CALIFORNIA

Nursing Continuing Education

Elite Learning
by Colibri Healthcare

Satisfies all continuing education requirements

30-hour Continuing Education Package

$38.95

ELITELEARNING.COM/BOOK

Complete this book online with book code: ANCCCA3023C

WHAT'S INSIDE

ALL COURSES SATISFY GENERAL HOURS REQUIREMENT

FREQUENTLY ASKED QUESTIONS

What are the requirements for license renewal?

Licenses Expire	Contact Hours	Mandatory Subjects
Licenses expire every two years on the last day of the birth month.	30 (All hours are allowed through home-study)	All non-managerial employees are required 1 hour of sexual harassment and abusive conduct prevention training once every two years. All managerial employees are required 2 hours.

How much will it cost?

If you are only completing individual courses in this book, enter the code that corresponds to the course below online.

COURSE TITLE	HOURS	PHARM HOURS	PRICE	COURSE CODE
Asthma: A Comprehensive Overview	4		$26.95	ANCCCA04AC
Basic Psychiatric Concepts	6		$35.95	ANCCCA06PC
Diabetes Prevention and Management for Healthcare Professionals	5		$29.95	ANCCCA05DM
Ethics and Moral Distress for Healthcare Professionals	4		$26.95	ANCCCA04EM
Evidence-Based Implicit Bias Implications for Physicians and Healthcare Professionals	1		$12.95	ANCCCA01IB
Hypertension Management: Evidence-Based Guidelines	4	4	$31.95	ANCCCA04HT
Nursing Assessment, Management and Treatment of Autoimmune Diseases	6		$35.95	ANCCCA06AD
Best Value - Save $161.70 - All 30 Hours	**30**		**$38.95**	**ANCCCA3023C**

How do I complete this course and receive my certificate of completion?
See the following page for step by step instructions to complete and receive your certificate.

Are you a California board-approved provider?
Yes, Colibri Healthcare, LLC is a board-approved provider of continuing education by the Department of Consumer Affairs, California Board of Registered Nursing, (Provider #CEP17480); California Board of Vocational Nursing and Psychiatric Technicians (LVN Provider #V15058 & PT Provider #V15020). In addition, Colibri Healthcare, LLC is accredited as a provider of nursing continuing professional development by the American Nurses Credentialing Center's Commission on Accreditation.

Are my credit hours reported to the California board?
No. The board performs random audits at which time proof of continuing education must be provided.

What information do I need to provide for course completion and certificate issuance?
Please provide your license number on the test sheet to receive course credit. Your state may require additional information such as date of birth and/or last 4 of Social Security number; please provide these, if applicable.

Is my information secure?
Yes! We use SSL encryption, and we never share your information with third-parties. We are also rated A+ by the National Better Business Bureau.

What if I still have questions? What are your business hours?
No problem, we have several options for you to choose from! Online at EliteLearning.com/Nursing you will see our robust FAQ section that answers many of your questions, simply click FAQs at the top of the page, e-mail us at office@elitelearning.com, or call us toll free at 1-866-344-0971, Monday - Friday 9:00 am - 6:00 pm, EST.

Important information for licensees:
Always check your state's board website to determine the number of hours required for renewal, and the amount that may be completed through home-study. Also, make sure that you notify the board of any changes of address. It is important that your most current address is on file.

Licensing board contact information:

California Board of Registered Nursing
1747 N. Market Blvd., Suite 150 | Sacramento, CA 95834-1924
Phone (916) 322-3350 | Fax (916) 574-7699
Website: http://www.rn.ca.gov/

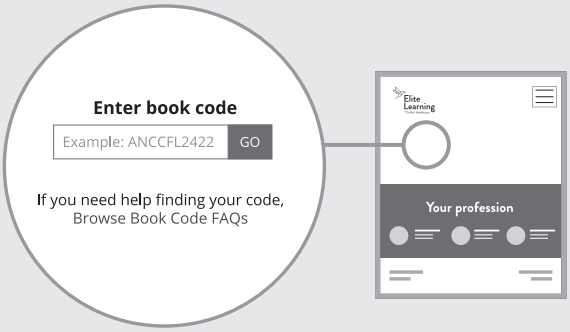
California Board of Vocational Nursing and Psychiatric Technicians
2535 Capitol Oaks Drive, Suite 205 | Sacramento, CA 95833
Phone (916) 263-7800 | Fax (916) 263-7855
Website: http://www.bvnpt.ca.gov/

HOW TO COMPLETE THIS BOOK FOR CREDIT

Please read these instructions before proceeding.

IF YOU'RE COMPLETING ALL COURSES IN THIS BOOK:

- Go to EliteLearning.com/Book and enter code **ANCCCA3023C** in the book code box, then click **GO**.
- If you already have an account created, sign in with your username and password. If you don't have an account, you'll be able to create one now.
- Follow the online instructions to complete your final exam. Once you finish your purchase, you'll receive access to your completion certificate.



IF YOU'RE ONLY COMPLETING CERTAIN COURSES IN THIS BOOK:

- Go to **EliteLearning.com/Book** and enter code that corresponds to the course below, then click GO.
  Each course will need completed individually

COURSES YOU'VE COMPLETED	CODE TO ENTER
All 30 hours in this correspondence book	**ANCCCA3023C**
Asthma: A Comprehensive Overview	ANCCCA04AC
Basic Psychiatric Concepts	ANCCCA06PC
Diabetes Prevention and Management for Healthcare Professionals	ANCCCA05DM
Ethics and Moral Distress for Healthcare Professionals	ANCCCA04EM
Evidence-Based Implicit Bias Implications for Physicians and Healthcare Professionals	ANCCCA01IB
Hypertension Management: Evidence-Based Guidelines	ANCCCA04HT
Nursing Assessment, Management and Treatment of Autoimmune Diseases	ANCCCA06AD

By mail

- Fill out the answer sheet and evaluation found in the back of this booklet. Please include a check or credit card information and e-mail address. Mail to Elite, **PO Box 37, Ormond Beach, FL 32175**.
- Completions will be processed within 2 business days from the date it is received and certificates will be e-mailed to the address provided.
- Submissions without a valid e-mail will be mailed to the address provided.

By fax

- Fill out the answer sheet and evaluation found in the back of this booklet. Please include credit card information and e-mail address. Fax to **(386) 673-3563**.
- All completions will be processed within 2 business days of receipt and certificates e-mailed to the address provided.
- Submissions without a valid e-mail will be mailed to the address provided.

Asthma: A Comprehensive Overview

4 Contact Hours

Release Date: June 28, 2021

Expiration Date: June 28, 2024

Faculty

Judith Quaranta, PhD, RN, CPN, AE-C, FNAP, is an Associate Professor in the Decker College of Nursing and Health Sciences, Binghamton University. She received her PhD from the Decker School of Nursing, with her dissertation focusing on asthma management for school nurses. Dr. Quaranta's research focus is on barriers and facilitators for asthma management as well as factors that impact asthma and asthma development. As a Train the Trainer for the American Lung Association's *Open Airways for Schools* curriculum, she has worked collaboratively with the Broome County Health Department, the Asthma Coalition of the Southern Tier, United Health Services Hospital, and the local American Lung Association to implement this program in local schools. She has presented at multiple national conferences on the topic of asthma and self-management and authored manuscripts for journals including the *Public Health Nursing, Journal of School Nursing, Journal of Asthma and Allergy Educators, Online Journal of Rural Nursing, Journal of Family Social Work, Journal of Interprofessional Care*, in addition to authoring textbook chapters on research and community and public health.

Judith Quaranta has disclosed that she has no significant financial or other conflicts of interest pertaining to this course.

Reviewer: Karen Meyerson, MSN, RN, FNP-C, AE-C, is Director of Commercial Care Management for Priority Health, the second largest health plan in the state of Michigan. Karen previously served as Manager of the Asthma Network of West Michigan (ANWM), a nationally recognized asthma coalition serving western Michigan. She has served as a national speaker/consultant and has lectured extensively on asthma for professional and lay audiences. Karen graduated with her Bachelor of Science degree in nursing from the University of Wisconsin-Madison and her Master of Science degree in Nursing from Grand Valley State University in Grand Rapids, Michigan. A board-certified family nurse practitioner, Karen specialized in asthma and allergies in private practice for 9 years. At the national level, Karen was elected to the National Asthma Educator Certification Board (NAECB), where she now serves as an Emeritus member, and has presented on asthma-related issues at Congressional Briefings on Capitol Hill in Washington, DC.

Karen Meyerson has disclosed that she has no significant financial or other conflicts of interest pertaining to this course.

Course overview

This course defines asthma and frames its discussion in accordance with the Expert Panel Report 3 ([EPR3]; National Heart, Lung, and Blood Institute [NHLBI], 2007), the 2020 Focused Updates to the EPR3 (Expert Panel Working Group of the NHLBI et al., 2020), and the Global Initiative for Asthma ([GINA]; 2020), which together comprise the most recent asthma guidelines. Updated research has been included to supplement these documents. This course introduces the learner to the state of asthma globally and nationally. Asthma prevalence and cost burden to society will be discussed. National objectives for asthma management will be presented. This course also focuses on the definition, pathophysiology, consequences of lack of control, and clinical signs and symptoms of asthma. Common asthma triggers as well as individual and family education regarding basic environmental control are also discussed. The content reflects current research findings and evidence-based practice guidelines.

Learning objectives

After completing this course, the learner will be able to:

- Analyze the current trends for prevalence and societal burdens of asthma.
- Evaluate national and global goals for the management of asthma.
- Distinguish risk and protective factors in the development of asthma.
- Differentiate the protective factors for asthma.
- Examine the evolving medical understanding and definition of asthma.
- Distinguish asthma phenotypes.
- Analyze the components of asthma pathophysiology.
- Illustrate the process for diagnosing asthma.Evaluate asthma triggers and strategies for controlling the triggers.
- Distinguish components of individualized education on trigger management.

How to receive credit

- Read the entire course online or in print which requires a 4-hour commitment of time.
- Complete the self-assessment quiz questions which are at the end of the course or integrated throughout the course. These questions are NOT GRADED. The correct answer is shown after you answer the question. If the incorrect answer is selected, the rationale for the correct answer is provided. These questions help to affirm what you have learned from the course.
- Depending on your state requirements you will be asked to complete either:
  - An affirmation that you have completed the educational activity.
  - A mandatory test (a passing score of 70 percent is required). Test questions link content to learning objectives as a method to enhance individualized learning and material retention.
- If requested, provide required personal information and payment information.
- Complete the MANDATORY Course Evaluation.
- Print your Certificate of Completion.

CE Broker reporting

Colibri Healthcare, LLC, provider # 50-4007, reports course completion results within 1 business day to CE Broker. If you are licensed in Arkansas, District of Columbia, Florida, Georgia, Kentucky, Michigan, Mississippi, New Mexico, North Dakota, South Carolina, or West Virginia, your successful completion results will be automatically reported for you.

Accreditations and approvals

Colibri Healthcare, LLC is accredited as a provider of nursing continuing professional development by the American Nurses Credentialing Center's Commission on Accreditation.

Individual state nursing approvals

Colibri Healthcare, LLC is accredited as a provider of nursing continuing professional development by the American Nurses Credentialing Center's Commission on Accreditation. In addition to states that accept courses offered by ANCC accredited Providers, Colibri Healthcare, LLC is an approved Provider of continuing education in nursing by: Alabama Board of Nursing, Provider #ABNP1418 (valid through February 5, 2025); Arkansas State Board of Nursing, Provider #50-4007; California Board of Registered Nursing, Provider #CEP17480 (valid through January 31, 2024); California Board of Vocational Nursing and Psychiatric Technicians (LVN Provider # V15058, PT Provider #V15020; valid through December 31, 2023); District of Columbia Board of Nursing, Provider #50-4007; Florida Board of Nursing, Provider #50-4007; Georgia Board of Nursing, Provider #50-4007; Kentucky Board of Nursing, Provider #7-0076 (valid through December 31, 2023; CE Broker provider #50-4007). Michigan Board of Nursing, Provider #50-4007; Mississippi Board of Nursing, Provider #50-4007; New Mexico Board of Nursing, Provider #50-4007; North Dakota Board of Nursing, Provider #50-4007; South Carolina Board of Nursing, Provider #50-4007; and West Virginia Board of Registered Nurses, Provider #50-4007. This CE program satisfies the Massachusetts States Board's regulatory requirements as defined in 244 CMR5.00: Continuing Education.

Activity director

Shirley Aycock, DNP, RN, Executive Director of Quality and Accreditation

Disclosures

Resolution of conflict of interest
In accordance with the ANCC Standards for Commercial Support for continuing education, Colibri Healthcare, LLC implemented mechanisms prior to the planning and implementation of the continuing education activity, to identify and resolve conflicts of interest for all individuals in a position to control content of the course activity.

Sponsorship/commercial support and non-endorsement
It is the policy of Colibri Healthcare, LLC not to accept commercial support. Furthermore, commercial interests are prohibited from distributing or providing access to this activity to learners.

Disclaimer

The information provided in this activity is for continuing education purposes only and is not meant to substitute for the independent medical judgment of a healthcare provider relative to diagnostic and treatment options of a specific patient's medical condition.

Course verification

All individuals involved have disclosed that they have no significant financial or other conflicts of interest pertaining to this course. Likewise, and in compliance with California Assembly Bill No. 241, every reasonable effort has been made to ensure that the content in this course is balanced and unbiased.

ASTHMA TRENDS AND COSTS

Asthma prevalence

Asthma is a disease characterized by chronic airway inflammation. It is a heterogeneous disease, meaning that asthma is no longer considered a single entity disease but rather a complex biological network of distinct and interrelating inflammatory pathways. An asthma diagnosis encompasses several processes with distinct mechanistic pathways (endotypes) and variable clinical presentations (phenotypes). Understanding these variations is crucial for appropriate asthma management (Kuruvilla et al., 2019). Diagnosis is based on the history of respiratory symptoms, such as wheeze, shortness of breath, chest tightness, and cough, which vary over time and in intensity with variable expiratory airflow limitation (GINA, 2020). Asthma, as a lifelong disease, can be controlled with proper management, thus preventing many adverse outcomes associated with this chronic condition. Key tasks in the study of asthma include determining who is affected by this disease (distribution) and what that entails, identifying risk factors associated with the development and severity of asthma (determinants), and exploring preventive and therapeutic interventions (Friis, 2018).

Asthma is a major public health issue worldwide. Globally, 339 million people had asthma in 2016 (World Health Organization [WHO], 2020). In the United States, 7.7% (19.2 million) of the adult population has an asthma diagnosis (Centers for Disease Control and Prevention [CDC], 2020c). Consistent with global trends, the number of people diagnosed with asthma in the United States has steadily increased since the 1980s in all age, sex, and racial groups (Asthma and Allergy Foundation of America [AAFA], 2019b). Industrialized countries – such as Canada, England, Australia, Germany, and New Zealand – have higher rates of asthma prevalence and asthma severity than do nonindustrialized countries, especially in children older than 6 years of age. Factors implicated in this increase include urbanization, air pollution, exposure to passive smoking, and change in exposure to environmental allergens (Soto-Martinez, 2017).

Asthma prevalence refers to the number of people affected and varies among populations. Statistics from the United States show asthma prevalence for children younger than 18 years at 7.5% (5.5 million). However, this varies significantly by age group. Whereas children ages 0 to 4 years have a low prevalence of 3.8%, this increases dramatically to 11% for 15- to 19-year olds. Asthma is more prevalent among males during childhood but among females during adulthood. Non-Hispanic African

American, American Indian and Alaska Natives, and Puerto Rican children have the highest asthma rates of all groups, at 9.6%, 10.5%, and 14.2%, respectively (CDC, 2020c). The good news is that asthma prevalence among children has not increased in recent years, and the disparity between non-Hispanic African American children and White children has plateaued. Poverty increases the risk for asthma, with 10.8% of all people below the federal poverty level having an asthma diagnosis (CDC, 2020c).

Asthma-related deaths

Several factors have been identified that increase the risk of asthma-related death. These include (GINA, 2020):

- A history of near-fatal asthma requiring intubation and mechanical ventilation
- Hospitalization or emergency care for asthma in the past year
- Currently using or recently stopped the use of oral corticosteroids
- Not currently using inhaled corticosteroids
- Overuse of short-acting beta agonists (SABAs)
- History of psychiatric illness or psychosocial issues
- Poor adherence with asthma medications and/or poor adherence to or lack of an asthma management plan
- Food allergy or anaphylaxis in a patient with asthma

Risk for asthma-related mortality in the United States may be related to underestimation of asthma severity. Kritikos and colleagues (2019) found that patients who inaccurately reported "well-controlled" asthma were 14 times more likely to have taken 5 to 12 puffs or more from an asthma inhaler in a single day within the previous 4 weeks, nine times more likely to be female, nearly nine times more likely to have required oral corticosteroids for worsening asthma in the previous year, and nearly four times more likely to have seen a respiratory specialist more than a year ago rather than in the previous year. Furthermore, if someone incorrectly believes that their asthma is under control, they are less likely to adhere to their asthma treatment plan. Lycett and colleagues (2018) conducted a systematic review and found that beliefs about the necessity for asthma treatment and concerns about treatment were associated with adherence. Medication issues, including side effects and concerns about addiction, as well as social stigma and embarrassment led to undertreatment of asthma.

Self-Assessment Quiz Question #1

Which of the following is true regarding asthma prevalence?

a. Prevalence rates of asthma have increased more in industrialized countries than nonindustrialized countries.
b. Puerto Rican children have the lowest asthma prevalence rates.
c. Prevalence rates are higher for girls during childhood.
d. Asthma prevalence in children continues to increase.

Personal and societal costs of asthma

Uncontrolled asthma gives rise not only to personal burdens but also to social and financial ones. Uncontrolled asthma often is treated in a hospital's emergency department (ED). The CDC reported 1.6 million ED visits and 182,620 hospitalizations in 2017 (CDC, 2020b). The overall rate of asthma-related physician office visits was 307.8 per 10,000 in 2016. However, non-Hispanic African Americans had a higher ED utilization of 482.2 per 10,000 for the period 2014 to 2016. In 2017, 43% of adults (18 years and older) with asthma and 53.8% of children (younger than 18 years) with asthma reported one or more asthma attacks in the past 12 months. Death rates in 2018 from asthma were 12.8 per 1 million adults and 2.6 per 1 million children (CDC, 2020a, 2020c, 2021).

The overall burden of costs associated with asthma is high, but it could be significantly reduced with appropriate diagnosis, management, and treatment. The total annual cost of asthma in the United States, including medical care, absenteeism and mortality, was $81.9 billion when examining expenditures from 2008 to 2013. Per-person medical cost of asthma was $3,266, which included $1,830 for prescriptions, $640 for office visits, $529 for hospitalizations, $176 for hospital outpatient visits, and $105 for ED care. Asthma-related mortality costs were $29 billion per year, representing on average 3,168 deaths. Missed work and school days combined cost $3 billion per year, accounting for 8.7 million workdays and more than 5.2 million school days lost because of asthma. However, these costs may be underestimated as nonmedical costs associated with asthma, including transportation expenses, time lost waiting for appointments, and diminished productivity while functioning at work or school with asthma, were not included (Nurmagambetov et al., 2018).

Evidence-based practice! A recent study examined the cost benefit of a nurse-supervised community health worker asthma home-visiting program, exploring the reduction in asthma treatment costs using claims data from one Medicaid managed care organization. The data was used to determine asthma-related utilization cost reductions between 1-year preintervention and 1-, 2-, and 3-years postintervention. The cost reductions were compared for patients receiving home visits and patients not receiving home visits for asthma. Results indicated that those patients receiving the home visits had statistically significant cost savings for healthcare utilization, which improved each year of the intervention. The reduction in asthma utilization costs of the home visit program by nurse-supervised community health workers exceeded program costs. The findings support the business case for the provision of secondary prevention of home-based asthma services through reimbursement from payers or integration into accountable care organizations (Bhaumik et al., 2020).

NATIONAL AND GLOBAL GOALS FOR ASTHMA MANAGEMENT

Healthy People 2030

Healthy People is a national initiative with targeted clinical and public health goals to improve the health and well-being of individuals, organizations, and communities, and it includes reducing asthma burden. This initiative first began in 1979 with the release of *Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention*, focusing on reducing preventable death and injury. Quantifiable objectives to achieve national health promotion and disease prevention goals for the United States within a 10-year period (by 1990) were developed and tracked. This report was later followed by updated, 10-year Healthy People goals and objectives, including *Healthy People 2000, Healthy People 2010*, and *Healthy People 2020*. Healthy People 2030 builds upon previous knowledge gained over the past 4 decades (US Department of Health and Human Services [HHS], 2020).

The overarching goals of Healthy People 2030 are pertinent to asthma (HHS, 2020):

- Attain healthy, thriving lives and well-being free of preventable disease, disability, injury, and premature death.
- Eliminate health disparities, achieve health equity, and attain health literacy to improve the health and well-being of all.
- Create social, physical, and economic environments that promote attaining the full potential for health and well-being for all.
- Promote healthy development, healthy behaviors, and well-being across all life stages.

- Engage leadership, key constituents, and the public across multiple sectors to take action and design policies that improve the health and well-being of all.

Self-Assessment Quiz Question #2

Which of the following is true concerning the high cost of asthma?

a. Reported costs for asthma are usually overestimated.
b. Overall asthma costs include transportation expenses.
c. The highest cost burden for asthma is prescription costs.
d. Costs related to mortality are not included in the overall cost of asthma.

For each new version of Healthy People, changes are made based on feedback from a diverse group of individuals and organizations. Healthy People 2030 has reduced the number of objectives to avoid overlap and prioritize what is considered the most pressing public health issues. The current Healthy People 2030 objectives addressing asthma include reducing asthma deaths, hospitalizations, and ED visits (HHS, n.d.a.). Objectives removed from Healthy People 2020 include reductions in activity limitations and school and work days missed; increasing formal asthma education, written asthma management plans, and instruction on the use of inhalers; environment and trigger management; follow-up visits; and assessment of asthma control (HHS, n.d.b). Although these are no longer specific objectives of Healthy People 2030, these activities are still vital to reducing the burden of asthma.

National Asthma Education and Prevention Program asthma guidelines

The National Asthma Education and Prevention Program (NAEPP) was initiated in 1989 to address the growing national health problem of asthma. NAEPP convenes diverse stakeholders with an interest in improving asthma management to address this national health concern through development of standards of care. The goals of the NAEPP include raising awareness of asthma as a serious chronic condition and encouraging collaboration among patients, health professionals, and the public. Emphasis is on the recognition of the signs and symptoms of asthma through treatment and education to ensure effective asthma control. The outcomes of this initiative focus on quality of life for those with asthma, reducing the burden of asthma, and decreasing asthma-related deaths. The NAEPP first developed guidelines for diagnosing and managing asthma in 1991, followed by revisions in 1997, 2002, 2007, and 2020. The most recent update to these guidelines, the 2020 Focused Updates to the Asthma Management Guidelines, provides guidance on six selected topic areas (NAEPP, n.d.).

Global Initiative for Asthma

GINA was established by the WHO and the NHLBI in 1993 with the focus to increase awareness about asthma among health professionals, public health authorities, and the community. The goal is to improve asthma prevention and management through a coordinated worldwide effort. GINA prepares scientific reports on asthma, encourages dissemination and implementation of the recommendations, and promotes international collaboration on asthma research. The GINA report, updated annually, provides evidence-based strategies for managing asthma for translation into practice. GINA strategy has a strong focus on preventing asthma-related deaths and severe exacerbations, and on efficacy and effectiveness of asthma management and treatment options for symptom control and lung function. The guidelines promote individualized treatment decisions based on asthma severity (Reddel et al., 2019).

Self-Assessment Quiz Question #3

The asthma objectives of Healthy People 2030 include:

a. Referral of all persons with asthma to a specialist.
b. Reduced ED visits.
c. Instruction on the use of inhalers.
d. Administration of the influenza vaccine.

RISK FACTORS FOR ASTHMA DEVELOPMENT

Although the exact cause of asthma is unknown, several risk factors have been implicated in its development. The American Lung Association lists the following influences (ALA, 2020a):

- Having a parent with asthma
- Viral respiratory infections during infancy and childhood
- Allergic conditions such as atopic dermatitis (eczema) or allergic rhinitis (hay fever)
- Workplace exposures
- Smoking
- In utero exposure to tobacco smoke
- Secondhand exposure to tobacco smoke during childhood
- Indoor and outdoor air pollution
- Obesity

Additional risk factors have been identified. These include maternal weight gain during pregnancy, urogenital infections, psychological stress, and cesarean section. Preterm birth, birth weight, and neonatal hyperbilirubinemia are also risk factors for asthma (dos Santos & Isoppo, 2019). Although these factors increase a person's risk for developing the disease, there are additional factors, such as poverty and lack of health insurance, that contribute to more asthma symptoms, ED visits, and hospitalizations (ALA, 2020a).

The ability to accurately predict which children will develop asthma is challenging. The Asthma Predictive Index (API), the most commonly used predictive tool, identifies risk factors for developing persistent asthma among children younger than 3 years of age who have wheezed at least once. Major criteria include either parental history of asthma or a physician diagnosis of atopic dermatitis (eczema). Minor criteria include clinician-diagnosed allergic rhinitis, wheezing apart from colds, and eosinophilia ≥4%. A positive loose index was defined as any parental report of wheezing at 2 or 3 years of age and either one major criterion or two minor criteria. A positive stringent index was defined as frequent wheezing plus the same combination of major or minor criteria. Children with a positive loose index were four times more likely to have active asthma at 6, 8, 11, or 13 years of age. Children with a positive stringent index were seven times more likely to have active asthma (Guilbert & Lemanske, 2019). A modified version of the Asthma Predictive Index (mAPI) was developed with the following criteria: recurrent wheezing in preschool children (four or more episodes with at least one physician diagnosis) with one major criterion (parental history of asthma, history of atopic dermatitis, or allergic sensitization to ≥1 aeroallergen); or two of three minor criteria (allergic sensitization to milk, egg, or peanuts; wheezing unrelated to colds; or eosinophils ≥4%; Hossny, 2020).

Biagini Myers and colleagues (2019) developed a quantitative tool to predict asthma development in young children, the Pediatric Asthma Risk Score (PARS). Although the API, mAPI, and PARS all predicted asthma development in high-risk children, the PARS was able to reliably predict asthma with mild to moderate asthma risk. The PARS risk factors are parental asthma, eczema at ages 1 to 3 years, early wheezing at ages 1 to 3 years, wheezing apart from colds, polysensitization (aeroallergens or food allergens), and African ancestry.

The role of genetics in the development of asthma is currently being studied. It is currently thought that asthma is likely transmitted by multiple genes. Different genes in different

individuals have been shown to lead to the same phenotype. Some genes may influence the development of asthma, whereas others modify asthma severity or the patient's response to therapy. Genetic influences may also play a role in an individual's response to specific medications. Additionally, interactions between genetic factors and environmental influences further complicate understanding. Studies with twin siblings raised together suggest that differences in exposure to certain environmental triggers may account for some of the disparity of disease expression. Other studies have demonstrated that genes and the environment contribute equally to asthma. The interaction of specific genes and early life tobacco smoke exposure is being investigated. The presence of a specific gene variant was found to increase the risk of early-onset asthma. This risk was further increased by early life tobacco smoke exposure. An association has also been found between specific genes and increased airway responsiveness and increased asthma exacerbation rates related to dust mite exposure (Barnes, 2020).

Children

Asthma is a leading chronic illness among children and adolescents in the United States. It is also one of the leading causes of school absenteeism (CDC, 2019a). On average, 1 out of every 12 school-aged children has asthma. Although the percentage of children with asthma who had an asthma attack declined from 2001 to 2016, nearly half of children with diagnosed asthma had one or more asthma attacks in 2016. Among children who were taking asthma control medicines, only 54.5% were using their control medicines regularly as prescribed (Zahran et al., 2018). More males under the age of 18 years have asthma (8.3%) compared with females (6.7%). This then reverses for those older than 18 years, with 5.5% of men having asthma compared with 9.8% of women (CDC, 2020c). Several risk factors for asthma development in childhood have been identified.

Atopy, which is the genetic tendency to develop allergic diseases such as asthma, is associated with heightened immune responses to common allergens, especially inhaled allergens and food allergens (American Academy of Allergy, Asthma, and Immunology [AAAAI], n.d.a). Family history of atopy is one of the most relevant risk factors for developing asthma. Almost 60% of schoolchildren with asthma are allergic, mainly to perennial allergens such as house dust mites, animal dander, and molds. Aeroallergen sensitization before the age of 5 years was found to significantly increase the risk of asthma, with persistence into adolescence (Ferrante & La Grutta, 2018).

Reduced microbial exposure since early life through improved sanitation and increased rates of immunization have been linked to the increased prevalence of asthma observed in childhood. This has been referred to as the "hygiene hypothesis." Living in environments with little exposures to microbes is thought to result in an understimulation of the immune system, increasing the likelihood of developing allergic disease. Conversely, certain respiratory viral infections in early life have been implicated in asthma development. Respiratory syncytial virus (RSV) and human rhinovirus (HRV) are most frequently associated with wheezing episodes in preschool children and with future asthma development. Additionally, infections by atypical bacteria, such as *Mycoplasma pneumoniae* and *Chlamydia pneumoniae*, may play a role in inducing and exacerbating asthma (Ferrante & La Grutta, 2018).

Environmental exposures also increase the risk for childhood asthma. Exposure to both outdoor and indoor pollutants has been associated with increased asthma exacerbations, rates of hospitalization, and reduced lung function. The most dangerous environmental exposure in children derives from environmental tobacco smoke (ETS) during the prenatal and postnatal periods. The use of electronic cigarettes has been associated with asthma symptoms in adolescents (Ferrante & La Grutta, 2018). There is also evidence that indoor dampness and molds are associated with increased asthma risk (von Mutius & Smits, 2020).

A significant association has been reported between obesity and asthma. Prenatal factors such as maternal stress, weight gain, or obesity during pregnancy, and mother's and child's use of antibiotics may play a role in increasing the risk of asthma. Cesarean birth has also been implicated for risk of asthma development. Prematurity and low birth weight have also been shown to be associated with subsequent asthma, but these findings may be confounded by neonatal chronic lung disease (von Mutius & Smits, 2020).

Adults

The onset of asthma can occur at any time in life. Those who develop asthma as adults (adult-onset asthma) usually have persistent symptoms and require daily medications. Women are more likely to develop asthma after the age of 20 years and during pregnancy or menopause, as onset appears to be related to hormonal changes. Obesity also increases the risk for adult-onset asthma. Someone with asthma as a child might see a reoccurrence as an adult. Allergies are the cause of 30% of cases of adult-onset asthma. Cat allergies increase the risk for onset of asthma as an adult. Prolonged exposure to workplace chemicals also has been implicated in the development of asthma as an adult. Viral illnesses also can be causative for adult-onset asthma (AAFA, New England Chapter, n.d.). Healthy People 2030 objectives related to adults with asthma are similar to those listed for children.

Racial and ethnic disparities

Racial and ethnic disparities in asthma outcomes are well-documented. Nearly 25 million people in the United States are living with asthma, but prevalence rates differ significantly by race and ethnicity. Puerto Ricans have the highest rate of asthma of all racial or ethnic groups in the United States. African Americans are also disproportionally diagnosed with asthma compared with White Americans. African American individuals are nearly three times as likely to die from asthma than White individuals. Asthma-related ED visits are nearly five times as high for African American patients compared with White patients (AAFA, 2020).

The AAFA identifies the complex interaction of social, structural, biological, and behavioral determinants of health as the resultant cause of these disparities. Social determinants include economic stability, education, physical environment, social environment, and healthcare. Structural determinants of health relate to US policies, governance, and culture and include systemic racism and discrimination, residential segregation and discriminatory housing policies, discriminatory hiring and promotion, and environmental injustice. At least some of the differences in asthma outcomes can also be attributed to potential genetic factors. Daya and colleagues (2019) identified two novel regions on a specific chromosome in individuals with African ancestry that may be linked to asthma risk. Additionally, an individual's behaviors play a substantial role in determining asthma outcomes. Historical exploitation of African American bodies in unethical medical experiments, including the Tuskegee Study, has led to lasting, intergenerational distrust of the medical establishment among African American families (AAFA, 2020).

Self-Assessment Quiz Question #4

Young children are particularly at risk for asthma if they:

a. Are thin.
b. Live with adults who smoke.
c. Live in an unsanitary environment.
d. Take their controller medications as prescribed.

The following studies provide evidence that disparities in asthma outcomes may not be because of race or ethnicity but rather those determinants that affect health status, including socioeconomic status (SES) and housing conditions. Levy and colleagues (2018) conducted a review to evaluate the evidence supporting a link between environmental exposures and health disparities. Findings suggest that co-occurring factors related to the home environment, neighborhood environment, nonmodifiable individual factors, and individual behaviors and attributes can increase or modify the risk of adverse respiratory outcomes among socioeconomically disadvantaged and racially and ethnically diverse populations. Indoor pollutants, including particulate matter, nitrogen dioxide, and pesticides, were found to be elevated among lower SES populations, implicated in the development or exacerbation of respiratory-related conditions. Neighborhood crime and the scarcity of green space were associated with SES and linked with asthma outcomes. Genetic predisposition was found to potentially increase susceptibility to air pollution and other stressors. Individual behaviors and attributes, including obesity and physical activity, also contributed to worse outcomes among those with asthma. Glick and colleagues (2016) found that race and ethnicity were not associated with inpatient asthma mortality. The hospital length stay was longer in children with public insurance and from low-income areas.

PROTECTIVE FACTORS IN ASTHMA DEVELOPMENT

Protection from asthma can be either absence of risk or specific protective exposures that might be needed for normal, healthy development. Intake of fish oil, zinc, and vitamin E during pregnancy appear as protective factors, as well as breastfeeding, fish intake in the first 2 years, and BCG (Bacillus Calmette-Guérin) vaccination (dos Santos & Isoppo, 2019). Day-care attendance during the first 6 months of life may reduce the risk of asthma in school-aged children, possibly related to exposure to other children and increased exposure to diverse microbes (Rantala et al., 2020). Growing up on farms has also shown to be protective in asthma development, possibly related to exposures to high concentrations of allergens, plant and animal materials, and bacteria, fungi, and other microbes in the environment. In children at risk for asthma, more than 80% reduction in risk was found with continued high exposure to animal sheds. Farm upbringing was also strongly inversely associated with multiple asthma-related traits, such as allergic sensitization, respiratory infections, and reduced lung function (von Mutius & Smits, 2020). When comparing rural and urban children in China, Feng and colleagues (2016) found the prevalence of physician-diagnosed asthma was lower in children from the rural areas. The authors concluded that early life exposure to crop farming and high environmental endotoxin levels might be protective in preventing asthma in these children. This is related to the hygiene theory, discussed previously, suggesting that exposure to germs would be protective for an individual's development of asthma.

Evidence-based practice! A secondary analysis of the 2011 American Housing Survey was conducted to determine if racial disparities in pediatric asthma are explained by material hardship and home ownership. A total of 33,201 households with children ages 6 to 17 years were surveyed for childhood asthma diagnosis and ED visits for asthma (for the youngest child with asthma in the household). Material hardship was defined as poor housing quality, crowded housing, lack of amenities, and no vehicle access. Results found that non-Hispanic African American heads of household were more likely to have a child diagnosed with asthma in the home, compared with non-Hispanic White heads of household, and a higher likelihood of ED visits for asthma. The race-asthma association was decreased but not eliminated after adjusting for material hardship and home ownership. Poor housing quality was independently associated with an asthma diagnosis and ED visits. Home ownership was associated with a lower likelihood of asthma-related ED visits. The authors concluded that racial disparities in pediatric asthma are lessened after controlling for material hardship. Poor housing quality in particular is strongly associated with asthma morbidity (Hughes et al., 2017).

Stein and colleagues (2016) compared two farming communities, the Amish and the Hutterites. Their lifestyles are similar; however, whereas the Amish practice traditional farming, live on single-family dairy farms, and use horses for fieldwork and transportation, the Hutterites live on large, highly industrialized, communal farms. The prevalence of asthma in Amish versus Hutterite schoolchildren is 5.2% versus 21.3%. The authors relate this stark difference to microbe exposure from traditional farming.

Protective factors must also be considered for those already diagnosed with asthma. Chen and colleagues (2019) evaluated the impact of family relationships on asthma outcomes for youth who live in dangerous and/or disorderly neighborhoods. They found that when neighborhood danger and/or disorder was low, family relationships were not associated with asthma. When neighborhood danger and/or disorder was high, better family relationship quality was associated with fewer asthma symptoms, fewer activity limitations, and higher percentile for FEV1 (forced expiratory volume in 1 s). Similar patterns emerged for asthma management behaviors. When youth live in dangerous and/or disorderly neighborhoods, high-quality family relationships can buffer youth from poor asthma outcomes.

Evidence-based practice! Researchers wanted to find out if green space lowers a child's asthma risk in areas with heavy traffic. Data from 4,447 children ages 6 to 7 years old in Australia was analyzed. The children included in the study had to have doctor-diagnosed asthma, asthma-related medications, and illness with wheezing lasting for at least 1 week within the 12 months before the study. Findings revealed that among children exposed to high traffic volumes in areas with 0% to 20% green space, asthma rates were almost two times higher. However, the association between high traffic and asthma was significantly lower for children living in areas with over 40% green space. No association between asthma and green space was observed for children not exposed to high traffic. The researchers concluded that protecting existing and investing in new green space may help to promote child respiratory health through the buffering of traffic-related air pollution (Feng & Astell-Burt, 2017).

THE EVOLVING MEDICAL UNDERSTANDING AND DEFINITION OF ASTHMA

History of asthma

Asthma has been around for a long time. Described as noisy breathing, asthma was first recorded by the ancient Chinese in 2600 B.C.E. The ancient Egyptians mentioned breathlessness and symptoms of respiratory distress, with treatments including inhalation of heated herbs. Asthma symptoms were also noted by the ancient Babylonians, who recorded them in the Code of Hammurabi in 1792 B.C.E. (Cannizzaro, 2017; Felman, 2018).

In the 19th century, Henry Hyde Salter, who himself had this disease, defined asthma as paroxysmal dyspnea of a peculiar character with intervals of healthy respiration between attacks. This was a nonspecific diagnosis, which allowed for the treatment of many "asthmas." As a treatment for asthmatic spasms, he described black coffee, which actually contained a derivative of theophylline, a medication used to treat asthma today (Kim, n.d.).

By the late 19th century, physicians adopted the view that asthma was a distinct disease with a specific set of causes, clinical consequences, and requirements for treatment. Sir William Osler, considered the father of modern medicine in the Western world, described asthma in his 1892 edition of the textbook *Principles and Practice of Medicine*. Osler noted the similarities between asthma and allergic conditions. Bronchial muscle spasms, swelling of the bronchial mucous membrane, and inflammation of bronchioles were identified as the underlying causes of symptoms. Osler discussed risk factors for asthma including family history, environmental exposures, emotions, and viral infections (Felman, 2018; Kim, n.d.).

Asthma, considered a disease of "bronchospasm" in the first part of the 20th century, was treated with bronchodilators. Unfortunately, their effectiveness in reversing bronchospasm and initial apparent safety led to an overreliance, with unrestricted access through over-the-counter purchase. This use has been implicated in the epidemic of asthma deaths in the mid-1960s and mid-1980s (Kim, n.d.). Allergy immunotherapy was also introduced during the same period for treating asthma (Patel, 2019).

In 1916, the realization that asthma could result from reasons other than allergy led to distinguishing allergic and nonallergic asthma triggers. Immunoglobulin E (IgE) was identified in 1921 with its correlation to allergic reactions in persons with asthma (Patel, 2019). IgE are antibodies produced by the immune system in response to an allergen, causing an allergic reaction. IgE is specific for each allergen, and someone can have multiple types of IgE antibodies if they have more than one allergy (AAAAI, n.d.b).

During the 1930s, skin tests for allergies could be performed so that particular environmental triggers could be identified (O'Donovan, 2019). The 1940s and 1950s saw increased use of aminophylline, adrenaline, and inhaled anticholinergics.

During the 1970s, inhaled corticosteroids became the foundation of asthma treatment. Peak flow meter development and lung function testing aided in asthma treatment. Increased understanding of the allergic reaction led to use of antileukotrienes, chromones, and anti-IgE therapies in more recent years (O'Donovan, 2019; Patel, 2019).

Current definition of asthma

Asthma is a chronic disease that causes a hyperresponse resulting in inflammation of the airways, which in turn results in a narrowing and swelling of the lungs. Asthma has many nonspecific symptoms, making it difficult to distinguish it from other respiratory diseases. Three components to define asthma include chronic airway inflammation, reversible airflow obstruction, and enhanced bronchial reactivity. These components represent the major pathophysiological events leading to the symptoms of wheezing, breathlessness, chest tightness, cough, and sputum production by which physicians clinically diagnose this disorder (Global Asthma Network, n.d., WHO, n.d.).

GINA (2020) defines asthma as a heterogenous disease characterized by chronic airway inflammation. It is defined by a history of respiratory symptoms that include wheezing, shortness of breath, chest tightness, and cough. These vary over time and in intensity, and they occur with variable airflow limitation. Asthma is deemed reversible and intermittent. As stated, the current asthma definition places the emphasis on the presence of inflammation and resulting symptoms. Asthma is considered a chronic inflammatory disorder of the airways involving several components, including mast cells, eosinophils, T lymphocytes, macrophages, neutrophils, and epithelial cells. This inflammation causes recurrent episodes of wheezing, breathlessness, chest tightness, and coughing, particularly at night or in the early morning, associated with widespread but variable reversible airflow obstruction. The inflammation also causes an associated increase in the existing bronchial hyperresponsiveness to a variety of stimuli (NHLBI, 2007).

Self-Assessment Quiz Question #5

The Global Initiative for Asthma (2020) and the Expert Panel Report 3 (NHLBI, 2007) describe asthma as a disease that is:

a. Acute and temporary.
b. Intermittent and severe.
c. Seasonal and autoimmune.
d. Chronic and inflammatory.

ASTHMA PHENOTYPES

As a heterogeneous disease, asthma has several different underlying disease processes. These are referred to as phenotypes, each of which has recognizable demographic, clinical, and/or pathophysiological characteristics (GINA, 2020). Phenotypes are differentiated as T2-high (eosinophilic airway inflammation) and non-T2-high groups (neutrophilic airway inflammation). It is believed that those individuals with non-T2-high asthma are more likely to be resistant to steroid therapy (Kuruvilla et al., 2019).

GINA (2020) identifies the most common phenotypes. Allergic asthma usually begins in childhood and is associated with either a personal or family history of allergic disease (e.g., eczema, allergic rhinitis, or food or drug allergy). Sputum reveals eosinophilic airway inflammation, which usually responds well to inhaled corticosteroids. Nonallergic asthma, as the name implies, is not associated with a history of allergy. Sputum from these patients may contain neutrophils or eosinophils, and does not usually respond well to inhaled corticosteroids. Adult-onset (i.e., late-onset) asthma occurs mainly in women. This asthma is usually nonallergic and does not respond well to inhaled corticosteroids. Asthma with persistent airflow limitation occurs in patients with long-standing asthma and is thought to be the result of airway remodeling, which will be discussed later in this section. Asthma with obesity displays prominent respiratory symptoms but little eosinophilic inflammation (GINA, 2020). The incidence of allergic asthma is highest in early childhood and steadily decreases with advancing age, whereas the incidence of nonallergic asthma is low until it peaks in late adulthood. After approximately 40 years of age, most of the new cases of asthma are nonallergic (Pakkasela et al., 2020).

It should be noted that no strong relationship has been found between specific pathological features and treatment responses. However, Kuruvilla and colleagues (2019) assert that understanding the distinct pathophysiologic mechanisms

(endotypes) allow for precision medicine to directly target the cause of symptoms for each phenotype.

In contrast with GINA (2020), Kuruvilla and colleagues (2019) view asthma phenotypes beyond demographic characteristics of allergic versus nonallergic, age of onset, disease severity, symptom triggers, inflammatory patterns, exacerbations, and airflow obstruction. Many of these categories are not distinct, and many overlap.

Self-Assessment Quiz Question #6

All asthma phenotypes:

a. Have the same underlying disease processes.
b. Can be categorized as either eosinophilic or neutrophilic inflammation.
c. Are allergic asthma.
d. Respond well to inhaled corticosteroids.

ASTHMA PATHOPHYSIOLOGY

Asthma impacts the respiratory system, which is characterized by the conducting zone and respiratory zone. The conducting zone goes from the nose to the bronchioles, and the respiratory zone, where gas exchange takes place, is from the alveolar duct to the alveoli. Asthma primarily involves the bronchial tree, which distributes air throughout the lungs to the alveolar sacs. The primary bronchi stem from the end of the trachea and then divide into secondary and tertiary bronchi. Bronchi contain smooth muscle and elastic fibers to maintain their wall integrity, which changes based on the contraction and relaxation of smooth muscle. In patients with asthma, the physiologic mechanism changes because of inflammation, decreasing the radius of the airway (Sinyor & Concepcion Perez, 2020).

Asthma is an obstructive airway disorder of the lower airways. This means that expiratory airflow is limited because of narrowing of the airways. In asthma, which is intermittent and reversible, obstruction is caused by bronchospasm because of airway hyperresponsiveness, inflammation, and increased secretions. There are two pathways for asthma: one for extrinsic, or allergic, responses and one for intrinsic, or nonatopic, responses. The underlying mechanism for both types of asthma is an exaggerated response to a stimulus. After exposure, macrophages, eosinophils, mast cells, and basophils release inflammatory mediators, leading to bronchoconstriction, increased vascular permeability, and mucus production (Norris, 2019).

Airway inflammation

Inflammation in asthma generally involves the same cells that play prominent roles in the allergic response in the nasal passages and skin, whether the individual is atopic or not. This supports the belief that mast cell activation, mediated by a variety of cells, cytokines, and other mediators, are key to the development of clinical asthma. Airway inflammation is categorized into two phases: the early phase and the late phase (Liu, 2019).

Early phase of airway inflammation

The first, or early phase, is immediate and short-lived. When inhalation of an allergen occurs, the early phase is initiated by IgE antibodies that bind to mast cells and basophils. The mast cells release cytokines, histamine, prostaglandins, and leukotrienes. These cells, in turn, contract the smooth muscle and cause muscle band tightening and airway narrowing. Airway smooth muscle contraction in asthma, also known as airway hyperresponsiveness, results in excessive bronchoconstriction and airflow obstruction with little provocation (Liu, 2019; Norris, 2019; Sinyor & Concepcion Perez, 2020).

Late phase of airway inflammation

The late phase response occurs 4 to 8 hr after exposure, resulting in inflammation and increased airway responsiveness in addition to recurrence of bronchoconstriction. Th2 lymphocytes produce a series of interleukins (IL-4, IL-5, IL-13) and granulocyte-macrophage colony-stimulating factor (GM-CSF), which sustains inflammation. IL-3 and IL-5 help eosinophils and basophils to survive. Within the next several hours, the late phase occurs, when eosinophils, basophils, neutrophils, and helper and memory T-cells localize to the lungs, causing bronchoconstriction and inflammation. Mast cells also play an essential role in the late phase. This reaction is more difficult to treat (Liu, 2019; Sinyor & Concepcion Perez, 2020).

Major cells involved in the inflammatory process

Eosinophils
Eosinophils are the cardinal cell associated with allergic asthma and subsequent inflammation. The presence of eosinophils is often related to disease severity. Activated eosinophils produce leukotrienes that mediate smooth muscle contraction and bronchoconstriction, toxic products that can damage airway epithelium and nerves, and cytokines that may be involved in airway remodeling through thickening of the basement membrane and fibrosis (Kuruvilla et al., 2019; Liu, 2019).

Mast Cells and Macrophages
Mast cells and macrophages are the predominant inflammatory mediators associated with asthma. The mast cell is the central feature in the initiation of an acute allergic reaction. Mast cells are white blood cells that line the upper and lower respiratory tract, the skin, and the digestive tract. When a person has an allergy, they develop IgE antibodies. Circulating IgE antibodies attach to high-affinity IgE receptors on the surface of mast cells in tissue or peripheral blood basophils. When the person with asthma subsequently reencounters an offending allergen, binding of the allergen with IgE induces the release of inflammatory mediators, leading to the bronchoconstriction that is characteristic of an exacerbation. The higher the number of circulating IgE antibodies, the higher the number of mast cells affected. Mast cells degranulate as the person comes in contact with their specific allergen. As a result of mast cell degranulation, chemical mediators are released, including histamines, eosinophils, neutrophils, leukotrienes, and cytokines. Once released, these mediators cause acute bronchospasm, airway inflammation, and mucus production. Mast cells also store and release tumor necrosis factor-a, which recruits and activates inflammatory cells. Macrophages are also white blood cells that produce vasoactive mediators including prostaglandins, leukotrienes, and inflammatory cytokines (Liu, 2019; Norris, 2019).

The activation of mast cells in the upper respiratory tract yields allergic rhinitis symptoms and in the lower respiratory tract yields asthma symptoms. When mast cells are activated on the skin, symptoms of atopic dermatitis or eczema result. Food allergies are caused by activation of mast cells in the digestive tract. Given the location of mast cells in the body, it is clear how asthma, allergic rhinitis, and atopic dermatitis are connected. When a person has been diagnosed with asthma, allergic rhinitis, and atopic dermatitis, the three diseases are together commonly referred to as the allergic triad (NHLBI, 2007).

Basophils
Whereas mast cells are tissue based, basophils are blood-borne and often recruited to tissues for activation. Basophils have been shown to be increased in bronchial walls of T2-high asthma likely because of increased inflammation. Upon activation, in addition to the mast cells, basophils secrete histamine and lipid

mediators. Basophils have been shown to secrete IL-4, which directly modulates the functioning of innate lymphoid type-2 cells (ILC2). Tissue basophils have been strongly associated with patients with allergic disease, and the mediators secreted by mast cells and basophils have been shown to correlate with disease severity in asthma (Sinyor & Concepcion Perez, 2020).

T-Helper Lymphocytes

Innate, or nonspecific, immunity is the defense system with which one is born. It protects against antigens. Innate immunity involves barriers that form the first line of defense in the immune response. Examples of innate immunity include the cough reflex, enzymes, and mucus. There is also innate humoral immunity, which includes interferon and IL-1 (US National Library of Medicine, 2021). Current research is exploring the role of immune imbalance as a cause of asthma. T-helper (Th) lymphocytes are the drivers of allergic responses. Th1 and Th2 cells are in a balanced state in healthy individuals and are both derived from CD4 T lymphocytes. Th1 cells produce IgM and IgG, which are protective and help fight infection. Th2 cells produce IgE, which binds to mucosal mast cells that cause asthma and allergy. Th2 cells are responsible for the inflammation associated with the asthmatic response to a trigger, resulting in the release of cytokines (IL-3, IL-4, IL-5, and IL-13) and GM-CSF. IL-3 is associated with eosinophils and basophils. IL-4 helps with Th2 production and synthesis of IgE. IL-5 and GM-CSF regulate eosinophils. IL-13 contributes to airway eosinophilia, mucous gland hyperplasia, and airway fibrosis and remodeling (Liu, 2019; Norris, 2019). Overexpression of Th2 is likely because of a combination of genetic and environmental factors (Liu, 2019; Norris, 2019).

Evidence-based practice! Caminati and colleagues (2018) conducted a review to look at innate and adaptive type-2 (Th2) immunity in asthma pathogenesis. The authors focused on severe asthma and the role of allergens in its development. A Th2 response was found not only in allergic individuals with specific IgE sensitization but also with exposure to other environmental stimuli, including viruses and pollutants. Dust mites and molds are able to activate both innate and adaptive Th2 immune reaction even in the absence of specific IgE antibodies. An increasing amount of evidence supports the relevance of airways, particularly bronchial epithelium dysfunction, as the predisposing condition of such impaired response. Under this perspective the Th2 polarization is the result of a both innate and adaptive immunity. It entails major clinical implications in terms of preventive and therapeutic options. Particularly, innate response can be considered as a new target for innovative selective treatments.

Serum IgE

Serum IgE develops in response to an allergen exposure and binds to mast cells. In addition to mediating the immediate hypersensitivity response in allergic asthma through mast cell activation, allergen-specific IgE also leads to a delayed phase reaction characterized by the massive influx of eosinophils and other inflammatory cells. IgE may play a role in airway remodeling through its impact on airway smooth muscle cells and mast cell activation, which causes an increase in vascular damage and infiltration by inflammatory cells (Kuruvilla et al., 2019).

Prostaglandins and Leukotrienes

Other mediators released by the mast cell include powerful chemicals, such as prostaglandins and leukotrienes, which also act to constrict the airway. These chemicals send signals that result in recruitment of many other inflammatory agents to the airway. These agents stimulate each other in a process that is both redundant and self-perpetuating. Prostaglandins induce inflammation and potentiate the effects of histamine and other inflammatory mediators. Leukotrienes affect permeability of postcapillary venules, adhesion properties of epithelial cells, and extravasation and chemotaxis of neutrophils, eosinophils, and monocytes. These mediators cause slow and sustained constriction of bronchioles (Norris, 2019).

Airway Remodeling

Intact epithelium is critical for healthy functioning of the airways. Normally, the epithelium is lined with ciliated cells that increase mucus clearance. This layer of cells is destroyed as a result of chronic inflammation. Airway remodeling refers to structural changes in the airways that may cause irreversible airflow limitation, superimposed on the effects of inflammation and smooth muscle contraction for the person with asthma. Some of the changes associated with airway remodeling include damage or loss of the normal structure of airway epithelium, an increase in mucus-producing goblet cells, fibrotic thickening of the subepithelial reticular basement membrane, increased vascularity, and increased airway smooth muscle mass caused by long-term inflammation. This results in permanent structural narrowing of airways and hyperinflation, which are associated with increased bronchial hyperresponsiveness. Subbasement membrane thickening in adults with severe asthma as well as in children with early diagnosed asthma causes accelerated lung function loss from this remodeling (Liu, 2019; Norris, 2019).

Self-Assessment Quiz Question #7

Airway remodeling can best be described as:

a. Permanent structural narrowing of the airway.
b. A static effect of the acute phase reaction.
c. Reversible airway damage.
d. A temporary restructuring of the airway.

DIAGNOSIS OF ASTHMA

Clinical signs and symptoms

Asthma is usually associated with airway hyperresponsiveness and chronic airway inflammation. These characteristics are present even when symptoms appear to be under control (GINA, 2020). Early recognition of these signs and symptoms is imperative to maintain asthma control and reduce or limit airway remodeling. Asthma symptoms are intermittent and vary over time and in response to a triggering event. Because changes often occur in the airways before symptoms are felt by the person with asthma, it is imperative to monitor asthma status. The disconnect between the inflammation and symptoms can allow for poor self-awareness of asthma, which can foster poor recognition and nonadherence with treatments (Campbell, 2017).

There are certain respiratory symptoms that increase the likelihood of an asthma diagnosis (GINA, 2020). Wheezing, shortness of breath, cough, and/chest tightness are typical of asthma. These symptoms usually worsen at night or in the early morning, and vary over time and in intensity. A history of worsening symptoms related to viral infections, exercise, allergen exposures or irritants (e.g., car fumes, smoke, strong smells), or changes in weather are indicative of asthma and would need clinical confirmation.

Wheezing is a musical, high-pitched sound that can be either audible or heard only through auscultation with a stethoscope, and it is commonly experienced by people who have asthma. The quality and duration of wheezing depends upon which part of the airways is affected. In asthma, the wheezing occurs because of narrowing of the lower airways. Wheeze is predominantly heard on expiration but in severe asthma may be heard on inspiration. In severe asthma no wheeze may be heard, as the air flow is severely reduced and might foreshadow an emergency because of decreased airflow, fatigue from respiratory effort, or impending respiratory failure (Patel et al., 2020).

Asthma can occur without wheezing when obstruction involves predominantly the small airways. Additionally, wheezing can be associated with other causes of airway obstruction distinct from asthma. In exercise-induced bronchoconstriction, wheezing may be present after exercise, and in nocturnal asthma, wheezing is present during the night (Morris, 2020).

Cough is frequently the sole presenting complaint for children, presenting typically as a dry, hacking, nonparoxysmal cough. The presence of a nocturnal cough, a cough that recurs seasonally, a cough in response to specific exposures (e.g., cold air, exercise, laughing, allergen exposure, or crying), or a cough that lasts more than 3 weeks increases the likelihood of an asthma diagnosis. When the cough is productive, the sputum is usually clear or white and contains eosinophils (Morris, 2020; Sawicki & Haver, 2020). Children with nocturnal asthma tend to cough after midnight and during the early hours of morning. The timing of the cough is related to circadian rhythms and hormone variations. The greatest decrease in respiratory function occurs at 4:00 a.m., when cortisol levels are low, melatonin levels are high, and eosinophil activity is increased (Norris, 2019). Other factors contributing to nocturnal cough are obesity, gastroesophageal reflux disease (GERD), cold air, and viral infection (Newsom, 2021).

He and colleagues (2020) conducted a systematic review and meta-analysis to determine signs and symptoms of asthma. Nasal congestion, sleep disturbance, and chest tightness were the most common symptoms of asthma, followed by wheezing and breathlessness with a combination of symptoms (e.g., wheezing, breathlessness, chest tightness, and cough). Therefore, a combination of symptoms needs to be included when considering an asthma diagnosis.

If early signs of an asthma exacerbation are not addressed, these symptoms may progress and become an emergency. These signs include breathlessness, cyanosis of the lips and nails, retractions, difficulty walking and talking, peak flows less than 40% of personal best, and wheezing that does not improve with rescue medication (NHLBI, 2007).

Screening tools for asthma

Use of screening tools can assist in assessing asthma symptoms. Sometimes people with asthma are not aware that their asthma is not in control. Commonly used validated tools include the Asthma Control Test (ACT), the Childhood Asthma Control Test (C-ACT), and the Asthma Control Questionnaire (ACQ). The ACT contains five items with a recall window of 4 weeks. The C-ACT is for use in children 4 to 11 years of age and consists of four pictorial items and three verbal items that are scored by the children and parents, respectively. The Asthma Control Questionnaire (ACQ) contains six items with a recall window of 1 week, supplemented by percentage of predicted FEV1 measurement. The Test for Respiratory and Asthma Control in Kids (TRACK) is a five-question caregiver-completed questionnaire that determines respiratory control in children 0 to 5 years of age with symptoms consistent with asthma. Another less commonly used instrument is the Asthma Therapy Assessment Questionnaire (ATAQ), a 20-item parent-completed questionnaire exploring several domains, with four questions relating to symptom control and primarily used in research (Dinakar et al., 2017).

Nursing Consideration: Given the high prevalence of asthma, nurses in adult and pediatric practice are likely to encounter patients with this chronic disease. It is imperative that all nurses be aware of the early warning signs of asthma so interventions can be done to reduce the likelihood of an adverse outcome and the need for preventable ED visits and hospitalizations. It is important to provide asthma self-management education to the person with asthma and include identification of the warning signs. The person with asthma also needs to be able to distinguish and recognize emergency signs and understand when the need to call 911 arises.

ASTHMA TRIGGERS

Asthma is a complex disease that is caused by a complex interaction of genetic, environmental, and social factors. Although pharmacotherapy is extremely important, it is only one aspect of asthma management. Avoidance of triggers is an effective strategy in controlling asthma, as triggers are the cause of airway inflammation and symptoms in sensitized persons. For optimal control of asthma, the individual must incorporate environmental control measures into the treatment plan. Healthcare professionals play an important role in assisting individuals and families in identifying and avoiding asthma triggers.

Nursing Consideration: Nurses need to be aware of who might be at greater risk for developing asthma. Reducing exposure to risk factors may prevent the development of asthma or reduce its severity. A good family history needs to be completed, as there is a strong hereditary component for asthma. Modifiable risk factors need to be addressed, with education provided on how to reduce exposure. The nurse should use a validated assessment tool to determine asthma risk and intervene as indicated.

Asthma triggers can be classified as allergic or nonallergic and can be found both indoors and outdoors. Allergic triggers (i.e., allergens) can include pollens, mold spores, dust mites, cockroaches, animal dander, or food. Exposure to allergens produces airway inflammation and can exacerbate asthma. The role of allergens is greater in children with asthma than in adults with asthma. Nonallergic triggers (i.e., irritants) can include smoke, odors, air pollution, cold air, weather, chemicals, certain medications, exercise, hormonal changes, and food additives. Irritants cause bronchoconstriction and increased asthma symptoms. Respiratory infections can trigger asthma as well (Asthma and Allergy Foundation of America, 2019c; Miller, 2020). These lists of asthma triggers are not exhaustive, as exposure to newly developed substances expands daily. It is important to note that not every trigger affects asthma in each person. People with asthma each respond differently to the various stimuli, related to the genetic effects, as mentioned previously. Trigger identification and avoidance are the keys to effective asthma management (Gautier & Charpin, 2017).

Gene-environment interaction

Research shows that asthma is the result of interactions between genetics and environmental influences (Barnes, 2020). Asthma is likely transmitted by multiple genes, but this transmission is not consistent from person to person. Different genes in different individuals may lead to similar asthma severity, and multiple genes within the same individual may lead to the expression of asthma severity. Some genes may influence asthma development, others may modify asthma severity or response to treatment, and still others may interact with environmental factors to affect one's asthma status. There is also investigation into epigenetics, which is the effect of the environment on gene expression of asthma (Dowshen, 2018). However, interpreting results from studies focusing on the genetic influence on asthma becomes difficult because there is no absolute diagnostic test for asthma, and clinical diagnoses are inconsistent.

Allergy testing

In nearly 90% of children and 50% of adults with asthma, the condition is classified as allergic asthma (US National Library of Medicine, 2020). Because a person's medical history is not sufficient to determine sensitivity to allergens, the NAEPP recommends allergy testing for those with persistent asthma exposed to perennial allergens (NHLBI, 2007). IgE-mediated allergies account for the majority of clinically significant allergies. To accurately diagnose someone with allergies, a careful history needs to be obtained; testing for specific IgE for the allergen-causing symptoms needs to be conducted either through skin prick testing or in vitro (i.e., blood test); additionally, it needs to be determined that exposure to the allergen causes symptoms (Nolte & DuBuske, 2020).

Skin prick testing is the preferable method for allergy testing because of its sensitivity and cost-effectiveness, and because results are known within 15 to 20 min. Skin prick testing detects the presence of allergen-specific IgE on cells. The allergen is introduced into the skin on the forearm or upper back during testing through a prick/puncture method, which is the safest way to perform a skin test. The skin is pricked to allow the allergen entry into the body. If there is IgE present for the injected allergen, mast cells are activated, leading to degranulation and release of inflammatory mediators. A "wheal and flare" will develop (an area of superficial skin edema surrounded by erythema), along with itching. A reaction measuring larger than 3 mm is considered a positive finding. This method of testing is contraindicated for persons with poorly controlled asthma and reduced lung function, those who have severe reactions to minute amounts of allergen, those who are taking medications that might interfere with the treatment of anaphylaxis or who cannot discontinue antihistamine medications, and those who have certain skin conditions that could result in a false-positive test (Nolte & DuBuske, 2020).

In vitro testing is a blood test that detects antigen-antibody complexes. In vitro does have some advantages. There is no risk for an allergic or anaphylactic reaction. The test is not affected by medications the person may be taking, so they do not need to discontinue taking their medications before testing, as they do for skin prick testing. Results are not affected by skin conditions (Kowal & DuBuske, 2021).

Indoor triggers

More than 80% of school-age children with asthma are sensitized to at least one indoor allergen. Aeroallergen sensitization at younger ages was associated with an increased risk of asthma in later childhood. This allergic sensitization is a strong predictor of disease persistence in later life (Bjerg et al., 2016; Rubner et al., 2017; Sheehan & Phipatanakul, 2016). Among the most common indoor allergens are house dust mites, pet dander, cockroaches, rodents, and molds (AAFA, 2019a). Research has shown that levels of indoor allergens are directly associated with asthma severity. In homes where indoor allergen exposure was reduced, children experienced fewer days of asthma symptoms and fewer school days missed. A reduction was also noted for acute healthcare visits related to asthma and hospitalizations per year related to asthma (US Department of Housing and Urban Development [HUD], 2018).

Dust mites

Dust mites are microscopic, insect-like pests that generate allergens that can trigger asthma. Hundreds of thousands of dust mites can live in the bedding, mattresses, upholstered furniture, carpets, or curtains in the home. These mites feed on the dead human skin cells found in dust. Dust mites are not parasites. Roughly 4 out of 5 homes in the United States have detectable levels of dust mite allergen in at least one bed (ALA, 2020d).

The primary allergen in dust mites is an intestinal enzyme on fecal particles. Because of its relatively large size, the allergen settles quickly on furniture and does not stay airborne. These organisms require moisture to survive, so they pose less of a health risk in dry climates. Dust mites thrive in temperatures of 77 F to 86°F (25°C to 30°C) and 70% humidity. They feed on skin cells that humans shed; an average adult sheds enough skin each day to feed 1 million mites. Contrary to what many people think, dust mites are found not only in the home but also in many public places, including schools. Identifying dust mites as one's asthma trigger is problematic. Because the mites are microscopic, it is less likely for individuals with asthma to associate their symptoms with the presence of these offending agents (Acevedo et al., 2019; Matsui et al., 2016).

There is a noted relationship between the amount of exposure to dust mites and allergen sensitization. The risk for developing asthma is increased in infants with early exposure to high levels of dust mites. Asymptomatic toddlers with early house dust mite sensitization have higher risks of developing asthma by age 7 years (Su et al., 2019). Studies examining the prevalence of asthma related to dust mite exposure indicated a range of more than 50% to between 65% and 90% of cases among children and young adults (Gruber et al., 2016; Litonjua & Weiss, 2020).

Avoiding exposure to dust mites is challenging. The Expert Panel Working Group of the NHLBI and colleagues (2020) recommend the use of multicomponent allergen mitigation intervention to reduce dust mite levels in the home and improve asthma outcomes. Dust mites are more prevalent in bedrooms, so it is recommended to cover mattresses and pillows in zippered, allergen-impermeable covers. Bed linens, rugs, and any materials implicated in dust mite allergy need to be washed in hot water. Any fabrics that cannot be washed should be avoided – carpets, curtains, upholstered furniture, down-filled covers, and pillows. Window blinds should be avoided because dust easily collects on the slats. Stuffed toys should be avoided as well. Use of a vacuum with a high-efficiency particulate air (HEPA) filter is recommended, although it is difficult to eliminate dust mites because they burrow deep in furniture and mattresses. Home humidity levels must be kept below 50%. If someone with a dust mite allergy needs to dust or vacuum, a filtering mask should be worn. Although it is recommended that air be filtered, research shows that because of the relatively large size of the allergen, it falls quickly on furniture and does not stay airborne (Matsui et al., 2016; US Environmental Protection Agency [EPA], 2018).

Evidence-based practice! Use of an in-home test kit, which quantifies dust mite allergen levels, was evaluated to see if it resulted in behavioral changes in implementation and maintenance of mite reduction strategies. Investigators also assessed if use of the in-home test also reduced allergen levels in homes of children sensitive to dust mites. Sixty households of children ages 5 to 15 years with parent-reported dust mite allergy participated in a randomized controlled trial. Intervention homes received educational material about reducing dust mites as well as test kits at 1, 2, 5, and 8 months. Control homes received only educational material. Results revealed that allergen concentrations in the child's bedroom and living room floors were significantly reduced in the intervention homes that received test kits and education, compared with the control homes that only received education about dust mites. Therefore use of in-home test kits along with education may beneficially influence behaviors and attitudes toward dust mite reduction strategies and help reduce residential dust mite allergen levels. The immediate knowledge of dust mite levels might motivate parents to more thoroughly perform dust mite avoidance strategies (Winn et al., 2016).

Mold

Americans spend up to 90% of their time indoors (EPA, 2020a). This places persons with asthma at great risk for mold exposure and worsening asthma. Visible indoor fungi are called mold or mildew. Fungi reproduce by producing spores, which are regularly found in indoor air and on surfaces. Airborne spores are inhaled and act as allergens. Indoor mold usually originates from the outside and gains access to the inside through open windows or being transferred on pets or people's clothing. With the right conditions of humidity and temperature and adequate food sources, mold spores can proliferate inside the home (EPA, 2020d; Kaneshiro, 2020a).

Mold allergy poses a significant health concern. The prevalence of mold sensitization in children with persistent asthma is approximately 50% (Matsui et al., 2016). The National Survey of Lead and Allergens in Housing found that 56% of homes had levels of some molds above thresholds observed to be associated with asthma symptoms, increasing the risk for exacerbation. Remediation of mold has been shown to reduce symptoms and medication use. Persons with persistent asthma should be tested for mold allergy. Reports of home dampness or moisture leaks confirm the probability of mold allergy and should be followed up with remediation efforts (Matsui et al., 2016).

Multiple studies have looked at the effect of mold on the health outcomes for persons with asthma. Byeon and colleagues (2017) found an association between mold sensitization and asthma severity. Sensitization to mold was associated with lower lung function and increased airway hyperresponsiveness in children with asthma. Caillaud and colleagues (2018) found that children exposed to visible mold and mold odor were more likely to develop asthma and experience exacerbations. Exposure to mold in the workplace was associated with the incidence and exacerbation of occupational asthma.

Mold control is essential. The key is controlling moisture in the home. Water-damaged areas and items need to be dried within 24 to 48 hr to prevent mold from growing. Leaky plumbing and other sources of water need to be repaired. Hard surfaces with mold present need to be washed with detergent and water, then dried thoroughly. Any absorbent materials, such as carpets and ceiling tiles, need to be replaced. Dehumidifiers or air conditioners should be used to maintain relative humidity at less than 50% and to keep temperatures cool. Improving air flow through whole-house ventilation or installing vents in the kitchen, bathroom, and clothes dryer is essential. Mold inhibitors should be added to paints before application. Bathrooms should be cleaned with mold-killing products (CDC, 2020b; EPA, 2020d; Hamilton, 2019; HUD, 2018).

Animal Allergens

Allergies to dogs and cats affect 10% to 20% of the population worldwide and is a growing public health concern as these rates increase. Given the prevalence of detectable dog and cat allergens, even in households without pets, there is a critical need to accurately diagnose and treat patients to reduce morbidity and mortality from exposure (Chan & Leung, 2018). All warm-blooded animals with fur (or feathers) can be problematic. The primary allergens that can trigger asthma are not the hair or fur but proteins found in saliva, skin flakes (dander), urine, and feces. Any breed of dog and cat is capable of being allergenic. In cats, the protein that causes most people's allergies is found in the cat's saliva, skin glands, and urinary/reproductive tract. Therefore, short-haired cats are not less allergenic than long-haired animals, and hairless cats have allergens that are similar to cats with hair. Other warm-blooded animals such as rodents, birds, and ferrets can also trigger asthma in an allergic individual. Pets without feathers or fur, such as reptiles, turtles, and fish, rarely cause allergy (Miller, 2020).

Additionally, fur can carry dust mites, pollen, mold, and other allergens. Fecal droppings from any caged animal, furry or feathered, also can attract dust mites and mold. These allergens become airborne and are spread through heating and ventilation systems (Dinetz, 2017; Gautier & Charpin, 2017). Although high levels of these allergens are found in homes with cats and dogs, buildings without any animals also have these triggers because these allergens are carried on clothing or spread in the air (Miller, 2020). Because of this, limiting an animal to a certain area in the house is not an effective strategy to minimize exposure and risk.

The best way to avoid exposure to this allergen is to remove all pets from the home. That said, people are very devoted to their pets, so this may not be a viable option. Reducing exposure is the next best option. Animals should not be allowed in bedrooms or play areas, and vacuuming with a HEPA filter and dusting should be done routinely. Rugs and carpeting should be avoided. HEPA air cleaners are recommended. Family members should practice handwashing after touching pets to prevent transferring the allergens to the person with asthma. People with asthma should not clean litter boxes or cages. Schools should maintain pet-free classrooms. Even after removal of pets from the environment, it may take up to 6 months to reduce allergen levels. Allergy shots are recommended for individuals with proven pet sensitivity (Dinetz, 2017; Miller, 2020).

Cockroaches

The major cockroach allergen is found in their secretions, fecal particles, and fragments of their body parts. These particles can become airborne and disseminate throughout the home. Infestations are associated with living in densely populated areas, urban environments, multifamily homes, and having low SES. Because of the airborne nature of the particles, homes without evidence of cockroaches can still be affected. One in five homes with no history of cockroach infestation was found to have significant levels of the allergen in dust and fabrics in the home (ALA, 2020b; Do et al., 2016).

Studies have shown a consistent association between sensitized individuals' exposure to cockroach allergens and asthma exacerbation or severity. Rhee and colleagues (2018) found that those with cockroach allergies were more likely to report ED visits, specialist visits, and asthma exacerbations compared with those without cockroach allergies.

For individuals in known areas of cockroach infestations, efforts must be consistent to reduce exposure. Removal of food sources and household food wastes from open areas needs to be implemented. All foods should be stored in sealed containers, and dishes should be washed promptly. Frequent disposal of garbage assists in decreasing cockroach presence. Because cockroaches have an affinity for water, reducing access to water by fixing leaking faucets and preventing water condensation on pipes can help reduce infestations. Sealing cracks and holes can help prevent entry into the home. Setting roach traps is an effective measure to reduce cockroach populations in the home. Pesticides in gel form are preferred to ones that are aerosolized. Gel form allows for greater control of the pesticide and prevents inhalation of the material, which might trigger an asthma exacerbation (Gautier & Charpin, 2017; Matsui et al., 2016; Miller, 2020).

The 2020 Focused Updates (Expert Panel Working Group of the NHLBI et al., 2020) recommend using integrated pest management to improve asthma outcomes. Integrated pest management can be used alone or with other interventions to reduce exposure to pest-related allergens in the home. The Expert Panel recommends tailored allergen intervention strategies only for individuals with asthma who are exposed to cockroaches and who have either asthma symptoms or have tested positive for a cockroach allergy through allergy testing.

Smoking

About 17% of adults with asthma in the United States smoke, compared with 13.7% without asthma, even though cigarette smoke is known to trigger asthma attacks (ALA, 2020c). Tobacco smoke contains more than 7,000 harmful chemicals (CDC, 2018). Approximately 5.7 trillion cigarettes were smoked worldwide in 2016, implying that secondhand smoke (SHS) exposure is almost unavoidable for children and for adults who do not smoke.

Nicotine and other tobacco compounds accumulate on surfaces such as clothes, furniture, walls, and vehicles and can stay there several months after smoking has stopped, even after the surfaces have been washed (Drope et al., 2018). All of these facts contribute to the risk for the most vulnerable to develop asthma or have worsened asthma outcomes.

Those exposed to the smoke from people who use tobacco are at increased risk for poor health outcomes. Secondhand smoke is the involuntary exposure of nonsmokers to tobacco smoke from the smoking of others. Secondhand smoke is a mixture of sidestream smoke, given off by the smoldering tobacco product, and the mainstream smoke that is exhaled back into the air by active smokers. Sidestream smoke, generated under lower temperatures, has higher concentrations of the toxic chemicals found in mainstream smoke and is quickly dispersed to contaminate the immediate environment. This smoke has more toxins than the smoke inhaled by the smoker. Thirdhand smoke refers to exposure to smoke components deposited on surfaces, as mentioned previously. These toxins may be absorbed through the skin, by ingestion, or through inhalation of resuspended dust; however, the potential health effects are not yet well studied (AAFA, 2017; Samet & Sockrider, 2020). Exposure to SHS is usually underreported and therefore underestimated. Myers and colleagues (2018) found a strong correlation between parental perceptions of children's exposure and perceptions of risk to the child's health. Exposure perceptions were lower among smokers compared with nonsmokers – smokers perceived children as being less exposed to smoke in various situations, whereas nonsmokers rated as higher the extent to which smoke reaches children when there is a smoker in the vicinity.

Hollenbach and colleagues (2017) investigated the association between secondhand smoke exposure and asthma severity in children with physician-diagnosed asthma. They found that among the 30,163 children with asthma evaluated, exposure to secondhand smoke was associated with greater asthma severity for those with mild and moderate persistent asthma. Litonjua and Weiss (2020) discuss the effects of maternal smoking, prenatally and postnatally, on asthma development. Prenatal exposure to maternal smoking has been associated with reduced pulmonary function in the infant and greater likelihood of childhood asthma. Compounding this is the greater risk for premature delivery in mothers who smoke during pregnancy, which is another risk factor for asthma. In children ages 7 to 9 years old with asthma, an association was found between current asthma/wheeze and maternal smoking during pregnancy and the number of household smokers.

The only avoidance measure for tobacco smoke is to stop smoking and to avoid being around cigarette smoke. However, this is a difficult task. Nearly 70% of adults who smoke say they want to quit, and over 50% of adults who smoke try to quit each year. Unfortunately, more than 40% of adults who smoke do not receive advice to quit from a healthcare professional. Therefore, the role of the nurse in encouraging individuals to stop smoking and counseling them about smoking cessation options can be invaluable. Fewer than 1 in 3 adults who smoke use cessation counseling or FDA-approved medications when trying to quit. The bad news is that fewer than 1 in 10 US adults successfully quit smoking each year (CDC, 2020d). The American Nurses Association (ANA, n.d.) offers resources to assist nurses with tobacco and use cessation. Their website includes a link to their position statement, *Prevention and Cessation of Tobacco and Other Nicotine Products* (ANA, 2020), which promotes nurse engagement in tobacco use prevention and cessation. Included are expanded efforts to reduce secondhand smoke exposure and to educate nurses and the public about the harmful effects of smoke and smokeless tobacco products. The focus is to eliminate tobacco-related disparities and to prevent tobacco use in youth (ANA, 2020). Links for evidence-based information from the CDC, FDA, Agency for Healthcare Quality and Research, National Institutes of Health, National Cancer Institute, and US Preventive Services Task Force are also located on this website.

Air-cleaning devices are generally not effective in ameliorating secondhand smoke exposure and should not be recommended. In homes where there are smokers, people should be instructed to smoke only outside. However, this will not eliminate the potential risks of thirdhand smoke where the chemicals are deposited on the smoker's clothing, risking exposure of anyone who comes in close contact with the smoker. Additionally, no smoking should be permitted in cars or closed spaces (Ben-Joseph, 2019; Samet & Sockrider, 2020).

Indoor Pollutants

Indoor pollution sources that release gases or particles into the air are the primary cause of problems with indoor air quality in homes, worsened by inadequate ventilation. High temperatures and humidity levels can also increase concentrations of pollutants. Sources of these pollutants include fuel products (e.g., gas, kerosene, coal, wood), tobacco products, asbestos, pressed-wood products, and outdoor sources that migrate into the home (e.g., radon, pesticides). Strategies to reduce levels of indoor pollutants include eliminating or controlling the sources of pollution, venting furnaces and gas appliances to the outside, avoiding wood smoke, adequately ventilating the home, avoiding household sprays, and installing air-cleaning devices. When purchasing materials for the home, solid wood products are preferable to particleboard. If carpeting is installed over concrete, there should be an effective moisture barrier (EPA, 2020c). It is important to keep in mind that those who rent housing might not be able to change the living environment. As healthcare professionals, it is imperative to discuss these issues with people and refer them as necessary for assistance with any modifications that might need to be done to prevent asthma from worsening. Installation of nonpolluting heat sources, including heat pumps, wood pellet burners, and flued gas, significantly reduces asthma symptoms, missed school days, healthcare utilization, and pharmacist visits (GINA, 2020).

Outdoor triggers

Plant Pollens

Pollen is a fine, yellowish powder that is transported from plant to plant by the wind, birds, insects, or other animals. Wind-pollinated plants, such as grasses, weeds, and trees, often are the cause of allergies. Pollen levels are increased on hot, windy days. On cool, rainy days, much of the pollen is washed to the ground, minimizing the effect on the person with asthma. Pollens vary by season. Spring pollens usually come from trees. Late spring and summer pollen is from grasses. Ragweed and other late-blooming plants produce pollen during late summer and early fall. Pollen avoidance is only relevant during the time that the offending pollen is airborne (Gautier & Charpin, 2017; Kaneshiro, 2020b). Strategies to reduce pollen exposure include checking local pollen counts and limiting time outside from 10:00 a.m. to 2:00 p.m. when pollen is the highest. Keep windows closed to prevent the pollen from entering the home. If available, air filters and air-conditioning should be used. Bedding should be washed weekly in hot, soapy water. Sunglasses and a hat should be worn when outside to avoid pollen exposure to eyes and hair. Clothes should not be hung outside to dry. Lawns should be kept short. Clothes should be changed and washed after outdoor activities. Long pants should be worn to avoid exposure to grass. Shower and shampoo every night to keep pollen out of the bed. Pets should be wiped off or brushed before coming inside to remove any pollen from their fur. Remove shoes and vacuum frequently (AAFA, 2021; AAFA Community Services, 2019).

Each year, the AAFA produces a report on allergy impact for 100 major cities in the United States. The AAFA bases their ranking on spring and fall pollen scores, over-the-counter

medicine use, and availability of board-certified allergists. This greatly impacts those with asthma, as a large proportion of individuals with asthma have allergies, as previously discussed. This information allows communities to plan interventions to decrease the impact on its citizens and provides much-needed information for the residents of these cities. The 10 worst cities are Scranton, Pennsylvania; Richmond, Virginia; Wichita, Kansas; McAllen, Texas; Pittsburgh, Pennsylvania; Hartford, Connecticut; Springfield, Massachusetts; New Haven, Connecticut; Oklahoma City, Oklahoma; and Bridgeport, Connecticut. The cities with the lowest pollen counts include Denver, Colorado; Fresno, California; Portland, Oregon; Milwaukee, Wisconsin; Stockton, California; San Jose, California; Salt Lake City, Utah; Provo, Utah; Seattle, Washington; and Durham, North Carolina (AAFA, 2021). It should be noted that for 2020, fewer people experienced problems with pollen. This has been attributed to COVID, as many people spent more times indoors in their homes, thereby having less exposure to these allergens. However, climate change continues to cause longer and more severe allergy seasons, intensifying pollen production, and worsening allergies (AAFA, 2021).

Air Pollution

Air pollution refers to the release of pollutants into the air that are detrimental to human health and the planet as a whole (Mackenzie, 2016). There are multiple sources of outdoor air pollution. Burning fossil fuels releases gases and chemicals into the air. Air pollution not only contributes to climate change but is also exacerbated by it. Air pollution, specifically carbon dioxide and methane, raises the earth's temperature, which increases the level of smog. Smog occurs when emissions from combusting fossil fuels react with sunlight. Particulate matter is tiny particles of chemicals, soil, smoke, dust, or allergens, in the form of gas or solids, carried in the air. Sources of smog and soot come from cars and trucks, factories, power plants, incinerators, and engines. The airborne particles in soot are especially dangerous because they can penetrate the lungs. Climate change also increases the production of allergenic air pollutants. Mold is increased related to the wet conditions caused by increased flooding. Pollen is increased from a longer pollen season and more pollen production (Mackenzie, 2016). Atmospheric conditions including thunderstorms may trigger exacerbations by increasing the level of respiratory allergens (GINA, 2020).

Living in areas with poor air quality has been implicated in asthma development in young children, with traffic-related pollutants a major source of offending pollutants. During the first year of life, nitrogen dioxide and ozone exposure from traffic-related air pollution increased asthma risk (To et al., 2020). Khreis and colleagues (2019) found 7% to 12% of annual childhood asthma cases were attributable to traffic-related air pollution, specifically particulate matter (PM) <2.5 μm in diameter (PM2.5), PM <10 μm in diameter (PM10), and black carbon. Khreis and colleagues (2018) found overall air pollution (nitrogen oxides and nitrogen dioxide) accounted for 38% of all annual childhood asthma cases. Exposure to these pollutants damages lung cells, decreases lung function, and increases respiratory symptoms (EPA, 2020b). Unfortunately, there is no realistic way to avoid exposure to air pollution. Wearing a dust mask has not been proven to be an effective measure (Gautier & Charpin, 2017). Reduction of air pollution usually requires policy changes at the national or local level (GINA, 2020).

Air Quality. The Air Quality Index (AQI) is a system for reporting daily air quality, indicating how polluted the air is that day and the potential health effects. The EPA calculates the AQI for five major air pollutants regulated by the Clean Air Act: ground-level ozone, particle pollution (particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide. National air quality standards have been established for each of these pollutants in order to protect public health. Of the five major air pollutants, ground-level ozone and particle pollution pose the greatest threat to health. The AQI ranges from 0 to 500; the higher the number, the worse the effect on health. Any value higher than 100 is considered unhealthy (EPA, n.d.).

Mold

The effects of outdoor mold are the same as the effects discussed earlier for indoor mold. To reduce exposure to outdoor molds, outdoor activities should be minimized when mold counts are high. Any water that collects outside of the home structure should be eliminated. Areas where mold is more likely to be present should be avoided: barns, hay, and woodpiles. The person with asthma should not rake leaves or mow grass and should avoid wooded areas. If these tasks are undertaken, a dust mask should be worn. Outdoor activities should be avoided on windy and rainy days because mold spore counts increase in warm, humid weather and immediately after summer rainstorms (Harvard Medical School, 2019; Kaneshiro, 2020a).

Other Potential Triggers

Food Allergy. Food allergy associated with asthma is primarily seen in children. If a person with asthma has a food allergy that triggers asthma symptoms, quick action needs to be taken to abate any risk of anaphylaxis. Persons with asthma should read food labels and avoid eating foods that trigger asthma symptoms. Sulfites, used as preservatives and antioxidants, can induce allergy-like symptoms, such as wheezing, chest tightness, and cough in people with underlying asthma. Persons with food allergies may exhibit asthma symptoms as part of food-induced anaphylaxis. Anaphylaxis should be suspected if an individual (especially a child or young adult) develops severe asthma symptoms soon after eating a food allergen. Sometimes food allergens can be aerosolized from the steam or vapors associated with cooking these foods or from powdered food that enters the air (Gautier & Charpin, 2017; GINA, 2020; Miller, 2020). Patients who have a confirmed food allergy that puts them at risk for anaphylaxis must have an epinephrine auto-injector available at all times and be trained how to use it (GINA, 2020).

Viruses. Viruses, including influenza, respiratory syncytial virus, rhinovirus, and pneumonia, cause airway inflammation and increased mucous production. Viral respiratory tract infections in infancy may be predictive of the development of asthma in later childhood to young adulthood. Asthma exacerbations occurring with respiratory infections are frequently more severe than those occurring at other times. Persons with asthma need to practice excellent hand hygiene and should avoid people with infections. As stated previously, the influenza and pneumonia vaccines should be administered (Litonjua & Weiss, 2020; Miller, 2020).

Drugs such as aspirin, nonsteroidal antiinflammatory agents, and beta blockers can act as asthma triggers. Angiotensin-converting enzyme (ACE) inhibitors appear to be safe for people who have asthma. However, some people develop a cough when taking ACE inhibitors, which needs to be differentiated from asthma. If the cough is caused by the ACE inhibitor, it will usually go away a week or so after stopping the medicine (Familydoctor.org, 2020).

Geographic information systems mapping

To minimize exposure to asthma triggers, it is essential to know where these triggers are found and how prevalent they are. Geographic information systems (GIS) mapping has the ability to provide this information, allowing for research to be conducted on the burden of these triggers and the potential effect of remediation of these offending agents on asthma. GIS mapping is a computer-based tool that enables integration and visualization of assessment data that assist in understanding the complex interrelationships of environmental factors and populations. Data include anything that can be associated with a location on the globe. GIS mapping helps answer questions about how location affects disease (CDC, 2019b). Using asthma data in combination with GIS allows for visualization of vulnerable populations and triggers that can lead to targeted interventions to decrease asthma complications.

Evidence-based practice! A study was conducted to explore if environmental factors co-occur in areas with high asthma rates in a convenience sample of 56 children enrolled in Head Start (HS), ages 3 to 5 years. The GIS program ArcGIS 10.4 was used to geocode and map aggregated address data at the census tract level through vector map analysis. Location, race, economic status, pollution remediation sites, age of housing, and blood lead levels were assessed for areas with high asthma concentration. Results indicated that children with asthma resided in one census tract, which was 1% of the total service area. Fifty-six percent of housing was built before 1960 and only 10% after 1990, which suggests deteriorating conditions. Pollution remediation sites were found in the vicinity of asthma cases. Elevated lead levels were found in 22% of all HS children; specific values for the children with asthma were not available. The need for proactive interventions to decrease asthma risk and poor asthma outcomes in HS children is evident. GIS locates children with high susceptibility to asthma. Knowing where to focus asthma efforts allows for more effective and efficient interventions to reduce the burden of asthma and its associated adverse outcomes (Quaranta et al., 2020).

EDUCATION ON ASTHMA TRIGGER MANAGEMENT

Many people with asthma have difficulty identifying their triggers. Healthcare professionals should ask individuals what happens when they come in contact with a potential trigger. Persons with asthma should be taught that asthma symptoms cannot be adequately controlled by medication alone. A focus on education and behavior change alone might be too limited to reduce exposure to asthma triggers.

Individuals must understand the importance of trigger avoidance. Gruber and colleagues (2016) looked at the effects of home environmental assessment and intervention for families of children with asthma. The educational part of the intervention consisted of information about the potential asthma triggers identified in the assessment process and how to mitigate these triggers. Each family received a cleaning kit – consisting of a microfiber mop, bucket, spray bottles, microfiber cloths, distilled white vinegar, baking soda, peroxide, Simple Green All-Purpose Cleaner, and Murphy's Oil Soap – and instructions on how to mix the products. Issues for repair, replacement, or installation were prioritized based on assessment and potential impact on the child with asthma, with mold, moisture, and pest infestations given highest priority; then heating, air-conditioning, and ventilation (HVAC); and then replacement or removal of carpeting. Families whose households did not require repairs were given HEPA vacuum cleaners, allergen-barrier pillow and mattress covers, HVAC filters, and window-mounted air-conditioning units where appropriate. Positive effects of the intervention were a decrease in the use of asthma medication, fewer health visits, and a subsequent 50% decrease in hospital bills for childhood asthma treatment (Gruber et al., 2016).

Strategies

Strategies need to be appropriate to the person's unique trigger profile. The family should be assisted in identifying and eliminating triggers. Suggested trigger assessment questions focus on indoor and outdoor allergens and irritants. It is important to assess the duration and timing of symptoms. Are they seasonal or year-round? Pet ownership needs to be explored. If there are pets, do they live indoors? It is important to assess for moisture and dampness in the home, and to observe any visible mold. Ask about any cockroach infestations. Have cockroaches been seen in the house in the last month? It is important to ask about tobacco exposure in the home, at work, or at school or day care. Heat sources need to be evaluated (NHLBI, 2007). Once this information is obtained, individualized trigger avoidance education can be provided for the person with asthma.

The option of a "do-it-yourself" environmental home assessment has proven valuable to many. The home assessment is conducted by systematically walking through the grounds and each room of the house. The AAFA offers a program called Wee Breathers that provides asthma education for families. This program is a free download. Trigger assessment and remediation are available at https://www.aafa.org/programs/programs-for-health-care-professionals/education-programs-for-teaching-patients.aspx. This is an excellent resource for all healthcare personnel providing asthma education.

The EPA also provides an Asthma Home Environment Checklist (EPA, 2018), which can be found at https://www.epa.gov/asthma/asthma-home-environment-checklist. This allows a home visitor the opportunity to identify environmental asthma triggers most commonly found in homes, as well as suggestions for remediation of these triggers.

Integrated pest management

For individuals with asthma who have sensitization or symptoms related to exposure to pests (e.g., cockroaches and rodents), the 2020 Focused Update of the EPR-3 (Expert Panel Working Group of the NHLBI et al., 2020) conditionally recommends the use of integrated pest management, alone or as part of a multicomponent allergen-specific mitigation intervention. Integrated pest management (IPM) is a preferable intervention to the use of pesticides. IPM is an approach that integrates ecological practices for economic control of pests, reducing risks while maximizing benefits. Traditional pest control involves the routine application of pesticides. Conversely, IPM focuses on pest prevention and uses pesticides only as needed, and integrates multiple pest control methods. Correct pest identification and areas vulnerable to those pests is essential to assure the best preventive measures and to reduce unnecessary use of pesticides. This approach also prevents the elimination of beneficial organisms. IPM programs routinely monitor the efficacy of prevention and control methods, and should be updated based on monitoring results. Preventive actions include reducing clutter, sealing areas where pests enter the building (weatherization), removing trash and overgrown vegetation, maintaining clean dining and food storage areas, installing pest barriers, removing standing water, and educating building occupants on IPM (EPA, 2017).

It is also recommended that schools use an IPM approach. This creates a safer and healthier learning environment by managing

pests and reducing children's exposure to pests and pesticides. With an emphasis on prevention, this allows for substantial economic savings for schools. In the United States, more than 53 million children and 6 million adults spend a significant portion of their days in school. IPM provides an opportunity to create a safer learning environment by reducing children's exposure to pesticides as well as eliminating pests (EPA, 2017).

Other issues

Finally, it is important to be aware of difficulties encountered by individuals and families when attempting to implement trigger control strategies. If the place of residence is a rental home, permission might be needed before any structural changes can be made home. Emotional attachments to pets may make it difficult to remove the pet from the home (EPA, 2018). Lack of economic resources to address, identify, and remediate environmental triggers in homes is a major concern. Households living in substandard housing with unaddressed conditions create multiple exposures to environmental triggers, including mold, moisture, and pests. Additionally, a lack of culturally sensitive asthma management and education resources may interfere with adherence because of lack of trust in the healthcare provider. Low level of health literacy also contributes to adequate trigger control strategies (HUD, 2018).

Evidence-based practice! Health literacy is a key factor influencing asthma management outcomes. A systematic review was conducted to look at the relationship between a child's health literacy and asthma outcomes. An electronic database search reviewed studies published between January 2005 and August 2016. The review identified 13 studies that mostly focused on the relationship between parental health literacy and children's asthma outcomes. Results indicated that having parents with low health literacy was associated with poor asthma control and increased healthcare utilization. In addition, it was found that there are not adequate tools to measure a child's health literacy. Few studies have been conducted on the direct assessment of children's health literacy. Additional studies are needed (Tzeng et al., 2018).

Case study 1

Your patient is a 52-year-old woman with a history of moderate persistent asthma. She is seeing you today with complaints of increased chest tightness and wheezing since temporarily moving into her mother's home (a farmhouse built 70 years ago) to care for her. Your patient tells you that her mother's home is a "dust pit" and has not been cleaned in months because of her mom's declining health and inability to do so. Your patient also states that she has recently seen a few cockroaches crawling in the kitchen. She recalls that her primary triggers for asthma are dust mites, dogs, cats, and cockroaches, but she has not had to think about them for years because her asthma has been well controlled until now. Your patient's mother does not have any pets. You discuss environmental control and avoidance measures.

Questions

1. What type of advice would you offer your patient about dust mite avoidance? How should she approach cleaning her mother's home?
2. How would you advise your patient to minimize cockroach exposure?
3. Your patient asks if she will feel this poorly the entire time she is staying at her mother's home. How would you answer her?

Discussion

1. Your patient is in a challenging position because she needs to take care of her mother; however, doing so significantly increases her exposure to her asthma triggers. The first task at hand is for your patient to wear a dust mask (one that covers her mouth and nose) and clean her mother's home or seek assistance with the cleaning while her mother is away from the house. Dusting with a damp cloth is the preferable method for cleaning. Once clean, measures to reduce her exposure to dust mites include using allergen-impermeable mattress and pillow covers, vacuuming with a HEPA filter, and reducing the humidity level in the home to below 50%. It is important to continue damp dusting on a weekly basis, if not more frequently. You should also assess any community resources that might be available to assist with allergen reduction. The patient's health insurance provider should also be contacted to see if any reimbursement is available for asthma management resources.
2. Cockroach exposure can be minimized by chemical extermination with insecticides, although that is sometimes an irritant to individuals with asthma. Gel pesticides are recommended over aerosolized ones to prevent the chemical from dispersing in the air and being inhaled. This might exacerbate asthma and have other harmful effects. Additionally, making sure that there is no exposed food source or food waste on the countertops or tables is important. Cockroaches like water, so it is necessary to ensure that there are no leaky pipes or faucets in the home. Your patient needs to understand that there is no method available to kill cockroach eggs; therefore, she must remain vigilant.
   Another option is a referral for integrated pest management. Integrated pest management is an approach that integrates ecological practices for economic control of pests – reducing risks while maximizing benefits. You should help the patient find resources in the community that might assist her with doing this service.
3. You can encourage your patient by informing her that as she implements a multicomponent approach, including environmental controls and avoidance measures, she can expect that, over time, her asthma symptoms will return to being controlled. If she is diligent about the environmental control and avoidance measures, she can be optimistic that she will regain control of her asthma while living at her mother's home. A follow-up visit should be scheduled to assess if she was able to implement the recommendation and reassess her status. Education should be provided for acute symptoms that may require emergency intervention. She should follow up with her primary care provider, as she may require an adjustment of her medication from exposure to her asthma triggers.

Case study 2

Your patient is a 10-year-old boy with mild persistent asthma. His triggers are cold weather, smoke, upper respiratory tract infections, and dust mites. After the weather suddenly became cold and wet, your patient experienced an acute asthma exacerbation that resulted in an ED visit. Findings from a home visit revealed smoke damage to half of the house from a recent fire. The family lives in the home, owned by a family member, as they do not have enough money to pay rent. Other findings included cigarette smoking by the mother (limited to her own bedroom), clutter in your patient's bedroom, and a resolving upper respiratory tract infection for your patient. The mother was stressed financially and emotionally and refused to discuss smoking cessation. When your patient experiences difficulty breathing, she lets him sleep in her room.

Questions

1. Do you think that the ED visit could have been prevented?
2. Considering the mother's stress and limited resources, describe a trigger-control plan that the child could reasonably follow.
3. What is the significance of the burned house?

Discussion

1. Most ED visits because of asthma are preventable. Recognition of early warning signs of asthma and awareness of asthma triggers and the need for their avoidance can potentially prevent the need for emergency care. This can be assisted with a home assessment and an educational plan individualized for this family that includes mitigating triggers and medication use for symptom exacerbations, detailed in a written asthma action plan.
2. Healthcare professionals should stress trigger-control measures that your patient can manage. He can control the bedroom clutter, recognize early warning signs, and notify an adult (including the school nurse) when he experiences warning signs. He should avoid sleeping in his mother's room because it contains cigarette smoke. Ideally, the mother should stop smoking or at least smoke outside the house, although she may not be willing to do this. It does need to be emphasized, however, that secondhand smoke is detrimental as well. The mother must understand that despite the use of highly effective asthma medications, it may be very difficult to get her child's asthma under control and keep it under control as long as she continues to smoke inside the home. If your patient continues to experience severe exacerbations of asthma (i.e., warranting an ED visit), exposure to environmental tobacco smoke may at some point be considered a case of medical neglect (although, in this case, the recent house fire also is a likely trigger).
3. Indoor air pollutants may be emitted from the burned part of the house. Certainly, the home is substandard and not a healthy environment for the family, especially for a person with asthma. As an advocate, you should assist the family in identifying resources to help locate alternative housing.

Conclusion

Asthma is increasing in prevalence and poses great risk to one's physical, social, and economic health. Asthma is a chronic inflammatory disease of the airway that produces bronchoconstriction, edema, and mucus formation. The inflammatory response is complex and self-perpetuating. Inflammatory events lead to airway obstruction and, over time, irreversible changes because of airway remodeling. Inflammation is persistent and widespread throughout the airway and produces characteristic asthma symptoms. Treatment must include antiinflammatory therapy that is continuous and delivered throughout all parts of the airway. However, despite optimal treatment, a person's airflow limitation may be only partially reversible. Permanent structural changes in the individual's airway can occur and are associated with a progressive loss of lung function. However, these changes can be minimized with early diagnosis and appropriate management. It is imperative to understand the triggers that increase risk for developing asthma and increasing asthma severity. Individualized and sensitive interventions and education need to be instituted to allow for the best possible outcomes.

References

- Acevedo, N., Zakzuk, J., & Caraballo, L. (2019). House dust mite allergy under changing environments. *Allergy, Asthma & Immunology Research, 11*(4), 450-469. https://doi.org/10.4168/aair.2019.11.4.450
- American Academy of Allergy, Asthma, and Immunology. (n.d.a). *Atopy defined.* https://www.aaaai.org/Tools-for-the-Public/Allergy,-Asthma-Immunology-Glossary/Atopy-Defined
- American Academy of Allergy, Asthma, and Immunology. (n.d.b). *Immunoglobulin E (IgE) definition.* https://www.aaaai.org/Tools-for-the-Public/Allergy,-Asthma-Immunology-Glossary/Immunoglobulin-E-(IgE)-Defined
- American Allergy Federation of America Community Services. (2019). *Tips for preventing allergic reactions to tree and grass pollen.* https://community.aafa.org/blog/tips-for-preventing-allergic-reactions-to-tree-and-grass-pollen
- American Lung Association. (2020a). *Asthma risk factors.* https://www.lung.org/lung-health-diseases/lung-disease-lookup/asthma/asthma-symptoms-causes-risk-factors/asthma-risk-factors
- American Lung Association. (2020b) *Cockroaches.* https://www.lung.org/clean-air/at-home/indoor-air-pollutants/cockroaches
- American Lung Association. (2020c). *The health effects of smoking with asthma.* https://www.lung.org/lung-health-diseases/lung-disease-lookup/asthma/asthma-symptoms-causes-risk-factors/smoking-with-asthma
- American Lung Association. (2020d). *What are dust mites?* https://www.lung.org/clean-air/at-home/indoor-air-pollutants/dust-mites
- American Nurses Association. (n.d.). *Tobacco and nicotine use cessation.* https://www.nursingworld.org/practice-policy/work-environment/health-safety/tobacco-free-nurses/
- American Nurses Association. (2020). *Position statement: Prevention and cessation of tobacco and other nicotine products.* https://www.nursingworld.org/~49b0b0/globalassets/practiceandpolicy/work-environment/health--safety/tobacco-cessation/ana-position-statement-on-tobacco-products-03202020.pdf
- Asthma and Allergy Foundation of America. (2017). *Tobacco smoke and asthma.* https://www.aafa.org/secondhand-smoke-environmental-tobacco-asthma
- Asthma and Allergy Foundation of America. (2019a). *Asthma.* https://www.aafa.org/asthma.aspx
- Asthma and Allergy Foundation of America. (2019b). *Asthma facts and figures.* https://www.aafa.org/asthma-facts
- Asthma and Allergy Foundation of America. (2019c). *What causes or triggers asthma?* https://www.aafa.org/asthma-triggers-causes/
- Asthma and Allergy Foundation of America. (2020). *Asthma disparities in America: A roadmap to reducing burden on racial and ethnic minorities.* https://www.aafa.org/media/2743/asthma-disparities-in-america-burden-on-racial-ethnic-minorities.pdf
- Asthma and Allergy Foundation of America. (2021). *2021 allergy capitals. https://www.aafa.org/media/2933/aafa-2021-allergy-capitals-report.pdf*
- Asthma and Allergy Foundation of America. New England Chapter. (n.d.). *Adult onset asthma.* http://asthmaandallergies.org/asthma-allergies/adult-onset-asthma/
- Barnes, K. C. (2020). Genetics of asthma. *UpToDate.* https://www.uptodate.com/contents/genetics-of-asthma
- Ben-Joseph, E. P. (2019). *Secondhand smoke.* KidsHealth. https://www.akronchildrens.org/kidshealth/en/teens/secondhand-smoke.html
- Bhaumik, U., Sommer, S. J., Lockridge, R., Penzias, R., Nethersole, S., & Woods, E. R. (2020). Community asthma initiative: Cost analyses using claims data from a Medicaid managed care organization. *Journal of Asthma: Official Journal of the Association for the Care of Asthma, 57*(3), 286-294. https://doi.org/10.1080/02770903.2019.1565825
- Biagini Myers, J. M., Schauberger, E., He, H., Martin, L. J., Kroner, J., Hill, G. M., Ryan, P. H., LeMasters, G. K., Bernstein, D. I., Lockey, J. E., Arshad, H., Kurukulaaratchy, R., & Khurana Hershey, G. K. (2019). A Pediatric Asthma Risk Score to better predict asthma development in young children. *Journal of Allergy and Clinical Immunology, 43*(5), 1803-1810.e2. https://doi.org/10.1016/j.jaci.2018.09.037
- Bjerg, A., Ekerljung, L., Eriksson, J., Näslund, J., Sjölander, S., Rönmark, E., Dahl, Å., Holmberg, K., Wennergren, G., Torén, K., Borres, M. P., Lötvall, J., & Lundbäck, B. (2016). Increase in pollen sensitization in Swedish adults and protective effect of keeping animals in childhood. *Clinical and Experimental Allergy : Journal of the British Society for Allergy and Clinical Immunology, 46*(10), 1328–1336. https://doi.org/10.1111/cea.12757
- Byeon, J. H., Ri, S., Amarsaikhan, O., Kim, E., Ahn, S. H., Choi, I. S., Kim, H. J., Seo, S., Yoon, W., & Yoo, Y. (2017). Association between sensitization to mold and impaired pulmonary function in children with asthma. *Allergy, Asthma & Immunology Research, 9*(6), 509-516. https://doi.org/10.4168/aair.2017.9.6.509
- Caillaud, D. Leynaert, B., Keirsbulck, M., Nadif, R., & Mould ANSES Working Group. (2018). Indoor mould exposure, asthma and rhinitis: findings from systematic reviews and recent longitudinal studies. *European Respiratory Review, 27*(148), 170137. https://doi.org/10.1183/16000617.0137-2017
- Caminati, M., Pham, D. L., Bagnasco, D., & Canonica, G. W. (2018). Type 2 immunity in asthma. *World Allergy Organization Journal, 11*(13). https://doi.org/10.1186/s40413-018-0192-5
- Campbell, J. D. (2017). Implications for asthma treatment strategies in managed care. *American Journal of Managed Care, 23*(1). https://www.ajmc.com/view/implications-for-asthma-treatment-strategies-in-managed-care
- Cannizzaro, T. (2017). *History of asthma (part one): In the beginning.* Asthma.net. https://asthma.net/living/history-of-asthma-part-one-in-the-beginning/#:~:text=The%20earliest%20recorded%20instance%20of,that%20date%20back%20even%20farther
- Centers for Disease Control and Prevention. (2018). *Secondhand smoke (SHS) facts.* https://www.cdc.gov/tobacco/data_statistics/fact_sheets/secondhand_smoke/general_facts/index.htm-
- Centers for Disease Control and Prevention. (2019a). Asthma.-https://www.cdc.gov/healthyschools/asthma/
- Centers for Disease Control and Prevention. (2019b). *What is GIS?* https://www.cdc.gov/gis/what-is-gis.htm
- Centers for Disease Control and Prevention. (2020a). *Asthma-related physician office visits 2010-2016.* https://www.cdc.gov/asthma/asthma_stats/asthma-related-physician-visits_2010-2016.html
- Centers for Disease Control and Prevention. (2020b). *Basic facts about mold and dampness.* https://www.cdc.gov/mold/faqs.htm#mold
- Centers for Disease Control and Prevention. (2020c). *Most recent asthma data.* https://www.cdc.gov/asthma/most_recent_national_asthma_data.htm
- Centers for Disease Control and Prevention. (2020d). Smoking cessation – The role of healthcare professionals and health systems. https://www.cdc.gov/tobacco/data_statistics/sgr/2020-smoking-cessation/fact-sheets/healthcare-professionals-health-systems/index.html
- Centers for Disease Control and Prevention. (2021). *Asthma prevalence and health care resource utilization estimates, United States, 2001-2017* [PowerPoint slides]. https://www.cdc.gov/asthma/asthmadata.htm
- Chan, S. K., & Leung, D. (2018). Dog and cat allergies: Current state of diagnostic approaches and challenges. *Allergy, Asthma & Immunology Research, 10*(2), 97–105. https://doi.org/10.4168/aair.2018.10.2.97
- Chen, E., Hayen, R., Le, V., Austin, M. K., Shalowitz, M. U., Story, R. E., & Miller, G. E. (2019). Neighborhood social conditions, family relationships, and childhood asthma. *Pediatrics, 144*(2), 1-10. https://doi.org/10.1542/peds.2018-3300
- Daya, M., Rafaels, N., Brunetti, T. M., Chavan, S., Levin, A. M., Shetty, A., Gignoux, C. R., Boorgula, M. P., Wojcik, G., Campbell, M., Vergara, C., Torgerson, D. G., Ortega, V. E., Doumatey, A., Johnston, H. R., Acevedo, N., Araujo, M. I., Avila, P. C., Belbin, G., … CAAPA. (2019). Association study in African-admixed populations across the Americas recapitulates asthma risk loci in non-African populations. *Nature Communications, 10*(1), 880. https://doi.org/10.1038/s41467-019-08469-7
- Dinakar, C., Chipps B. E., AAP Section on Allergy and Immunology, & AAP Section on Pediatric Pulmonology and Sleep Medicine. (2017). Clinical tools to assess asthma control in children. *Pediatrics, 139*(1), e20163438. https://doi.org/10.1542/peds.2016-3438
- Dinetz, S. F. (2017). *Dealing with triggers: Pets.* KidsHealth. https://kidshealth.org/en/parents/asthma-pet.html
- Do, D. C., Zhao, Y., & Gao, P. (2016). Cockroach allergen exposure and risk of asthma. *Allergy, 71*(4), 463-474. https://doi.org/10.1111/all.12827
- dos Santos, K., & Isoppo, N. (2019). Risk and protective factors for childhood asthma and wheezing disorders in the first 1,000 days of life: A systematic review of meta-analyses. *Journal of Human Growth and Development, 29*(2), 136-152. https://doi.org/10.7322/jhgd.v29.9413
- Dowshen, S. (2018). *What is epigenetics?* KidsHealth. https://kidshealth.org/en/parents/about-epigenetics.html
- Drope, J., Schluger, N., Cahn, Z., Drope, J., Hamill, S., Islami, F., Liber, A., Nargis, N., & Stoklosa,
- M. (2018). *The tobacco atlas.* https://tobaccoatlas.org/wp-content/uploads/2018/03/TobaccoAtlas_6thEdition_LoRes_Rev0318.pdf
- Expert Panel Working Group of the National Heart, Lung, and Blood Institute (NHLBI) administered and coordinated National Asthma Education and Prevention Program Coordinating Committee (NAEPPCC), Cloutier, M. M., Baptist, A. P., Blake, K. V., Brooks, E. G., Bryant-Stephens, T., DiMango, E., Dixon, A. E., Elward, K. S., Hartert, T., Krishnan, J. A., Lemanske, R. F., Jr., Ouellette, D. R., Pace, W. D., Schatz, M., Skolnik, N. S., Stout, J. W., Teach, S. J., Umscheid, C. A., & Walsh, C. G. (2020). 2020 focused updates to the asthma management guidelines: A Report from the National Asthma Education and Prevention Program Coordinating Committee Expert Panel Working Group. *Journal of Allergy and Clinical Immunology, 146*(6), 1217-1270. https://doi.org/10.1016/j.jaci.2020.10.003
- Familydoctor.org. (2020). *Asthma medicines that can make it worse.* https://familydoctor.org/medicines-that-can-make-it-worse/
- Felman, A. (2018). *A brief history of asthma.* Medical News Today. https://www.medicalnewstoday.com/articles/winter-allergies
- Feng, M., Yang, Z., Pan, L., Lai, X., Xian, M., Huang, X., Chen, Y., Schröder, P. C., Roponen, M., Schaub, B., Wong, G. W. K., & Li, J. (2016). Associations of early life exposures and environmental factors with asthma among children in rural and urban areas of Guangdong, China. *Chest, 149*(4), 1030-1041. https://doi.org/10.1016/j.chest.2015.12.028
- Feng, X., & Astell-Burt, T. (2017). Is neighborhood green space protective against associations between child asthma, neighborhood traffic volume and perceived lack of area safety? Multilevel analysis of 4447 Australian children. *International Journal of Environmental Research and Public Health, 14*(5), 543. https://doi.org/10.3390/ijerph14050543
- Ferrante, G., & La Grutta, S. (2018). The burden of pediatric asthma. *Frontiers in Pediatrics, 6*, 186. https://doi.org/10.3389/fped.2018.00186
- Friis, R. (2018). *Epidemiology 101* (2nd ed.). Jones and Bartlett Learning.
- Gautier, C., & Charpin, D. (2017). Environmental triggers and avoidance in the management of asthma. *Journal of Asthma and Allergy, 10*, 47-56. https://doi.org/10.2147/JAA.S121276
- Glick, A. F., Tomopoulos, S., Fierman, A. H., Trasande, L. (2016). Disparities in mortality and morbidity in pediatric asthma hospitalizations, 2007 to 2011. *Academic Pediatrics, 16*(5), 430-437. https://doi.org/10.1016/j.acap.2015.12.014
- Global Asthma Network. (n.d.). *About asthma.* http://globalasthmanetwork.org/patients/asthma.php
- Global Initiative for Asthma. (2020). *Global strategy for asthma management and prevention.* https://ginasthma.org/wp-content/uploads/2020/06/GINA-2020-report_20_06_04-1-wms.pdf
- Gruber, K. J., McKee-Huger, B., Richard, A., Byerly, B., Raczkowski, J. L., & Wall, T. C. (2016). Removing asthma triggers and improving children's health: The Asthma Partnership Demonstration project. *Annals of Allergy, Asthma & Immunology, 116*(5), 408-414. https://doi.org/10.1016/j.anai.2016.03.025
- Guilbert, T. W., & Lemanske, R. F. (2019). Wheezing phenotypes and prediction of asthma in young children. *UpToDate.* https://www.uptodate.com/contents/wheezing-phenotypes-and-prediction-of-asthma-in-young-children
- Hamilton, R. G. (2019). Assessment of mold in the indoor environment. *UpToDate.* https://www.uptodate.com/contents/assessment-of-mold-in-the-indoor-environment/print?source=related_link
- Harvard Medical School. (2019). *Allergies? Tips to minimize your exposure to mold.* https://www.health.harvard.edu/diseases-and-conditions/allergies-tips-to-minimize-your-exposure-to-mold#:~:text=People %20who%20are%20allergic% 20to,and% 20 immediately% 20after%20summer %20rainstorms
- He, Z., Feng, J., Xia, J., Wu, Q., Yang, H., & Ma, Q. (2020). Frequency of signs and symptoms in persons with asthma. *Respiratory Care, 65*(2), 252-264. https://doi.org/10.4187/respcare.06714
- Hollenbach, J. P., Schifano, E. D., Hammel, C., & Cloutier, M. M. (2017). Exposure to secondhand smoke and asthma severity among children in Connecticut. *PLoS ONE, 12*(3), e0174541. https://doi.org/10.1371/journal.pone.0174541
- Hossny, E. (2020). *Management of asthma in children 5 years and under.* World Allergy Organization. https://www.worldallergy.org/education-and-programs/education/allergic-disease-resource-center/professionals/treatment-of-asthma-in-children-5-years-and-under
- Hughes, H. K., Matsui, E. C., Tschudy, M. M., Pollack, C. E., & Keet, C. A. (2017). Pediatric asthma health disparities: race, hardship, housing, and asthma in a national survey. *Academic Pediatrics, 17*(2), 127-134. https://doi.org/10.1016/j.acap.2016.11.011
- Kaneshiro, N. K. (2020a). *Allergies, asthma, and molds.* US National Library of Medicine. https://medlineplus.gov/ency/patientinstructions/000488.htm
- Kaneshiro, N. K. (2020b). *Allergies, asthma, and pollens.* US National Library of Medicine. https://medlineplus.gov/ency/patientinstructions/000489.htm
- Khreis, H., de Hoogh, K., & Nieuwenhuijsen, M. J. (2018). Full-chain health impact assessment of traffic-related air pollution and childhood asthma. *Environment International, 114*, 365-375. https://doi.org/10.1016/j.envint.2018.03.008
- Khreis, H., Ramani, T., de Hoogh, K., Mueller, N., Rojas-Rueda, D., Zietsman, J., & Nieuwenhuijsen, M. J. (2019). Traffic-related air pollution and the local burden of childhood asthma in Bradford, UK. *International Journal of Transportation Science and Technology.* https://doi.org/10.1016/j.ijtst.2018.07.003
- Kim, Y. Y. (n.d.). *Asthma history and timeline: A brief history of asthma.* World Asthma Foundation. http://worldasthmafoundation.org/asthma-history-and-timeline
- Kowal, K., & DuBuske, L. (2020). Overview of skin testing for allergic disease. *UpToDate*
- https://www.uptodate.com/contents/overview-of-skin-testing-for-allergic-disease
- Kowal, K., & DuBuske, L. (2021). Overview of in vitro allergy tests. *UpToDate.* https://www.uptodate.com/contents/overview-of-in-vitro-allergy-tests/print
- Kritikos, V., Price, D., Papi, A. Infantino, A., Ställberg, B., Ryan, D., Lavorini, F., Chrystyn, H., Haughney, J., Lisspers, K., Gruffydd-Jones, K., Rodríguez, M. R., Henrichsen, S. H., van der Molen, T., Carter, V., & Bosnic-Anticevich, S. (2019). A multinational observational study identifying primary care patients at risk of overestimation of asthma control. *Primary Care Respiratory Medicine, 29*(43). https://doi.org/10.1038/s41533-019-0156-4
- Kuruvilla, M. E., Lee, F. E., & Lee, G. B. (2019). Understanding asthma phenotypes, endotypes, and mechanisms of disease. *Clinical Reviews in Allergy & Immunology, 56*(2), 219-233. https://doi.org/10.1007/s12016-018-8712-1
- Levy, J. I., Quirós-Alcalá, L., Fabian, M. P., Basra, K., & Hansel, N. N. (2018). Established and emerging environmental contributors to disparities in asthma and chronic obstructive pulmonary disease. *Current Epidemiology Reports,* 5, 114-124. https://doi.org/10.1007/s40471-018-0149-9
- Litonjua, A. A., & Weiss, S. T. (2020). Risk factors for asthma. *UpToDate.* https://www.uptodate.com/contents/risk-factors-for-asthma
- Liu, M. (2019). Pathogenesis of asthma. *UpToDate.* https://www.uptodate.com/contents/pathogenesis-of-asthma
- Lycett, H., Wildman, E., Raebel, E. M., Sherlock, J. P., Kenny, T., & Chan, A. H. Y. (2018). Treatment perceptions in patients with asthma: Synthesis of factors influencing adherence. *Respiratory Medicine, 141*, 180-189. https://doi.org/10.1016/j.rmed.2018.06.032
- Mackenzie, J. (2016). *Air pollution: Everything you need to know.* Natural Resources Defense Council. https://www.nrdc.org/stories/air-pollution-everything-you-need-know#sec1
- Matsui, E. C., Abramson, S. L., Sandel, M. T., Section on Health Allergy and Immunology, & Council on Environmental Health. (2016). Indoor environmental control practices and asthma management. *Pediatrics, 138*(5), e1-e11. https://doi.org/10.1542/peds.2016-2589
- Miller, R. (2020). Patient education: Trigger avoidance in asthma (beyond the basics). *UpToDate.* https://www.uptodate.com/contents/trigger-avoidance-in-asthma-beyond-the-basics/print

- Morris, M. J. (2020). *Asthma clinical presentation*. Medscape. https://emedicine.medscape.com/article/296301-clinical#b1
- Myers, V., Shiloh, S. & Rosen, L. (2018). Parental perceptions of children's exposure to tobacco smoke: Development and validation of a new measure. *BMC Public Health,* 18**,** 1031. https://doi.org/10.1186/s12889-018-5928-1
- National Asthma Education and Prevention Program. (n.d.). *National Asthma Education and Prevention Program (NAEPP*). https://www.nhlbi.nih.gov/science/national-asthma-education-and-prevention-program-naepp
- National Heart, Lung, and Blood Institute. (2007). *Expert panel report 3 (EPR3): Guidelines for the diagnosis and management of asthma.* https://www.nhlbi.nih.gov/health-topics/guidelines-for-diagnosis-management-of-asthma
- Newsom, R. (2021). *Asthma and sleep*. Sleep Foundation. https://www.sleepfoundation.org/sleep-related-breathing-disorders/asthma-and-sleep
- Norris, T. L. (2019). *Essentials of pathophysiology* (4th ed.). Wolters Kluwer.
- Nurmagambetov, T., Kuwahara, R., & Garbe, P. (2018). The economic burden of asthma in the United States, 2008-2013. *Annals of the American Thoracic Society*, *15*(3), 348-356. https://doi.org/10.1513/AnnalsATS.201703-259OC
- O'Donovan, A. (2019). *A brief history of asthma.* Allergy Standards. https://www.allergystandards.com/news_events/a-brief-history-of-asthma/
- Pakkasela, J., Ilmarinen, P., Honkamäki, J., Tuomisto, L. E., Andersén, E., Piirilä, P., Hisinger-Mölkänen, H., Sovijärvi, A., Backman, H., Lundbäck, B., Rönmark, E., Kankaanranta, H., & Lehtimäki, L. (2020). Age-specific incidence of allergic and non-allergic asthma. *BMC Pulmonary Medicine, 20*(9). https://doi.org/10.1186/s12890-019-1040-2
- Patel, H. H. (2019). *Asthma history.* News Medical LifeSciences. https://www.news-medical.net/health/Asthma-History.aspx
- Patel, P. H., Mirabile, V. S., & Sharma, S. (2020). Wheezing. *StatPearls*. https://www.ncbi.nlm.nih.gov/books/NBK482454/
- Quaranta, J. E., Swaine, J., & Ryszka, S. (2020). Preschool asthma: Examining environmental influences using geographic information systems. *Public Health Nursing, 37*(3), 405-411. https://doi.org/10.1111/phn.12729
- Rantala, A. K., Magnus, M. C., Karlstad, Ø., Stigum, H., Håberg, S. E., Nafstad, P., Nystad, W., & Jaakkola, J. J. K. (2020). Is the association of early day care attendance with childhood asthma explained by underlying susceptibility? *Epidemiology, 31*(3), 451-458. https://doi.org/10.1097/EDE.0000000000001163
- Reddel, H. K., FitzGerald, J. M., Bateman, E. D., Bacharier, L. B., Becker, A., Brusselle, G. Buhl, R., Cruz, A. A., Fleming, L., Inoue, H., Ko, F. W., Krishnan, J. A., Levy, M. L., Lin, J., Pedersen, S. E., Sheikh, A., Yorgancioglu, A., & Boulet, L.-P. (2019). GINA 2019: A fundamental change in asthma management. *European Respiratory Journal, 53,* 1901046. https://doi.org/10.1183/13993003.01046-2019
- Rhee, H., Love, T., Harrington, D., & Grape, A. (2018). Common allergies in urban adolescents and their relationships with asthma control and healthcare utilization. *Allergy Asthma & Clinical Immunology, 14*(33). https://doi.org/10.1186/s13223-018-0260-y
- Rubner, F. J., Jackson, D. J., Evans, M. D., Gangnon, R. E., Tisler, C. J., Pappas, T. E., Gern, J. E., & Lemanske, R. F., Jr (2017). Early life rhinovirus wheezing, allergic sensitization, and asthma risk at adolescence. *The Journal of Allergy and Clinical Immunology*, *139*(2), 501–507. https://doi.org/10.1016/j.jaci.2016.03.049
- Samet, J. M., & Sockrider, M. (2020). Secondhand smoke exposure: Effects in children. *UpToDate*. https://www.uptodate.com/contents/secondhand-smoke-exposure-effects-in-children
- Sawicki, G., & Haver, K. (2020). Asthma in children younger than 12 years: Initial evaluation and diagnosis. *UpToDate*. https://www.uptodate.com/contents/asthma-in-children-younger-than-12-years-initial-evaluation-and-diagnosis
- Sheehan, W. J., & Phipatanakul, W. (2016). Indoor allergen exposure and asthma outcomes. *Current Opinion in Pediatrics, 28*(6), 772-777. https://doi.org/10.1097/MOP.0000000000000421
- Sinyor, B., & Concepcion Perez, L. (2020). *Pathophysiology of asthma.* In: StatPearls [Internet]. StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK551579/
- Soto-Martinez, M. E. (2017). The impact of the environment on respiratory outcome. *Pediatric Pulmonology, 52,* S32-S34. https://doi.org/10.1002/ppul.23729
- Stein, M. M., Hrusch, C. L., Gozdz, J., Igartua, C., Pivniouk, V., Murray, S. E., Ledford, J. G., Marques dos Santos, M., Anderson, R. L., Metwali, N., Neilson, J. W., Maier, R. M., Gilbert, J. A., Holbreich, M., Thornes, P. S., Martinez, F. D., von Mutius, E., Vercelli, D., Ober, C., & Sperling, A. I. (2016). Innate immunity and asthma risk in Amish and Hutterite farm children. *New England Journal of Medicine, 375*, 411-421. https://doi.org/10.1056/NEJMoa1508749
- Su, K.-W., Chiu, C.-Y., Tsai, M.-H., Liao, S.-L., Chen, L.-C., Hua, M.-C., Yao, T.-C., Huang, J.-L., Yeh, K.-W. (2019). Asymptomatic toddlers with house dust mite sensitization at risk of asthma and abnormal lung functions at age 7 years, *World Allergy Organization Journal, 12*(9). https://doi.org/10.1016/j.waojou.2019.100056
- To, T., Zhu, J., Strieb, D., Gray, N., Fong, I., Pinault, L., Jerret, M., Robichaud, A., Ménard, R., van Donkelaar, A., Martin, R. V., Hystad, P., Brook, J. R., & Dell, S. (2020). European *Respiratory Journal*, *55*(2), 1900913. https://doi.org/10.1183/13993003.00913-2019
- Tzeng, Y.-F., Chiang, B.-L., Chen, Y.-H., & Gau, B. S. (2018). Health literacy in children with asthma: A systematic review. *Pediatrics and Neonatology, 59*, 429-438. https://doi.org/10.1016/j.pedneo.2017.12.001
- US Department of Health and Human Services. (n.d.a). *Healthy People 2030: Asthma.* https://health.gov/healthypeople/search?query=asthma
- US Department of Health and Human Services. (n.d.b). *How has Healthy People changed?* https://health.gov/healthypeople/about/how-has-healthy-people-changed
- US Department of Health and Human Services. (2020). *Healthy People 2030 framework.* https://health.gov/healthypeople/about/healthy-people-2030-framework
- US Department of Housing and Urban Development. (2018). *Guide to sustaining effective asthma home intervention programs.* https://www.hud.gov/sites/dfiles/HH/documents/HUD%20Asthma%20Guide%20Document_Final_7_18.pdf
- US Environmental Protection Agency. (n.d.). *Air Quality Index (AQI) basics.* https://www.airnow.gov/aqi/aqi-basics/
- US Environmental Protection Agency. (2017). *Introduction to integrated pest management.* https://www.epa.gov/ipm/introduction-integrated-pest-management#Principles
- US Environmental Protection Agency. (2018). *Home characteristics and asthma triggers: Checklist for home visitors.* https://www.epa.gov/sites/production/files/2018-05/documents/asthma_home_environment_checklist.pdf
- US Environmental Protection Agency. (2020a). *Asthma triggers: Gain control.* https://www.epa.gov/asthma/asthma-triggers-gain-control
- US Environmental Protection Agency. (2020b). *Health and environmental effects of particulate matter (PM): Health effects.* https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm
- US Environmental Protection Agency. (2020c). *Indoor air quality (IAQ): The inside story: A guide to indoor air quality.* https://www.epa.gov/indoor-air-quality-iaq/inside-story-guide-indoor-air-quality#reference-guide
- US Environmental Protection Agency. (2020d). *Molds and health: How do molds affect people?* https://www.epa.gov/mold/mold-and-health
- US National Library of Medicine. (2020). *Allergic asthma.* https://medlineplus.gov/genetics/condition/allergic-asthma/
- US National Library of Medicine. (2021). *Immune response*. https://medlineplus.gov/ency/article/000821.htm
- von Mutius, E., & Smits, H. H. (2020). Primary prevention of asthma: From risk and protective factors to targeted strategies for prevention. *Lancet, 396, 854-866*. https://doi.org/10.1016/S0140-6736(20)31861-4
- Winn, A. K., Salo, P. M., Klein, C., Sever, M. L., Harris, S. F., Johndrow, D., Crockett, P. W., Cohn, R. D., & Zeldin, D. C. (2016). Efficacy of an in-home test kit in reducing dust mite allergen levels: results of a randomized controlled pilot study. *Journal of Asthma, 53*(2), 133-138. https://doi.org/10.3109/02770903.2015.1072721
- World Health Organization. (n.d.). *Asthma: Definition*. https://www.who.int/respiratory/asthma/definition/en/
- World Health Organization. (2020). *Asthma.* https://www.who.int/news-room/fact-sheets/detail/asthma
- Zahran, H., Bailey, C., Damon, S., Garbe, P., & Breysse, P. (2018). Vital signs: Asthma in children – United States, 2001-2016. *Morbidity and Mortality Weekly Report, 67*, 149-155. http://doi.org/10.15585/mmwr.mm6705e1

Self-Assessment Answers and Rationales

1. The correct answer is A.
Rationale: Asthma prevalence is increasing in industrialized countries. Puerto Rican children have the highest asthma prevalence rates. Males have higher prevalence in childhood, whereas females have higher prevalence in adulthood. Overall asthma prevalence for children has not increased in recent years.

2. The correct answer is C.
Rationale: In the breakdown of costs, asthma prescriptions is the highest cost. Asthma costs are usually underestimated and do not include related costs such as transportation for care. Mortality costs for asthma are included in the calculation for overall cost.

3. The correct answer is B.
Rationale: Healthy People 2030 reduced the number of objectives from Healthy People 2020. Healthy People 2030 focuses on reducing asthma deaths, hospitalizations, and ED visits. Instruction on inhalers is a Healthy People 2020 objective. Referral to a specialist and administration of the influenza vaccine are not specifically addressed.

4. The correct answer is B.
Rationale: Exposure to tobacco smoke is a known risk factor for asthma development. Obese children, not thin children, are at greater risk for asthma. According to the hygiene hypothesis, lack of exposure to microbes increases the risk of asthma. Taking controller medications would lessen asthma risk.

5. The correct answer is D.
Rationale: Both guidelines emphasize that asthma is controllable and does not need to be necessarily severe. Although asthma can be seasonal, it is not considered autoimmune. Asthma is not considered a temporary or acute disease but rather a chronic disease.

6. The correct answer is B.
Rationale: It is believed that the different phenotypes are differentiated by their levels of Th2. Each phenotype has its own pathophysiology, which is why asthma is considered a heterogenous disease. Phenotypes can be classified as allergic and nonallergic, although the research is still clarifying much of this information. Individuals with T2 high asthma respond better to inhaled corticosteroids compared with those with non-T2-high asthma.

7. The correct answer is A.
Rationale: This is an irreversible occurrence. Subbasement membrane thickening in adults with severe asthma and in children with early diagnosed asthma causes accelerated lung function loss from this remodeling. Damage or loss of the normal structure of airway epithelium, an increase in mucus-producing goblet cells, fibrotic thickening of the subepithelial reticular basement membrane, increased vascularity, and increased airway smooth muscle mass caused by long-term inflammation contribute to this permanent structural change.

Basic Psychiatric Concepts

6 Contact Hours

Release Date: June 1, 2022 **Expiration Date:** June 1, 2025

Faculty

Robyn B. Caldwell, DNP, FNP-BC, earned a Doctor of Nursing Practice (DNP) from Samford University in nursing administration with an emphasis in nursing education in 2013; a post-master's certificate as a family nurse practitioner from Delta State University in 2003; a master's degree in Nursing Administration (MSN) in 1996; and Bachelor of Science in nursing (BSN) degree in 1990 from the University of Tennessee. Dr. Caldwell has worked in a variety of healthcare settings throughout her 32-year career including adult and pediatric emergency nursing, nursing administration, and nursing education (LPN to DNP) in both the community college and university settings. She has published and presented on topics relevant to nursing education and patient outcomes in local, state, and national venues. Currently, Dr. Caldwell is employed in an urgent care setting and is working on a post masters as a psychiatric mental health nurse practitioner (PMHNP).

Robyn B. Caldwell has disclosed that she has no significant financial or other conflicts of interest pertaining to this course.

Reviewer: Kimberleigh Cox, DNP, PMHNP-BC, ANP-BC, PHNc., is an Associate Professor at the University of San Francisco's School of Nursing and Health Professions and is nationally board certified as both an adult nurse practitioner (ANP) and psychiatric mental health nurse practitioner (PMHNP). She is also a certified Public Health Nurse (PHNc). Dr. Cox received her bachelor's degree in Psychology from Brown University. She then worked for Harvard, Brown and Stanford Universities' Departments of Psychiatry and Mood Disorders Clinics from 1990-1995 doing clinical research, primarily in depressive and anxiety disorders. Dr. Cox received her master's degree in Nursing (MSN) from University of California San Francisco in 1998, completing a dual adult and psychiatric nurse practitioner program. She has practiced clinically as a Nurse Practitioner since 1998 working with diverse populations of individuals with psychiatric, behavioral health, and addictive problems in a variety of specialty mood disorders, psychiatric and residential care settings in California. She completed her Doctor of Nursing Practice (DNP) from USF in 2010 and was the Dean's Medal recipient for professionalism. Her doctoral work focused on chronic depression and the application of an evidence-based psychotherapeutic treatment. Dr. Cox has been teaching undergraduate and graduate nursing students in community/public health and psychiatric/mental health since 2003. She has presented nationally on managing patients with difficult behaviors, has authored publications, including "Bipolar and Related Disorders: Signs, Symptoms and Treatment Strategies" (2018), and has peer reviewed "Depression: A Major Public Health Concern" (2nd & 3rd editions - 2019, 2022).

Kimberleigh Cox has disclosed that she has no significant financial or other conflicts of interest pertaining to this course.

Course overview

The goal of this course is to provide an introductory overview of mental health concepts. This course examines the history, epidemiology, legal/ethical aspects, mental health assessment, and other basic therapeutic skills used in mental health nursing. In-text links, case studies, and self-assessment questions and NCLEX-style testing are utilized.

This course is designed for registered nurses, licensed practical/vocational nurses, and newly licensed registered nurses who desire a greater understanding of basic mental health concepts. A fundamental understanding of medical terminology, abbreviations, and nursing care is assumed.

Learning objectives

Upon completion of the course, the learner will be able to:

- Explore historical aspects associated with mental healthcare.
- Identify legal and ethical principles of mental health nursing.
- Explore cultural aspects of mental health.
- Describe components of the psychiatric assessment, including the mental status exam.
- Describe neurobiological components essential to mental health.
- Identify therapeutic modalities used in mental healthcare.

How to receive credit

- Read the entire course online or in print which requires a 6-hour commitment of time.
- Complete the self-assessment quiz questions which are at the end of the course or integrated throughout the course. These questions are NOT GRADED. The correct answer is shown after you answer the question. If the incorrect answer is selected, the rationale for the correct answer is provided. These questions help to affirm what you have learned from the course.
- Depending on your state requirements you will be asked to complete either:
  - An affirmation that you have completed the educational activity.
  - A mandatory test (a passing score of 70 percent is required). Test questions link content to learning objectives as a method to enhance individualized learning and material retention.
- If requested, provide required personal information and payment information.
- Complete the MANDATORY Course Evaluation.
- Print your Certificate of Completion.

CE Broker reporting

Colibri Healthcare, LLC, provider # 50-4007, reports course completion results within 1 business day to CE Broker. If you are licensed in Arkansas, District of Columbia, Florida, Georgia, Kentucky, Michigan, Mississippi, New Mexico, North Dakota, South Carolina, or West Virginia, your successful completion results will be automatically reported for you.

Accreditations and approvals

Colibri Healthcare, LLC is accredited as a provider of nursing continuing professional development by the American Nurses Credentialing Center's Commission on Accreditation.

Individual state nursing approvals

Colibri Healthcare, LLC is accredited as a provider of nursing continuing professional development by the American Nurses Credentialing Center's Commission on Accreditation. In addition to states that accept courses offered by ANCC accredited Providers, Colibri Healthcare, LLC is an approved Provider of continuing education in nursing by: Alabama Board of Nursing, Provider #ABNP1418 (valid through February 5, 2025); Arkansas State Board of Nursing, Provider #50-4007; California Board of Registered Nursing, Provider #CEP17480 (valid through January 31, 2024); California Board of Vocational Nursing and Psychiatric Technicians (LVN Provider # V15058, PT Provider #V15020; valid through December 31, 2023); District of Columbia Board of Nursing, Provider #50-4007; Florida Board of Nursing, Provider #50-4007; Georgia Board of Nursing, Provider #50-4007; Kentucky Board of Nursing, Provider #7-0076 (valid through December 31, 2023; CE Broker provider #50-4007). Michigan Board of Nursing, Provider #50-4007; Mississippi Board of Nursing, Provider #50-4007; New Mexico Board of Nursing, Provider #50-4007; North Dakota Board of Nursing, Provider #50-4007; South Carolina Board of Nursing, Provider #50-4007; and West Virginia Board of Registered Nurses, Provider #50-4007. This CE program satisfies the Massachusetts States Board's regulatory requirements as defined in 244 CMR5.00: Continuing Education.

Activity director

Deborah Martin, DNP, MBA, RN, NE-BC, FACHE, Director of Learning Innovation Colibri Healthcare, LLC

Disclosures

Resolution of conflict of interest
In accordance with the ANCC Standards for Commercial Support for continuing education, Colibri Healthcare, LLC implemented mechanisms prior to the planning and implementation of the continuing education activity, to identify and resolve conflicts of interest for all individuals in a position to control content of the course activity.

Sponsorship/commercial support and non-endorsement
It is the policy of Colibri Healthcare, LLC not to accept commercial support. Furthermore, commercial interests are prohibited from distributing or providing access to this activity to learners.

Disclaimer

The information provided in this activity is for continuing education purposes only and is not meant to substitute for the independent medical judgment of a healthcare provider relative to diagnostic and treatment options of a specific patient's medical condition.

Course verification

All individuals involved have disclosed that they have no significant financial or other conflicts of interest pertaining to this course. Likewise, and in compliance with California Assembly Bill No. 241, every reasonable effort has been made to ensure that the content in this course is balanced and unbiased.

INTRODUCTION

AIn 1973, the American Nurses Association (ANA) developed standards as a framework for psychiatric-mental health nursing practice, which evolved into the "Psychiatric-Mental Health Nursing: Scope and Standards of Practice" (2nd edition, 2014). These practice guidelines provide a foundation for standardization of the professional role, scope, and standards of practice for psychiatric-mental health nurses. During the 1980s and 1990s, respectively, the American Nurses Credentialing Center (ANCC) and American Association of Nurse Practitioners (AANP) implemented specialty certifications relevant to the level of education and experience of the applicants. Increasing numbers of psychiatric mental health nurse practitioners (PMHNPs) have obtained certification to provide advanced care to individuals in both acute and community health settings.

HISTORY OF MENTAL HEALTHCARE

Before the late 1800s, unusual behaviors were commonly thought to be caused by demonic forces. Those who displayed strange behaviors were often banished or confined. People with these odd behaviors were treated poorly and the treatments were aggressive and torturous. In the late 1700s, Philippe Pinel became the superintendent of a mental institution in France (Keltner, 2015). He noted the substandard conditions of the institution and the brutal treatment of the patients. He was the first to begin what became known as *moral therapy*, which consisted of better treatment, including unchaining patients and allowing them time outside. Soon after, William Tuke founded a similar facility in England (Boyd, 2018; Kibria & Metcalfe, 2016). This facility was based on the religious teachings of the Quakers and ensured moral treatment. Tuke saw this institution as a refuge for those with mental illness.

In the United States, Dorothea Dix, a Boston school teacher, was instrumental in opening a state hospital that endorsed a warm and caring environment, providing food and protection for Massachusetts residents (Boyd, 2018; Forrester, 2016). This facilitated a movement toward a more humanistic view of those with mental illness.

In the late 1800s and early 1900s, Sigmund Freud developed his landmark work regarding how childhood experiences and faulty parenting shape the mind (Boyd, 2018; Fromm, 2013). This began the movement toward scientific reasoning and understanding behaviors. Freud influenced researchers such as Carl Jung and Alfred Adler as well as other researchers who contributed to the fields of behaviorism, somatic treatments, and biology (Wedding & Corsini, 2020). With these new developments, patients with psychiatric disorders began to receive needed psychiatric treatment and rehabilitation.

In 1946, the United States passed the National Mental Health Act, which resulted in the establishment of the National Institute of Mental Health or NIMH. In the second half of the 20th century, equality became a central tenet in mental health treatment. Many mental healthcare consumers became advocates and began to promote the rights of those with mental illness, working to demolish stigma, discrimination, and forced treatments.

In 1979, the National Alliance on Mental Illness, an advocacy group, was formed. Through the work of the alliance and other advocacy efforts, mental health patients were granted autonomy and began participating in their own care.

The 1990s were known as the *decade of the brain*, with focus placed on neuroscience and brain research.

It stimulated a worldwide growth of scientific research and advances, including the following:

- Research on genetic basis for mental illnesses.
- Mapping of the genes involved in Parkinson, Alzheimer's, and epilepsy.
- Discovery of the actions and effects of neurotransmitters and cytokines.
- Advancements in neuroimaging techniques that have increased our understanding of normal brain function and pathologic states (Halter, 2018).

In 1990, the Human Genome Project began to map the human genome. This 13-year project strengthened the theory that there are biological and genetic explanations for psychiatric conditions (https://www.genome.gov/human-genome-project). Although researchers have begun to identify genetic links to mental illness, research has yet to reveal the exact nature and mechanisms of the genes involved. It has been established, however, that psychiatric disorders can result from multiple mutated or defective genes.

EPIDEMIOLOGY

Epidemiology is the scientific study of the distribution (frequency, pattern) and determinants (causes, risk factors) of health-related states and events (not just diseases) in specified populations including neighborhoods, schools, cities, states, countries, and globally (https://www.cdc.gov/). Concepts related to epidemiology include *incidence* and *prevalence*. Applied to mental health, incidence is the number of new cases of a mental disorder in each period. Prevalence is the total number of cases in each population for a specific period. According to 2019 data from the National Institutes of Mental Health (NIMH), an estimated 51.5 million adults aged 18 or older (20.6%) in the United States have been diagnosed with mental illness. Lifetime prevalence estimates 49.5% of adolescents have been diagnosed with a mental disorder and 22.2% have had severe impairment (NIMH).

POLICY AND PARITY

The first Surgeon General's report on mental health was published in 1999. This landmark report, which was based on scientific literature and included a focus on mental health providers and consumers, concluded that mental health is fundamental to holistic health and that effective treatments for mental disorders are available.

In 2003, the President's New Freedom Commission on Mental Health recommended that the healthcare system needed to streamline care for those suffering from mental illness. This commission advocated for early diagnosis, prevention, and treatment and set forth new expectations for recovery and assistance for those experiencing mental illness to find housing and work.

In 2006, the Institute of Medicine (now the Health and Medicine Division of the National Academies) Committee on Crossing the Quality Chasm published Improving the Quality of Health Care for Mental and Substance Use Conditions. The *Quality Chasm* series highlights effective treatments and addresses large gaps in care, focusing on voluntary treatment. Additionally, this promotes a system that treats mental health issues separately from physical problems. A strong recommendation was made for equality in financial reimbursement and quality treatment. *The Mental Health Parity and Addiction Equity Act of 2008* (Office of the Federal Register, 2013) sought to improve the quality of treatments for those with mental illness by advocating mental health coverage at the same annual and lifetime benefit as any medical-surgical coverage (Centers for Medicare & Medicaid Services, n.d.). This Act required any business with more than 50 employees to have mental health coverage at the same level as medical-surgical coverage (Centers for Medicare & Medicaid Services, n.d.). This includes deductibles, copayments, coinsurance, out-of-pocket expenses, and treatment limitations. The requirements under the Act are applied indirectly to small group health plans in tandem with the Affordable Care Act's essential health benefit requirements (Centers for Medicare & Medicaid Services, n.d.).

PSYCHIATRIC AND MENTAL HEALTH NURSING

The psychiatric nurse *promotes mental health through the assessment, diagnosis, and treatment of human responses to mental health problems and psychiatric disorders* (American Nurses Association, 2014, p. 129). Psychiatric nursing integrates the use of self, neurobiological theories, and evidence-based practice in planning treatments. Nurses work in a variety of inpatient and outpatient settings with individuals and families across the lifespan who exhibit mental health needs. Specific activities of the psychiatric nurse are defined by the Psychiatric-Mental Health Nursing: Scope and Standards of Practice, published jointly by the American Nurses Association, the American Psychiatric Nurses Association, and the International Society of Psychiatric Mental Health Nurses (American Nurses Association, 2014).

Nurses encounter patients in crisis in many clinical settings. The crisis may be physical, emotional, mental, or spiritual. Regardless of the origin, these patients express a variety of feelings including hopelessness, helplessness, anxiety or anger, low self-esteem, and confusion. Many individuals act withdrawn, suspicious, depressed, hostile, or suicidal. Additionally, the individual may be intoxicated or withdrawing from alcohol or other substances. Knowledge of basic psychiatric concepts increases nursing competency in any clinical setting.

DSM-5 NOMENCLATURE FOR DIAGNOSES AND CLASSIFICATIONS

Blood tests, though useful for diagnosing many physical disorders, cannot diagnose all psychiatric disorders. Instead, healthcare practitioners base their diagnoses primarily on symptoms. Emil Kraepelin was the first healthcare provider to recognize and categorize patients' symptoms into mental disorders around the turn of the 20th century (Boyd, 2018). Today, healthcare providers often use other forms of tests, such as genetic testing, computerized tomography, magnetic resonance imaging, and positron emission tomography, to detect changes in the brain and brain activity.

By 1880, researchers had developed seven classifications of mental illness: mania, melancholia, monomania, paresis, dementia, dipsomania, and epilepsy (APA, n.d.). By 1918, the need for uniformity in diagnoses drove the Committee on Statistics of the American Medico-Psychological Association, which later became the American Psychiatric Association (APA, 2013), to develop the first *Statistical Manual for the Use of Institutions for the Insane*. The purpose of this document was to gather statistical information from institutions regarding 22 known disorders. Following World War II, US Army psychiatrists expanded the diagnostic categories to better incorporate the types of problems veterans experienced as a result of combat (APA, n.d.).

In 1952, the APA published the first edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM)*. Since then, the APA has published new editions of the DSM every 5 to 10 years. In 2013, the APA released the fifth edition of the DSM, the most recent version (APA, 2013). The DSM-5 is the result of a 12-year revision process involving hundreds of professionals, field trials to demonstrate the reliability of the data, and public and professional review and comment (APA, 2013).

The purpose of the DSM-5 is to facilitate healthcare providers' diagnosis of mental disorders and development of individualized treatment plans (APA, 2013). The DSM-5 bases disorders on a continuum from mental health to mental illness. A mental disorder is defined in the DSM-5 as *a syndrome characterized by clinically significant disturbance in the individual's cognition, emotion regulation, or behavior that reflects a dysfunction in the psychological, biological, or developmental processes underlying mental functioning* (APA, 2013, p. 20). The definition also reflects the high level of disability or distress in occupational or other life activities that results from the mental disorder.

Some healthcare providers feel that the DSM-5's categorical classifications limit its use because individuals may not fit neatly into one specific category. Regardless, the DSM-5 serves as a guideline to assist practitioners in making sound clinical decisions. Diagnosis does not always imply etiology; therefore, using the DSM-5 to predict behavior or response to treatment is inappropriate (APA, 2013).

THEORIES RELATED TO PSYCHIATRIC AND MENTAL HEALTH NURSING

Mental health professionals base their work on assessments, behaviors, and theories. These are often described as explanations or hypotheses and tested for relevance and soundness. In mental health, theories are often borrowed from other disciplines and inspire treatments for the practice of psychiatric nursing.

Freud's psychoanalytic theory

Sigmund Freud, referred to as *the father of psychoanalysis*, revolutionized thinking about mental disorders (Townsend, 2019). His theories of personality structure, level of awareness, anxiety, the role of defense mechanisms, and stages of psychosexual development revolutionized the psychiatric world (Townsend, 2019). Although Freud started as a biological scientist, he changed his approach to conversational therapy. He concluded that talking about difficult issues involving intense emotions had the potential to heal problems that could cause mental illnesses. This led Freud to develop his psychoanalytic theory (https://pmhealthnp.com/pmhnp-topics/sigmund-freud-psychoanalytic-theory/).

Erikson's theory on the stages of human development

Erik Erikson, a developmental psychologist, emphasized the role of the psychosocial environment and expanded on Freud's psychoanalytic theory. The Eight Stages of Man, is organized by age and developmental conflicts:

1. Basic trust versus mistrust.
2. Autonomy versus shame and doubt.
3. Initiative versus guilt.
4. Industry versus inferiority.
5. Identity versus role confusion.
6. Intimacy versus isolation.
7. Generativity versus stagnation.
8. Ego integrity versus despair.

Analysis of behavior using Erikson's framework helps nurses to identify long term successful resolution of psychosocial development across the lifespan.

Harry Stack Sullivan's interpersonal theory

Interpersonal theories are the cornerstone of mental health nursing. Harry Stack Sullivan, an American-born psychiatrist, identified personality as an observable behavior within interpersonal relationships, which led to the development of his interpersonal theory. Sullivan believed that anxiety or painful feelings arise from insecurities or the inability to meet biological needs. All behaviors are designed to help individuals through interpersonal interactions by decreasing anxiety. Individuals are unaware that they act out behaviors to decrease anxiety and therapy can help the patient gain personal insight into these insecurities. He was the first to use the term *participant observer*, which refers to the idea that therapists must be part of the therapeutic session. Sullivan insisted that healthcare professionals should interact with patients as authentic human beings through mutual respect, unconditional acceptance, and empathy. Sullivan developed the concept of psychotherapeutic environments characterized by accepting the patient and the situation, which has become an invaluable treatment tool. Even today, many group psychotherapies, family therapies, and training programs use Sullivan's design of an accepting atmosphere (Halter, 2018).

Hildegard Peplau's theory of interpersonal relations

Hildegard Peplau, sometimes referred to as the *mother of psychiatric nursing*, published the theory of interpersonal relations in 1952, which became a foundation for modern psychiatric and mental health nursing (Townsend, 2019). The goal of interpersonal therapy is to reduce or eliminate psychiatric symptoms by improving interpersonal functioning (Sadock, & Ruiz, 2015). Sullivan's work greatly influenced Peplau. She developed the first systematic framework for psychiatric nursing, focusing on the nurse-patient relationship. Peplau established the foundation of professional practice for psychiatric nurses and continued working on psychiatric nursing theory and advancement of nursing practice throughout her career. She was the first nurse to identify mental health nursing as a specialty area with specific ideologies and principles, and the first to describe the nurse-patient relationship as the foundation for nursing practice (Boyd, 2018).

Peplau created a major shift from a care model focused on medical treatment to one based on the interpersonal relationship between nurses and patients. She further proposed that nurses are both participants and observers in the therapeutic treatment of patients. Her theory recognizes the *ability to feel in oneself the feelings experienced by another*; she identified this as *empathetic linkage* (Boyd, 2018). Another key concept, according to Peplau, is anxiety, which is an energy that arises when present expectations are not met (Boyd, 2018). Throughout her career, Peplau's goal was for nurses to care for the person and the illness.

B.F. Skinner's behavioral theory

Behavioral theories supply techniques that patients can use to modify or replace behaviors. This is an important concept in psychiatric nursing management and is the basis of several approaches that research has shown to be successful in altering specific behaviors. B. F. Skinner, a prominent behaviorist, researched *operant conditioning*, the process through which consequences and reinforcements shape behaviors. Behavioral therapy is grounded in the assumption that maladaptive behaviors can be changed, and positive and negative reinforcements can be used to help modify behavior. Behavioral therapy is often used in treating people with phobias, alcoholism, and anxiety. Another type of behavioral therapy is modeling, in which the therapist or nurse role-plays specific behaviors so that the patient can learn through imitation. Role-playing allows the patient to practice modeled behaviors in a safe environment. Another form of behavioral therapy is systematic desensitization, which targets a patient's specific fears and proceeds in a step-by-step manner to alleviate those fears with the help of relaxation techniques (Keltner, 2018).

Aaron Beck's cognitive behavioral therapy

Whereas behaviorists focus on the belief that behaviors can be changed, other researchers focus on cognition or thoughts involved in behaviors. Aaron Beck developed cognitive behavioral therapy after working with depressed patients. Cognitive behavioral therapy is based on cognitive psychology and behavioral therapy. Beck believed that depression was the result of distorted thinking processes and negative self-concept (https://www.ncbi.nlm.nih.gov/books/NBK470241/). Using this approach, the nurse can help the patient identify negative thought patterns and then help the patient recondition these cognitive distortions into more appropriate beliefs that are based on facts (https://www.ncbi.nlm.nih.gov/books/NBK470241/).

Humanistic Theories

Humanistic theories focus on the potential and the free will of patients. These theories emphasize self-actualization, the highest potential and productivity that an individual can achieve in life. For example, Abraham Maslow believed that motivation is driven by a hierarchy of needs that leads to becoming the best person possible. This model allows the nurse to work with the patient to create an individualized care plan based on the current hierarchical needs of the patient https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4130906/.

THE STRESS-DIATHESIS MODEL

The Stress-Diathesis Model was originally developed to explain schizophrenia during the 1960s, but later adapted to study depression during the 1980s (Colodro-Conde, et.al, 2018). According to this model, stress activates certain vulnerabilities (diathesis), which predisposes the individual to psychopathology. This model has been criticized for its vagueness, yet these principles are used to understand other psychiatric disorders.

BIOLOGICAL MODEL

Mental health nurses also attend to the physical needs of psychiatric patients. The nurse may administer prescribed medication, nutrition, and hydration to ensure optimal physiological functioning of the patient. The biological model of mental illness focuses on the chemical, biological, and genetic makeup of mental illness. This model seeks to understand how the body and brain interact to create experiences and emotions, and how social, environmental, cultural, spiritual, and educational factors influence individuals (Halter, 2018). All the theories discussed in this section play a vital role in how the nurse cares for the patient with a mental health disorder.

Self-Assessment Quiz Question #1

Which best describes Aaron Beck's Contribution to the mental health profession?

a. Hierarchy of needs.
b. Cognitive behavioral therapy.
c. Empathetic linkages.
d. Operant conditioning.

ETHICAL, LEGAL, AND CULTURAL CONSIDERATIONS

The term *ethics* refers to an individual's beliefs about right and wrong and societal standards regarding right and wrong. Bioethics refers to ethical questions related specifically to healthcare (Halter, 2018).

Ethics are linked to cultural values. Societal standards and values can be determined only within a specific group. However, fundamental principles of ethics exist in all cultures and are inherent in all human beings. Understanding how cultures view mental illness and the accompanying patient symptoms can influence how decisions, particularly ethical decisions, are made. Nurses can be an instrumental part of effective decision making when cultural values and societal standards differ.

A thorough understanding of general ethical principles is necessary to make reasonable, fair, and sound judgments in providing care. Nurses who choose to work in the specialty of mental healthcare will encounter ethical questions on almost a daily basis. Issues such as autonomy, confidentiality, patient protection, therapeutic relationships, mental health competency, and mental health admissions are particularly complicated. To better guide the nurse in making ethical choices, an understanding of the American Nurses Association Code of Ethics and the five basic principles of bioethics is useful.

American Nurses Association Code of Ethics

The American Nurses Association (ANA) established an ethical standard for the nursing profession that guides ethical analysis and decision making (ANA, 2015). Ethics is a branch of philosophy where one reflects on morality, which is the person's character, values, and conduct in a particular situation (ANA, 2015).

The Code of Ethics is the foundation for nursing theory and practice where values and obligations shape the nursing profession (ANA, 2015). This living document changes based on nursing's social context, with a revision occurring at minimum every 10 years (ANA, 2015). The ANA Code divides ethical issues into nine provisions, based on general ethical principles:

- Provision 1
  - The nurse practices with compassion and respect for the inherent dignity, worth, and unique attributes of every person, including self-determination (ANA, 2015).
- Provision 2
  - The nurse's primary commitment is to the patient, whether an individual, family, group, community or population (ANA, 2015).
- Provision 3
  - The nurse promotes, advocates for, and protects the rights, health, and safety of the patient (ANA, 2015).
- Provision 4
  - The nurse has authority, accountability, and responsibility for nursing practice, makes decisions, and takes action consistent with the obligation to promote health and to provide optimal care (ANA, 2015).
- Provision 5
  - The nurse owes the same duties to self as to others, including the responsibility to promote health and safety, persevere wholeness of character and integrity, maintain competence and continue personal and professional growth (ANA, 2015).
- Provision 6
  - The nurse, through individual and collective effort, establishes, maintains, and improves the ethical environment of the work setting and conditions and employment are conducive to safe, quality care (ANA, 2015).
- Provision 7
  - The nurse, in all roles and settings, advances the profession through research and scholarly inquiry, professional standards development, and the generation of both nursing and health policy (ANA, 2015).
- Provision 8
  - The nurse collaborates with other health professionals and the public to protect human rights, promote health diplomacy, and reduce health disparities (ANA, 2015).
- Provision 9
  - The profession of nursing, collectively through its professional organizations, must articulate nursing values, maintain the integrity of the profession and integrate principles of social justice into nursing and health policy (ANA, 2015).

The ANA Code may be viewed at no charge on the ANA website (https://www.nursingworld.org/coe-view-only).

Bioethical principles

Bioethics is a branch of ethics that studies the implications of biological and biomedical advances and can be considered a set of guiding principles for the nursing profession that go beyond right and wrong. Bioethical principles fall into five categories (Boyd, 2018; Halter, 2018). These principles are meant to be guidelines to help all clinicians in decision making.

- *Beneficence*: Clinicians have a duty to assist the patient to achieve a higher level of well-being. This concept encompasses kindness and generosity toward the patient in providing care. An example of this is changing healthcare policy or making sure a patient brought to the emergency department in severe pain gets medication as soon as possible.
- *Fidelity*: Healthcare providers have a duty to be honest and trustworthy. This concept includes loyalty, advocacy, and a commitment to the patient. An example of this is staying abreast of best practices in nursing or advocating for the patient to receive high-quality services. Another example is being faithful in your promises to check on a patient within a specific timeframe.
- *Autonomy*: The healthcare provider acknowledges the patient's right to make their own decision, even if the nurse disagrees with the decision. An example of this is a patient with cancer who refuses treatments that may prolong their life.
- *Justice*: Healthcare providers must recognize that all persons are entitled to equal treatment and quality of care. For

example, it can be particularly difficult to provide emotional support and counseling equally to both the family harmed by an intoxicated driver and to the driver. Healthcare providers should strive to be nonjudgmental and fair to all patients, regardless of age, gender, race, sexual orientation, diagnosis, or any other differentiating characteristic.

- *Veracity*: The healthcare provider should always be truthful with the patient. This allows the patient to make informed decisions about their treatment. For example, talking to the patient about the side effects of medications is showing respect to the patient by being truthful.

Self-Assessment Quiz Question #2

Patients admitted to inpatient psychiatric units are scheduled for group therapy two times daily. Attendance is strongly encouraged, but not mandatory. Which ethical principle is demonstrated by this unit policy?

a. Autonomy.
b. Justice.
c. Beneficence.
d. Veracity.

IMPORTANT LEGISLATION IN MENTAL HEALTH

Section 1 of the 14th Amendment to the US Constitution adopted on July 9, 1868, states:

> *All persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States and of the state wherein they reside. No state shall … deprive any person of life, liberty, or property, without due process of law; nor deny to any person within its jurisdiction the equal protection of the laws* (U.S. Constitution). The issue of liberty has been tested repeatedly in the courts in cases in settings where U.S. citizens have been held against their will, including in psychiatric institutions.

Keltner and Steele (2018) provide an overview of landmark legal decisions related to patients with psychiatric disorders. Historically, these nine rulings have had a major impact on the legal rights of patients with psychiatric disorders. A summary of each of these legal decisions is as follows:

1843 – The *M'Naghten rule* first identified a legal defense of not guilty by reason of insanity by stating that persons who do not understand the nature of their actions cannot be held legally responsible for those actions (https://www.law.cornell.edu/wex/m%27naughten_rule).

1965 – In *Griswold v. Connecticut*, The Supreme Court first recognized that a person has the right of marital privacy under the Constitution of the United States (https://www.law.cornell.edu/wex/griswold_v_connecticut_(1965)).

1966 – In *Rouse v. Cameron*, the courts found that a patient committed to an institution must be actively receiving treatment and not merely warehoused (https://casetext.com/case/rouse-v-cameron)

1968 – In *Meier v. Ross General Hospital*, a physician was found liable for the death of a hospitalized patient who committed suicide while under his care. The patient had a previous suicide attempt before the hospital stay. The physician was liable for failing in his *duty to warn* of the threat of suicide in this patient (https://caselaw.findlaw.com/ca-supreme-court/1822578.html)

1972 – In *Wyatt v. Stickney*, the entire mental healthcare system of Alabama was sued for an inadequate treatment program. The court ruled that each institution within the mental healthcare system must (1) stop using patients for hospital labor needs, (2) ensure a humane environment, (3) maintain minimum staffing levels, (4) establish human rights committees, and (5) provide the least restrictive environment possible for the patients (https://mentalillnesspolicy.org/legal/wyatt-stickney-right-treatment.html).

1976 – In the well-known case of *Tarasoff v. The Regents Of the University of California*, the parents of Tatiana Tarasoff sued the university following the 1969 death of their daughter at the hands of Prosenjit Poddar. Poddar had told his therapist that he planned to kill Tarasoff when she returned from summer break. Although the therapist had contacted the police, law enforcement released Poddar because he appeared rational. The court found that the therapist had a *duty to warn of threats of harm to others* and was negligent in not notifying Tarasoff of the threats that had been made against her (https://law.justia.com/cases/california/supreme-court/3d/17/425.html).

1979 – Patients at Boston State Hospital sought the right to refuse treatment in *Rogers v. Okin*. Based on the 1965 decision regarding the right of personal privacy, the court found that the hospital could not force nonviolent patients to take medication against their will. This ruling also included the directive that patients or their guardians must give informed consent before medications could be given (https://pubmed.ncbi.nlm.nih.gov/6134270/ and https://muse.jhu.edu/article/404046).

1983 – In *Rennie v. Klein*, a patient claimed a hospital violated his rights when he was forced to take psychotropic medications. The ruling again addressed the right to refuse treatment and the right to privacy, and it furthered the necessity of obtaining informed consent (https://pubmed.ncbi.nlm.nih.gov/11648483/).

1992 – *Foucha v. Louisiana* demonstrated that the nature of an ongoing psychiatric commitment must *bear some reasonable relation to the purpose for which the patient is committed* (Foucha v. Louisiana, 1992). When Foucha was first hospitalized, the indication was a patient who was considered mentally ill and dangerous. The ruling recognized that patients who are no longer mentally ill do not require hospitalization and that patients are not required to prove themselves to be no longer dangerous (https://www.law.cornell.edu/supct/html/90-5844.ZO.html).

Mental health laws have been created to protect patients with psychiatric disorders and regulate their care. These laws often vary by state. Check the Nurse Practice Act within the respective state of practice to determine state-level regulation.

MENTAL HEALTH AND DEINSTITUTIONALIZATION

The changes in mental healthcare over the years show a shift in care from institutionalization to community settings, also known as deinstitutionalization (Boyd, 2018). Deinstitutionalization was also significant because this shaped our current community and mental health treatment for many vulnerable individuals including the homeless and those with substance use disorders. During the era of state hospitals, mentally ill individuals were less likely to be chronically homeless. While deinstitutionalization was a noble concept, it was not well implemented. The lack of existing public health infrastructure left communities unprepared to manage those with chronic mental illness. Additionally, the arrival of inexpensive and accessible illicit drugs like crack cocaine, changed the face of communities and left those with mental illness even more vulnerable. The lack of affordable treatment for mental health disorders contributes to both individual and public health risk.

Two of the most important concepts in civil rights law are the writ of habeas corpus and the least restrictive alternative doctrine (Halter, 2018). The writ of habeas corpus pertains to holding people against their will. Psychiatric patients are included in this protection and they have the right not to be detained unless individual welfare is involved. Additionally, the least restrictive alternative doctrine states that a patient's autonomy must be upheld whenever possible (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2733575/pdf/behavan00025-0105.pdf). In practice it means that nurses need to try to manage patients' symptoms and behaviors with psychotherapeutic interventions (milieu management, communication, and behavioral approaches) first. If symptoms are not fully or adequately managed, nurses should document what was attempted and ineffective in order to move to more restrictive measures or levels of care (i.e. move up the treatment hierarchy to more restrictive approaches such as medications/chemical restraints, seclusion, and/or physical restraints). Each time a more restrictive measure is applied, documentation needs to support which lesser restrictive strategies were attempted and describe their lack of efficacy.

An understanding of civil rights and state regulations is important to patient care procedures. Admission of psychiatric patients can be voluntary or involuntary, but neither voluntary nor involuntary admission indicates the ability of the patient to make decisions (Halter, 2018). Admission procedures are in place to protect the patient and the public. Involuntary admission is used when patients are a danger to self or others or cannot take care of themselves. However, all patients are to be treated with respect and have the right to informed consent, the right to refuse medications, and the right to the least restrictive treatments (Boyd, 2018). Furthermore, the patient must be seen by a specified number of providers who confirm that the patient meets the criteria for involuntary admission.

THE CONSUMER BILL OF RIGHTS AND CONFIDENTIALITY

In 1997, President Clinton appointed the Advisory Commission on Consumer Protection and Quality in the HealthCare Industry. The Commission, co-chaired by Donna Shalala, secretary of the Department of Health and Human Services at the time, issued its final report, which included a Consumer Bill of Rights & Responsibilities. Of interest to psychiatric nurses is the section on confidentiality of health information. Patients with psychiatric disorders are expressly protected in the confidentiality of their records; practitioners may not share information with any third party without the express written consent of the patient or their legal guardian. The patient can withdraw consent to release information at any time.

CONSUMER BILL OF RIGHTS AND RESPONSIBILITIES

The Commission's consumer bill of rights consists of the following rights and responsibilities:

1. Access to Accurate, Easily Understood Information about health plans, facilities, and professionals to assist consumers in making informed health care decisions;
2. Choice of Health Care Providers that is sufficient to ensure access to appropriate high quality care. This right includes providing consumers with complex or serious medical conditions access to specialists, giving women access to qualified providers to cover routine women's health services, and ensuring continuity of care for consumers who are undergoing a course of treatment for a chronic or disabling condition;
3. Access to Emergency Services when and where the need arises. This provision requires health plans to cover these services in situations where a prudent layperson could reasonably expect that the absence of care could place their health in serious jeopardy;
4. Participation in Treatment Decisions including requiring providers to disclose any incentives -- financial or otherwise -- that might influence their decisions, and prohibiting gag clauses that restrict health care providers' ability to communicate with and advise patients about medically necessary options;
5. Assurance that Patients are Respected and Not Discriminated Against, including prohibiting discrimination in the delivery of health care services based on race, gender, ethnicity, mental or physical disability, and sexual orientation;
6. Confidentiality provisions that ensure that individually identifiable medical information is not disseminated and that provide consumers the right to review, copy, and request amendments to their medical records;
7. Grievance and Appeals Processes for consumers to resolve their differences with their health plans and health care providers -- including an internal and external appeals process; and
8. Consumer Responsibilities provisions that ask consumers to take responsibility by maximizing healthy habits, becoming involved in health care decisions, carrying out agreed-upon treatment plans, and reporting fraud.

Note. Adapted from the President's Advisory Commission. (1997). Consumer bill of rights and responsibilities. Retrieved from https://govinfo.library.unt.edu/hcquality/press/cborimp.html

In addition to the Consumer Bill of Rights, the Health Insurance Portability and Accountability Act (HIPAA) was enacted in 1996 and went into effect in 2003 (U.S. Department of Health and Human Services, 1996). This act was designed to protect patient health information more securely and has been a major force behind the use of electronic health records.

There are a few circumstances where confidentiality may be waived in mental health (U.S. Department of Health and Human Services, 2000). If the patient has made a direct threat against another person, the healthcare provider has a clear duty to warn the endangered individual (U.S. Department of Health and Human Services, 2000). If the patient has reported actual or suspected abuse (including molestation) or neglect of a minor child, the healthcare provider has an obligation to report this to the appropriate Child Protective Services division of the state's Office of Family and Children. A judge may also order documents (clinical records) to be turned over to the court for examination. A subpoena to appear in court does not constitute a judge's order to release information; it merely mandates the appearance of the subpoenaed individual. Violation of the confidentiality of a patient with a psychiatric illness in situations other than those outlined by law may subject the nurse to legal action and revocation of licensure. Most agencies have an acceptable form that identifies to whom information can be released, the date that the release is valid, and types of information that can be shared.

NURSING LIABILITY IN MENTAL HEALTH

The state nurse practice act (NPA) is the single most important piece of legislation for the nurse because it affects ALL facets of nursing practice. Each state has its own NPA for which the courts have jurisdiction. NPA's generally grant specific provisions on how nurses practice in a state and define 3 levels of nurses: LPNs, RNs, and APRNs with defined scopes of practice. The nurse practice act also established a state board of nursing. Its main purpose is to ensure enforcement of the act and protect the public.

Individuals who present themselves as nurses must be licensed. The National Council of State Boards of Nursing serves as a clearinghouse, further ensuring that nursing licenses are recorded and enforced in all states. Individual state boards of nursing develop and implement rules and regulations regarding the discipline of nursing. Most changes deal with modifications with rules and regulations rather than the act itself. Nurses must be advised of the provisions of the state's nurse practice act. Thus, what is acceptable in one state is not necessarily acceptable in another state.

The nurse has legal liability in the psychiatric setting when caring for patients (Boyd, 2018). *Torts* are wrongful acts that result in injury, loss, or damage and can be intentional or unintentional (Boyd, 2018). *Intentional torts* are voluntary acts that result in harm to the patient and include the following:

- *Assault* involves any action that causes an individual to fear being touched in any way without consent. Examples of this include making threats to restrain a patient or making threats to administer an injection for failure to cooperate.
- *Battery* involves harmful or unwarranted contact with a patient; actual injury may or may not occur. Examples of this include touching a patient without consent or unnecessarily restraining a patient.
- *False imprisonment* involves the unjustifiable detention of a patient. Examples of this include inappropriate use of a restraint or inappropriate use of seclusion

Unintentional torts are involuntary acts that result in harm to the patient and include the following:

- *Negligence* involves causing harm by failing to do what a reasonable and prudent person would do in a similar circumstance (anyone can be negligent). Examples of this include failing to erect a fence around a pool and a small child drowns or leaving a shovel on the icy ground and someone falls down on it and cuts their head.
- *Malpractice* is a type of negligence that refers specifically to healthcare professionals. An example of this includes a nurse who does not check the treatment orders and subsequently gives a medication that kills the patient.

CULTURAL CONSIDERATIONS IN MENTAL HEALTHCARE

Culture influences various aspects of mental health, including the recognition and expression of psychiatric symptoms, coping styles, community support, and the willingness to seek treatment. Cultural concepts of distress are recurrent, locality-specific patterns of aberrant behavior that are not linked to a specific diagnostic category in the *Diagnostic and Statistical Manual of Mental Disorders*, fifth edition (American Psychiatric Association, 2013). More impoverished communities have environmental risks such as a lack of access to healthy nutritious foods, clean soil, and clean air in urban areas. This may impact mental health via physiological/neurological impact and deficits, especially in vulnerable populations.

As of 2021, the percentage of the US population that self-identified as African American had grown to 13.4% (U.S. Census Bureau QuickFacts: United States). Although anyone can develop a mental health problem, African Americans may experience barriers to appropriate mental healthcare(National Alliance on Mental Illness, n.d.a). For example, the poverty rate among African Americans in 2020 was 19.4%, with 11.4 million people of all races living in poverty (Income and Poverty in the United States: 2020 [census.gov]). Poverty directly relates to mental healthcare access. The poverty rates in the African American community combined with provider bias and patient distrust of the health system can result in subpar mental health care for African Americans (NAMI: National Alliance on Mental Illness. In addition, the African American community has experienced increasing diversity because of immigration from Africa, the Caribbean, and Latin America. Mental healthcare providers need to understand this diversity and develop cultural competence (Boyd, 2018). Contributing to this cultural consideration is the estimation that over half of the prison population has a mental illness and that African Americans are five times more likely to be incarcerated than Whites (Mental Health America, n.d.; Sakala, 2014).

The Latin/Hispanic American population is rapidly growing, currently comprising 18.6% of the nation's total population (U.S. Census Bureau QuickFacts: United States). In 2020, 17.0% of Latin/Hispanic Americans were living in poverty. Rates of mental health disorders in this population are similar to those of non-Hispanic Caucasians, with some exceptions:

- Older Hispanic adults and Hispanic youths are more vulnerable to the stress associated with immigration and acculturation' and experience more anxiety, depression, and drug use than non-Hispanic youths.
- Depression in older Hispanic adults is closely correlated with physical illness; and suicide rates were about 50% that of non-Hispanic Whites, although suicide ideation and unsuccessful attempts were higher (State of Mental Health in America - 2020_0.pdf (mhanational.org).
- There is a higher incidence of post-traumatic stress disorder (PTSD) in Hispanic men, some of which may be attributable to social disorder experienced before immigration. As of 2020, there were 1.2 million Hispanic or Latinos who are US military veterans (U.S. Census Bureau QuickFacts: United States).

- The rates of substance use disorders are slightly lower in Hispanic women and slightly higher in Hispanic men. Hispanics are approximately twice as likely as Whites to die from liver disease, which could be associated with substance use (Hispanic Health | VitalSigns | CDC).

There are few Hispanic children in the child welfare system, but Hispanics are twice as likely as Whites to be incarcerated at some point in their lifetime (Sakala, 2014). The lack of Spanish-speaking mental healthcare providers has been a problem, likely causing fewer than 1 in 11 Hispanic individuals with a psychiatric disorder to seek treatment (Mental and Behavioral Health - Hispanics - The Office of Minority Health (hhs.gov)). Misdiagnosis is common and is often related to language barriers. Among Hispanics living in the United States, one in three do not speak English well (Hispanic Health | VitalSigns | CDC). Hispanic Americans are more likely to use folk remedies solely or as a complement to traditional care, and some may consult church leaders or healers for more traditional care (Hispanic/Latinx | NAMI: National Alliance on Mental Illness).

Asian Americans and Pacific Islanders comprise just over 20 million of the US population and are considered one of the fastest growing racial/ethnic groups within the United States (U.S. Census Bureau, 2020; Wyatt, Ung, Park, Kwon, & Trinh-Shevrin, 2015). By 2060, it is projected that 1 in 10 children in the United States will be Asian (Wyatt et al., 2015). There are numerous ethnic subgroups included in the Asian American/Pacific Islander demographic, with over 100 languages and dialects (Asian American/Pacific Islander Communities and Mental Health | Mental Health America (mhanational.org)). Thirty-two percent of Asian Americans have difficulty accessing mental healthcare services because they do not speak fluent English (Asian American/Pacific Islander Communities and Mental Health | Mental Health America (mhanational.org)). For example, older Asian Americans may not understand questions or the intent of a medical interview, and they may give affirmative answers to avoid confrontation. Asian Americans and Pacific Islanders are the least likely of any group to seek help with mental health issues (Hernandez, Nesman, Mowery, Acevedo-Polakovich, & Callejas, 2015). Although fewer mental health concerns are reported in this group, few epidemiological studies have included this population (Asian American/Pacific Islander Communities and Mental Health | Mental Health America (mhanational.org)). Asian Americans tend to exhibit somatic (physical) symptoms of depression more frequently than emotional symptoms (Boyd, 2018; Kalibatseva & Leong, 2011). The focus on physical symptoms and misdiagnosis serves as a barrier to mental healthcare for this population. Suicide rates within this population should be monitored closely by examining risk factors such as acculturation, family discrimination, social acculturalization, and discrimination (Boyd, 2018; Wyatt et al., 2015).

NURSING CARE IN MENTAL HEALTH

Standards of practice

The American Nurses Association's scope and standards of practice of psychiatric-mental health nursing *(Psychiatric-Mental Health Nursing Scope and Standards of Practice)* provides the foundation for the application of the nursing process to patients with psychiatric disorders (American Nurses Association, 2014). The *PMHNP Scope and Standards of Practice* also serves as a reference document for the National Council Nursing Licensure Examination (NCLEX) and many state nurse practice acts. The *PMHNP Scope and Standards of Practice* includes each step of the nursing process: assessment, diagnosis, planning, implementation, and evaluation.

When using the *PMHNP Scope and Standards of Practice*, the nurse should consider the individual's age, language, and culture. The nurse should also address each patient's developmental level. Note that the age and the developmental level may be incongruent in certain mental illnesses. Use age-appropriate communication techniques to establish a therapeutic alliance with both the patient and the family. Additionally, observations of behaviors and reactions are just as important as the conversation. Parents are often present during a child assessment. However, if abuse or neglect is suspected, it may be prudent to talk to the child or adolescent alone. In cases involving child sexual abuse or other uncomfortable issues, the nurse may need the assistance of a healthcare provider with advanced training to interview the child.

When working with adolescents, the therapeutic alliance may be hindered by concerns of confidentiality. Reassure the adolescent that conversations are confidential, and information is only shared with team members, except in certain circumstances. In cases of suicidal or homicidal thoughts, sexual abuse, or other high-risk behaviors, the nurse must share the assessment information with other healthcare professionals and the parents. In fact, identifying risk factors in this age group is an important aspect of the assessment.

THE NURSING PROCESS IN MENTAL HEALTH

The physiological health exam and work-up is an initial step for thoroughly and accurately diagnosing and managing mental health conditions, including common screening labs and physical exams to rule out common medical issues that could be causing, mimicking, or contributing to mental health symptoms. Some physiological conditions present with psychiatric symptoms. Ensuring that the patient has a baseline physical assessment assist in the accurate diagnosis and appropriate treatment of all conditions, thus demonstrating the mind-body connection. Because of this link, the history and presenting symptoms of the patient are of utmost importance.

The nursing process is a systematic way of developing an individualized plan of care for those experiencing a disruption in mental health status. The traditional nursing process consists of performing a comprehensive assessment, formulating nursing diagnoses, developing a care plan, implementing selected nursing interventions, and evaluating the outcome or effectiveness of those interventions (Boyd, 2018). Most facilities have their own documentation that follows accepted guidelines for mental health assessment.

Assessment

Creating a therapeutic alliance is an important step in the holistic care of the patient. This connection provides an optimal setting for obtaining the psychosocial and psychiatric history. The first step is to obtain a thorough history of the patient, incorporating elements of current and past health problems, social issues affecting health, and cultural or spiritual beliefs that may support or interfere with prescribed healthcare treatments (Halter, 2018). The nurse should obtain the history in an environment conducive to effective communication between the nurse and the patient. Family members and significant others may or may not be present, or they may be present for a portion of the time and then be asked to step out to maintain the patient's confidentiality. Interviews should be conducted in a private conference room or patient's room (if inpatient or residential) rather than in a public area where others may overhear. If personal safety is a concern, the nurse may request another staff member to be present. The nurse should remove distracting elements such as a television or radio. If the nurse determines that the patient is too ill to be able to provide accurate information or that the interview process itself will be detrimental

to the patient's health, then the nurse should obtain information from other reliable sources, such as family members, social workers, therapists, and primary healthcare providers (Boyd, 2018). Documentation of the source of information is important, particularly when the patient is unable to provide an accurate history. Although the psychiatric nurse may gather information from other sources, it is important that the nurse not disclose any information regarding the patient's status without the patient's written consent to avoid a breach in confidentiality.

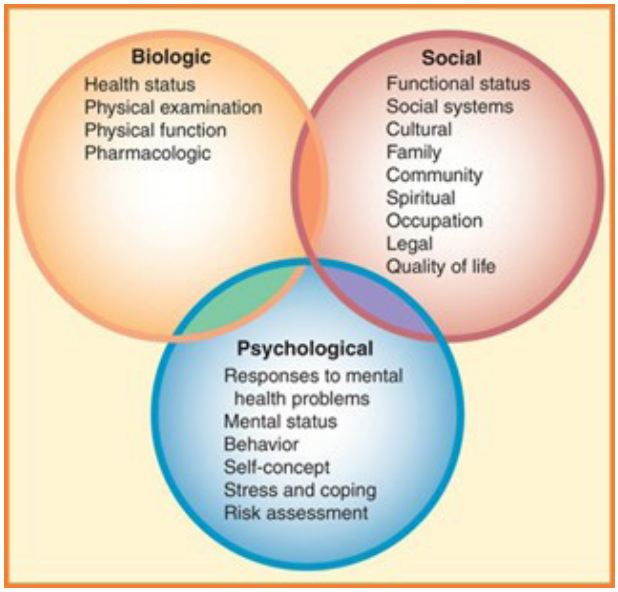
Nursing diagnosis and planning

Most healthcare facilities have an existing form to guide the nurse in data collection. The data collection process assists the nurse in developing a nursing diagnosis list. After identifying real and potential problems, the nurse develops written nursing diagnoses to address each problem. Nursing diagnoses are important in structuring appropriate, efficient nursing care while serving as a common language nursing team members. Prioritization is also based on Maslow's Hierarchy of needs so that physiological and safety needs that are outlined in nursing diagnoses will be addressed first. The nursing diagnosis drives the planning process in the care of patients with psychiatric-mental health disorders. Implementation of interventions is driven by goals established during the planning process. Short- and long-term goals must be observable, measurable (i.e., goals or outcomes that can be evaluated) and realistically attainable in the given time frame and setting. Identifying contributing factors and behavioral symptoms can directly lead to the development of short- and long-term goals that help evaluate progress. Interventions for this population will always include therapeutic communication and the mental status examination (Boyd, 2018).

The biopsychosocial framework

The biopsychosocial framework is a well-accepted, holistic model for organizing healthcare issues (Boyd, 2018). Three interdependent domains have separate treatment focus but interact to provide a framework for implementing nursing care through a systematic process.

The *biologic domain* is related to functional health patterns in mental health such as sleep, exercise, and nutrition. Pharmacologic principles in medication administration are related to neurobiological theories. The *psychological domain* contains the interpersonal dynamics that influence emotions, cognition, and behavior. This generates theories and research critical in understanding symptoms and responses in mental disorders. Therapeutic communication techniques exist in this domain, as there are many cognitive and behavioral approaches in patient care. The *social domain* accounts for the family and community influences in mental disorders. While these influences do not cause mental illness, manifestations and disorders are significantly affected by these factors.



Boyd, 2018

A comprehensive nursing assessment enables the nurse to make sound clinical judgments and plan appropriate interventions. Assessment skills in psychiatric nursing are essential in-patient care. Although data collection and assessment vary among clinical agencies, the psychiatric examination consists of two parts: the psychiatric history and the mental status exam. Patients are often reluctant to discuss mental illness because of the associated stigma. Clinical reasoning in nursing practice depends on critical thinking skills such as problem solving and decision making, where nurses must analyze, interpret, and evaluate biopsychosocial data in the context of the nursing process.

THE MENTAL STATUS EXAMINATION

The mental status examination is a structured means of evaluating the psychological, physical, and emotional state of a patient with a psychiatric disorder to facilitate appropriate healthcare treatments. The nurse may also identify significant problem areas to be addressed in the treatment plan. Mental status exams are an essential tool for evaluating the safety of the patient and caregivers. Although each healthcare facility may vary slightly in its approach, all mental status exams include the same basic elements. These include an assessment of the patient's appearance, behaviors, thoughts, and moods. These are called the ABC's of MSE: (1) A-appearance, (2) B- Behavior and (3) C- Cognition which includes mood, affect and speech. Speech is a reflection of cognition (https://psychscenehub.com/psychinsights/ten-point-guide-to-mental-state-examination-mse-in-psychiatry; Boyd, 2018).

Appearance

Appearance includes primarily objective data based on observations of the patient's general appearance. The nurse assesses the patient's overall hygiene and grooming, considering gender, apparent age, height/weight, dress, odors, and tattoos/piercings.

Height and weight should be documented along with nutritional status. The nurse evaluates if the patient looks the stated age since chronological age may not be a reflection of the client's physical/mental status. For example, a patient appears in their 50s, but the actual age is 35, suggesting poor self-care or illnesses (Boyd, 2018).

Behavior

The patient's behavior should be noted during the interview. Consider any mannerisms, notable movements such as agitation, physical slowing (retarded movements), tics, or other abnormal movements. It is important for the nurse to be developmentally and culturally aware during the mental status examination. For example, American culture considers eye contact to be a sign of respect and attention, but other cultures deem eye contact as offensive, challenging, or arrogant (Boyd, 2018).

Mood and affect

Mood is subjective (whatever the patient states) so this must be asked directly (e.g., How is your mood?) and is typically documented in quotations (Mood is "happy"). Affect is objective data (the nurse's observations) based on clinical descriptors that take into account the tone, range, and quality, together with facial expressions and body language that reveal the emotional state or feelings of the person. Mood and affect do not necessarily have to be consistent or similar. For example, a patient may state that their mood is "fine" but through their presentation they are expressing significant difficulty in their emotions with anger, sadness, or depression. Affect is the facial expression, body language, voice, or tone that reveals the emotional state or feelings of a person (Boyd, 2018).

A *dysphoric mood* indicates that the patient is persistently depressed, lethargic, apathetic, or "down" and is usually accompanied by a depressed affect. However, the affect may also be described as anxious or flat, meaning that there is no facial expression of feelings. A *euphoric mood* is an elevated emotional state that may be associated with an affect that is giddy, cheerful, or excessively bright. A *labile affect* is one that is rapidly changing and unpredictable – the patient may be cheerful, then suddenly become enraged with little provocation or may burst into tears unexpectedly. A labile affect can accompany various psychiatric disease states such as depression or psychosis. Substance use can also affect the patient's mood in many ways, depending on the degree of intoxication, the substance used, and any withdrawal symptoms. Some medications can interfere with the physical expression of an emotion, resulting in a flat or blunted affect (Boyd, 2018).

Thought processes

Thought processes refer to the way thoughts are organized and structured. One can think of thought process as HOW one is thinking and thought content as WHAT they are thinking. Speech assessment reveals both. Normally, thoughts are logical, sequential, and easily understood by others (in the absence of a known speech or communication disorder). Patients with disorganized thoughts may respond to questions with nonsensical speech because speech often reflects the thought process. There may be difficulty in performing simple activities such as bathing or eating without assistance, even in the absence of a physical impairment. Patients may mix up or confuse medications when a structured system (such as a weekly pill dispenser) is not available. Thoughts can be rapid, racing, or slowed. Poverty of speech can occur where questions are answered with one or two words and patients may be unable to expand on responses or use their imagination. Thoughts can be either abstract or concrete (Boyd, 2018).

A patient's thought processes may also show flight of ideas, as in the following example: "I came here in an ambulance. I wish I had more money! Did you see that TV show about Pekingese dogs the other night?" When a patient is experiencing a flight of ideas, speech is often accelerated and thoughts are random, abruptly changing with little association between thoughts (Boyd, 2018). When assessing a patient's thought processes, the nurse might also note the phenomenon of word salad. In a word salad, the patient's statements have no logical connections, and the thoughts are jumbled – for example: "I don't. Here, he said. My house. Mouse. Spouse." The previous statement also serves as an example of clang association, which is a pattern of using words because they have similar sounds and not because of the actual meanings of the words. A patient may use neologisms or words that don't exist in the English language. Words such as "frugelzip" or "rappeliciosity" will have a meaning that is clear only to the patient.

Thought content

Thought content refers to what the patient is thinking about. Initially, it is helpful to assess preoccupations or obsessions about real-life events, such as finances, employment, or relationships (Boyd, 2018). Sometimes a patient can experience intrusive or ruminating thoughts. An intrusive thought is an unwelcome idea that occurs without conscious effort, and ruminative thoughts are thoughts that seem *stuck* in the patient's mind. An obsessive patient may have ruminative thoughts that may be unusual, such as a desire to check the door repeatedly to ensure it is locked or the belief that germs may be everywhere. Obsessive thoughts will often lead to compulsive behaviors – such as ritualized handwashing – in part as an attempt to relieve intrusive thoughts and their accompanying anxiety. The nurse's role is to help the patient understand that these thought processes are irrational.

Thought content problems are of essential importance. *Hallucinations* are false sensory perceptions (Boyd, 2018). Auditory, visual, olfactory, gustatory, or tactile symptoms may be present. Auditory hallucinations, such as hearing voices, are the most common in psychiatric disorders (Boyd, 2018). Visual hallucinations are false visual perceptions, such as seeing people who are not present. Patients can also experience a tactile hallucination, known as a false perception of touch (Boyd, 2018). Tactile hallucinations can present as "hands touching me" or "bugs crawling on me" and can exist with psychological or medical conditions such as withdrawal. When caring for a patient experiencing hallucinations, it is important to remember that the brain perceives the reported sensation, meaning that to the patient, it is very real. It is important for the nurse to address hallucinations with the patient; however, nursing judgment on how to therapeutically address them is critical. Initially, pointing out that the hallucination does not exist may jeopardize the development of a secure nurse-patient relationship; however, rationalizing with and helping the patient reason are important elements in the progression of treatment.

Delusions are fixed false beliefs (Boyd, 2018). The patient experiencing a delusion is certain that something is true, even when there is no substantiating evidence to prove the belief. Paranoid patients may be frightened as they often believe they are being watched, monitored, or spied upon by others. These individuals may report cars following them or mysterious phone calls late at night. Occasionally, a patient with paranoia may fear being poisoned and refuse medications or food. Religious delusions can also occur where the patient may feel persecuted by demons or may be very excited about a special relationship with God or with angels. Careful assessment by the healthcare provider is important to determine a patient's baseline religious beliefs so as not to label a thought as delusional when it is a well-accepted belief for the patient. Somatic delusions are uncomfortable beliefs that there is something wrong with one's body (Boyd, 2018). For example, some patients may believe that their bowels are necrotic or dead or may believe that their brain is missing.

Other delusions may exist such as a belief that aliens are broadcasting signals, or a belief that loved ones have been replaced by clones. It is always essential to determine what feelings are elicited in the patient because of the delusional thoughts. Paranoid thoughts will drive fear and fight-or-flight responses. The patient may set up protective traps around the home to prevent others from entering. Religious delusions may be pleasant and make the patient feel special, or they may be so persecutory that the patient becomes depressed and suicidal. Somatic delusions can lead to excess visits to healthcare providers and may result in the label of "hypochondriac" for the patient.

Ideas of reference can also occur in which the patient may believe that all events in the environment are related to or about them (Boyd, 2018). Patients experiencing ideas of reference may believe that, when in a group setting, others are talking about or ridiculing them (Boyd, 2018). Sometimes, ideas of reference are associated with grandiosity, or the belief that one is especially important or powerful (Boyd, 2018). An elderly homemaker who suddenly believes herself to be the next Marilyn Monroe may be experiencing grandiosity. Grandiose patients attempt to convince others of their importance and may present with perceived rude or arrogant behavior patterns.

Cognition and memory

Cognitive abilities are the elements of thinking that determine attention, concentration, perception, reasoning, intellect, and memory (Boyd, 2018). Attention span is particularly important in evaluating the mental status because a decreased attention span often limits comprehension. Decreased concentration levels and distractibility may occur in patients with disorders that affect attention, as well as for those with depression and other mental health concerns.

The nurse can assess the patient's perception by asking open-ended questions that encourage description, such as "What makes you feel anxious?" (Boyd, 2018). Intellect is assessed through clinical assessment as well as intelligence testing (American Psychiatric Association, 2020). Intelligence quotients (IQs), as well as cognitive, social, and psychomotor capabilities, are assessed to determine intellectual function. Intellectual disabilities are categorized as mild, moderate, severe, or profound. Although IQ scores can serve as a parameter for these categories, the level of severity is determined by adaptive functioning (American Psychiatric Association, 2020).

An assessment of memory consists of three basic parts: immediate recall, recent memory, and remote memory (Boyd, 2018). A simple test of recall is to give the patient three items to remember and then 5 minutes later ask the patient to state those items. *Immediate recall* can be quickly determined by asking what a patient consumed for breakfast. *Recent memory* is recall of one to several days. Questions regarding family members' names or place of residence help assess recent memory. *Remote memory* is recalled from several days to a lifetime. Asking patients where they grew up, what their parents' names were, or where they went to school readily provides this information.

Memory assessments help in differentiating a thought disorder from a dementia disorder. Patients with a primary psychiatric disturbance may be delusional in their beliefs but extremely accurate in memory and recital of facts and dates. A patient with early dementia may lose some short-term memory first, progressing to the loss of immediate recall, then finally to long-term memory loss (Boyd, 2018). *Orientation* means that patients are aware of who they are (person), where they are now (place), the approximate time and date (time), and awareness of the circumstances (situation). A disoriented person may be suffering from a cognitive disorder, drug or alcohol use or withdrawal, or several physical or psychological health problems.

Insight and motivation

Insight refers to patients that demonstrate understanding of their illness and the steps necessary to treat or manage the illness. The determination of a patient's level of insight is often associated with treatment adherence. The goal is that understanding leads to adherence. Occasionally, nurses encounter patients who demonstrate good insight and knowledge, but continue to display nonadherence to recommended treatments. Nurses should ask these patients about barriers to treatment, such as financial constraints or concerns regarding health insurance. The stigma of having a psychiatric diagnosis may lead the patient to feel ashamed or angry. Anger may be causing the patient to intentionally deny and refuse adequate treatment. Hidden motivations, such as the defense mechanisms may also have a significant impact on the patient.

Judgment

Healthcare choices can reflect *judgment*. This can be a positive or negative reflection on an ability to reach a logical decision about a situation (Boyd, 2018). For example, the patient with diabetes who continues to consume a diet high in sugar is demonstrating poor judgment. Actions and behaviors are often signs of judgment capabilities. A manic patient may spend their life savings on a trip or a lottery ticket. However, once in the normal or melancholic state, the patient may have no memory of the incident. Proper evaluation of the mood state when the actions were carried out is an important part of the assessment. Conversely, the patient who recognizes that an increase in paranoia is a sign of decompensation and seeks out emergency treatment is demonstrating good judgment. A patient's insight, or awareness of their own feelings, relates to the ability to display logical judgment (Boyd, 2018). Assessing and understanding a patient's ability to make positive or negative choices is an important piece of planning effective mental healthcare.

Safety

Finally, an evaluation of safety is important in any mental status assessment. The essential areas to examine include safety of self and safety of others. The nurse should determine if the patient has thoughts or urges of intentional harm. When suicidal thoughts are noted, inpatient treatment must be considered. Assessing suicide risk consists of asking the patient about a suicide plan, suicidal intent, and the available means to harm oneself. A well-developed suicide plan with means at hand may necessitate forcing an involuntary hospital stay, whereas an impulsive episode of self-mutilating may be best treated by an intensive outpatient program with family supervision. For example, a hunter who thinks about shooting himself is at much higher risk than the office worker who doesn't own or have access to a gun. Determining the lethality of the means available is also essential.

Patients experiencing extreme emotional pain may also self-mutilate by cutting or burning their arms, legs, or other areas. Although this is not considered suicidal behavior, it is high-risk behavior that indicates significant emotional distress.

The nurse should also determine the degree of risk of harm to others. There are two distinct areas in which patients with a psychiatric disorder may lose their rights to confidentiality: a threat to harm or kill another person and the report of child or elder abuse (Halter, 2018; U.S Department of Health and Human Services, 2019). *Duty to warn is an obligation to warn third parties when they may be in danger from a patient* (Halter, 2018, p. 99; Duty to Warn). The nurse must use all means necessary to reasonably contact the individual at risk, including notifying the police. In most healthcare settings, there are policies to ensure the report is made accurately and documented appropriately. Across the United States, nurses are considered mandatory reporting agents when a patient offers knowledge of abuse, molestation, or neglect of vulnerable patients. The nurse is obligated to report this to the local Child Protective Services agency (Duty to Warn). However, there is a conflict between state and federal law when child abuse is revealed during drug and/or alcohol treatment, and a court order is required for disclosure (Halter, 2018). State laws vary and healthcare providers should be very clear on their respective state laws and facility policy in terms of confidentiality.

THE THERAPEUTIC RELATIONSHIP

Hildegard Peplau applied Sullivan's teaching to her own theory, which nurses still use today in practice. Peplau viewed the nurse-patient relationship as representative of the patient's relationship with other important people in their life (husband, wife, mother, father, etc.). By analyzing the dynamic between the self and the patient, the nurse draws inferences about how the patient interacts with others and helps the patient to develop insight into these behaviors to promote change. Furthermore, Peplau applied Sullivan's views on anxiety as a driving force behind behaviors and related these views to nursing practice and a patient's ability to perceive and learn. For example, mild anxiety promotes learning, whereas severe or panic levels of anxiety prevent learning and distort perceptions (Keltner, 2014, p. 87).

From her own research, Peplau developed the therapeutic model of the nurse-patient relationship and introduced this in 1952 in her book entitled *Interpersonal Relations in Nursing: A Conceptual Frame of Reference for Psychodynamic Nursing*. Today, this framework is relevant as a basis of nurse-patient relationships. The nurse performs several roles while engaged in the relationship, including advocate, teacher, role model, and healer. Peplau saw these roles as significant in each phase of the nurse-patient relationship, all of which overlap and work together to facilitate interventions. There are traditionally three phases in the therapeutic relationship: the initiation (orientation) phase, the working phase, and the termination phase (Edberg, Nordmark, & Hallberg, 1995). Peplau (1952) identified five phases: orientation, identification, exploitation, resolution, and termination.

In the orientation phase, the nurse establishes rapport and begins to discuss the parameters of the relationship. The nurse also collaborates with the patient to identify the problem and extent of intervention needed, and how the patient and the nurse will work together to find solutions (Jones & Bartlett Learning, n.d.). Here the nurse can discuss confidentiality while developing the plan of care. The nurse will also address termination of the relationship. This involves informing the patient that the interactions will take place over a specific period. This helps the patient plan for the termination phase so that complications are less likely to arise when the nurse-patient relationship ends. An example of an orientation-phase introduction is:

> *Good morning, Mr. Jamison. I am Chris and I will be your nurse while you are a patient. I would like to arrange a time to meet this morning to discuss how we will work together to develop the plan of care for the next week. Together we will develop strategies to manage your depression and we will continue to meet daily to evaluate what you have accomplished before you are discharged.*

In the working phase, identification, exploitation, and resolution take place. During identification, the patient begins to identify with the nurse independently, dependently, or interdependently (Jones & Bartlett Learning, n.d.). It is during identification that the nurse reinforces the understanding of the meaning of the patient's situation (Jones & Bartlett Learning, n.d.). During exploitation, the patient utilizes the nurse's services based on personal needs, and once needs are resolved during resolution, mature goals emerge (Jones & Bartlett Learning, n.d.). During this working phase, the patient can practice new techniques or behaviors to manage thoughts, feelings, and behaviors that have contributed to their symptoms and created problems in relationships, occupational functioning, or interpersonal well-being. These skills and strategies can be practiced within the safety of the inpatient, partial hospital, or outpatient environment. The nurse helps to promote problem-solving skills, self-esteem, and behavioral changes. Unconscious thoughts and behaviors may arise in the working phase. It is important to address lingering or past issues to aid in the resolution of present symptoms. The patient learns about *self*, develops coping mechanisms, and tests new behaviors. During this phase, transference and countertransference often occur. Transference takes place when the patient unconsciously displaces feelings for another onto the nurse (Boyd, 2018). Likewise, countertransference can occur when the nurse's emotions may also be displaced onto the patient (Boyd, 2018). The nurse's self-awareness and ability to maintain healthy boundaries and remain patient focused are important elements of the nurse-patient relationship.

The termination phase is the final phase of the relationship. In this phase, the nurse and the patient discuss the goals and outcomes achieved, review coping skills, and determine how to incorporate new behaviors into life outside of the facility. Closure of the relationship occurs so that the patient and the nurse can move forward. However, this phase can elicit strong emotions of loss or abandonment. For the nurse, feelings of guilt can arise if the patient has not met all goals. It is not appropriate for the nurse to meet with the patient once discharged. The nurse can plan for discharge by recalling successes achieved with the patient and taking pride in helping the patient gain positive outcomes to date. The patient may experience feelings of abandonment which may be revealed in behavior or emotions. For example, the patient may avoid signing necessary papers or have sudden outbursts. The nurse may need to discuss the

importance of the termination phase with the patient, help redirect the patient to reflect on successes achieved while working together, and refer the patient to the next level of care, if appropriate (https://psychscenehub.com/psychinsights/ten-point-guide-to-mental-state-examination-mse-in-psychiatry/).

THERAPEUTIC COMMUNICATION

Therapeutic communication and the therapeutic relationship are a significant part of mental health nursing. Hildegard Peplau reiterated this sentiment in her work many times, stating that understanding was central to the nurse-patient relationship (Ramesh, 2013). Therapeutic communication differs from social communication in that patient goals are the central focus of the interaction. The goal may be to solve a problem, examine self-defeating behaviors, or promote self-care. Additionally, therapeutic communication involves active listening and responding in a way that creates rapport and moves the patient toward the end goal.

Therapeutic communication involves trust, boundaries, empathy, genuineness, and respect for the patient, regardless of the patient's condition (Halter, 2018; Morgan & Townsend, 2019). Sometimes, recognizing an individual's behaviors and making statements can add to the assessment data and provide insight into the patient's current state. An example is "I notice you are pacing more today." Allow the patient to respond. Remember that no response from an individual provides further insight into the individual's state of mind.

One important aspect of therapeutic communication is the therapeutic use of self. This is when the nurse uses self-disclosure in a goal-oriented manner to promote trust and teach the patient how to view the feelings or actions of others (Riley, 2015). Use of self, however, should not reveal personal details. Effective use of self involves self-reflection, self-awareness, and self-knowledge. As in any nurse-patient interaction, it is important to remain objective and nonjudgmental while considering the patient's needs. Nonverbal communication can tell the nurse a lot about the patient. Awareness of how the patient gestures or moves while conversing is vital in determining verbal/nonverbal congruence. Sitting across from the patient with an open stance demonstrates openness and a willingness to listen. An angled position or sitting side by side can promote comfort. Additionally, the doorway should never be blocked; this promotes safety as well as prevents the patient from feeling trapped or confined (Boyd, 2018).

A general opening, such as asking how the patient slept, can help facilitate the conversation. Gradually start asking open-ended questions to encourage the patient to engage, such as "Tell me a little about what has been going on." If anxiety or nervousness is observed, the nurse may need to step back and alter the questions or provide encouraging statements such as *go on* or *tell me more about that*. Those types of statements confirm that the nurse is listening and is open to knowing more about the topic. *Why* questions can be perceived as challenging and judgmental (e.g., "Why would you do that?"). Reword the question so that the patient can answer without feeling belittled or betrayed. It is important to get as much of the patient's history as possible. However, this may be difficult if the patient has severe symptoms that may limit their ability to carry on a conversation. In that case, observation will take precedence in the interview.

Samples of therapeutic and nontherapeutic communication techniques are provided in Table 1. *Therapeutic and nontherapeutic communication techniques*. Each of these techniques will elicit responses that give the nurse insight into the patient's thoughts and emotions (Boyd, 2018). Use open-ended questions so that the patient can respond with more than a yes or no answer. Give the patient enough time to answer the question as well. Avoid using jargon or medical terminology (https://publichealth.tulane.edu/blog/communication-in-healthcare/).

Table 1. Therapeutic And Nontherapeutic Communication Techniques

Therapeutic	**Example**
Open-ended question	"How are you feeling?"
Offering self	"I'll sit here with you for a while."
Giving general leads	"Go on … you were saying."
Silence	Sitting quietly.
Active listening	Leaning forward, making eye contact, and being attentive.
Restating	"So, what you're saying is …"
Clarification	"I don't quite understand. Could you explain …"
Making observations	"I notice that you shake when you say that."
Reflecting feelings	"You seem sad."
Encouraging comparisons	"How did you handle this situation before?"
Interpreting	"It sounds like what you mean is …"
Nontherapeutic	**Example**
Closed-ended question	"Did you do this?"
Challenging	"Just what do you mean by that, huh?"
Arguing	"No. That's not true."
Not listening	Body turned away, poor eye contact.
Changing the subject	(Patient states he is sad.) "Where do you work?"
Being superficial	"I'm sure things will turn out just fine!"
Being sarcastic	"Well, that's not important or anything. Not!"
Using clichés	"All's well that ends well."
Being flippant	"I wouldn't worry about it."
Showing disapproval	"That was a bad thing to do."
Ignoring the patient	"Did anyone see the news today?"
Making false promises	"I'll make the doctor listen to you!"

(Boyd, 2018)

During the evaluative process, the nurse will assess the use of defense mechanisms that may indicate the need for ongoing revision of the plan of care. Consistent evaluation of goals and progress is integral for successful nursing care of the patient with a psychiatric-mental health disorder. Sigmund Freud, the grandfather of psychotherapy, believed that most psychiatric disturbances arise out of childhood experiences and the way human beings respond to their environment, and are based on unconscious drives or motivations (Halter, 2018). Freudian therapy, developed in 1936 and referred to as psychoanalysis, attempts to bring the unconscious into consciousness to allow individuals to work through past issues and develop insight into present behaviors. Although classic psychoanalysis as developed by Freud is rarely used today, Freud's understanding of anxiety as well as the unconscious mind are significant drivers

in understanding the human response with defense mechanisms (Halter, 2018).

Any behavior or psychological strategies employed (often unconsciously) to protect a person (the real self or 'ego') from discomfort, uncomfortable emotions, anxiety, or tension that may result from unacceptable thoughts or feelings is considered a defense mechanism. Most individuals use defense mechanisms from time to time, but problems may occur when they are used exclusively or in place of healthier coping mechanisms.

Therefore, recognition and nursing interventions focused on adaptive coping strategies should be implemented before working to replace the person's usual defense mechanisms. Defense mechanisms are behaviors that an individual uses to deal with stressors. Defense mechanisms can be beneficial and protective for the patient, or they can be counterproductive and maladaptive. Table 2. Defense mechanisms provides an overview of commonly utilized defense mechanisms; a brief discussion of some of these defense mechanisms follows (https://www.ncbi.nlm.nih.gov/books/NBK559106/)

Table 2. Defense Mechanisms

Defense Mechanism	Definition	Example
Repression	Involuntarily forgetting painful events.	A woman who was sexually abused as a child cannot remember that it occurred.
Suppression	Voluntarily refusing to remember events.	An emergency room nurse refuses to think about the child who is dying from injuries sustained in an auto accident.
Denial	Refusing to admit certain things to oneself.	An alcoholic man refuses to believe that he has a problem, in spite of evidence otherwise.
Rationalization	Trying to prove one's actions are justifiable.	A student insists that poor academic advice is the reason he cannot graduate on time.
Intellectualization	Using logic without feelings.	A father analyzes why his son is depressed without expressing any emotions of concern.
Identification	Attempting to model one's self after an admired other.	An adolescent tries to look and dress like his favorite musician to feel stronger and more in control.
Displacement	Discharging pent-up feelings (usually anger) on another.	A child who is yelled at by her parents goes outside and kicks the dog.
Projection	Blaming someone else for one's thoughts or feelings.	A jealous man states that his wife is at fault for his abuse of her.
Dissociation	Unconsciously separating painful feelings and thoughts from awareness.	A rape victim "goes numb" and feels like she is floating outside of her body.
Regression	Returning to an earlier developmental level.	A 7-year-old child starts talking like a baby after the birth of a sibling.
Compensation	Covering up for a weakness by overemphasizing another trait.	A skinny, nonathletic child becomes a chess champion.
Reaction formation	Acting exactly opposite to an unconscious desire or drive.	A man acts homophobic when he secretly believes he is gay.
Introjection	Taking on values, qualities, and traits of others.	A 12-year-old girl acts like her teacher when the teacher is out of the room.
Sublimation	Channeling unacceptable drives into acceptable outlets.	An angry woman joins a martial arts club and takes lessons.
Conversion	Converting psychiatric conflict into physical symptoms.	A lonely, elderly woman develops vague aches and pains all over.
Undoing	Trying to counteract or make up for something.	A man who yells at his boss sends her flowers the next day to "make up."

(Boyd, 2018)

Denial

Denial indicates an inability to believe or act on some type of news or information. This may be attributed to unconscious forces that override a person's rational thoughts or the premise that changing a behavior is more difficult and anxiety provoking than continuing the behavior. For example, a man with lung cancer may continue to smoke because quitting smoking may mean acknowledging a life-threatening illness, or a woman with alcoholism may continue to drink to avoid facing a dysfunctional marriage. Denial provides protection by allowing the psyche to slowly grasp traumatic events (e.g., death of a loved one), but it becomes maladaptive when the person can't move on. Understanding denial as a psychological process is important, especially when it may seem that a patient is not adhering to a plan of care (https://www.ncbi.nlm.nih.gov/books/NBK559106/).

Repression and suppression

Repression and suppression are defense mechanisms that are commonly confused with each other. In repression, a person cannot voluntarily recall a traumatic event such as a rape or terrorist attack (Halter, 2018). Only through therapy and sometimes hypnosis can the memories start to painfully resurface; when they do, the event will be as acutely distressful as if it had just happened. In suppression, a person chooses to ignore or forget painful events; however, when queried, they can instantly recall them (Halter, 2018). This can be very productive for the nurse in an emergency, when they are able to temporarily push aside personal feelings and reactions to deal with the crisis at hand (https://www.ncbi.nlm.nih.gov/books/NBK559106/).

Displacement

Displacement occurs in our everyday lives. For example, when a person has a bad day at work and goes home and takes it out on their spouse or children, displacement has occurred as the person has shifted their feelings away from the intended object (job, boss, etc.) and onto an innocent and unsuspecting other. Displacement can be the defense mechanism behind anger outbursts such as road rage (https://www.ncbi.nlm.nih.gov/books/NBK559106/).

Rationalizing

Rationalizing is the attempt to explain away situations while not taking responsibility for one's own actions. A senator who is arrested for taking gifts or money from lobbyists may try to rationalize this behavior by saying, *everyone does it, or that's the way you get business done* (https://www.ncbi.nlm.nih.gov/books/NBK559106/).

Identification

An adolescent who tries to emulate a respected authority figure is using identification. Identifying with others and trying to be like them is adaptive and useful when the role model is a positive influence (e.g., father, mother, minister), but it can be very maladaptive when the role model is a negative influence (e.g., gang leader, rock star with drug problems). The psychiatric nurse who understands the various defense mechanisms patients in emotional distress use will be able to develop a treatment plan that addresses the use of defense mechanisms and presents alternatives that are more conducive to mental health and improved quality of life (https://www.ncbi.nlm.nih.gov/books/NBK559106/).

Self-Assessment Quiz Question #3

Which best describes the meaning of defense mechanisms?

a. Behaviors used to deal with stressors.
b. False sensory perceptions.
c. Beliefs that lack substantiation.
d. Overall emotional state.

THERAPEUTIC APPROACHES IN MENTAL HEALTH

Milieu therapy

The word milieu means surroundings or environment; milieu therapy is also referred to as therapeutic community. Milieu therapy is a structuring of the environment in order to affect behavioral changes and improve the psychological health and functioning of the individual. The goal of milieu therapy is to manipulate the environment so that all aspects of a patient's hospital environment are considered therapeutic (Townsend, 2019). Within this setting, the patient is expected to learn adaptive coping, interaction, and relationship skills that can be generalized to other aspects of the patient's life. Although milieu therapy was originally developed for patients in the inpatient setting, these principles have been adapted for a variety of outpatient settings (https://easpublisher.com/media/articles/EASJNM_22_129-135.pdf)

Care of patients in the therapeutic milieu is directed by an interdisciplinary treatment team, but overall management is the responsibility of the nurse. The initial assessment is made by the nurse or psychiatrist and the comprehensive treatment is developed by the treatment team. Basic assumptions of milieu therapy include the opportunity for therapeutic intervention, the powerful use of peer pressure within the environment, and inappropriate behavior can be addressed as it occurs (Boyd, 2018).

There are certain conditions that promote a therapeutic community.

1. The patient is protected from injury from self or others.
2. The patient's physical needs are met.
3. Programming is structured, and routines are encouraged.
4. Staff members remain relatively consistent.
5. Emphasis is placed on social interaction among patients and staff.
6. Decision-making authority is clearly defined.
7. The patient is respected as an individual and is encouraged to express emotion
8. The patient is afforded opportunities for freedom of choice.
9. The environment provides opportunities for testing new behaviors.

(Townsend, 2019;
https://currentnursing.com/pn/milieu_therapy.html)

It is understood that basic physiologic needs are fulfilled, and safety is paramount. Within this environment, a democratic self-government exists through community group participation. This promotes member interaction and communication. The therapeutic milieu provides structure and consistent limit setting at a time when individuals need it the most. These elements provide an assessment of the patient's progress toward treatment goals. The nurse assumes responsibility for the overall management of the therapeutic milieu including assessment, safety and limit setting, medication administration, and education.

Effects of the environment can easily be understood by thinking about common events in one's own life. Going to a party may evoke a sense of festivity, joy, and excitement; going to a funeral can cause somber feelings of sadness; when walking into a quiet library, a person may feel the need to whisper and walk softly; and a starkly painted, tiled hospital room may lead us to feel fearful, anonymous, or disengaged. Even schools reflect environmental or milieu manipulation and effects (consider a Montessori-style school compared with a stricter military school). Inpatient psychiatric settings and residential settings are the most common places in which milieu therapy occurs. A patient who is disorganized, paranoid, or agitated responds better to an environment that is calm, well structured, and predictable, with staff persons who are pleasant in nature but consistent, directive, and firm.

Self-Assessment Quiz Question #4

The nurse is explaining milieu therapy to a group of students. What is the primary role of the nurse in milieu therapy?

a. Conducts individual, group and family therapy
b. Directs drama that portrays real life situations
c. Assumes responsibility for management of milieu
d. Focuses on rehabilitation and vocational training

Group therapy

Irvin Yalom, MD, has been highly influential in the development of group therapy. Dr. Yalom's first book, *The Theory and Practice of Group Psychotherapy* (1970), became a foundational text for many psychotherapists and advanced practice nurses interested in group therapy. Dr. Yalom postulated that when individuals are grouped together, certain characteristics of the individuals will emerge that are reflective of family-of-origin and childhood issues (1970). In therapy sessions with groups of people, these negative or destructive childhood events can be reworked and reframed, leading to healthier adult coping responses while the group members develop identities and go through phases.

In a counseling group setting, members can discuss stressors in a safe environment. The group often provides a sense of community and the feeling that the individual is not alone in dealing with their problems (Corey, Corey, & Corey, 2013). Dr. Yalom termed this concept universality (Yalom & Leszcz, 2014). Thus, universality, or the camaraderie sense of *we are all in this together*, serves to encourage trust and move the group into productivity. Individual group members grow and develop self-awareness through the relationships developed and feedback gathered from those around them (Corey et al., 2013).

Yalom's stages include orientation, conflict development, cohesion, and working (Yalom & Leszcz, 2014). There are many other theories regarding groups; although they may differ in certain ways, they all show how the group forms interpersonal relationships cohesively. The group leader recognizes what phase the group is in and helps facilitate progression toward the group's goals.

The best size for a therapy group is usually 6 to 12 members (Boyd, 2018). In larger groups, some members may be ignored or can more easily avoid participation. In smaller groups, the gatherings can turn into a series of individual therapy sessions with the group leader while everyone else watches. Training in facilitation of therapy groups is standard in graduate programs for advanced practice nurses, psychiatric and psychological master's programs, and clinical doctoral programs.

Psychoeducational groups

Psychiatric nurses are often responsible for facilitating psychoeducational groups in mental health settings, where there is a defined group leader and specific content or topics to be discussed. Topics are frequently based on developing skills important to daily living and maximizing the quality of life. Some topic examples include strategic management of symptoms, medication education, coping with stress, and relapse prevention. Psychoeducational groups emphasize group member interaction and participation, but they also emphasize learning new behaviors. The facilitator may organize hands-on activities and sometimes give homework assignments. Other non-nursing personnel may conduct psychoeducational groups; however, psychiatric nurses are in a unique position based on their education, training, and holistic approaches, to help bridge the gap between patients' physical and mental health. Psychoeducational groups may be larger than strictly therapeutic groups, although larger groups can be difficult to manage depending upon the personality mix of those attending (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7001357/).

Cognitive-behavioral therapy (Individual therapy)

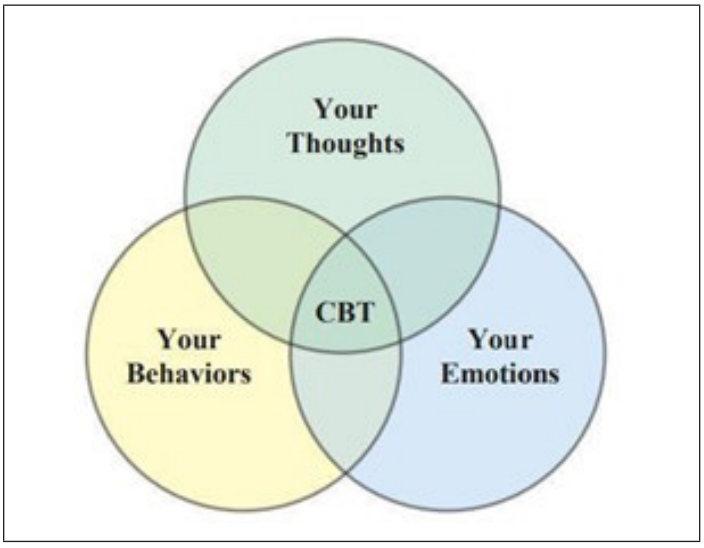
Cognitive-behavioral therapy (CBT), pioneered by Aaron Beck (1967) and Albert Ellis (1973), focused on the relationship between a patient's perceptions about events and the resultant feelings and behaviors. This cycle of thoughts that influence feelings and behaviors is demonstrated in this example:

> *Imagine you are driving down the interstate at 75 miles per hour. You check your rear-view mirror and see the flashing lights of a state trooper. Knowing that you are driving over the speed limit, you are certain you will be pulled over and given a traffic ticket. You think of the two glasses of wine you just consumed with dinner. "What if my blood alcohol level is too high? I can't be arrested! I would lose my job! They'll take away my nursing license!" Your palms get sweaty and your heart starts to race. Barely able to contain your panic, you swerve quickly into the right-hand lane without signaling and cut off a car coming up behind you. The car honks, you pull onto the shoulder, and finally stop. In dread, you look out the window for the trooper, who drives past you down the highway.*

In this example, the driver's thoughts of breaking the law by speeding and getting arrested for drunk driving cause the driver to feel anxious and panic, which results in erratic behavior and nearly causes an accident. Now consider this example:

> *Imagine yourself driving down the interstate. You check your mirror and see the flashing lights of a state trooper. You know you're driving over the speed limit, but so are many drivers around you. You think of the two glasses of wine you had with dinner, but you did eat a large portion and you don't feel drowsy – besides, that was several hours ago. You determine that the state trooper must be on the way to the scene of a crime or accident, so you signal a right turn, check your mirrors, and carefully pull over onto the shoulder of the road. The state trooper drives past you and you continue your journey.*

CBT is based on the supposition that behaviors are a result of distorted thinking about situations (Yalom & Leszcz, 2014). These distortions can take the shape of catastrophizing, which involves thinking that the worst that can possibly happen will happen or has happened; perceiving threats where none exist; thinking only of negative outcomes; or making over-generalizations. In anxiety disorders, fear is the driving force for distorted thoughts. These distorted thoughts impact feelings and lead to behaviors such as situational avoidance where objects or places may become a self-reinforcing behavior as the person has no additional life experience to combat the distorted thinking. Cognitive restructuring is used to help the patient examine their beliefs in more detail and to break down the resultant feelings and behaviors into A (antecedent), B (behavior), and C (consequence).



Exposure is a CBT technique that provokes the patient's anxiety over a feared idea or object in a controlled, supportive environment (Boyd, 2018). A person afraid of heights might be asked to work toward standing on a footstool for a minute or two in the clinician's office. Gradual exposure to the situation allows the patient to systematically desensitize to the stressor with tools to manage thoughts and feelings that arise when confronted with the feared stimulus. Flooding exposes the patient to the stressful object or idea all at once; although this technique can be used, trained clinicians should judiciously use it as it may produce panic symptoms. Skills training may also be employed in CBT. This specifically trains the individual based on their needs. Cognitive-behavioral techniques are useful with most psychiatric conditions and mental health states to improve mental flexibility and resilience, moving the person towards health on the health-illness continuum. Helping the patient to identify beliefs (true or false) about situations enables the patient to challenge the beliefs that are detrimental to recovery (McKay et al., 2015). Psychiatric nurses of all levels can utilize the basic skills of CBT in teaching their patients how to reframe distorted thoughts that lead to emotional turmoil and erratic behaviors.

Family therapy (Social theory)

Individuals with psychiatric, mental health, or behavioral problems often live in a family environment. Children and adolescents are still part of the family unit although the nature of "family" may differ in situations concerning foster care or residential treatment centers. Adults may live alone or with others, be married or single, and live with or without children of their own. Even adults who live alone often have significant family relationships with parents, children, or others. The concept of "family" is identified by the patient but usually involves other persons with whom the patient interacts on a frequent basis and in whom the patient has significant emotional investment.

Family therapy is based within the understanding that, although there is an identified patient, problems may arise out of dysfunctions within the system because the family is a unit and problems are relational to each other (Friedman, Bowden, & Jones, 2003; Sexton & Alexander, 2015). Family therapies focus on strengths of the individual patient and the family as a basis for treatment. Understanding how the family functions and relates to one another helps contribute information that is helpful in the development of a plan of care. Family therapy is complex, and master's or doctorate-level clinicians should be utilized for this type of intense treatment. The Commission on Accreditation for Marriage and Family Therapy Education (COAMFTE) offers specialized accreditation to marriage and family therapy programs; this encourages programs to continue monitoring and maintaining their rigor and development and demonstrates that programs are meeting industry standards and their own objectives (COAMFTE, n.d.)

Treating the family via emotional or cognitive methods allows problems to be addressed within the family dynamic; treating the patient apart from his or her family alone will not correct these systemic problems, and relapse is likely (Sexton & Alexander, 2015). Cognitive awareness (as in CBT) helps individuals and families recognize the cyclic nature of thoughts creating feelings, which create behaviors, which reinforce thoughts, and which continue circularly. Addressing this from a systems nature allows all members of the family unit to explore their role within this continuum and work toward healthier interactions simultaneously.

Community support groups (Social theory)

Many community support groups exist to help individuals who are experiencing specific mental health problems. Groups exist for gambling addiction, rape and sexual abuse support, bipolar disorder, depression, grief and bereavement, suicide, attention deficit disorder, PTSD, substance abuse, and many more. Support groups differ from therapy groups in several important ways. Support groups are a network of members with similar traits or characteristics; support groups are leaderless – they may have a nominated leader, but that person is also a victim or patient and a group member; support groups are not managed by a healthcare professional; support groups are free or have minimal cost; support groups may meet less frequently than therapy groups but for a longer period of time (years to indefinitely); and support groups are usually self-sustaining. If members lose interest, the group can't find a place to meet, or membership wanes, then the group may end (https://www.frontiersin.org/articles/10.3389/fpsyt.2021.714181/full).

The National Alliance on Mental Illness (NAMI) is the nation's largest grassroots support organization for families and persons affected by mental illness. Established in 1979, NAMI is a powerful lobbying force in Washington, DC, with affiliates in every state and more than 1,100 communities across the country. NAMI focuses on fighting against the stigma associated with mental illness and provides support for families and patients with psychiatric illnesses.

Self-Assessment Quiz Question #5

Which of the following is considered a support group?

a. Cognitive behavioral therapy.
b. Alcoholics Anonymous.
c. Family therapy.
d. Medication education.

BRAIN ANATOMY AND PHYSIOLOGY

Within the brain, several areas influence behaviors and are related to psychiatric-mental health disorders, such as the areas involved in mood, anger, and thoughts. Therefore, it is important for nurses to understand how the brain regulates mood and behaviors. The cortex, the outer surface of the brain, is associated with rational thinking (Halter, 2018). The orbitofrontal cortex, which is in the forehead, regulates sympathetic and parasympathetic signals and houses the executive functions (Norris, 2019). Examples of executive functions include decision making, organizing, and determining right from wrong. Additionally, the cortex is adjacent to other areas of the brain, connecting rational thought to mood.

Several other areas of the brain also have a role in psychiatric-mental health disorders. The frontal lobe, for example, is heavily involved in decision making. The parietal lobe integrates sensory and motor information. The occipital cortex is the vision center. The cerebellum works to create muscle tone, posture, and coordination. The temporal lobe is involved with memory, smells, sounds, and language. The hypothalamus regulates body temperature and metabolism, and research suggests that it plays a role in emotions. The pituitary gland regulates hormones, and the brainstem controls basic vital functions such as respiratory rate, heart rate, reflexes, and movement (Norris, 2019).

The limbic system, which is involved in emotions, has a central role in psychiatric-mental health disorders. The limbic system contains the amygdala, which regulates mood and emotions such as anger; the hippocampus, which regulates memory; and the anterior cingulate, which regulates sensations (Norris, 2019; Stahl, 2020). These areas all work together to compose emotions and the body's responses to emotions. There are millions of connections among these areas. These connections, or pathways of electrical impulses, allow parts of the brain to communicate with one another and respond to stimuli.

NEUROTRANSMITTERS

The presynaptic area located at one end of each neuron holds neurotransmitters. A neurotransmitter is a chemical that carries a message to another neuron. An electrical charge, usually powered by a sodium-potassium channel, causes a reaction from one end of the neuron to the other, releasing the neurotransmitter into the synapse like a gun firing (Norris, 2019; Stahl, 2020). The neurotransmitter then crosses the space or synapse between the neurons and attaches to a specific receptor on the postsynaptic cell. Once the neurotransmitter has delivered the message to the postsynaptic cell, it is released back into the synapse (Stahl, 2020). Once released, the neurotransmitter can be destroyed by specific enzymes or be taken back into the presynaptic area by a process called *reuptake* (Stahl, 2020).

Psychiatric-mental health treatment is based on enabling neurotransmitters with messages to attach to the postsynaptic neurons (Stahl, 2020). Each neurotransmitter attaches to a receptor like a key fitting into a lock. This causes a reaction in the neuron referred to as a *second messenger system*. These exchanges must happen several times before the goal of change in the neurons and brain occurs. Sometimes a message gets lost or is incorrectly transmitted. This can lead to emotional dysregulation and psychiatric symptoms (Stahl, 2020).

Dopamine, serotonin, and norepinephrine are the most important neurotransmitters in mental health. In addition, two amino acids, gamma-aminobutyric acid and glutamate, have a role in psychiatric-mental health, with each having its own effect on mood and behavior.

Dopamine

Dopamine is a neurotransmitter associated with psychosis and influences several areas of the brain. Dopamine regulates movement and coordination, emotions, and decision making. Decreased levels of dopamine can cause Parkinson's disease. Conversely, increased levels can lead to schizophrenia or mania (Stahl, 2020). Dopamine also stimulates the hypothalamus to release sex, thyroid, and adrenal hormones (Stahl, 2020). Antipsychotic medications aim to decrease symptoms of psychosis by enhancing the impact of dopamine on the postsynaptic cells.

Serotonin

Serotonin is a neurotransmitter found in the limbic system, the brain cortex, and the stomach. Research suggests that low levels of serotonin are implicated in depression, whereas excess levels have a role in anxiety, mania, aggression, and possibly schizophrenia. Serotonin is also associated with appetite, mood, aggression, libido, sleep, and arousal, as well as perception of pain (Stahl, 2020). Medications that support serotonin are the first line of action against depression and are components of some antipsychotic medications.

Norepinephrine

Norepinephrine is a neurotransmitter found in various parts of the brain and the brainstem. Norepinephrine regulates mood, cognition, perception, sleep, arousal, and cardiovascular status (Stahl, 2020). Excess levels can trigger a fight-or-flight response and long-term elevations are associated with mania and anxiety. When norepinephrine is depleted, depression can occur. Research suggests that norepinephrine plays a role in the chronic pain that can accompany depression. Medications that increase the messages or actions of receptors that involve norepinephrine are usually antidepressants.

Gamma-Aminobutyric Acid

Gamma-aminobutyric acid (GABA), an amino acid, is an inhibitory protein. It is concentrated in the frontal and temporal lobes of the brain, where it slows down activity. GABA works like a light switch, turning on and off other excitatory molecules (Stahl, 2020). When there is not enough GABA in the brain, anxiety can occur. Medications such as benzodiazepines aim to increase levels of GABA to slow down the brain activity involved in, for example, panic attacks and anxiety.

Glutamate

Glutamate is an excitatory amino acid that functions to open the calcium channel so that neurons fire faster (Stahl, 2020). This causes excitement in the brain. Researchers are currently investigating the role of glutamate in ADHD, anxiety disorders, depression, mania, and mood disorders (Stahl, 2020).

Self-Assessment Quiz Question #6

Dopamine is responsible for which of these symptoms?

a. Sleep.
b. Psychosis.
c. Arousal.
d. Catatonia.

PSYCHOPHARMACOLOGY AND THE BRAIN

Typically, medications that treat psychiatric-mental health disorders work by either increasing or decreasing the activity of neurotransmitter receptor systems in several ways (Stahl, 2020). For example, benzodiazepines aim to slow down brain activity, thus reducing anxiety, by increasing levels of GABA. It is important to remember that the change in the neurotransmitter system either facilitates or inhibits different functions in the brain. Medications can have a single specific target, such as serotonin reuptake inhibitors, or they can target multiple transporters, such as serotonin and norepinephrine reuptake inhibitors.

Simply stated, psychiatric medications block receptors or increase the number of neurotransmitters available for use, thus changing the message at the postsynaptic site. For example, consider a patient with depression who takes a selective serotonin reuptake inhibitor (SSRI). The medication increases the serotonin in the synapse, making more serotonin available for the receptors (Stahl, 2020). The message is sent via the postsynaptic cell and a second messenger to change the cell. The result is a decrease in depressed mood. Note that it might take several weeks of changes to this system for the desired health outcome to occur (Stahl, 2020).

Because neurons and the messages they carry are interrelated, even medications that target only one neurotransmitter can affect other neurotransmitters and messages. These alterations can cause changes in basic drives, sleep patterns, body movements, and autonomic functions (Stahl, 2020). These are side effects of medications affecting neurotransmission. For example, several psychotropic medications have the side effect of drowsiness. This occurs because the medication affects more than one neurotransmitter and message. Side effects are often the result of unintended changes in the neurotransmitter systems.

Classifications in psychopharmacology

Medications play a role in the treatment of nearly every psychiatric condition. For the purposes of this course, psychotropic medications are classified into seven broad categories: antidepressants, anti-anxiety agents (also called anxiolytics), antipsychotics and their "partners" anticholinergics (used to reverse some side effects), mood stabilizers, sedative-hypnotics, psychostimulants, and miscellaneous medications designed to reduce or prevent alcohol or drug dependence, including nicotine dependence (Stahl, 2021)

Complementary and alternative therapies in mental health

Herbals and dietary supplements have gained interest in Western cultures as people search for natural remedies. Many people feel that natural herbal remedies are healthier and safer overall than pharmaceutical drugs. The Food and Drug Administration (FDA) considers herbal supplements, vitamins, and other dietary supplements to be food sources and, as such, only monitors information on the product's label and does not regulate their manufacturing or usage. This can result in wide variances in the amount of active ingredient that may be available in a certain product; some products have even been found to contain no active ingredients after undergoing laboratory evaluation. Some herbal supplements have been used in the treatment of mental health conditions, as these products are available over the counter in many stores. Patients may seek information available on the Internet and then choose supplements based upon their understanding. The nurse should always assess the use of herbal and other supplements and educate patients about known mechanisms of action, side effects, and possible interactions with pharmaceutical drugs. It is important to review available research regarding supplements and use this evidence when providing patient education. The role of certain natural herbs in the treatment of psychiatric disorders is discussed below.

St. John's wort (*Hypericum perforatum*) is derived from the St. John's wort plant. It is primarily used to address depression. St. John's wort is thought to affect serotonin and monoamine oxidase inhibitors in the brain, similar to antidepressants. There are numerous studies that demonstrate reports of drug-to-drug interactions in patients who used St. John's wort while taking other medications (including prescribed antidepressants), so it is important that the nurse teaches patients not to combine this supplement with other medication, as it may increase the risk for serotonin syndrome.

Valerian root (*Valeriana officinalis*) is powdered and taken in a capsule form. It is believed to work on the gamma-aminobutyric acid (GABA) system to alleviate anxiety and treat insomnia. Valerian should not be taken with other central nervous system depressants (especially anesthetics, barbiturates, and benzodiazepines) because it can potentiate their effects. Side effects include headaches, uneasiness, dizziness, and, sometimes, excitability.

Kava kava (*Piper methysticum*) is a South Pacific oceanic herb with sedative, analgesic, and mild euphoria-inducing properties. Kava kava may act on GABA in a manner similar to benzodiazepines, and it does have drug-to-drug interaction effects with those products. Side effects of kava kava can include stomach disturbances, dizziness, and a temporary yellowing of the skin. A person with liver impairment or one who is a heavy alcohol user should never use kava kava because it has been linked with hepatotoxicity (Rivers, Xing, & Narayanapillai, 2016). Banned in some European countries, kava kava is still widely available for over the counter or Internet purchase in the United States, Australia, and New Zealand (Rivers et al., 2016).

Ginseng (*Panax ginseng*) is a stimulating herb that can produce energy similar to caffeine, meant to result in improved endurance and reduced fatigue. Jitteriness and nervousness can be side effects of this supplement, as can insomnia, hypertension, restlessness, and, possibly, mania.

Ginkgo biloba (*Ginkgo biloba*) has gained popularity for its theoretical ability to improve blood flow to the brain to promote alertness, mental sharpness, and memory; to treat fatigue and stress; and to improve endurance. Ginkgo biloba has antioxidant properties, reducing free radicals in the body that cause cellular death (Tulsulkar & Shah, 2013). Ginkgo biloba can interfere with blood clotting and reduce platelet action, leading to increases in bleeding times. It may interfere with anticoagulant therapy and should not be taken by patients with circulatory problems who are taking such medications such as Coumadin, Plavix, or aspirin. Side effects of ginkgo biloba include headaches, nausea, vomiting, stomach upset, and, occasionally, skin allergies (Izzo, Hoon-Kim, Radhakrishnan, & Williamson, 2016).

Chamomile preparations are often used in Europe to facilitate digestion, ease gas, and decrease cramping (Mahady, Wicks, & Bauer, 2017). It has been shown to be safe for children and is a first line of therapy in Germany for treating sensitive skin infants and young children (Mahady et al., 2017).

To address vitamin and mineral needs, a one-a-day multivitamin supplement for adults and a chewable daily supplement for children can be helpful. Iron deficiency is associated with fatigue and oral conditions such as stomatitis. Omega-3 fatty acids (fish oil, flaxseed oil) have shown positive benefits in treating behavioral problems (Bondi et al, 2014; Raine, Portnoy, Liu, Mahoomed, & Hibbeln, 2015). The fat-soluble vitamins A, D, and K can be dangerous in high doses. B-complex vitamins are associated with energy. Given with calcium, vitamin B6 has been shown to reduce premenstrual symptoms (Masoumi, Ataollahi, & Oshvandi, 2016). L-methylfolate (Deplin), a prescription medical food, is a derivative of folic acid (a B vitamin). It is a dietary supplement that has demonstrated effectiveness in enhancing the treatment of depression and is monitored by the FDA (Shelton, Manning, Barrentine, & Tipa, 2013).

Massage is the manipulation of the body's soft tissues to promote circulation and relaxation. There are numerous types of massage techniques, varying from light touch to deep muscle work and from specific to generalized body parts. Swedish massage is meant to provide relaxation and increase circulation; Shiatsu massage, influenced by Chinese medicine, is used by a specialized practitioner who applies pressure to acupoints on the body with the intention of increasing the life flow (or Japanese ki; Halter, 2018).

Reflexology, also called *zone therapy*, is the application of massage or pressure to the hands and feet to alleviate distress in different parts of the body. The theory of reflexology is that all of the body is represented in areas in the hands and feet, and thus stimulating these trigger points can eliminate distress in the related body system(s) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4624523/).

According to traditional Chinese medical theory, acupuncture points are situated along meridians (channels) in the body that align with a vital energy flow, the *Qi* (Halter, 2018). Illness or distress interrupts the Qi. Acupuncturists insert tiny filiform needles along the meridians to stimulate and readjust the energy flow. Practitioners diagnose which systems in the body are affected based on inspection, auscultation, olfactory senses, palpation, and taking a limited history of symptoms. Side effects to the treatment are generally mild and may include slight headaches, nausea, or pain in certain areas. In the Western hemisphere, a common use of acupuncture is for the treatment of pain (Halter, 2018 (https://www.sciencedirect.com/science/article/pii/S2213422021000883?via%3Dihub).

Hypnosis is a technique that induces a deep relaxation and calm, trance-like state of mind. The patient's focus of awareness

becomes so restricted that external noise and distractions are no longer present in the conscious mind. Hypnotherapy is practiced by highly trained clinicians, often psychologists, to achieve certain therapeutic goals with the patient, such as recovering memories lost through the defense mechanism of repression, learning to be less anxious when faced with anxiety-provoking situations, or reducing or eliminating undesirable behavior such as smoking. The patient undergoing hypnotherapy must be relaxed and receptive to the procedure (https://positivepsychology.com/hypnotherapy/).

Psychiatric nurses should familiarize themselves with the various modalities of psychotherapy, the medications used in the treatment of psychiatric illness, as well as the complementary and alternative therapies and the various somatic therapies used in the treatment of psychiatric disorders. Psychiatric nurses provide psychoeducational services to patients and their families and should have a thorough understanding of the treatment modalities commonly used in psychiatric practice.

Self-Assessment Quiz Question #7

Which complementary alternative medicine interferes with anticoagulants?

a. Chamomile.
b. Ginseng.
c. Ginkgo biloba.
d. St. John's wort.

Self-Assessment Quiz Question #8

Which complementary alternative medicine should be avoided in patients who report heavy alcohol use?

a. St. John's Wort.
b. Ginseng.
c. Valerian root.
d. Kava kava.

OTHER THERAPIES IN MENTAL HEALTH

Electroconvulsive therapy

Mental health professionals once used ECT, introduced in the 1930s, to treat a broad range of psychiatric disturbances (George et al., 2020). With strong advances and refinements in the field, professionals may still use ECT to treat certain conditions such as severe depression (major depression), mania, or psychosis (George, et. al, 2020). To perform ECT, the patient is given a short-acting sedative, followed by a muscle relaxant. The muscle relaxant prevents tonic-clonic jerking of the body caused by seizure activity that, historically, was the cause of physical injuries to the patient. After the patient is anesthetized, electrodes are placed on the sides of their head and an electrical stimulus that is sufficient to trigger a seizure is given. Ideally, the seizure activity lasts about 15 seconds (Townsend, 2014). Breathing is supported during the procedure by nurse anesthetists or anesthesiologists. The ECT session is repeated two to three times a week for 3 to 4 weeks and is often done on an outpatient basis (Townsend, 2019).

Providers usually use medications and therapy before deciding to use ECT. ECT has an effectiveness rate of approximately 60% to 70% in the treatment of depression (George, et. al, 2020). There are few contraindications to ECT; however, caution should be used in pregnancy, patients with cardiac conditions, or patients with intracranial pressure because of disease (Townsend, 2019). Side effects of ECT include memory loss and some confusion in recalling events right before and after the procedure. Some people complain of long-term memory and cognitive problems. Also, complications related to the use of anesthetics (allergic reaction, respiratory suppression) can occur.

Transcranial magnetic stimulation

Transcranial magnetic stimulation (TMS) is a noninvasive treatment for depression. The patient is exposed to electrical energy that is passed through a coil of wires to produce a powerful magnetic field (George, et. al, 2020). Magnetic waves pass through the brain and skull painlessly, while the patient remains awake for the procedure. It is most effective when administered for 40 minutes daily for 4 to 6 weeks. It is thought to work by stimulating nerve cells to produce the neurotransmitters that relieve depression. Side effects of TMS are few, with patients reporting only mild headaches. TMS cannot be used if the patient has implanted or permanent metal in the skull or brain (George, et. al, 2020).

Vagus nerve stimulation

Vagus nerve stimulation (VNS) is an adjunctive, long-term, invasive therapy for adult patients with serious and persistent depression (George, et. al, 2020). Most of these individuals have shown no improvement in condition after trials of four or more antidepressants before attempting VNS therapy. A VNS implant is a small, battery-powered device, similar to a cardiac pacemaker, that is surgically implanted subcutaneously under the skin of the upper left or right chest. Internally, a wire runs from the device to the vagus nerve, which then carries electrical impulses to the brain. These impulses are emitted every few minutes. The device is thought to work by electrically stimulating the production of neurotransmitters that are associated with depression treatment. The side effects of VNS include a tickle in the throat (may trigger a cough reflex), mild hoarseness or other voice changes, and, rarely, difficulty swallowing, shortness of breath, neck pain, and a prickling sensation in the skin.

Case study 1

Mrs. Jones was admitted as an involuntary patient to the psychiatric unit. She was brought to the emergency department by her daughter, who reported her mother was showing "new and bizarre" behaviors. She has a history of schizophrenia, which has been well controlled until this episode.

The psychiatric nurse begins the mental status exam of Mrs. Jones. The nurse notes that she is wearing a short dress that is on backwards. She appears disheveled and unkempt; she has not eaten any of her breakfast. Further, the nurse observes that Mrs. Jones has taken the blankets off the bed and laid them out on the floor. She has also taken the toilet paper and unrolled it into a pile on the floor.

When the nurse introduces herself, Mrs. Jones is at the window talking in nonsensical words. She is wringing her hands and appears to be fixated on something outside. She does not acknowledge the nurse.

Later, she turns around and exclaims, "Sally, I am so glad you are here. Tea is almost ready. Flubrubaroo?" She moves to the pile of blankets and stands in the middle of them, smiling at the nurse.

The nurse smiles and begins to talk to Mrs. Jones. The nurse explains again that she is a psychiatric nurse and is there to care for her. She states, "Oh no, dear, have you tokenitnd?"

The nurse notes that Mrs. Jones' affect is flat as she stares out at the window but animated when speaking in nonsensical words. The nurse asks her name. Suddenly, the patient turns to the nurse and starts talking very quickly, saying, "I know it is late. What was the dog's name again? I must go to the store. More milk."

Questions

1. Which components of the mental status examination can the nurse document from this interaction with Mrs. Jones?
2. How might you describe Mrs. Jones' affect?
3. How would you summarize the nurse's observation and evaluation of Mrs. Jones' thought processes?
4. What other health status information is helpful for the nurse to assess?

Responses

1. The psychiatric nurse can document Mrs. J's appearance, her behavior, and her affect, but not her mood. Documentation can also include thought processes and thought content. The psychiatric nurse is unable to assess Mrs. J's memory, cognition, insight, motivation, and judgment as well as her safety.
2. In addition to being flat and animated, Mrs. J's affect may also be described as anxious. Because her affect seems to be fluctuating, there may be an incongruence between her affect and behavior.
3. Word salad is a common finding and learners should be familiar with the term. Mrs. J's nonsensical and disorganized speech gives some indication of her thought processes. Her thought process appears to be confused. She exhibits word salad and her thought processes are disjointed and incoherent. Mrs. J's thought content is not clear as she does not respond coherently to the questions being asked.
4. It would be helpful for the psychiatric nurse to obtain information from the patient's daughter. What has Mrs. J been exhibiting at home? What is Mrs. J's baseline level of functioning? Were there any past episodes of self-harm or dangerous behavior? Over what period has this change in behavior occurred? Were there any triggers?

Case study 2

Donald is a 45-year-old male patient employed as a financial manager by a large bank. Because of economic downturns, there have not been as many opportunities to gain new business, which has led to fierce competition between financial managers.

Donald presents to his primary care provider's office reporting recent episodes of shortness of breath, sweating, anxiety, and the strong feeling that he is about to die. These symptoms started 3 months ago, occurring once or twice a week. Within the past few weeks, Donald reports he has experienced symptoms daily and he has begun to fear leaving his home because he is afraid that he will have another attack. His attendance at work has suffered and he reports that his supervisor told him that he might lose his job as a result. This has caused problems between him and his wife and she has started talking about leaving him to move back in with her parents.

An electrocardiogram, stress test, and laboratory testing are performed, all of which show normal results. Donald is prescribed alprazolam (Xanax) by his primary care provider and referred to the local mental health center for treatment. Once there, he meets with a therapist for a comprehensive assessment. Donald is diagnosed with panic disorder and agoraphobia. He is referred to the psychiatric nurse practitioner for a medication evaluation and treatment. The nurse practitioner recommends that Donald start taking sertraline (Zoloft), 50 mg daily, and that he uses the Xanax only as needed to avoid tolerance and dependency.

Questions

1. What are other therapies that are most likely to be beneficial for Donald?
2. Are there any ancillary services that could also be helpful to Donald?
3. Which recommendations regarding his relationship status with his wife could the nurse practitioner discuss with Donald?

Responses

1. Panic attacks and panic disorder are treatable and respond well to medications and therapy. Cognitive-behavioral therapy is indicated to help this patient learn to identify anxiety-provoking triggers and reframe how he thinks about these events. Relaxation training, such as guided imagery and mindfulness, could be helpful in teaching Donald a means of reducing the anxiety once it occurs.
2. Another recommendation for Donald would be to include regular daily exercise in his routine (aerobic or weightlifting) because exercise can have a significantly positive effect on panic disorder treatment.
3. Donald may wish to consider the need for marital therapy sessions to work on improving communication with his wife. If she is willing to participate in Donald's treatment plan, they may also want to join a National Alliance on Mental Illness (NAMI) support group to learn more about psychiatric disorders and the rights of individuals who have such disorders. Finally, mental and behavioral health problems are considered medical problems and are protected under the federal Family and Medical Leave Act of 1993. If Donald's symptoms increase and become more debilitating, the psychiatric nurse practitioner treating Donald can provide him with a work statement and absence excuse that should help to protect his employment status and prevent him from losing his job while he is receiving treatment.

Case study 3

Mr. Fisher is a young adult male patient who has been newly diagnosed with panic attacks. The psychiatric mental-health nurse working in the outpatient clinic meets with Mr. Fisher, who was recently prescribed benzodiazepine by the psychiatrist for his panic attacks. Mr. Fisher asks the nurse what it means to have "a chemical imbalance" in the brain. He also asks how the new medication will "fix" his panic attacks.

Questions

1. How should the nurse explain "a chemical imbalance" in the brain to Mr. Fisher?
2. How should the nurse describe how benzodiazepine medications work?

Responses

1. The psychiatric-mental health nurse should explain to Mr. Fisher that neurotransmitters are chemicals in the brain that form messenger systems between neurons to help the brain and body regulate functions (e.g., thinking, feeling) and react or behave. The nurse also explains that there are excitatory and inhibitory amino acids that assist in regulating these brain functions. The nurse describes that a person's emotions and behaviors are the result of the functioning of these chemicals carrying messages between the neurons and amino acids. When there is an imbalance among neurotransmitters, the messenger system receives too many or too few messages, impairing regulation.
2. The nurse should explain that, in a person with panic disorder, the function of GABA may be altered. Normally, GABA slows down other chemicals that are more excitatory. If GABA is not working correctly or at the correct level, there is no way to slow down the other chemicals. The result may be panic attacks. There are anti-anxiety medications, such as benzodiazepines, that aim to increase levels of GABA to help slow down brain activity; they decrease anxiety by changing how the chemicals in the brain communicate and work.

Healthcare Considerations

1. Therapeutic use of self is one of the foundations of mental health nursing.
2. An understanding of the mental health exam is fundamental to the diagnosis and treatment of mental illness.

Conclusion

The brain is an amazing organ that not only monitors changes in the external world but also regulates internal body functions. The brain initiates basic drives and controls contractions of muscles, internal organs, sleep cycles, moods, and emotions. Knowledge of how the brain works with regard to neurotransmission is an important aspect of understanding psychiatric-mental health disorders and the medications used to alleviate patient symptoms. Neurotransmitters carry specific messages from neuron to neuron to produce emotions and behaviors. Psychiatric-mental health medications work by altering these messenger systems. The neurotransmitters involved in mood and behavior include serotonin, norepinephrine, and dopamine. Through epidemiological research, healthcare providers can learn more about the prevalence of psychiatric and mental health disorders, as well as ways to identify persons who are at risk. This information becomes an important part of the nurse's assessment and identification of patients with psychiatric disorders. Recognizing an individual's behaviors and making statements can add to the assessment data and provide insight into the patient's current mental health state.

Assessing the patient, performing mental status assessments, identifying priority problems, developing goals and objectives, and developing evidence-based plans of care comprise the core steps of the systematic approach to caring for patients with psychiatric disorders. After these processes have taken place, the provision of relevant and appropriate nursing interventions follows. The therapeutic relationship is established during initial patient encounters, during the assessment and implementation of interventions during the nursing care planning process.

Psychiatric nurses who use therapeutic communication will be able to conduct effective, comprehensive mental status examinations that provide the information necessary to develop a comprehensive mental healthcare plan, regardless of practice setting.

References

- American Nurses Association. (2014). Psychiatric mental health nursing: Scope and standards of practice (2nd ed.). Silver Spring, MD: Author.
- American Nurses Association. (2016). Code of ethics for nurses with interpretative statements. Retrieved from http://www.nursingworld.org/MainMenuCategories/Ethics Standards/CodeofEthicsforNurses/Code-of-Ethics-For-Nurses.html
- American Psychiatric Association. (n.d.). DSM history. Retrieved from https://www.psychiatry.org/psychiatrists/practice/dsm/history-of-the-dsm
- American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Arlington, VA: Author.
- American Psychoanalytic Association. Psychoanalytic Theory & Approaches (n.d.) Retrieved April 07, 2022 from https://apsa.org/content/psychoanalytic-theory-approaches
- Beck, A. T. (1967). Depression: Clinical, experimental, and theoretical aspects. Philadelphia, PA: University of Pennsylvania Press.
- Black, D. W. & Grant, J. E. (2014). DSM-5 guidebook: The essential companion to the Diagnostic and Statistical Manual of Mental Disorders. Arlington, VA: American Psychiatric Publishing.
- Bondi, C. O., Taha, A. Y., Tock, J. L., Totah, N. K., Cheon, Y., Torres, G. E., ... Moghaddam, B. (2014). Adolescent behavior and dopamine availability are uniquely sensitive to dietary omega-3 fatty acid deficiency. Biological Psychiatry, 75(1), 38-46.
- Boyd, M. (2018). Psychiatric nursing: Contemporary practice (5th ed.). Philadelphia, PA: Lippincott Williams & Wilkins.
- Centers for Disease Control. (n.d.). *Health Insurance Portability and Accountability Act*
- *of 1996 (HIPAA).* Retrieved January 16, 2022, from https://www.cdc.gov/phlp/publications/topic/hipaa.html
- Centers for Disease Control and Prevention. (2015). Hispanic health. Retrieved from https://www.cdc.gov/vitalsigns/hispanic-health/index.html
- Centers for Medicare & Medicaid Services. (n.d.). The center for consumer information & insurance oversight: The Mental Health Parity and Addiction Equity Act
- (MHPAEA). Retrieved from https://www.cms.gov/cciio/programs-and-initiatives/other-insurance-protections/mhpaea_factsheet.html
- Chen C, Zhan J, Wen H, Wei X, Ding L, Tao C, Li C, Zhang P, Tang Y, Zeng J, Lu L. Current state of research about acupuncture for the treatment of COVID-19: A scoping review. Integr Med Res. 2021;10(Suppl):100801. doi: 10.1016/j.imr.2021.100801. Epub 2021 Oct 14. PMID: 34664024; PMCID: PMC8516141. Retrieved April 6, 2022.
- Children's Bureau, Child Welfare Information Gateway. (2016). Mandatory reporters of child abuse and neglect. Washington, DC: U.S. Department of Health and Human Services, Children's Bureau. Retrieved from https://www.childwelfare.gov/pubPDFs/manda.pdf
- Commission on Accreditation for Marriage and Family Therapy Education (COAMFTE). (n.d.). Retrieved from http://www.coamfte.org/iMIS15/COAMFTE/Accreditation/Value%20of%20Accreditation.aspx
- Corey, M. S., Corey, G., & Corey, C. (2013). Groups: Process and practice (9th ed.). Boston, MA: Cengage Learning.
- Corsini, R. J. & Wedding, D. (Eds.). (2018). *Current Psychotherapies* (11th ed.). Cengage Learning.
- Diathesis Stress Theory Explained. (n.d.). HealthResearchFunding.org. Retrieved January 16, 2022, from https://healthresearchfunding.org/diathesis-stress-theory-explained/
- Duke, M. R., Moore, R. S., & Ames, G. M. (2011). PTSD treatment-seeking among rural Latino combat veterans: A review of the literature. Journal of Rural Social Sciences, 26(3), 157-180.
- Ebert, A. (n.d.). *Emil Kraepelin: A pioneer of scientific understanding of psychiatry and psychopharmacology.* NCBI. Retrieved January 16, 2022, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2927892/
- Embong, N. H., Soh, Y. C., Ming, L. C., & Wong, T. W. (2015). Revisiting reflexology: Concept, evidence, current practice, and practitioner training. *Journal of traditional and complementary medicine*, *5*(4), 197–206. Retrieved from April 6, 2022, from https://doi.org/10.1016/j.jtcme.2015.08.008
- Emergency Hospitalization, 51 Ohio Rev. Code ch. 5122.10. (2014). Retrieved from http://codes.ohio.gov/orc/5122.10
- Forrester, D. A. (2016). Nursing's greatest leaders: A history of activism. New York, NY: Springer.
- Foucha v. Louisiana (90-5844), 504 U.S. 71. (1992). Supreme Court. Retrieved from https://www.law.cornell.edu/supct/html/90-5844.ZO.html
- Friedman, M. M., Bowden, V. R., & Jones, E. (2003). *Family Nursing: Research, Theory & Practice* (5th ed.). Prentice Hall.
- Fromm, E. (2013). Sigmund Freud's mission: An analysis of his personality and influence. New York, NY: Open Road Media.
- George, M., Taylor, J, Short, E., Snipes, J., Pelic, C., & Fryml, L. In Gabbard, G. O. (Ed.). (2014). *Gabbard's Treatments of Psychiatric Disorders* (5th ed.). American Psychiatric Publishing, a division of American Psychiatric Association.
- Griswold v. Connecticut. (1965). Legal Information Institute. Cornell Law School. (https://www.law.cornell.edu/wex/griswold_v_connecticut_(1965)).
- Halter, M. J. (2018). Varcarolis' foundations of psychiatric mental health nursing: A clinical approach (8th ed.). St. Louis, MO: Elsevier.
- Headlee, R. & Corey, B. W. (1948). Psychiatry in Nursing. New York, NY: Rinehart; original from the University of Michigan.
- Henwood, B. F., Derejko, K. S., Couture, J., & Padgett, D. K. (2015). Maslow and mental health recovery: a comparative study of homeless programs for adults with serious mental illness. Administration and policy in mental health, 42(2), 220–228. https://doi.org/10.1007/s10488-014-0542-8
- Herne, M. A., Bartholomew, M. L., & Weahkee, R. (2014). Suicide mortality among American
- Indians and Alaska Natives, 1999-2009. American Journal of Public Health, 104 (Suppl. 3), S336-S342. doi:10.2105/AJPH.2014.301929
- Institute of Medicine (now the Health and Medicine Division of the National Academies) Committee on Crossing the Quality Chasm. (2006). Improving the quality of health care for mental and substance-use conditions. In Quality Chasm. Retrieved from http://www.ncbi.nlm.nih.gov/books/NBK19830/
- Izzo, A. A., Hoon-Kim, S., Radhakrishnan, R., & Williamson, E. M. (2016). A critical approach to evaluating clinical efficacy, adverse events and drug interactions of herbal remedies. Phytotherapy Research, 30(5), 691–700.
- Jahnke, R., Larkey, L., Rogers, C., Etnier, J., & Lin, F. (2010). A comprehensive review of health benefits of qigong and tai chi. *American journal of health promotion: AJHP*, *24*(6), e1–e25. Retrieved April 6, 2022, from https://doi.org/10.4278/ajhp.081013-LIT-248
- Jones & Bartlett Learning. (n.d.). The Nurse-Patient Relationship. Retrieved from http://samples.jbpub.com/9781449691776/9781449691776_CH05_Pass2.pdf
- Keltner, N. L. (2018). Historical issues. In N. L. Keltner & D. Steele (Eds.), Psychiatric nursing (7th ed., pp. 9-18). St. Louis, MO: Mosby Elsevier. (2015). Anxiety-related, obsessive-compulsive, trauma and stressor-related, somatic, and dissociative disorders. In N. L. Keltner & D. Steele (Eds.), Psychiatric nursing (7th ed., pp. 308-330). St. Louis, MO: Mosby Elsevier.
- Keltner, N. L. & Steele, D. (2014). Psychiatric nursing (7th ed.). St. Louis, MO: Mosby Elsevier.
- Kibria, A. A. & Metcalfe, N. H. (2016). A biography of William Tuke (1732–1822): Founder of the modern mental asylum. Journal of Medical Biography, 24(3), 384-388. doi:10.1177/0967772014533059
- Lasagna, L. (1982). The Boston State Hospital Case (*Rogers* v. *Okin*): A Legal, Ethical, and Medical Morass. Perspectives in Biology and Medicine Volume 25, Number 3, Spring 1982, pp. 382-403, Johns Hopkins University Press, 10.1353/pbm.1982.0031. Retrieved April 8, 2022 from https://muse.jhu.edu/article/404046
- Mahady, G. B., Wicks, S. M., & Bauer, R. (2017). Use of botanicals in children and adults. In S. W. Ekvall & V. K. Ekvall (Eds.), Pediatric and adult nutrition in chronic diseases, developmental disabilities, and hereditary metabolic disorders: Prevention, assessment, and treatment, p. 191.
- Masoumi, S. Z., Ataollahi, M., & Oshvandi, K. (2016). Effect of combined use of calcium and vitamin B6 on premenstrual syndrome symptoms: A randomized clinical trial. Journal of Caring Sciences, 5(1), 67.
- McKay, D., Sookman, D., Neziroglu, F., Wilhelm, S., Stein, D. J., Kyrios, M., ... Veale, D. (2015). Efficacy of cognitive-behavioral therapy for obsessive–compulsive disorder. Psychiatry Research, 225(3), 236–246.
- Meier, E., et al., Plaintiffs and Appellants, v. ROSS GENERAL HOSPITAL et al., Defendants and Respondents. S.F. 22607. Decided: October 04, 1968. Retrieved April 8, 2022, from https://caselaw.findlaw.com/ca-supreme-court/1822578.html
- Rennie v. Klein. Fed Report (1983). 1983 Oct 13; 720:266-77.U.S. Court of Appeals, Third Circuit PMID: 11648483. Retrieved April 8, 2022, from https://pubmed.ncbi.nlm.nih.gov/11648483/
- Riley, J. B. (2015). Communication in nursing. St. Louis, MO: Elsevier Health Sciences.
- Rivers, Z., Xing, C., & Narayanapillai, S. (2016). Kava as a pharmacotherapy of anxiety disorders: Promises and concerns. Medicinal Chemistry, 6(2), 81-87.
- Rouse v. Cameron. (1966) 125 U.S.App. D.C. 366, 373 F.2d 451 (https://casetext.com/case/rouse-v-cameron)
- Rüsch, N., Zlati, A., Black, G., & Thornicroft, G. (2014). Does the stigma of mental illness contribute to suicidality? The British Journal of Psychiatry, 205(4), 257-259.
- Sadock, B. J., Sadock, V. A., & Ruiz, P. (2015). Kaplan and Sadock's synopsis of psychiatry: Behavioral sciences/clinical psychiatry (11th ed.). Philadelphia, PA: Wolters Kluwer.
- Sarkhel, S., Singh, O. P., & Arora, M. (2020). Clinical Practice Guidelines for Psychoeducation in Psychiatric Disorders: General Principles of Psychoeducation. *Indian journal of psychiatry*, *62*(Suppl 2), S319–S323. Retrieved April 06, 2022, from https://doi.org/10.4103/psychiatry.IndianJPsychiatry_780_19
- S.F. No. 23042. Supreme Court of California. July 1, 1976. VITALY TARASOFF et al., Plaintiffs and Appellants, v. THE REGENTS OF THE UNIVERSITY OF CALIFORNIA et al., Defendants and Respondents
- Sharma, N. & Gupta, V. (2022). Therapeutic communication. Stat Pearls. Retrieved from NCBI, April 8, 2022, from https://www.ncbi.nlm.nih.gov/books/NBK567775/
- Shelton, R. C., Manning, J. S., Barrentine, L. W., & Tipa, E. V. (2013). Assessing effects of l-methylfolate in depression management: results of a real-world patient experience trial. The Primary Care Companion for CNS Disorders, 15(4).
- Stahl, S. M. (2020). Stahl's essential psychopharmacology: Neuroscientific basis and practical applications (4th ed.). Cambridge, United Kingdom: Cambridge University Press.
- Suma, P., Kuckel, D., & Huecker, M. (2021). Cognitive Behavior Therapy. *Stat Pearls* 8. Retrieved 4/8/22 from https://www.ncbi.nlm.nih.gov/books/NBK470241/
- Townsend, M. C. (2019). Psychiatric mental health nursing: Concepts of care in evidence-based practice (8th ed.). Philadelphia, PA: F. A. Davis.
- Treatment Advocacy Center. (2014). Mental health commitment laws: A survey of the states. Retrieved from http://www.treatmentadvocacycenter.org/storage/documents/2014-state-survey-abridged.pdf
- Tuckman, B. W. & Jensen, M. A. C. (1977). Stages of small-group development revisited. Group & Organization Management, 2(4), 419-427.
- U.S. Census Bureau. (2016a, November). Facts for features: American Indian and Alaska Native heritage month: November 2016. Retrieved from https://www.census.gov/newsroom/facts-for-features/2016/cb16-ff22.html
- U.S. Census Bureau. (2016b, October). FFF: Hispanic heritage month 2016. Retrieved from https://www.census.gov/newsroom/facts-for-features/2016/cb16-ff16.html
- U.S. Census Bureau. (2016c). Table: Black or African American alone, percent, July 1, 2016 (V2016). Retrieved from https://www.census.gov/quickfacts/fact/table/US/RHI225216
- US Census Bureau. (2021). *US Census Bureau QuickFacts: United States.* Census Bureau. Retrieved January 16, 2022, from https://www.census.gov/quickfacts/fact/table/US/RHI225219
- US Constitution. (1868). 14th Amendment. https://constitution.congress.gov/constitution/amendment-14/
- U.S. Department of Health and Human Services. (1996). The Health Insurance Portability and Accountability Act. Retrieved from https://aspe.hhs.gov/report/health-insurance-portability-and-accountability-act-1996
- U.S. Department of Health and Human Services. (2017a). Health information privacy. Retrieved from https://www.hhs.gov/hipaa/for-professionals/faq/2098/if-doctor-believes-patient-might-hurt-himself-or-herself-or-someone-else-it-duty-provider.html
- U.S. Department of Health and Human Services. (2017b). Information related to mental and behavioral health. Retrieved from https://www.hhs.gov/hipaa/for-professionals/special-topics/mental-health/index.html
- U.S. Department of Labor (1993). Family medical leave act of 1993. Retrieved January 2, 2022, from https://www.dol.gov/agencies/whd/laws-and-regulations/laws/fmla#
- Volpi-Abadie, J., Kaye, A. M., & Kaye, A. D. (2013). Serotonin syndrome. *The Ochsner journal*, *13*(4), 533–540. retrieved Apr 8, 2022 from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3865832/
- Wyatt v. Stickney 325 F. Supp 781(M.D.Ala.1971), 334 F. Supp. 1341 (M.D.Ala 1971), 344 F. Supp. 373 (M.D. Ala. 1972), sub nom Wyatt v. Aderholt, 503 F. 2d 1305 (5th Cir. 1974). Retrieved April 8, 2022, from https://mentalillnesspolicy.org/legal/wyatt-stickney-right-treatment.html
- Yalom, I. D. & Leszcz, M. (2014). The theory and practice of group psychotherapy (5th ed.). New York, NY: Basic Books.

Self-Assessment Answers and Rationales

1. The correct answer is B.
Rationale: Aaron Beck developed cognitive behavioral therapy after working with depressed patients. Cognitive behavioral therapy is based on cognitive psychology and behavioral therapy.

2. The correct answer is A.
Rationale: The unit policy regarding voluntary patient participation in group therapy preserves the ethical principle of autonomy. The principle of autonomy presumes that individuals are capable of making independent decisions for themselves and that healthcare workers must respect these decisions. Beneficence refers to one's duty to benefit or promote the good of others. Justice reflects the nurse's duty to treat all patients equally. Veracity refers to the duty to be truthful (Boyd, 2018).

3. The correct answer is A.
Rationale: Defense mechanisms are behaviors that an individual uses to deal with stressors. Defense mechanisms can be beneficial and protective for the patient or they can be counterproductive and maladaptive.

4. The correct answer is C.
Rationale: The nurse assumes responsibility for the milieu. The nurse is responsible for the overall environment as well as assessment and medication administration. The therapist is primarily responsible for group and individual therapy in a traditional care model. Psychodrama uses role-play to express feelings. The occupational therapy assists the patient to develop independence in life skills. (Boyd, 2018)

5. The correct answer is B.
Rationale: Many community support groups exist to help individuals who are experiencing specific mental health problems. Groups exist for gambling addiction, rape and sexual abuse support, bipolar disorder, depression, grief and bereavement, suicide, attention deficit disorder, Tourette's disorder, substance use disorders, and many more.

6. The correct answer is B.
Rationale: Dopamine is a neurotransmitter associated with psychosis and influences several areas of the brain.

7. The correct answer is C.
Rationale: Ginkgo biloba can interfere with blood clotting and reduce platelet action, leading to increases in bleeding times. It may interfere with anticoagulant therapy and should not be taken by patients with circulatory problems who are taking such medications such as Coumadin, Plavix, or aspirin.

8. The correct answer is D.
Rationale: A person with liver impairment or one who is a heavy alcohol user should never use kava kava because it has been linked with hepatotoxicity (Rivers, Xing, & Narayanapillai, 2016)

Diabetes Prevention and Management for Healthcare Professionals

5 Contact Hours

Release Date: November 16, 2021

Expiration Date: November 16, 2024

Faculty

Adrianne Avillion, D.Ed, RN, is an accomplished nursing professional development specialist and healthcare author. She earned a doctoral degree in adult education, an MS in nursing from Penn State University, and a BSN from Bloomsburg University. Dr. Avillion has held a variety of nursing positions as a staff nurse in critical care and physical medicine and rehabilitation settings, as well as numerous leadership roles in professional development. She has published extensively and is a frequent presenter at conferences and conventions devoted to the specialty of continuing education and nursing professional development. Dr. Avillion owns and is the CEO of Strategic Nursing Professional Development, a business that specializes in continuing education for healthcare professionals and consulting services in nursing professional development.

Adrianne Avillion has disclosed that she has no significant financial or other conflicts of interest pertaining to this course.

Reviewer: Mary C. Ross, Ph.D., RN, is an experienced nursing clinician and educator. She has clinical expertise in nursing and various medical-surgical areas. Dr. Ross has had numerous research grants, and multiple publications and presentations. In addition to a BSN and an MSN, she has a doctorate in nursing.

Mary C. Ross has disclosed that she has no significant financial or other conflicts of interest pertaining to this course.

Course overview

Diabetes is a significant health problem in the United States and throughout the world. It is imperative that the healthcare community take aggressive steps to reduce the number of Americans who have the disease and to promote more effective treatment so that persons with diabetes can enjoy their maximum quality of life. This education program presents information on both the impact of the disease and how to provide effective healthcare professional interventions to those affected.

Learning objectives

Upon completion of the course, the learner should be able to:

- Discuss the incidence and prevalence of diabetes mellitus.
- Explain the financial and societal impact of diabetes mellitus.
- Describe the normal anatomy and physiology of the pancreas.
- Differentiate among the different types of diabetes mellitus.
- Discuss the pathologies of the different types of diabetes mellitus.
- Explain the screening guidelines for diabetes mellitus.
- Identify risk factors for the development of diabetes mellitus.
- Describe the presenting clinical manifestations of each type of diabetes mellitus.
- Explain the process of diagnosing diabetes mellitus.
- Describe strategies for the management of diabetes mellitus.
- Identify the potential complications of diabetes mellitus.
- Describe healthcare professional interventions when caring for persons with diabetes mellitus.
- Discuss the educational needs of diabetic patients and their families.

How to receive credit

- Read the entire course online or in print which requires a 5-hour commitment of time.
- Complete the self-assessment quiz questions which are at the end of the course or integrated throughout the course. These questions are NOT GRADED. The correct answer is shown after you answer the question. If the incorrect answer is selected, the rationale for the correct answer is provided. These questions help to affirm what you have learned from the course.
- Depending on your state requirements you will be asked to complete either:
  - An affirmation that you have completed the educational activity.
  - A mandatory test (a passing score of 70 percent is required). Test questions link content to learning objectives as a method to enhance individualized learning and material retention.
- If requested, provide required personal information and payment information.
- Complete the MANDATORY Course Evaluation.
- Print your Certificate of Completion.

CE Broker reporting

Colibri Healthcare, LLC, provider # 50-4007, reports course completion results within 1 business day to CE Broker. If you are licensed in Arkansas, District of Columbia, Florida, Georgia, Kentucky, Michigan, Mississippi, New Mexico, North Dakota, South Carolina, or West Virginia, your successful completion results will be automatically reported for you.

Accreditations and approvals

Colibri Healthcare, LLC is accredited as a provider of nursing continuing professional development by the American Nurses Credentialing Center's Commission on Accreditation.

Individual state nursing approvals

Colibri Healthcare, LLC is accredited as a provider of nursing continuing professional development by the American Nurses Credentialing Center's Commission on Accreditation. In addition to states that accept courses offered by ANCC accredited Providers, Colibri Healthcare, LLC is an approved Provider of continuing education in nursing by: Alabama Board of Nursing, Provider #ABNP1418 (valid through February 5, 2025); Arkansas State Board of Nursing, Provider #50-4007; California Board of Registered Nursing, Provider #CEP17480 (valid through January 31, 2024); California Board of Vocational Nursing and Psychiatric Technicians (LVN Provider # V15058, PT Provider #V15020; valid through December 31, 2023); District of Columbia Board of Nursing, Provider #50-4007; Florida Board of Nursing, Provider #50-4007; Georgia Board of Nursing, Provider #50-4007; Kentucky Board of Nursing, Provider #7-0076 (valid through December 31, 2023; CE Broker provider #50-4007). Michigan Board of Nursing, Provider #50-4007; Mississippi Board of Nursing, Provider #50-4007; New Mexico Board of Nursing, Provider #50-4007; North Dakota Board of Nursing, Provider #50-4007; South Carolina Board of Nursing, Provider #50-4007; and West Virginia Board of Registered Nurses, Provider #50-4007. This CE program satisfies the Massachusetts States Board's regulatory requirements as defined in 244 CMR5.00: Continuing Education.

Activity director

Shirley Aycock, DNP, RN, Executive Director of Quality and Accreditation

Disclosures

Resolution of conflict of interest
In accordance with the ANCC Standards for Commercial Support for continuing education, Colibri Healthcare, LLC implemented mechanisms prior to the planning and implementation of the continuing education activity, to identify and resolve conflicts of interest for all individuals in a position to control content of the course activity.

Sponsorship/commercial support and non-endorsement
It is the policy of Colibri Healthcare, LLC not to accept commercial support. Furthermore, commercial interests are prohibited from distributing or providing access to this activity to learners.

Disclaimer

The information provided in this activity is for continuing education purposes only and is not meant to substitute for the independent medical judgment of a healthcare provider relative to diagnostic and treatment options of a specific patient's medical condition.

Course verification

All individuals involved have disclosed that they have no significant financial or other conflicts of interest pertaining to this course. Likewise, and in compliance with California Assembly Bill No. 241, every reasonable effort has been made to ensure that the content in this course is balanced and unbiased.

INTRODUCTION

According to the National Diabetes Statics Report, 2020, 34.2 million Americans, just over 1 in 10, have diabetes. Of these 34.2 million people, 7.3 million, or 21.4%, are undiagnosed (Centers for Disease Control and Prevention (CDC), 2020c; 2020d). The World Health Organization (WHO) reports that in 2019 an estimated 1.5 million deaths were directly caused by diabetes (WHO, 2021). The numbers of people who have diabetes continue to increase at alarming rates. It is critical that healthcare professionals aggressively pursue identification of persons who have, and who are at risk for, developing diabetes, and intervene to facilitate not only treatment, but prevention efforts (CDC, 2020c; 2020d).

INCIDENCE AND PREVALENCE OF DIABETES MELLITUS

Diabetes mellitus (DM) is a chronic endocrine disease characterized by impaired glucose regulation that occurs when the pancreas fails to produce adequate amounts of insulin or when the patient's body is unable to effectively utilize the insulin that is produced (Ignatavicius et al., 2018; WHO, 2021).

Approximately 304.2 million Americans have diabetes. Data indicate that (CDC, 2020c; 2020d):

- An estimated 10.5% of the United States (US) population are dealing with diabetes.
- About 26.9 million people have been diagnosed. This figure includes 26.8 million adults.
- A significant number of these people, 7.3 million or 21.4%, are undiagnosed.
- A total of 88 million people 18 years of age and older have prediabetes. This figure represents 34.5% of the adult US population.
- For persons 65 years of age and older, 24.2 million people have prediabetes.

Healthcare Professionals Consideration: An estimated 1.5 million world-wide deaths were directly caused by diabetes in 2019 (WHO, 2021). Healthcare professionals must increase their efforts in the recognition, treatment, and prevention of diabetes mellitus.

Diabetes is also a leading cause of death in the United States. According to the most recent data available on the CDC website (2021d), the following are the leading causes of death in the United States.

1. Heart disease: 659,041
2. Cancer: 599,601
3. Accidents (unintentional injuries): 173,040
4. Chronic lower respiratory diseases: 156,979
5. Stroke (cerebrovascular diseases): 150,005
6. Alzheimer's disease: 121,499
7. Diabetes: 87,647
8. Nephritis, nephrotic syndrome, and nephrosis: 51,565
9. Influenza and pneumonia: 49,783
10. Intentional self-harm (suicide): 47,511

Key findings of the National Diabetes Statistics Report 2020 regarding incidence and prevalence include (CDC, 2020d ;2020e; 200f):

- 34.2 million Americans—just over 1 in 10—have diabetes.
- 88 million American adults—approximately 1 in 3—have prediabetes.
- New diabetes cases were higher among non-Hispanic blacks and people of Hispanic origin than non-Hispanic Asians and non-Hispanic whites.
- For adults diagnosed with diabetes:
  - New cases significantly decreased from 2008 through 2018.
  - The percentage of existing cases was highest among American Indians/Alaska Natives.
  - 15% were smokers, 89% were overweight, and 38% were physically inactive.
  - 37% had chronic kidney disease (stages 1 through 4); and fewer than 25% with moderate to severe chronic kidney disease (stage 3 or 4) were aware of their condition.
- New diagnosed cases of type 1 and type 2 diabetes have significantly increased among US youth.
- For ages 10 to 19 years, incidence of type 2 diabetes remained stable among non-Hispanic whites and increased for all others, especially non-Hispanic blacks.
- The percentage of adults with prediabetes who were aware they had the condition doubled between 2005 and 2016, but most continue to be unaware.

More people are developing type 1 and type 2 diabetes during youth, and racial and ethnic minorities continue to develop type 2 diabetes at higher rates. Likewise, the proportion of older people in our nation is increasing, and older people are more likely to have a chronic disease like diabetes. By addressing diabetes, many other related health problems can be prevented or delayed.

Prevalence and incidence according to age, race, and ethnicity

Age

According to the National Diabetes Statistics Report 2020, (CDC, 2020c; 2020d;2020e):

- About 34.2 million people of all ages had diabetes mellitus.
- The percentage of adults (18 years of age or older) with diabetes increased with age.
- About 34.1 million adults 18 years of age or older) had diabetes.
- The highest percentage was 26.8% among persons 65 years of age or older.
- An estimated 4.9 million adults between the ages of 18 and 44 had diabetes.
- An estimated 14.8 million people between the ages of 45 and 64 had diabetes.
- An estimated 14.3 million people over the age of 65 had diabetes.

Incidence and Trends among Children and Adolescents.

According to the National Diabetes Statistics Report 2020 (CDC, 2020c; 2020d; 2020e):

- 18,291 children and adolescents younger than age 20 years with type 1 diabetes.
- 5,758 children and adolescents age 10 to 19 years with type 2 diabetes.
- During 2011–2015, non-Hispanic Asian and Pacific Islander children and youth had the largest significant increases in incidence of type 1 diabetes.
- During 2011–2015, non-Hispanic Asian and Pacific Islander children and youth had the largest significant increases in incidence of type 1 diabetes.
- Among US children and adolescents aged 10 to 19 years (CDC, 2020c; 2020d; 2020e):
- For the entire period 2002–2015, overall incidence of type 2 diabetes significantly increased.
- During the 2002–2010 and 2011–2015 periods, changes in incidence of type 2 diabetes were consistent across race/ethnic groups. Specifically, incidence of type 2 diabetes remained stable among non-Hispanic whites and significantly increased for all others, especially non-Hispanic blacks.

Evidence-based practice! Research data shows that the number of younger people with diabetes is significant and continues to increase (CDC, 2020c; 2020d; 2020e). It is therefore essential that nurses identify those at risk and provide patient/family education regarding risk factors for the disease and how to modify these risk factors as appropriate.

Racial and ethnic differences (Prevalence of diagnosed diabetes)

Among the US population overall, crude estimates for 2018 were (CDC, 2020c; 2020d; 2020e):

- 26.9 million people of all ages—or 8.2% of the US population—had diagnosed diabetes.
- 210,000 children and adolescents younger than age 20 years—or 25 per 10,000 US youths— had diagnosed diabetes. This includes 187,000 with type 1 diabetes.
- 1.4 million adults aged 20 years or older—or 5.2% of all US adults with diagnosed diabetes—reported both having type 1 diabetes and using insulin.
- 2.9 million adults aged 20 years or older—or 10.9% of all US adults with diagnosed diabetes—started using insulin within a year of their diagnosis.

Among US adults aged 18 years or older, age-adjusted data for 2017–2018 indicated the following (CDC, 2020c; 2020d; 2020f):

- Prevalence of diagnosed diabetes was highest among American Indians/Alaska Natives (14.7%), people of Hispanic origin (12.5%), and non-Hispanic blacks (11.7%), followed by non-Hispanic Asians (9.2%) and non-Hispanic whites (7.5%).
- American Indians/Alaska Natives had the highest prevalence of diagnosed diabetes for women (14.8%).
- American Indian/Alaska Native men had a significantly higher prevalence of diagnosed diabetes (14.5%) than non-Hispanic black (11.4%), non-Hispanic Asian (10.0%), and non-Hispanic white (8.6%) men.
- Among adults of Hispanic origin, Mexicans (14.4%) and Puerto Ricans (12.4%) had the highest prevalence, followed by Central/South Americans (8.3%) and Cubans (6.5%).
- Among non-Hispanic Asians, Asian Indians (12.6%) and Filipinos (10.4%) had the highest prevalence, followed by Chinese (5.6%). Other Asian groups had a prevalence of 9.9%.
- Among adults, prevalence varied significantly by education level, which is an indicator of socioeconomic status. Specifically, 13.3% of adults with less than a high school education had diagnosed diabetes versus 9.7% of those with a high school education and 7.5% of those with more than a high school education.

Prevalence of Prediabetes in Adults

Data regarding prediabetes in adults show that (CDC, 2020c; 2020d; 2020e):

- An estimated 88 million adults aged 18 years or older had prediabetes in 2018.
- Among US adults aged 18 years or older, crude estimates for 2013–2016 were: 34.5% of all US adults had prediabetes, based on their fasting glucose or A1C level (Table 3).
- 10.5% of adults had prediabetes based on both elevated fasting plasma glucose and A1C levels.
- 15.3% of adults with prediabetes reported being told by a health professional that they had this condition.
- Among US adults aged 18 years or older, age-adjusted data for 2013–2016 indicated:

- A higher percentage of men (37.4%) than women (29.2%) had prediabetes.
- Prevalence of prediabetes was similar among all racial/ethnic groups and education levels.

Incidence of Newly Diagnosed Diabetes in Adults

Among US adults aged 18 years or older, crude estimates for 2018 were (CDC, 2020c; 2020d; 2020e):

- 1.5 million new cases of diabetes—or 6.9 per 1,000 persons—were diagnosed.
- Compared to adults aged 18 to 44 years, incidence rates of diagnosed diabetes were higher among adults aged 45 to 64 years and those aged 65 years and older.
- Among US adults aged 18 years or older, age-adjusted data for 2017–2018 indicated that non-Hispanic blacks (8.2 per 1,000 persons) and people of Hispanic origin (9.7 per 1,000 persons) had a higher incidence compared to non-Hispanic whites (5.0 per 1,000 persons).

Evidence-based practice! The rate of new cases of diabetes in youths younger than 20 years of age increased in the US between 2002 and 2015, with a 4.8% increase per year for type 2 diabetes and a 1.9% increase per year for type 1 diabetes (CDC, 2020g). These findings indicate that education regarding prevention and recognition of diabetes in youth must be provided with increased effectiveness, as well as aggressive efforts to prevent development whenever possible.

Self-Assessment Quiz Question #1

Among U. S. adults 18 years of age and older indicated that prevalence of diagnosed diabetes was highest among:

a. American Indians/Alaska Natives.
b. People of Hispanic origin.
c. Non-Hispanic blacks.
d. Non-Hispanic Asians.

FINANCIAL AND SOCIETAL IMPACT OF DIABETES MELLITUS

The momentous financial and societal impact of diabetes continues to increase at an alarming rate. Federal, state, and local governments (and ultimately the US taxpayer) bear the brunt of costs related to diabetes. The American Diabetes Association (ADA) gives as an example that Medicare's diabetes-related burden increased as the prevalence of diabetes increased (O'Connell & Manson, 2019).

According to the CDC, diabetes is the most expensive chronic condition in the US. A summary of these expenses includes (CDC, 2021c):

- The total annual cost of diabetes is $327 billion. An additional $90 billion is spent on reduced productivity.
- One dollar out of every four dollars in US healthcare costs is spent on caring for people with diabetes.
- The total economic cost of diabetes rose 60% from 2007 to 2017.
- Sixty-one percent of diabetes costs are for people 65 years of age or older. These costs are mainly paid by Medicare.
- An estimated 48% to 64% of lifetime medical costs for a person with diabetes are for complications related to diabetes, such as heart disease and stroke.

Medical costs are not the only costs related to diabetes. The stress of chronic illness can impact interpersonal relationships. It can impact the person's ability to work, which may have significant economic impact on the family income. Financial burdens are inter-related with psychological issues that impact persons dealing with diabetes. Medical bills, loss of work time, and inability to actively participate in work and social activities can all have s significant adverse impact on patients, their families, and their employers. Dealing with a chronic illness can lead to significant stress, which can adversely impact ability to function effectively at work, home, and school and interfere with interpersonal relationships. Therefore, the costs of diabetes include monetary, societal, and interpersonal factors. The impact on society includes overextended health services, increased public assistance programs for financially stressed families, and the societal burden of mental health care and rehabilitation for those with complications resulting from diabetes (CDC, 2021c; O'Connell, 2019).

The cost of medications used in the treatment of diabetes continues to increase at alarming rates. The price of insulin, for example, has increased 1,200% since 1996 (Kumok, 2021).

The estimated economic cost of glucose-lowering drugs is $57.6 billion per year in the U.S. in 2015–2017 (15–20% of the estimated annual cost for all prescription drugs in the U.S.). The cost of such drugs can cause a financial burden and have a devastating impact on people without health insurance and people whose insurance imposes high deductibles—the people least able to afford the high cost of diabetes drugs. This means that the high cost of diabetes drugs has important implications for both public policy and social justice (Taylor, 2020a).

Members of an Insulin Access and Affordability Working Group (Cefalu, (2018) made the following recommendations to help lower the cost of insulin. These recommendations may also be applied to other drugs used in the treatment of diabetes. Examples include (Cefalu, (2018):

- Providers, pharmacies, and insurers should discuss the cost of insulin preparations (and other drugs) with patients to help them understand the advantages, disadvantages, and financial impact of potential insulin preparations and those of other diabetes medications.
- Providers should prescribe the lowest-priced medications that effectively and safely achieve treatment goals.
- Researchers should study the comparative effectiveness and cost-effectiveness of the various insulins.
- Organizations such as the (ADA) should:
  - Advocate for access to affordable medications for all people who have diabetes.
  - Develop and regularly update clinical guidelines or standards of care based on scientific evidence for prescribing medications.
  - Make information about the advantages, disadvantages, and financial implications of medications easily available to people with diabetes.

NORMAL ANATOMY AND PHYSIOLOGY OF THE PANCREAS

It is not possible to comprehend the pathophysiology of diabetes without an understanding of normal pancreatic functioning. The pancreas is a triangular shaped organ, about six to 10 inches long, located in the curve of the duodenum (the first portion of the small intestine from the stomach to the jejunum). The pancreas plays critical roles in both the digestive process and the process that regulates blood sugar (The Pancreas Center, n.d.; Willis, 2018).

The pancreas is surrounded by various other organs: the small intestine, liver, and spleen. It has three sections. The wide part, referred to as the head of the pancreas, is positioned toward the center of the abdomen. The middle section is called the neck and the body of the pancreas. The thin end of the organ is referred to as the tail and extends to the left side (Johns Hopkins Medicine, n.d.; The Pancreas Center, n.d.; Willis, 2018).

The pancreas is surrounded by several major blood vessels: the superior mesenteric artery, the superior mesenteric vein, the portal vein, and the celiac axis, which supply blood to the pancreas and many other abdominal organs (The Pancreas Center, n.d.).

Exocrine function of the pancreas

The pancreas contains exocrine glands, which produce enzymes that are essential to the process of digestion (The Pancreas Center, n.d.). Acinar cells make up most of the pancreas and are responsible for the regulation of the exocrine functions of the gland (Willis, 2018).

Below is a summary of the exocrine function of the pancreas (The Pancreas Center, n.d.):

- Food enters the stomach.
- Pancreatic juices flow into a system of ducts that terminate in the primary pancreatic duct.
- The pancreatic duct joins with the common bile duct to form the ampulla of Vater located in the duodenum.
- The common bile duct produces bile. Pancreatic juices and bile flow into the duodenum and facilitate the digestion of fats, carbohydrates, and proteins.

Endocrine function of the pancreas

The endocrine function of the pancreas focuses on hormone secretion. The endocrine cells of the pancreas are islet cells, or islets of Langerhans. These islet cells exist as clusters of cells that are scattered among the acinar cells. They consist of alpha, beta, and delta cells, which produce the following essential hormones (Johns Hopkins Medicine, n.d.a.; The Pancreas Center, n.d.; Willis, 2018):

- Glucagon: Glucagon is produced by the alpha cells. It raises blood glucose levels by causing the breakdown of glycogen to glucose.
- Insulin: Insulin is produced by beta cells. Insulin's primary function is to reduce blood glucose levels by triggering the conversion of glucose to glycogen.
- Somatostatin: Delta cells are responsible for the production of somatostatin. Somatostatin inhibits the release of growth hormone (GH), corticotrophin, and some other hormones.

Under normal conditions, a small amount of insulin is constantly secreted by the pancreas. Insulin secretion increases in response to increases in blood glucose levels. Insulin triggers the conversion of glucose to glycogen. Glycogen is stored primarily in the liver and in skeletal muscle (Johns Hopkins Medicine, n.d.; The Pancreas Center, n.d.; Willis, 2018).

When blood glucose levels are low such as between meals or during or immediately following exercise, alpha cells are stimulated to release glucagon. Glucagon causes the liver to release glycogen, which is then converted to glucose. Glucose travels through the blood stream to the cells of the body where it is converted to energy to maintain body functioning (Johns Hopkins Medicine, n.d.a.; The Pancreas Center, n.d.; Willis, 2018).

Maintaining normal blood glucose levels is essential to the ability of key organs—including the brain, liver, and kidneys—to function properly (Johns Hopkins Medicine, n.d; The Pancreas Center, n.d.; Willis, 2018). However, the normal blood glucose range is rather narrow. Blood glucose levels are regulated by an internal feedback mechanism that involves the pancreas and the liver (Willis, 2018).

The following blood glucose test results indicate normal findings (Pagana et al., 2019).

From the ages of two to adulthood:

- Fasting (no caloric intake for at least eight hours): 70 to 110 mg/dL or <6.1 mmol/L.
- Casual (any time of day regardless of food intake): <200 mg/dL (11.1 mmol/L).

Children <2 years of age:

- 60 to 100 mg/dL or 3.3 to 5.5 mmol/L.

When normal blood glucose levels are not maintained, the impact can be devastating on an individual's health and wellness. To effectively provide healthcare services for persons who have diabetes, healthcare professionals must understand both normal pancreatic functioning and the pathophysiology associated with the disease. To do this, it is essential to differentiate among the different types of diabetes, all of which have different pathologies.

Self-Assessment Quiz Question #2

The endocrine function of the pancreas focuses on:

a. The production of enzymes essential to the process of digestion.
b. The production of bile.
c. Hormone secretion.
d. Alpha cell production of insulin.

THE DIFFERENT TYPES OF DIABETES MELLITUS

Health care professionals and health care consumers are arguably most familiar with type 1 and type 2 diabetes. But there are other types of diabetes with which nurses must be familiar (Rebar et al., 2019).

- Type 1: The body is unable to produce adequate amounts of insulin.
- Type 2: There is resistance to insulin or abnormal insulin secretion.
- Secondary diabetes: This form of diabetes develops because of, or secondary to, another disease or condition.
- Gestational diabetes: This occurs in pregnant women who have never had diabetes.

The primary focus of this educational program is on type 1 and type 2 diabetes, but the issue of other types of diabetes is also quite important. Therefore, it will be discussed before delving into type 1 and type 2 diabetes.

The term secondary diabetes refers to specific types of diabetes because of other causes (ADA, 2021b). Some of the most common causes of secondary diabetes include (Khardori, 2021c; Rebar et al., 2019):

- Physical or emotional stress, which may cause prolonged increases in levels of the stress hormone cortisol, epinephrine, glucagon, and growth hormone (GH). These increases, in turn, raise the blood glucose level and place more demands on the pancreas.
- Use of adrenal corticosteroids, hormonal contraceptives, and other types of drugs that antagonize the effects of insulin.
- Diseases of the pancreas that destroy pancreatic beta cells, such as pancreatic cancer, pancreatitis, and cystic fibrosis.
- Hormonal syndromes that interfere with the secretion of insulin, such as pheochromocytoma.
- Hormonal syndromes that cause peripheral insulin resistance, such as Cushing syndrome.
- Some medications, such as estrogens, phenytoin, and glucocorticoids.

Gestational diabetes

Gestational diabetes occurs in women who have never had diabetes mellitus but have high blood glucose levels during pregnancy (Mayo Clinic, 2020c). This condition develops in a fairly high number of women. In the US, an estimated 10% of women who are pregnant develop gestational diabetes (Dansinger, 2019a). Healthcare professionals are becoming increasingly concerned about the occurrence of gestational diabetes. Thus, the following more detailed information is provided.

Etiology of Gestational Diabetes
As a result of hormonal changes associated with pregnancy, nearly all women experience some amount of impaired glucose intolerance. Although blood sugar may be higher than normal, it is not high enough to be diagnosed as diabetes mellitus. During the third trimester of pregnancy, these hormonal changes put women at higher risk for gestational diabetes. Hormonal changes can interfere with the appropriate action of insulin, which leads to insulin resistance (American Diabetes Association, 2021d; Dansinger, 2019a).

During pregnancy, certain placental hormones help to shift nutrients from the mother to the fetus. Other placental hormones help prevent hypoglycemia in the pregnant woman. As pregnancy advances, such hormones can lead to progressive impaired glucose intolerance (elevated blood glucose levels). Usually, the woman's pancreas is able to compensate for these elevated levels by producing about three times the normal amount of insulin. If the pancreas is not able to produce adequate amounts of insulin, blood glucose levels rise, and gestational diabetes occurs (Dansinger, 2019a).

Risk Factors for Development of Gestational Diabetes
Several factors increase the risk for the development of gestational diabetes (Dansinger, 2019a; Mayo Clinic, 2020c):

- Being overweight or obese
- Being a member of a high-risk ethnic group such as Hispanic, Black, Native American, African American, Pacific Islander, Alaska native, Native American, or Asian
- Being older than 25 years of age
- Having impaired glucose tolerance or impaired fasting blood glucose levels. This means that blood glucose levels are high but not high enough to be diagnosed as diabetes mellitus.
- Having gestational diabetes during a previous pregnancy
- Having a family history of gestational diabetes
- Having polycystic ovary syndrome or other condition that is associated with insulin abnormalities
- Previously giving birth to a baby that weighed over 9 pounds
- Previously giving birth to a stillborn baby or one that had birth defects
- Having had a miscarriage
- Having hypertension, elevated cholesterol, or heart disease

Complications
Gestational diabetes may increase the risk of (Mayo Clinic, 2020c):

- Hypertension
- Preeclampsia
- Development of diabetes in the future
- Need for a surgical delivery (C-section)

Diagnosis of Gestational Diabetes
The ADA (2021b) has published the following recommendations for gestational diabetes mellitus screening.

- Test for undiagnosed prediabetes and diabetes at the first prenatal visit in those with risk factors using standard diagnostic criteria.
- Test for gestational diabetes mellitus at 24-28 weeks of gestation in pregnant women not previously found to have diabetes.
- Test women with gestational diabetes mellitus for prediabetes or diabetes at 4-12 weeks postpartum, using the 75-g oral glucose tolerance test and clinically appropriate nonpregnancy diagnostic criteria.
- Women with a history of gestational diabetes mellitus should have lifelong screening for the development of diabetes or prediabetes at least every three years.
- Women with a history of gestational diabetes mellitus found to have prediabetes should receive intensive lifestyle interventions and/or metformin to prevent diabetes.

The steps of an oral glucose tolerance include (Pagana et al., 2018):

1. Obtain fasting blood and urine specimens. The patient should fast for 12 hours before the test.
2. Administer a prescribed oral glucose solution of 75-100 g for pregnant women. Note that the ADA recommends using 75 g solution.
3. Instruct patient to drink the entire glucose solution.
4. Instruct patient not to eat or drink anything except water during the testing period.
5. Obtain a venous blood sample at 30 and 60 minutes and then hourly.
6. Collect urine specimens hourly.
7. Monitor the patient for dizziness, sweating, and weakness.

Screening tests may vary slightly depending on the patient's healthcare provider. General results include (Mayo Clinic, 2020c; Pagana et al., 2019):

- Initial glucose challenge test: This challenge test is done first. It is a one-hour test that involves drinking a glucose solution and having blood glucose levels assessed. A blood sugar level of 10 mg per deciliter (mg/dL) or 10.6 millimoles per liter indicates gestational diabetes. A blood glucose level below 140 mg/dL is usually considered normal. A higher-than-normal blood glucose level means that the glucose tolerance test should be performed.
- Follow-up glucose tolerance testing: If at least two of the blood glucose readings are higher than normal, a diagnosis of gestational diabetes is made.

Management of Gestational Diabetes
The goal of treatment for gestational diabetes is to keep blood glucose levels equal to those of pregnant women who do not have gestational diabetes (ADA, 2021d).

Management of gestational diabetes includes the following initiatives (ADA,2021d; Dansinger, 2019a; Mayo Clinic, 2020c; WebMD, 2017a):

- Teach patients and family members (as appropriate) how to monitor blood glucose levels. Monitoring should be done four times per day, before breakfast and two hours after meals. Some patients require checking glucose levels before meals as well.
- Teach patients and family members (as appropriate) how to monitor urine for ketones.
- Initiate a dietary consultation for the development of an appropriate diet. Explain to patients and family members the importance of following prescribed dietary plans. A healthy diet focuses on fruits, vegetables, whole grains, and lean proteins.
- Help patients to develop medically approved exercise regimens.
- Teach patients to monitor their weight.
- If needed, teach patients about any hypoglycemic medications, including insulin, that are prescribed.
- Monitor blood pressure and initiate prescribed actions such as exercise and reduction of salt intake. As appropriate, teach patient and family members how to monitor blood pressure.
- Teach patients to keep a careful written record of their blood glucose levels and results of urine monitoring—including the time readings were obtained and how readings relate to dietary intake, exercise, and stress—and blood pressure readings if monitoring blood pressure at home. Instruct patients to bring a copy of these written records with them to all health care appointments.
- Teach patients stress reduction techniques such as meditation and deep breathing exercise as appropriate.

Most pregnant women are concerned about the possible effects of gestational diabetes on their unborn children. Fortunately, gestational diabetes affects the mother relatively late in her pregnancy, when the majority of the baby's organs have been formed, but while the baby is still growing. Gestational diabetes is not associated with the types of birth defects in infants whose mothers had diabetes mellitus before pregnancy (Dansinger, 2019a; Mayo Clinic, 2020c).

Unfortunately, untreated, or inadequately controlled gestational diabetes can harm the fetus. The pancreas works "overtime" to

produce insulin in the presence of gestational diabetes, but the insulin does not reduce blood glucose levels. Insulin does not cross the placenta, but glucose does. Thus, the unborn child is exposed to high blood glucose levels. In response to these elevated levels, the unborn baby produces additional insulin, receives more energy, and stores the "extra" energy as fat. Additional stores of fat can lead to macrosomia, a condition in which the baby is abnormally large before birth. Adverse effects of macrosomia include damage to the baby's shoulders during birth, low blood glucose levels because of the extra insulin production, respiratory distress, and jaundice. These infants are also at higher risk for obesity as children and at risk for type 2 diabetes as adults. Thus, it is essential that all pregnant women be screened for gestational diabetes and, if a diagnosis of diabetes is found, treated appropriately and promptly (Dansinger, 2019a; Mayo Clinic, 2020c).

About six weeks after delivery, the mother's blood glucose levels usually return to normal because the placenta, which was responsible for producing the hormones that led to insulin resistance, is no longer in the body. Blood glucose levels will be monitored to ensure that they have returned to normal. Some health care providers recommend an oral glucose tolerance test 6 to 12 weeks after delivery to screen for diabetes mellitus (Dansinger, 2019a; Mayo Clinic, 2020c).

Evidence-based practice! Women who have had gestational diabetes have a 50% chance of developing type 2 diabetes within 10 to 20 years of delivery (Dansinger, 2019a). Therefore, they should work to reduce this risk by maintaining an ideal body weight, following a healthy diet, and exercising regularly.

Self-Assessment Quiz Question #3

ADA recommendations for gestational diabetes screening include all of the following EXCEPT:

a. Pregnant women not previously found to have diabetes should be screened for gestational diabetes at the first prenatal visit.
b. Women with a history of gestational diabetes mellitus should have lifelong screening for the development of diabetes at least every three years.
c. A blood glucose level of 140 mg/dL is considered normal.
d. The initial glucose challenge test is done before the glucose tolerance test.

TYPE 1 DIABETES: ETIOLOGY AND PATHOPHYSIOLOGY

Type 1 diabetes occurs when the beta cells of the pancreas are destroyed or suppressed. This results in failure of the pancreas to release insulin and inadequate transport of glucose (Rebar et al., 2019). The prevalence of diagnosed type 1 diabetes in 2016 was 0.55%, or 1.3 million adults. This is significantly less than the prevalence of diagnosed type 2 diabetes, which was 8.6%, or 21.0 million adults (Morr, 2018).

Immune mediated types of type 1 diabetes, an autoimmune attack on beta cells occurs. This results in an inflammatory response in the pancreas (insulitis). Antibodies may be present for considerable time before the development of symptoms. In fact, by the time the disease is symptomatic, 80% of the beta cells are deactivated. Some experts believe that the beta cells are not destroyed, but instead they are disabled and may be able to be reactivated (Rebar et al., 2019).

Healthcare Professional Consideration: Type 1 diabetes is divided into idiopathic and immune-mediated types. In idiopathic diabetes (referred to as type 1b diabetes) there is nearly complete insulin deficiency. There is no evidence of autoimmunity (Kalyani, 2017; Rebar et al., 2019). Healthcare professionals must be aware of the various types of diabetes to recognize them and to provide safe and appropriate care. Screening and patient education are critical elements of care. Clinical Practice Guidelines are constantly being updated and should be followed for effective care. The Centers for Medicare & Medicaid Services (CMS) sets reimbursement rates for Medicare providers and generally pays them according to approved guidelines.

Latent autoimmune diabetes (LADA)

Latent autoimmune diabetes in adults (LADA) is characterized by a slow progression of autoimmune reaction against the pancreas. Some experts recognize LADA as a form of type 1 diabetes, while others do not. LADA occurs because of an inadequate production of insulin. However, LADA does not require insulin administration for several months up to years after diagnosis is made (Castro, 2021).

Following are characteristics of LADA (Castro, 2021):

- People are usually over the age of 30 when the disease is diagnosed.
- The pancreas produces some insulin initially
- LADA is often misdiagnosed with type 2 diabetes because the patients are older at diagnosis and some insulin production is still evident.
- Initially, LADA is managed with diet, weight reduction as needed, exercise, and oral medications as needed. But insulin is eventually needed because the pancreas gradually loses its ability to produce insulin.

Research is underway regarding LADA and the best way to manage treatment. Health care providers with expertise in all forms of diabetes should direct treatment initiatives (Castro, 2021).

TYPE 2 DIABETES: PATHOPHYSIOLOGY AND ETIOLOGY

Type 2 diabetes is an impairment of the way the glucose is regulated and used by the body. A chronic condition, type 2 diabetes can lead to disorders of the circulatory, nervous, and immune system (Mayo Clinic, 2021g). The following are general characteristics of type 2 diabetes (Mayo Clinic, 2021g Santos-Longhurst, 2020):

- The disease is caused by a combination of insulin resistance and insulin deficiency. Some people develop the disease predominantly because of insulin resistance, whereas others are affected predominantly by deficient insulin secretion but have little insulin resistance.
- About 90% to 95% of people with diabetes have type 2 diabetes.
- Type 2 diabetes has a strong hereditary component.
- Its onset is typically slow and insidious
- Type 2 diabetes is significantly less common in children and young adults than in older adults. But the number of children with type 2 diabetes is increasing because of the prevalence of overweight children.
- Although some people with this type of diabetes may need insulin, they are still categorized as having type 2 diabetes.

Pathophysiology

Under normal conditions, insulin molecules bind to body cell preceptors. Insulin activates cell portals to open allowing glucose to enter the cells where it is then converted to energy. Insulin decreases the amount of glucose in the blood. As the blood glucose level decreases, so does the amount of insulin secreted by the pancreas (Mayo Clinic, 2021g).

In type 2 diabetes, the cells develop a resistance to insulin. This inhibits the ability of glucose to enter the cells. If glucose cannot enter the cells, the cells fail to receive enough energy. Blood glucose levels increase, and organs are damaged throughout the body (Mayo Clinic, 2021g).

Etiology

Type 2 diabetes is mainly the result of two interrelated issues (Mayo Clinic, 2021g):

- Muscle, fat, and hepatic cells become insulin-resistant and are unable to function efficiently.
- The pancreas is not able to manufacture adequate amounts of insulin to appropriately manage blood glucose levels.

Several environmental and lifestyle factors play a role in the development of type 2 diabetes. The aging process, alcohol consumption, smoking, lack of exercise, and obesity have all been found to be related to the development of diabetes (Mayo Clinic, 2021g). Obesity seems to have an impact on disease development. Obesity, especially visceral fat obesity, leads to a decrease in muscle mass and an increase in insulin resistance (Mayo Clinic, 2021g; Taylor, 2020b).

Research has shown that a number of factors contribute to an increase in the amount of visceral fat in the body (Mayo Clinic, 2021g; Taylor, 2020b):

- Disorders of the nervous or endocrine systems that lead to an increase in cortisol and abnormalities in the secretion of sex hormones.
- Smoking
- Increased intake of alcohol
- Overeating, particularly an excessive intake of simple sugars
- Decreased energy consumption because of insufficient exercise
- Genetic influences
- The aging process

PREDIABETES

Prediabetes is sometimes referred to as a "wake-up call" that the development of diabetes may be imminent. About 84 million Americans over the age of 20 have prediabetes, but 90% of these people do not know that they have it. (Dansinger, 2019b; Mayo Clinic, 2020d). Lifestyle modifications—including weight loss, implementing an exercise regimen, and following a healthy diet—are strongly recommended to prevent prediabetes from progressing to type 2 diabetes (Dansinger, 2019b; Mayo Clinic, 2020d).

With a diagnosis of prediabetes, patients must be counseled regarding diet, exercise, and weight loss. Patients may also need antidiabetic agents (Mayo Clinic, 2020d).

Healthcare Professional Consideration: Prediabetes is a significant risk factor for developing type 2 diabetes and cardiovascular disease (Dansinger, 2019b; Mayo Clinic, 2020d). Risk factors for the risk of developing prediabetes are the same as for type 2 diabetes, which will be discussed later in this education program.

SCREENING GUIDELINES

Type 1 diabetes

At this time, there is a deficit of accepted and clinically validated screening programs outside of research settings. The ADA recommends considering referring relatives of those with type 1 diabetes for islet autoantibody testing for risk assessment in the setting of a clinical research study. (ADA, 2021b).

Current ADA (2021b) recommendations include:

- Screening for type 1 diabetes risk with a panel of islet autoantibodies is currently recommended in the setting of a research trial or can be offered as an option for firs-degree family members of a proband with type 1 diabetes. The proband is the first individual to be studied in a family.
- Persistence of autoantibodies is a risk factor for clinical diabetes and may serve as an indication for intervention in the setting of a clinical trial.

Prediabetes and type 2 diabetes

The 2021 ADA screening guidelines list the same recommendations for both prediabetes and type 2 diabetes. These include (ADA, 2021b):

- Screening for prediabetes and type 2 diabetes with an informal assessment of risk factors or validated tools should be considered in asymptomatic adults.
- Testing for prediabetes and/or type 2 diabetes in asymptomatic people should be considered in adults of any age with overweight or obesity (BMI ≥25 kg/m2 or ≥23 kg/m2 in Asian Americans) and who have one or more additional risk factors for diabetes
- Testing for prediabetes and/or type 2 diabetes should be considered in women with overweight or obesity planning pregnancy and/or who have one or more additional risk factor for diabetes.
- For all people, testing should begin at age 45 years.
- If tests are normal, repeat testing carried out at a minimum of 3-year intervals is reasonable, sooner with symptoms.
- To test for prediabetes and type 2 diabetes, fasting plasma glucose, 2-h plasma glucose during 75-g oral glucose tolerance test, and A1C are equally appropriate.
- In patients with prediabetes and type 2 diabetes, identify and treat other cardiovascular disease risk factors.
- Risk-based screening for prediabetes and/or type 2 diabetes should be considered after the onset of puberty or after 10 years of age, whichever occurs earlier, in children and adolescents with overweight (BMI ≥85th percentile) or obesity (BMI ≥95th percentile) and who have one or more risk factor for diabetes.
- Patients with HIV should be screened for diabetes and prediabetes with a fasting glucose test before starting antiretroviral therapy, at the time of switching antiretroviral therapy, and three to six months after starting or switching antiretroviral therapy. If initial screening results are normal, fasting glucose should be checked annually.

Risk factors for the development of type 1 diabetes

A number of risk factors are associated with the development of type 1 diabetes (American Heart Association, 2021; Mayo Clinic, 2020a):

- Family history
- Exposure to a viral illness
- Presence of autoantibodies
- Geography (Some countries, including Finland and Sweden, have higher rates of type 1 diabetes)

Risk factors for the development of type 2 diabetes

There are several risk factors related to the development of type 2 diabetes mellitus. These risk factors are classified as nonmodifiable and modifiable.

Nonmodifiable risk factors

The following risk factors are nonmodifiable; in other words, they cannot be changed (American Heart Association, 2021; CDC, 2021b; Mayo Clinic, 2020a):

- Age: Risk increases with age. This increase seems to begin at the age of 40
- Race and ethnicity: Some racial and ethnic groups have a higher incidence of type 2 diabetes than others. These include:
  - African Americans
  - Asian-Americans
  - Latino/Hispanic-Americans
  - Native Americans
  - Pacific Islander descent
- Family history: A person's chances of developing type 2 diabetes increases if immediate or even extended family members have the disease.
- History of gestational diabetes: Women who have gestational diabetes have a greater risk of developing prediabetes and type 2 diabetes. Having given birth to a baby that weighs more than 9 pounds also increases risk.

Healthcare Professional Consideration: Although research has shown that certain risk factors cannot be modified, healthcare professionals must still include them in patient/family education and be aware of such factors that increase the risk for development of diabetes.

Modifiable risk factors

The following risk factors are those that can be modified or changed to decrease risk of developing type 2 diabetes.

Overweight/Obesity

Being obese or overweight is one of the greatest risk factors for type 2 diabetes. Because obesity is increasing among children and adolescents, type 2 diabetes is affecting more and more young people (American Heart Association, 2021; Taylor, 2020b).

The body mass index, or BMI, is the standard to determine overweight and obesity. BMI is a person's weight in kilograms divided by the square of height in meters. According to CDC, the following BMI measures indicate underweight, normal, overweight, and obesity (CDC, 2021a):

- Underweight: BMI is < 18.5
- Normal: BMI is 18.5 to <25
- Overweight: BMI is 25.0 to <30
- Obese: BMI is 30.0 or higher

Fortunately, even a small loss of weight can have a significant impact on health and longevity. Lifestyle modifications to achieve weight loss include the following:

- Reduction in caloric intake: Patients should work with their health care providers, including a clinical dietician as necessary, to implement a well-balanced diet that will facilitate weight loss (Ignatavicius et al., 2018).
- Increase in physical activity: The American Heart Association (2021) and CDC, 2020a) publishes the following physical activity guidelines for adult Americans:
  - Two hours and 30 minutes (150 minutes) of moderate-intensity aerobic activity every week and muscle strengthening activities that work all major muscle groups two or more days a week OR
  - Seventy-five minutes of vigorous-intensity aerobic activity every week and muscle strengthening activities that work all major muscle groups two or more days a week.

Moderate-intensity aerobic activity is defined as exercising hard enough to increase heart rate and break a sweat. Examples include walking fast, water aerobics, riding a bicycle on level ground, and pushing a lawn mower. Vigorous-intensity aerobic activity is defined as exercising hard enough to breathe hard and fast and increase heart rate significantly. Examples include jogging, running, swimming laps, riding a bicycle rapidly or on hills, and playing basketball. Physical activity can be spread out so that it is not done all at once. However, physical activity should be sustained for at least 10 minutes at a time (American Heart Association, 2021; CDC, 2021b).

Elevated Blood Glucose

An elevated blood glucose level significantly increases the risk of diabetes as well as for cardiovascular disease and stroke. The American Diabetes Association recommends using one of three testing methods (American Diabetes Association, 2021b; National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), 2018e):

1. A1C test
2. Fasting plasma glucose (FPG)
3. Oral glucose tolerance test (OGTT)

Hypertension

Hypertension is a modifiable risk factor for diabetes as well as for cardiovascular disease and stroke. Hypertension is defined as a consistent systolic pressure of 130 mmHg or higher or diastolic pressure of 80 mmHg or higher. For persons who do not have diabetes, blood pressure should be evaluated at each regular health care provider visit or at least once every two years if it is less than 120/80 mmHg. For patients who have diabetes, blood pressure should be measured at each regular health care provider visit or as often as needed (CDC, 2020b; Ignatavicius et al., 2018).

Abnormal Lipid Metabolism

Abnormalities in cholesterol levels can contribute not only to cardiovascular disease but also to the development of diabetes mellitus. The desired goals of cholesterol levels for adults are as follows (Mayo Clinic, 2021a):

- LDL: below 70 mg/dL for people who have heart disease or diabetes; below 100 mg/dL for people at risk of heart disease; and 100 to 129 mg/dL near optimal if there is no heart disease but high if there is heart disease.
- HDL: greater than 60 mg/dL
- Triglycerides: less than 150 mg/dL
- Total cholesterol: less than 200 mg/dL

Physical Inactivity
Physical inactivity contributes to overweight and obesity, cardiovascular disease, malignancies, diabetes, and many other adverse medical conditions. Participating in a regular physical exercise routine can increase insulin sensitivity, improve lipid levels, reduce blood pressure, reduce weight, lower the risk of cardiovascular disease, and improve blood glucose management in type 2 diabetes (Ignatavicius et al., 2018).

Smoking
Smoking is a significant risk factor for the development of type 2 diabetes and makes the disease harder to control after its development. Smokers are 30% to 40% more likely to develop type 2 diabetes than nonsmokers. People who smoke are more likely than nonsmokers to have trouble managing the disease (CDC, 2021e).

Medications
Such medications as glucocorticoids, thiazide diuretics, and atypical antipsychotics increase the risk of diabetes (American Diabetes Association, 2021b).

Healthcare Professional Consideration: Healthcare professionals need to be aware of the significance of metabolic syndrome. Metabolic syndrome is a group of conditions (hypertension, elevated blood glucose levels, excess amounts of body fat around the waist, and abnormal cholesterol level) that exist in conjunction with one another and increase the risk of cardiac disease, stroke, and diabetes. Taking steps to alter the impact of modifiable risk factors for diabetes can delay or possibly prevent the occurrence of serious health conditions (Mayo Clinic, 2020a). Assessing diabetic patients should include indicators for metabolic syndrome. Cholesterol level and blood pressure should be monitored at least yearly for obese patients at risk of diabetes.

Self-Assessment Quiz Question #4

When counseling patients about modifiable risk factors for diabetes, it is important to explain that:

a. A person is considered overweight of the BMI is 18.5 to <25.
b. Adults should engage in 60 minutes of moderate-intensity aerobic activity every week.
c. The desired HDL is less than 150 mg/dL.
d. Smokers are 30% to 40% more likely to develop type 2 diabetes than non-smokers.

PRESENTING CLINICAL SIGNS AND SYMPTOMS OF DIABETES MELLITUS

Many of the signs and symptoms of type 1 and type 2 diabetes are the same. There are, however, some differences. It is important for healthcare professionals to recognize all clinical manifestations of the disease and to know which of those signs and symptoms are more prevalent in one of the two types.

Clinical manifestations of type 1 diabetes mellitus

Type 1 diabetes is found most often in children. But the disease can also develop in adults. Patients with type 1 diabetes generally report an abrupt onset of symptoms. Following are the classic symptoms of type 1 diabetes (Khardori, 2021a; 2021b):

- Polyuria: production of abnormally large amounts of urine that is dilute
- Polydipsia: abnormally great thirst
- Polyphagia: excessive appetite or excessive feelings of hunger
- Unexplained weight loss

Polyuria is caused by osmotic diuresis secondary to hyperglycemia. Severe nocturnal enuresis (bedwetting) secondary to polyuria suggests type 1 diabetes in young children. Polyphagia develops to dehydration and hyperosmolar status (Khardori, 2021a; 2021b).

Following are other clinical manifestations of type 1 diabetes mellitus (Khardori, 2021a; 2021b):

- Weight loss occurs despite experiencing excessive appetite and hunger. This is caused by water depletion and a catabolic state with reduction in glycogen, proteins, and triglycerides.
- Fatigue and weakness may occur secondary to muscle wasting caused by a catabolic state of insulin deficiency, hypovolemia, and hypokalemia.
- Muscle cramping is caused by electrolyte imbalance.
- Blurred vision is a result of osmotic swelling of the lens, which alters its normal focal length.

Type 1 diabetes may also cause gastrointestinal (GI) disturbances (Khardori, 2021a; 2021b):

- Nausea, abdominal pain, and changes in bowel movements: these signs and symptoms may accompany acute diabetic ketoacidosis.
- Right upper quadrant pain because of acute fatty liver.
- Persistent GI disturbances, which may be caused by abdominal causes of diabetic ketoacidosis.

The onset of symptomatic type 1 diabetes may be abrupt. The first evidence of the disease may be the occurrence of ketoacidosis (Khardori, 2021a; 2021b).

Diabetic ketoacidosis (DKA)

DKA occurs most often in patients with type 1 diabetes and/or those less than 65 years of age, although it can occur with type 2 diabetes as well. DKA is an acute complication of hyperglycemic crisis. DKA is precipitated by acute insulin deficiency. Such deficiency can be caused by illness; stress; infection; and, in insulin-dependent patients, failure to take insulin (Ignatavicius et al., 2018; Mayo Clinic, 2020b; Rebar et al., 2019).

Without adequate amounts of insulin, which allow the cells to take in glucose to convert it to energy, glucose accumulates in the blood. The body begins to break down fat as an alternative fuel. When this happens, toxic acids known as ketones build up in the blood. Without treatment, DKA can result in coma or death (Ignatavicius et al, 2018; Mayo Clinic, 2020b).

The signs and symptoms of DKA usually develop rapidly, often within 24 hours. Patients experience polyuria, polydipsia, nausea, vomiting, abdominal pain, weakness or unusual fatigue, shortness of breath, fruity-scented breath, and confusion. Blood testing shows hyperglycemia and high levels of ketones in the urine (Mayo Clinic, 2020b; Rebar et al., 2019).

Because untreated DKA can be fatal, patients experiencing the signs and symptoms should seek emergency medical help. Emergency treatment usually includes insulin therapy, electrolyte replacement because inadequate amounts of insulin can reduce various electrolyte levels, and fluid replacement to correct dehydration (Mayo Clinic, 2020b).

Risk factors for DKA include having type 1 diabetes and frequently missing insulin doses. (Mayo Clinic, 2018g).

Persons with diabetes mellitus, especially those with type 1 diabetes, should work with their health care providers to manage conditions that trigger DKA. Following are examples of such conditions (Mayo Clinic, 2020b):

- Infections and illnesses: Infections and illnesses can cause the body to produce higher levels of adrenaline or cortisol, both of which are antagonistic to insulin. Common conditions that trigger DKA are pneumonia and urinary tract infections.
- Inadequate insulin therapy: Missing insulin treatments or taking inadequate amounts of insulin can trigger DKA.
- Miscellaneous problems: High fever, surgery, physical or emotional trauma, or alcohol or drug abuse, especially cocaine, can trigger DKA.

Healthcare Professional Consideration: It is imperative that healthcare professionals assess the knowledge of patients and families regarding the signs and symptoms of DKA, what causes it, and what to do about it. Parents may want to discuss the symptoms of DKA with their diabetic child's teachers, especially if the child participates in sports.

Self-Assessment Quiz Question #5

A patient is at risk for developing DKA if which of the following problems exist:

a. Excessive insulin.
b. Hypothermia.
c. Prediabetes.
d. Urinary tract infection.

CLINICAL MANIFESTATIONS OF TYPE 2 DIABETES MELLITUS

Until recently, it was believed that if diabetes occurred in childhood, it was type 1 diabetes. Now it is known that children also develop type 2 diabetes. As obesity in children increases, so does the incidence of type 2 diabetes in that population (Dansinger, 2021a). Therefore, it is important to identify risk factors and work with patients of all ages to reduce the risk of developing type 2 diabetes. It is also important to be alert to the clinical manifestations of the disease realizing that it can affect all age groups.

It can take years for the signs and symptoms of type 2 diabetes to become evident. Following are clinical manifestations of untreated diabetes (Ignatavicius et al., 2021; Mayo Clinic, 2021g):

- Polyuria and polydipsia: Excessive buildup of glucose in the blood stream causes fluid to move from the cells into the bloodstream to maintain homeostasis. This increases thirst and fluid intake casing an increase in dilute urine production.
- Polyphagia: When cells fail to receive adequate amounts of glucose for energy production, muscles, and organs experience energy depletion. This triggers intense hunger as the body attempts to obtain nourishment and energy.
- Weight loss: Even though patients may be eating more because of intense hunger, weight loss can occur. This is because the body is using alternative fuel sources in muscle and fat because it cannot metabolize glucose. Calories are lost as glucose is excreted in urine.
- Blurred vision: As glucose levels increase in the blood stream, fluid may be pulled from the lenses of the eyes to restore homeostasis. This can interfere with the ability of the eyes to focus, thus causing blurred vision.
- Fatigue: When cells are deprived of glucose and the ability to create energy, weakness, fatigue, and irritability can occur.
- Slow-healing cuts, lacerations or wounds, or frequent infections: Type 2 diabetes interferes with the body's ability to heal and to resist infections.
- Areas of darkened skin: Areas of darkened skin, called acanthosis nigricans, are dark velvety patches of skin in the folds and creases of the body. They are usually noted in the neck and axilla.

Healthcare Professional Consideration: Thirst mechanisms function less efficiently in elderly persons. So older adults may not report polydipsia when relaying signs and symptoms (Ignatavicius et al., 2018).

Diabetic hyperglycemic hyperosmolar syndrome (HHS) is a complication of type 2 diabetes. HHS is characterized by extremely high blood glucose levels without the presence of ketones, extreme dehydration, and decreased levels of consciousness. The kidneys attempt to rid the body of excess amounts of glucose in the blood by increasing urinary output. Without adequate fluid replacement, dehydration occurs. Additionally, dehydration makes the blood more concentrated with sodium, glucose, and other substances. This condition is known as hyperosmolarity and causes the body to withdraw fluid from other body organs (including the brain) to restore balance. Electrolyte balances are disturbed as well. If blood glucose levels are not returned to normal, an ongoing cycle of hyperglycemia and dehydration occurs that can lead to coma and even death (Ignatavicius et al. 2018; MedlinePlus, 2021a).

The goals of treatment are to correct dehydration, restore fluid and electrolyte balance, and control blood glucose levels. Intravenous fluids containing appropriate amounts of various electrolytes are administered as well as insulin via the venous route. Untreated, HHS may lead to shock, thrombosis formation, cerebral edema, and lactic acidosis (Ignatavicius, Workman, & Rebar, 2018; MedlinePlus, 2021a).

DIAGNOSIS OF DIABETES MELLITUS

Diabetes may be diagnosed based on plasma glucose criteria, either the fasting plasma glucose (FPG) value or the 2-hour plasma glucose (2-hour PG) value during a 75-g oral glucose tolerance test (OGTT), or A1C criteria (ADA, 2021b).

The ADA (2021b) diagnostic criteria include:

- A fasting plasma glucose (FPG) level >126 ng.dL (7.0 mmol/L), or
- A 2-hour plasma glucose level >200 mg/dL (11.1 mmol/L) during a 75-g oral glucose tolerance test (OGTT) or
- A random plasma glucose > 200 mg/dL (11.1 mmol/L) in a patient with classic symptoms of hyperglycemia or hyperglycemic crisis.

Details about the various tests used in the diagnostic process follow.

Random (casual) plasma glucose test

This test can be performed at any time of day when severe diabetic symptoms develop. Diabetes is diagnosed when the blood glucose is >200 mg/dL (ADA,2021n).

Fasting plasma glucose (FPG)

FPG assesses fasting blood glucose levels. Fasting is defined as not have anything to eat or drink except water for at least eight hours before the test. The test is typically performed first thing in the morning before breakfast. (ADA, 2021n).

FPG results are (ADA, 2021n):

- Normal: Less than 100 mg/dL
- Prediabetes: 100 mg/dL to 125 mg/dL
- Diabetes: 126 mg/dL or higher

Oral glucose tolerance test (OGTT)

An OGTT is performed to assess insulin response to glucose loading. A fasting blood sugar is obtained before the ingestion of an oral glucose solution, and blood samples are drawn at specifically timed intervals. The oral glucose solution should contain the equivalent of 75 g anhydrous glucose dissolved in water (ADA, 2021a; Pagana et al., 2019).

Results from the OGTT are (ADA, 2021a):

- Normal: less than 140 mg/dL.
- Prediabetes: 140 mg/dL to 199 mg/dL
- Diabetes: 200 mg/dL or higher

Patient care considerations and patient teaching include the following important factors (Pagana et al., 2019; Rebar et al, 2019):

- The patient should follow their usual diet and exercise regimen for three days before the test.
- The patient must be instructed to fast for 12 hours before the OGTT.
- Certain drugs may be withheld before testing based on the recommendations of the patient's health care provider. Examples of drugs that can interfere with test results are hormonal contraceptives, salicylates, diuretics, phenytoin, and nicotinic acid.
- Fasting blood and urine specimens are obtained.
- An oral glucose solution is administered that consists of 75 g of glucose or dextrose for patients who are not pregnant or 100 g for pregnant patients. The patient must drink the entire glucose solution. The amount of glucose in solution is based on body weight for pediatric patients.
- During the OGTT, the patient must not use tobacco or ingest coffee or tea because these substances cause physiological stimulation. They must be told not to eat or drink anything during the testing period except for the oral glucose solution provided by the test administrator—except for water, which the patient is encouraged to drink.
- A venous blood sample is collected at 30- and 60-minutes post-ingestion of the glucose solution and at hourly intervals thereafter.
- Urine samples are collected at hourly intervals.
- During the period of testing, the patient should be monitored for dizziness, sweating, weakness, and giddiness, which are usually transient and self-limiting.

A1C test

The A1C test is a blood test used to obtain information about a patient's average blood glucose over the past three months. The A1C is used in the diagnosis of type 2 diabetes and prediabetes and is the primary test used for diabetes management (NIDDK, 2018e).

The A1C test does not require fasting. Blood can be drawn at any time of day, thus making it more convenient than some other testing options. The test may also be used during the first health care pregnancy visit to determine if the woman had undiagnosed diabetes before becoming pregnant. After that, the oral glucose tolerance test (OGTT) or the glucose challenge test is used to test for gestational diabetes (NIDDK, 2018e; Pagana et al., 2019).

The A1C test is based on attachment of glucose to hemoglobin in red blood cells. Although red blood cells are continually forming and dying, they typically live for approximately three months. The A1C can reflect blood glucose levels over the previous three months. Reported as a percentage, the higher the percentage, the higher the blood glucose levels have been (NIDDK, 2018e).

Results of the A1C are (2021n):

- Normal: Less than 5.7%
- Prediabetes: 5.7 to 6.4%
- Diabetes: 6.5% or higher

Recommendations from the ADA include (2021n):

- Assess glycemic status (A1C or other glycemic measurement) at least two times a year in patients who are meeting treatment goals (and who have stable glycemic control).
- Assess glycemic status at least quarterly, and as needed, in patients whose therapy has recently changed and/or who are not meeting glycemic goals.

Healthcare Professional Consideration: Because A1C reflects average glucose status over several months, it has significant predictive value for diabetes complications. A1C testing should be performed routinely in all patients who have diabetes (ADA, 2021e).

Following are the A1C-range recommended goals (ADA, 2021e):

- An A1C goal for many nonpregnant adults of <7% (53 mmol/mol) without significant hypoglycemia is appropriate.
- If using ambulatory glucose profile/glucose management indicator to assess glycemia, a parallel goal is a time in range of >70% with time below range <4%.
- Based on provider judgment and patient preference, achievement of lower A1C levels than the goal of 7% may be acceptable, and even beneficial, if it can be achieved safely without significant hypoglycemia or other adverse effects of treatment.
- Less stringent A1C goals (such as <8% [64 mmol/mol]) may be appropriate for patients with limited life expectancy, or where the harms of treatment are greater than the benefits.
- Reassess glycemic targets over time based on the criteria specific to various age groups.

Table 1. Explanation of Results of Diabetes Screenings

Test	Normal	Prediabetes	Diabetes
A1C	Less than 5.7%	5.7% to 6.4%	6.5% or higher
Fasting plasma glucose	Less than 100 mg/dL	100 mg/dL to 125 mg/dL	126 mg/dL or higher
Oral glucose tolerance test	Less than 140 mg/dL	140 mg/dL to 199 mg/dL	200 mg/dL or higher

Compiled from: (ADA, 2021b; 2021e; 2021n)

Self-Assessment Quiz Question #6

When teaching a patient about the random plasma glucose test, it is important to explain that:

a. The test should be performed first thing in the morning.
b. The random plasma glucose test requires that the patient fast for 8 hours before the test.
c. The test is performed when severe diabetic symptoms develop.
d. Diabetes is diagnosed when the blood glucose is > 150 mg/dL.

MANAGEMENT OF DIABETES MELLITUS

Management of diabetes mellitus focuses on glycemic control and prevention and reduction of complications. Successful management depends on a team approach that involves physicians, nurse practitioners, nurses, dieticians, pharmacists, and mental health professionals who have expertise in diabetes mellitus management. The most critical members of the team are patients and families who are ultimately responsible for adhering, or helping loved ones to adhere to, the treatment regimen (ADA, 2021l).

Glycemic control

Glycemic control is assessed by the A1C measurement, continuous glucose monitoring (CGM), and self-monitoring of blood glucose (SMBG). Rationale for these tests includes (ADA, 2021e; 2021m):

- A1C reflects average glycemia over about a period of three months. This test is the primary test for the assessment of glycemic control and has strong predictive value for diabetic complications.
- CGM: CGM plays an important role in the assessment of the effectiveness and safety of treatment in many patients with type1 diabetes, including the prevention of hypoglycemia and in selected patients with type 2 diabetes.
- SMBG: SMBG can be used with self-management and medication adjustment, especially in persons who are taking insulin.

Recommendations for glycemic assessment are (ADA, 2021e):

- Assess glycemic status (A1C or other glycemic measurement) at least two times a year in patients who are meeting treatment goals (and who have stable glycemic control).
- Assess glycemic status at least quarterly, and as needed, in patients whose therapy has recently changed and/or who are not meeting glycemic goals.

Self-monitoring blood glucose (SMBG)

SMBG is essential to effective diabetes management. Individual patients' needs and goals guide SMBG frequency and timing. Research findings have shown that in patients who have type 1 diabetes, there is a correlation between greater SMBG frequency and lower A1C (American Diabetes Association, 2021e).

Continuous glucose monitoring (CGM)

Most of the people who use CGM have type1 diabetes. Research is now underway to learn how CGM might help people who have type 2 diabetes. A healthcare provider's prescription is needed to obtain CGM systems (NIDDK, 2021f).

CGMs are approved for use by adults and children. Some models may be used for children as young as two years of age. CGM may be recommended if the patient (NIDDK, 2021f):

- Is on intensive insulin therapy (also referred to as tight blood sugar control)
- Has hypoglycemia unawareness (Hypoglycemia unawareness occurs when the patient does not feel or recognize the signs or symptoms of hypoglycemia; patients who have frequent episodes of hypoglycemia may no longer experience hypoglycemia's usual warning symptoms).
- Often experiences episodes of elevated or low blood glucose

CGM has evolved swiftly in terms of both accuracy and affordability. This means that many patients have data available to assist with both self-management and assessment by healthcare providers (ADA, 2021e).

The ADA (2021e) makes the following recommendations for glucose assessment by continuous glucose monitoring.

- Standardized, single-page glucose reports from continuous glucose monitoring (CGM) devices with visual cues, such as the ambulatory glucose profile (AGP), should be considered as a standard printout for all CGM devices.
- Time in range (TIR) is associated with the risk of microvascular complications, should be an acceptable end point for clinical trials moving forward, and can be used for assessment of glycemic control. Additionally, time below target (,70 and ,54 mg/dL [3.9 and 3.0 mmol/L]) and time above target (.180 mg/dL [10.0 mmol/L]) are useful parameters for reevaluation of the treatment regimen.

CGM systems use a tiny sensor that is inserted under the skin to check glucose levels in tissue fluid. The sensor remains in place for several days to a week and then is replaced. A transmitter relays information about glucose levels via radio waves from the sensor to a wireless monitor (NIDDK, 2021f).

Advantages of a CGM system include (NIDDK, 2021f):

- An alarm can sound when glucose levels are too high or too low
- Meals, physical activity, and medicines can be noted in a CGM device, as well as glucose levels
- Data can be downloaded to a computer or smart device to improve visibility of glucose trends
- CGM systems offer better management of daily glucose levels
- There are fewer hypoglycemic emergencies with the use of a CGM
- With a CGM, fewer finger sticks are needed

CGM has limitations, as well as advantages. These limitations include (NIDDK, 2021f):

- Most CGM models cannot be used to make treatment decisions unless the CGM reading is confirmed by doing a finger-stick glucose test.
- A CGM is more expensive than using a standard glucose meter. Patients should check their insurance plans or Medicare to see what costs are covered.

Insulin Pumps

Most people with type 1 diabetes should be treated with multiple daily injections of prandial insulin and basal insulin or continuous subcutaneous insulin infusion. Most people with type 1 diabetes should use rapid-acting insulin analogs to reduce hypoglycemia risk (ADA 2021k).

Patient/family education regarding pharmacological management with insulin should include matching prandial insulin doses to carbohydrate intake, premeal blood glucose levels, and anticipated physical activity. Individuals with type 1 diabetes who have been successfully using continuous subcutaneous insulin infusion should have continued access to this therapy after they turn 65 years of age (ADA, 2021k).

Hundreds of thousands of people of all ages throughout the world are using an insulin pump for diabetes mellitus management. First used by patients with type 1 diabetes, some persons with type 2 diabetes use them as well. (Stoppler, 2018).

Insulin pumps are about the size of a small cell phone and are computerized. Insulin pumps provide a constant stream of insulin so that fewer needle sticks are required. Pumps are a good option for children or anyone else who has trouble remembering to administer their insulin injections (Cleveland Clinic, 2021).

Insulin pumps may be especially useful for people who (Cleveland Clinic, 2021):

- Experience delays in the absorption of food
- Are active and may want to pause insulin doses when exercising
- Have severe reactions to hypoglycemia
- Have diabetes and are planning a pregnancy

Traditional insulin pumps transport insulin from a chamber within the pump via tubing to a site on the skin that is connected to a smaller flexible plastic cannula. The cannula is a few millimeters long and delivers the insulin underneath the skin (Cleveland Clinic, 2021).

Insulin patch pumps also use a cannula beneath the skin. However, the insulin delivery chamber and the cannula are part of one pod that "sits" in the skin with an adhesive patch. The patch can be directly placed on the stomach or arm. There is no external tubing, and it is controlled wirelessly via a handheld controller (Cleveland, Clinic, 2021).

There are both advantages and disadvantages of insulin pumps. Advantages include:

- Consistent, adjustable insulin delivery
- Fewer insulin injections
- Flexibility and privacy
- Improved blood glucose levels
- Improved lifestyle freedom and flexibility

Risks or complications of insulin pumps include (Cleveland Clinic, 20210:

- Setting up the pump incorrectly
- Costing more than injections
- Problems hiding the tubing or pump with non-patch styles (Cleveland, Clinic, 2021)

Artificial Pancreas Device System

The Artificial Pancreas Device System is a system of devises that closely mimics the functioning of a healthy pancreas. Most of these systems consist of a continuous glucose monitoring system, and an insulin infusion pump. A blood glucose device is used to calibrate CGM. A computer-controlled algorithm connects the CGM and insulin pump to facilitate ongoing communication between the two devices (Food and Drug Administration (FDA), 2018).

An artificial pancreas device system replaces manual blood glucose testing and the use of insulin injections. The system monitors blood glucose levels 24-hours a day. The system can be monitored remotely (e.g., by parents or healthcare professionals) (NIDDK, 2021f).

There are three categories of artificial pancreas device systems. These include:

1. Threshold suspend device systems (also called low glucose suspend systems): This type of system temporarily suspends insulin delivery when the glucose level falls to or approaches a low glucose threshold. Its purpose is to reduce the severity of or reverse hypoglycemia.
2. Insulin-only system: This system "achieves a target glucose level by automatically increasing or decreasing the amount of insulin infused based on the CGM values.
3. Bi-hormonal control system: This device "achieves a target glucose level by using two algorithms to instruct an infusion pump to deliver two different hormones—one hormone (insulin) to lower glucose levels and another (such as glucagon) to increase blood glucose levels. The bi-hormonal system mimics the glucose-regulating function of a healthy pancreas more closely than an insulin-only system (FDA, 2017).

Research continues regarding the development of artificial pancreas device systems. To date, the FDA has approved two systems. These are (Tenderich, 2020).

- Medtronic MiniMed 670G: This is a hybrid closed-loop system.
- Control-IQ from Tandem Diabetes Care: This system combines Tandem's touchscreen insulin pump with the Dexcom CGM and a smart algorithm for the purpose of auto-adjusts for high and low blood glucose levels and automatic corrections for unexpected highs.

Insulin

Typical blood glucose levels targets are to keep daytime blood glucose levels before meals between 80 and 130 mg/dL (4.44 to 7.2 mmol/L) and after meal results to no higher than 180 mg/dL (10 mmol/L), two hours after eating (Mayo Clinic, 2021f).

Persons with type 1 diabetes typically need lifelong insulin therapy. There are many types of insulin therapy and include:

- Short-acting (regular) insulin
- Rapid acting insulin
- Intermediate-acting (NPH) insulin.
- Long-acting insulin (Mayo Clinic, 2021f)

Examples of the various types of insulin include (Mayo Clinic, 2021f):

- Short-acting: Humulin R and Novolin R
- Rapid-acting: Glulisine (Apidra), insulin lispro (Humanlog), and insulin aspart (Novolog)
- Intermediate-acting: Insulin NPH (Novolin N, Humulin N0
- Long-acting: Insulin glargine (Lantus, Toujeo Solostar), insulin detemir (Levemir), and insulin degludec (Tresiba)

Inhaled insulin is available as a rapid-acting insulin. Inhaled insulin is contraindicated in patients with chronic lung disease and is not recommended in patients who smoke or who recently stopped smoking. All patients require spirometry evaluation to identify potential lung disease before and after starting inhaled insulin therapy (ADA, 2021k).

Self-Assessment Quiz Question #7

Pharmacological therapy for the treatment of diabetes includes which of the following interventions?

a. Administration of inhaled insulin is contraindicated in patients who smoke.
b. Administration of Lantus is the preferred initial pharmacological agent for patients with type 2 diabetes.
c. Incorporating manual blood glucose testing in conjunction with an artificial pancreas system.
d. Using inhaled insulin is available as a long-acting insulin.

Pharmacologic therapy for type 2 diabetes

The FDA (2021k) makes the following recommendations for pharmacologic therapy for type 2 diabetes.

- Metformin is the preferred initial pharmacologic agent for the treatment of type 2 diabetes.
- Once initiated, metformin should be continued as long as it is tolerated and not contraindicated; other agents, including insulin, should be added to metformin.
- Early combination therapy can be considered in some patients at treatment initiation to extend the time to treatment failure.
- The early introduction of insulin should be considered if there is evidence of ongoing catabolism (weight loss), if symptoms of hyperglycemia are present, or when A1C levels (>10% [86 mmol/mol]) or blood glucose levels (≥300 mg/dL [16.7 mmol/L]) are very high.
- A patient-centered approach should be used to guide the choice of pharmacologic agents. Considerations include effect on cardiovascular and renal comorbidities, efficacy, hypoglycemia risk, impact on weight, cost, risk for side effects, and patient preferences.
- Among patients with type 2 diabetes who have established atherosclerotic cardiovascular disease or indicators of high risk, established kidney disease, or heart failure, a sodium–glucose cotransporter 2 inhibitor or glucagon-like peptide 1 receptor agonist with demonstrated cardiovascular disease benefit is recommended as part of the glucose-lowering regimen independent of A1C and in consideration of patient-specific factors.
- In patients with type 2 diabetes, a glucagon-like peptide 1 receptor agonist is preferred to insulin when possible.
- Recommendation for treatment intensification for patients not meeting treatment goals should not be delayed.
- The medication regimen and medication-taking behavior should be reevaluated at regular intervals (every 3–6 months) and adjusted as needed to incorporate specific factors that impact choice of treatment.
- Clinicians should be aware of the potential for over-basalization with insulin therapy. Over-basalization is titration of basal insulin beyond an appropriate dose to achieve glycemic targets. Clinical signals that may prompt evaluation of over-basalization include basal dose more than 0.5 IU/kg, high bedtime-morning or post-preprandial glucose differential, hypoglycemia (aware or unaware), and high variability. Indication of over-basalization should prompt reevaluation to further individualize therapy.

Non-pharmacologic diabetes management

Nutrition

Nutrition therapy is recommended for all patients with type 1 and type 2 diabetes. For those patients who are overweight or obese, modest weight loss may provide significant clinical benefits such as improved glucose control and lipid levels and reduction in blood pressure, especially early in the course of the disease (ADA, 2021h).

Evidence-based practice! Research suggests that there is a benefit to eating protein or protein and vegetables before eating the carbohydrate portion of a meal (ADA, 2021h). healthcare professionals should collaborate to ensure patients and families have access to planning the best meal options for persons with diabetes.

The goal of a good nutrition plan is to get the nutrients needed while keeping blood glucose levels within target range. The patient's goals, tastes, preferences, lifestyle, and medications should be considered when meal planning (CDC, 2021f).

According to the CDC (2021f) a good meal plan will:

- Include more non-starchy vegetables, such as broccoli, spinach, and green beans.
- Include fewer added sugars and refined grains such as white bread, rice, and pasta with less than two grams of fiber per serving.
- Focus on whole foods instead of highly processed foods as much as possible.

The CDC (2021f) recommends using a plate method as part of the meal planning process. Patients should consider a nine-inch dinner plate and:

- Fill half of the plate with non-starchy vegetables, such as salad, green beans, broccoli, cauliflower, cabbage, and carrots.
- Fill one-quarter of the plate with a lean protein, such as chicken, turkey, beans, tofu, or eggs.
- Fill one-quarter of the plate with carb foods such as grains, starchy vegetables (peas, potatoes), rice, pasta, fruit, and yogurt. A cup of milk counts as a carb food.
- Choose water or a low-calorie drink such as unsweetened tea to go with a meal.

Many people appreciate having a guide as to what constitutes a "portion" of a particular nutrient. The CDC (2021f) offers the following suggestions for estimating portion size.

- Three ounces of meat, fish, or poultry: Palm of hand (no fingers)
- One ounce of meat or cheese: Thumb tip to base
- One cup or one medium fruit: Fist
- One to two ounces of nuts or pretzels: Cupped hand
- One Tablespoon: Thumb tip (tip to first joint)
- One teaspoon: Fingertip (tip to first joint)

Physical activity

Being overweight or obese is linked to a vast number of medical problems, including heart disease and cancer. Proper nutritional intake and physical activity not only help patients to achieve weight goals but also have a positive impact on diabetes. Exercise may also have a positive effect for depression associated with the consequences of the need for diabetes management.

As previously noted, the American Heart Association (2021) recommends:

- At least 150 minutes per week of moderate-intensity aerobic physical activity;
- Or 75 minutes per week of vigorous-intensity aerobic physical activity (or a combination of the two);
- And muscle-strengthening exercises at least two days per week.

People who have diabetes must monitor their physical activity in relation to their glycemic levels. For example, exercise can lead to hyperglycemia or hypoglycemia depending on its intensity, timing, duration, and type of physical activity (ADA 2021h).

People who take insulin or oral pharmacological agents are at risk for hypoglycemia if insulin dose or carbohydrate intake is not adjusted with exercise. Exercise regimens should be planned with the healthcare team. The ADA (n.d.) recommends following the 15-15 rule:

- Check blood sugar
- If the reading is 100mg/dL or lower have 15-20 grams of carbohydrate. Examples include four glucose tablets, one glucose gel tube, four ounces of juice ore regular soda, or one tablespoon of sugar or honey.
- Check blood sugar again after 15 minutes. If it is still below 100 mg/dL another servicing of 15 grams of carbohydrate is needed.
- Repeat these steps every 15 minutes until blood sugar is at least 100 mg/dL.

Smoking cessation

All patients should be advised not to use any tobacco products or e-cigarettes. Nonsmokers should be advised not to use e-cigarettes. Smoking cessation should be a routine part of diabetes management (American Heart Association, 2021).

Psychosocial care

Mental health and well-being are important to general health and wellness and can impact the patient's or family's ability to implement diabetes treatment. The physical and emotional stress that can accompany a chronic health problem can put the patient and her family at risk for mental health problems (ADA, 2021o; Grygotis, 2016).

Psychosocial screening and follow-up treatment include attitudes about illness; expectations for management and outcomes; affect/mood; quality of life experiences and expectations; financial, social, and emotional resources; and psychiatric history. Patients should also be routinely screened for such issues as depression and diabetes-related distress, anxiety, eating disorders, and impairment of cognitive functioning (ADA, 2021o; Grygotis, 2016).

Support groups for diabetics may offer some therapeutic value. In addition, group exercise such as yoga, workout groups, or swimming exercise classes can provide both psychosocial support and a physical benefit for weight loss and improved cardiovascular condition. Meditation, pet therapy, behavioral therapy, and religious support may be of interest to some patients. Antidepressant medication may be considered if needed (ADA, 2021o; Grygotis, 2016).

Hypoglycemia prevention

Hypoglycemia is the primary factor limiting the glycemic management of type 1 and insulin-treated type 2 diabetes. It is imperative that nurses and other members of the health care team instruct patients and families how to recognize signs and symptoms of hypoglycemia, identify situations that increase their risk for hypoglycemia such as fasting, during or after intense exercise, and during sleep. They must be taught to balance insulin use, carbohydrate intake, and exercise to prevent and reduce hypoglycemic episodes (ADA, 2021e).

Immunizations

There are several recommendations for adults who have diabetes mellitus (ADA, 2021c).

- Provide routinely recommended vaccinations for adults with diabetes by age. Children should also receive routine vaccinations by age.
- Administer Hepatitis B vaccine for persons less than 60 years of age. For persons over 60 healthcare providers should be consulted.
- Administer HPV vaccine to persons 26 years old and under. Persons between the ages of 27-45 years may also be vaccinated after consulting with their healthcare providers.
- Administer influenza vaccine to all patients annually. All patients should be advised not to receive live attenuated influenza vaccine.
- Administer pneumonia PPSV23 pneumovax to persons 19-64 years of age. Persons 65 and older should receive a second dose at least five years from prior pneumovax vaccine.
- There are no recommendations for the administration of pneumonia (PCV13 Prevnar) to persons 19-64 years of age. For persons 65 and older who are not immunocompromised, have a cochlear implant, or cerebrospinal fluid leak, decisions must made in conjunction with their healthcare providers.
- Administer tetanus, diphtheria, pertussis (TDAP) to all adults with a booster every 10 years. All adult pregnant women should have an extra dose of this vaccine.
- Administer Zoster vaccine to all persons 50 years of age or older (two-dose Shingrix even if previously vaccinated).
- COVID vaccinations for all patients, as permitted by age.

Obesity management

Overweight and obesity contribute to a myriad of health problems. There is significant evidence that managing obesity can delay the progression from prediabetes to type 2 diabetes and may contribute to successful management of type 2 diabetes (ADA, 2021j).

The ADA (2021j) recommends that BMI be calculated and documented at all patient visits. Additional recommendations state that overweight and obese patients should participate in a regimen of diet, physical activity, and behavioral therapy to achieve >5% weight loss. Furthermore, such interventions should be individualized to the patient. After weight loss goals have been achieved, diet, physical activity, and behavioral therapy should be continued to maintain weight loss and achieve treatment goals.

Healthcare Professional Consideration: It is important that patients' medication regimens be evaluated for their impact on weight. This evaluation should include all the medications the patient takes: prescription drugs, over-the-counter supplements, and herbal preparations. If necessary, weight loss medications may be prescribed to help lose weight. Potential benefits of these medications should be weighed against potential risks and side effects (ADA, 2021j). Patients should be cautioned not to take any weight loss products without prior consultation with their health care providers.

Metabolic surgery

Metabolic surgery is the phrase used to describe surgery and procedures that treat metabolic diseases, especially type 2 diabetes (ADA, 2021j). Bariatric surgery that aims to treat comorbid conditions, such as diabetes mellitus associated with obesity, is called as metabolic surgery. Metabolic surgery is usually limited to patients with a body mass index (BMI) >35. The surgeon typically connects one end of the stomach to an opening in the new stomach pouch. After this surgery, when you eat, food bypasses most of the stomach and the first part of the small intestines. That makes this surgery both restrictive and malabsorptive.

Following are recommendations and suggestions for metabolic surgery (ADA, 2021j).

- Recommend metabolic surgery as an option for the treatment of type 2 diabetes in appropriate surgical candidates with BMI > 40 kg/m2 (BMI >37.5 kg/m2 in Asian Americans and in adults with BMI 35.0-39.9 kg/m2 (32.5-37.4 kg/m2 in Asian Americans.
- Suggest metabolic surgery as an option for adults with type 2 diabetes and BMI 30.0 to 34.9 kg/m2, (27.5 to 32.4 kg/m2 in Asian Americans, if hyperglycemia is inadequately controlled despite appropriate medical intervention.
- Metabolic surgery should be done in health care facilities that perform high-volume numbers of such surgeries and where multidisciplinary teams experienced in metabolic surgery work.
- Provide long-term support and monitoring of patients who have undergone metabolic surgery according to national and international standards.
- Perform a comprehensive mental health evaluation before surgery.
- Postpone surgery in patients with histories of alcohol abuse, substance abuse, depression, suicidal ideation, and other mental health concerns until these issues have been adequately addressed.
- Evaluate the need for ongoing mental health services to help with medical and psychosocial changes post-surgery.

Research has shown that metabolic surgery leads to "superior glycemic control and reduction of cardiovascular risk factors in obese patients with type 2 diabetes compared with various lifestyle/medical interventions" (ADA, 2021j).

Pancreas transplant

A pancreas transplant is performed to implant a healthy pancreas from a deceased donor into a patient with diabetes. Almost all pancreas transplants are done to treat cases of type 1 diabetes and are usually reserved for those patients with serious diabetes complications because side effects of transplantation are significant. The pancreas must be meticulously matched to the recipient and is transported in a cooled solution that preserves the organ for up to approximately 15 to 20 hours. Once a pancreas becomes available, it must be transplanted into a recipient within 18-24 hours. Pancreas transplant is often done in conjunction with a kidney transplant or after successful kidney transplantation in persons whose kidneys have been damaged by diabetes. The average waiting time for a pancreas transplant is about 23 months. The average wait for a simultaneous kidney-pancreas transplant is about 13 months (Mayo Clinic, 2019; MedlinePlus, 20121b).

Candidates for a pancreas transplant typically have type 1 diabetes, along with kidney damage, nerve damage, or eye problems, or other complications. Transplant candidates usually have diabetes that is out of control despite medical treatment. Some people who have type 2 diabetes may be candidates for transplant if they have both low insulin resistance and low insulin production (Johns Hopkins Medicine, 2021).

About 10% of all pancreas transplants are performed in people with type 2 diabetes. This is generally because of the patients' having both low insulin resistance and low insulin production (Mayo Clinic, 2019).

Surgical pancreatic transplant takes about three hours. If done in conjunction with a kidney transplant, the combined surgery takes about six hours. The patient's diseased pancreas is not removed during the surgery. The donor pancreas is usually placed in the right lower part of the abdomen, and blood vessels from the new pancreas are attached to the patient's blood vessels. The donor duodenum is attached to the patient's intestine or bladder (MedlinePlus, 2019).

- The following are complications associated with the transplant surgery (Mayo Clinic, 2019).
- Hemorrhage
- Blood clots
- Infection
- Hyperglycemia
- Urinary tract infections
- Failure of the donated pancreas
- Rejection of the donated pancreas

Following a pancreas transplant the patient must take medications for the rest of his life to help prevent rejection of the donor pancreas. Such medications have several side effects (Mayo Clinic, 2019):

- Thinning of bones
- Elevated cholesterol
- Hypertension
- Skin sensitivity
- Fluid retention
- Weight gain
- Swollen gums
- Acne
- Excessive hair growth

Before transplantation, patients are evaluated both physically and mentally. Patients must be able to cope with and adhere to lifelong medical follow-up, the need to take medications to help prevent organ rejection for the rest of their lives, and the ability to cope with side effects of medications needed after transplantation (Mayo Clinic, 2019; MedlinePlus, 2021b18b).

Self-Assessment Quiz Question #8

All of the following immunization recommendations for adults who have diabetes mellitus are accurate EXCEPT:

a. Administer influenza vaccine to all patients annually.
b. The TDAP vaccine should not be administered to pregnant women.
c. All persons 50 years of age or older should receive the two-dose Shingrix vaccine.
d. The HPV vaccine should be given to persons 26 years old and under.

Case study: Jeremy Wilson

Jeremy is a 16-year-old high-school student who has a history of hard-to-control type1 diabetes. Jeremy is struggling to live what he calls "a normal life like my friends." Because of the seriousness of his condition he, his parents, and his healthcare providers agree that he is a candidate for pancreas transplant.

Question 1: How long will it take to obtain a pancreas for transplantation?

Discussion:
The average wait time for a pancreas transplant is about 23 months. The pancreas must be meticulously matched to the recipient and is transported in a cooled solution that preserves the organ for up to approximately 15 to 20 hours. Once a pancreas becomes available, it must be transplanted into a recipient within 18-24 hours. Jeremy needs to know about the waiting period for a pancreas. It may be a difficult waiting period as he is anxious to live "a normal life." Jeremy, and his family, may benefit from counseling as they wait and in preparation for undergoing, and living with, transplantation.

Question 2: What happens during the transplant procedure?

Discussion
Surgical pancreatic transplant takes about three hours. If done in conjunction with a kidney transplant, the combined surgery takes about six hours. The patient's diseased pancreas is not removed during the surgery. The donor pancreas is usually placed in the right lower part of the abdomen, and blood vessels from the new pancreas are attached to the patient's blood vessels. The donor duodenum is attached to the patient's intestine or bladder

Question 3: Why is a mental health examination needed before transplant surgery?

Discussion
Before transplantation, patients are evaluated both physically and mentally. Patients must be able to cope with and adhere to lifelong medical follow-up, the need to take medications to help prevent organ rejection for the rest of their lives, and the ability to cope with side effects of medications needed after transplantation

PREVENTION AND MANAGEMENT OF COMPLICATIONS OF DIABETES

The possibility of complications must be addressed with patients and families. Healthcare professionals must not only monitor patients but also teach patients and families to recognize signs and symptoms of complications and how to adhere to treatment regimens for complications if they occur.

The CDC identifies the following risk factors for diabetes-related complications (CDC, 2020c):

Smoking

- 21.6% were tobacco users based on self-report or levels of serum cotinine.
- 15.0% reported current cigarette smoking.
- 36.4% had quit smoking but had a history of smoking at least 100 cigarettes in their lifetime.

Overweight and obesity

- 89.0% were overweight or had obesity, defined as a body mass index (BMI) of 25 kg/m2 or higher.

Specifically:
- 27.6% were overweight (BMI of 25.0 to 29.9 kg/m2)
- 45.8% had obesity (BMI of 30.0 to 39.9 kg/m2)
- 15.5% had extreme obesity (BMI of 40.0 kg/m2 or higher)

Physical inactivity

• 38.0% were physically inactive, defined as getting less than 10 minutes a week of moderate or vigorous activity in each physical activity category of work, leisure time, and transportation.

A1C

- 50.0% had an A1C value of 7.0% or higher

Specifically:
- 22.3% had an A1C value of 7.0% to 7.9%
- 13.2% had an A1C value of 8.0% to 9.0%
- 14.6% had an A1C value higher than 9.0%
- 16.3% of adults aged 18–44 years had A1C levels of 10% or higher, compared to 12.7% of those aged 45–64 years and 4.3% of those aged 65 years or older.

High blood pressure

- 68.4% had a systolic blood pressure of 140 mmHg or higher or diastolic blood pressure of 90 mmHg or higher or were on prescription medication for their high blood pressure.

High cholesterol

- 43.5% had a non-HDL level of 130 mg/dL or higher

Specifically:
- 22.4% had a non-HDL level of 130 to 159 mg/dL
- 11.2% had a non-HDL level of 160 to 189 mg/dL
- 9.9% had a non-HDL level of 190 mg/dL or higher

Cardiovascular disease

Prevention and management of complications of diabetes are important strategies for the promotion of health and wellness among those persons with diabetes mellitus. Cardiovascular disease (CVD) is the major cause of morbidity and mortality for persons who have diabetes as well as the largest contributor to both direct and indirect costs of diabetes. Research has shown that controlling individual cardiovascular risk factors helps prevent or slow CVD development in people with diabetes (ADA, 2021a).

Hypertension

Hypertension is a significant problem among people with diabetes and is a major risk factor for cardiovascular disease. There are generally three categories of blood pressure (CDC, 2020b):

1. Normal: systolic is less than 120 mmHg; diastolic is less than 80 mmHg.
2. Prehypertension: systolic is 120 to 139 mmHg; diastolic is 80 to 89 mmHg.
3. Hypertension: systolic is 140 mmHg or higher; diastolic is 90 mmHg or higher.

Persons who have elevated blood pressure should have blood pressure confirmed by using multiple readings and on separate days to diagnose hypertension. Additionally, all patients with hypertension and diabetes should monitor their blood pressure at home (American Diabetes Association, 2021a).

In pregnant patients with diabetes and pre-existing hypertension, blood pressure targets of 110-135/85 mmHg are suggested (ADA, 2021a).

The ADA (2021a) Standards of Medical Care in Diabetes recommends the following treatment initiatives for blood pressure control in persons with diabetes (American Diabetes Association, 2021a):

- Blood pressure should be measured at every routine clinical visit. Patients found to have elevated blood pressure (≥140/90 mmHg) should have blood pressure confirmed using multiple readings, including measurements on a separate day, to diagnose hypertension.
- All hypertensive patients with diabetes should monitor their blood pressure at home.
- For patients with diabetes and hypertension, blood pressure targets should be individualized through a shared decision-making process that addresses cardiovascular risk, potential adverse effects of antihypertensive medications, and patient preferences.
- For individuals with diabetes and hypertension at higher cardiovascular risk (existing atherosclerotic cardiovascular disease [ASCVD] or 10-year ASCVD risk ≥15%), a blood pressure target of <130/80 mmHg may be appropriate if it can be safely attained.
- For individuals with diabetes and hypertension at lower risk for cardiovascular disease (10-year atherosclerotic cardiovascular disease risk <15%), treat to a blood pressure target of <140/90 mmHg.
- In pregnant patients with diabetes and preexisting hypertension, a blood pressure target of 110–135/85 mmHg is suggested in the interest of reducing the risk for accelerated maternal hypertension and minimizing impaired fetal growth.
- For patients with blood pressure >120/80 mmHg, lifestyle intervention consists of weight loss when indicated, a Dietary Approaches to Stop Hypertension (DASH)-style eating pattern including reducing sodium and increasing potassium intake, moderation of alcohol intake, and increased physical activity.
- Patients with confirmed office-based blood pressure ≥140/90 mmHg should, in addition to lifestyle therapy, have prompt initiation and timely titration of pharmacologic therapy to achieve blood pressure goals.
- Patients with confirmed office-based blood pressure ≥160/100 mmHg should, in addition to lifestyle therapy, have prompt initiation and timely titration of two drugs or a single-pill combination of drugs demonstrated to reduce cardiovascular events in patients with diabetes.
- Treatment for hypertension should include drug classes demonstrated to reduce cardiovascular events in patients with diabetes. ACE inhibitors or angiotensin receptor blockers are recommended first-line therapy for hypertension in people with diabetes and coronary artery disease.
- Combination drug therapy is generally required to achieve blood pressure targets. However, combinations of ACE inhibitors and angiotensin receptor blockers and combinations of ACE inhibitors or angiotensin receptor blockers with direct renin inhibitors should not be used. These combinations increase the risk of hypotension, hyperkalemia, and renal impairment.
- An ACE inhibitor or angiotensin receptor blocker, at the maximum tolerated dose indicated for blood pressure treatment, is the recommended first-line treatment for hypertension in patients with diabetes and urinary albumin-to-creatinine ratio ≥300 mg/g creatinine or 30–299 mg/g creatinine. If one class is not tolerated, the other should be substituted.
- For patients treated with an ACE inhibitor, angiotensin receptor blocker, or diuretic, serum creatinine/estimated glomerular filtration rate and serum potassium levels should be monitored at least annually.
- Patients with hypertension who are not meeting blood pressure targets on three classes of antihypertensive medications (including a diuretic) should be considered for mineralocorticoid receptor antagonist therapy.

The DASH (Dietary Approaches to Stop Hypertension) diet focuses on fruits, vegetables, whole grains, and other foods that are deemed to be heart healthy and low in fat, cholesterol, and sodium. DASH also emphasizes intake of fat-free or low-fat dairy products, fish, poultry, and nuts. The intake of red meats, sweets, added sugars, and sugar-containing beverages is reduced. DASH is rich in nutrients, protein, and fiber (Mayo Clinic, 2020e; 2021c). This diet has been shown to help diabetic patients lose weight and maintain a more stable blood sugar.

Salt should be limited. Foods that are low in sodium and contain no added salt should be chosen. Salt should not be on the table during meals. No more than one teaspoon of salt per day should be consumed (Mayo Clinic, 2020e; 2021c).

Patients who smoke should be referred to smoking cessation programs. Smoking constricts and damages blood vessels and increases hypertension risk (Mayo Clinic, 2021c).

Finally, patients must be instructed in stress management techniques. Relaxation training, deep breathing exercises, guided imagery, and exercise all have been shown to facilitate stress reduction. Equally important is to help patients identify stressors in their lives and how to deal with them. For example, financial issues may prove to be significant stressors. The costs of a chronic illness, even with insurance coverage, can place a financial burden on patients and families. Relaxation techniques may be helpful, but patients may also need referral to financial counseling or resources that may be able to help defray the cost of medications and other treatments (Mayo Clinic, 2021c).

Lipid management

Lifestyle modifications that focus on weight loss if needed, dietary changes as needed (reduce intake of saturated fat, trans fat, and cholesterol; increase intake of n-3 fatty acids, fiber, and plant stanols/sterols), and glycemic control are central to lipid management (American Diabetes Association, 2021a).

The American Diabetes Association (2021a) offers the following recommendations for lipid management:

- For adults not taking lipid-lowering therapy, obtain a lipid profile at the time of diabetes diagnosis, at an initial medical evaluation, and every 5 years thereafter if younger than 40 years of age. Testing may be done more frequently as needed.
- A lipid profile should be obtained at the start of lipid-lowering therapy 4 to 12 weeks after starting therapy or when there is a change in dosage and annually thereafter.

- In adults not taking statins or other lipid-lowering therapy, it is reasonable to obtain a lipid profile at the time of diabetes diagnosis, at an initial medical evaluation, and every five years thereafter if under the age of 40 years, or more frequently if indicated.
- For patients with diabetes aged 40–75 years without atherosclerotic cardiovascular disease, use moderate-intensity statin therapy in addition to lifestyle therapy.
- For patients with diabetes aged 20–39 years with additional atherosclerotic cardiovascular disease risk factors, it may be reasonable to initiate statin therapy in addition to lifestyle therapy.
- In patients with diabetes at higher risk, especially those with multiple atherosclerotic cardiovascular disease risk factors or aged 50–70 years, it is reasonable to use high-intensity statin therapy.
- In adults with diabetes and 10-year atherosclerotic cardiovascular disease risk of 20% or higher, it may be reasonable to add ezetimibe to maximally tolerated statin therapy to reduce LDL cholesterol levels by 50% or more.
- For patients of all ages with diabetes and atherosclerotic cardiovascular disease, high-intensity statin therapy should be added to lifestyle therapy.
- For patients with diabetes and atherosclerotic cardiovascular disease considered very high risk using specific criteria, if LDL cholesterol is ≥70 mg/dL on maximally tolerated statin dose, consider adding additional LDL-lowering therapy (such as ezetimibe or PCSK9 inhibitor). Ezetimibe may be preferred because of lower cost.
- For patients who do not tolerate the intended intensity, the maximally tolerated statin dose should be used.
- In adults with diabetes aged >75 years already on statin therapy, it is reasonable to continue statin treatment.
- In adults with diabetes aged >75 years, it may be reasonable to initiate statin therapy after discussion of potential benefits and risks.
- Statin therapy is contraindicated in pregnancy.
- For patients with fasting triglyceride levels ≥500 mg/dL, evaluate for secondary causes of hypertriglyceridemia and consider medical therapy to reduce the risk of pancreatitis.
- In adults with moderate hyper-triglyceridemia (fasting or non-fasting triglycerides 175–499 mg/dL), clinicians should address and treat lifestyle factors (obesity and metabolic syndrome), secondary factors (diabetes, chronic liver or kidney disease and/or nephrotic syndrome, hypothyroidism), and medications that raise triglycerides.
- In patients with atherosclerotic cardiovascular disease or other cardiovascular risk factors on a statin with controlled LDL cholesterol but elevated triglycerides (135–499 mg/dL), the addition of icosapent ethyl can be considered to reduce cardiovascular risk.
- Statin plus fibrate combination therapy has not been shown to improve atherosclerotic cardiovascular disease outcomes and is generally not recommended.
- Statin plus niacin combination therapy has not been shown to provide additional cardiovascular benefit above statin therapy alone, may increase the risk of stroke with additional side effects, and is generally not recommended.

Antiplatelet agents for the management of CVD

Research findings indicate that aspirin has been shown to help reduce cardiovascular morbidity and mortality in patients who are high risk and who have had previous heart attack or stroke. However, its overall benefit in primary prevention among adults with no previous cardiovascular events (heart attack or stroke) is controversial for patients with or without a history of diabetes. Aspirin is not recommended for persons at low risk of ASCVD (men and women younger than 50 years of age with no other major ASCVD risk factors). This is because the low potential benefit is outweighed by the risks for bleeding (American Diabetes Association, 2021a).

Following are recommendations regarding aspirin therapy (American Diabetes Association, 2018j):

- Use aspirin therapy (75 to 162 mg/day) as a secondary prevention strategy for persons with diabetes and a history of ASCVD.
- Use clopidogrel (75 mg/day) for those patients with ASCVD and documented aspirin allergy.
- The use of dual antiplatelet therapy (low-dose aspirin and a P2Y12 inhibitor) is deemed reasonable for a year after an acute coronary syndrome and may have benefits beyond one year.
- Long-term treatment with dual antiplatelet therapy should be considered for patients with prior coronary intervention, high ischemic risk, and low bleeding risk to prevent major adverse cardiovascular events.
- Combination therapy with aspirin plus low-dose rivaroxaban should be considered for patients with stable coronary and/or peripheral artery disease and low bleeding risk to prevent major adverse limb and cardiovascular events.
- Aspirin therapy (75 to 162 mg/day) may be considered as a primary prevention strategy for those patients with type 1 or type 2 diabetes who have increased cardiovascular risk.

Screening and treatment recommendations for cardiovascular disease

The American Diabetes Association (2021a) does not recommend routine screening for coronary artery disease in asymptomatic patients if ASCVD risk factors are treated. Investigations for coronary artery disease should be considered if any of the following is present:

- Unexplained dyspnea
- Chest discomfort
- Carotid bruits
- Transient ischemic attack
- Stroke
- Claudication
- Peripheral arterial disease
- Electrocardiogram abnormalities

Following are recommendations for treatment of coronary heart disease for patients with diabetes (American Diabetes Association, 2021a):

- Among patients with type 2 diabetes who have established atherosclerotic cardiovascular disease or established kidney disease, a sodium–glucose cotransporter 2 inhibitor or glucagon-like peptide 1 receptor agonist with demonstrated cardiovascular disease benefit is recommended as part of the comprehensive cardiovascular risk reduction and/or glucose-lowering regimens.
- In patients with type 2 diabetes and established atherosclerotic cardiovascular disease, multiple atherosclerotic cardiovascular disease risk factors, or diabetic kidney disease, a sodium–glucose cotransporter 2 inhibitor with demonstrated cardiovascular benefit is recommended to reduce the risk of major adverse cardiovascular events and/or heart failure hospitalization.
- In patients with type 2 diabetes and established atherosclerotic cardiovascular disease or multiple risk factors for atherosclerotic cardiovascular disease, a glucagon-like peptide 1 receptor agonist with demonstrated cardiovascular benefit is recommended to reduce the risk of major adverse cardiovascular events.
- In patients with type 2 diabetes and established heart failure with reduced ejection fraction, a sodium–glucose cotransporter 2 inhibitor with proven benefit in this patient population is recommended to reduce risk of worsening heart failure and cardiovascular death.
- In patients with known atherosclerotic cardiovascular disease, particularly coronary artery disease, ACE inhibitor

or angiotensin receptor blocker therapy is recommended to reduce the risk of cardiovascular events.
- In patients with prior myocardial infarction, β-blockers should be continued for 3 years after the event.
- Treatment of patients with heart failure with reduced ejection fraction should include a β-blocker with proven cardiovascular outcomes benefit, unless otherwise contraindicated.
- In patients with type 2 diabetes with stable heart failure, metformin may be continued for glucose lowering if estimated glomerular filtration rate remains >30 mL/min/1.73 m2 but should be avoided in unstable or hospitalized patients with heart failure.

Diabetic neuropathy

Diabetic neuropathy is a group of nerve disorders caused by diabetes mellitus. Over the course of time, nerve damage can occur throughout the body. Some persons have no symptoms of nerve damage, but others may feel pain, tingling, or numbness in the hands, arms, feet, and legs. Neuropathy can occur in every organ system throughout the body (NIDDK, n.d).

The following persons are at highest risk for diabetic neuropathy (Mayo Clinic, 2021b):
- Those who are overweight
- Those who are hypertensive
- Those who have elevated cholesterol
- Those who have advanced renal disease
- Those who drink large amounts of alcohol
- Those who smoke

The American Diabetes Association (2021i) advocates the following screenings and treatments:
- Assess all patients for diabetic peripheral neuropathy beginning at diagnosis of type 2 diabetes and five years after the diagnosis of type 1 diabetes. After these initial assessments, patients should be evaluated at least annually.
- Include a careful history and assessment of either temperature or pinprick sensation as part of the assessment for distal symmetric polyneuropathy.
- Assess for signs and symptoms of autonomic neuropathy in patients who have microvascular complications.
- Optimize glucose control to prevent or delay the development of neuropathy or to slow its progression.
- Assess and treat patients to reduce pain related to diabetic peripheral neuropathy and symptoms of autonomic neuropathy.
- Prescribe either pregabalin or duloxetine as initial pharmacologic treatments for neuropathic pain in diabetes.

There are four types of diabetic neuropathy (NIDDK, n.d.):
1. Peripheral
2. Autonomic
3. Proximal
4. Focal

Peripheral Diabetic Neuropathy

Peripheral neuropathy is the most common type of diabetic neuropathy. The areas of the body most affected are the feet and legs. Rarely, other areas of the body—the arms, abdomen, and back—may be affected by peripheral neuropathy. Nerve damage can lead to a loss of sensation in the feet and legs placing the patient at significant risk for foot problems. Injuries, lesions, blisters, and sores on the feet may go unnoticed because of a lack of sensation. Infection can easily occur, and if not treated promptly, the infection can spread to the bone. Such infections may lead to amputation of toes, feet, and lower limbs. Many amputations can be prevented with meticulous skin care and swift recognition and treatment of infections (Dansinger, 2021b; Mayo Clinic, 2021e; NIDDK, 2018).

Common symptoms of diabetic peripheral neuropathy are tingling (resembling a "pins and needles" sensation), numbness (which can become permanent), burning (especially in the evening), and pain. Discomfort related to these symptoms may be reduced or controlled when blood glucose levels are under control (NIDDK, 2018c).

Painful diabetic neuropathy may be treated with oral medications (NIDDK, 2018c):
- Tricyclic antidepressants and other types of antidepressants as appropriate
- Anticonvulsants
- Skin creams, patches, or sprays (e.g., lidocaine)

Healthcare professionals must instruct patients and families in skin care, especially the care of the feet, because the nerves to the feet are the longest in the body and are the nerves most often impacted by neuropathy. Education should include the following instructions (Dansinger, 2021b; Mayo Clinic, 2021e):
- Clean the feet daily using warm, not hot, water and a mild soap. Do not soak the feet. Dry the feet gently but thoroughly with a soft towel, paying special attention to the skin between the toes.
- Apply gentle, non-perfumed lotion to the feet if they are dry. Do not put lotion between the toes.
- Inspect the feet and toes every day for cuts, blisters, redness, sores, calluses, or other problems. Use a mirror to check the bottom of the feet. If any abnormalities are noted, notify a health care provider immediately. Rigorous attention to leg and foot ulcers may include debridement, hyperbaric oxygen therapy, or intensive would care.
- Go to a podiatrist, if possible, to avoid injuring the toes when toenails need to be trimmed.
- Never go barefoot. Wear properly fitting shoes or slippers at all times to protect the feet from injuries. Shoes should not be tight; the toes should be able to move when wearing them. New shoes should be broken in gradually by wearing them for only an hour at a time initially.
- Examine shoes and slippers before putting them on, including feeling the insides. This is done to be sure that shoes and slippers are free from tears, sharp edges, or objects that might damage the feet.
- Participate in regular, gentle exercise. Routines such as yoga and tai chi might be of benefit.
- Stop smoking.
- Eat healthy meals.
- Avoid excessive amounts of alcohol.
- Monitor blood glucose levels per health care provider instructions.

Autonomic diabetic neuropathy

Autonomic neuropathy is damage to the nerves that are responsible for the control of the internal organs. Autonomic neuropathy can lead to problems in the cardiovascular, digestive, and renal systems. It can also cause sexual dysfunction, vision problems, and alterations in the function of the sweat glands (NIDDK, 2018a).

Heart and Blood Vessel Impact of Autonomic Neuropathy

Damage to the nerves of the cardiovascular system adversely affects the body's ability to adjust blood pressure and heart rate. This can lead to orthostatic hypotension, dizziness, lightheadedness, or fainting. Damage to the nerves that control heart rate can lead to tachycardia instead of normal increases and decreases in heart rate in response to body functions, stress, and physical activity (NIDDK, 2018a).

Patients must be taught to avoid changing position too quickly, especially from a lying to a sitting or standing position. Wearing elastic stockings may be helpful, and physical therapy can be useful when dealing with muscle weakness or loss of coordination. Heart healthy interventions such as smoking cessation, lipid management, blood pressure control, exercise, and diet may help

to decrease the development or progression of heart and blood vessel autonomic neuropathy (NIDDK, 2018a).

Digestive System Autonomic Neuropathy.
Following are common symptoms of digestive autonomic neuropathy (NIDDK, 2018a):

- Bloating
- Diarrhea
- Constipation
- Difficulty swallowing
- Feeling full after eating only a small amount of food
- Loss of appetite
- Nausea
- Vomiting
- Fecal incontinence

Treatments include dietary changes and medications to treat symptoms of constipation, diarrhea, fecal incontinence, and gastroesophageal reflux (NIDDK, 2018a).

Urinary Tract Involvement
Nerve damage can cause incomplete emptying of the bladder and increase the likelihood of urinary tract infections. Patients may also experience incontinence and increased urination at night (NIDDK, 2018a).

Patients are encouraged to drink plenty of fluids to help prevent infections. Because they may not be able to sense when their bladders are full, patients may implement a regular schedule of voiding such as every four hours (NIDDK, 2018a).

Sexual Organs Involvement
Autonomic neuropathy can gradually decrease sexual response in men and women even though sex drive may be unchanged. Men may be unable to have or unable to maintain an erection or have dry or reduced ejaculations. Women may have difficulty becoming aroused or achieving orgasm or experience a decrease in vaginal lubrication that can lead to painful intercourse (NIDDK, 2018a).

Treatment of erectile dysfunction in men begins with testing to rule out hormonal causes. To treat erectile dysfunction caused by neuropathy, medications that increase blood flow to the penis may be prescribed. Some medications are oral; others are injected into the penis or inserted into the urethra at the tip of the penis. Other interventions include the use of mechanical vacuum devices to increase blood flow to the penis or surgical implantation of an inflatable or semirigid device in the penis (Dansinger, 2021b; Ignatavicius et al., 2018; NIDDK, 2018a).

For women, the use of vaginal lubricants, estrogen creams, suppositories, and rings or medications to help reduce symptoms and facilitate arousal may be prescribed (Dansinger, 2021b; Ignatavicius et al., 2018; NIDDK, 2018a).

Self-Assessment Quiz Question #9

When counseling patients about autonomic diabetic neuropathy, healthcare professionals must know that:

a. The impact on heart and blood vessels can lead to orthostatic hypotension or fainting.
b. This type of neuropathy has no impact on sexual functioning.
c. It is important to limit fluid intake.
d. The use of elastic stockings is contraindicated.

Focal diabetic neuropathy

Focal diabetic neuropathy can appear suddenly. It affects specific nerves most often in the head, torso, or leg (NIDDK, 2018b).

Focal diabetic neuropathy may cause the following problems (NIDDK, 2018b):

- Double vision
- Aching behind one eye
- Bell's palsy (paralysis on one side of the face)
- Difficulty focusing the eyes

Focal diabetic neuropathy is unpredictable as well as being painful and is seen most often in older patients with focal neuropathy who tend to develop nerve compressions, also called entrapment syndromes. Carpal tunnel syndrome, which causes numbness and tingling of the hand and sometimes muscle weakness and pain, is a common example of such compression. Other nerves that are vulnerable to entrapment may cause pain on the outside of the shin or the inside of the foot (NIDDK, 2018b).

Diabetic retinopathy

Diabetic retinopathy is the most common diabetic eye disease and a leading cause of blindness in American adults. Initially, diabetic retinopathy may not cause any symptoms or only mild vision disturbances. However, the complication can eventually result in blindness (Mayo Clinic, 2021b; National Eye Institute, 2019).

The American Diabetes Association (2021i) recommends that to slow progression of diabetic retinopathy, patients should optimize glycemic control, blood pressure, and serum lipid control.

Diabetic retinopathy has four stages (Dansinger, 2021c):

1. Mild non-proliferative retinopathy: Microaneurysms occur, which are small areas of balloon-like swelling in the blood vessels of the retina.
2. Moderate non-proliferative retinopathy: Some blood vessels that provide nourishment to the retina are blocked.
3. Severe non-proliferative retinopathy: More and more blood vessels are blocked. Several areas of the retina are deprived of their blood supply, and they transmit messages to the body to grow new, additional blood vessels to supply nourishment.
4. Proliferative retinopathy: New blood vessels grow in an attempt to nourish the retina. This condition is referred to as proliferative retinopathy. These new blood vessels are fragile and abnormal and grow along the retina and along the surface of the clear vitreous gel that fills the inside of the eye. Because the walls of the abnormal vessels are so thin and fragile, they leak blood causing severe vision loss and even blindness.

It is rare to have signs and symptoms of the disease during early stages of diabetic retinopathy. However, as the disease progresses, symptoms may include the following Mayo Clinic, 2021b; National Eye Institute, 2019):

- Spots or dark strings floating in the visual field (commonly referred to as floaters)
- Blurred vision
- Dark or empty areas in vision
- Vision loss
- Problems with color perception

The American Diabetes Association (2021i) recommends that adults with type 1 diabetes have their first eye exam within five years of diagnosis. Persons with type 2 diabetes should get the initial eye exam soon after receiving a diagnosis. After the initial exam. The ADA recommends that all people with diabetes get an annual eye exam. Patients who have no evidence of retinopathy for one or more annual eye exams and glycemia is well controlled, then screening every one to two years may be considered.

The early stage of diabetic retinopathy may not require treatment. However, as the disease progresses, treatment is generally needed. Proliferative diabetic retinopathy requires prompt treatment (Mayo Clinic, 2021b).

Focal Laser Treatment
Also known as photocoagulation, focal laser treatment can stop or slow the leakage of blood or fluid in the eye. This procedure is performed in the office setting or at an eye clinic and is generally done in a single session. Vision may be blurry for a day after the procedure, and the patients may see small spots in their visual field for several weeks (University of Michigan Health, 2020).

Scatter Laser Treatment
Also known as panretinal photocoagulation, this treatment can shrink abnormal blood vessels. Also performed in an office or eye clinic setting, this procedure involves treating affected areas with scattered laser burns. The burns cause the abnormal blood vessels to shrink and scar. Scatter laser treatment is usually done in two or more sessions and causes blurred vision for about a day after the procedure. Some loss of peripheral vision or night vision after undergoing the procedure is possible (University of Michigan Health, 2020).

Vitrectomy
A vitrectomy is performed to remove blood from the middle of the eye (vitreous) as well as any scar tissue that is pulling on the retina. A vitrectomy is performed in a surgical center or hospital using local or general anesthesia. A tiny incision is made in the eye through which scar tissue and blood are removed and replaced with a saline solution to maintain the normal shape of the eye. A gas bubble may be placed in the cavity of the eye to help reattach the retina. If so, the patient may need to remain prone (face down) for several days until the gas bubble dissipates. An eye patch is worn, and medicated eye drops instilled for a few days or weeks. Vitrectomy may be followed or accompanied by laser treatment (Johns Hopkins Medicine, n.d.b).

Nursing Considerations: Patients treated with Scatter Laser procedures or vitrectomy may be extremely anxious for the fear of both pain and the possible complete loss of vision. Coaching, information about the procedures, and possible pre-mediation for anxiety should be considered. Patients required to remain prone for extended periods may also present nursing care challenges for eating and elimination.

Diabetic nephropathy

Diabetic nephropathy refers to damage to the kidneys caused by diabetes. Not all diabetics develop diabetic nephropathy. Diabetics who are at higher risk for its development include persons with hypertension, elevated cholesterol, smoking history, and uncontrolled blood glucose (ADA, 2021i).

Diabetic nephropathy does not produce symptoms in its early stages. Therefore, testing urine for the presence of albumin is very important so that kidney damage can be detected as soon as possible. Early kidney damage may be reversed (ADA, 2021g; 2021i).

Symptoms, when they appear, are not particularly specific. Fluid retention and edema, loss of sleep, loss of appetite, nausea and vomiting, weakness, and trouble concentrating are reported (ADA, 2020g; 2021i).

The primary treatment for diabetic nephropathy is to lower blood pressure. ACE inhibitors are recommended for most people who have hypertension, diabetes, and renal disease. Cholesterol and triglyceride levels must also be controlled; statins are generally prescribed (ADA, 2021g; 2021i).

As with most complications, the best way to prevent diabetic nephropathy is to control blood glucose levels. Blood pressure management, a healthy diet, regular physical exercise, and adhering to prescribed medication schedules are all extremely important. A low protein diet may be recommended (ADA, 2021g; 2021i).

Self-Assessment Quiz Question #10

All of the following statements pertaining to diabetic nephropathy are true EXCEPT:

a. Risk factors for the development of diabetic nephropathy include hypertension, smoking, and elevated cholesterol.
b. Diabetic nephropathy produces symptoms even in its early stages.
c. Symptoms of diabetic nephropathy are not particularly specific.
d. The primary treatment for diabetic nephropathy is to lower blood pressure.

Resources

There are a number of resources that may be helpful for patients, families, and healthcare professionals.

- American Association of Diabetes Educators https://journals.lww.com/nursing/Fulltext/2019/11000/Online_resources_for_patients_with_diabetes.19.aspx
- American Diabetes Association https://www.diabetes.org/resources
- Association of Diabetes Care & Education Specialists https://www.diabeteseducator.org/living-with-diabetes
- Centers for Disease Control and Prevention https://www.cdc.gov/diabetes/professional-info/index.html
- DiabetesCare.net http://www.diabetescare.net/resources
- Johns Hopkins Medicine https://www.hopkinsmedicine.org/gim/faculty-resources/core_resources/Patient%20Handouts/

Conclusion

Diabetes mellitus is a chronic disease that affects millions of people of all ages in the United States and around the world. It has the potential to cause complications that can affect all facets of a person's life as well as placing significant financial burden on patients, families, and society. But by adhering to individualized treatment regimens that rely on pharmacological therapy, diet, exercise, and healthy lifestyle habits, persons with diabetes can lead long, productive lives.

It is important to note that patients and families need a significant amount of education to carry out prescribed management interventions. They also need emotional support and referrals to mental health professionals as needed. The health care community must remember that dealing with a chronic illness places a great deal of stress not only on patients and loved ones but also on society as a whole. The costs of a chronic disease can be overwhelming. Sick time away from work can impact employers and work colleagues.

Effective management of diabetes also helps to prevent or reduce the occurrence of complications associated with the disease. Complications can range from mild inconveniences to serious consequences, including kidney failure, vision loss, and cardiovascular disease. The importance of taking every possible step to control blood glucose levels cannot be overemphasized.

But achieving and maintaining such control can be a challenge. The constant need to monitor blood glucose levels, exercise, monitor one's weight, and adhere to dietary mandates can be frustrating. The realization that such lifestyle mandates are lifelong can make some people disregard treatment recommendations. Thus, it is important that ongoing support and encouragement are provided by the health care team.

References

- American Diabetes Association (ADA). (n.d.). *Blood sugar and exercise.* https://www.diabetes.org/healthy-living/fitness/getting-started-safely/blood-glucose-and-exercise
- American Diabetes Association (ADA). (2021a). Cardiovascular disease and risk management: Standards of medical care in diabetes: 2021. *Diabetes Care,* 44(Supplement 1): S125-S150.https://doi.org/10.2337/dc21-S010.
- American Diabetes Association (ADA). (2021b). Classification and diagnosis of diabetes: Standards of medical care in diabetes: 2021. *Diabetes Care*, 44(Supplement 1, S115-533. https://doi.org/10.2337/dc21-S002.
- American Diabetes Association (ADA). (2021c). Comprehensive medical evaluation and assessment of comorbidities: Standards of medical care in diabetes: 2021. *Diabetes Care,* 44(Supplement 1)., S40-S52. https://doi.org/10.2337/dc21-S004.
- American Diabetes Association (ADA). (2021d). *Gestational diabetes treatment & perspective.* https://www.diabetes.org/diabetes/gestational-diabetes/how-to-treat-gestational-diabetes
- American Diabetes Association (ADA). (2021e). Glycemic targets: Standards of medical care in diabetes:2021. *American Diabetes Association Diabetes Care 2021,*44(Supplement 1): 573-584. https://doi.org/10.2337/dc21-S006.
- American Diabetes Association (ADA). (2021f). *How gestational diabetes can impact your baby.* https://www.diabetes.org/diabetes/gestational-diabetes/how-will-this-impact-my-baby
- American Diabetes Association (ADA). (2021g). *Kidney disease (nephropathy).* https://www.diabetes.org/diabetes/complications/kidney-disease-nephropathy
- American Diabetes Association (ADA). (2021h). *Lifestyle management: Five evidence-based lifestyle habits people with diabetes can use.* https://clinical.diabetesjournals.org/content/38/3/273
- American Diabetes Association (ADA). (2021i). Microvascular complications and foot care: Standards of medical care in diabetes: 2021. *Diabetes Care,* 44(Supplement 1): S151-S167. https://doi.org/10.2337/dc21-S011.
- American Diabetes Association (ADA). (2021j). Obesity management for the treatment of type 2 diabetes: Standards of medical care in diabetes: 2021. *Diabetes Care,* 44(Supplement 1): S100-S110. https://doi.org/10.2337/dc21-S008.
- American Diabetes Care (ADA). (2021k). Pharmacologic approaches to glycemic treatment: Standards of medical care in diabetes: 2021. *Diabetes care,* 44(Supplement 1), S111-S124. https://doi.org/10.2337/dc21-S009.
- American Diabetes Association (ADA). (2021l). *Standards of medical care in diabetes: 2021.* https://care.diabetesjournals.org/content/44/Supplement_1
- American Diabetes Association (ADA). (2021m). *Summary of revisions: Standards of medical care in diabetes: 2021.* https://care.diabetesjournals.org/content/44/Supplement_1/S4
- American Diabetes Association (ADA). (2021n). *Understanding A1C: Diagnosis.* https://www.diabetes.org/a1c/diagnosis
- American Diabetes Association (ADA). (2021o). *Understanding and facilitating behavioral change and well-being to improve health outcomes: Standards of medical care in diabetes.* https://care.diabetesjournals.org/content/44/Supplement_1/S53
- American Heart Association. (2021). *Diabetes risk factors.* https://www.heart.org/en/health-topics/diabetes/understand-your-risk-for-diabetes
- Castro, M. R. (2021). *Latent autoimmune diabetes in adults (LADA): What is it?* https://www.mayoclinic.org/diseases-conditions/type-1-diabetes/expert-answers/lada-diabetes/faq-20057880
- Cefalu, W. T., Dawes, D. Ed., Gavlak, G., Goldman, D., Herman, W. H., Van Nuys, K., Powers, A. C., Taylor, S. I., & Yatvin. (2018). Insulin access and affordability working group: Conclusions and recommendations. *Diabetes Care,* 41(6), 1299-1311. https://doi.org/10.2337/dci18-0019.
- Centers for Disease Control and Prevention (CDC) (2020a). *How much physical activity do adults need?* https://www.cdc.gov/physicalactivity/basics/adults/index.htm
- Centers for Disease Control and Prevention (CDC). (2020b). *Measuring blood pressure. About high blood pressure.* https://www.cdc.gov/bloodpressure/about.htm
- Centers for Disease Control and Prevention (CDC). (2020c) *National diabetes statistics report.* https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf
- Centers for Disease Control and Prevention (CDC). (2020d). *National diabetes statistics report, 2020.* https://www.cdc.gov/diabetes/library/features/diabetes-stat-report.html
- Centers for Disease Control and Prevention (CDC). (2020e). *National diabetes statistics report 2020.* https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf
- Centers for Disease Control and Prevention (CDC). (2020f). *Prevalence of both diagnosed and undiagnosed diabetes.* https://www.cdc.gov/diabetes/data/statistics-report/diagnosed-undiagnosed-diabetes.html
- Centers for Disease Control and Prevention (CDC). (2020g). *Rates of new diagnosed cases of type1 and type 2 diabetes continue to rise among children, teens.* https://www.cdc.gov/diabetes/research/reports/children-diabetes-rates-rise.html.
- Centers for Disease Control and Prevention (CDC). (2021a). *Defining adult overweight & obesity: Adult body mass index.* https://www.cdc.gov/obesity/adult/defining.html
- Centers for Disease Control and Prevention (CDC). (2021b). *Diabetes risk factors.* https://www.cdc.gov/diabetes/basics/risk-factors.html
- Centers for Disease Control and Prevention (CDC). (2021c). *Cost-effectiveness of diabetes.* https://www.cdc.gov/chronicdisease/programs-impact/pop/diabetes.htm
- Centers for Disease Control and Prevention (CDC). (2021d). *Leading causes of death.* https://www.cdc.gov/nchs/fastats/leading-causes-of-death.htm
- Centers for Disease Control and Prevention (CDC). (2021e). *Tips from former smokers.* https://www.cdc.gov/tobacco/campaign/tips/diseases/diabetes.html
- Centers for Disease Control and Prevention (CDC). (2021f). *Tips regarding diabetes meal planning.* https://www.cdc.gov/diabetes/managing/eat-well/meal-plan-method.html
- Cleveland Clinic. (2021). *Insulin pumps.* https://my.clevelandclinic.org/health/articles/9811-insulin-pumps
- Dansinger, M. (2019a). *Gestational diabetes.* https://www.webmd.com/diabetes/gestational-diabetes#1-1
- Dansinger, M. (2019b-). *Prediabetes (borderline diabetes).* https://www.webmd.com/diabetes/what-is-prediabetes
- Dansinger, M. (2021a). *Type 2 diabetes in children.* https://www.webmd.com/diabetes/type-2-diabetes-in-children#1
- Dansinger, M. (2021b). *What is diabetic neuropathy?* https://www.webmd.com/diabetes/diabetes-neuropathy#2-6
- Dansinger, M. (2021c). *What are the stages of diabetic retinopathy?* https://www.webmd.com/diabetes/eyes-21/dr/diabetic-retinopathy-stages
- Food and Drug Administration (FDA). (2017). *Types of artificial pancreas device systems.* https://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/HomeHealthandConsumer/ConsumerProducts/ArtificialPancreas/ucm259555.htm - TSDS
- Food and Drug Administration (FDA). (2018). *What is an artificial pancreas device system?* https://www.fda.gov/medical-devices/artificial-pancreas-device-system/what-pancreas-what-artificial-pancreas-device-system
- Grygotis, L. (2016). *ADA releases guidelines for psychosocial care for diabetes patients.* https://www.clinicaladvisor.com/home/topics/diabetes-information-center/ada-releases-guidelines-for-psychosocial-care-for-diabetes-patients/
- Ignatiavicius, D. D., Workman, M. L., Rebar, C., & Heimgartner, N. M. (2021). *Medical-surgical nursing (10th ed.).* Elsevier.
- Johns Hopkins Medicine. (n.d.a). *The pancreas.* https://www.hopkinsmedicine.org/health/conditions-and-diseases/the-pancreas
- Johns Hopkins Medicine. (n.d.b). *Vitrectomy.* https://www.hopkinsmedicine.org/health/wellness-and-prevention/vitrectomy
- Johns Hopkins Medicine. (2021). *Pancreas transplantation.* https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/pancreas-transplant
- Kalyani, R. R. (2017). *Diagnosis and classification of diabetes. https://www.hopkinsguides.com/hopkins/view/Johns_Hopkins_Diabetes_Guide/547038/all/Diagnosis_and_Classification_of_Diabetes*
- Khardori, R. (2021a). *Type 1 diabetes mellitus.* https://emedicine.medscape.com/article/117739-overview
- Khardori, R. (2021b). *Type 1 diabetes mellitus clinical presentation.* https://emedicine.medscape.com/article/117739-clinical
- Khardori, R. (2021c.). *What are common causes of secondary diabetes?* https://www.medscape.com/answers/117853-6389/what-are-common-causes-of-secondary-diabetes
- Kumok, Z. (2021). *Living with diabetes in 2021 means skyrocketing financial costs.* https://www.health.com/money/living-with-diabetes-costs
- Santos-Longhurst, A. (2020). *Type 2 diabetes statistics and facts.* https://www.healthline.com/health/type-2-diabetes/statistics
- Mayo Clinic. (2019). *Pancreas transplant.* https://www.mayoclinic.org/tests-procedures/pancreas-transplant/about/pac-20384783
- Mayo Clinic. (2020a). *Diabetes.* https://www.mayoclinic.org/diseases-conditions/diabetes/symptoms-causes/syc-20371444
- Mayo Clinic. (2020b). *Diabetic ketoacidosis.* https://www.mayoclinic.org/diseases-conditions/diabetic-ketoacidosis/symptoms-causes/syc-20371551
- Mayo Clinic. (2020c). *Gestational diabetes.* https://www.mayoclinic.org/diseases-conditions/gestational-diabetes/symptoms-causes/syc-20355339
- Mayo Clinic. (2020d). *Prediabetes. https://www.mayoclinic.org/diseases-conditions/prediabetes/symptoms-causes/syc-20355278*
- Mayo Clinic. (2020e). *Sample menus for the DASH diet.* https://www.mayoclinic.org/healthy-lifestyle/nutrition-and-healthy-eating/in-depth/dash-diet/art-20047110
- Mayo Clinic. (2021a). *Cholesterol test.* https://www.mayoclinic.org/tests-procedures/cholesterol-test/about/pac-20384601
- Mayo Clinic. (2021b). *Diabetic retinopathy.* https://www.mayoclinic.org/diseases-conditions/diabetic-retinopathy/symptoms-causes/syc-20371611
- Mayo Clinic. (2021c). *High blood pressure (hypertension).*https://www.mayoclinic.org/diseases-conditions/high-blood-pressure/diagnosis-treatment/drc-20373417
- Mayo Clinic. (2021d). *Metabolic syndrome.* https://www.mayoclinic.org/diseases-conditions/metabolic-syndrome/symptoms-causes/syc-20351916
- Mayo Clinic. (2021e). *Peripheral neuropathy.* https://www.mayoclinic.org/diseases-conditions/peripheral-neuropathy/diagnosis-treatment/drc-20352067
- Mayo Clinic. (2021f). *Type 1 diabetes diagnosis.* https://www.mayoclinic.org/diseases-conditions/type-1-diabetes/diagnosis-treatment/drc-20353017
- Mayo Clinic. (2021g). *Type 2 diabetes.* https://www.mayoclinic.org/diseases-conditions/type-2-diabetes/symptoms-causes/syc-20351193
- Mayo Clinic. (2021h). *Type 2 diabetes. Diagnosis. https://www.mayoclinic.org/diseases-conditions/diabetes/symptoms-causes/syc-20371444*
- Medline Plus. (2021a). *Diabetic hyperglycemic hyperosmolar syndrome.* https://medlineplus.gov/ency/article/000304.htm
- Medline Plus. (2021b). *Pancreas transplant.* https://medlineplus.gov/ency/article/003007.htm
- Morr, M. (2018). *Diabetes prevalence by type in the United States: CDC report.* https://www.clinicaladvisor.com/home/topics/diabetes-information-center/diabetes-prevalence-by-type-in-the-united-states-cdc-report/
- National Eye Institute. (2019). *Diabetic retinopathy.* https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/diabetic-retinopathy
- National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). (n.d.). *Diabetic neuropathy.* https://www.niddk.nih.gov/health-information/diabetes/overview/preventing-problems/nerve-damage-diabetic-neuropathies/all-content#section5
- National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). (2018a). *Autonomic neuropathy.* https://www.niddk.nih.gov/health-information/diabetes/overview/preventing-problems/nerve-damage-diabetic-neuropathies/autonomic-neuropathy
- National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). (2018b). *Focal neuropathies. https://www.niddk.nih.gov/health-information/diabetes/overview/preventing-problems/nerve-damage-diabetic-neuropathies/focal-neuropathies*
- National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). (2018c). *Peripheral neuropathy.* https://www.niddk.nih.gov/health-information/diabetes/overview/preventing-problems/nerve-damage-diabetic-neuropathies/peripheral-neuropathy
- National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). (2018d). *Proximal neuropathy. https://www.niddk.nih.gov/health-information/diabetes/overview/preventing-problems/nerve-damage-diabetic-neuropathies/proximal-neuropathy*
- National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). (2018e). *The A1C test & diabetes.* https://www.niddk.nih.gov/health-information/diagnostic-tests/a1c-test?dkrd=/health-information/diabetes/overview/tests-diagnosis/a1c-test#whatis
- National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). (2021f). *Continuous glucose monitoring. https://www.niddk.nih.gov/health-information/diabetes/overview/managing-diabetes/continuous-glucose-monitoring*
- O'Connell, J. M., & Manson, S. M. (2019). Understanding the economic costs of diabetes and prediabetes and what we may learn about reducing health and economic burden of these conditions. *Diabetes Care,* 42(9), 1609-1611. https://doi.org/10.2337/dci19-0017.
- Pagana, K. D., Pagana, T. J., & Pagana, T. N. (2019). *Mosby's diagnostic and laboratory test reference.* Elsevier.
- Rebar, C. R., Heimgartner, N. M., & Gersch, C. J. (Clinical Eds.). (2019). *Pathophysiology made incredibly easy (6th ed.).* Wolters Kluwer.
- Santos-Longhurst, A. (2020). *Type 2 diabetes statistics and facts.* https://www.healthline.com/health/type-2-diabetes/statistics
- Stoppler, M. C. (2018). *Insulin pump for diabetes.* https://www.medicinenet.com/insulin_pump_for_diabetes_mellitus/article.htm#what_is_an_insulin_pump
- Taylor, S. I. (2020a). The high cost of diabetes drugs: Disparate impact on the most vulnerable patients. *Diabetes Care,* 43(10), 2330-2332. https://doi.org/10.2337/dci20-0039. https://care.diabetesjournals.org/content/43/10/2330
- Taylor, S. I. (2020b). *What increases my risk of diabetes?* https://www.webmd.com/diabetes/guide/risk-factors-for-diabetes#1
- Tenderich, A. (2020). *Artificial pancreas: What you should know.* https://www.healthline.com/diabetesmine/artificial-pancreas-what-you-should-know
- The Pancreas Center. (n.d.). *The pancreas and its functions.* https://columbiasurgery.org/pancreas/pancreas-and-its-functions
- University of Michigan Health. (2020). *Laser photocoagulation retinopathy.* https://www.uofmhealth.org/health-library/tf4075
- Willis, L. M. (Clinical Ed.). (2018). *Anatomy & physiology made incredibly easy (5th ed.).* Wolters Kluwer.
- World Health Organization (WHO). (2021). *Diabetes.* https://www.who.int/news-room/fact-sheets/detail/diabetes

Self-Assessment Answers and Rationales

1. The correct answer is A.
Rationale: Prevalence of diagnosed diabetes was highest among American Indians/Alaska Natives (14.7%), people of Hispanic origin (12.5%), and non-Hispanic blacks (11.7%), followed by non-Hispanic Asians (9.2%) and non-Hispanic whites (7.5%).

2. The correct answer is C.
Rationale: The endocrine function of the pancreas focuses on hormone secretion. The endocrine cells of the pancreas are islet cells, or islets of Langerhans. These islet cells exist as clusters of cells that are scattered among the acinar cells. They consist of alpha, beta, and delta cells.

3. The correct answer is A.
Rationale: Pregnant women not previously found to have diabetes should be tested for gestational diabetes mellitus at 24-28 weeks of gestation.

4. The correct answer is D.
Rationale: Smoking is a significant risk factor for the development of type 2 diabetes and makes the disease harder to control after its development. Smokers are 30% to 40% more likely to develop type 2 diabetes than nonsmokers. People who smoke are more likely than nonsmokers to have trouble managing the disease.

5. The correct answer is D.
Rationale: Infections and illnesses can cause the body to produce higher levels of adrenaline or cortisol, both of which are antagonistic to insulin. Common conditions that trigger DKA are pneumonia and urinary tract infections.

6. The correct answer is C.
Rationale: This test can be performed at any time of day when severe diabetic symptoms develop. Diabetes is diagnosed when the blood glucose is >200 mg/dL.

7. The correct answer is A.
Rationale: Inhaled insulin is contraindicated in patients with chronic lung disease and is not recommended in patients who smoke or who recently stopped smoking.

8. The correct answer is B.
Rationale: Administer tetanus, diphtheria, pertussis (TDAP) to all adults with a booster every 10 years. All adult pregnant women should have an extra dose of this vaccine.

9. The correct answer is A.
Rationale: Damage to the nerves of the cardiovascular system adversely affects the body's ability to adjust blood pressure and heart rate. This can lead to orthostatic hypotension, dizziness, lightheadedness, or fainting.

10. The correct answer is B.
Rationale: Diabetic nephropathy does not produce symptoms in its early stages. Therefore, testing urine for the presence of albumin is very important so that kidney damage can be detected as soon as possible. Early kidney damage may be reversed

Course Code: ANCCCA05DM

Ethics and Moral Distress for Healthcare Professionals

4 Contact Hours

Release Date: April 28, 2021 **Expiration Date:** May 5, 2024

Faculty

Cheryl M. Lindy, PhD, RN-BC, NEA-BC, is an independent nursing consultant. She received her bachelor's degree with a major in nursing from the College of St. Teresa, Winona, Minnesota. Her master's degree is from Texas Woman's University, Denton, Texas, with a focus in medical surgical nursing and nursing education. She received her PhD in nursing science from Texas Woman's University, Denton, Texas. She has over 45 years of experience in the acute care setting. She has worked in various roles from staff nurse to administrative director of education, research, and professional practice. She is certified in professional nursing development and as a nursing executive, advanced by the American Nurses Credentialing Center. She has been involved in staff education for over 40 years.

Cheryl M. Lindy has disclosed that she has no significant financial or other conflicts of interest pertaining to this course.

Peer Reviewer: Michelle Doran, RN, DPN, NPD-BC, has 25 years of nursing experience in clinical and leadership administrative roles. She has extensive experience in writing and editing for publication and has written several continuing education courses on the topic of ethics. Ms. Doran served on the Ethics Advisory Board when she was the pediatric program director at Spaulding Rehabilitation Hospital in Boston, Massachusetts. She currently works in nursing professional development at Massachusetts General Hospital in Boston. She has a bachelor's degree in nursing from The Johns Hopkins University School of Nursing, a master's degree from Regis College, and a doctorate in nursing practice from the George Washington University School of Nursing.

Michelle Doran has disclosed that she has no significant financial or other conflicts of interest pertaining to this course.

Course overview

According to Jones-Bonofiglio (2020), healthcare professionals may experience moral distress when decisions are made to address an ethical dilemma that cannot be implemented, a sense of being required to act, or are not consistent with ethical practices. Several factors contribute to an individual's experience of moral distress. Negative consequences may result if interventions are not initiated to enable the individual to overcome moral distress. Studies have identified that healthcare professionals often do not believe they are prepared to address ethical dilemmas that could lead to care needs not being meet and moral distress in the healthcare professional (Milliken, 2018). The purpose of this course is to provide the learner information about ethical principles that guide practice, present factors that contribute to moral distress, and provide strategies to manage moral distress. The course is applicable to all healthcare professionals. This course will provide the learner with an overview of ethics, ethical principles, and moral distress. Learning activities will include self-assessment questions, nursing considerations, evidence-based practice highlights, and a case study including questions and discussion to apply the information presented.

Learning objectives

After completing this course, the learner will be able to:

- Compare and contrast ethical decision-making models.
- Explore the Nursing Code of Ethics.
- Describe factors that may result in moral distress.
- Identify signs and symptoms of moral distress.
- Analyze the costs of moral distress.
- Examine actions to take to recover from moral distress.
- Select strategies to prevent or minimize moral distress.

How to receive credit

- Read the entire course online or in print which requires a 4-hour commitment of time.
- Complete the self-assessment quiz questions which are at the end of the course or integrated throughout the course. These questions are NOT GRADED. The correct answer is shown after you answer the question. If the incorrect answer is selected, the rationale for the correct answer is provided. These questions help to affirm what you have learned from the course.
- Depending on your state requirements you will be asked to complete either:
  - An affirmation that you have completed the educational activity.
  - A mandatory test (a passing score of 70 percent is required). Test questions link content to learning objectives as a method to enhance individualized learning and material retention.
- If requested, provide required personal information and payment information.
- Complete the MANDATORY Course Evaluation.
- Print your Certificate of Completion.

CE Broker reporting

Colibri Healthcare, LLC, provider # 50-4007, reports course completion results within 1 business day to CE Broker. If you are licensed in Arkansas, District of Columbia, Florida, Georgia, Kentucky, Michigan, Mississippi, New Mexico, North Dakota, South Carolina, or West Virginia, your successful completion results will be automatically reported for you.

Accreditations and approvals

Colibri Healthcare, LLC is accredited as a provider of nursing continuing professional development by the American Nurses Credentialing Center's Commission on Accreditation.

Individual state nursing approvals

Colibri Healthcare, LLC is accredited as a provider of nursing continuing professional development by the American Nurses Credentialing Center's Commission on Accreditation. In addition to states that accept courses offered by ANCC accredited Providers, Colibri Healthcare, LLC is an approved Provider of continuing education in nursing by: Alabama Board of Nursing, Provider #ABNP1418 (valid through February 5, 2025); Arkansas State Board of Nursing, Provider #50-4007; California Board of Registered Nursing, Provider #CEP17480 (valid through January 31, 2024); California Board of Vocational Nursing and Psychiatric Technicians (LVN Provider # V15058, PT Provider #V15020; valid through December 31, 2023); District of Columbia Board of Nursing, Provider #50-4007; Florida Board of Nursing, Provider #50-4007; Georgia Board of Nursing, Provider #50-4007; Kentucky Board of Nursing, Provider #7-0076 (valid through December 31, 2023; CE Broker provider #50-4007). Michigan Board of Nursing, Provider #50-4007; Mississippi Board of Nursing, Provider #50-4007; New Mexico Board of Nursing, Provider #50-4007; North Dakota Board of Nursing, Provider #50-4007; South Carolina Board of Nursing, Provider #50-4007; and West Virginia Board of Registered Nurses, Provider #50-4007. This CE program satisfies the Massachusetts States Board's regulatory requirements as defined in 244 CMR5.00: Continuing Education.

Activity director

Lisa Simani, MS, APRN, ACNP, Nurse Planner

Disclosures

Resolution of conflict of interest
In accordance with the ANCC Standards for Commercial Support for continuing education, Colibri Healthcare, LLC implemented mechanisms prior to the planning and implementation of the continuing education activity, to identify and resolve conflicts of interest for all individuals in a position to control content of the course activity.

Sponsorship/commercial support and non-endorsement
It is the policy of Colibri Healthcare, LLC not to accept commercial support. Furthermore, commercial interests are prohibited from distributing or providing access to this activity to learners.

Disclaimer

The information provided in this activity is for continuing education purposes only and is not meant to substitute for the independent medical judgment of a healthcare provider relative to diagnostic and treatment options of a specific patient's medical condition.

Course verification

All individuals involved have disclosed that they have no significant financial or other conflicts of interest pertaining to this course. Likewise, and in compliance with California Assembly Bill No. 241, every reasonable effort has been made to ensure that the content in this course is balanced and unbiased.

INTRODUCTION

Ethics are the principles that guide behavior and conduct (Fowler, 2015). In 1984, Jameton first defined the concept of moral distress in a book titled Nursing Practice, the Ethical Issues as "the experience of knowing the right thing to do while being in a situation in which it is nearly impossible to do" (Jameton, 2017, p. 617). This definition was driven by nurses describing clinical situations based on ethical concerns while delivering compassionate care. Moral distress is experienced by all members of the interprofessional healthcare team – from students to those in varying levels of leadership (Jones-Bonofiglio, 2020). Since first identified, healthcare professionals continue to be challenged by ethical issues without viable actions to take. Ethical issues arise in every practice setting for variable reasons ranging from patient care to work environments to family situation. Examples include end-of-life or futile care, family decision making on behalf of patients that are not aligned with the patient's wishes and working without adequate resources (American Association of Critical Care Nurses [AACN], 2020a). Jones-Bonofiglio (2020) indicated that, in addition to clinical situations, moral distress may result from internal and external factors. Internal factors include lack of confidence, fear, and personal safety concerns. Work environment, fiscal pressures, poor communication, and lack of support are examples of external factors.

The resulting moral distress is a psychological response that negatively impacts physical health (Bressler et al., 2017). Some suggest there is a relationship between moral distress, compassion fatigue, and burnout. Each of these responses is a result of work situations. If not addressed, each response could lead to attrition and a negative impact on patient outcomes (Jones-Bonofiglio, 2020).

According to Zuzelo (2020), there are inconsistent methods to identify the reactions one experiences with moral distress. Furthermore, educational activities have not adequately prepared healthcare professionals to address ethical situations, to recognize and manage moral distress, to effectively communication and advocate for patients, and to use strategies to prevent or minimize moral distress (Rushton et al., 2021).

ETHICS

Ethics is defined as "moral principles that control or influence a person's behavior" (Oxford Learner's Dictionaries, 2021). Ethics guides behavior and is "what you do, how you do it, who you are, and who you become during and after experiences" (Jones-Bonofiglio, 2020, p. 89). Ethical awareness is needed for a healthcare professional to recognize an ethical issue (Milliken, 2018). To develop ethical awareness requires knowing the virtues and obligations of the profession. This enables healthcare professionals to act or decide what action not to take to assure safe and ethical care is provided. Ethical issues and decisions

regarding actions to take are framed by several factors, including context, relationships, and culture (Jones-Bonofiglio, 2020).

Professional organizations and employers provide education and resources on ethics and ethical decision-making using case discussions, written information, and expert individuals. The goal is to assist individuals in addressing ethical dilemmas that may confront them. An ethical dilemma is a situation requiring the individual to choose between conflicting actions or equally unacceptable actions (Morley & Ives, 2017). Several models are available to guide ethical decision making.

Ethical decision-making models

The Nursing Process

This model is familiar to nurses. It is part of daily practice. Assessment data are collected and analyzed about the ethical situation, including those individuals involved; patient's health status, values, and beliefs; and other relevant information. Based on clinical judgment, a diagnosis is made considering conflicts between obligations and values. Actions to take that are appropriate for the patient and family are planned in accordance with the agency's policies. The plan that may include other members of the healthcare team is implemented. The outcome of the plan is evaluated to determine effectiveness of the actions taken. Modifications are made as needed (Fowler, 2015).

Ethical Principlism

When making ethical decisions, ethical principlism is the model most often used. In 1976, this decision-making model was in the Belmont Report to address ethical issues found in research conducted on human subjects (Fowler, 2015). The key principles in this decision-making process are autonomy, beneficence, nonmaleficence, and justice. Autonomy is the right to choose. Regarding ethics, the patient's preferences are respected. Beneficence is duty to do good and assure the actions benefit the patient. To assure no harm occurs is nonmaleficence and considers the patient's quality of life. Justice is providing fair and equitable treatment (Pugh, 2017). These four principles provide a foundation to develop goals for patient care (Milliken, 2018).

Ethic of Care

The relationship between the care provider and the recipient of care is the framework for the ethic-of-care model. There are four phases in the model: caring about, taking care, care giving, and care receiving (Fowler, 2015). Concepts associated with this model are compassion, empathy, concern for others, and caring for others. The nurse recognizes care needed through assessment and addresses the needs. As the nurse is responsible for determining the action to take to meet the patient's needs, consideration is given to the environment in which the care is provided and the family, healthcare team, and involved organizations. The care is culturally appropriate and designed for the individual patient. The nurse provides competent care based on knowledge and skills. The patient responds to the care received and validates that the care was needed. With the framework of the care provider and care recipient relationship, some recognition of this model for decision making has been achieved in nursing (Fowler, 2015) and has been introduced in the social work literature (Reamer, 2016).

The ethical decision-making model used to address issues is decided by the agency. An ethics committee, bioethicist, or resource individuals will establish processes to provide consultative services to healthcare team members, patients, and families as needed regarding ethical issues (Porter-O'Grady & Malloch, 2016).

Code of ethics

Most professions have a code of ethics that is based on the profession's values and is used to guide the practice of members. Discipline-specific codes of ethics are available from these associations:

- American Nurses Association *(https://www.nursingworld.org/practice-policy/nursing-excellence/ethics/code-of-ethics-for-nurses/)*
- American Association of Respiratory Care *(https://www.aarc.org/wp-content/uploads/2017/03/statement-of-ethics.pdf)*
- American Medical Association *(https://www.ama-assn.org/sites/ama-assn.org/files/corp/media-browser/principles-of-medical-ethics.pdf)*
- National Association of Social Workers *(https://www.socialworkers.org/About/Ethics/Code-of-Ethics/Code-of-Ethics-English)*
- American Physical Therapy Association *(https://www.apta.org/apta-and-you/leadership-and-governance/policies/code-of-ethics-for-the-physical-therapist)*
- Occupational Therapy Code of Ethics *(https://doi.org/10.5014/ajot.2020.74S3006)*

Each of these codes describes the professional's responsibilities to the patient/client, to the interprofessional healthcare team, and to themselves for continuing education and competence. The code of ethics for nurses will be used to demonstrate how the code serves as a reference to guide nurses through ethical analysis and decision making.

The Nine Provisions of the Nursing Code of Ethics

Provision 1. "The nurse practices with compassion and respect for the inherent dignity, worth, and unique attributes of every person" (Fowler, 2015, p. 1). This provision addresses the concepts of compassion and human dignity. Nurses demonstrate compassion through caring behaviors such as active listening, being present, and working to relieve suffering. Through the code, nurses are expected to respect, protect, and preserve human dignity in all practice settings. This is not limited to patients and their families, but it includes colleagues, students, and the community (Fowler, 2015).

Provision 2. "The nurse's primary commitment is to the patient, whether an individual, family, group, community, or population" (Fowler, 2015, p. 25). This provision centers on the relationship with the patient and is linked to the ethic-of-care decision-making model. Although the nurse's primary commitment is to the patient, it must be remembered that the nurse has other commitments that may conflict with the commitment to the patient. Other commitments are to their employer, their own family, care of themselves, and the profession (Fowler, 2015). Conflicts may arise, but the focus should remain on the nurse-patient relationship, keeping in mind the needs of the patient. Collaboration with the healthcare team to meet the patient's needs is paramount. Professional boundaries are addressed in this provision with a discussion of maintaining a therapeutic nurse-patient relationship.

Provision 3. "The nurse promotes, advocates for, and protects the rights, health, and safety of the patient" (Fowler, 2015, p. 41). In this provision patient safety is stressed and includes confidentiality of patient information, protection of those participating in research, promotion of a culture of safety, and recognition of impaired nurses. Ethical principlism is the decision-making model aligned with this provision (Fowler, 2015).

Provision 4. "The nurse has authority, accountability, and responsibility for nursing practice; makes decisions; and takes action consistent with the obligation to promote health and to provide optimal care" (Fowler, 2015 p. 59). One must remember accountability and responsibility are not the same thing. Accountability is being liable for actions or inactions one has or has not taken; responsibility is having the duty to do the work (Porter-O'Grady & Malloch, 2016). A core principle of practice is the duty of care, which is based on legal, professional, and personal

obligations (Sheahan & Lamont, 2020). Actions taken are to be based on current evidence guided by clinical judgment, professional standards, and the code of ethics. Authority for nursing practice is given through laws, the employing agency, and the current state of the art and science of nursing (Fowler, 2015). This provision addresses delegation and references the American Nurses Association (ANA) and National Council of State Boards of Nursing (NCSBN) joint statement on delegation. With the complexities of patient care and the increased workload, the nurse must have the skills to assign, delegate, and supervise activities of others. The delegated activity must be within the delegatee's position description and the delegatee must have the skills and competencies to perform the activity. State nurse practice acts delineate what tasks a registered nurse may delegate (ANA & NCSBN, 2019).

Provision 5. "The nurse owes the same duties to self as to others, including the responsibility to promote health and safety, preserve wholeness of character and integrity, maintain competence, and continue personal and professional growth" (Fowler, 2015, p. 73). Nurses are responsible to themselves to act to maintain and promote their health and well-being. The value of integrity is required. Ongoing professional growth and development are expected to maintain competence and promote improvement in care provided (Fowler, 2015).

Provision 6. "The nurse, through individual and collective effort, establishes, maintains, and improves the ethical environment of the work setting and conditions of employment that are conducive to safe, quality healthcare" (Fowler, 2015, p. 95). This provision considers the environment in which the nurse practices. The environment must support the nurse's ability to meet their moral obligations within the framework of the principles of autonomy, beneficence, nonmaleficence, and justice. Environmental factors such as policies, procedures, and working conditions must be in place to achieve a culture of excellence (Fowler, 2015). The ANA Nurse's Bill of Rights delineates a work environment that protects the dignity and autonomy of the nurse.

Provision 7. "The nurse, in all roles and settings, advances the profession through research and scholarly inquiry, professional standards development, and the generation of both nursing and health policy" (Fowler, 2015, p. 113). In this provision, nurses are directed to pursue scholarly inquiry that could include reviewing current literature, working on evidence-based practice projects, or being involved in nursing research. Nurses are obligated to know the professional standards that govern their practice. Nurses should be involved in the development of organizational policies and participate in activities to improve the outcomes associated with nurse-sensitive indicators (Fowler, 2015).

Provision 8. "The nurse collaborates with other health professionals and the public to protect human rights, promote health diplomacy, and reduce health disparities" (Fowler, 2015, p. 129). Health is viewed as a universal right. Nurses are directed to work with other healthcare professionals to achieve this at the local, regional, national, or international level by addressing equitable access and reducing health disparities (Fowler, 2015).

Provision 9. "The profession of nursing, collectively through its professional organizations, must articulate nursing values, maintain the integrity of the profession, and integrate principles of social justice into nursing and health policy" (Fowler, 2015, p. 151). Nurses are called upon to join together with their professional organizations to uphold the values of nursing and maintain the integrity of the profession. Through professional organizations, members have a platform to voice concerns about social injustice and support social change (Fowler, 2015).

It should be remembered that the code of ethics articulates the values of the nursing profession. The accountabilities and responsibilities of nurses related to the patient, the family, self, other healthcare professionals, employing agency, and local and global communities are noted. With the code of ethics, the nurse is able to navigate ethical situations.

Agencies should have resources and processes to enable healthcare staff, patients, and family members to discuss ethical issues. These resources may include an ethics committee, an ethics consultation team, an ethicist, chaplains, a palliative care service, and Schwartz Rounds (Hamric & Wocial, 2016). The resources must be available to all shifts 7 days a week. The resource individuals not only need to understand ethical principles, but also possess excellent communication skills and an understanding of clinical practice. All healthcare staff should be empowered to access the ethics resources without fear of reprisal from other members of the care team (Hamric & Wocial, 2016). This can be facilitated though administrative support and ongoing education addressing ethical issues and ethical decision making.

Self-Assessment Quiz Question #1

There have been some staff changes in the department, which have resulted in one of the senior members bullying the newer staff. You are one of the senior members of the staff with comparable experience and tenure of the senior member who is bullying the newer staff. What action should you take?

a. Report the behavior to your manager and have them address the issue.
b. Ignore the behavior until it is directed toward you.
c. Meet with other senior staff members discuss the unacceptable behavior with the individual.
d. Have a private conversation with the individual expressing how the behavior is making you feel.

Self-Assessment Quiz Question #2

A young child sustained a closed head traumatic brain injury from a car accident. After performing the needed EEGs to determine brain function based on state law, the child was declared brain dead. The medical team has met with the family to discuss the removal of life support. The family disagrees with the decision, believing that God's will determines life and death. The nurse feels "in the middle" in this situation, knowing the evidence but also experiencing the suffering of the family. The mother asks, "What would you do?"

a. Share your opinion, being sensitive to the mother's response.
b. Ignore the mother's question.
c. Talk with your religious adviser regarding what to do.
d. Empathize with the mother regarding the difficult decision she is facing. Offer a consultation with resources available in the agency such as the ethics committee, the ethics consultative services, or a chaplain.

Self-Assessment Quiz Question #3

A previous patient from years ago at a different agency is interviewing for a position in your department. You know this person has had a history of substance abuse and are concerned the person may not be able to manage the workload, stress, and pace of the department. You are not involved in the hiring process. What should you do?

a. Do not interfere.
b. Approach the candidate and discuss the workload, stress, and pace of the department.
c. Tell the hiring manager what you know of the individual's past.
d. Ask one of your coworkers what to do.

Self-Assessment Quiz Question #4

Because of the COVID-19 pandemic and the surge in patients admitted to the hospital, travel nurses have been brought in to provide care to cover for staff who are out ill. As the charge nurse, what is your responsibility for patient assignments made to the travel nurses on your shift?

a. Assess the travel nurses' skills before making assignments.
b. Split the patients evenly among the staff assigned to the shift without considering skills of the nurses and the patients' needs.
c. Assign the travel nurse those patients that require less care.
d. Assign the travel nurse those patients requiring more care to give the unit staff a break.

Nursing consideration: Reflect on how your discipline-specific code of ethics applies to your everyday practice.

MORAL DISTRESS

Moral distress occurs when one perceives that the action or inaction is an undesirable compromise in one's values, responsibilities, and/or obligations (Jones-Bonofiglio, 2020) or a threat to one's integrity (Carse & Rushton, 2017). Moral distress is the manifestation of concern experienced when one senses one is not being faithful to one's commitments (Carse & Rushton, 2017). It challenges an individual's sense of moral agency, which is the responsibility, readiness, and ability to act (Jones-Bonofiglio, 2020). There is a relationship between an ethical situation and the occurrence of emotional distress that results in moral distress (Morley, 2018). Not all ethical issues result in moral distress. For moral distress to occur when confronting an ethical issue, the individual feels their moral obligations have been compromised and the individual experiences a "crisis of conscience" (Dudzinski, 2016). It may result when decisions are made to resolve an ethical dilemma that cannot be implemented or are not consistent with ethical principles. Morally challenging events may lead to moral distress, but not all individuals develop moral distress when exposed to the same ethical dilemma (Fourie, 2017). The development of moral distress is influenced by an individual's values, beliefs, education, and experiences. Moral distress is closely related to an individual's involvement in an event or situation and may be caused by system barriers to ethical practice (Epstein et al., 2020; Jones-Bonofiglio, 2020). Moral distress may result in physical, emotional, cognitive, or behavioral response because of unmet professional accountabilities and responsibilities.

Moral uncertainty may be associated with moral distress, which is not being certain how to proceed when confronted with an ethical dilemma (Jones-Bonofiglio, 2020). This could be attributed to not fully understanding the ethical dilemma and not trusting in one's own judgment. Moral uncertainty is an internal conflict with outcomes such as silence, negative emotions, indifference, and powerlessness.

Moral stress is generated when healthcare professionals are sensitive to ethical dilemmas (Jones-Bonofiglio, 2020). With the use of ethical decision-making processes, actions to take are determined, or more challenging events may require consultation with the ethics committee or an ethicist (Zuzelo, 2020). The right actions or those that cause the least harm are taken to mitigate the situation and the duty of care has been met. There is no lingering effect on the healthcare provider, which differentiates moral stress from moral distress.

Observable justifiable anger or frustration is moral outrage that occurs when one believes there has been a violation of ethical standards (Rushton & Thompson, 2020). Ungrounded moral rage is a strong impulsive emotional response such as anger without defining the ethical issue or principle that has been violated. Principled moral outrage occurs when one has defined the ethical issue and responds with empathy and compassion, which may lead one to the use of an ethical decision-making model preventing moral distress (Jones-Bonofiglio, 2020).

All professionals on the healthcare team may experience moral distress in various practice settings, including acute care and community care (Fourie, 2017; Jones-Bonofiglio, 2020). A study was conducted with 134 critical care staff and 116 staff from a step-down unit. The staff included 64 nurses, 128 nurse technicians, and 57 respiratory therapists. Thirty-three physicians provided care to patients in both the critical care and step-down unit. All groups scored a high level of moral distress with no significant differences between the two groups (Fumis et al., 2017). Some studies have found nurses have a higher incidence of moral distress than physicians have, and critical nurses experience more moral distress than noncritical care nurses do (Epstein et al., 2020).

Evidence-based practice! A study regarding moral distress experienced in critical care units involved 428 nurses, 211 other nonphysician healthcare providers (profession not noted), and 30 physicians. It was found that the nurses and the other nonphysician healthcare providers had higher levels of moral distress than the physicians had (Dodek et al., 2016).

Evidence-based practice! A systematic review of the literature investigated moral distress in the neonatal and pediatric intensive care units. Of 13 studies identified, 6 included other members of the interprofessional team in addition to nurses. It was found that moral distress was attributed to the powerlessness staff were experiencing as the result of the use of technology that was not viewed as beneficial to the patient (Prentice et al., 2016).

Measuring moral distress

Instruments have been designed to measure moral distress. They include Moral Distress Scale, the Measure of Moral Distress for Healthcare Professionals, and Moral Distress Thermometer (Epstein et al., 2020).

Moral Distress Scale and the Moral Distress Scale Revised
The Moral Distress Scale was a 32-item scale developed to study moral distress among critical care nurses in end-of life situations (Epstein et al., 2020). When the instrument was revised in 2012, it became known as the Moral Distress Scale Revised (MDS-R). The revision made the scale applicable to noncritical care nurses and other healthcare professionals. The scale included items to capture the root causes of the moral distress (Epstein et al., 2020). The instrument has 21 items designed to collect the frequency and intensity of moral distress (Hiler et al., 2018).

Measure of Moral Distress for Healthcare Professionals
When the MDS-R instrument was revised again, it was renamed the Measure of Moral Distress for Healthcare Professionals (MMD-HP). The revisions were based on root causes of moral distress identified during the review of literature. The instrument includes 27 items. The participants rank the frequency and intensity of their moral distress for each item. During analysis, the frequency and the intensity are multiplied for each item and then totaled. This provides a composite moral distress score of 0 to 432 (Latimer et al., 2021).

Moral Distress Thermometer

The Moral Distress Thermometer (MDT) was developed by Wocial and Weaver in 2013 to measure short-term episodes of moral distress. The participants are directed to reflect on their current level of moral distress as it relates to their practice. The graphic representation of a thermometer has a scale of 0 to 10 with statements noted beside each degree. None is noted at 0 and worst possible noted at 10 (Powell et al., 2018). It has been found beneficial as an instrument to measure moral distress before and after an intervention to demonstrate effectiveness of the intervention (Epstein et al., 2020).

Causes of Moral Distress

Jones-Bonofiglio (2020) described moral distress as "a lens that can reveal ethical issues present in healthcare environments and the challenges of responding to these issues" (p. 1). Moral distress can be caused by clinical situations such as futile care without considering relief of suffering, internal factors such as lack of confidence, and external factors such as the work environment and ethical climate (Jones-Bonofiglio, 2020). Moral distress has been found to increase as medical interventions became more aggressive as the patient neared death (Browning & Cruz, 2018). A clinical situation causing moral distress for some was what they referred to as "being in the middle." This was in reference to feeling between the patient's wishes and the family's wishes for care or the care decisions of the physician. Another example is what the healthcare professional deems is the best care for the patient, but agency policies and procedures or doctors' orders prevent the best action to be taken (Sabin, 2017).

Other causes of moral distress caused by the sense of not being able to meet duty-of-care obligations have been identified as follows:

- Diminished self-confidence or decreased sense of moral agency (Rushton, 2016).
- Demanding pace of the work hindering duty of care obligations (Epstein, et al., 2020).
- Increased workloads with unsafe staffing levels (Epstein et al., 2020; Howe, 2017).
- Working with colleagues not competent to meet the complex needs of the patients (Howe, 2017).
- Witnessing an informed patient consent when the patient was left without a choice (Howe, 2017).
- Ineffective interprofessional communication (Epstein et al., 2020).
- Unable to meet care needs because of lack of financial resources (Olsen & Kellman, 2020).
- Agreeing with a decision or plan of action that one really did not agree with (Dudzinski, 2016).
- Not feeling they added value or that their opinions are not valued by others on the healthcare team (Epstein et al., 2020).
- Perceived unethical practices in the environment (Morley, 2018).

Evidence-based practice! A study was designed to examine the relationship between the left ventricular assisted device (LVAD) coordinator role and moral distress. An on-line questionnaire was sent to 36 LVAD coordinators that included questions about role, responsibilities, and any formal training regarding palliative care, turning off the LVAD, and formal VAD training. The MMD-HP was included to measure moral distress that was within the average range. Moral distress was higher when the family wanted aggressive treatment to continue (Latimer et al., 2021).

Nursing consideration: An example of the lack of financial resources is seen in undocumented immigrants with end-stage renal failure who are covered by Medicare but are unable to receive dialysis until emergent criteria are met, such as dangerously high potassium, ECG dysrhythmias, or symptoms of uremia (Olsen & Kellman, 2020). What other examples of lack of financial resources have you seen in your practice that have resulted in negative patient outcomes and moral distress?

Acute Care and Moral Distress

Moral distress was first studied in the 1990s to determine the frequency and intensity of moral distress among critical care nurses. Recent studies have found that moral distress is present in all acute care settings related to technology, end-of-life care, collaboration, and high-stress environments (Jones-Bonofiglio, 2020). Findings of studies have demonstrated that moral distress frequency increases with age, experience, and direct patient care, but it decreases with empowerment, continuing education, and collaboration (Jones-Bonofiglio, 2020).

With nurses being the closest to the patient's suffering, they often see themselves between the patient's wishes and those of their family or the physician's plan. This dissimilarity in the point of view and the perception of the situation is known as the depth of field dissimilarity (Bressler et al., 2017). The conflict between the points of view and perceptions may contribute to moral distress in all those involved.

Advances in technology to prolong life have added to moral distress experienced by healthcare professionals. Families may request all interventions and measures be taken to preserve the lives of their loved ones. The ethical dilemma is: "Not can we, but should we? Is it right to prolong life at all costs?" (Jones-Bonofiglio, 2020, p. 59).

Social workers who work in acute care settings are often confronted with complex patient situations that could result in moral distress. However, little research has been conducted to determine the degree of moral distress social workers experience. It is uncertain what causes their moral distress. According to Fantus and colleagues (2017), some roles, responsibilities, and the work environment of the social worker have a potential to contribute to moral distress. This may include addressing patient/family dynamics, maintaining confidentiality and professional boundaries, managed care, discharge planning, preserving patient autonomy while being aware of specific safety issues, lack of administrative support, inadequate staffing, increased paperwork, and work that conflicts with personal values.

There have been multiple examples of studies in the acute care setting examining the causes of moral distress. Some are discussed below.

In a national study, the MDS-R was administered to 328 critical care nurses; 56% showed moderate moral distress. Higher levels of moral distress were identified when the nurses perceived that the care they were providing was futile. The highest level of moral distress was related to situations when the nurse thought continued care was not beneficial, but the patient or family wished to continue life support (Hiler et al., 2018).

Some 288 critical care nurses participated in a national survey using the MDS-R to evaluate moral distress, empowerment, ethical climate, and access to palliative care. Moral distress was found negatively correlated to empowerment and an ethical climate. Moral distress was higher in nurses who had access to a palliative care team. This was related to insufficient collaboration and integration of the palliative care team with the other members of the healthcare team providing care to patients in the unit (Altaker et al., 2018).

The MDS-R was used in a study exploring the moral distress of 93 inpatient oncology nurses. The level of moral distress was between low and moderate. Following family wishes for care although not beneficial to the patient, observing a healthcare

provider giving false hope, and providing life-saving treatments that prolong life were three scenarios that were seen as causing the most moral distress (Marturano et al., 2020).

A qualitative study examined the nurses' experience in working on a unit providing care to chronic ventilator-dependent Orthodox Jewish patients. There were 27 participants. Their moral distress response to the futility of care they were providing was framed by the individual's worldview, education, and experience (Bressler et al., 2017).

Moral distress in the acute care setting is often linked to relationships with patients, families, and other healthcare professionals. The work environment –which includes staffing, technology, and the stress level in the setting – may also contribute to moral distress.

Community-Based Care and Moral Distress

Moral distress occurs in community-based care settings, which include schools, public health, academia, primary care clinics, home health, nursing and residential care homes, and correctional facilities. Limited studies have been conducted on moral distress in these areas of practice (Jones-Bonofiglio, 2020).

Two studies examined the causes of moral distress in community-based nurses.

There were 264 school nurses who responded to a survey using the Moral Distress Thermometer to measure their moral distress. The majority of the respondents were assigned to more than one school with the responsibility for more than 900 students. Some 25% recorded "greater than distressing to worst possible" on the thermometer. The scores were attributed to workload, the inability to provide care because of time constraints, and not enough time to provide care to students with chronic illnesses (Powell et al., 2018).

A qualitative study explored the nurse practitioners' moral distress in the continuing care setting, which could be the patient's home, a supportive living facility, or a long-term care facility. Six nurse practitioners participated in semistructured interviews in which they were asked to describe their experiences with moral distress. Causes of moral distress were attributed to meeting the patients' complex care needs, perceptions by others regarding the role of the nurse practitioner, tension between the nurse practitioner and physician, palliative care resources unavailable, and agency policies that were not aligned with professional responsibilities (Ritchie et al., 2018).

The identified causes of moral distress in the community-based care providers are similar to those causes experienced by acute care providers. They include patient care needs, relationships, conflicting responsibilities, and collaboration with other healthcare professionals.

Self-Assessment Quiz Question #5

Which of the following is NOT considered a possible cause of moral distress?

a. Providing futile care.
b. A new attendance policy.
c. New technology that the healthcare provider is not competent using.
d. Ineffective healthcare team communication.

Recognizing moral distress

Moral distress affects one's emotions (Dudzinski, 2016). The emotional response seen in those with moral distress may include anger, anxiety, frustration, guilt, hopelessness, irritation, isolation, depression, and powerlessness. Physical symptoms may occur during moral distress that could include gastrointestinal issues, insomnia, headaches, muscle aches, physical exhaustion, and nightmares (AACN, 2020b). There may be feelings that threaten one's moral integrity such as feeling belittled, unimportant, or unintelligent (Epstein et al., 2020). Additionally, changes in behavior may be observed such as impaired thought processes, withdrawal, and anger directed at others (Rushton, 2016). Cognitive and behavioral responses may include addressing the basic care needs and avoiding being engaged in more complicated and individual care needs of a patient (Bressler et al., 2017).

If one has any of these symptoms while being confronted with an ethical dilemma, a self-assessment needs to identify and acknowledge the emotions being experienced (Webster & Wocial, 2020). The next step is to identify the exact source of the moral distress. One should consider if the moral distress is a result of internal constraints, external constraints, or conflicting responsibilities. Possible actions to resolve the moral distress are next identified, followed by a decision on what action should be taken (Dudzinski, 2016). Dudzinki developed a moral distress map with these steps noted to guide the healthcare professional in clarifying the source of the moral distress and possible actions to take.

Consequences of moral distress

There are many negative consequences of moral distress, most notably on one's personal feelings about oneself. A devastating repercussion of moral distress is a feeling of an assault on one's integrity. A sense of powerlessness may also occur (Carse & Rushton, 2017). This can lead to anger and frustration. When an individual expresses their moral distress, others may see them as not being able to manage difficult situations. They are considered "bleeding hearts" and not part of the group. The individual develops a sense of shame for not being able to distance themselves from the situation (Howe, 2017) or are unable to decide how to solve the situation (Carse & Rushton, 2017). Disengagement, lessened responsiveness, and increased hesitancy to act may occur.

If moral concerns are ignored, one develops a sense of not being valued. This may lead to the healthcare provider not being able to voice their concerns about the moral dilemma; consequently, communication is decreased. If voicelessness continues, the sense of isolation increases (Carse & Rushton, 2017). The quality of care could be reduced with the healthcare professional not effectively using their skills and knowledge to make and implement care decisions to achieve desired outcomes.

In addition, the healthcare professional may experience a myriad of emotions and reactions. Some include withdrawal from the care (Carse & Rushton, 2017), humiliation from the feeling of being deficient in meeting obligations (Carse & Rushton, 2017), dissatisfaction with the work environment with a greater intent to leave (Hiler et al., 2018), and decreased productivity (Hiler et al., 2018). Healthcare professionals who experience moral distress may develop the feeling of helplessness, avoid speaking up for patients, become apathetic, or are overly vigilant of patient's needs in morally distressing situations (Epstein et al., 2020). The healthcare team performance may be diminished with attrition, decreased morale, and poor teamwork (Rodney, 2017).

The cost to patient of care was identified in a study exploring the consequences of moral distress (Henrich et al., 2017). There were 56 participants who were interviewed either in a focus group or individually for this qualitative study. The participants represented community and tertiary hospitals and included 19 staff nurses, 4 clinical nurse leaders, 13 physicians, and 20 other healthcare professionals (unidentified profession). Moral distress was noted as negatively impacting patient care in 26 separate situations. It was reported that moral distressing situations required time and attention, which prevented the healthcare provider from being attentive to other assigned patients.

Some reported that they avoided patients and their families in distressing situations where the needed support of the patient and family to manage the situation was not provided, leading to decreased quality of patient care. Others reported that when caring for a patient and family in a distressing situation, they felt they lost focus on what needed to be achieved. After experiencing moral distress, it was reported that some were hesitant to develop meaningful relationships with patients and families because of fear of additional moral distress.

There were 11 responses that indicated moral distress had a positive impact on patient care. It was indicated that there was an increase in vigilance and attentiveness. Errors were avoided, which increased the quality of care. Physicians indicated that moral distress was needed for them to become good doctors. The nurses reported that they became more compassionate (Henrich et al., 2017). The study was inconclusive but provided insight into how healthcare providers viewed the impact of moral distress on patient care.

Moral distress impacts the emotions of the individual, their relationship with other healthcare professionals, and patient care. Morally distressed healthcare professionals are at risk of experiencing burnout, compassion fatigue, and moral residue (Jones-Bonofiglio, 2020).

Burnout

Subsequent events of moral distress may lead to burnout, which is considered the most damaging cost of moral distress (Fumis et al., 2017). "Burnout is defined as a syndrome of emotional exhaustion, depersonalization, diminished personal achievement and disengagement, not as a problem of quality, safety, or satisfaction" (Epstein et al., 2020, p. 147). Physical and mental exhaustion may also be present (AACN, 2020b). Cynicism and decreased productivity may be seen when burnout occurs (Jones-Bonofiglio, 2020). It is thought to be a result of extended exposure to stressful work-related conditions (Christodoulou-Fella et al., 2017).

Evidence-based practice! In the study described above, conducted by Fumis and colleagues (2017) with 283 participants from critical care and a step-down unit, 23.7% of the nurses from step down and 22.1% of the critical care nurses had severe burnout in comparison to the physicians with 18.2% severe burnout.

In the context of burnout and moral distress, mattering refers to adding value to patient care. When one's input into patient care decisions are valued by the healthcare team, the clinician sense of mattering is positive and increases job satisfaction. The reverse is that the input is not valued and seen as not mattering to the team. The outcome may be an increase in moral distress and burnout. Many need confirmation and support of their value. When confirmation and support are not received from other members of the healthcare team, the outcome may result in a sense of isolation, being undervalued, a negative impact on interpersonal relationships, and burnout. The intent to leave a position has been associated with moral distress and burnout (Epstein et al., 2020). There is a shared responsibility among the individual, the healthcare team, and the agency to reduce burnout and moral distress and to increase engagement (Sabin, 2017).

Evidence-based practice! In a survey of more than 500 nurses, physicians, social workers, and therapists, burnout increased when there was a lack of mattering or feeling valued (Epstein et al., 2020).

Compassion Fatigue

The feeling of being powerless may result in moral distress and compassion fatigue (Mason et al., 2014). It is believed to be caused by the collective effect of providing empathetical care to those suffering (Jones-Bonofiglio, 2020). The definition of compassion fatigue is the result of "not being able to act in accordance with one's beliefs and the fear of reliving the stressful traumatic episode" (Mason et al., 2014, p. 217). Compassion satisfaction occurs from helping someone in need during a life-threatening event. If not resolved, the individual becomes withdrawn, less empathetic, and hopeless. For example, a study examined the correlation of moral distress and compassion fatigue in a neonatal intensive care unit (NICU) with 172 nurse participants. The causes of moral distress in the NICU were identified as communication between the parents and other members of the healthcare team, invasive procedures used on dying infants, pain and suffering induced by the procedures, and technology used. The moral distress measured with the MDS was moderate. The total compassion fatigue scores ranged from moderate to high. It was found that compassion fatigue increased as work experience increased. A correlation was found between moral distress and compassion fatigue based on the intensity of the distress experienced (Saleh et al., 2019).

Compassion fatigue is often used interchangeably with secondary trauma. Foli and Thompson (2019) differentiated between the two. Compassion fatigue is an accumulative process that may exceed the nurse's stamina and recuperative abilities. The stress reaction an individual experiences after being subjected to another person's traumatic event is secondary trauma. This is not only knowing about the trauma but also being involved in providing care to the traumatized patient. The healthcare provider experiencing secondary trauma is referred to as the second victim. In a study of 206 mental health nurses, a correlation between moral distress and secondary trauma was found. The study participants with high moral distress scores also had high secondary traumatic stress syndrome scores (Christodoulou-Fella et al., 2017).

Moral Residue

If moral distress is unresolved or continues for an extended period, it is referred to as moral residue (Karakachian & Colbert, 2017). All healthcare professionals are at risk of experiencing moral residue after involvement in a morally distressing situation if not fully resolved (Rosa et al., 2020). Moral residue is a lingering sense that one's moral integrity has been diminished because they allowed themselves to be compromised by others (Lachman, 2016). With repeated exposure to moral distress, a cumulative result of moral distress or crescendo effect may develop that becomes increasingly more intense and difficult to resolve (Jones-Bonofiglio, 2020; Rushton, 2017). There is an activation of previous responses to moral distress such as frustration and powerlessness (Carse & Rushton, 2017). Negative comments made by colleagues have caused some to relapse into unresolved moral distress (Henrich et al., 2017). No research has been conducted on moral residue and the ensuing crescendo effect to develop a better understanding of the phenomenon.

If not addressed, those experiencing moral distress, burnout, compassion fatigue, or moral residue become disengaged in their role and their work with the healthcare team. The retention of qualified healthcare professionals is impacted, leading to patients not receiving the care from skilled, knowledgeable providers to achieve desired outcomes. Moral distress cannot be eliminated because of the complex environment in which healthcare is provided. If addressed, some benefits could be realized (Morley, 2018). Strategies to mitigate and recover from moral distress is important, not only to the quality of care provided, but also to the well-being of the healthcare provider.

Self-Assessment Quiz Question #6

Sally is caring for a 35-year-old patient who is beginning a new round of chemotherapy to treat her Stage 4 ovarian cancer. The patient confides in her that she is tired and wants to die. She does not want the chemotherapy. The last treatment took everything out of her, but her husband and her parents want her to continue on. They have told her that she is everything to them. The medical team sees this treatment as the patient's only hope for survival. This situation is causing Sally to experience moral distress. She feels like she is in middle between the patient's wishes, the family's wishes, and the medical team. What should Sally do?

a. Tell the patient she has an obligation to her family to do everything she can to fight this disease.
b. Empathize with the patient and ask what she thinks could be done to ease the effects of the chemotherapy based on her experience.
c. Discuss this situation with a colleague who has not been involved with the patient's care.
d. Seek guidance from the ethics consultation team at the agency.

Self-Assessment Quiz Question #7

The medical surgical critical care unit nurses are experiencing moral distress. An 80-year-old male patient had surgery for a bowel obstruction. After 7 days they have not been able to wean the patient from the ventilator. He has been unresponsive to commands. The patient has developed septicemia and is not responding to therapies. The family is emotionally upset. When they asked the surgeon what the prognosis was, they were told everything is fine and this is the normal course of treatment for this type of surgery considering the patient's age. This surgeon is the chief of surgery and admits many patients to the agency. An ethics consultation is requested. The ethics consultation team found nothing medically wrong with the care the patient is receiving. The surgeon is making disparaging remarks to the staff when he is making rounds because they reported him to the ethic consultation team. All of the following are appropriate next steps EXCEPT:

a. Consult risk management if there is concern the agency is at risk for legal action.
b. Discuss situation with the chief nursing officer and the chief medical officer.
c. Do nothing more. The surgeon is viewed as one of the leaders in the agency.
d. Provide empathic support to family during this difficult time.

Nursing consideration: Reflect on what are the costs of caring too much and the costs of not caring enough.

Recovery strategies

Insufficient resolution to moral distress has a lingering effect and may lead to an individual with diminished moral resilience that will increase the individual's moral distress (Carse & Rushton, 2017). Coping strategies have been cited to manage emotions, which include discussing the situation with a trusted colleague, pigeonholing the event and attempting to leave the concerns at work, distracting themselves with more work, requesting a change in assignment, increasing exercise, increasing consumption of food and alcohol, and spending more time with loved ones (Henrich et al., 2017). Oncology nurses in a study regarding moral distress reported that they relied on assistance from the palliative consultative team, pastoral care department, and the social work department to help resolve moral distress (Marturano et al., 2020).

Evidence-based practice! A study of nurses and social workers found that 10% of the participants did not access the ethics consult team because they perceived the team to be unqualified to address the ethical issue. Another 7% cited they thought the team made the situation worse (Hamric & Wocial, 2016).

The role of the leader is important in resolving moral distress. An effective leader is sensitive to the work environment and situations when staff are dealing with ethical dilemmas that may lead to moral distress (Carter & Hawkins, 2019). The dilemmas may be related to patient situations, relationships within the healthcare team, or agency policies. The leader needs to be an empathic listener to the challenges the staff are experiencing (Sabin, 2017). Emotional huddles established by the leader with a skilled facilitator leading the discussion provide healthcare providers an opportunity to verbalize and process distressful situations. Acknowledgement by the leader for actions taken by individuals during the situation contributes to recovery (Carter & Hawkins, 2019). It is advisable for the leader to be cognizant of absenteeism when ethical challenges are unfolding on the unit/department. This may be a sign of increasing moral distress. Another sign of impending moral distress is requests for different assignments (Marturano et al., 2020). The leader should advise individuals with moral distress to seek assistance from resources available in the agency. The leader may be instrumental in initiating structured activities to resolve moral distress, such as debriefing, mindfulness, and moral resilience training.

A study investigated how nurse leaders address moral distress. A critical incident questionnaire was developed to gain insight into leaders' perceptions of complex clinical situations. A total of 68 nurse leaders and clinical nurse specialists completed the online questionnaire. Supporting staff during a difficult situation was the most often response to action taken when moral distress was identified. Other actions included education, promoting self-care activities, counseling through the employee assistance program or chaplain service, and encouraging collaboration with other healthcare professionals. Lack of knowledge regarding moral distress and organization barriers were issues that prevented action by the leader. It was identified that, with support from the leader, nurses were able to practice ethically during difficult situations.

Findings from this study and other studies led to the development of the evidence-based SUPPORT model to be used by nurse leaders as an action guide to address moral distress. SUPPORT is an acronym. Each letter stands for a specific action to take, as follows (Pavlish et al., 2016):

S = See it, seek it out.

U = Understand it.

P = Pay attention: Assess workplace climate.

P = Promote receptive environment and engagement.

O = Open opportunities for dialogue.

R = Reflect, evaluate, revise.

T = Transform environment.

Nursing consideration: Reflect on the possibility that you will experience moral distress in the future. What activities or resources described above would you employ to recover from the moral distress?

Debriefing

Debriefing is a process used to gather and share information after an event occurs. The process is facilitated by a person with effective interpersonal and counseling skills who is able to identify participants who may benefit from additional counseling. At the beginning of the discussion, the facilitator identifies the group goals based on the situation. Each participant provides information regarding what happened. The facilitator helps the participants explore their feelings, thoughts, and responses to the situation. Actions to take are discussed and the best action to be implemented is chosen. The moral distress map is an effective tool to use during debriefing (Dudzinski, 2016). Each participant completes a self-assessment to identify emotions experienced, sources of the moral distress, constraints in taking action, conflicting responsibilities, and possible action to take. The facilitator guides the group through the map, with participants sharing their responses. Collectively, the group members determine the actions to take.

Using a similar process of debriefing, a group of investigators explored the feasibility of developing a tool to be used during moral case deliberations. The tool was referred to as a moral compass (Hartman et al., 2019). Moral compass is a metaphor used to depict a perception or feeling of right and wrong. Like a navigational compass, the moral compass points north guiding one to a moral decision. One's moral compass is based on values and norms attained while growing up and is influenced by experiences. The moral compass in the study was designed to enable the user to explore moral concepts of a specific situation. Not all those involved in an ethical situation responded the same based on their norms, values, and perception of the situation. The situation may not have been a moral dilemma for them. At the start of the moral case deliberation, the facilitator asked the participants to describe the ethical questions they had regarding the situation. The first question was "Sometimes, it is not self-evident what the right thing to do is. What is your dilemma?" (Hartman et al., 2019, p. 1017). Using the moral compass, participants responded to the following series of questions regarding the moral dilemma (Hartman et al., 2019):

- What makes this situation difficult for you?
- What is important to you, the patient, other members of the team, and the agency?
- Considering all those involved in the situation, what is important to everyone?
- What action should be taken?
- Are there any disadvantages to the action that will be taken? Is so, is there anything to minimize the disadvantages?

The moral compass tool was found to be easy to use and a facilitator was not needed to guide the process. Actions were not prescribed. However, the user was encouraged to review the situation from different perspectives. The tool was not designed to address organizational or policy issues that may result in moral distress (Hartman et al., 2019). The code of ethics and professional standards of practice serve as a moral compass to further assist healthcare professionals to make morally sound decisions and take appropriate actions (Jones-Bonofiglio, 2020).

Distress debriefings are employed to lessen moral distress that occurs as a result of a critical incident. The session is less than 30 minutes. The session begins with a facilitator stating the ground rules. In the next step, the facilitator asks questions to encourage the participants to share their thoughts and feelings about the situation. The session ends with the facilitator summarizing the distress debriefing and validating the difficulty of the situation discussed. The participants are reminded of additional resources available in the agency to further process the moral distress they are experiencing (Appleton et al., 2018).

Evidence-based practice! A pilot study using the distress debriefings was conducted in the pediatric critical care unit to determine if distress briefings reduced the effects of moral distress and burnout. Groups were limited to 8 participants. There were 52 participants in the distress debriefings who completed the post-course survey. Participants indicated they felt supported and empowered to act. More investigation is needed to identify the impact of distress briefings on moral distress and burnout (Appleton et al., 2018).

Reflective debriefing was a group being led through reflection and debriefing with education. The goal was to decrease moral distress (Browning & Cruz, 2018). A social worker facilitated reflective a debriefing protocol that was developed for use in a critical care unit. There were 42 participants with 23 participating in the intervention of reflective debriefing and 19 in the comparison group. The intervention of the six sessions included self-reflection and learning goals. The reflective debriefing posed 10 questions regarding a recent palliative care or end-of-life situation seen in the unit. Educational handouts were provided to the participants at each session. Topics included signs of moral distress, ethical principles, decision making, AACN 4As (Ask, Affirm, Assess, Act; this is discussed with moral resilience), nonbeneficial care, feelings of powerlessness, and team communication. The MDS-R instrument was used to measure moral distress. Lowered moral distress scores were found in those participating in reflective debriefing (Browning & Cruz, 2018).

Mindfulness

Through mindfulness, the individual intentionally pays attention to the moment and the moral dilemma confronting them without judgment. They become cognizant of the emotional, somatic, and cognitive responses they are experiencing (Rushton et al., 2021). This helps the individual to reduce the negative emotions they may be experiencing and leads to moral resilience. When practicing mindfulness, the triggers resulting in an emotional response are acknowledged (Carse & Rushton, 2017). There is some evidence that demonstrates that mindfulness contributes to patient-centered care, increases patient satisfaction, and improves attentiveness, leading to greater patient safety (Halm, 2017).

Mindfulness is based on seven concepts: nonjudging, patience, beginner's mind, trust, nonstriving, accepting, and letting go (Beer et al., 2020, p. 249). With nonjudging one is aware of thoughts and emotions without judging. Taking time to become aware of thoughts and emotions is patience. Beginner's mind is considering the situation without influence of previous experiences. Acknowledging one's thoughts and feelings without bias from accepted norms is trust. Nonstriving suggests being present. Acceptance is recognizing the experience as it happened. The final concept is letting go in which one does not concentrate on thoughts and feelings.

A 10-week program led by an experienced meditation coach resulted in decreased exhaustion, anxiety, and stress with improved self-care, joy at work, and interpersonal communication (Jones-Bonofiglio, 2020). Nursing units are developing rooms designed to promote mindfulness, process emotions, and refocus before returning to continue with patient care (Foli & Thompson, 2019). Moral distress is not only reduced through mindfulness but also may provide the healthcare provider the ability to identify other alternatives to the dilemma (Howe, 2017). There is evidence in the literature that supports the benefits of mindfulness activities.

Two systematic reviews examined mindfulness

In a systematic review of the literature, 11 studies were identified that examined the impact of mindfulness on the nurse's ability to respond to distressful situations rather than react. Of these studies, five were randomized controlled trials. The length of the Interventions varied from 1- to 2-day workshops or 30-minute to 2-hour sessions held over 4 to 8 weeks. Meditation activities in the studies were diverse, such as being mindful of body

sensations, sitting meditation paying attention to breathing, yoga breathing and stretching, and focus on thoughts of self-kindness. The sample size of each study was small, but benefits were identified with the interaction of attention focused on body awareness and emotional regulation. Some participants reported that engaging in a 10-minute mindfulness activity during the workday reduced stress (Halm, 2017).

Another systematic review focused on the impact of mindfulness-based interventions studies on social workers. The investigators identified 10 studies. The participants in five studies were practicing social workers; in the other five studies, social workers were the participants. Intervention of mindfulness varied among the studies. Although there were limitations identified with the design of some of the studies, a connection was found between mindfulness activities and stress reduction (Beer et al., 2020).

The use of mindfulness has been found to have a positive impact on well-being and reduction of stress. An outcome of mindfulness training has been an enhancement of moral resilience (Halm, 2017). Mindfulness facilitates individuals to become aware of emotions and reduce the response to those emotions. This enables the individual to address the situation and move forward, which promotes moral resilience (Rushton, 2016).

Moral Resilience

Resilience is defined as "the dynamic capacity to recover from adversity within the individual and the environment" (Rushton et al., 2017). Resilience and resiliency are used interchangeably (Oxford Learner's Dictionaries, 2021). At times resilience is referred to as hardiness (Foli & Thompson, 2019). Wocial (2020) differentiates between personal resilience and moral resilience. Personal resilience is the capacity to endure, adapt, and recover from adversity, whereas moral resilience is needed to retain or restore integrity when moral adversity occurs. Moral resilience was defined as "the ability and willingness to speak and take right and good action in the face of an adversity that is moral/ethical in nature" (Lachman, 2016, p. 122). Adversity may be experienced after events causing stress, trauma, loss, or other challenges (Carse & Rushton, 2017). In addition to clinical situations, other events include natural disasters, war, and crime. Through moral resilience one regains moral integrity and retains the essence of humanity (Jones-Bonofiglio, 2020). The focus of moral resilience is on the complexity of moral aspects of the situation related to obligations and relationships that are impacted by moral distress (Rushton, 2016).

Moral resilience includes personal competency based on values, spiritual influences, acceptance of change, controlling what can be controlled, and maintenance of interpersonal relationships. Flexibility, openness, and re-examination of one's thoughts and choices are required to develop or increase one's responsiveness to adversity and ability to control emotional responses (Carse & Rushton, 2017). Conscientiousness is the foundation for moral resilience with one knowing one's values that guide their actions in ethical situations. When one is conscientious, they are able to confront threats to their integrity. One must be cognizant of the boundaries and the extent of their power and influence. The final decisions and outcomes may not be within one's control (Rushton, 2016). In nursing practice, conscientious objection is "the refusal to participate in some aspect of patient care, for doing so would violate deeply held values" (Fowler, 2015, p. 87).

According to Rushton (2016), moral resilience is enhanced when one is:

- Reflective and self-aware of their emotional response to ethical situations.
- Capable of controlling their emotional responses.
- Knowledgeable of ethical principles and actions.
- Confident to use their voice to express their thoughts and feelings clearly.
- Able to identify meaning from the situation, which will benefit their practice.
- Collaborative with other members of the healthcare team.

Other strategies to further develop one's moral resilience are to increase clinical knowledge, skills, and competence through education or assistance from a mentor. In addition, one should know and abide by the code of ethics and know what ethical resources are available within the agency (Stutzer & Bylone, 2018).

In 2004, AACN introduced a framework titled "The 4As to Rise Above Moral Distress" to assist nurses in mitigating the effects of moral distress and enhance their moral resilience (Karakachian & Colbert, 2017). The 4As are Ask, Affirm, Assess, and Act. One is asked if they are experiencing moral distress and to identify the emotions being felt. This is achieved through self-reflection and self-awareness. The feelings and perceptions must be affirmed with others. One then accepts the responsibility to resolve the moral distress to preserve one's well-being. Next, one assesses the cause of the moral distress, individuals involved, work environment issues, and potential actions to take to resolve the moral distress. The risks and benefits of possible actions must be evaluated. Lastly, a plan to act is developed,with resources identified to support or assist with the implementation of the plan. Action is then taken. The advantage of this framework is that it can be used by an individual without the assistance of a facilitator.

Limited studies have been identified that evaluated the effectiveness of resilience training programs. The studies found were designed to address stress or burnout. The impact of resilience training on moral distress was found only in one study. Presently, research has not found a link between resilience training and one's ability to cope with moral distress (Wocial, 2020).

A study was conducted to investigate how moral distress impacts adult and pediatric critical care nurses. In addition, the study was designed to determine if a 2-hour education activity discussing moral distress, the use of ethical reasoning skills, and the application of the AACN's 4As framework reduced moral distress and improved job satisfaction and retention. Moral distress was measured with the MDS-R instrument; another instrument was used to measure the ethical climate. There were 12 adult critical care nurses and 7 pediatric critical care nurses in the study. In the preintervention measure of moral distress and ethical climate, the pediatric nurses had low moral distress scores. The adult care nurses scores showed a negative correlation between the moral distress and the ethical climate. In other words, the higher the ethical climate, the lower the moral distress score. Only 4 of the 17 nurses participated in the 3-month postintervention survey to measure moral distress and ethical climate, resulting in no statical analysis performed. During the 3-month follow-up focus group, all participants indicated they were satisfied with the educational activity and had used the information and skills in the clinical setting (Allen & Butler, 2016).

Following are other studies found to decrease stress or burnout.

The Resilience in Stressful Events (RISE) program was developed at Johns Hopkins Hospital to support second victims who were involved in an incident in which a patient was harmed. The peer support program was developed to support individuals to become resilient after the incident. There were 119 calls in the first 52 months of the program. It was noted that 56% of the calls were for groups rather than individuals. A majority of the calls were for adverse events. There were 102 staff surveys completed, with 70% of the participants reporting they had been involved in an unanticipated adverse event, with 57.9% indicating they had experienced anxiety and difficulty performing their jobs. More than 70% had found the program beneficial. The peer responders reported that 88% of their meetings were successful, with 83.3% of the callers' needs met. The evaluation of the program demonstrated that the goal was met. Further investigation is needed to quantify the effectiveness of the program on resilience (Edrees et al., 2016).

A study was designed to determine the effect of stress management training and resilience training. The 24-week training focused on moving away from reactive responses to

experiences and toward positive reflection on the experiences. Learning activities included web-based modules, self-assessments, and reading materials. Four facilitated discussions were held to answer questions and problem solve concerns that had arisen during the training. Significant findings were found in decreasing stress and burnout with an increase in mindfulness and resilience (Magtibay et al., 2017).

A 90-minute workshop with a 90-minute one-on-one follow-up discussion with a facilitator was the intervention used in a study to determine the effectiveness of a resilience coaching intervention. The participants included 37 healthcare providers and 29 students. Nine workshops were held with activities that included case studies, group discussion, and stress reduction techniques. In the one-on-one discussion, the coping strategies during the workshop were discussed with the participant identifying their strengths. A resilience questionnaire was used to collect baseline data. The questionnaire was used to gather data after the workshop, after the one-on-one discussion, and 4 to 6 weeks postinterventions. The results indicated a higher level of resilience (Johnson et al., 2020).

Resilience helps one to recover from stress, burnout, and compassion fatigue. There is limited evidence that demonstrates the impact of resilience training on moral distress. Those with moral resilience have developed coping skills to be aware of the complexities of the situation. They use their knowledge of the culture of the work environment to reframe the situation and employ problem-solving techniques to address the situation. They manage what is within their level of control and depend on others to resolve the situation beyond their control (Lachman, 2016). In addition, those with moral resilience have the ability to control their emotional, physical, and behavioral responses to adversity using moral agency to effectively meet the ethical challenge (Wocial, 2020). Although the focus of mindfulness and moral resilience is introspective to examine one's response to moral distress, there is a risk to this activity. The healthcare provider may determine the moral distress is their fault and view the distress as a personal weakness (Sabin, 2017). The individual should be guided to assess resources available to assist them to resolve their moral distress.

Evidence-based practice! An interventional study to determine the impact of a program to enhance the participants' skills in mindfulness, moral resilience, confidence, and ability to address ethical dilemmas was conducted with 192 participants in the intervention group and 223 participants in the comparison group. After six workshops totaling 24 hours, mindfulness, moral resilience, and confidence were significantly increased in the intervention group (Rushton et al., 2021).

Self-Assessment Quiz Question #8

Which of the following is NOT a strategy to recover from moral distress?

a. Seek consultation from the employee assistance program.
b. Ask for education on ethics and the application of the code of ethics.
c. Participate in an interprofessional debriefing session.
d. Practice mediation and yoga.

Prevention strategies

A correlation between the practice environment and moral distress has been found. The agency has a responsibility to establish an environment that promotes an ethical climate that supports practices to prevent or minimize moral distress (Jones-Bonofiglio, 2020). After identifying common sources of moral distress, interventions need to be implemented to directly address the causes (Epstein et al., 2020) while considering the agency's culture (Jameton, 2017). The agency's culture must empower healthcare providers to voice ethical concerns without the fear of retaliation (Hamric & Wocial, 2016). The value of interprofessional collaboration must be acknowledged and promoted by the agency (Stutzer & Bylone, 2018).

Some interventions have been successful in reducing the common sources of moral distress. Workshops to decrease moral distress, a workshop to increase moral empowerment, and training of a moral consultation team were some of the educational activities developed to reduce moral distress that were identified in a systematic review of the literature (Dacar et al., 2019). To mitigate conflicts between healthcare professionals and patient families – which may lead to moral distress – policies have been developed that include responses to specific situations. The implementation of interprofessional team meetings to promote effective communication, in addition to establishing plans of care for complex patients, have been successful in diffusing moral distress (Jameton, 2017). The healthcare team having access to resources regarding the resolution of moral dilemma before moral distress occurs has prepared the team to better address the dilemma and minimize the impact. As noted previously, debriefing by a skilled facilitator after a stressful event was found to assist in minimizing moral distress (Jones-Bonofiglio, 2020). Individuals need to advocate for solutions to moral dilemmas (Jameton, 2017).

Education

To decrease the intensity of moral distress, ethics education is essential (Rushton et al., 2016). Interprofessional education improves collaboration, ethical analysis, decision making, and conflict resolution (Carse & Rushton, 2017). The healthcare team should be educated to identify and address ethical challenges in daily practice before escalation of the situation, which may lead to moral distress (Rushton et al., 2017). Unit-based ethics rounds and ethics huddles including the healthcare team are viewed as a strategy to heighten ethical awareness in addition to other venues to discuss ethical issues (Milliken, 2018).

Although most, if not all, agencies have an ethics committee or an ethics consultation team, no consistent process is used globally to prepare members for their roles on the committee or team. Members may not have received any formal education on ethics. Without education members may rely on their experiences and opinions to make ethical decisions. Time and money must be invested to assure members have the necessary education on ethical principles, the ethical decision-making model used by the agency, conflict resolution strategies, problem-solving skills, and effective communication techniques (Hamric & Wocial, 2016).

The healthcare team should receive ongoing education on ethics to increase their ability to identify and raise concerns early regarding possible ethical challenges before the situation escalates. This may require some discipline-specific education (Fantus et al., 2016; Hamric & Wocial, 2016). The team should be made aware of resources available for their use. This should be introduced while one is in orientation and during ethics-related activities such as ethics rounds, debriefing, and ongoing ethics education.

Evidence-based practice! A study with 121 student participants from the schools of nursing, social work, and medicine explored the impact of a mock ethics committee on learning about ethical decision making. After a case study was introduced, the students were asked to identify the need for an ethics review, determine how to start the process, evaluate the ethical situation using a decision-making model, and use ethical principles to examine practice issues. In addition to learning about ethics, the students experienced interprofessional group dynamics and increased their understanding of discipline-specific responsibilities (Opsahl et al., 2020).

Morley and Ives (2017) described the approach to nursing ethics education as being focused on determining the ethical situation and developing actions to resolve it. In practice, nurses document the discussions held by the healthcare team and actions to be taken. Using this approach may risk nurses identifying themselves as moral agents based on their ability to compress a complex ethical situation into a concise ethical issue. This may lead one to limit oneself to only a single solution or to simplify the process of critically examining ethical issues. In addition, using this approach promotes the belief that ethical challenges are easy to identify and resolve. No consideration is given to those situations when a satisfying resolution is not available or feasible. Some clinicians may see this lack of resolution as a moral failure that could lead to moral residue as discussed above. In ethics education there is a need to clearly state that ethical challenges and moral dilemmas are complex and may have few options for resolution.

Three topics should be added to ethics education. The first is the resolution of the emotional responses clinicians may experience because of the perceived unsatisfactory resolution of the situation. Secondly, clinicians must be cognizant that compromise may be required after rigorous deliberation to identify solutions that have been implemented. Lastly, clinicians should discussthe possibility that a sense of moral failure and moral residue may occur because of the complexities of ethical situations (Morley & Ives, 2017).

Nursing consideration: Reflect on your employing agency. What ethics continuing education activities are available? What ethics resources are available? Consider people, written, and on-line resources. What education and additional resources are you planning to request?

Moral Reflective Space

When empowerment is strengthened, a sense of powerlessness and the hesitancy to speak up are reduced. A strategy to increase empowerment is to establish a safe place for healthcare professionals to assess the moral distress in their daily practice. A moral reflective space is a designated area within the agency designed for individual reflection and to promote interprofessional collaborative reflection on ethical and moral challenges (Carse & Rushton, 2017). The moral reflective space should be available at all times, providing a space for moral reflection on action to take when involved in a moral dilemma (Hamric & Wocial, 2016). The interprofessional team should meet regularly. There should be an understanding that participants may openly and honestly share concerns, anger, and suggestions without fear of retaliation. The goal is to provide various viewpoints from different disciplines on challenges confronting the members. Trust, team building, and greater understanding of members' roles result from the interactions. A moral reflective space provides a venue to build ethical skills and to share ideas for changes in practices, processes, and protocols.

There are risks associated with reflecting on the response to moral dilemmas. Others may perceive the expression of moral distress as a complaint or an opportunity to voice anger and frustration. Another risk is that others will identify with the experiences and will unite to intensify the negative expressions of moral distress. These risks highlight the importance of a facilitator to guide the process to explore the ethical challenges. Carse and Rushton (2017) proposed questions to be asked during the reflection: What assumptions are we making? Are they true? What interim steps might we take to shift our understanding or change the situation?

Schwartz Center Rounds are an example of a moral reflective space in which healthcare professionals discuss the social and emotional aspects of their clinical role in relation to a specific situation (Sabin, 2017). The structured process is facilitated by someone who has the interpersonal skills to encourage others to speak up. The discussion begins with the facilitator defining the purpose of the rounds, stating that the focus of the discussion is sharing and problem solving, not to debate decisions made about care provided. Each person is encouraged to share their experience with the situation, including their thoughts and feelings. A summary of the discussion is provided by the facilitator at the conclusion of the rounds (Pfaff, 2016).

A systematic review of the literature was conducted to determine the impact of Schwartz Rounds in providing support to healthcare professionals as well as comparing it to similar interventions with comparable support provided. The review of 43 articles resulted in 11 similar interventions identified that included interventions such as caregiver support programs, critical incident debriefing, and reflective practice groups. Only 10 articles provided data measuring the effectiveness of the intervention. It was found that the ability to reflect on one's practice resulted in increased self-awareness and empowerment. Interpersonal communication and teamwork were enhanced. There was an impact on team's focus on patient-centered care and knowledge of patient suffering (Taylor, 2018).

Another example of the use of the moral reflective space is moral case deliberation as described above. A facilitator leads a group through the examination of ethical practices implemented during a specific situation to reveal the moral reasoning used in practice and to identify alternative approaches (Hartman et al., 2018).

In a review of the literature completed to determine the impact of moral case deliberation, 25 studies were found (Haan et al., 2018). The authors classified their findings into four themes.

The first theme was the facilitator and barriers. The facilitator needed to establish a safe environment for participants to express their experiences. Therefore, only those directly involved with a specific situation were allowed to attend. Mutual trust and respect were important to encourage individuals to share their experiences. The focus must remain on the moral dimensions of the case being discussed.

Personal and interpersonal changes were identified as the second theme. There was a sense of relief from a moral burden. Those involved felt a strong sense of closeness after having experienced the event and participated in the moral case deliberation. Most participants reported an increase in their confidence and understanding. Some reported a better understanding of alternative approaches to the same dilemma. There was an increase in awareness of the moral issues and moral caring dimensions involved.

The third theme was centered on the changes made to patient and family care. Limited evidence demonstrated an impact on care. There was some evidence of an increased awareness of patient and family situations. Participants were more mindful of the patients' and families' right to be involved in the decision-making process. Determining patients' wishes was timelier. With the decrease in moral distress, there was an increase in job satisfaction and a decrease in absenteeism.

Professional attention to ethics at the organizational level was the fourth theme. There was some evidence found in one study regarding an improved ethical environment. Several of the studies did report an increase in informal ethical discussions.

Additional Agency Strategies

AACN has described a healthy work environment for a nurse as one where skilled communication is fostered, involvement in organizational decision making is encouraged, adequate competent staff are available, meaningful recognition is provided, and the work is led by an authentic leader (Pavlish et al., 2016). A culture of engagement and empowerment is fostered when members of the healthcare team are encouraged to voice concerns without fear of reprisal (Sabin, 2017). Policies and procedures should be established to provide guidance for clinicians to report ethical challenges and morally complex situations without concern regarding retribution (Lachman, 2016).

A symposium was held in 2016 to address moral distress and build resilience, with recommendations to organizations.

Following are some of the recommendations from that meeting (Rushton et al., 2017):

- Commit to secure resources to support moral resilience.
- Assure healthcare team members have the education and development opportunities to enhance relationship skills and mindfulness.
- Appoint nurses as members of the ethics committee.
- Identify and distribute best practice for interprofessional communication and resolution of ethical issues.

Ethics Committee. An agency should establish an ethics committee that is responsible for the development and revision of all policies relating to ethics. Another responsibility of the committee is providing education to the staff on ethical issues. Members of the committee provide consultation to the healthcare team challenged by ethical situations and moral dilemmas. It is advisable the membership of the committee be interprofessional, including direct care nurses, social workers, chaplains, and palliative care staff in addition to the medical staff (Hamric & Wocial, 2016). Each member will contribute a different point of view. Direct care nurses provide insight into the daily ethical challenges. The social worker brings the perspective of social justice (Pugh, 2017). Chaplains are able to address the spiritual needs of patients and families. Their counsel may aid healthcare professionals as well as patients during complex situations to balance spirituality and ethical obligations. The knowledge and skills of the palliative care staff are important when considering end-of-life care (Hamric & Wocial, 2016).

Nursing ethics committees have been established in some agencies to provide guidance to nurses as they are confronted with ethical situations and moral dilemmas. The activity promotes an enhanced understanding of the ethical decision-making model used by the agency. The committee may be instrumental in the implementation of organizational changes. There is an increased sense of empowerment in those who participate (Rushton et al., 2016).

Leader's Role. The leader must possess the knowledge and skills to address clinicians' ethical concerns (Stutzer and Bylone, 2018). A climate of interpersonal collaboration to address ethical challenges and to minimize or prevent moral distress should be established by the leader (Lachman, 2016). Through coaching the leader assists clinicians to develop ethical awareness, which is the recognition of the ethical implication of their actions. Clinicians should be encouraged to identify and address ethical issues as they occur to prevent moral distress (Milliken, 2018). As a leader, one should use introspection to assure directions given are not in conflict with an ethical work environment (Lachman, 2016).

The leader must advocate for resources to support clinical staff as they are confronted daily with ethical challenges. Through the leader's advocacy, the healthcare professionals should be provided with education to develop skills in applying ethical and discipline-specific resources. The leader should champion the development of a moral reflective space. (Hamric & Wocial, 2016).

Self-Assessment Quiz Question #9

All must be present in an agency that is striving to minimize moral distress EXCEPT:

a. Establish an ethical climate.
b. Open the ethics committee to all medical staff and senior leaders.
c. Promote interprofessional collaboration.
d. Empower healthcare professionals to voice ethical concerns.

With the complexities of patient care, it is important to assure that the work environment promotes healthcare professionals to be empowered and engaged. Agency leaders create the work environment and culture. Through education, coaching, and dialogue, they should be able to prevent or minimize the impact of moral distress.

Ethics and moral distress during the pandemic

The global pandemic of 2020 and beyond has strained the entire healthcare system and has posed many ethical challenges for healthcare professionals. These challenges include high surges of patients arriving at healthcare facilities, scarce supplies and equipment, limited or no family visitation, and delay in the treatment of those without urgent needs (Webster & Wocial, 2020). The duty of care is impacted by these challenges (Morley et al., 2020). Additional ethical issues identified include the onset of mental health issues associated with isolation and prolonged lockdowns, management of biowaste, effective treatments, duty of care opposed to the protection of healthcare professionals, and lack of dignity and rituals during death (Gopichandran, 2020).

Misinformation and conspiracy theories have added to the ethical dilemma of individuals not adhering to preventative measures such as social distancing, face mask wearing, and resistance to receive the vaccine (Agley & Xiao, 2021).

During the pandemic, the importance of collaboration within the organization, city, county, and state among healthcare professionals has become paramount. There is a need for equitable distribution of supplies and equipment to meet patient care needs. A shift from patient-centered care to saving the most lives occurs (Webster & Wocial, 2020, September). The duty of care expands from the individual patient to include the community (Sheahan & Lamont, 2020). Nurses are still obligated to speak up for their patients and protect them from harm. All healthcare professionals must keep current in the developments in the progression and treatment of the disease and the variants in order to provide accurate information to others. As professionals they are obligated to promote their own health and well-being by engaging in protective measures such as the proper use of protective equipment, adhering to infection control practices, and social distancing.

Moral distress has resulted from healthcare professionals facing multiple ethical dilemmas encountered during the pandemic (Gopichandran, 2020; Webster & Wocial, 2020). When left unchecked, moral distress can result in burnout (Daubman et al., 2020), compassion fatigue (Saleh et al., 2019), and mental health issues, including a higher risk of suicide (Gopichandran, 2020; Rahman & Plummer, 2020).

As noted previously, moral distress is complex with individuals responding differently to moral and ethical dilemmas. Crises and disasters heighten the challenges. Many nurses believe that their moral integrity has been diminished because of agency policies during the pandemic that have prevented them from doing what is right (Zuzelo, 2020). In December 2020, it was reported that 93% of healthcare workers were experiencing stress with 86% anxious and 77% frustrated (Lagasse, 2020, December 2). No data were found on the number of healthcare professionals experiencing moral distress during the pandemic.

Moral distress has increased during the pandemic. Following are some of the contributing factors:

- Families not involved in patient care decisions because of strict visitation policies (Altman, 2020; Morley et al., 2020).
- Developing a caring relationship with patients has been impacted by the use of masks, face shields, and additional PPE, which has been seen as dehumanizing (Morley et al., 2020).
- Patients dying alone (Altman, 2020).
- Crisis standards that require shifting from meeting the care needs of the individual patient to the needs of the community (Morley et al., 2020).
- Inability to provide life-saving measures because of shortages (Altman, 2020) or care and procedures not emergent (Morley et al., 2020).

- Requirement to conserve PPE placing healthcare professionals at risk and, subsequently, their families (Morley et al., 2020).
- Reallocation of scarce resources to someone else who may receive greater benefit from the resource or meet a specific criterion such as removing a ventilator from one patient to give to another (Morley et al., 2020).

There has been a question whether nurses are experiencing moral distress or moral injury as a result of the pandemic. Moral injury has been used to describe the result of veterans committing, witnessing, or failing to prevent actions during war that were contrary to moral convictions (Zuzelo, 2020). Whether moral distress or moral injury, the pandemic has resulted in healthcare professionals suffering and experiencing frustration, anxiety, and anger.

The AACN developed a position statement calling on healthcare agencies to adopt the following recommendations to reduce the incidence of moral distress (AACN, 2020a):

- Supply the needed personal protection equipment and supplies.
- Develop evidence-based procedures to fairly distribute scarce resources.
- Establish an interprofessional committee to address difficult situations.
- Ensure visibility and accessibility of agency leaders to direct care providers to promote clear and transparent communication.
- Include nurses on decision-making ethics committees.
- Scrutinize work environment to identify situations that may result in moral distress.
- Secure resources to enable nurses to identify moral distress. Make certain that resource to address moral dilemmas, such as ethics committee, employee assistance, and critical incidents debriefing, are readily accessible.
- Recognize when a conflict arises between your values and the actions you are being asked to do.
- Develop a moral compass for yourself.
- Become aware of the signs and symptoms of moral distress.
- Engage a trusted mentor.
- Make use of available resources to address moral dilemmas or moral distress.
- Rely on colleagues and family members to help you through moral distress by providing a balance between personal and profession obligations.

Daubman and colleagues (2020) proposed a framework to manage moral distress during the pandemic. The three stages in the framework are indignation, resignation, and acclimation. With indignation, the conditions present, the suffering experienced by the patients, and the lack of supplies and equipment shock the clinician. The intensity of suffering and the frequency of death is overwhelming. The clinicians have a sense of powerlessness to provide compassionate care. Adding to the indignation is the realization that healthcare disparities are affecting racial and ethnic minorities. The resignation stage follows, with the clinician continuing to provide care with resignation to the fact they are doing the best they can. The final stage is acclimation, when the healthcare team has developed a shared purpose in meeting the patients' needs. The authors noted that there is not a linear progression through this framework, but that having knowledge of the stages is useful in managing moral distress as the pandemic continues. An added complexity to managing moral distress in the pandemic is that healthcare professionals are returning to their families after their shifts, not knowing what risks they are introducing to them.

Moral distress cannot be eliminated during the pandemic. Measures should be taken to lessen the impact by addressing the source of the moral distress and engaging in debriefing for the healthcare providers involved (Morley et al., 2020). Additionally, culturally sensitive, and appropriate individual crisis counseling should be provided that focuses on the current effects and residual effects of the pandemic (Zuzelo, 2020). At the beginning of the shift, take time to remember what you are grateful for and at the end of the shift reflect on what went well (Altman, 2020). Mindfulness activities, use of the AACN 4As, and self-care activities should be employed to manage moral distress (Daubman et al., 2020.) Self-care activities must be implemented, such as rest breaks during the shift, healthy eating, getting adequate sleep, paying attention to feelings and emotions, and seeking support to manage the stress and distress (Webster & Wocial, 2020). Agency leaders should make rounds in the units/departments to understand what the staff are experiencing, identify any barriers that are hindering care, gain input on decisions being made, and provide information (Rosa et al., 2020). Other strategies noted above to resolve and prevent moral distress should be considered.

Case study

Mrs. J., a 75-year-old patient, was admitted to the critical care unit with fever, increased respiratory secretions, Stage IV tunneling sacral ulcer, and leukocytosis. She is a resident at a long-term care facility. She has multiple comorbidities, including stroke 5years ago with right sided paralysis, COPD, and expressive aphagia. The plan of care included supportive care, treatment with antibiotics, and return to the long-term care facility. The patient did not have an advance directive. The patient's daughter, who held medical power of attorney, insisted her mother should be resuscitated. The physician ordered full code. The nurse's notes indicate there has been a decrease in Mrs. J.'s response to verbal commands in the past 24 hours. She no longer opens her eyes when spoken to.

Melissa, who is certified and has worked in the unit for 6 years, is experiencing symptoms of moral distress. She is concerned that resuscitating the patient would not be beneficial and ethically inappropriate.

Questions:

1. What is the best action for Melissa to take?
2. What should the healthcare team do to ease their moral distress?
3. Is there any additional action the team should consider and take?
4. What action could Jeff take to support the staff to prevent or minimize moral distress when they are confronted with ethical dilemmas?

Discussion:

1. With Melissa beginning to experience moral distress, one option would be for her to ask the charge nurse to change her assignment. This would separate her from the distressful situation. Another option would be to gain more understanding about the physician's decision to make the patient a full code. She may not understand the rationale for the full code. A third option would be to request an ethics consultation. The ethics consultation team would review the ethical and medical reasoning for the care provided with respect to the four principles of ethics: autonomy, beneficence, nonmaleficence, and justice. The ethics consultation was requested. The ethics consult note indicated there was a meeting with the hospitalist and the patient's primary care physician to discuss the code status and to review the benefits of aggressive care. There was a hesitancy to change Mrs. J.'s code status because the antibiotics had just been started and what is occurring might be related to the infection and not a deterioration in the patient's status.

Several other members of the healthcare team involved in Ms. J.'s care are discussing the pros and cons of the continuation of the aggressive treatment. Some state they think Mrs. J. is suffering. They feel powerless and helpless to take any meaningful action.

2. Some of the team think it would be advantageous for them to go to the wellness center and engage in some strenuous exercise to "work out their distress." Others think that the team should continue to discuss the pros and cons of the plan of care to resolve the distressing situation. One member suggests a facilitator-guided debriefing to enable members to discuss their feelings and identify possible actions to take. A team member indicated that in a similar situation one of the social workers served as the facilitator. Jeff, the nurse manager, agreed to contact the social workers to determine if they would be willing to serve as the facilitator and, if so, when could the session be scheduled.

   Jeff attended the debriefing. He had seen the anguish and anger the members of the team were experiencing. Of the possible actions to take that were discussed at the debriefing, the team agreed another ethics consult should be requested. Mrs. J. had been on antibiotics for 7 days with no improvement noted. Her status had changed only with her response to pain.

   After the second ethics consult, Mrs. J.'s code status was changed from full code to do not resuscitate (DNR). This was consistent with the unbeneficial or medically ineffective treatment agency policy. Mrs. J.'s primary care physician informed the patient's daughter of the change in her mother's code status. The daughter admitted that she knew her mother would probably not improve. However, she did not agree with the code status change and wanted her to get well enough to return to the nursing home.

3. The team should continue to provide comfort care. Mrs. J.'s daughter needs support and encouragement during this exceedingly difficult time. The staff need to continue to meet their duty of care.

   Connie, the social worker on the team, investigated if hospice care or palliative care was available at the long-term care facility Mrs. J. had come from. Connie discovered that a contracted hospice care service could be arranged. Connie made the referral for the contracted hospice service and Mrs. J. returned to the long-term care facility when the referral was finalized.

4. Jeff could establish ethics rounds or interprofessional ethics discussions at the unit. He could identify and designate a room on the unit to serve as a moral reflective space. Clinical nurses and other members of the unit healthcare team should be involved in determining resources to be available in the room. When ethical dilemmas occur in the future, Jeff should be an empathetic listener and timely initiate interventions to prevent or resolve moral distress

Conclusion

The professional code of ethics and professional standards are the foundation for ethical practice. Healthcare professionals are responsible for understanding how the code and standards apply to their role. Moral distress occurs when one's senses they have failed to meet their duty of care obligation. Internal, external, and environmental factors contribute to the cause of moral distress. When moral distress occurs, the individual experiences an emotional response that may also include physical and behavioral responses. If moral distress is not resolved, the individual may experience a sense of an assault on their integrity, burnout, or compassion fatigue. Moral distress has been shown to negatively impact patient care.

In addition, self-care activities – such as seeking counseling, debriefing, and mindfulness activities – have demonstrated a positive impact on resolving moral distress. Although moral distress cannot be completely prevented, education has provided individuals with the knowledge and skills to address ethical situations that could lead to moral distress. Another effective intervention is the development of a moral reflective space for individuals to reflect on their practice. The moral reflective space has been beneficial for interprofessional dialogue regarding complex patient situations and to be attuned to any members of the team who may be experiencing moral distress.

Agency leaders are responsible for establishing an ethical climate and a culture that promotes engagement and empowerment. Interprofessional collaboration is valued and promoted within the agency. Policies should guide ethical practice that enables healthcare professionals to work toward achieving improved patient outcomes.

References

- Agley, J. & Xiao, Y. (2021). Misinformation about COVID-19: Evidence for differential latent profiles and a strong association with trust in science. *BMC Public Health, 21*(89). https://doi.org/10.1186/s12889-020-10103-x
- Allen, R. & Butler, E. (2016). Addressing moral distress in critical care nurses: A pilot study. *International Journal of Critical Care and Emergency Medicine, 2*(1). https://doi.org/10.23937/2474-3674/1510015
- Altaker, K. W., Howie-Esquivel, J., & Cataldo, J. K. (2018). Relationships among palliative care, ethical climate, empowerment, and moral distress in intensive care unit nurses. *American Journal of Critical Care, 27*(4), 295–302. https://doi.org/10.4037/ajcc2018252
- Altman, M. (2020). *Facing Moral distress during the COVID-19 crisis*. https://www.aacn.org/blog/facing-moral-distress-during-the-covid-19-crisis
- American Association of Critical Care Nurses. (2020a). *AACN Position Statement: Moral Distress in Times of Crisis*. https://www.aacn.org/policy-and-advocacy/aacn-position-statement-moral-distress-in-times-of-crisis
- American Association of Critical Care Nurses. (2020b). *Recognize & address moral distress*. https://www.aacn.org/~/media/aacn-website/clincial-resources/moral-distress/recognizing-addressing-moral-distress-quick-reference-guide.pdf
- American Nurses Association. (n.d.). *Nurse's bill of rights*. https://www.nursingworld.org/practice-policy/work-environment/health-safety/bill-of-rights-faqs/
- American Nurses Association & National Council of State Boards of Nursing. (2019). *Joint statement on delegation*. https://www.nursingworld.org/practice-policy/nursing-excellence/official-position-statements/id/joint-statement-on-delegation-by-ANA-and-NCSBN/
- Appleton, K. P., Nelson, S., & Wedlund, S. (2018). Distress debriefings after critical incidents: A pilot project. *AACN advanced critical care, 29*(2), 213–220. https://doi.org/10.4037/aacnacc2018799
- Beer, O. W., Phillips, R., Stepney, L., & Quinn, C. R. (2020). The feasibility of mindfulness training to reduce stress among social workers: A conceptual paper. *The British Journal of Social Work, 50*(1), 243–263. https://doi.org/10.1093/bjsw/bcz104
- Bressler, T., Hanna, D., & Smith, E. (2017). Making sense of moral distress within cultural complexity. *Journal of Hospice & Palliative Nursing, 19*(1), 7-14. https://doi.org/10.1097/NJH.0000000000000308
- Browning, E. D. & Cruz, J. S. (2018). Reflective debriefing: A social work intervention addressing moral distress among ICU Nurses. *Journal of Social Work in End-of-Life & Palliative Care, 14*(1), 44–72. https://doi.org/10.1080/15524256.2018.1437588
- Carse, A. & Rushton, C. H. (2017). Harnessing the promise of moral distress: A call for re-orientation. *Journal of Clinical Ethics, 28*(1),15-29.
- Carter, K. & Hawkins, A. (2019). Joy at work: Creating a culture of resilience. *Nursing Management, 50*(12), 34-42. https://doi.org/10.1097/01
- Christodoulou-Fella, M., Middleton, N., Papathanassoglou, E., & Karanikola, M. (2017). Exploration of the association between nurses' moral distress and secondary traumatic stress syndrome: Implications for patient safety in mental health services. *BioMed Research International, 2017*, 1-19. https://doi.org/10.1155/2017/1908712
- Dacar, S., Covell, C., & Papathanassoglou, E. (2019). Addressing moral distress in critical care nurses: A systemized literature review of intervention studies. *Connect: The World of Critical Care Nursing, 13*(2), 71-89. http://dx.DOI.org:10.1891/1748-6254.13.2.71
- Daubman, B. R., Black, L., & Goodman, A. (2020). Recognizing moral distress in the COVID-19 pandemic: Lessons from global disaster response. *Journal of Hospital Medicine, 15*(11), 696-698. https://doi.org/10.12788/jhm.3499
- Dodek, P. M., Wong, H., Norena, M., Ayas, N, Reynolds, S. C., Keenan, S.P., Hamric, A., Rodney, P., Stewart, M., & Alden, L. (2016). Moral distress in intensive care unit professionals is associated with profession, age, and years of experience. *Journal of Critical Care, 31*(1), 178-82. https://doi.org/10.3949/ccjm.87a
- Dudzinski, D. M. (2016). Navigating moral distress using the moral distress map. *Journal of Medical Ethics, 42*(5), 321-324. https://www.jstor.org/stable/44014379
- Edrees, H., Connors, C., Paine, L., Norvell, M., Taylor, H., & Wu, A. W. (2016). Implementing the RISE second victim support programme at the Johns Hopkins Hospital: A case study. *BMJ Open, 6*(9), e011708. https://doi.org/10.1136/bmjopen-2016-011708
- Epstein, E. G., Haizlip, J., Liaschenko, J., Zhao, D., Bennett, R., & Faith, M. (2020). Moral distress, mattering, and secondary traumatic stress in provider burnout: A call for moral community. *AACN Advanced Critical Care, 31*(2), 146–157. https://doi.org/10.4037/aacnacc2020285
- Fantus, S., Greenberg, R. A., Muskat, B., & Katz, D. (2017). Exploring moral distress for hospital social workers. *The British Journal of Social Work, 47*(8), 2273–2290. https://doi.org/10.1093/bjsw/bcw113
- Foli, K. J. & Thompson, J. R. (2019). *The influence of psychological trauma in nursing*. Sigma Theta Tau.
- Fourie, C. (2017). Who is experiencing what kind of moral distress? Distinctions for moving from a narrow to broad definition of moral distress. *American Medical Association Journal of Ethics, 19*(6), 578-584. https://doi.org/10.1001/journalofethics.2017.19.6.nlit1-1706
- Fowler, M. D. (2015). *Guide to the code of ethics for nurses with interpretive statements: development, interpretation, and application* (2nd Ed). American Nurses Association.
- Fumis, R., Junqueira Amarante, G. A., de Fátima Nascimento, A., & Vieira Junior, J. M. (2017). Moral distress and its contribution to the development of burnout syndrome among critical care providers. *Annals of intensive care, 7*(1), 71. https://doi.org/10.1186/s13613-017-0293-2
- Gopichandran, V. (2020). Clinical ethics during the COVID-19 pandemic: Missing the trees for the forest. *Indian Journal of Medical Ethics, 5*(3). https://doi.org/10.20529/IJME.2020.053
- Haan, M. M., van Gurp, J. L. P., Naber, S. M., & Groenewoud, A. S. (2018). Impact of moral case deliberation in healthcare settings: A literature review. *BMC Medical Ethics, 19*(85). https://doi.org/10.1186/s12910-018-0325-y
- Halm, M. (2017). The role of mindfulness in enhancing self-care for nurses. *American Journal of Critical Care, 26*(4), 344–348. https://doi.org/10.4037/ajcc2017589
- Hamric, A. B. & Wocial, L. D. (2016). Institutional ethics resources: Creating moral spaces. *Hastings Center Report, 46*, S22–S27. https://doi.org/10.1002/hast.627
- Hartman, L., Metselaar, S., Widdershoven, G., & Molewijk, B. (2019). Developing a "moral compass tool" based on moral case deliberations: A pragmatic hermeneutic approach to clinical ethics. *Bioethics, 33*(9), 1012–1021. https://doi.org/10.1111/bioe.12617
- Henrich, N. J., Dodek, P. M., Gladstone, E., Alden, L., Keenan, S. P., Reynolds, S., & Rodney, P. (2017). Consequences of moral distress in the intensive care unit: A qualitative study. *American Journal of Critical Care, 26*(4), e48–e57. https://doi.org/10.4037/ajcc2017786
- Hiler, C. A., Hickman, R. L., Reimer, A. P., & Wilson, K. (2018). Predictors of moral distress in a US sample of critical care nurses. *American Journal of Critical Care, 27*(1), 59–66. *https://doi.org/10.4037/ajcc2018968* Howe, E. G. (2017). Fourteen important concepts regarding moral distress. *Journal of Clinical Ethics, 28*(1), 3-14.
- Jameton, A. (2017). What moral distress in nursing history could suggest about the future of healthcare. *AMA Journal of Ethics, 19*(6), 617-628.
- Johnson, J., Simms-Ellis, R., Janes, G., Mills, T., Budworth, L., Atkinson, L. & Harrison, R. (2020). Can we prepare healthcare professionals and students for involvement in stressful healthcare events? A mixed-methods evaluation of a resilience training intervention. *BMC Health Services Research, 20*(1), 1472-6963. https://doi.org/10.1186/s12913-020-05948-2
- Jones-Bonofiglio. K. (2020). *Healthcare ethics through the lens of moral distress*. Springer Nature.
- Karakachian, A. & Colbert, A. (2017). Moral distress: A case study. *Nursing, 47*(10),13-15. https://doi.org/10.1097/01.NURSE.0000525602.20742.4b
- Lachman, V. D. (2016). Moral resilience: Managing and preventing moral distress and moral residue. *Medsurg Nursing, 25*(2), 121–124.
- Lagasse, J. (2020). *Healthcare workers experiencing burnout, stress because of COVID-19 pandemic*. Healthcare Finance. https://www.healthcarefinancenews.com/news/covid-19-pandemic-taking-toll-mental-health-frontline-healthcare-workers
- Latimer, A. L., Ori, M. D., Flaherty, C., & Ross, M. A. (2021). A survey of moral distress and end of life care in mechanical circulatory support nurses. *Heart & Lung, 50*(1), 65-70. https://doi.org/10.1016/j.hrtlng.2020.06.010
- Magtibay, D. L., Chesak, S. S., Coughlin, K., & Sood, A. (2017). Decreasing stress and burnout in nurses: Efficacy of blended learning with stress management and resilience training program. *The Journal of Nursing Administration, 47*(7-8), 391–395. https://doi.org/10.1097/NNA.0000000000000501
- Marturano, E. T., Hermann, R. M., Giordano, N. A., & Trotta, R. L. (2020). Moral distress: Identification among inpatient oncology nurses in an academic health system. *Clinical Journal of Oncology Nursing, 24*(5), 500-508. https://doi.org/10.1188/20.CJON.500-508
- Mason, V. M., Leslie, G., Clark, K., Lyons, P., Walke, E., Butler, C., & Griffin, M. (2014). Compassion fatigue, moral distress, and work engagement in surgical intensive care unit trauma nurses: A Pilot study. *Dimensions of Critical Care Nursing, 33*(4), 215-225. https://doi.org/10.1097/dcc.0000000000000056
- Milliken, A. (2018). Ethical awareness: What it is and why it matters. OJIN: The *Online Journal of Issues in Nursing, 23*(1). https://doi.org/10.3912/OJIN.Vol23No01Man01
- Morley, G. (2018). What is "moral distress" in nursing? How, can and should we respond to it? *Journal of Clinical Nursing, 27*(19-20), 3443–3445. https://doi.org/10.1111/jocn.14332
- Morley, G. & Ives, J. (2017). Reflections on how we teach ethics: Moral failure in critical care. *AACN Advanced Critical Care, 28*(4), 384–390. https://doi.org/10.4037/aacnacc2017743
- Morley, G., Sese, D., Rajendram, P., & Horsburgh, C. C.(2020). Addressing caregiver moral distress during the COVID-19 pandemic. *Cleveland Clinic Journal of Medicine*. https://doi.org/10.3949/ccjm.87a.ccc047
- National Association of Social Workers (2017). *Read the code of ethics*. NASW.
- Olsen, D. P. & Keilman, L. J. (2020). The moral distress of nurses when patients forgo treatment because of cost. *American Journal of Nursing, 120*(9), 61–66. https://doi.org/10.1097/01.NAJ.0000697668.09031.71
- Opsahl, A., Nelson., T., Madeira, J., & Wonder, A. H. (2020), Evidence‐based, ethical decision‐making: Using simulation to teach the application of evidence and ethics in practice. *Worldviews on Evidence‐Based Nursing, 17*(6), 412-417. https://doi.org/10.1111/wvn.12465
- Oxford Learner's Dictionaries. (2021). *https://www.oxfordlearnersdictionaries.com/us/*
- Pavlish, C., Brown-Saltzman, K., So, L., & Wong, J. (2016). SUPPORT: An evidence-based model for leaders addressing moral distress. *Journal of Nursing Administration, 46*(6), 313–320. https://doi.org/10.1097/NNA.0000000000000351
- Pfaff, K., Hamilton, L., & Jonathan, S. (2016). Sharing the burden: Schwartz Rounds as a compassionate collaborative practice and education model in long-term care. *Nursing and Palliative Care, 1*(4), 72-74. https://doi.org/10.15761/NPC.1000119
- Porter-O'Grady, T. & Malloch, K. (2016). *Leadership in nursing practice: Changing in landscape of healthcare*. Jones & Bartlett Learning.
- Powell, S. B., Engelke, M. K., & Swanson, M. S. (2018). Moral distress among school nurses. *Journal of School Nursing, 34*(5), 390–397. https://doi.org/10.1177/1059840517704965
- Prentice, T., Janvier, A., Gillam, L., & Davis, P. G. (2016). Moral distress within neonatal and paediatric intensive care units: A systematic review. *Archives of Disease in Childhood, 101*(8), 701–708. https://doi.org/10.1136/archdischild-2015-309410
- Pugh, G. L. (2017). A model of comparative ethics education for social workers. *Journal of Social Work Education*, 53(2), 312–326. https://doi.org/10.1080/10437797.2016.1243497
- Rahman, A. & Plummer, V. (2020). COVID-19 related suicide among hospital nurses; Case study evidence from worldwide media reports. *Psychiatry Research*, 291, 113272. https://doi.org/10.1016/j.psychres.2020.113272
- Reamer, F. G. (2016). Eye of ethics: The ethics of care. Social Work Today. https://www.socialworktoday.com/news/eoe_0916.shtml
- Ritchie, V., O'Rourke, T., & Stahlke, S. (2018). Nurse practitioners' experiences of moral distress in the continuing care setting. *The Journal for Nurse Practitioners, 14*(10), 745-752. https://doi.org/10.1016/j.nurpra.2018.07.021
- Rodney, P. A. (2017). What we know about moral distress. *American Journal of Nursing, 117*(2 Suppl 1), S7-S10. https://doi.org/10.1097/01.NAJ.0000512204.85973.04
- Rosa, W. E., Schlak, A. E., & Rushton, C. H. (2020). A blueprint for leadership during COVID-19. *Nursing Management, 51*(8). https://doi.org/10.1097/01
- Rushton, C. H. (2016). Moral resilience: A capacity for navigating moral distress in critical care. *AACN Advanced Critical Care, 27*(1), 111–119. https://doi.org/10.4037/aacnacc2016275
- Rushton, C. H. (2017). Cultivating moral resilience. *American Journal of Nursing, 117*, S11-S15. https://doi.org/10.1097/01.NAJ.0000512205.93596.00
- Rushton, C. H., Caldwell, M., & Kurtz, M. (2016). CE: Moral distress: A catalyst in building moral resilience. *American Journal of Nursing, 116*(7), 40–49. https://doi.org/10.1097/01.NAJ.0000484933.40476.5b
- Rushton, C. H., Schoonover-Shoffner, K., & Kennedy, M. (2017). Executive summary: Transforming moral distress into moral resilience in nursing. *American Journal of Nursing, 117*(2), 52-56. https://doi.org/10.1097/01.NAJ.0000512298.18641.31
- Rushton, C. H., Swoboda, S. M., Reller, N., Skarupski, K. A., Prizzi, M., Young, P. D., & Hanson, G. C. (2021). Mindful ethical practice and resilience academy: Equipping nurses to address ethical challenges. *American Journal of Critical Care, 30*(1), e1–e11. https://doi.org/10.4037/ajcc2021359
- Rushton, C. H. & Thompson, L. (2020). Moral outrage: Promise or peril? *Nursing outlook, 68*(5), 536–538. https://doi.org/10.1016/j.outlook.2020.07.006
- Sabin J. E. (2017). Using moral distress for organizational improvement. *The Journal of Clinical Ethics, 28*(1), 33–36.
- Saleh, Z. N., Loghmani, L., Rasouli, M., Nasiri, M., & Borhani, F. (2019). Moral distress and compassion fatigue in nurses of neonatal intensive care unit. *Electronic Journal of General Medicine, 16*(2), em116. https://doi.org/10.29333/ejgm/93473
- Sheahan, L. & Lamont, S. (2020). Understanding ethical and legal obligations in a pandemic: A taxonomy of "duty" for health practitioners. *Journal of Bioethical Inquiry, 17*(4), 697–701. https://doi.org/10.1007/s11673-020-10003-0
- Stutzer, K. & Bylone, M. (2018). Building moral resilience. *Critical Care Nurse, 38*(1), 77–79. https://doi.org/10.4037/ccn2018130/ccn2018130
- Taylor, C., Xyrichis, A., Leamy, M. C., Reynolds, E., & Maben, J. (2018). Can Schwartz Center Rounds support healthcare staff with emotional challenges at work, and how do they compare with other interventions aimed at providing similar support? A systematic review and scoping reviews. *BMJ Open, 8*(10), e024254. https://doi.org/10.1136/bmjopen-2018-024254
- Webster, L. & Wocial, L. D. (2020). Ethic in a pandemic. *American Nurse*. https://www.myamericannurse.com/ethics-in-a-pandemic-2/
- Wocial, L. D. (2020). Resilience as an incomplete strategy for coping with moral distress in critical care nurses. *Critical Care Nurse, 40*(6), 62–66. https://doi.org/10.4037/ccn2020873
- Zuzelo, P. R. (2020). Making do during a pandemic: Morally distressing and injurious events. *Holistic Nursing Practice, 34*(4), 259–261. https://doi.org/10.1097/HNP.0000000000000396

Self-Assessment Answers and Rationales

1. The correct answer is D.
Rationale: An ethical work environment promotes safety for staff and patients. Have a private conversation with the individual. The manager should be informed about the behavior and intervene if the behavior continues. See Provision 6.

2. The correct answer is D.
Rationale: Provide support to the mother. Assure she has the needed resources. This is a situation where the nurse is confronted with competing loyalties to the employing agency, the patient, and boundaries of professional nursing practice. See Provision 2.

3. The correct answer is A.
Rationale: Although the candidate is a former patient, it is your responsibility to maintain confidentiality about your past knowledge of the individual. See Provision 3.

4. The correct answer is A.
Rationale: It is the responsibility of the delegator to be knowledgeable of the delegatee's capabilities to determine if they have the knowledge and skills to provide the care to the patients assigned. See provision 4.

5. The correct answer is B.
Rationale: A new attendance policy may cause stress and distress, but for moral distress to occur, the situation must prevent the provider from meeting obligations to the patient.

6. The correct answer is D.
Rationale: Sally needs some guidance from experts in ethics and ethically challenging situations.

7. The correct answer is C.
Rationale: All actions should be done except do nothing more. The ethical dilemma needs to be escalated to individuals with the authority and responsibility to take meaningful action, and the staff needs to provide support to the family.

8. The correct answer is B.
Rationale: Ethics education is a strategy to be employed either before moral distress occurs or after moral distress is resolved to help prevent or minimize future moral distress.

9. The correct answer is B.
Rationale: The ethics committee may have a limited membership; however, direct care nurses, social workers, and chaplains should be on the committee.

Course Code: ANCCCA04EM

Evidence-Based Implicit Bias Implications for Physicians and Healthcare Professionals

1 Contact Hour

Release Date: December 23, 2021

Expiration Date: December 23, 2024

Faculty

Author:

Adrianne E. Avillion, DEd, RN, is an accomplished nursing professional development specialist and published healthcare education author. She is the owner of Strategic Nursing Professional Development, a business devoted to helping nurses maintain competency and enhance their professional growth and development. Dr. Avillion earned her doctoral degree in adult education and her MS from Penn State University, along with a BSN from Bloomsburg University. She has served in various nursing roles over her career in both leadership roles and as a bedside clinical nurse. She has published extensively and is a frequent presenter at conferences and conventions devoted to the specialty of continuing education and nursing professional development.

Adrianne E. Avillion has disclosed that she has no significant financial or other conflicts of interest pertaining to this course.

Peer reviewer:

Mary C. Ross, PhD, RN, iis an experienced nursing educator with extensive clinical experience in multiple areas of nursing. She is a retired Air Force flight nurse and previous chair of a national Veterans Administration advisory council. She has extensive experience in mental health nursing and has numerous publications.

Mary C. Ross has disclosed that she has no significant financial or other conflicts of interest pertaining to this course.

Course overview

The purpose of this education program is to teach nurses how to prevent and deal with sexual harassment in the workplace in the state of Illinois.

Learning objectives

Upon completion of this course, the learner should be able to:

- Discuss federal legislation related to sexual harassment in the workplace.
- Explain how to report sexual harassment in the workplace.
- Discuss the impact of sexual harassment in the workplace.
- Identify interventions to help persons who have been sexually harassed. Discuss ways to prevent sexual harassment in the workplace.

How to receive credit

- Read the entire course online or in print which requires a 1-hour commitment of time.
- Complete the self-assessment quiz questions which are at the end of the course or integrated throughout the course. These questions are NOT GRADED. The correct answer is shown after you answer the question. If the incorrect answer is selected, the rationale for the correct answer is provided. These questions help to affirm what you have learned from the course.
- Depending on your state requirements you will be asked to complete either:
  - An affirmation that you have completed the educational activity.
  - A mandatory test (a passing score of 70 percent is required). Test questions link content to learning objectives as a method to enhance individualized learning and material retention.
- If requested, provide required personal information and payment information.
- Complete the MANDATORY Course Evaluation.
- Print your Certificate of Completion.

CE Broker reporting

Colibri Healthcare, LLC, provider # 50-4007, reports course completion results within 1 business day to CE Broker. If you are licensed in Arkansas, District of Columbia, Florida, Georgia, Kentucky, Michigan, Mississippi, New Mexico, North Dakota, South Carolina, or West Virginia, your successful completion results will be automatically reported for you.

Accreditations and approvals

Colibri Healthcare, LLC is accredited as a provider of nursing continuing professional development by the American Nurses Credentialing Center's Commission on Accreditation.

Individual state nursing approvals

Colibri Healthcare, LLC is accredited as a provider of nursing continuing professional development by the American Nurses Credentialing Center's Commission on Accreditation. In addition to states that accept courses offered by ANCC accredited Providers, Colibri Healthcare, LLC is an approved Provider of continuing education in nursing by: Alabama Board of Nursing, Provider #ABNP1418 (valid through February 5, 2025); Arkansas State Board of Nursing, Provider #50-4007; California Board of Registered Nursing, Provider #CEP17480 (valid through January 31, 2024); California Board of Vocational Nursing and Psychiatric Technicians (LVN Provider # V15058, PT Provider #V15020; valid through December 31, 2023); District of Columbia Board of Nursing, Provider #50-4007; Florida Board of Nursing, Provider #50-4007; Georgia Board of Nursing, Provider #50-4007; Kentucky Board of Nursing, Provider #7-0076 (valid through December 31, 2023; CE Broker provider #50-4007). Michigan Board of Nursing, Provider #50-4007; Mississippi Board of Nursing, Provider #50-4007; New Mexico Board of Nursing, Provider #50-4007; North Dakota Board of Nursing, Provider #50-4007; South Carolina Board of Nursing, Provider #50-4007; and West Virginia Board of Registered Nurses, Provider #50-4007. This CE program satisfies the Massachusetts States Board's regulatory requirements as defined in 244 CMR5.00: Continuing Education.

Activity director

Shirley Aycock, DNP, RN, Executive Director of Quality and Accreditation

Disclosures

Resolution of conflict of interest
In accordance with the ANCC Standards for Commercial Support for continuing education, Colibri Healthcare, LLC implemented mechanisms prior to the planning and implementation of the continuing education activity, to identify and resolve conflicts of interest for all individuals in a position to control content of the course activity.

Sponsorship/commercial support and non-endorsement
It is the policy of Colibri Healthcare, LLC not to accept commercial support. Furthermore, commercial interests are prohibited from distributing or providing access to this activity to learners.

Disclaimer

The information provided in this activity is for continuing education purposes only and is not meant to substitute for the independent medical judgment of a healthcare provider relative to diagnostic and treatment options of a specific patient's medical condition.

Course verification

All individuals involved have disclosed that they have no significant financial or other conflicts of interest pertaining to this course. Likewise, and in compliance with California Assembly Bill No. 241, every reasonable effort has been made to ensure that the content in this course is balanced and unbiased.

INTRODUCTION

Although implicit or unconscious bias and its impact on healthcare can be understood in relationship to a range of identity characteristics (age, gender, sexual orientation, etc.), implicit bias related to race is particularly salient in the United States. This focus on racial implicit bias can be understood in the context of the history of race and racism in America.

The Enslavement of Africans

The first Africans were brought to this country forcibly on ships, arriving on the Southern shores of our nation. Packed body-next-to-body in the hull of ships, those that survived disease, malnutrition, and abuse entered this country as cargo…property. White farmers and various businessmen purchased Africans to plant and harvest crops and to cook, clean homes, and care for their children. They were the property of the individuals and families that purchased them. This forced enslavement of Africans was maintained by a system of inhumane physical and psychological abuse, norms, accepted practices, and laws. As property, Africans weren't considered human. They were property to be purchased, sold, and even named in the will of individuals before they died, like one might leave a house or wagon to a spouse or children. Like the evaluation or assessment of a used car or house, enslaved Africans were evaluated and rated according to their fitness and/or physical defects. They were not viewed as human beings on par with Whites.[1]

The ingrained nature of this racist system afforded any White person the right to stop any African American individual, question them, search them, and even physically abuse them. These actions were accepted practice and, in many cases, were part of legal codes and regulations. Thus, the systemic and structural nature of racism in this country was not only built on the economic practice of enslaving African Americans for individual and family profit, but was built on the practices, beliefs, and laws that created and supported the belief that Africans were not fully human.[2]

In the 18th and 19th century, the support of this belief of inhumanity took the form of scientific racism or pseudoscience. Many people, both professionals and laypersons, thought that African American people had an innate tendency to want to run away from the confinement of the plantation, had thicker skin and skulls, and had fewer nerve endings and therefore could endure more pain. This rationale was often used for the extreme brutalization and whipping experienced by African American men, women, and children.[3] These beliefs contributed to the medical experimentation conducted on African American bodies, sometimes without any attempt to reduce the pain and suffering of African American patients or experimental subjects.[4,5]

Although current laws, policies, and accepted medical practices have eliminated the horrendous abuses of African American bodies, it is important to recognize how deeply embedded many of the beliefs and perceptions of African American people are within American culture, consciously and implicitly.

A 2016 study revealed that almost half of the medical students and residents surveyed endorsed notions of pseudoscience, believing that African American people had thicker skin, less sensitive nerve endings, and experienced less pain than Whites.[6,7] In spite of conscious endorsements of equity, fairness, social justice, and providing the highest level of care, there is this parallel process of unconscious or implicit bias. It is not that providers are inherently bad. Rather, they are human and prone to internalize, to a greater or lesser extent, the beliefs and stereotypes resulting from centuries of systemic and structural racism. These beliefs and internalized stereotypes can cause physicians to behave in ways that violate their deeply held values of fairness and equity. The process is unconscious or implicit.

Definition

Implicit bias can be defined as those attitudes, beliefs, and stereotypes that affect our understanding, behavior, and actions in an unconscious (implicit) manner. A relatively small portion of the information the brain processes is conscious. The majority of information is processed unconsciously, out of awareness. As people process this information, their unconscious association can reinforce stereotypes that most often differ from their conscious assessment of an individual or group. These unconscious associations can contribute to the unequal treatment of people based on their race, ethnicity, gender, gender identity, age, disability, sexual orientation, etc.

Although implicit bias and unconscious associations can be a subtle influence on cognition and behavior, their impact on decisions can be significant.[8,9] Recently, an increasing number of states have enacted legislation recognizing the criticality of implicit bias in healthcare. The following is an example from California.[10]

Assembly Bill No. 241

Chapter 417

An act to amend Sections 2190.1 and 3524.5 of, and to add Section 2736.5 to, the Business and Professions Code, relating to healing arts.

[Approved by Governor October 02, 2019. Filed with Secretary of State October 02, 2019.]

LEGISLATIVE COUNSEL'S DIGEST

This bill would require the Board of Registered Nursing, by January 1, 2022, to adopt regulations requiring all continuing education courses for its licensees to contain curriculum that includes specified instruction in the understanding of implicit bias in treatment. Beginning January 1, 2023, the bill would require continuing education providers to comply with these provisions and would require the board to audit education providers for compliance with these provisions, as specified.

THE PEOPLE OF THE STATE OF CALIFORNIA DO ENACT AS FOLLOWS:

SECTION 1.

The Legislature finds and declares all of the following:

(a) Implicit bias, meaning the attitudes or internalized stereotypes that affect our perceptions, actions, and decisions in an unconscious manner, exists, and often contributes to unequal treatment of people based on race, ethnicity, gender identity, sexual orientation, age, disability, and other characteristics.

(b) Implicit bias contributes to health disparities by affecting the behavior of physicians and surgeons, nurses, physician assistants, and other healing arts licensees.

(c) Evidence of racial and ethnic disparities in healthcare is remarkably consistent across a range of illnesses and healthcare services. Racial and ethnic disparities remain even after adjusting for socioeconomic differences, insurance status, and other factors influencing access to healthcare.

(d) African American women are three to four times more likely than White women to die from pregnancy-related causes nationwide. African American patients often are prescribed less pain medication than White patients who present the same complaints, and African American patients with signs of heart problems are not referred for advanced cardiovascular procedures as often as White patients with the same symptoms.

(e) Implicit gender bias also impacts treatment decisions and outcomes. Women are less likely to survive a heart attack when they are treated by a male physician and surgeon. LGBTQ and gender-nonconforming patients are less likely to seek timely medical care because they experience disrespect and discrimination from healthcare staff, with one out of five transgender patients nationwide reporting that they were outright denied medical care due to bias.

(f) The Legislature intends to provide specified healing arts licensees with strategies for understanding and reducing the impact of their biases in order to reduce disparate outcomes and ensure that all patients receive fair treatment and quality healthcare.

The process of implicit bias in no way diminishes the importance of conscious, deliberate behavior. Physicians' conscious endorsements of the values of equity and fairness can be an important element of their service to patients. In addition to deeply held values, creating equitable healthcare environments requires physicians' conscious actions to build systems and processes that move them towards the elimination of disparities. It is not only the responsibility of those with particular titles, like a chief diversity officer, but all healthcare providers must be "activists" in their own areas of work: in the treatment room, in the laboratory, or in the administrative suite. The focus on implicit bias does not absolve providers of conscious, focused, deliberate action, it simply highlights an important parallel process.

EARLY CHILDHOOD RESEARCH

Did you know? Much of the research on implicit bias has only occurred in the last 40 years. It has provided increasing support for theories related to the development of implicit biases and ways in which unconscious biases impact decision making.

One of the important areas of implicit bias research focuses on the question, how early in one's development does implicit bias begin to show up? Recent research suggests that the foundation for what later shows up as implicit bias occurs in infancy. For example, if we track the eyes of infants, at about four weeks of age they will stare longer and more frequently at female faces if a woman has been the primary caregiver. This is clearly not implicit bias, but it appears to reflect a differential association or a preference. This process of differential response in terms of what types of faces infants tend to stare at continues to evolve.[11,12] Although care has to be taken to not infer bias from infant behavior, it appears that responsiveness to faces that are similar to the infant or the individual who provides nurturing/food may be a precursor to preferences later in development.

As toddlers and older children begin to spend time online, watch television, and read books, they sense the race or gender of the people who tend to be in leadership roles, those who appear dangerous, those who are police and fire people, those who are doctors, etc. Inequities and biases in the broader society get incorporated into media, which get consumed by children, whether intentionally or not. These portrayals then influence and

shape unconscious associations in children of all ages.[13] Children are also influenced by the behavior of parents, caregivers, and other significant adults in their life, noticing the complexion and gender of their close friends, as well as comments and jokes. It's not only the things that parents and caregivers say to convey fairness and kindness for all people, but it's also what children observe day-to-day in the behavior of those adult models.[14]

The process of unconscious associations can also be seen in the way adults begin to view and interact with children. In a study at the Yale Child Study Center in 2016, preschool teachers viewed videos of African American and White children walking around a classroom, talking, and interacting with each other[15]. The viewing device also recorded who and what the teachers were looking at during the study. When teachers then were told that there might be challenging behavior, the device revealed that they began to look at and track the African American children. Further, their eyes tracked the African American boys more than the other children. The teachers did not have any conscious idea of their viewing behavior.

ADULT RESEARCH

Within the racial history of America, the complexion of African American people has always been a complex dynamic. The One Drop Rule, in practice and then in law, has existed since Africans were forcibly brought to this country. Interracial relationships, both forced and voluntary, resulted in bi-racial children and adults. Essentially, any African ancestry ("one drop of African American blood") classified an individual as African American.[16] In addition, lighter-skinned African Americans were sometimes viewed as slightly higher in status than darker-skinned African Americans. Darker-skinned African Americans often had fewer employment opportunities and were treated more harshly. Although the deliberate disparate treatment of light-skinned and darker-skinned African Americans has significantly diminished, unconscious bias related to the complexion of people still exists in many sectors of American society. Hiring and promotions of African Americans can sometimes be significantly influenced by implicit racial bias related to complexion.[17,18] In one experiment, subjects were sent to one of two rooms. In one room subjects saw the subliminal presentation of the word "ignorant" on a screen, followed by the subliminal presentation of the face of an African American male. In the other room, subjects saw the subliminal presentation of the word "educated" and the subliminal presentation of the face of the same man.

In the next phase of the experiment, subjects in both rooms saw seven variations of the same man's face: three images were lighter-skinned versions, three images were darker-skinned versions, and one image was identical to the first subliminal presentation. From the seven photographs, subjects were asked to select the version that was identical to the subliminal presentation. Researchers found that subjects primed with the word "ignorant" selected a darker-skinned version of the man, while those primed with the word "educated" selected a lighter-skinned version.[19] Judgment about the worth or intellect of the African American man appeared to be unconsciously influenced by his complexion. Although not reported in the research, subjects would probably deny making judgment based on complexion. It should be noted that in recent generations, discrimination based on skin tone appears to be diminishing.[20]

Excessive and biased focus on African American youth's behavior in schools contributes to the disparate suspension rate for African American and White students in primary and secondary schools.[21] This does not appear to be the result of conscious discrimination. It appears that similar behavior is judged differently when occurring by an African American versus a White student. Blake and colleagues went a step further and examined race, complexion, and suspension rates. They found that African American teenage girls with darker complexions are suspended at a higher rate than those with lighter complexions.[22] Again, unconscious bias seems to be a major factor.

As mentioned earlier, implicit bias operates not only for race, given the historical context of race in America, but gender, sexual orientation, height, weight, and even accent can unconsciously influence attitudes and decisions. In one experiment, subjects listened to two separate English speakers reading the same script. When they saw a photograph of an Asian person as the speaker, they rated the accent as being stronger than when the speaker was paired with a photo of a White person. They also rated the understanding of the content as being more difficult to understand when they saw a face of an Asian person. The assessment of the speaker, prompted by the photograph of an Asian individual, appeared to be influenced by unconscious bias.[23]

Before the Covid-19 pandemic, it was more common to have online courses with PowerPoint slides and videos, without seeing the actual instructor. MacNell constructed a research design where a male and a female instructor each led two sections of a discussion group. During one section they both used a male name; during the other section they both used a female name. Students couldn't see the face of the instructor or hear their voice. They tried to teach all four sections similarly. At the end of the semester, the students in all four discussion groups were asked to rate the instructors on 12 different traits, covering characteristics related to their effectiveness and interpersonal skills. The male-named instructors were rated highest on all characteristics, regardless of whether the instructors were actually male or female. Classwork was graded and returned to students at the same time in all four sections. Students who thought that they were being taught by a male instructor gave a promptness rating of 4.35 out of 5. Student gave the female-named instructors a rating of 3.55.[24,25] Again, this points to the powerful influence of unconscious bias.

Case study exercise 1

You've just come from a meeting with a group of African American and Latinx community residents. They presented the committee, which you are a part of, with a list of demands related to what they perceive as a racist hospital environment.

Questions:

1. Why might the community members perceive a hospital or healthcare system as being racist?
2. Why might some African American patients question White providers about their background and experience in working with African American patients?

Answers:

1. In addition to the history and present state of a particular hospital or healthcare system, the history of racism in America in general, as well as continuing racial health disparities, may contribute to some African Americans and Latinx community residents perceiving a hospital as being racist.
2. The history of race relations in American has contributed to many divisions. White providers may not have many close friends who are African American or spend significant amounts of time in predominately African American communities. Stereotypes about casually dressed young African American men may operate for some providers.

What does this have to do with healthcare? In addition to a provider's conscious adherence to high ethical standards and a commitment to quality care, they are also subject to implicit bias, like the rest of the population. Fitzgerald and Hurst examined 42 peer-reviewed articles.[26] The evidence indicated that healthcare professionals exhibit the same level of implicit bias as the wider population. A couple decades earlier, Shulman and his colleagues published research that many view as a major stimulus for further research regarding implicit bias and healthcare.[27] They presented 720 physicians with videos of patients (actors) who were similar in physical appearance and medical history, differing only by race and sex. All were candidates for cardiac catheterization. After the physicians saw the videos of the patients and reviewed their history, the researchers found that women and African Americans were less likely to be referred for cardiac catheterization than men and Whites. It appeared that, in spite of the conscious commitment to equitable care, unconscious bias was an influence in referral decision making.

The national interest in implicit bias in healthcare intensified when the Institute of Medicine delivered their report, Unequal Treatment, in 2003.[28] It concluded that implicit bias against social groups, including racial and ethnic groups, can impact the clinical encounter. Much of the research supporting this report utilized the online Implicit Association Test (IAT). The IAT measures the strength of associations between concepts such as African American or White, old or young, good or bad, desirable or undesirable, and dangerous or friendly. The reaction time (association) to various pairs of words or photographs is a measure of the strength of the association. Millions of people used this website (operated by Harvard University) to take the IAT or one of the other tests.

The racial disparity in the judgment of pain has been studied as an example of implicit bias in healthcare. In research by Mende-Siedlecki and colleagues, White providers demonstrated more stringent thresholds in perceiving pain on African American faces versus White faces, and those with more stringent thresholds for African American patients prescribed fewer non-narcotic pain relievers.[29] This was not true for Asian faces, suggesting that other-face dynamics were not at play. This research did not investigate whether gaps in empathy or perspective taking skills might be a partial explanation for the disparity.

Implicit bias has also been shown to impact the quality of the clinical encounter, particularly communication. In an early study, primary care physicians took the IAT and had their clinical encounters recorded.[30] Provider race bias on the IAT was associated with lower quality communication with African American patients, such as more provider verbal dominance, lower patient positive affect, poorer patient ratings of interpersonal care, lower perceptions of respect from clinicians, and lower likelihood of recommending the clinician.

The quality of communication is also related to word choice. One hundred and seventeen videotaped racially discordant physician-patient encounters were analyzed using the Linguistic Inquiry and Word Count software. Providers with higher levels of implicit racial bias (based on IAT scores) more frequently used first-person pronouns and anxiety-related words than providers with lower implicit racial bias scores.[32] Communication is also a major factor in a patient's experience of trust in the clinical encounter. [33]

There is abundant evidence that even when controlling for variables such as insurance, socioeconomic status, geography, and even socioeconomic status, implicit bias is an important influence on patient satisfaction and referral for treatment, both contributors to healthcare disparities.[34,35,36], Even high-status African American patients can experience disparate treatment. When giving birth, tennis star Serena Williams suffered a pulmonary embolism, although thankful for the care she received, she noted that her status likely contributed to her getting a level of care not afforded to all women.[37] Ms. Williams' experience causes some to reflect on the 2019 CDC report that indicated a racial disparity in pregnancy-related deaths. Implicit bias can not only influence the assessment of pain but can also influence provider decision making in high-discretion situations.[38,39] For example, of the two or three tests that might be available for a particular condition, there is sometimes discretion on the part of the provider in terms of which test is given or how soon a test is recommended. While consciously endorsing values of equity, fairness, high quality care, etc., provider behavior can be influenced by implicit bias.

Case study exercise 2

John is a White nurse caring for an African American pregnant woman in an obstetrics unit in a hospital. The patient is a lesbian and had an in vitro fertilization. Her partner is White and asks to speak to you, the physician, in private and not in the patient's room. The partner mentions that she recently saw a news story about how African American women are treated unfairly in comparison to White women.

You're sure that her partner will be given the same level of care as other patients, and you give this reassurance consciously in a deliberate manner. However, you know that, in addition to this conscious process, there are potential areas of implicit bias that might occur, both in decision making and in communication.

Questions:

1. How might the racial difference between the nurse, John, and the patient influence provider-patient communication?
2. How might implicit bias show up in this case?

Answers:

1. Given the history of racism in America, racial discordance between provider and patient may negatively impact trust in the clinical encounter. African American patients may have experienced racial insensitivities, bias, or discrimination in the past and may be vigilant for signs of caring and trust from the provider. In addition to racial implicit bias, there can be implicit bias based on other characteristics, such as sexual orientation.
2. Given that there might be a difference between conscious attempts to be fair and equitable and implicit bias, care needs to be taken to ensure that word choice and nonverbal communication (eye contact, smiling, etc.) do not reflect unintentional bias. Further, nonverbal bias includes not touching and standing further away from the patient.31 Self-reflection and awareness can be useful tools. Reflecting on the question, Would I react differently if the patient was White or heterosexual? can be a useful strategy.

ACCELERATING IMPLICIT BIAS[40]

Quick Implicit Bias Facts: Several factors can accelerate implicit bias or make it more likely to be a significant influence.

- Time constraints (e.g., limited time to see a patient)
- Complexity (e.g., multitasking or needing to consider multiple factors quickly)
- Physical constraints (e.g., working long hours)

Given the rapid, unconscious associations that characterize implicit bias, factors that impede the slow, careful refection of multiple factors can be fertile ground for implicit bias.

Many providers may see these factors as basically describing their day-to-day work. But recognizing these factors can provide an opportunity to try to make small modifications, where possible, to mitigate the influence of implicit bias.

MITIGATING IMPLICIT BIAS

There are several strategies that have shown promise in mitigating or reducing the occurrence of implicit bias. Given the brain's innate rapid processing of large amounts of data every second and the acceleration factors mentioned above, there is no strategy that can completely eliminate unconscious associations or bias. Further, approaches to mitigating or reducing implicit bias are most effective when more than one strategy is utilized. Strategies to consider include the following:[41,42,43,44]

Increasing knowledge

It is useful for workshops and presentations to describe how implicit bias develops and its relationship to societal stereotypes (race, gender, sexual orientation, disability, etc.). Presentation of research findings can help providers understand how implicit bias can negatively impact various aspects of the clinical encounter and contribute to healthcare disparities. As a component of workshops, case studies can help providers apply knowledge to realistic, complex situations. Refresher experiences are also useful.

Self-awareness

With knowledge of the development and process of implicit bias as a foundation, a pause-and-reflect approach can increase the occasions when providers deliberately take a few moments to reflect on their thoughts and behaviors when interacting with a patient and/or making an important decision. Pausing allows for a few seconds to reflect on the kinds of associations that they may be making as the patient walks through the door based on the way they're dressed, their gender, their race, or any other characteristic. Discovering personal tendencies or becoming aware of an area of personal bias can help in modifying communication, where necessary. Such self-awareness can prompt providers to focus on seeing a given patient as an individual (individuation) and trying to see things from the patient's perspective (perspective taking).

Organization systems and processes

Implicit bias can play a key role in fostering and reinforcing systems of inequities in hiring and promotion. Race, gender, accent, weight, etc. are factors that not only impact implicit bias in patient care but can also influence hiring and promotion decisions. Mitigating unconscious bias in rewards and recognition, as well as in selection decisions, is of critical importance in the work to increase the diversity of medical students, clinical providers, researchers, managers, and senior healthcare providers.

Cues and reminders

Information about implicit bias as well as motivation to reflect on personal biases can begin to fade months and even weeks after the initial intervention. Strategies to stimulate recall or remind providers about the work to mitigate implicit bias can be useful. Key words or phrases on the treatment room computer screen or even a specially designed screen saver can be used as a reminder. A mobile phone background can contain a photo or a word that serves as a reminder every time the provider uses the phone. Changing the photo or word periodically can help to avoid habituation. The inside cover of a folder containing CVs can list key phrases to remind search committee members to avoid bias in the screening process.

DISPARITIES IN ACCESS TO AND DELIVERY OF HEALTH CARE SERVICES

As it is quite apparent that disparities in healthcare exist, The Department of Health and Human Services intends to directly address this inequality in the next four years. It has posted a draft of its strategic goals for the fiscal years 2022-2026, and impartial access to healthcare is of particular interest. The first of the five stated goals are to "Protect and Strengthen Equitable Access to High Quality and Affordable Healthcare".[45] As part of this goal, one strategic objective specifies an intent to "expand equitable access to comprehensive, community-based, innovative, and culturally-competent healthcare services while addressing social determinants of health".

They describe improved access to health-related services for an underserved population through the removal of barriers to access, a reduction in disparities in healthcare, and support of community-based services. An increase in healthcare facilities, a more diverse healthcare workforce and collaboration with cultural and community services can all contribute to improvements in access disparities.[46] Chin et al provided specific suggestions for community involvement through school-based care, household outreach, and religious based care delivery. Members of the community may be involved as peer coaches, peer educators and patient care navigators to enhance use of healthcare services. Educational material intended to address specific cultural perspectives can target unique characteristics of the community and, "open door" clinic policies and streamlined referral processes may contribute to an increase in patient participation. Chin et al also suggest that reduced out of pocket costs, or free giveaways can serve as financial incentives to improve participation in healthcare services. Lastly, psychological services and support through family therapy, motivational interviewing and counseling can help to encourage access to additional services and care. [47]

Conclusion

The history of race and racism in America is central to the development of racial implicit bias across various sectors of our society and is a major contributor to racial healthcare inequities. However, we must not lose sight of the intersection of implicit bias and gender, sexual orientation, weight, race, and other individual and group characteristics. Our patients bring their unique physical condition, their intersectional identity, and, in many cases, significant time, living within the ingrained structures, attitudes, and beliefs of this nation. It's our responsibility to not only engage what we are consciously aware of but also work to uncover personal and organizational biases that impede our movement towards a healthcare environment and society of true equity and the highest quality care.

References

- Franklin JH, Higginbotham EB. From Slavery to Freedom: A History of African Americans. Mcgraw-Hill/Connect Learn Succeed; 2011.
- Phrenology: What is it, and how did it contribute to neuroscience? www.medicalnewstoday.com. Published February 2, 2021. https://www.medicalnewstoday.com/articles/phrenology-the-pseudoscience-of-skull-shapes
- Historical Context: Facts about the Slave Trade and Slavery | Gilder Lehrman Institute of American History. Gilderlehrman.org. https://www.gilderlehrman.org/history-resources/teaching-resource/historical-context-facts-about-slave-trade-and-slavery. Published 2021. Accessed October 24, 2021.
- Cohen AS. Harvard's Eugenics Era. Harvard Magazine. Published February 19, 2016. Accessed October 24, 2021. https://www.harvardmagazine.com/2016/03/harvards-eugenics-era
- Dimuro G. Southerners Actually Thought Slaves Escaping Was A Sign Of Mental Illness. All That's Interesting. Published April 4, 2018. https://allthatsinteresting.com/drapetomania
- Hoffman KM, Trawalter S, Axt JR, Oliver MN. Racial bias in pain assessment and treatment recommendations, and false beliefs about biological differences between blacks and whites. Proceedings of the National Academy of Sciences. 2016;113(16):4296-4301. doi:10.1073/pnas.1516047113
- Ramin Skibba. The Disturbing Resilience of Scientific Racism. Smithsonian. Published May 20, 2019. https://www.smithsonianmag.com/science-nature/disturbing-resilience-scientific-racism-180972243/
- Edgoose J, Quiogue M, Sidhar K. How to Identify, Understand, and Unlearn Implicit Bias in Patient Care. Family Practice Management. 2019;26(4):29-33. https://www.aafp.org/fpm/2019/0700/p29.html
- DeAngelis T. How does implicit bias by physicians affect patients' health care? https://www.apa.org. https://www.apa.org/monitor/2019/03/ce-corner. Published March 2019.
- Bill Text - AB-241 Implicit bias: continuing education: requirements. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201920200AB241. Published 2021. Accessed October 24, 2021.
- Balas B, Westerlund A, Hung K, Nelson III CA. Shape, color and the other-race effect in the infant brain. Developmental Science. 2011;14(4):892-900. doi:10.1111/j.1467-7687.2011.01039.x
- Lee K, Quinn PC, Pascalis O. Face Race Processing and Racial Bias in Early Development: A Perceptual-Social Linkage. Current Directions in Psychological Science. 2017;26(3):256-262. doi:10.1177/0963721417690276
- Williams A, Steele JR. Examining Children's Implicit Racial Attitudes Using Exemplar and Category‐Based Measures. Child Development. 2017;90(3). doi:10.1111/cdev.12991
- Pirchio S, Passiatore Y, Panno A, Maricchiolo F, Carrus G. A Chip Off the Old Block: Parents' Subtle Ethnic Prejudice Predicts Children's Implicit Prejudice. Frontiers in Psychology. 2018;9. doi:10.3389/fpsyg.2018.00110
- Gilliam W, Maupin A, Reyes C, Accavitti M, Shic F. Do Early Educators' Implicit Biases Regarding Sex and Race Relate to Behavior Expectations and Recommendations of Preschool Expulsions and Suspensions. Yale Child Study Center; 2016
- O'Connell HA, Bratter JL, Casarez RS. One drop on the move: historical legal context, racial classification, and migration. Ethnic and Racial Studies. Published online May 12, 2020:1-20. doi:10.1080/01419870.2020.1761554
- Grant C. What Is Colorism? Verywell Mind. Published November 21, 2020. https://www.verywellmind.com/what-is-colorism-5077380
- Louie P, Wilkes R. Representations of race and skin tone in medical textbook imagery. Social Science & Medicine. 2018;202:38-42. doi:10.1016/j.socscimed.2018.02.023
- Ben-Zeev A, Dennehy TC, Goodrich RI, Kolarik BS, Geisler MW. When an "Educated" Black Man Becomes Lighter in the Mind's Eye. SAGE Open. 2014;4(1):215824401351677. doi:10.1177/2158244013516770
- Branigan AR, Freese J, Sidney S, Kiefe CI. The Shifting Salience of Skin Color for Educational Attainment. Socius: Sociological Research for a Dynamic World. 2019;5:237802311988982. doi:10.1177/2378023119889829
- Erickson JH, Pearson J. Excluding Whom? Race, Gender, and Suspension in High School. Education and Urban Society. Published online June 24, 2021:001312452110275. doi:10.1177/00131245211027510
- Blake JJ, Keith VM, Luo W, Le H, Salter P. The role of colorism in explaining African American females' suspension risk. School Psychology Quarterly. 2017;32(1):118-130. doi:10.1037/spq0000173
- Zheng Y, Samuel AG. Does seeing an Asian face make speech sound more accented? Attention, Perception, & Psychophysics. 2017;79(6):1841-1859. doi:10.3758/s13414-017-1329-2
- MacNell L, Driscoll A, Hunt AN. What's in a Name: Exposing Gender Bias in Student Ratings of Teaching. Innovative Higher Education. 2014;(4):291-303. doi:10.1007/s10755-014-9313-4
- Mitchell KMW, Martin J. Gender Bias in Student Evaluations. PS: Political Science & Politics. 2018;51(03):648-652. doi:10.1017/s104909651800001x
- FitzGerald C, Hurst S. Implicit bias in healthcare professionals: a systematic review. BMC Medical Ethics. 2017;(1). doi:10.1186/s12910-017-0179-8
- The Effect of Race and Sex on Physicians' Recommendations for Cardiac Catheterization. New England Journal of Medicine. 1999;340(14):1130-1130. doi:10.1056/nejm199904083401424
- Institute of Medicine (US) Committee on Understanding and Eliminating Racial and Ethnic Disparities in Health Care, Smedley BD, Stith AY, Nelson AR, eds. Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care. Washington (DC): National Academies Press (US); 2003.
- Mende-Siedlecki P, Qu-Lee J, Backer R, Van Bavel JJ. Perceptual contributions to racial bias in pain recognition. Journal of Experimental Psychology: General. 2019;148(5):863-889. doi:10.1037/xge0000600
- Cooper LA, Roter DL, Carson KA, et al. The Associations of Clinicians' Implicit Attitudes About Race With Medical Visit Communication and Patient Ratings of Interpersonal Care. American Journal of Public Health. 2012;102(5):979-987. doi:10.2105/ajph.2011.300558
- Elliott, A. M., Alexander, S. C., Mescher, C. A., Mohan, D., & Barnato, A. E. Differences in physicians' verbal and nonverbal communication with black and white patients at the end of life. Journal of pain and symptom management, 2016; 51(1), 1-8.
- Hagiwara N, Slactcher RB, Eggly S, Penner LA. Physician Racial Bias and Word Use during Racially Discordant Medical Interactions. Health Communication. 2016;32(4):401-408. Doi:10.1080/10410236.2016.1138389
- Cuevas AG, O'Brien K, Saha S. Can patient-centered communication reduce the effects of medical mistrust on patients' decision making? Health Psychology. 2019;38(4):325-333. doi:10.1037/hea0000721
- Saluja B, Bryant Z. How Implicit Bias Contributes to Racial Disparities in Maternal Morbidity and Mortality in the United States. Journal of Women's Health. 2020;30(2). doi:10.1089/jwh.2020.8874
- Wilson BN, Murase JE, Sliwka D, Botto N. Bridging racial differences in the clinical encounter: How implicit bias and stereotype threat contribute to health care disparities in the dermatology clinic. International Journal of Women's Dermatology. Published online January 2021. doi:10.1016/j.ijwd.2020.12.013
- Wilson BN, Murase JE, Sliwka D, Botto N. Bridging racial differences in the clinical encounter: How implicit bias and stereotype threat contribute to health care disparities in the dermatology clinic. International Journal of Women's Dermatology. Published online January 2021. doi:10.1016/j.ijwd.2020.12.013
- Salam M. For Serena Williams, Childbirth Was a Harrowing Ordeal. She's Not Alone. The New York Times. https://www.nytimes.com/2018/01/11/sports/tennis/serena-williams-baby-vogue.html. Published January 11, 2018.
- Johnson JD, Asiodu IV, McKenzie CP, et al. Racial and Ethnic Inequities in Postpartum Pain Evaluation and Management. Obstetrics and gynecology. Published online 2019:10.1097/AOG.0000000000003505. doi:10.1097/AOG.0000000000003505
- Roeder A. America is Failing its Black Mothers. Harvard Public Health Magazine. Published December 21, 2018. https://www.hsph.harvard.edu/magazine/magazine_article/america-is-failing-its-black-mothers/
- Johnson TJ, Hickey RW, Switzer GE, et al. The Impact of Cognitive Stressors in the Emergency Department on Physician Implicit Racial Bias. Gerson L, ed. Academic Emergency Medicine. 2016;23(3):297-305. doi:10.1111/acem.12901
- Eight tactics to identify and reduce your implicit biases. The Journal of Medical Practice Management : MPM. 2020;35(5):237. https://login.proxy.lib.duke.edu/login?url=https://www.proquest.com/scholarly-journals/eight-tactics-identify-reduce-your-implicit/docview/2504870922/se-2?accountid=10598
- Narayan MC. Addressing Implicit Bias in Nursing: A Review. AJN, American Journal of Nursing. 2019;119(7):36-43. doi: 10.1097/01.naj.0000569340.27659.5a
- IHI Multimedia Team. How to Reduce Implicit Bias. Ihi.org. Published 2019. http://www.ihi.org/communities/blogs/how-to-reduce-implicit-bias
- Di Brito SR, Lopez CM, Jones C, Mathur A. Reducing Implicit Bias: Association of Women Surgeons #HeForShe Task Force Best Practice Recommendations. Journal of the American College of Surgeons. 2019;228(3):303-309. doi: 10.1016/j.jamcollsurg.2018.12.011
- HHS.gov. Strategic Goal 1: Protect and Strengthen Equitable Access to High Quality and Affordable Healthcare. October 6, 2021. https://www.hhs.gov/about/draft-strategic-plan/goal-1/index.html
- HHS.gov. Strategic Goal 1.3. Expand equitable access to comprehensive, community-based, innovative, and culturally-competent healthcare services while addressing social determinants of health October 6, 2021. https://www.hhs.gov/about/draft-strategic-plan/goal-1/objective-1-3/index.html
- Chin, M.H., Clarke, A.R., Nocon, R.S. et al. A Roadmap and Best Practices for Organizations to Reduce Racial and Ethnic Disparities in Health Care. J GEN INTERN MED 27, 992–1000 (2012). https://doi.org/10.1007/s11606-012-2082-9

Course Code: ANCCCA01IB

Hypertension Management: Evidence-Based Guidelines

4 Contact Hours, 4 Pharmacology Hours

Release Date: January 6, 2022

Expiration Date: January 6, 2025

Faculty

Author: Katie Blair, PharmD, RPh, is a pharmacist and freelance writer specializing in pharmacy education. She works as a consultant pharmacist in Vancouver, Washington, serving long-term care facilities in the area. She also has over 6 years of experience working as a staff pharmacist at a community pharmacy in Seattle. Dr. Blair graduated from Northeastern University in Boston in 2009 with a Doctor of Pharmacy degree. She has done freelance work writing and revising continuing education programs for pharmacists, pharmacy technicians, and nurses, as well as writing practice questions for various pharmacy technician exams.

Katie Blair has disclosed that she has no significant financial or other conflicts of interest pertaining to this course.

Reviewer: Susan L. Rubin, MSN, RN received her baccalaureate degree in nursing from West Chester University and a master's degree in clinical trials nursing from Drexel University. She is a published author who has experience as a progressive care unit nurse with a special interest in cardiac nursing.

Susan L. Rubin has disclosed that she has no significant financial or other conflicts of interest pertaining to this course.

Course overview

This program is intended to provide a hypertension treatment overview. Safe and effective prescribing decisions must be guided by an in-depth understanding of each agent: how it works, how to dose it, anticipated adverse events, drug interactions, etc. When combination drugs are included, there may be as many as 200 different pharmacological options (both individual agents as well as combination products) that are approved by FDA for the treatment of hypertension. As a result, this educational program is designed only to highlight the major categories of therapeutics by identifying key products and characterizing them as a class. To provide perspective, an effort was made to provide highlights of clinically meaningful outcomes studies for the various drug classes.

Learning objectives

On completion of this course, the reader should be able to:

- Interpret clinical findings in relation to the different stages of high blood pressure, including elevated blood pressure, Stage 1 hypertension, and Stage 2 hypertension.
- Describe social, environmental, and biological factors implicated in the development of hypertension.
- Explain the lifestyle changes recommended to prevent and manage hypertension.
- Differentiate between the classes of medications used to treat hypertension and their side effect profiles.
- Apply drug information to choose appropriate hypertension treatment regimens based on patient factors.
- Describe racial, ethnic, and age-related considerations in the treatment of hypertension.
- Discuss the treatment of gestational hypertension, preeclampsia, and hypertensive emergencies.

How to receive credit

- Read the entire course online or in print which requires a 4-hour commitment of time.
- Complete the self-assessment quiz questions which are at the end of the course or integrated throughout the course. These questions are NOT GRADED. The correct answer is shown after you answer the question. If the incorrect answer is selected, the rationale for the correct answer is provided. These questions help to affirm what you have learned from the course.
- Depending on your state requirements you will be asked to complete either:
  - An affirmation that you have completed the educational activity.
  - A mandatory test (a passing score of 70 percent is required). Test questions link content to learning objectives as a method to enhance individualized learning and material retention.
- If requested, provide required personal information and payment information.
- Complete the MANDATORY Course Evaluation.
- Print your Certificate of Completion.

CE Broker reporting

Colibri Healthcare, LLC, provider # 50-4007, reports course completion results within 1 business day to CE Broker. If you are licensed in Arkansas, District of Columbia, Florida, Georgia, Kentucky, Michigan, Mississippi, New Mexico, North Dakota, South Carolina, or West Virginia, your successful completion results will be automatically reported for you.

Accreditations and approvals

Colibri Healthcare, LLC is accredited as a provider of nursing continuing professional development by the American Nurses Credentialing Center's Commission on Accreditation.

Individual state nursing approvals

Colibri Healthcare, LLC is accredited as a provider of nursing continuing professional development by the American Nurses Credentialing Center's Commission on Accreditation. In addition to states that accept courses offered by ANCC accredited Providers, Colibri Healthcare, LLC is an approved Provider of continuing education in nursing by: Alabama Board of Nursing, Provider #ABNP1418 (valid through February 5, 2025); Arkansas State Board of Nursing, Provider #50-4007; California Board of Registered Nursing, Provider #CEP17480 (valid through January 31, 2024); California Board of Vocational Nursing and Psychiatric Technicians (LVN Provider # V15058, PT Provider #V15020; valid through December 31, 2023); District of Columbia Board of Nursing, Provider #50-4007; Florida Board of Nursing, Provider #50-4007; Georgia Board of Nursing, Provider #50-4007; Kentucky Board of Nursing, Provider #7-0076 (valid through December 31, 2023; CE Broker provider #50-4007). Michigan Board of Nursing, Provider #50-4007; Mississippi Board of Nursing, Provider #50-4007; New Mexico Board of Nursing, Provider #50-4007; North Dakota Board of Nursing, Provider #50-4007; South Carolina Board of Nursing, Provider #50-4007; and West Virginia Board of Registered Nurses, Provider #50-4007. This CE program satisfies the Massachusetts States Board's regulatory requirements as defined in 244 CMR5.00: Continuing Education.

Activity director

Shirley Aycock, DNP, RN, Executive Director of Quality and Accreditation

Disclosures

Resolution of conflict of interest
In accordance with the ANCC Standards for Commercial Support for continuing education, Colibri Healthcare, LLC implemented mechanisms prior to the planning and implementation of the continuing education activity, to identify and resolve conflicts of interest for all individuals in a position to control content of the course activity.

Sponsorship/commercial support and non-endorsement
It is the policy of Colibri Healthcare, LLC not to accept commercial support. Furthermore, commercial interests are prohibited from distributing or providing access to this activity to learners.

Disclaimer

The information provided in this activity is for continuing education purposes only and is not meant to substitute for the independent medical judgment of a healthcare provider relative to diagnostic and treatment options of a specific patient's medical condition.

Course verification

All individuals involved have disclosed that they have no significant financial or other conflicts of interest pertaining to this course. Likewise, and in compliance with California Assembly Bill No. 241, every reasonable effort has been made to ensure that the content in this course is balanced and unbiased.

INTRODUCTION

In clinical practice, blood pressure is a measure of the hydrostatic pressure of the blood against the walls of the arteries. Blood pressure is generally assessed with two distinct measurements, expressed as millimeters of mercury (mmHg) (National Heart, Lung, and Blood Institute [NHLBI], 2020):

- Systolic blood pressure: The pressure when the ventricles are pumping blood out of the heart.
- Diastolic blood pressure: The resting pressure measured between heartbeats when the heart is filling with blood.

For healthy adult patients, normal blood pressure is defined as a systolic blood pressure less than 120 mmHg and a diastolic blood pressure less than 80 mmHg (120/80 mmHg). Pressures fluctuate throughout the day and are dependent on a patient's activity. Typically, if a patient is excited, nervous, or exerting themselves, blood pressure will rise, falling back to normal when the exacerbating activity concludes. Blood pressure is also a function of age and body size. For example, compared to older teenage children or adults, newborn babies have lower blood pressure. Hypertension is a common pathologic condition describing higher than normal arterial blood pressure (NHLBI, 2020).

Abnormal blood pressure - Hypertension may be diagnosed based on increased systolic blood pressure, increased diastolic blood pressure, or increases of both. Hypertension can be categorized into distinct stages, as described in the following table (Whelton et al., 2018):

Stage	Systolic pressure (mmHg)		Diastolic pressure (mmHg)
Normal	<120	and	<80
Elevated Blood Pressure	120 – 129	and	< 80
Stage 1 Hypertension	130 – 139	or	80 – 89
Stage 2 Hypertension	≥ 140	or	≥ 90

It is critical to note that these stages of blood pressure are based on November 2017 guidelines issued by the American College of Cardiology (ACC) and the American Heart Association (AHA). These new definitions are at lower levels than those previously employed and remove the old designation of prehypertension. These levels are designed to identify a larger number of people with elevated blood pressure, estimated to include 46% of American adults, to facilitate earlier interventions. These changes

are expected to triple the prevalence of high blood pressure in men under the age of 45 while doubling the incidence in women in that same age group (Whelton et al., 2018).

Self-Assessment Quiz Question #1

Which of the following average blood pressures would fall into the category of stage 1 hypertension?

a. 138/78 mmHg.
b. 124/79 mmHg.
c. 145/85 mmHg.
d. 118/77 mmHg.

PRIMARY HYPERTENSION

Primary hypertension, also known as essential hypertension, refers to high blood pressure for which there is no identified cause. Nonetheless, its definition also implies that treatment of elevated blood pressure will result in significant clinical benefit. Because of differences in each individual's cardiovascular risk, that benefit will vary from patient to patient (Firth et al., 2020). A hypertension diagnosis can be made at such time that the average of two or more blood pressure assessments, on at least two subsequent patient encounters, is elevated (Whelton et al., 2018).

In cases where patients have consistent systolic blood pressure measurements of ≥ 140 mmHg accompanied by diastolic blood pressures < 90 mmHg, diagnosis can be made of isolated systolic hypertension. It is the most common form of hypertension in the elderly, often because of aging and modifiable risk factors, though it can also be seen in young and middle-aged adults. Since systolic blood pressure is a major determinant of cardiovascular risk, it is important to ensure these patients are treated appropriately (Bavishi et al., 2016).

SECONDARY HYPERTENSION

Secondary hypertension occurs in cases where high blood pressure stems from a different medical condition, which occurs in about 5-10% of cases. It can be caused by a variety of pathologies, including conditions impacting the health of the kidneys, arteries, heart, or endocrine system. In some cases, secondary hypertension can also occur as a result of pregnancy. In addition to efforts to reduce blood pressure, proper treatment of secondary hypertension also requires attention to the underlying condition to decrease the risk of developing serious complications (Charles et al., 2017).

SYMPTOMS

Hypertension has a unique pathology as it often has no overt symptoms. As a result, hypertension is referred to as the "silent killer." The only certain way to recognize hypertension is through a clinical diagnosis, largely based on blood pressure assessment (Centers for Disease Control and Prevention [CDC], 2021a).

Nursing Consideration: Up to 20% of adults experience higher readings when blood pressures are taken at their provider's office compared to blood pressure readings taken at home. This phenomenon, known as white coat hypertension, was once thought to be related to anxiety experienced in the medical setting. However, studies have shown that white coat hypertension can significantly increase the risk of heart disease, with patients experiencing a two-fold increase in the risk of cardiovascular-related death compared to patients with normal blood pressure. There was not an increased risk of heart disease in patients undergoing treatment of white coat hypertension with antihypertensive agents, highlighting the importance of treating all patients who have higher blood pressure readings in the medical setting (Cohen et al., 2019).

PREVALENCE

According to a recent report from the Centers for Disease Control and Prevention (2021b), hypertension is common in the United States, afflicting 116 million Americans, or nearly half of all American adults. Of those impacted, only 24% are managing their hypertension appropriately. Care for these patients is expensive, with total expenditures – including costs for healthcare services, missed work, and medications – equaling $131 billion each year. Over the course of a lifetime, the risk of developing hypertension is somewhat higher in men compared to women, affecting 50% of men and 44% of women. Racial disparities have long been noted with Black people experiencing higher rates of hypertension than people identifying with other racial or ethnic backgrounds. Hypertension appears to be closely linked to mortality; in 2019, more than half a million deaths in the United States included hypertension as a primary or related cause of death (CDC, 2021b).

PATHOPHYSIOLOGY

To maintain normal blood pressure, a proper balance must exist between cardiac output and peripheral resistance. Peripheral vascular resistance, or the resistance that blood flow encounters in the body, is caused by constriction of blood vessels, either because of smooth muscle constriction or buildup of plaque inside the blood vessels. Peripheral resistance is generally not a function of blood flow through large arteries or even capillaries; rather, the main driver of peripheral resistance is blood flow through smaller arterioles (Delong & Sharma, 2021).

Cardiac output, or the volume of blood pumped by the heart in a minute, is affected by the stroke volume and heart rate. The heart rate, or the number of times the heart beats in a minute, can be affected by physical activity and cardiac health. Increases in heart rate are common with increased activity such as exercise, but chronically increased heart rates can result in pathologic changes to the heart. Stroke volume, or the amount of blood pumped from the left ventricle with each contraction, is dependent on the heart's ability to fill with blood and contract strongly enough to pump it out. Both stroke volume and heart rate can be affected by a variety of pathologies, including heart conditions such as congenital disease, heart failure, and myocardial infarction, as well as genetic diseases, autonomic nervous system overactivation, and endocrine signaling issues (King & Lowery, 2021).

Although current knowledge does not allow a complete explanation for primary hypertension, a brief examination of some potential factors resulting in hypertension can be instructive. Possible factors contributing to hypertension include the following:

- *Renin-angiotensin system:* Also known as RAS, this system plays a critical role in regulating fluid balance and blood pressure in the body. If blood volumes or sodium levels become low or if potassium is elevated, the kidney releases an enzyme called renin. Renin converts angiotensinogen to create the hormone angiotensin I. Then angiotensin-converting enzyme (ACE) turns angiotensin I into angiotensin II. Angiotensin II causes blood vessels to constrict, leading to increases in blood pressure (University Kidney Research Organization [UKRO], 2020).
- *Autonomic nervous system:* The autonomic nervous system is made up of the sympathetic and parasympathetic nervous systems and regulates blood flow and cardiac output through signaling pathways and the release of hormones. Physiological models have long implicated the role of the autonomic nervous system in the control of various cardiovascular functions as they control blood pressure (often in response to environmental stimuli). Both observation and investigation have shown that abnormal activation of the sympathetic nervous system is related to dysfunctional cardiovascular control, including both the promotion and amplification of primary hypertension (Valensi, 2021).
- *Endothelial dysfunction:* The endothelium is a tissue formed as a single layer of cells that serve as a lining to a variety of organs and body cavities, including blood vessels. The endothelium plays a large role in determining the tone and structure of the vascular system. A key chemical that influences the endothelium is nitric oxide (NO), which serves as a potent vasodilator, among other functions. Dysfunction of the endothelium because of NO deficiency has been implicated in the development of hypertension (Konukoglu & Uzun, 2017).
- *Insulin resistance:* Insulin resistance can lead to elevated levels of insulin, which impact normal intracellular communication, and can create an imbalance in sodium and potassium (increasing blood volume) as well as calcium and magnesium (leading to vasoconstriction). The mechawwnisms linking insulin resistance and hypertension continue to be studied (Tarray et al., 2014).
- *Genetic factors:* Although hereditary predisposition to hypertension is well acknowledged, it is complex and, at times, difficult to understand. There is strong evidence supporting genetic influences on hypertension, with data showing that hypertension is 2.4 times more common in patients with two parents who have hypertension. At least a thousand genes have been identified that contribute to increases in the risk of hypertension. While family and twin studies have shown that the heritability of blood pressure is between 30% and 50%, it is difficult to isolate exact causes and separate these from social and environmental factors that also affect families (Ehret, 2021).
- *Intrauterine influences:* Evidence suggests that improper nutrition of pregnant women can negatively impact the vascular health of the child later in life. It is thought that proper levels of calories and protein are key determinants for fetal programming. A longitudinal study of mothers and children in India found that the use of protein-calorie food supplements to pregnant and lactating women and their offspring resulted in lower levels of cardiovascular risk factors in the offspring when they were young adults (Kinra et al., 2021).

Secondary hypertension has several underlying pathologies. Because the kidney plays a significant role in blood pressure management, kidney diseases such as renal artery stenosis can lead to the development of hypertension. Excessive aldosterone release from the adrenal gland, or hyperaldosteronism, can lead to hypertension through the effects of aldosterone on salt and water regulation. Benign tumors can also form in the adrenal glands, known as pheochromocytoma, affecting aldosterone production and blood pressures. Obstructive sleep apnea can over-activate the sympathetic nervous system, responsible for the 'fight or flight' response, which can increase blood pressure. Cushing syndrome, a disorder caused by the overproduction of cortisol, can be caused by corticosteroid medication use or genetic conditions and lead to hypertension. Thyroid hormone changes seen with thyroid disorders can also affect blood pressures (Charles et al., 2017).

RISK FACTORS FOR CARDIOVASCULAR DISEASE

Cardiovascular disease risk factors are common among hypertension patients and a higher percentage of adults with these risk factors have hypertension. As an example, 71% of adults in the United States diagnosed with diabetes have hypertension. The presence of multiple risk factors for cardiovascular disease creates a high risk of coronary heart disease and stroke in hypertension patients. Common risk factors for cardiovascular disease seen in patients with hypertension can be divided into two categories: modifiable risk factors and relatively fixed risk factors (Whelton et al., 2018).

Modifiable risk factors are those that patients can typically influence. These include current cigarette smoking, overweight or obesity, diabetes mellitus, physical inactivity, unhealthy diet, and dyslipidemia. Treatment of these risk factors can decrease blood pressure as well as cardiovascular risk (Whelton et al., 2018).

Relatively fixed risk factors are those that are difficult to change, cannot be changed, or may not reduce the risk of cardiovascular disease if changed through currently available interventions. These include family history, increased age, low educational or socioeconomic status, male sex, obstructive sleep apnea, psychosocial stress, and chronic kidney disease. It remains important to identify these risk factors to create a picture of a patient's total cardiovascular risk, but treatment should focus on modifiable risk factors (Whelton et al., 2018).

Case study #1

Marlene is a 67-year-old Black female presenting to the clinic for her biannual checkup. She has pre-existing mild chronic kidney disease as well as type 2 diabetes. The medical assistant checked her blood pressure, and it was 139/77 mmHg. Her previous blood pressure readings were 134/76 mmHg 6 months ago, and 136/74 mmHg a year ago. She weighs 210 pounds today and is 5'3" tall. She wants to speak to her nurse practitioner about tips on cutting back her cigarette smoking.

Self-Assessment Quiz Question #2

Which of the following is a relatively fixed risk factor for cardiovascular disease that Marlene has?

a. Current cigarette smoking.
b. Type 2 diabetes.
c. Chronic kidney disease.
d. Overweight.

HISTORY OF TREATMENTS FOR HYPERTENSION

Although assessment of blood pressure dates to ancient times in Chinese and Indian Ayurvedic medicine, conclusive evidence documenting "normal" blood pressure and potential treatment developments did not occur until the last half of the 20th century. Before the early 1970s, hypertension was not routinely treated in contemporary medical practice. Hypertension was considered an unavoidable component of the aging process, and the few drugs that were available to treat it often caused more misery and earlier demise than in patients who were left untreated. In the 1940s, President Franklin D Roosevelt's blood pressure was documented as very high on several occasions; his doctor was not concerned when his blood pressure readings were approximately 220/120mmHg. When President Roosevelt died a few years later of a fatal hemorrhagic stroke, his death created more awareness of the potentially deadly effects of hypertension (Saklayen & Deshpande, 2016).

A study conducted by the Veterans Administration in the late 1960s established that diastolic blood pressures over 90 mmHg were treatable with available medications and that doing so reduced the risk of stroke, heart failure, and mortality. As a result, routine blood pressure monitoring began, taking place at medical facilities as well as at a variety of non-medical settings. Additional research by the Veterans Administration in the 1970s established a diastolic blood pressure target of less than 90 mmHg (Saklayen & Deshpande, 2016).

Additional studies demonstrated a decline in death caused by cardiac issues and stroke since the mass treatment of hypertension began. In 1991, new research suggested the benefit of treating patients with elevated systolic blood pressure over 160 mmHg, even if their diastolic pressure was within the normal range. These new interventions resulted in a decrease in cardiac issues and stroke rates, especially in older patients. Nationwide health surveys demonstrate that progress in managing hypertension continues to improve with ongoing research continuing to close gaps in knowledge and improving treatment (Saklayen & Deshpande, 2016).

NON-PHARMACOLOGIC TREATMENT OF HYPERTENSION

Prevention and management of hypertension through non-pharmacological approaches is the first step in reducing the risk of cardiovascular disease. Patients should be counseled and encouraged to make appropriate lifestyle changes that include healthy eating, ensuring an adequate level of physical exercise, and avoiding excessive consumption of alcohol. In cases where hypertension persists despite proper lifestyle changes, medication is typically indicated. Nonetheless, even if prescribed medication, patients must be encouraged to continue with healthy lifestyle choices as part of a comprehensive treatment plan (Whelton et al., 2018).

Guidelines recommend several critical lifestyle choices to help in the prevention and management of hypertension. These include the following (Whelton et al., 2018):

- Weight loss in the case of overweight or obese patients.
- Increasing physical activity with structured exercise programs for all adults. People should get at least 30 minutes of aerobic exercise at least five times a week.
- Consumption of a heart healthy diet, such as the DASH diet (Dietary Approaches to Stop Hypertension), including more vegetables, fruits, and low-fat dairy products, coupled with reductions in saturated and total fats. This helps facilitate achieving a desirable weight and is recommended for all adults with elevated blood pressure.
- Reducing sodium intake to less than 1,500 milligrams per day if hypertensive, or ideally less than 1000mg per day in most adults.
- Potassium supplementation of 3500 to 5000 mg per day, preferably through dietary modification, unless contraindicated by the use of potassium-retaining medications or the presence of chronic kidney disease.
- Limiting alcohol to less than 2 standard drinks per day for men or 1 drink per day for women.

Extensive research has determined the most useful behavioral interventions for the treatment of hypertension. Exercise has the potential to lower systolic blood pressure by 5 to 8 mmHg on average. Patients who follow diets high in low-fat dairy products, fruits, and vegetables can expect systolic blood pressure reductions of approximately 11 mmHg. Furthermore, weight loss is a reliable tool to reduce blood pressure. On average, patients can expect a blood pressure reduction of approximately 1 mmHg for every 1 kg reduction in body weight. The effects of non-pharmacological interventions are cumulative; patients who utilize multiple interventions may be able to meet blood pressure goals without the use of medications. Taken either alone or in combination, available data supports the benefit of positive behavioral modifications in treating hypertension (Whelton et al., 2018).

Evidence-based practice alert! To assess the impact of sodium in the diet on blood pressure, Sacks et al. (2001) conducted a study of 412 participants randomized to eat either a control diet typical of that consumed in the United States or a modified DASH diet. Within those cohorts, each participant ate foods with high, intermediate, and low levels of sodium for 30 consecutive days. In patients receiving the control diet, sodium reductions from the high to the intermediate level resulted in systolic blood pressure reductions of 2.1 mmHg. The same reductions in subjects receiving the DASH diet experienced reductions of 1.3 mmHg. Further reduction, from intermediate to low levels of sodium resulted in additional decreases of 4.6 mmHg in the control diet subjects and 1.7 mmHg in the DASH diet subjects. Similar results were observed irrespective of hypertensive diagnosis or ethnicity. In all cases, the DASH diet was associated with a significantly lower systolic blood pressure at each of the sodium intake levels. The most extreme difference was observed when comparing high sodium, control diet patients with hypertension to low sodium, and DASH diet subjects (11.5 mmHg). Investigators concluded that both the DASH diet and sodium reduction are effective mechanisms to lower blood pressure, with the greatest impacts observed when sodium reduction is combined with the DASH diet. To deliver meaningful clinical benefit, a lifelong commitment to these dietary changes is required (Sacks et al., 2001). This study continues to provide the foundation for recommendations today.

Nursing Consideration: Lifestyle changes are powerful tools, useful for both preventing and managing diagnosed hypertension. Nurse-led programs that guide lifestyle modifications have been shown to increase self-efficacy and improve the implementation of health-promoting behaviors. Nurses are recommended to apply lifestyle interventions as a part of routine care (Zheng et al., 2020).

Case study #1, continued

After finishing with the medical assistant, Marlene's nurse practitioner comes into the room to conduct her examination. The NP notes the trend of high blood pressure and calculates her average blood pressure to be approximately 136/76mmHg. The NP diagnoses her with stage I hypertension. They review many treatment considerations, including lifestyle modifications that would be helpful in reducing her blood pressure.

Self-Assessment Quiz Question #3

Which of the following lifestyle modifications would have the greatest impact on reducing Marlene's blood pressure?

a. A weight loss of 14 kg.
b. A diet high in low-fat dairy products, fruits, and vegetables.
c. At least 30 minutes of aerobic exercise at least five times a week.
d. Limiting alcohol to less than two drinks per day.

PHARMACOLOGIC TREATMENT OF HYPERTENSION

In cases where lifestyle modifications are not sufficient to manage hypertension, medications may be required. Providers managing patients with hypertension should focus on the overall health of the patient, while emphasizing a reduction in the risk of future cardiovascular disease development. A comprehensive treatment plan should be developed, utilizing both pharmacological and nonpharmacological strategies, depending on the severity of hypertension. Increases in blood pressure or in the risk of cardiovascular events should be met with intensified management of blood pressure.

There are several classes of medications available to treat hypertension. Medications that have been shown to reduce clinical cardiovascular events are preferred; these primary agents include angiotensin-converting enzyme (ACE) inhibitors, angiotensin II receptor blockers (ARBs), thiazide diuretics and calcium channel blockers. Many other drug classes are available to treat hypertension, but they are either lacking in confirmation that they decrease clinical cardiovascular disease outcomes, or their tolerability or safety profiles relegate them to use as secondary agents. Secondary antihypertensive agents include the following (Whelton et al., 2017):

- Loop diuretics.
- Potassium-sparing diuretics.
- Aldosterone antagonists.
- Beta blockers.
- Alpha-1 blockers.
- Alpha-2 agonists.
- Renin inhibitors.
- Direct vasodilators.

ANGIOTENSIN-CONVERTING ENZYME (ACE) INHIBITORS

Angiotensin-converting enzyme (ACE) inhibitors are useful in treating a variety of maladies in addition to hypertension, including chronic kidney disease and diabetes. ACE inhibitors work by blocking the angiotensin-converting enzyme from converting angiotensin I to angiotensin II. Angiotensin II is a protein that narrows blood vessels, increases the retention of sodium and water in the renal tubules, and stimulates the release of the hormone aldosterone from the adrenal gland. Decreasing the availability of this potent vasoconstrictor can improve vasodilation and lead to decreased blood pressure (Herman et al., 2021).

ACE inhibitors are recommended as first-line antihypertensive agents, particularly in patients with diabetes mellitus and cardiovascular disease. These medications have been shown to slow the progression of kidney disease in patients with diabetes, as well as reduce the risk of myocardial infarction and improve heart function in diabetic patients with hypertension. Chronic kidney disease patients also experience benefits in their disease management, with studies showing effectiveness in decreasing proteinuria and slowing the progression of kidney disease. In addition, ACE inhibitors have been proven beneficial in patients with heart failure by increasing cardiac output without increasing the heart rate. ACE inhibitors are generally less efficacious in Black patients than White (Herman et al., 2021; Whelton et al., 2017).

The U.S. Food & Drug Administration has approved several ACE inhibitors for marketing. Examples of ACE inhibitors include the following (GlobalRPh, 2017b):

- Benazepril (Lotensin) – available in tablets of 5 mg, 10 mg, 20 mg, and 40 mg.
- Captopril (Capoten) – available in tablets of 12.5, 25, 50, and 100 mg.
- Enalapril (Vasotec) – available in tablets of 2.5, 5, 10, and 20 mg; as a solution for intravenous (IV) injection of 1.25 mg/mL; and as an oral solution of 1 mg/mL.
- Fosinopril (Monopril) – available in tablets of 10, 20, and 40 mg.
- Lisinopril (Prinivil, Zestril) – available as 2.5, 5, 10, 20, and 40 mg tablets.
- Moexipril (Univasc) – available in tablets of 7.5 and 15 mg.
- Perindopril (Aceon) – available in tablets of 2, 4, and 8 mg.
- Quinapril (Accupril) – available in tablets of 5, 10, 20, and 40 mg.
- Ramipril (Altace) – available in capsules of 1.25, 2.5, 5, and 10 mg.
- Trandolapril (Mavik) – available in tablets of 1, 2, and 4 mg.

When initiating ACE inhibitors, lower initial doses should be used in the geriatric population. In addition, patients with heart failure, hyponatremia, or renal impairment should initiate doses at the lower end of the range to assess the effects of ACE inhibitors on these conditions (Herman et al., 2021).

ACE inhibitor class effects

ACE inhibitor use is fairly widespread in the treatment of hypertension as a result of the relatively benign adverse event profile. Approximately 1% to 10% of patients develop a dry cough while taking ACE inhibitors, for which there is no treatment – this side effect often requires therapy to be changed to an alternative medication class. Initiation of ACE inhibitors often causes a reversible decline in renal function, which may require increased monitoring of serum creatinine while the patient stabilizes. Renal function decline can be especially profound in patients with bilateral renal artery stenosis; these patients experience an increased risk of acute renal failure when taking ACE inhibitors (Herman et al., 2021).

Other side effects associated with ACE inhibitors include hyperkalemia, dizziness, headache, fatigue, and hypotension. Although rare, angioedema, a rapidly occurring form of edema, has been observed in patients taking ACE inhibitors. If angioedema occurs in the throat or tongue, this adverse event can be life-threatening and requires immediate medical attention. Angioedema has a higher rate of occurring in the Black population. Patients experiencing angioedema should have ACE inhibitors discontinued immediately (Herman et al, 2021).

Because of an increased risk of teratogenicity, ACE inhibitors are contraindicated for use during pregnancy. ACE inhibitors

are known to cause numerous teratogenic effects on the fetus, including skeletal deformations, renal failure, hypotension, lung hypoplasia, and death (Herman et al., 2021).

ACE inhibitors are known to cross into breast milk. The appropriateness of nursing mothers using these medications is dependent on the age of the infant and the specific agent. Because of the potential risk of profound neonatal hypotension, these drugs should be avoided by nursing mothers in the first few weeks of life. Pre-term infants are at higher risk than full-term babies. In the case of mothers breastfeeding older infants, data exists supporting the use of quinapril, captopril, and enalapril. Babies should be monitored for signs of hypotension (UK Medicines and Healthcare Products Regulatory Agency, 2014).

Although ACE inhibitors are not largely susceptible to pharmacokinetic drug-drug interactions, clinicians should be aware of a number of potentially clinically significant pharmacodynamic drug interactions associated with the use of these medications. For example, in patients who are sodium and/or volume depleted from diuretic usage, excessive decreases in blood pressure – to the extent of symptomatic hypotension – are possible. If co-administered with potassium-sparing diuretics, hyperkalemia may occur, especially in cases of patients with renal insufficiency. When ACE inhibitors are combined with nonsteroidal anti-inflammatory drugs (NSAIDs), the potential for acute renal failure should be considered. Lastly, clinicians should be vigilant for occurrences of severe hypersensitivity in patients also receiving allopurinol (Dipiro et al., 2019).

Self-Assessment Quiz Question #4

Which of the following side effects of ACE inhibitors has a higher rate of occurring in the Black population?

a. Dry cough.
b. Dizziness.
c. Hypotension.
d. Angioedema.

ANGIOTENSIN II RECEPTOR BLOCKERS (ARB)

Angiotensin II receptor blockers (ARBs) provide an alternative method of reducing the effects of angiotensin II to those provided by ACE inhibitors. ARBs work by blocking angiotensin II receptors to decrease the vasoconstriction caused by angiotensin II. This results in a decrease in blood pressure as well as a decrease in the production of aldosterone. ARBs are useful in patients who are intolerant to ACE inhibitors, since ARBs do not cause a dry cough (Hill & Vaidya, 2021).

ARBs are recommended as first-line therapy in hypertensive patients. The effects of ARBs have been shown to be roughly comparable to ACE inhibitors, and these two classes of medications are often used interchangeably. Similar to ACE inhibitors, ARBs are recommended for the treatment of heart failure and prevention of kidney disease progression in patients with diabetes or chronic kidney disease. The ACC/AHA guidelines recommend avoiding the combination of an ACE inhibitor with an ARB, because of the potential for harm related to hyperkalemia and decreased renal function (Hill & Vaidya, 2021; Whelton et al., 2017).

The U.S. Food & Drug Administration (FDA) has approved several ARBs for the treatment of heart failure and hypertension, including the following (GlobalRPh, 2017c):

- Azilsartan (Edarbi) – available in tablets of 40 and 80 mg.
- Candesartan (Atacand) – available in tablets of 4, 8, 16, and 32 mg.
- Eprosartan (Teveten) – available in tablets of 400, and 600 mg.
- Irbesartan (Avapro) – available in tablets of 75, 150, and 300 mg.
- Losartan (Cozaar) – available in tablets of 25, 50, and 100 mg.
- Olmesartan (Benicar) – available in tablets of 5, 20, and 40 mg.
- Telmisartan (Micardis) –available in tablets of 20, 40, and 80 mg.
- Valsartan (Diovan) – available in tablets of 40, 80, 160, and 320 mg.

ARB class effects

ARBs are generally safe and well-tolerated. They are associated with a lower incidence of cough and angioedema compared with ACE inhibitors, though these side effects are still possible in patients taking ARBs. ARBs are often useful in patients who have experienced angioedema while taking ACE inhibitors; patients with a history of angioedema on an ACE inhibitor can receive an ARB beginning 6 weeks after the ACE inhibitor was discontinued (Hill & Vaidya, 2021; Whelton et al., 2017).

Decline in renal function has been reported with ARBs, and these medications should be avoided in patients with severe bilateral renal artery stenosis because of the risk of acute renal failure. Other reported side effects of ARBs include dizziness, angioedema, hyperkalemia, and hypotension (Hill & Vaidya, 2021).

Like ACE inhibitors, ARBs are known to cause teratogenic effects when administered during pregnancy. They have been shown to reduce perfusion of the fetal kidneys, cause skeletal deformities, and even result in fetal death. Women of childbearing age should be counseled on the importance of birth control while taking ARBs and, if pregnancy occurs, ARB therapy should be stopped immediately (Hill & Vaidya, 2021).

Evidence-based practice alert! Moretti et al. (2012) conducted a study of 138 women receiving ACE inhibitors or ARBs (a total of 28 patients were administered ARB) during the first trimester of pregnancy. Infants of mothers who received ACE inhibitors and ARB exhibited lower birth weights and gestational age compared to the control group. Moreover, there was a significantly higher rate of miscarriage reported in mothers taking ACE inhibitors or ARBs. Investigators concluded that while these medications are not major human teratogens, they may be associated with an increased risk of miscarriage (Moretti et al., 2012). This study continues to be cited in current guidelines as rationale against the use of these products in pregnancy; the use of ACE inhibitors or ARB in women who are pregnant, or planning to become pregnant, is not recommended (Whelton et al., 2017).

Angiotensin receptor blockers are known to cross into breast milk. The appropriateness of nursing mothers using these medications is dependent on the age of the infant and the specific agent. Because of the potential risk of profound neonatal hypotension, these drugs should be avoided by nursing mothers in the first few weeks of life. Pre-term infants are at higher risk than full-term babies. If nursing mothers do receive an ARB, the baby's blood pressure should be monitored (Hill & Vaidya, 2021).

Although ARBs have a relatively low potential to interact with other drugs, the literature identifies a few possible pharmacokinetic and pharmacodynamic drug interactions. Since an ARB may increase serum potassium levels, combinations with other drugs that increase potassium levels may result in hyperkalemia; if uncontrolled, this can lead to cardiac arrhythmias. An ARB should not be used concomitantly with ACE inhibitors since these combinations increase the risk of hypotension, hyperkalemia, and renal impairment. Lastly, an ARB should not be combined with the direct renin inhibitor aliskiren (Tekturna) because of an increased risk of kidney failure, hyperkalemia, and excessive hypotension (Hill & Vaidya, 2021; Whelton et al., 2017).

DIURETICS

Diuretics work to lower blood pressure by providing their action in the kidney, inducing the body to excrete additional sodium and water, thereby reducing fluid volume. This reduction in the amount of fluid flowing through the blood vessels effectively reduces pressure on blood vessels, countering hypertension. Diuretics are grouped into three distinct categories: Thiazide, loop, and potassium-sparing. Each type acts on different sites in the kidney and thus has a different use, causing dissimilar adverse event profiles. As a result, each type of diuretic requires unique precautions. The type chosen can be specially tailored for each individual patient to meet their specific needs (DiPiro et al., 2019).

Thiazide diuretics

Thiazide diuretics are recommended by the ACC/AHA guidelines as a first-line agent in the treatment of hypertension because of their ability to reduce clinical cardiovascular disease events. Since ACE inhibitors and ARBs are less effective in Black patients, thiazide diuretics are highly recommended for the initial treatment of hypertension in this population (Whelton et al., 2017).

Thiazide diuretics work in the distal tubule of the nephron to decrease reabsorption of sodium and chloride, allowing for increased excretion of sodium and fluids. Thiazides are typically used in low doses to induce fluid loss and the antihypertensive response; higher doses have been shown to increase fluid loss but not produce an equivalent increase in antihypertensive effects. The increased fluid loss seen with higher doses has also been associated with increased electrolyte and metabolic complications (Mann & Hilgers, 2021a).

Side effects seen with thiazide diuretics are largely dose dependent. Effects related to the volume of fluid excreted include hyponatremia, hypokalemia, hyperuricemia, hyperglycemia, hypomagnesemia, and hypercalcemia (higher doses that increase the volume of fluid excretion have a higher risk of causing these side effects). Monitoring laboratory values for electrolytes is recommended within the first 1 to 2 weeks of initiating therapy and again after 6 to 12 months. Monitoring may need to be more frequent in patients who become symptomatic or if the dose is increased. Side effects that are not dose dependent include sleep disturbances, sexual dysfunction, and photosensitivity (Mann & Hilgers, 2021a).

Thiazide diuretics should be used with caution in patients taking other medications that cause electrolyte disturbances because of the risk of additive complications. Thiazide diuretics are contraindicated during pregnancy because of the risk of oligohydramnios, or too little amniotic fluid surrounding the baby (Youssef, 2019).

High doses of thiazide diuretics are known to suppress lactation, which may also occur at lower dose levels. Clinicians should monitor the weight of infants of nursing mothers receiving these medications to ensure adequate milk production. The levels of drugs in milk have not been largely assessed but are thought to be too low to be significant. Nonetheless, shorter-acting diuretics are the medication of choice and should be used at the lowest dose for the shortest duration to achieve benefit in the mother (Specialty Pharmacy Service, 2020).

Thiazide diuretics, readily available as generic drugs, are often the least expensive medications useful for the treatment of hypertension. Examples include the following (GlobalRPh, 2017g):

- Chlorothiazide (Diuril) – available in tablets of 250 and 500 mg; as powder for reconstitution for parenteral injection of 500 mg; and as an oral solution of 250 mg/500 mL.
- Chlorthalidone (Hygroton) – available in tablets of 25, 50, and 100 mg.
- Hydrochlorothiazide (Microzide) – available in tablets of 25, 50, and 100 mg, in capsules of 12.5 mg, and as an oral solution of 50 mg/5 mL.
- Indapamide (Lozol) – available in tablets of 1.25 and 2.5 mg.
- Metolazone (Zaroxolyn and Mykrox) – available in tablets of 2.5, 5, and 10 mg.

Evidence-based practice alert! A meta-analysis published in 2021 aimed to evaluate the safety and efficacy of chlorthalidone compared with hydrochlorothiazide. The clinical efficacy of chlorthalidone has been well established in landmark clinical trials, but hydrochlorothiazide remains a more commonly prescribed agent. This study evaluated data from 37 clinical trials and found a slight superiority for chlorthalidone in lowering systolic blood pressure, but no statistically significant difference in blood pressure lowering between the agents. Hydrochlorothiazide appeared to be a safer choice because of more significant serum potassium lowering seen with chlorthalidone. The authors concluded that the two diuretics can be used interchangeably (Dineva et al., 2021).

Loop diuretics

Loop diuretics are named for their action at the ascending limb of the loop of Henle in the nephron, where they act to decrease sodium and chloride reabsorption. They provide more potent diuresis than thiazide diuretics and are therefore frequently chosen for hypertensive patients with impaired kidney function. They are also commonly used in hypertensive patients who also have heart failure, as significant diuresis is often required in these patients (Agarwal, 2021). The ACC/AHA guidelines recommend loop diuretics as secondary agents for the treatment of hypertension because of the lack of data showing their effectiveness in reducing cardiovascular events. However, the guidelines do recommend these agents as the preferred diuretics in patients with symptomatic heart failure and state that loop diuretics are preferred over thiazides in patients with moderate to severe chronic kidney disease (Whelton et al., 2017).

Similar to thiazides, loop diuretics typically provide increasing diuresis as the dose is increased. However, a plateau is reached at which point increased doses do not provide an equivalent increase in diuresis. Increasing doses further beyond this point typically does not increase effectiveness but does increase the risk of side effects (Brater & Ellison, 2021).

Several side effects related to the use of loop diuretics are related to the extent of diuresis. These include hypokalemia, hypotension, hypovolemia, hyponatremia, hyperuricemia, and metabolic alkalosis. Higher doses are associated with more profound diuresis-related side effects (Brater & Ellison, 2021).

Loop diuretics are also associated with hypersensitivity reactions. Furosemide, bumetanide, and torsemide are considered sulfonamides, which can lead to the development of allergic reactions. These reactions often manifest with a rash, though

they can rarely present with acute interstitial nephritis. There is minimal evidence that patients with a known allergy to sulfonamide antibiotics experience an allergic cross-reaction with loop diuretics; reactions that do occur in patients with a known allergy to sulfonamide antibiotics appear to be related to a predisposition to allergic reactions rather than a cross-reaction (Brater & Ellison, 2021).

Ototoxicity is associated with high doses of loop diuretics and can lead to transient or permanent deafness. It occurs primarily with high dose intravenous therapy. Cases have also been documented at lower doses in patients with impaired kidney function or those who are also taking other medications with ototoxic effects, such as aminoglycosides. Ethacrynic acid is thought to be more ototoxic than furosemide, bumetanide, or torsemide (Brater & Ellison, 2021).

Loop diuretics should be used with caution in patients taking other medications that cause electrolyte disturbances because of the risk of additive complications, particularly hypokalemia (Brater & Ellison, 2021). These medications are not contraindicated in pregnancy, but their use is not recommended unless there is a compelling indication for the use of diuretics, such as severe heart failure (Youssef, 2019). In lactation, loop diuretics may suppress breast milk production, though this is largely theoretical. Clinicians should monitor the weight of infants of nursing mothers receiving these medications to ensure adequate milk production. The levels of drugs in milk have not been largely assessed but are thought to be too low to be of significance. If loop diuretics are used in lactating women, furosemide is preferred because of its short half-life, low oral bioavailability, and most experience of use (Specialty Pharmacy Service, 2020).

Several loop diuretics are readily available as generic drugs, including the following (GlobalRPh, 2017g):

- Bumetanide (Bumex) – available in tablets of 0.5, 1 mg, and 2 mg, and as a solution for injection of 0.25 mg/mL.
- Ethacrynic acid (Edecrin) – available in tablets of 25 mg and 50 mg, and as powder for reconstitution for parenteral injection of 50 mg.
- Furosemide (Lasix) – available in tablets of 20 mg, 40 mg, 50 mg, and 80 mg; as a solution for injection of 10 mg/mL, and as an oral solution of 8 mg and 10 mg/mL.
- Torsemide (Demadex) – available in tablets of 5 mg, 10 mg, 20 mg, and 100 mg and as a solution for injection of 10 mg/mL.

Potassium-sparing diuretics

Potassium-sparing diuretics include agents in two broad categories: mineralocorticoid receptor antagonists and other potassium-sparing diuretics. The mineralocorticoid receptor antagonists, spironolactone and eplerenone, work by preventing aldosterone from binding to the mineralocorticoid receptor. This action inhibits the effects of aldosterone and cortisol, preventing sodium retention and its associated fluid retention, thereby reducing blood pressure (Alscher, 2021; DiPiro et al., 2019).

The effects of mineralocorticoid receptor antagonists are useful in the treatment of hypertension as well as heart failure. They are reserved as second-line agents in the ACC/AHA guidelines because of their lack of evidence showing effectiveness in reducing cardiovascular events (Whelton et al., 2017).

Since mineralocorticoid receptor blockers also bind to progesterone and androgen receptors, they create some undesirable side effects. These include breast tenderness, gynecomastia, and erectile dysfunction in men and menstrual abnormalities in pre-menopausal women. Eplerenone is more selective for mineralocorticoid receptors than spironolactone, resulting in reduced sexual side effects. Mineralocorticoid receptor antagonists can also increase potassium levels, which may require careful monitoring and dietary adjustments (Alscher, 2021; DiPiro et al., 2019).

The other potassium-sparing diuretics, amiloride and triamterene, produce weaker diuresis by blocking sodium transport channels to increase renal sodium excretion. They are less effective as monotherapy for hypertension, but they are frequently used with thiazide diuretics as combination therapy. Like the mineralocorticoid receptor antagonists, they are reserved as second-line agents for the treatment of hypertension. Potassium levels should be monitored in patients taking amiloride and triamterene because of the potential to cause hyperkalemia (Alscher, 2021; DiPiro et al., 2019).

Potassium-sparing diuretics include the following (GlobalRPh, 2017g):

- Amiloride (Midamor) – available in tablets of 5 mg.
- Eplerenone (Inspra) – available in tablets of 25 mg and 50 mg.
- Spironolactone (Aldactone) – available in tablets of 25 mg, 50 mg, and 100 mg.
- Triamterene (Dyrenium) – available in tablets of 50 mg and 100 mg.

Nursing Consideration: Nurses should emphasize the importance of monitoring potassium intake with patients receiving potassium-sparing diuretics because of the risk of hyperkalemia. Patients should be educated on foods to avoid or limit because of high potassium content, including commonly used salt substitutes. Many patients may be unaware of the potentially dangerous interaction between seemingly innocuous salt substitutes and these drugs.

Self-Assessment Quiz Question #5

Which of the following diuretics are recommended by the ACC/AHA guidelines as a first-line agent in the treatment of hypertension because of its ability to reduce clinical cardiovascular disease events?

a. Thiazide diuretics.
b. Loop diuretics.
c. Potassium-sparing diuretics.
d. Calcium channel blockers.

BETA-BLOCKERS

Beta-blocking agents are medications that block the B1 and/or B2 beta-adrenergic receptors to exhibit their action. Epinephrine and norepinephrine bind to B1 and B2 receptors; when bound to B1 receptors, these hormones lead to an increase in heart rate and conduction velocity. B2 receptor binding results in smooth muscle relaxation as well as increased metabolic effects. When beta blockers antagonize these receptors, it results in reductions of cardiac contractility (both rate and force) as well as reductions in cardiac output, leading to decreases in blood pressure and heart rate (DiPiro et al., 2019).

Evidence-based practice alert! Wiysonge et al., (2017) published results from a large meta-analysis that examined outcomes from a total of 13 randomized clinical trials. Of these studies, four, enrolling a total of 23,613 patients, compared beta blockers to placebo. Five studies, enrolling 18,241 patients, compared beta blockers to diuretics. Four studies designed to compare calcium channel blockers (CCB) to beta blockers enrolled 44,825 patients. The final three studies, with 10,828 patients, characterized the difference between beta blockers and drugs impacting the renin-angiotensin system (RAS). Across all these trials, a total of 40,245 participants received beta blockers, three-fourths of whom took atenolol. Results showed no difference in all-cause mortality between patients who received placebo and those who were administered beta blockers, diuretics, or RAS inhibitors. In the CCB comparison, risk of all-cause mortality was 7% higher in patients who received beta blockers. In the single study evaluating older patients at least 65 years old, the differences were more pronounced with atenolol usage associated with a 63% percent greater incidence of coronary heart disease compared to patients receiving a diuretic. Investigators concluded that current evidence suggests that in the treatment of hypertension, beta blockers are inferior to CCBs and RAS medications for prevention of stroke, as well as inferior to CCBs for all-cause mortality and total cardiovascular events (Wiysonge et al., 2017).

Beta-blockers are a diverse group of medications employing a host of pharmacologic properties. Their benefits on mortality and cardiovascular disease in patients with heart failure or acute myocardial infarction is well established. It was thought that beta blockers might provide similar benefit to patients as a first-line treatment for hypertension; however, this benefit is controversial as recent studies have shown little to no effect on mortality for the treatment of hypertension (Wiysonge et al., 2017). Contemporary practice appears to be in step with Wiysonge and colleagues' (2017) publication: Beta blockers are largely relegated to second-line therapy, as described the ACC/AHA guidelines (Whelton et al., 2017).

There are many beta-blockers available, with various levels of selectivity for B1 and B2. Comorbid conditions will influence the selection of a beta-blocker. For example, patients with angina pectoris and asthma should avoid using non-selective beta-blockers because of the presence of B2 in lung tissue and the potential for asthma exacerbation. B1 selective beta-blockers should be used in low doses for these patients, as B1 selectivity is lost at high doses. Examples of beta blockers include the following (GlobalRPh, 2017e):

Nonselective Beta Blockers:

- Propranolol (Inderal LA, InnoPran XL) –available in tablets and capsules of 10, 20, 40, 60, and 80 mg; as suspensions of 4 mg/mL; and as a solution for IV of 1 mg/mL.
- Carvedilol (Coreg) – available in tablets of 3.125, 6.25, 12.5, and 25mg, and extended-release capsules of 10, 20, 40, and 80mg.
- Sotalol (Betapace) – available in tablets of 80, 120, 160, and 240 mg.
- Labetalol (Normodyne) – available in tablets of 100, 200, and 300mg, as well as a solution for IV injection 5mg/mL.
- Nadolol (Corgard) – available in tablets of 20, 40, 80, 120, and 160mg.

Selective Beta Blockers:

- Atenolol (Tenormin) – available in tablets of 25, 50, and 100 mg, and as a solution for IV of 0.5 mg/mL.
- Betaxolol (Kerlone) – available in tablets of 10 and 20mg.
- Bisoprolol (Zebeta) –available in tablets of 5 and 10 mg.
- Metoprolol (Lopressor, Toprol-XL) – available in immediate release tablets of 25, 50, and 100, as a solution for IV of 01 mg/mL, and extended-release tablets of 25 mg, 50 mg, 100 mg, and 200 mg.
- Nebivolol (Bystolic) – available in tablets of 2.5, 5, 10, and 20 mg.

Beta blocker class effects

Since beta receptors are found all over the body, several side effects can result. Common side effects associated with the use of beta blockers include fatigue, dizziness, nausea, constipation, bradycardia, and hypotension. Beta blockers, particularly nonselective agents, can hypothetically trigger asthma attacks and mask signs of hypoglycemia in diabetics, as well as increase serum lipid levels. Patients with acute or chronic hypotension or bradycardia should avoid the use of beta blockers (DiPiro et al., 2019).

Beta blockers are the most commonly used medication class for treating cardiac conditions during pregnancy. However, data supporting their safety are limited. Beta blockers can cross the placenta, which can potentially result in physiologic fetal changes such as bradycardia and hypoglycemia. A large population-based study published in 2017 found that beta blocker exposure was not associated with an increase in fetal cardiac anomalies (Duan et al., 2017).

The concentration of beta blockers that partition into breastmilk varies between agents. Some data suggests that atenolol and nadolol may have high affinities to enter breast milk. As a result, other beta blockers, such as metoprolol, propranolol, or labetalol, may be preferred in these patients (MotherToBaby.org, 2019).

Each beta blocker has a unique pharmacologic profile, leaving it susceptible to agent-specific drug interactions. While in general, symptomatic interactions with these medications are infrequent, prescribers still need to be familiar with the interaction potential of each agent that they prescribe relative to existing medications and supplements. Beta blockers should be given cautiously with other medications that slow the heart rate or cardiac activity, such as digoxin or other antiarrhythmic medications, because of the risk of profound bradycardia (DiPiro et al., 2019).

CALCIUM CHANNEL BLOCKERS

Calcium channel blockers work by antagonizing calcium channels, which decreases the entry of calcium into cardiac and blood vessel tissue. The resulting vascular smooth muscle relaxation decreases vascular resistance, reducing blood pressure. The effects on calcium also allow for an increase in coronary blood flow, increasing the oxygen supply to the heart (Bloch & Basile, 2021).

Calcium channel blockers can be divided into two categories: dihydropyridines and non-dihydropyridines. Dihydropyridine calcium channel blockers are more selective for vascular smooth muscle tissue, making them drugs of choice in the treatment of hypertension. Non- dihydropyridines are more selective for cardiac smooth muscle tissue, allowing for more significant effects on decreasing heart rate and contractility and making them preferred agents in patients with angina or arrhythmias (Bloch & Basile, 2021).

According to the ACC/AHA guidelines, calcium channel blockers play a critical role as first-line agents in the treatment of hypertension. Calcium channel blockers have been shown to be more effective at preventing stroke and heart failure in Black patients when compared to ACE inhibitors, making them one of the best initial choices for hypertension monotherapy in this population (Whelton et al., 2017).

Several calcium channel blockers are available; some are short-acting, while others rely on sustained-release formulations to provide a longer effect on blood pressure. Examples include the following (GlobalRPh, 2017f):

Dihydropyridine calcium channel blockers:

- Amlodipine (Norvasc) – available in tablets of 2.5, 5, and 10 mg.
- Felodipine (Plendil) – available in extended-release tablets of 2.5, 5, and 10 mg.
- Isradipine (Dynacirc) – available in immediate release capsules of 2.5 and 5 mg, and controlled release tablets of 5 and 10 mg.
- Nicardipine (Cardene) – available in immediate release capsules of 20 and 30 mg; sustained release capsules of 30, 45 and 60 mg; and as a solution for IV of 2.5 mg/mL.
- Nifedipine (Adalat and Procardia) – available as immediate release capsules of 10 and 20 mg and extended-release tablets of 30, 60, and 90 mg.
- Nisoldipine (Sular) – available as extended-release tablets of 10, 20, 30, and 40 mg.

Non-dihydropyridine calcium channel blockers:

- Diltiazem (Cardizem) – available in immediate release tablets of 30, 60, 90, and 120 mg; extended/sustained release capsules of 60, 90, 120, 180, 240, 300, and 360 mg; and as a solution for IV of 5 mg/mL.
- Verapamil (Isoptin) – available as immediate release tablets of 40, 80 and 120 mg and sustained release tablets of 120, 180, and 240 mg.

Side effects associated with calcium channel blockers vary significantly with the subclass and dose. The dihydropyridines are associated with headache, lightheadedness, flushing, and dose-dependent peripheral edema. The edema caused by calcium channel blockers is caused by a fluid redistribution from the vascular space into the interstitium, which typically does not respond to diuretic therapy. Patients experiencing edema with calcium channel blockers can try reducing the dose or switching to a non-dihydropyridine agent (Bloch & Basile, 2021).

The non-dihydropyridines are associated with dose-dependent constipation, bradycardia, and worsening cardiac output. This results in a relative contraindication for patients taking beta blockers and those who have heart failure with a reduced ejection fraction, sick sinus syndrome, and second- or third-degree atrioventricular block. However, it appears that these agents can be taken by patients who have heart failure with preserved ejection fraction, as well as those with chronic stable angina or those who have suffered a myocardial infarction (Bloch & Basile, 2021).

Calcium channel blockers have been used during pregnancy for over 30 years. Most of the published literature focuses on using extended release nifedipine. The extended-release formulation is preferred because abrupt decreases in blood pressure seen with immediate-release formulations can potentially be more problematic for placental perfusion. Nifedipine has not been associated with teratogenic effects (Malha & August, 2019).

Limited published evidence and clinical experience suggest that nifedipine and verapamil are compatible with breastfeeding. While nicardipine usage is also considered to be appropriate, less clinical experience has been documented. Interestingly, nifedipine is sometimes employed as an off-label remedy for painful nipple spasm in breastfeeding mothers (SPS, 2020b).

In addition to the additive effects of calcium channel blockers on other drugs impacting blood pressure, calcium channel blockers are prolific inhibitors of the Cytochrome P450 (CYP) family of isozymes. All calcium channel blockers inhibit CYP2D6 and CYP2C9 to varying degrees. These findings are critical, as some of these drug interactions may be clinically significant. Prescribers must be familiar with the interaction potential of each agent that they prescribe relative to existing medications and supplements (Ma et al., 2000).

Evidence-based practice alert! Brown et al. (2000) conducted a randomized trial enrolling 6,321 hypertensive patients between the ages of 55 and 80. Patients received either nifedipine (3,157 patients) or a hydrochlorothiazide/amiloride combination diuretic product (3,164 patients). Titration was accomplished by doubling the starting dose and the addition of atenolol or enalapril. The primary outcomes of interest were cardiovascular death, myocardial infarction, heart failure, or stroke. The average follow-up time for each group was about 11 years. Primary outcomes were recorded in 6.3 percent of patients receiving nifedipine and 5.8 percent in the diuretic cohort of patients. While the overall risk of a primary outcome was 10 percent higher, on average, in the nifedipine group, the difference was not statistically significant (p=0.35). While the impact on blood pressure was similar between treatments (173/99 mmHg at baseline compared to 138/82 mmHg at the end of the study for both groups), there was an 8 percent higher study withdrawal rate because of peripheral edema in the nifedipine group compared to the patients receiving the diuretic (p<0·0001). Serious adverse events were more frequent in the diuretic group than in the nifedipine patients (880 versus 796, p=0.02). Investigators concluded that nifedipine and diuretic treatment were equally effective in preventing cardiovascular and cerebrovascular complications of hypertension, and that drug choice should be based on tolerability and/or blood pressure response (Brown et al., 2000).

ALPHA BLOCKERS

Alpha blockers antagonize the alpha-1 receptors, primarily located in the smooth muscle. This reduces the effect of the hormone norepinephrine, allowing for relaxation of the smooth muscles of small blood vessels, resulting in less restrictive blood flow and ultimately decreases in blood pressure. There are two main categories of alpha-1 receptors: alpha 1a and alpha 1b. Alpha 1a receptors are found in the bladder neck and prostate, while alpha 1b receptors are found in the arterioles. Nonselective agents and those selective for alpha 1a are commonly used to treat urinary obstruction associated with symptomatic benign prostatic hypertrophy (National Institute of Diabetes and Digestive and Kidney Diseases [NIDDK], 2018).

Alpha blockers are reserved for second line treatment, as recommended by the ACC/AHA guidelines because of the limited evidence on their efficacy in reducing cardiovascular events (Whelton et al., 2017). Long term therapy with alpha blockers has not been associated with improved survival; studies have shown an increase in stroke, cardiovascular disease, and heart failure with long term use (NIDDK, 2018).

A variety of nonselective alpha blockers (sometimes called alpha-adrenergic blockers/antagonists, adrenergic blockers, or alpha-blockers) are available for the treatment of hypertension and can be short- or long-acting agents. Examples include the following (GlobalRPh, 2017a):

- Doxazosin (Cardura) – available as tablets of 1, 2, 4, and 8 mg.
- Prazosin (Minipress) – available as tablets of 1, 2, and 5 mg.
- Terazosin (Hytrin) – available as tablets of 1, 2, 5, and 10 mg.

Alpha blocker class effects

A "first-dose effect" is peculiar to some alpha blockers and results in symptomatic orthostatic hypotension and tachycardia when the dosing of these agents is started. As a result, patients experience an increased risk of dizziness, falls, and fracture when initiating therapy (Hiremath et al., 2019).

Nursing Consideration: It is critical that nurses make patients aware of the risk of first dose effects when initiating alpha blockers, since this can significantly increase a patient's risk of falling. This effect is potentially heightened in elderly patients and those taking multiple antihypertensive agents. Proper education should include directions for patients to rise slowly when getting up and employing judicious caution, as well as assistance and supervision when available (Hiremath et al., 2019).

Potential adverse events associated with the use of alpha blockers include headache, tachycardia, orthostatic hypotension, and dizziness. Taking alpha blockers at night can reduce the risk of daytime falls related to orthostatic hypotension (DiPiro et al., 2019; NIDDK, 2018).

Although alpha blockers have not been adequately studied in pregnant women, their use in this population is common. Moreover, these agents have been demonstrated to be safe in examinations of pregnant animals. All drugs carry some degree of risk, and use in women who are pregnant or trying to become pregnant should be evaluated on a patient-specific basis (Thakur et al., 2020).

Alpha blockers should be used cautiously in women with essential hypertension who are breastfeeding, especially in the cases of premature infants and newborns. Other anti-hypertensives are generally better choices than alpha blockers for breastfeeding women. If no other option is available, infants should be monitored for hypotension (SPS, 2020b).

Although clinically significant drug interactions with alpha blockers are not common, there are some combinations that healthcare professionals should be wary of, in addition to the additive effects of combining antihypertensive medications. When used in combination with beta blockers, alpha blocker-mediated first dose hypotensive effects can be exaggerated. Cimetidine has been shown to enhance the hypotensive effects of tamsulosin because of decreases in its metabolism (DiPiro et al., 2019; Hiremath et al., 2019).

Evidence-based practice alert! The Antihypertensive and Lipid-Lowering treatment to prevent Heart Attack Trial (ALLHAT) was a landmark trial that enrolled 42,418 hypertensive patients 55 and older with at least one additional risk factor for cardiovascular disease. Patients received a variety of antihypertensive regimens to assess the long-term effect of developing heart failure in high-risk patients. A total of 9,061 patients were assigned to receive doxazosin and 15,256 patients were administered chlorthalidone for a median duration of 3.3 years. Results obtained demonstrated that patients treated with doxazosin, overall (monotherapy + add-on rescue therapy) had twice the risk of developing heart failure than patients randomized to receive chlorthalidone (monotherapy + add-on rescue therapy). Moreover, 68 percent of the doxazosin patients required an additional medication to achieve their target blood pressure, while 59 percent of the chlorthalidone patients needed the extra intervention. Investigators concluded that the diuretic chlorthalidone was significantly more effective than doxazosin at preventing heart failure in high-risk hypertensive patients (Davis et al., 2002).

ALPHA-AGONISTS

Through stimulation of the alpha-2 adrenoceptors in the central brainstem, alpha agonists reduce sympathetic nervous system activity. This results in decreased peripheral resistance, heart rate, and blood pressure. In general, these medications carry relatively high potential risks of side effects. As a result, their usage is limited (Brown et al, 2018). The ACC/AHA guidelines reserve alpha agonists as second-line agents, used as adjunctive treatment (Whelton et al., 2017).

Examples of alpha agonists used in the treatment of hypertension include the following (GlobalRPh, 2017d):

- Clonidine (Catapres) – available as tablets of 0.1, 0.2, and 0.3 mg.
- Methyldopa (Aldomet) – available as tablets of 250 and 500 mg and as a solution for injection of 50 mg/mL.

Alpha agonists class effects

Side effects associated with the use of alpha agonists include hypotension, bradycardia, and orthostatic hypotension. Heart rate and blood pressure should be monitored closely when initiating medication and with dosage changes. Other side effects associated with alpha agonists include dry mouth, sedation, dizziness, headache, and constipation. Abruptly stopping alpha agonists may result in sudden, dangerously high elevations in blood pressure. As a result, discontinuation of these medications must be accomplished through tapering (Brown et al., 2018).

Nursing Consideration: Because of the potential for sudden, unsafe increases in blood pressure upon abrupt discontinuation of alpha agonists, nurses should educate their patients not to abruptly discontinue their medications and to employ a conservative tapering approach when medical practice requires discontinuation (Brown et al., 2018).

Of all antihypertensive drugs, methyldopa has the longest safety record in pregnant women; it has been used for more than 40 years without serious side effects on the mother or fetus. Methyldopa is thus considered the agent of choice for lowering blood pressure in this population without significantly impacting fetal health (Youssef, 2019). While methyldopa is compatible with breastfeeding, other medications in this class such as clonidine should be used with caution and should include infant monitoring for hypotension (SPS, 2020b).

When used with other anti-hypertensives, a potentiation of effect should be expected. In addition, patients receiving methyldopa and lithium should be closely monitored for lithium toxicities. Iron supplements have been shown to reduce the bioavailability of methyldopa, which can adversely affect blood pressure control in patients taking both products at the same time. As such, patients receiving methyldopa should not be given iron supplementation with ferrous sulfate or ferrous gluconate at the same time. Clonidine is known to potentiate the CNS-depressive impact of alcohol and other sedating drugs. Further, its hypotensive effects can be reduced by tricyclic antidepressant agents. Lastly, clonidine carries the potential for additive cardiac effects including AV block and bradycardia. As a result, caution is warranted if used concomitantly with drugs known to impact sinus node function (DiPiro et al., 2019).

Nursing Consideration: Because of the reduction in the bioavailability of methyldopa, nurses must educate those receiving methyldopa to avoid using ferrous sulfate or ferrous gluconate. Since methyldopa is frequently used in pregnant women, who are also at a higher risk of anemia, this drug combination may be seen more frequently in this population. Patients should be counseled to separate iron products from methyldopa by at least 2 hours, and blood pressure should be carefully monitored to ensure effectiveness of methyldopa (DiPiro et al., 2019).

RENIN INHIBITORS

Renin inhibitors offer a novel approach to treating hypertension and were first approved in the United States in 2007. They work by directly inhibiting renin, the initial and rate-limiting step in the renin-angiotensin system, reducing the creation of the vasodilator angiotensin II. As a result, blood vessels relax and dilate, reducing blood pressure. Renin inhibitors offer a more complete blockade of this system than any other known modality, possibly offering greater protection from hypertensive complications with a relatively benign side effect profile. It is important to note that renin inhibitors, ARB, and ACE inhibitors all target different points of the same metabolic process, so they should not be administered together (Mann & Hilgers, 2021b). Currently, only one renin inhibitor, aliskiren (Tekturna), has received FDA authorization for marketing in the United States. It is available as 150 and 300 mg tablets (GlobalRPh, 2017d).

Adverse events associated with aliskiren

Side effects commonly observed with aliskiren include hypotension, dizziness, diarrhea, and cough. Rarely, but more seriously, allergic reactions have occurred leading to hives, difficulty breathing, and swelling of the face, lips, tongue and/or throat (Novartis, 2017).

Nursing Consideration: All healthcare professionals caring for patients receiving aliskiren should be aware of the potential allergic reactions associated with its use. Nurses should advise their patients to be vigilant in monitoring for these potentially serious adverse events, with instructions to immediately contact their prescriber or call 911, as appropriate, should they occur.

Although there is no clinical experience with aliskiren in pregnant women, it is known that agents acting on the renin-angiotensin system can lead to fetal morbidity and mortality. If a woman taking aliskiren becomes pregnant, the drug should be discontinued as soon as possible (Mann & Hilgers, 2021b). Furthermore, it is not known if aliskiren is partitioned into human breast milk. Since the potential for adverse effects on a nursing infant is not known, prescribing this agent in nursing mothers is not recommended (Novartis, 2017).

Aliskiren depends on the CYP3A isoenzyme system for metabolism. Further, aliskiren employs the p-glycoprotein efflux system. These two properties, then, subject aliskiren to several drug-drug interactions with concomitant medications. Interactions with ketoconazole, cyclosporin, verapamil, and atorvastatin all result in clinically significant increases in patient exposure to aliskiren, potentially resulting in excessive hypotensive effects. Although aliskiren does not modulate major CYP isoenzymes, a clinically significant drug-drug interaction was demonstrated with furosemide (furosemide levels decreased by 30 to 50 percent) (Novartis, 2017).

Evidence-based practice alert! McMurray et al. (2016) accomplished a clinical evaluation in patients with heart failure and a reduced ejection fraction (ATMOSPHERE). A total of 2,236 patients were assigned to receive enalapril, alone, 5-10 mg, once daily; 2,340 received aliskirin 300 mg once daily; and 2,340 received combination therapy (both medications). On average, treatment persisted for 36.6 months. The primary outcome of interest in the study was death because of a cardiovascular event or hospitalization for heart failure. The primary outcome occurred in 770, 791, and 808 patients in the combination, aliskirin, and enalapril groups, respectively. These observed differences were not statistically significant. Nonetheless, higher frequencies of hypotension and elevated creatine and potassium levels were observed in the combination group. Investigators concluded that the addition of aliskirin to ACE inhibition therapy in heart failure patients with reduced ejection fraction led to an increased rate of adverse events without providing significant increases in efficacy (McMurray et al., 2016).

DIRECT VASODILATORS

Vasodilators have a role in many clinical conditions, including hypertension, heart failure, and preeclampsia. They work by dilating blood vessels, increasing blood flow to the organs, and decreasing the workload on the heart (DiPiro et al., 2017). There are two vasodilators used in the treatment of hypertension that are typically reserved for resistant hypertension or pregnant patients (Whelton et al., 2017). These include the following (GlobalRPh, 2017d):

- Hydralazine (Apresoline): available in 10, 25, 50 and 100 mg oral tablets, as well as a solution for injection 20mg/mL.
- Minoxidil (Loniten): available in 2.5, 5, and 10 mg tablets.

Hydralazine and minoxidil are both associated with sodium and water retention, as well as reflex tachycardia. It is recommended that they be added to treatment with a diuretic and beta blocker to minimize these effects (Whelton et al, 2017).

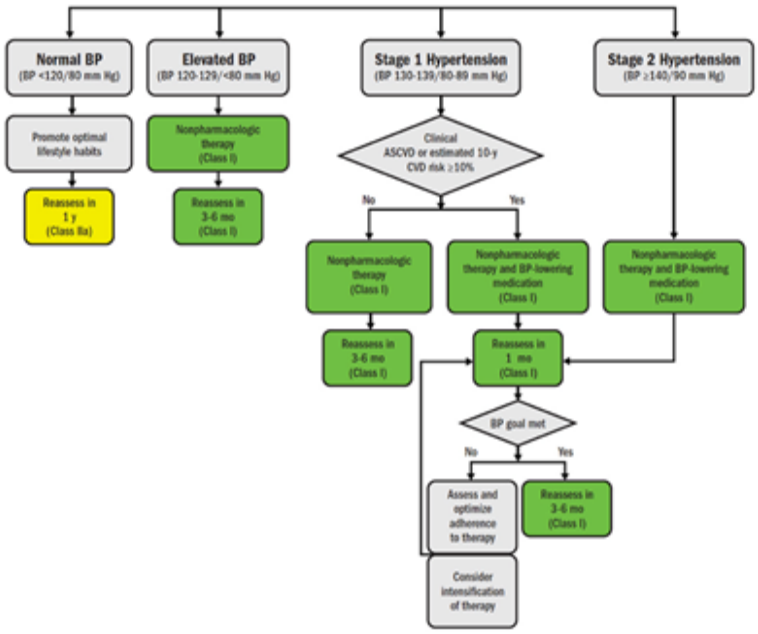
Hydralazine is frequently used in the treatment of resistant hypertension, preeclampsia, and hypertensive emergencies (Whelton et al., 2017). Its safety and efficacy in pregnant patients are well established, and it is considered compatible with breastfeeding (SPS, 2020b). Hydralazine is associated with drug-induced lupus-like syndrome at higher doses and can also cause headache and compensatory tachycardia. The use of minoxidil is uncommon. It can induce pericardial effusion and is associated with hirsutism (Whelton et al., 2017).

CHOOSING AN INITIAL HYPERTENSION TREATMENT AGENT

In addition to lifestyle modification, medications are a cornerstone of treatment in patients with high blood pressure. The overall treatment goal should be managing the patient's overall health, with an emphasis on reducing the risk of cardiovascular events. Initial therapy should consist of one of the four first-line medication classes: thiazide diuretics, calcium channel blockers, ACE inhibitors, or ARBs. When choosing an initial antihypertensive agent for newly diagnosed patients, consideration should be given to the patient's comorbid conditions that may benefit from antihypertensive agents, such as heart failure or chronic kidney disease (Whelton et al., 2017).

Patients who have stage 2 hypertension and an average blood pressure 20/10 mmHg above their blood pressure target should initiate drug therapy with two first-line agents from different medication classes. In stage 1 hypertension patients, it is reasonable to initiate a single agent, with the plan to titrate the dose and/or add other agents as needed to achieve their blood pressure goals. The most current ACC treatment and follow-up guidelines are shown in Figure 1 (Whelton et al., 2017).

Figure 1. Hypertensive Treatment and Follow-up, as Described in the 2017 ACC Treatment Guidelines



American College of Cardiology. (2017). The 2017 High Blood Pressure Guideline: Risk Reduction Through Better Management. Retrieved from http://www.acc.org/latest-in-cardiology/articles/2017/11/14/14/42/the-2017-high-blood-pressure-guideline-risk-reduction-through-better-management

Evidence-based practice alert! MThe Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial (ALLHAT) was a large, randomized trial designed to characterize the impact first-line drugs have on preventing fatal coronary heart disease (CHD) or myocardial infarction (MI) in high-risk hypertensive patients. Sponsored by the National Heart, Lung and Blood Institute (NHLBI), the study enrolled 9,000 to 15,000 subjects per treatment cohort, with a follow-up period of 4 to 8 years. Subjects were randomized to receive antihypertensive treatment with a calcium channel blocker (amlodipine), an ACE inhibitor (lisinopril), an alpha-blocker (doxazosin), or a diuretic (chlorthalidone) (Furburg et al., 2002). Interim analysis demonstrated that treatment with chlorthalidone was significantly superior to doxazosin. As a result, the doxazosin treatment cohort was terminated early (Davis et al. 2002).

Excluding patients randomized to receive doxazosin, the study enrolled 33,357 hypertensive patients 55 and older with at least one other risk factor for CHD. A total of 15,255 patients were randomized to receive chlorthalidone 12.5-25 mg/day; 9,048 patients were assigned to the amlodipine 2.5-10 mg/day group; and 9,054 patients were administered lisinopril 10-40 mg/day. The primary outcome of interest was fatal CHD or non-fatal MI. Outcomes of secondary interest included stroke, all-cause mortality, non-fatal CHD, and a variety of events related to cardiovascular disease. On average, patients were followed for 4.9 years, with primary outcomes occurring in 2,956 patients with no significant differences recorded between treatment groups. The 6-year risk rate was 11.5%, 11.3%, and 11.4%, for chlorthalidone, amlodipine, and lisinopril, respectively. Similarly, there was no difference in all-cause mortality across treatment groups. Regarding secondary outcomes, results were similar with the exception of heart failure. For this outcome, the 6-year risk rates of occurrence for the amlodipine and chlorthalidone were 10.2% and 7.7%, respectively. Examination of 6-year risks for combined cardiovascular disease, stroke, and heart failure also showed significant advantage to chlorthalidone compared to lisinopril. ALLHAT investigators concluded that thiazide diuretics are superior to ACE inhibitors, calcium channel blockers, and alpha blockers. Further, they are generally less expensive and, thus, should receive preference as the first-step agent for antihypertensive therapy (Furburg et al., 2002).

Case study #1, continued

After reviewing lifestyle modifications with Marlene, her provider decides to prescribe an antihypertensive agent to help lower her blood pressure to the goal of less than 130/80 mmHg. Her provider reviews her chart and notes that her chronic kidney disease is stable, and her diabetes is relatively well-controlled.

Self-Assessment Quiz Question #6

Which of the following medications would be most appropriate to initiate to treat Marlene's high blood pressure at this time?

a. Furosemide.
b. Lisinopril.
c. Hydralazine.
d. Amlodipine.

Case study #1, continued

Marlene calls her provider's office 3 weeks after her checkup appointment. She thought she had a cold and wasn't sure if she needed to be seen. She has a bad dry cough for the past 2 weeks and isn't sure what she should take to treat it now that she has high blood pressure. She says many of the over-the-counter cold medications at the pharmacy state not to take them if you have high blood pressure.

Self-Assessment Quiz Question #7

Which of the following would be an appropriate next step to take based on Marlene's recent development?

a. Tell her to take over the counter dextromethorphan for the cough.
b. Discontinue her lisinopril and switch her to losartan.
c. Tell her the cough is likely residual from a cold and will resolve within the next couple of weeks.
d. Discontinue her lisinopril and switch her to furosemide.

COMBINATION THERAPY

Most patients will require more than one medication in order to obtain their blood pressure targets. When creating a multidrug regimen, knowledge of the pharmacological mechanisms of each agent is important. Medications with complimentary activity, where a second agent is added to block compensatory responses of the initial agent or act on a different mechanism of antihypertension, can result in additive blood pressure lowering. For example, thiazide diuretics can stimulate the renin-angiotensin-aldosterone system. Adding an ACE inhibitor or ARB to thiazide therapy can create an additive blood pressure lowering effect (Whelton et al, 2017).

Combinations of medications that have similar mechanisms of action or clinical effects should be avoided. Two medications from the same class should not be given together, and two medications from classes that target the same blood pressure control system, such as ACE inhibitors and ARBs, are less effective and potentially harmful. Exceptions to this rule include the use of diuretics from differing classes, or the use of dihydropyridine and non-dihydropyridine calcium channel blockers (Whelton et al., 2017).

There is some evidence that utilizing a fixed dose combination drug product to treat hypertension confers certain advantages, to include enhanced efficacy, improved patient compliance, cost, convenience, safety, and even patient perceptions of wellness (Whelton et al., 2017).

Evidence-based practice alert! A 2018 population-based study conducted in Canada aimed to assess the difference in clinical outcomes between combination therapy with multiple pills or a single-pill, fixed-dose combination. A retrospective cohort of 13,350 patients over the age of 65 was evaluated with up to 5 years of follow up. Individuals who were newly initiated on an ACE inhibitor or ARB with a thiazide diuretic were included. The primary outcome was a composite of hospitalization or death from acute myocardial infarction, heart failure, or stroke. Researchers found that there was a significantly lower risk of composite clinical outcomes in patients taking fixed dose combination therapy, which may be associated with improved medication adherence (Verma et al., 2018).

Case study #1, continued

At Marlene's next checkup appointment 6 months later, the medical assistant checks her blood pressure and notes it is elevated, with a reading of 146/83 mmHg. Upon further discussion, Marlene states that she has checked it a few times at the pharmacy while waiting for her prescriptions and presents a record card with several recorded several systolic blood pressure values in the high 130s and low 140s. Marlene's provider determines that her blood pressure is not yet controlled with one medication and is considering adding an additional agent. Her provider also notes mild edema around Marlene's ankles.

Self-Assessment Quiz Question #8

Which of the following medications would be most appropriate to add on to Marlene's high blood pressure treatment regimen?

a. Valsartan.
b. Metoprolol.
c. Chlorthalidone.
d. Amlodipine.

RESISTANT HYPERTENSION

Resistant hypertension is diagnosed when a patient does not achieve blood pressure control despite taking 3 antihypertensive medications. Approximately 13% of American adults are diagnosed with resistant hypertension, which can be difficult to control and can significantly increase the risk of poor cardiovascular outcomes, including myocardial infarction, stroke, end-stage kidney disease, and death. The development of resistant hypertension is more common in patients who are obese, elderly, or Black, as well as those with chronic kidney disease and diabetes (Whelton et al., 2017).

When evaluating patients who may have resistant hypertension, it is important to consider the potential for pseudoresistant hypertension. This occurs when blood pressure levels appear to be uncontrolled when they actually may be falsely elevated. Common causes of pseudoresistant hypertension include poor technique in measuring blood pressure, white coat syndrome, or medication noncompliance. Up to 50% of patients with resistant hypertension are experiencing pseudoresistance, so it is critical to evaluate potential cases of resistant hypertension carefully (Bhatt et al., 2016; Whelton et al., 2017).

The treatment of resistant hypertension is multifactorial. Medication adherence should be evaluated and improved and contributing lifestyle factors should be reevaluated and addressed. Weight loss and the importance of physical exercise should be reiterated, excessive alcohol consumption should be reduced, and a low salt, high fiber diet should be encouraged. Other medications or substances that can contribute to increased blood pressure or interact with blood pressure medications should be discontinued or minimized, including stimulants, licorice, NSAIDs, and oral contraceptives (Whelton et al., 2017).

Pharmacologic treatment of resistant hypertension involves ensuring the treatment regimen combines medications that work in different but complimentary ways and preventing adverse effects from occurring. A highly recommended regimen of complimentary medications consists of a calcium channel blocker, chlorthalidone, and an ACE inhibitor or ARB. To build on this regimen, prescribers should ensure the patient's diuretic is at the maximum effective dose and, if another agent is necessary, they should consider the addition of spironolactone to provide substantial blood pressure reduction. Studies also support the addition of hydralazine to resistant hypertension regimens because of its effectiveness in controlling blood pressure in resistant hypertension patients. Patients receiving hydralazine or minoxidil should ensure they have a loop diuretic on board to combat fluid retention and reflex tachycardia. Patients whose blood pressure remains uncontrolled after 6 months of therapy or who may have secondary hypertension should be referred to a specialist (Whelton et al., 2017).

Self-Assessment Quiz Question #9

Which of the following medications is recommended for add-on therapy in cases of resistant hypertension in a non-pregnant patient, after maximizing the recommended three-drug regimen of a calcium channel blocker, chlorthalidone, and an ACE inhibitor or ARB?

a. Methyldopa.
b. Hydrochlorothiazide.
c. Aliskiren.
d. Spironolactone.

TREATMENT CONSIDERATIONS

Patients should be strongly encouraged to make lifestyle modifications, including dietary adjustments, weight loss, and increased exercise. These lifestyle changes can be effective in preventing hypertension and are also useful as first line and adjunctive hypertension therapy. However, implementing lifestyle modifications can be difficult because of lack of social support, decreased access to healthy foods, fewer opportunities for exercise, and cost burdens. Lower socioeconomic status may make it difficult to access basic living needs, including medications and healthcare. In addition, clinicians must consider differences in values, personal beliefs, learning styles, and culture when developing treatment plans (Whelton et al., 2017).

Prevalence of blood pressure control is higher in non-Hispanic White patients than non-White patients, likely because of a wide range of factors. Accordingly, Black and Hispanic patients have higher morbidity and mortality related to uncontrolled hypertension than White patients. When it comes to medication selection, guidelines recommend that Black patients experience more effective blood pressure lowering when given thiazide diuretics or calcium channel blockers as first-line therapy. The thiazide diuretic chlorthalidone is an optimal starting drug in this population because it has shown more robust effectiveness in preventing heart failure in Black patients. In addition, Black patients experience reduced effectiveness of ACE inhibitors when compared to calcium channel blockers in preventing heart failure. Angioedema caused by ACE inhibitors occurs with a higher frequency in Black patients, and ACE inhibitor-induced cough occurs with a higher frequency in Asian Americans. Despite these considerations, ACE inhibitors can still offer significant benefits to patients of all ethnicities who have hypertension in conjunction with diabetes or nephropathy, so considerations should be made on a patient-specific basis (Whelton et al., 2017).

Combination products that contain two medications in a single tablet are an effective tool for achieving blood pressure control in certain situations, as these products help to decrease pill burden and reduce costs. Racial and ethnic factors should be considered when choosing medication therapy but should not be used as a sole reason to exclude any class of medications in combination therapy (Whelton et al, 2017).

AGE-RELATED CONSIDERATIONS

Hypertension is particularly common in older adults and is a common, preventable cause of premature disability, morbidity, and mortality. Systolic and diastolic blood pressures increase slowly from birth until around age 60, at which point the diastolic blood pressure slowly decreases while systolic blood pressure continues to rise. Hypertension that only affects systolic blood pressure, known as isolated systolic hypertension, is a common form of hypertension in older adults. Reducing blood pressure remains important in isolated systolic hypertension; studies have shown that these patients can experience a reduced risk of stroke, cardiovascular events, and death when treated appropriately (Whelton et al., 2017).

The intensity of blood pressure management in older adults can be difficult to determine because of the significant relationship between reductions in blood pressure and the risk of falls. In addition, comorbidities, polypharmacy, frailty, cognitive impairment, and variable life expectancy can complicate treatment decisions further. Regardless, lowering blood pressure has been shown to reduce mortality risk even in frail, older adults, and should be implemented as tolerated, on a patient-specific basis. Patients over the age of 65 who are not institutionalized should be treated to a goal systolic blood pressure of less than 130 mmHg. Those with a high burden of comorbidities and limited life expectancy should be treated on a patient-specific basis using a team-based approach to assess the risks and benefits regarding the intensity of blood pressure lowering and medication choices (Whelton et al., 2017).

Lifestyle modifications remain important in the older population. Dietary sodium restriction is particularly important because the beneficial effects of sodium restriction on blood pressure increase with age. Dietary sodium intake of 2300 to 2800 mg/day is recommended for older adults. Sodium restriction can be more difficult for older adults to comply with, since they may utilize more salt to compensate for decreased taste sensitivity and may depend more on processed, prepared foods that are high in sodium rather than fresh foods (Egan, 2021).

Several studies have shown a clear benefit of treating hypertension in older adult patients, including those over 80 years of age. When initiating antihypertensive therapy in older adults, lower initial doses should be used to minimize side effects. Blood pressure should be lowered slowly in older adults to minimize the risk of ischemic symptoms and orthostatic hypotension, with plans to meet blood pressure goals over the course of 2 to 4 months, or even longer in very old patients. Up to 20% of older adults experience orthostatic hypotension, and antihypertensive treatment is associated with an increased risk of hip fracture within the first 1 to 2 months of therapy. Before the initiation of therapy, supine and standing pressures should be measured to assess for pre-existing orthostatic hypotension (Egan, 2021).

When choosing an agent for older adults, comorbidities must be considered. Older adults frequently have a number of comorbidities that could benefit from specific antihypertensive classes. ACE inhibitors or ARBs, calcium channel blockers, and thiazide diuretics are considered to be first-line therapy in older adults. ACE inhibitors or ARBs should be considered in patients with heart failure, prior myocardial infarction, and chronic kidney disease with proteinuria. Calcium channel blockers, particularly long-acting dihydropyridines, have proven safety and efficacy in older adults with isolated systolic hypertension. Low to moderate doses of thiazide diuretics, particularly chlorthalidone, are also beneficial in older adults. Beta blockers should be avoided because of their lack of benefit in preventing stroke, though they are mainstays of the treatment of heart failure and myocardial infarction, so their use may already be necessary (Egan, 2021).

GESTATIONAL HYPERTENSION

During pregnancy, blood pressures typically decline during the first trimester and slowly rise over the remainder of the pregnancy. The development of hypertension during pregnancy is a risk factor for the development of future hypertension and cardiovascular disease. Blood pressure management during pregnancy is complicated by the fact that many antihypertensives are contraindicated for use during pregnancy. These include ACE inhibitors, ARBs, and direct renin inhibitors. The goal of blood pressure management in pregnant women is preventing the development of severe hypertension and its potential adverse outcomes, as well as ensuring gestation can be long enough to allow the fetus to mature before delivery (Whelton et al., 2017).

Gestational hypertension is diagnosed in pregnant women who develop high blood pressure after 20 weeks of gestation and do not meet other criteria for preeclampsia (Leeman et al., 2016). Patients with mild to moderate hypertension during pregnancy or those with a systolic blood pressure of 140-169 or diastolic blood pressure of 90-109 mmHg are recommended to receive antihypertensive treatment. Medication treatment can decrease the risk of developing severe hypertension by 50% compared to placebo. However, efficacy has not been proven in the prevention of preterm birth, preeclampsia, low birth weight, or infant mortality, and more stringent blood pressure goals of less than 130/80 mmHg did not improve these outcomes (Whelton et al., 2017).

Hypertensive pregnant women without severe symptoms can have their blood pressure managed with several oral medications that are relatively safe and used frequently in pregnancy. These include labetalol, nifedipine, methyldopa, and hydralazine. Studies have not shown sufficient evidence in favor of a specific agent. The choice of medication is dependent on the patient's blood pressure, pre-existing conditions, side effect profile, medication availability, and clinician experience. Careful monitoring of blood pressure and fetal health is recommended for all hypertensive pregnant women to prevent progression to more severe conditions (Leeman et al., 2016; Whelton et al., 2017).

PREECLAMPSIA

Gestational hypertension can be a preliminary diagnosis for women who ultimately develop preeclampsia, or high blood pressure with signs of damage to another organ system, such as proteinuria or thrombocytopenia. Patients with preeclampsia can develop severe symptoms of maternal organ damage, including high blood pressure over 160/110 mmHg, low platelet count, high liver transaminase levels, increased serum creatinine, severe right upper quadrant pain, pulmonary edema, or new onset visual or cerebral disturbances. Preeclampsia can progress to eclamptic seizures, a life-threatening emergency (Leeman et al., 2016). Preeclampsia occurs in approximately 3.8% of pregnancies, and preeclampsia and eclampsia are responsible for 9% of maternal deaths in the United States (Whelton et al., 2017).

Management of gestational hypertension and preeclampsia are similar, with frequent blood pressure and fetal monitoring as well as labor induction at 37 weeks of gestation. Patients who develop severe features require immediate inpatient stabilization. Intravenous magnesium sulfate is used to prevent eclamptic seizures and placental abruption in women with severe features. An initial loading dose of 4 to 6 grams/100 mL is recommended to be given over 15 to 20 minutes, followed by a continuous infusion of 2 grams per hour. Patients receiving magnesium sulfate should have magnesium levels monitored,

as well as reflexes, mental status, respiratory status, and urine output (Leeman et al., 2016).

The goal blood pressure of women with severe preeclampsia is unknown, but it is commonly recommended to ensure systolic blood pressure remains below 160 mmHg and diastolic blood pressure less than 110 mmHg to reduce the risk of stroke. If intravenous agents are required, labetalol and hydralazine are commonly used and equally effective. Hydralazine is a vasodilator that is typically reserved for add-on therapy in cases of severe hypertension. It can be given in bolus doses of 5 to 10 mg over 2 minutes, or as a continuous infusion at a rate of 0.5 to 10 mg per hour. Labetalol, a beta blocker, is initiated at 20 mg given intravenously and can be doubled at 10-minute intervals up to 80 mg until the target blood pressure has been reached, or a maximum of 220 to 300 mg has been met within 24 hours. Oral nifedipine is also commonly used in the acute setting, particularly when IV access has not been achieved, and 10 to 20 mg can be given every 4 to 6 hours as needed (Leeman et al., 2016).

Low dose aspirin has shown some benefit in the prevention of preeclampsia, particularly in women who are already at the highest risk of developing preeclampsia, such as those with a prior history. The American College of Obstetricians and Gynecologists recommends starting low dose aspirin 81 mg daily late in the first trimester in women with a previous preeclampsia history. The US Preventative Services Task Force expands this recommendation to include women with chronic hypertension, diabetes, renal disease, autoimmune disease, multifetal pregnancies, or those with several moderate risk factors (Leeman et al., 2016).

Self-Assessment Quiz Question #10

Which of the following medications has shown some benefit in the prevention of preeclampsia?

a. Low dose aspirin.
b. Labetalol.
c. Hydralazine.
d. Methyldopa.

HYPERTENSIVE EMERGENCY

A hypertensive emergency is an acute, significant rise in blood pressure that is accompanied by signs of organ damage. Specific organ damage may include neurologic deficits, encephalopathy, left ventricular failure, pulmonary edema, myocardial ischemia, aortic dissection, and acute renal failure. Damage to organs can progress rapidly and can lead to death. It is critical to note that while some patients suffering from stroke or intracranial hemorrhage present with elevated blood pressure, these increases are often a consequence of the condition rather than a cause (Bakris, 2021).

Possible signs and symptoms of hypertensive emergencies can affect many organ systems. Central nervous system (CNS) symptoms include rapidly changing neurologic abnormalities, such as confusion, blindness, and seizures. Cardiovascular symptoms include chest pain and dyspnea. Renal damage can be asymptomatic or can include signs of severe azotemia, such as lethargy or nausea. Hypertensive emergencies are diagnosed when target organ damage is identified, often through an electrocardiogram, urinalysis, blood urea nitrogen, creatinine, or head CT (Bakris, 2021).

Ideally, hypertensive emergencies are treated in an intensive care setting. Blood pressure should be progressively reduced because abrupt lowering of blood pressure may be detrimental. Typical agents for blood pressure reduction vary, depending on the target organ for treatment. Goals for blood pressure reduction are generally on the order of 20-25% per hour, with titration based on symptoms. The medication chosen should be a short-acting, intravenous drug that can be easily titrated; oral medications are not recommended for hypertensive emergency management because of their variable onset and difficult titration (Bakris, 2021). Typical first-line drugs are listed below (Globalrph, 2017a):

- Sodium nitroprusside (Nipride) – Nipride, available as a solution for IV of 25 mg/mL, is the most effective parenteral agent for the majority of hypertensive emergencies. It is extremely fast acting (within seconds) and lasts for only 2 to 3 minutes, making it an ideal candidate for titration. The typical dose is 3 µg/kg/minute, and the maximum dose is 10 µg/kg/minute. A downside of Nipride is its associated risk of cyanide and thiocyanate toxicity, especially in renally impaired patients or after prolonged treatment.
- Fenoldopam mesylate (Corlopam) – Corlopam, available as a solution for IV of 10 mg/mL, is a vasodilator that is as effective as nitroprusside, with the additional advantage that it also increases renal blood flow six times as potently as dopamine and is not associated with the accumulation of toxic metabolites. While Corlopam can be used in all hypertensive emergencies, it is of particular benefit in patients suffering from renal insufficiency. Its onset of action is 5-10 minutes, and its duration is approximately 1 hour. A typical starting dose is 0.1 to 0.3 µg/kg/minute, with a maximum dose of 1.6 µg/kg/minute.
- Labetalol (Trandate) – Trandate, available as a solution for IV of 5 mg/mL, is the only beta blocker useful in treating hypertensive emergencies. It does not increase heart rate, so it is also safe to use in patients with active coronary disease. Trandate should typically be avoided in patients with asthma, COPD, CHF, bradycardia, or heart block. Its onset of action is 5-10 minutes, with a duration of 2to 6 hours, and peak effects in about 30 minutes. The initial infusion rate is 0.5 – 2 mg/min.

Conclusion

According to current guidelines, whenever sustained blood pressures exceed 120/80 mmHg, an awareness of blood pressure is warranted, and lifestyle changes are required to prevent becoming hypertensive. When blood pressures exceed 129/80 mmHg, patients are diagnosed with stage 1 hypertension. In these patients, clinicians should act to lower their blood pressure to a safer level. Depending on other risk factors and the patient's lifestyle, this may include the use of medications. Although nearly half of American adults are hypertensive, only 24% are managing their hypertension appropriately. Although positive lifestyle changes should be the cornerstone of all hypertension treatment regimens, many patients will eventually require medication therapy. All patients and medications must be considered individually in order to make optimal treatment choices. Prescribers should also consider the results of large outcome-based clinical investigations. It appears that there is relative parity between some medication classes' ability to manage blood pressure and their impact on meaningful outcomes. Although both alpha blockers and beta blockers are effective at lowering blood pressure, there is a lack of long-term outcome data to support the use of these medications as first-line therapy. Each patient must be considered individually to make optimum medication choices in order to reduce the risk of cardiovascular events.

References

- Agarwal, R. (2021). *Thiazides versus loop diuretics in the treatment of hypertension*. https://www.uptodate.com/contents/thiazides-versus-loop-diuretics-in-the-treatment-of-hypertension
- Alscher, M.D. (2021). Diuretics as a problem – pharmacokinetics and dynamics, use in edema or hypertension. *Internist, 62*, 215-220. https://doi.org/10.1007/s00108-021-00945-x
- Bakris, G.L. (2021). Merck Manual. *Hypertensive Emergencies*.
- www.merckmanuals.com/professional/cardiovascular-disorders/hypertension/hypertensive-emergencies
- Bavishi, C., Goel, S., & Messerli, F. H. (2016). Isolated systolic hypertension: An update after SPRINT. *The American Journal of Medicine, 129*(12), 1251–1258. https://doi.org/10.1016/j.amjmed.2016.08.032
- Bhatt, H., Siddiqui, M., Judd, E., Oparil, S., & Calhoun, D. (2016). Prevalence of pseudoresistant hypertension due to inaccurate blood pressure measurement. *Journal of the American Society of Hypertension: JASH*, 10(6), 493–499. https://doi.org/10.1016/j.jash.2016.03.186
- Bloch, M.J. & Basile, J. (2021). *Major side effects and safety of calcium channel blockers*. https://www.uptodate.com/contents/major-side-effects-and-safety-of-calcium-channel-blockers
- Brater, D.C. & Ellison, D.H. (2021). *Loop diuretics: Dosing and major side effects*. https://www.uptodate.com/contents/loop-diuretics-dosing-and-major-side-effects
- Brown, K. A., Samuel, S., & Patel, D. R. (2018). Pharmacologic management of attention deficit hyperactivity disorder in children and adolescents: A review for practitioners. *Translational Pediatrics, 7*(1), 36–47. https://doi.org/10.21037/tp.2017.08.02
- Brown, M.J., Palmer, C.R., Castaigne, A., deLeeuw, P.W., Mancia, G., Rosenthal, T., & Ruilope, L.M. (2000). Morbidity and mortality in patients randomised to double-blind treatment with a long-acting calcium-channel blocker or diuretic in the International Nifedipine GITS study. Intervention as a goal in hypertension treatment. *Lancet. 356*, 366–72
- Centers for Disease Control and Prevention (CDC). (2021a). *About high blood pressure*. https://www.cdc.gov/bloodpressure/about.htm
- Charles, L., Triscott, J., & Dobbs, B. (2017). Secondary hypertension: Discovering the underlying cause. *American Family Physician, 96*(7), 453–461.
- Cohen, J. B., Lotito, M. J., Trivedi, U. K., Denker, M. G., Cohen, D. L., & Townsend, R. R. (2019). Cardiovascular events and mortality in white coat hypertension: A systematic review and meta-analysis. *Annals of Internal Medicine, 170*(12), 853–862. https://doi.org/10.7326/M19-0223
- Davis, B.R., Cutler, J.A., Furberg, C.D., Wright, J.T., Farber, M.A., & Stokes, J.D. (2002). Relationship of antihypertensive treatment regimens and change in blood pressure to risk for heart failure in hypertensive patients randomly assigned to doxazosin or chlorthalidone: Further analyses from the Antihypertensive and Lipid-lowering treatment to prevent Heart Attack Trial. *Annals of Internal Medicine. 137*313-320.
- Delong, C. & Sharma, S. (2021). Physiology, Peripheral Vascular Resistance. *StatPearls*. StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK538308/
- Dineva, S., Uzunova, K., Pavlova, V., Filipova, E., Kalinov, K., & Vekov, T. (2021). Network meta-analysis of efficacy and safety of chlorthalidone and hydrochlorothiazide in hypertensive patients. *Blood pressure monitoring, 26*(2), 160–168. https://doi.org/10.1097/MBP.0000000000000486
- DiPiro, J., Yee, G., Posey, L. M., Haines, S. T., Nolin, T. D., & Ellingrod, V. (2019). *Pharmacotherapy: A pathophysiologic approach* (8th ed.) McGraw-Hill.
- Duan, L., Ng, A., Chen, W., Spencer, H.T., Nguyen, J., Shen, A.Y.J., & Lee, M.S. (2017). -Blocker exposure in pregnancy and risk of fetal cardiac anomalies. *JAMA Intern Med. 177*(6):885–887. https://doi.org/10.1001/jamainternmed.2017.0608
- Egan, B.M. (2021). *Treatment of hypertension in older adults, particularly isolated systolic hypertension*. https://www.uptodate.com/contents/treatment-of-hypertension-in-older-adults-particularly-isolated-systolic-hypertension
- Ehret, G. (2021). *Genetic factors in the pathogenesis of hypertension*. https://www.uptodate.com/contents/genetic-factors-in-the-pathogenesis-of-hypertension
- Firth, J., Conlon, C., & Cox, T. (2020). *Oxford Textbook of Medicine*. Oxford University Press. https://oxfordmedicine.com/view/10.1093/med/9780198746690.001.0001/med-9780198746690
- Furburg, C.D., Wright, J.T., Davis, B.R., Cutler, J.A., Alderman, M., Black, H., . . . Pelosi, J. (2002). Major outcomes in high-risk hypertensive patients randomized to angiotensin-converting enzyme inhibitor or calcium channel blocker vs diuretic. *JAMA, 288*,2981-2997. https://doi.org/10.1001/jama.288.23.2981
- GlobalRPh. (2017a). *Alpha-1 adrenergic blockers*. https://globalrph.com/drugs/alpha-blockers/
- GlobalRPh. (2017b). *Angiotensin converting enzyme (ACE) inhibitors*. www.globalrph.com/ace.htm
- GlobalRPh. (2017c). *Angiotensin II inhibitors*. https://globalrph.com/drugs/angiotensin-ii-inhibitors/
- GlobalRPh. (2017d). *Anti-hypertensive (other*). https://globalrph.com/drugs/anti-hypertensive-other
- GlobalRPh. (2017e). *Beta blockers*. https://globalrph.com/drugs/beta-blockers/
- GlobalRPh. (2017f). *Calcium channel blockers*. https://globalrph.com/drugs/calcium-channel-blockers/
- GlobalRPh. (2017g). *Diuretics*. https://globalrph.com/drugs/diuretics/
- Globalrph. (2017h). *Hypertensive emergency – IV agents*. https://globalrph.com/drugs/hypertensive-emergency-iv/
- Herman, L.L., Padala, S.A., Ahmed, I., & Bashir, K. (2021). Angiotensin converting enzyme inhibitors (ACEI). *StatPearls*. StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK431051/
- Hill, R.D. & Vaidya, P.N. (2021). Angiotensin II Receptor Blockers (ARB). *StatPearls*. https://www.ncbi.nlm.nih.gov/books/NBK537027/
- Hiremath, S., Ruzicka, M., Petrcich, W., McCallum, M. K., Hundemer, G. L., Tanuseputro, P., Manuel, D., Burns, K., Edwards, C., Bugeja, A., Magner, P., McCormick, B., Garg, A. X., Rhodes, E., & Sood, M. M. (2019). Alpha-blocker use and the risk of hypotension and hypotension-related clinical events in women of advanced age. *Hypertension, 74*(3), 645–651. https://doi.org/10.1161/HYPERTENSIONAHA.119.13289
- King, J. & Lowery, D.R. (2021). Physiology, Cardiac Output. *StatPearls*. StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK470455/
- Kinra, S., Gregson, J., Prabhakaran, P., Gupta, V., Walia, G. K., Bhogadi, S., Gupta, R., Aggarwal, A., Mallinson, P., Kulkarni, B., Prabhakaran, D., Davey Smith, G., Radha Krishna, K. V., Ebrahim, S., Kuper, H., & Ben-Shlomo, Y. (2020). Effect of supplemental nutrition in pregnancy on offspring's risk of cardiovascular disease in young adulthood: Long-term follow-up of a cluster trial from India. *PloS Medicine, 17*(7), e1003183. https://doi.org/10.1371/journal.pmed.1003183
- Konukoglu, D. & Uzun, H. (2017). Endothelial dysfunction and hypertension. *Advances in Experimental Medicine and Biology, 956*, 511–540. https://doi.org/10.1007/5584_2016_90
- Leeman, L., Dresang, L. T., & Fontaine, P. (2016). Hypertensive disorders of pregnancy. *American Family Physician, 93*(2), 121–127.
- Ma, B., Prueksaritanont, T., & Lin, J.H. (2000). Drug interactions with calcium channel blockers: Possible involvement of metabolite-intermediate complexation with CYP3A. *Drug Met Dis. 28*, 125-130.
- Malha, L. & August, P. (2019). Safety of antihypertensive medications in pregnancy: Living with uncertainty. *Journal of the American Heart Association, 8*, e013495. https://doi.org/10.1161/JAHA.119.013495
- Mann, J.F.E. & Hilgers, K.F. (2021a). *Use of thiazide diuretics in patients with primary (essential) hypertension*. https://www.uptodate.com/contents/use-of-thiazide-diuretics-in-patients-with-primary-essential-hypertension
- Mann, J.F.E. Hilgers, K.F. (2021b). *Renin-angiotensin system inhibition in the treatment of hypertension*. https://www.uptodate.com/contents/renin-angiotensin-system-inhibition-in-the-treatment-of-hypertension
- McMurray, J.J.V., Krum, H., Abraham, W.T., Dickstein, K., Køber, L., Desai, A., . . . Massie, B. (2016). Aliskiren, enalapril, or aliskiren and enalapril in heart failure. *New England Journal of Medicine, 374,* 1521-1532.
- Moretti, M.E., Caprara, D., Drehuta, I., Yeung, E., Cheung, S., Federico, L., & Koren, G. (2012). *The fetal safety of angiotensin converting enzyme inhibitors and angiotensin ii receptor blockers*. www.hindawi.com/journals/ogi/2012/658310/
- MotherToBaby.org. (2019). *Beta blockers*. https://mothertobaby.org/fact-sheets/beta-blockers/
- National Heart, Lung and Blood Institute (NHLBI). (2020). *Description of high blood pressure*.
- www.nhlbi.nih.gov/health/health-topics/topics/hbp
-
- Novartis. (2017). *Package insert for Tekturna*.
- https://www.accessdata.fda.gov/drugsatfda_docs/label/2017/210709s000lbl.pdf
- Sacks, F.M., Svekey, L.P., Vollmer, W.M., . . . Lin, P.H. (2001). Effects on blood pressure of reduced dietary sodium and the dietary approaches to stop hypertension (DASH) diet. *New England Journal of Medicine, 344*, 3-10. https://doi.org/10.1056/NEJM200101043440101
- Saklayen, M. G. & Deshpande, N. V. (2016). Timeline of history of hypertension treatment. *Frontiers in Cardiovascular Medicine, 3*, 3. https://doi.org/10.3389/fcvm.2016.00003
- Tarray, R. Saleem, S., Afroze, D., Yousuf, I., Gulnar, A., Laway, B., & Verma, S., (2014). Role of insulin resistance in essential hypertension. *Cardiovascular Endocrinology.3*(4), 129-133 DOI: 10.1097/XCE.0000000000000032
- Thakur, A.P.S., Sharma, V., Ramasamy, V., Choudhary, A., Patel, P., Singh, S., & Parol, S. (2020). Management of ureteric stone in pregnancy: A review. *African Journal of Urology, 26*, 60. https://doi.org/10.1186/s12301-020-00070-5
- Tumlin, J.A., Dunbar, L.M., Oparil, S., Buckalew, V., Ram, C.V., Mathur, V., . . . Luther, R.R. (2000). Fenoldopam, a dopamine agonist, for hypertensive emergency: A multicenter randomized trial. Academy of Emergency Medicine, 7, 653-662.
- UK Medicines and Healthcare Products Regulatory Agency. (2014). *ACE inhibitors and angiotensin II receptor antagonists: Recommendations on how to use for breastfeeding*. https://www.gov.uk/drug-safety-update/ace-inhibitors-and-angiotensin-ii-receptor-antagonists-recommendations-on-how-to-use-for-breastfeeding
- University Kidney Research Organization (UKRO). (2020). *The renin-angiotensin system and blood pressure control*. http://ukrocharity.org/kidney-disease/the-renin-angiotensin-system-and-blood-pressure-control/
- Valensi, P. (2021). Autonomic nervous system activity changes in patients with hypertension and overweight: role and therapeutic implications. *Cardiovascular Diabetology, 20*, 170. https://cardiab.biomedcentral.com/articles/10.1186/s12933-021-01356-w
- Verma, A. A., Khuu, W., Tadrous, M., Gomes, T., & Mamdani, M. M. (2018). Fixed-dose combination antihypertensive medications, adherence, and clinical outcomes: A population-based retrospective cohort study. *PLoS Medicine, 15*(6), e1002584. https://doi.org/10.1371/journal.pmed.1002584
- Whitaker, J. (2021). *Hypertension and insulin resistance*. http://whitakerwellness.com/health-concerns/high-blood-pressure-treatment/what-is-insulin-resistance
- Whelton, P. K., Carey, R. M., Aronow, W. S., Casey, D. E., Jr, Collins, K. J., Dennison Himmelfarb, C., DePalma, S. M., Gidding, S., Jamerson, K. A., Jones, D. W., MacLaughlin, E. J., Muntner, P., Ovbiagele, B., Smith, S. C., Jr, Spencer, C. C., Stafford, R. S., Taler, S. J., Thomas, R. J., Williams, K. A., Sr, Williamson, J. D., … Wright, J. T., Jr. (2018). 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the prevention, detection, evaluation, and management of high blood pressure in adults: A report of the American College of Cardiology/American Heart Association task force on clinical practice guidelines. *Journal of the American College of Cardiology, 71*(19), e127–e248. https://doi.org/10.1016/j.jacc.2017.11.006
- Wiysonge, C.S., Bradley, H.A., Volmink, J., Mayosi, B.M., & Opie, L.H. (2017*). Beta-blockers for hypertension*. Cochrane Database of Systematic Reviews. http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD002003.pub5/epdf
- Youssef, G.S. (2019). *Hypertension in pregnancy*. European Society of Cardiology. https://www.escardio.org/Journals/E-Journal-of-Cardiology-Practice/Volume-17/hypertension-in-pregnancy
- Zheng, X., Yu, H., Qiu, X., Chair, S. Y., Wong, E. M., & Wang, Q. (2020). The effects of a nurse-led lifestyle intervention program on cardiovascular risk, self-efficacy and health promoting behaviours among patients with metabolic syndrome: Randomized controlled trial. International Journal of Nursing Studies, 109, 103638. https://doi.org/10.1016/j.ijnurstu.2020.103638

Self-Assessment Answers and Rationales

1. The correct answer is A.
Rationale: Stage 1 hypertension includes average systolic blood pressures between 130-139 mmHg or diastolic blood pressures between 80-89 mmHg. The highest applicable category should be used when categorizing, therefore the blood pressure of 138/78 mmHg would be considered Stage 1 hypertension.

2. The correct answer is C.
Rationale: Marlene has chronic kidney disease, a relatively fixed risk factor that may not be possible for her to change. Cigarette smoking, type 2 diabetes, and overweight status are all modifiable risk factors that Marlene may have some influence over changing. Addressing these risk factors can decrease blood pressure as well as cardiovascular risk.

3. The correct answer is A.
Rationale: The ACC/AHA guidelines state that patients can expect a blood pressure reduction of approximately 1 mmHg for every 1 kg reduction in body weight, so 14 kg of weight loss would lead to a reduction in blood pressure of approximately 14mmHg. Exercise has the potential to lower systolic blood pressure by about 5 to 8 mmHg on average. Patients who follow diets high in low-fat dairy products, fruits, and vegetables can expect systolic blood pressure reductions of approximately 11 mmHg.

4. The correct answer is D.
Rationale: Angioedema, a potentially life-threatening medical condition, has a higher rate of occurring in the Black population. Patients experiencing angioedema require immediate medical attention and should have ACE inhibitors discontinued immediately.

5. The correct answer is A.
Rationale: Thiazide diuretics are recommended by the ACC/AHA guidelines as a first-line agent in the treatment of hypertension because of their ability to reduce clinical cardiovascular disease events. Loop diuretics and potassium-sparing diuretics are reserved for second-line or add-on therapy. Calcium channel blockers are not a type of diuretic.

6. The correct answer is B.
Rationale: Despite the clear benefits of calcium channel blockers in Black patients, lisinopril would be the most appropriate antihypertensive starting agent for Marlene. The benefits of ACE inhibitors in patients with chronic kidney disease and diabetes are numerous. ACE inhibitors have been shown to slow the progression of kidney disease in patients with diabetes, as well as reduce the risk of myocardial infarction and improve heart function in diabetic patients with hypertension. Chronic kidney disease patients also experience benefits in their disease management, with studies showing effectiveness in decreasing proteinuria and slowing the progression of kidney disease. Therefore, lisinopril would be the most appropriate starting agent for Marlene.

7. The correct answer is B.
Rationale: The most appropriate next step would be to discontinue Marlene's lisinopril and switch her to losartan. Losartan, an ARB, is significantly less likely to cause a dry cough and will still provide Marlene with the beneficial effects on her kidneys. Dry cough is a common side effect of ACE inhibitors and should not be ignored or dismissed, as it can lead to medication non-adherence and inadequately treated hypertension.

8. The correct answer is C.
Rationale: Chlorthalidone is a thiazide diuretic, which are recommended by the ACC/AHA guidelines for first line treatment of hypertension because of their ability to reduce clinical cardiovascular disease events. Amlodipine, a calcium channel blocker, is also recommended as first line therapy, but since Marlene is exhibiting mild symptoms of edema, a diuretic would be more appropriate to add on at this time to address both her edema and high blood pressure. Valsartan is an ARB and, since Marlene is already taking an ARB, a second agent in the same class should not be added. Metoprolol is a beta blocker, reserved for second line therapy, and would not be the most appropriate agent to add on at this time.

9. The correct answer is D.
Rationale: After the three-drug regimen of a calcium channel blocker, chlorthalidone, and an ACE inhibitor or ARB has been maximized, the addition of spironolactone should be considered to provide substantial blood pressure reduction. Hydrochlorothiazide is a thiazide diuretic, so another thiazide diuretic should not be added if a patient is already taking one. Aliskiren is a direct renin inhibitor, which should not be added on if a patient is already taking an ACE inhibitor or ARB. Methyldopa is used infrequently in non-pregnant patients and would not be the best medication to add at this time.

10. The correct answer is A.
Rationale: Low dose aspirin has shown some benefit in the prevention of preeclampsia, particularly in women who are already at the highest risk of developing preeclampsia, such as those with a prior history. The American College of Obstetricians and Gynecologists recommends starting low dose aspirin 81 mg daily late in the first trimester in women with a previous preeclampsia history. Labetalol, hydralazine, and methyldopa are all utilized in the treatment of preeclampsia, not prevention.

Nursing Assessment, Management and Treatment of Autoimmune Diseases

6 Contact Hours

Release Date: March 3, 2022

Expiration Date: March 2, 2025

Faculty

Author: Adrianne E. Avillion, DEd, RN, is an accomplished nursing professional development specialist and published healthcare education author. She is the owner of Strategic Nursing Professional Development, a business devoted to helping nurses maintain competency and enhance their professional growth and development. Dr. Avillion earned her doctoral degree in adult education and her MS from Penn State University, along with a BSN from Bloomsburg University. She has served in various nursing roles over her career in both leadership roles and as a bedside clinical nurse. She has published extensively and is a frequent presenter at conferences and conventions devoted to the specialty of continuing education and nursing professional development.

Adrianne E. Avillion has disclosed that she has no significant financial or other conflicts of interest pertaining to this course.

Reviewer: Mary C. Ross, PhD, RN, is an experienced nursing educator with substantial clinical experience in multiple areas of nursing including medical/surgical nursing and community health. She is a retired Air Force flight nurse and has extensive experience as an administrator and graduate faculty member, teaching advanced practice nurses.

Mary C. Ross has disclosed that she has no significant financial or other conflicts of interest pertaining to this course.

Course objective

Almost 4% of the world's population is affected by one of more than 80 different autoimmune diseases. In the United States (US), as many as 50 million Americans are living with an autoimmune disease, at a cost of $86 billion a year (National Stem Cell Foundation [NSCF], 2021).

This education program provides information on autoimmune diseases with the purpose of adding to the nurse's ability to recognize, assess, and facilitate treatment of such diseases.

Learning objectives

Upon completion of this course, the learner should be able to:

- Discuss the incidence and prevalence of common autoimmune diseases.
- Describe the pathophysiology of common autoimmune diseases.
- Initiate appropriate assessment of patients affected by common autoimmune diseases.
- Explain diagnosis and treatment options for common autoimmune diseases.
- Identify nursing interventions important to the care of patients living with common autoimmune diseases.

How to receive credit

- Read the entire course online or in print which requires a 6-hour commitment of time.
- Complete the self-assessment quiz questions either integrated throughout or all at the end of the course. These questions are NOT GRADED. The questions are included to help affirm what you have learned from the course. The correct answer is shown after the question is answered. If the incorrect answer is selected, a Rationale for the correct answer is provided.
- Depending on your state requirements you will then be asked to complete either:
  - An affirmation that you have completed the educational activity.
  - A mandatory test (a passing score of 70 percent is required). Exam questions link content to the course learning objectives as a method to enhance individualized learning and material retention.
- If requested, provide required personal and payment information.
- Complete the MANDATORY Course Evaluation.
- Print your Certificate of Completion

CE Broker reporting

Colibri Healthcare, LLC provider # 50-4007, reports course completion results within 1 business day to CE Broker. If you are licensed in Arkansas, District of Columbia, Florida, Georgia, Kentucky, Michigan, Mississippi, North Dakota, New Mexico, South Carolina, or West Virginia, your successful completion results will be automatically reported for you.

Accreditations and approvals

Colibri Healthcare, LLC is accredited as a provider of nursing continuing professional development by the American Nurses Credentialing Center's Commission on Accreditation.

Individual state nursing approvals

Colibri Healthcare, LLC is accredited as a provider of nursing continuing professional development by the American Nurses Credentialing Center's Commission on Accreditation. In addition to states that accept courses offered by ANCC accredited Providers, Colibri Healthcare, LLC is an approved Provider of continuing education in nursing by: Alabama Board of Nursing, Provider #ABNP1418 (valid through February 5, 2025); Arkansas State Board of Nursing, Provider #50-4007; California Board of Registered Nursing, Provider #CEP17480 (valid through January 31, 2024); California Board of Vocational Nursing and Psychiatric Technicians (LVN Provider # V15058, PT Provider #V15020; valid through December 31, 2023); District of Columbia Board of Nursing, Provider #50-4007; Florida Board of Nursing, Provider #50-4007; Georgia Board of Nursing, Provider #50-4007; Kentucky Board of Nursing, Provider #7-0076 (valid through December 31, 2023; CE Broker provider #50-4007). Michigan Board of Nursing, Provider #50-4007; Mississippi Board of Nursing, Provider #50-4007; New Mexico Board of Nursing, Provider #50-4007; North Dakota Board of Nursing, Provider #50-4007; South Carolina Board of Nursing, Provider #50-4007; and West Virginia Board of Registered Nurses, Provider #50-4007. This CE program satisfies the Massachusetts States Board's regulatory requirements as defined in 244 CMR5.00: Continuing Education.

Activity director

Shirley Aycock, DNP, RN, Executive Director of Quality and Accreditation

Disclosures

Resolution of conflict of interest
In accordance with the ANCC Standards for Commercial Support for continuing education, Colibri Healthcare, LLC implemented mechanisms prior to the planning and implementation of the continuing education activity, to identify and resolve conflicts of interest for all individuals in a position to control content of the course activity.

Sponsorship/commercial support and non-endorsement
It is the policy of Colibri Healthcare, LLC not to accept commercial support. Furthermore, commercial interests are prohibited from distributing or providing access to this activity to learners.

Disclaimer

The information provided in this activity is for continuing education purposes only and is not meant to substitute for the independent medical judgment of a healthcare provider relative to diagnostic and treatment options of a specific patient's medical condition.

Course verification

All individuals involved have disclosed that they have no significant financial or other conflicts of interest pertaining to this course. Likewise, and in compliance with California Assembly Bill No. 241, every reasonable effort has been made to ensure that the content in this course is balanced and unbiased.

INTRODUCTION

Autoimmune diseases are typically chronic conditions that often present with non-specific symptoms. Therefore, it may be a good deal of time before patients are diagnosed and properly treated. Living with a chronic condition can be burdensome as providers and patients work together to find the optimal treatment and promote the ideal quality of life. As autoimmune conditions can present differently and patients may react in various ways to medication options, treatment plans vary from patient to patient. This education program provides information on autoimmune diseases with the purpose of adding to the nurse's ability to recognize, assess, and facilitate treatment of such diseases.

INCIDENCE AND PREVALENCE

An estimated four percent of the world's population is affected by one of more than 80 different autoimmune diseases. In the United States, autoimmune diseases are the third most common cause of chronic illness. The National Institutes for Health (NIH) reports that autoimmune diseases affect between five and eight percent of the population. The prevalence of autoimmune diseases is increasing. However, the reason for this increase is not yet known (NSCF, 2021).

About 50 million Americans are living with an autoimmune disease at a cost of $86 billion a year. Autoimmune diseases affect women three times as often as men. In fact, the Office of Research on Women's Health at the NIH has named autoimmunity a major women's health issue. These types of diseases are the fourth largest cause of disability in women in the US and they are the eighth leading cause of death for women between the ages of 15 and 64 (NSCF, 2021).

Self-Assessment Question 1

When discussing autoimmune diseases with a female patient, the nurse should explain that:

a. Autoimmune disease affects males and females equally.
b. In the US, autoimmune diseases are the third most common cause of chronic illness.
c. About 25 million Americans are living with an autoimmune disease.
d. Autoimmune diseases are the third largest cause of disability in males.

An autoimmune disease develops when the body's immune system mistakes its own healthy tissues as foreign substances and attacks these tissues. Most autoimmune diseases cause inflammation that can affect many parts of the body (National Cancer Institute, n.d.). Autoimmune diseases tend to run in families and affect various races and ethnicities differently (National Cancer Institute, n.d.; NSCF, 2021).

Autoimmunity appears to be increasing in the US according to scientists at the National Institutes of Health (2020) and their collaborators. The most common biomarker of autoimmunity was found to be increasing generally in the US, especially in males, non-Hispanic Whites, adults 50 years of age and older, and adolescents.

The reasons for these increases have not been definitely identified but they suggest a possible increase in future autoimmune diseases.

Some of the most common autoimmune diseases include the following (Messenger, 2021; NSCF, 2021):

- Alopecia Areata.
- Celiac Disease.
- Crohn's Disease.
- Diabetes Type 1.
- Multiple Sclerosis (MS).
- Rheumatoid Arthritis (RA).
- Lupus.
- Scleroderma.
- Psoriasis.
- Ulcerative colitis.
- Vitiligo.

Alopecia areata

Alopecia areata is a chronic disorder that affects anagen hair follicles and causes non-scarring hair loss. The disorder occurs throughout the world. Its estimated prevalence is about one in 1,000 people, with a lifetime risk of approximately two percent. The disorder occurs at similar rates in males and females and affects both children and adults. The mean age for diagnosis of alopecia areata is 32 years in males and 36 years in females (Messenger, 2021).

Pathophysiology

Alopecia areata is an autoimmune disease. Cells of the immune system surround and "attack" hair follicles, which causes the attached hair to fall out. The greater the number of hair follicles attacked by the immune system, the greater the loss of hair. Although hair loss occurs, hair follicles are rarely destroyed (American Academy of Dermatology Association (AAD), 2021a).

Anyone can develop alopecia areata. There are, however, some people who are at greater risk for its development (AAD, 2021a):

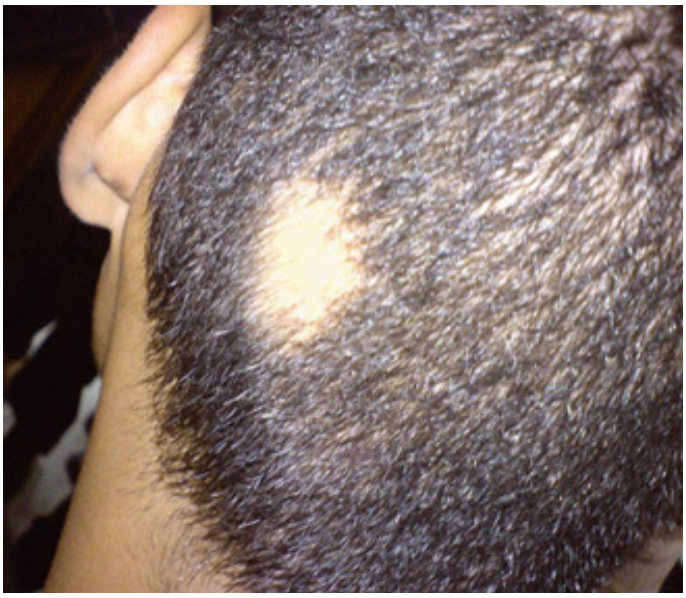
- An estimated 10% to 20% of people with alopecia areata have a family member with the disorder. The actual percentage may be much higher since many people try to hide hair loss.
- People who have asthma, hay fever, atopic dermatitis, thyroid disease, vitiligo, or Down syndrome are at higher risk for developing the disease.
- People with cancer who are being treated with various chemotherapeutic drugs are at risk for hair loss. Hair generally regrows after treatment is completed.

Assessment

Alopecia areata most typically causes discrete, smooth patches of hair loss on the scalp (see Figure 1). Hair loss may also occur in other areas of the body, such as eyebrows, eyelashes, beard, and extremities. Severe disease may lead to the loss of all scalp hair (alopecia totalis) or of all body hair (alopecia universalis; AAD, 2021a).

In addition to the physical findings, a complete health history needs to be obtained. Emphasis is on current state of health, medications being taken, and any risk factors that are in evidence. A mental health assessment is also an important part of any assessment process (AAD, 2021a).

Figure 1. Alopecia areata



Note. Andrzej. (2011). Alopecia areata.JPG https://commons.wikimedia.org/wiki/File:Allopecia_areata.JPG

Diagnosis and treatment

Diagnosis is based on patterns of hair loss, history, and physical findings. It is important to rule out other autoimmune disorders (AAD, 2021b).

Treatment in Persons Less than 10 Years of Age. Treatment depends on age, the amount of hair loss, and the location of the hair loss. In children 10 years of age and younger, treatment may be initiated to help hair regrowth. Pharmacological interventions include the following (AAD, 2021b):

- **Corticosteroids**: Prescription-strength corticosteroids may be applied to sites of hair loss. Corticosteroids may be applied once or twice a day. For children, corticosteroids alone may be effective in promoting hair growth.
- **Minoxidil**: Minoxidil (Rogaine) can help to maintain regrowth after corticosteroids are discontinued.

Treatment in Persons over 10 Years of Age. If there are only a few patches of alopecia areata, one or more of the following treatments may be initiated (AAD, 2021b):

- **Injection of corticosteroids**: Corticosteroids are injected into bald areas every 4 to 8 weeks.
- **Application of minoxidil (Rogaine)**: The medication is applied to bald spots once or twice a day as prescribed. It is useful when bald spots are over the scalp, beard area, and eyebrows.
- **Application of anthralin**: This medication is applied to bald spots, allowing it stay on the skin for as long as prescribed, and then it is washed off. Skin irritation is expected. Using anthralin in conjunction with minoxidil is prescribed for most effective results.

If eyelashes are affected, false eyelashes or wearing glasses helps to make hair loss less apparent. The use of bimatoprost or similar medications has been approved, in addition to glaucoma treatment, to help eyelashes grow longer (AAD, 2021b).

For eyebrow loss, "stick-on" eyebrows or semi-permanent tattoos may be used. A dermatologist may also inject

intralesional corticosteroids in conjunction with the application of minoxidil (AAD, 2021b).

If hair loss is rapid and extensive, the following interventions may be used (AAD, 2021b):

- **Topical immunotherapy**: This intervention is designed to alter the immune system so that it stops attacking hair follicles. Treatment is typically implemented on a weekly basis.
- **Methotrexate**: This medication may be prescribed when other treatments fail to be effective.

Nursing consideration: Methotrexate is also used to treat leukemia and various malignancies including cancers of the breast, skin, head, neck, lung, or uterus. It is also used to treat severe psoriasis and rheumatoid arthritis in adults. Methotrexate can cause serious, even fatal, side effects (Entringer, 2020). Such side effects include bone marrow, liver, lung, and kidney toxicities, soft-tissue necrosis, osteonecrosis, severe bone marrow suppression, aplastic anemia, gastrointestinal toxicity, hemorrhagic enteritis, and intestinal perforation (Comerford & Durkin, 2021).

- **Corticosteroids**: Taking corticosteroids for about 6 weeks may help hair growth in the presence of widespread alopecia areata.
- **Janus kinase (JAK) inhibitors**: These types of medications may treat extensive hair loss. Examples include tofacitinib, ruxolitinib, and baricitinib.
- **Wigs, hairpieces, or scalp prosthesis**: Use of these items may cover up hair loss.

Nursing Interventions

Nurses are typically involved in patient/family education. They take a lead role in education regarding accurate medication administration, adherence to treatment regimen, and psychosocial support. In the case of patients who are dealing with alopecia areata, body image changes may have psychological consequences, therefore, mental health is an aspect of care that nurses must assess.

Although the symptoms of alopecia areata typically do not cause physical pain, psychological pain may become a serious problem (National Alopecia Areata Foundation, n.d.).

Evidence-based practice! An analysis of U S hospitalizations found that alopecia areata patients are at risk for anxiety disorders, attention-deficit hyperactivity disorder, dementia, mood disorders, personality disorders, and suicide or intentionally self-inflicted injury. It was unclear if psychological stress might cause or exacerbate alopecia areata, or whether alopecia areata can lead to or worsen mental health disorders (Singam et al., 2018).

A diagnosis of alopecia areata in children can be just as, or even more, upsetting for parents. Parents of these children have reported that they feel a sense of "guilt" as though they had somehow contributed to the development of the disease or cannot stop its progression (National Alopecia Areata Foundation, n.d.).

Parents (and other caregivers) are urged to avoid being overly protective or permissive with their children. They should identify a support network to help them manage stress. Parents are also encouraged to speak directly to their children about their alopecia areata and urge the children to talk about their feelings about living with alopecia areata (National Alopecia Areata Foundation, n.d.).

Children with alopecia areata are at risk for emotional distress, anxiety, depression, and sadness. Children may not be able to describe their feelings, so it is important to teach parents and other family members/caregivers how to recognize depression and anxiety. Symptoms of depression in children include the following (National Alopecia Areata Foundation, n.d.):

- Sadness and/or irritability.
- Not wanting to participate in "fun" activities that were enjoyed in the past.
- Changes in eating patterns.
- Changes in sleep patterns.
- Changes in energy patterns.
- Having a hard time paying attention.
- Feelings of worthlessness, uselessness, and/or guilt.
- Exhibiting self-destructive behavior.

Symptoms of anxiety in children include the following (National Alopecia Areata Foundation, n.d.):

- Excessive fearfulness or worry.
- Irrational anger.
- Trouble sleeping.
- Physical symptoms including fatigue, headaches, and stomach aches.

Children are also at risk for bullying. Examples of bullying behaviors that affect children with alopecia areata include the following (National Alopecia Areata Foundation, n.d.):

- Pulling head coverings from the child's head.
- Verbalizing insults about the child's appearance.
- Telling others about the child's alopecia and making deliberate attempts to humiliate and embarrass the child.

Evidence-based practice! Results from a study of 80,000 students showed that 25% of participants reported having been bullied. Results also showed a significant disconnect between teachers' perceptions and what their students say is happening in their schools (Stringer, 2016).

To combat bullying, the National Alopecia Areata Foundation offers the following suggestions for parents and other caregivers as they work to help their children who are being bullied (National Alopecia Areata Foundation, n.d.):

- Help children to understand and identify bullying behaviors.
- Encourage open communication, check in with the children frequently, and listen/observe closely to what children are saying and doing.
- Encourage children to participate in enjoyable activities to foster confidence.
- Model treating other with kindness and respect.
- Speak to school officials and leaders of extra-curricular activities about bullying and how to stop it.
- Provide information about how to deal with bullying such as leaving the bullying situation if possible, telling the bully (calmly) to stop the bullying, controlling emotions (avoiding showing fear or anger, which may increase the bullying), and do not try to bully the person(s) who is doing the bullying (this only perpetuates the cycle of bullying).

When working with patients who are dealing with alopecia areata nurses have a responsibility to work with patients and families as they attempt to navigate the mental health issues that often accompany the disease. They should be prepared to discuss these issues and intervene effectively.

Case Study: Mr. Nathan Lacy

Nathan has recently been diagnosed with alopecia areata. He has a few patches of alopecia over his scalp and is distressed over his hair loss. There is no hair loss of eyebrows or other facial hair. At 28 years of age, Nathan says, "I never thought I'd be going bald at my age!" The nurse practitioner, who is Nathan's primary healthcare provider, assures him that there are treatment options for alopecia areata.

Question:
What treatment options are available to Nathan?

Discussion:
There are several treatment options for Nathan. Treatment varies according to age and the amount of hair loss. Nathan is over 10 years of age and has only a few patches of alopecia. Corticosteroids may be injected directly into the bald areas every 4 to 8 weeks. Topical medications that are available are minoxidil (Rogaine) and/or anthralin. Minoxidil is applied to the bald spots once or twice a day.

Anthralin is applied to bald spots and left on the skin for a prescribed amount of time, after which it is washed off. Patients should anticipate skin irritation when using anthralin. Treatment is most effective when these drugs are used together.

Nathan also needs to receive emotional support. He has already told his nurse practitioner that he is distressed about his hair loss. Research shows that people who have alopecia areata are at risk for a variety of mental health issues including anxiety disorders, mood disorders, and personality disorders. A mental health assessment is very important as is ongoing observation and professional mental health consultation as needed.

Celiac disease

Celiac disease, also referred to as celiac sprue or gluten-sensitivity enteropathy, is an immune reaction to eating gluten, which is a protein found in wheat, barley, and rye (Mayo Clinic, 2020a). An estimated one in 100 people throughout the world are affected by celiac disease. Two and one-half million Americans are undiagnosed and at risk for long-term health-related complications (Celiac Disease Foundation, 2018; Celiac Disease Foundation, 2021).

A recent meta-analysis and review of studies from throughout the world showed that the world-wide prevalence of celiac disease is an estimated 1.4% based on blood tests, and 0.7% based on the results of biopsies. The prevalence was higher in females than males and was significantly higher in children compared to adults (Celiac Disease Foundation, 2018).

Evidence-based practice! Research shows that celiac disease typically becomes evident between the ages of 6 and 18 months after gluten-containing foods are introduced into the diet (Meadows-Oliver, 2019). Therefore, parents should be taught to carefully observe their children for symptoms of the disease during this period of time.

Pathophysiology

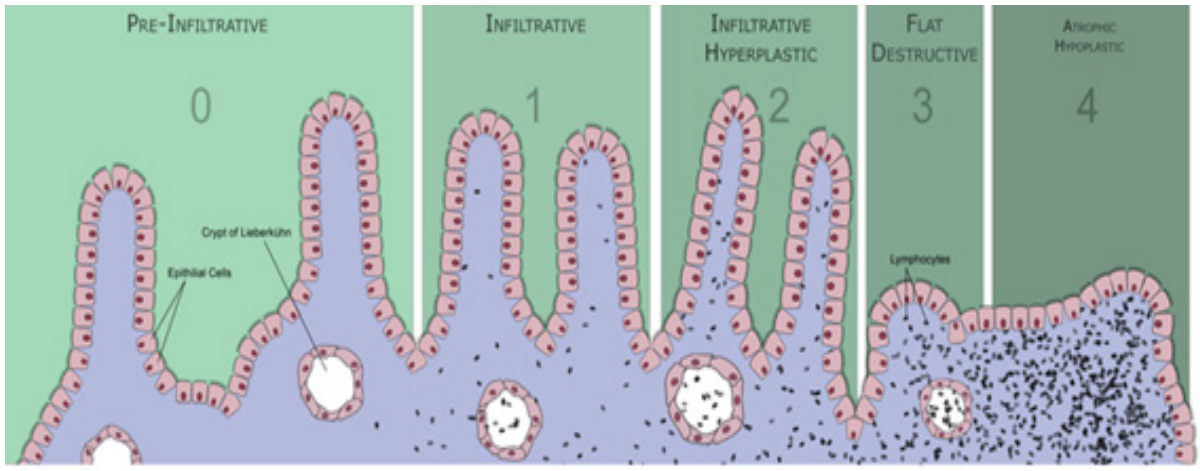
When people with celiac disease ingest gluten, the immune system responds and attacks the cells of the small intestine. Eventually the villi of the small intestine are damaged. Villi are the projections that line the small intestine and facilitate the absorption of protein (Celiac Disease Foundation, n.d.).

Nursing consideration: Celiac disease cannot be prevented, but adherence to a strict gluten-free diet may stop and reverse small intestine damage (My Health Alberta, 2021).

Figure 2 illustrates the various stages of celiac disease. These stages can be explained as follows (Celiac Disease Foundation, n.d.; Goebel, 2019):

- **Stage 1**: Pre-infiltrate. There is an increased percentage of intraepithelial lymphocytes (>30%).
- **Stage 2**: Infiltrative hyperplastic. This stage is characterized by the presence of inflammatory cells and crypt cell (which act as immunoglobulin receptors) proliferation while preserving the architecture of the villa.
- **Stage 3**: Flat destructive. Stage 3 is characterized by villous atrophy progressing from mild to total atrophy.
- **Stage 4**: Atrophic hypoplastic. Stage 4 is characterized by total mucosal hypoplasia.

Figure 2. Upper Jejunal Mucosal Immunopathology



Note. From Wikipedia Commons, 2020.

Nursing consideration: Dermatitis herpetiformis (DH) is an itchy, bumpy rash commonly found in people with celiac disease. DH causes blisters that resemble herpes, but they are associated with celiac disease. The antibody produced by the intestines in the presence of celiac disease, called IgA, can enter the bloodstream and accumulate in blood vessels under the skin. This causes the DH rash (Nazario, 2020).

Risk Factors. There several risk factors associated with celiac disease. These include the following (Mayo Clinic, 2020a):

- Having a family member with celiac disease or dermatitis herpetiformis.
- Having type 1 diabetes.
- Having Down syndrome or Turner syndrome.
- Having autoimmune thyroid disease.
- Having microscopic colitis.
- Having Addison's disease.

Complications. Celiac disease can lead to several complications, especially if it is untreated. These complications include the following (Mayo Clinic, 2020a):

- **Malnutrition**: Malnutrition occurs if the small intestine is unable to absorb adequate amounts of necessary nutrients. In children, untreated malnutrition can slow growth and shorten stature.
- **Weakening of bones**: Failure to absorb calcium and vitamin D may lead to osteomalacia (softening of the bone) in children. It may cause loss of bone density, referred to as osteopenia or osteoporosis.
- **Infertility and miscarriage**: Inability to absorb calcium and vitamin D may cause fertility issues and pregnancy complications.
- **Lactose intolerance**: The small intestine damage may cause abdominal pain and diarrhea after consuming dairy products that contain lactose.
- **Malignancy**: If persons affected by celiac disease fail to adhere to a gluten-free diet, they are at higher risk for the development of cancers such as intestinal lymphoma and small intestine malignancy.
- **Nervous system issues**: Celiac disease is associated with issues such as seizures or peripheral neuropathy.

Types of Celiac Disease that Fail to Respond to Treatment. There are two forms of celiac disease that do not respond to traditional treatment.

Nonresponsive Celiac Disease. Some patients do not respond to what they believe is a gluten-free diet. This problem is typically because patients continue to consume food and drink that contain gluten. A dietary consult is needed to help these types of patients completely eliminate gluten form their diets. People with nonresponsive celiac disease might have bacterial overgrowth in the small intestine, pancreatic insufficiency, irritable bowel syndrome (IBS), microscopic colitis, or trouble digesting sugars such as lactose, sucrose, and/or fructose (Mayo Clinic, 2020a).

Refractory Celiac Disease. In some rare cases, patients fail to respond to treatment even when adhering to a strict gluten-free diet. This failure is referred to as refractory disease. Those persons who still have signs and symptoms for 6 months to 1 year after following a gluten-free diet require further evaluation (Mayo Clinic, 2020a). The exact cause of this form of the disease is not yet known. It is believed that the body's immune system is involved, particularly T lymphocytes and intraepithelial lymphocytes (IEL), cytokines, and antigens (National Organization for Rare Disorders, 2021).

Assessment

A complete physical and mental health assessment is conducted. Symptoms related to the disease are an integral part of the patient assessment. However, signs and symptoms of celiac disease can vary significantly, and signs and symptoms may differ in children and adults (Mayo Clinic, 2020a).

Upon assessment, nurses should monitor for the presence of the following symptoms in adults (Mayo Clinic, 2020a):

- Abdominal pain.
- Bloating and gas.
- Constipation.
- Diarrhea.
- Fatigue.
- Nausea and vomiting.
- Weight loss.

According to the Mayo Clinic (2020a), more than 50% of adults with celiac disease have signs and symptoms that are unrelated to the digestive system. These types of signs and symptoms include the following:

- Anemia.
- Dermatitis herpetiformis.
- Fatigue.
- Headaches.
- Hyposplenism.
- Joint pain.
- Mouth ulcers.
- Symptoms related to the nervous system such as numbness and tingling of the extremities, impaired cognition, and problems with balance.
- Osteoporosis.

Children with celiac disease are more likely than adults to experience digestive problems such as the following (Mayo Clinic, 2020a):

- Abdominal distention.
- Chronic diarrhea.
- Flatulence.
- Nausea and vomiting.
- Pale, foul-smelling stools.

Nursing consideration: In children, celiac disease leads to an inability to absorb adequate amounts of nutrients. This may lead to failure to thrive in infants, weight loss, anemia, delayed puberty, short stature, and tooth enamel damage (Mayo Clinic, 2020a). Nurses must be aware of the potential for these types of complications when working with children who have celiac disease.

Long-Term Health Effects

People with celiac disease have a 2X greater risk of developing coronary artery disease (CAD) and a 4X greater risk of developing small bowel malignancies. Untreated celiac disease can lead to other autoimmune disorders such as Type 1 diabetes and multiple sclerosis (MS) as well as dermatitis herpetiformis, anemia, osteoporosis, infertility, miscarriage, and neurologic conditions such as epilepsy and migraines (Celiac Disease Foundation, 2021).

Diagnosis and Treatment

Diagnosis. In addition to the presence of relevant signs and symptoms, results from some diagnostic tests help to confirm the diagnosis. These include the following (Mayo Clinic, 2020a; Meadows-Oliver, 2019):

- Histologic changes observed on small-bowel biopsy specimens, which confirms diagnosis.
- Poor glucose absorption as evidenced by a glucose tolerance test.
- Decreases in albumin, calcium, sodium, potassium, cholesterol, and phospholipids.
- Possible decreases in hemoglobin and hematocrit levels, white blood cell (WBC) counts, and platelet counts.
- Immunologic assay screen is positive for celiac disease.
- Serology testing looks for the presence of specific antibodies that indicate an immune reaction to gluten.
- Genetic testing for human leukocyte antigens (HLA-DQ2 and HLA_DQ8) can be used to rule out celiac disease.
- High fat content in stool specimens.

Nursing consideration: It is important that patients be tested for celiac disease BEFORE trying a gluten-free diet. If gluten is eliminated from the diet before testing, the results may appear falsely normal (Mayo Clinic, 2020a).

If any of the preceding tests indicate the presence of celiac disease, it is most likely that the healthcare provider will order one of the following tests (Mayo Clinic, 2020a):

- **Endoscopy**: Conducted to enable a view of the small intestine and take a biopsy for analysis.
- **Capsule endoscopy**: The patient swallows a capsule that contains a minute wireless camera that takes pictures of the small intestine. As the capsule moves through the digestive tract thousands of pictures are taken. The pictures are transmitted to a recorder.

Treatment. The foundation of treatment is a strict, lifelong adherence to a gluten-free diet (Mayo Clinic, 2020a). Patients and families must be educated about what foods, besides wheat, contain gluten. These include the following (Mayo Clinic, 2020a; Meadows-Oliver, 2019):

- Barley.
- Bulgur.
- Durum.
- Farina.
- Graham flour.
- Malt.
- Rye.
- Semolina.
- Spelt (a form of wheat).
- Triticale.

Nursing consideration: A referral to a nutritionist is important. The nutritionist can help patients and families make informed choices and plan a suitable diet (Meadows-Oliver, 2019). A gluten-free diet helps to heal the villous atrophy and promotes symptom resolution. Following a gluten-free diet helps to prevent complications in the future, including malignancy development (Celiac Disease Foundation, 2021).

The recommended diet is a high-protein, low-fat, high calorie diet that includes corn and rice products, soy and potato flour, and fresh fruits. Additionally, infants may have breast milk or soy-based formula (Celiac Disease Foundation, 2021).

If the patient is anemic or severe nutritional deficiencies are present, healthcare providers might recommend that supplements be taken, including the following (Mayo Clinic, 2020a):

- Copper.
- Folate.
- Iron.
- Vitamin B-12.
- Vitamin D.
- Vitamin K.
- Zinc.

Nursing consideration: Supplements and vitamins are typically taken in pill form. However, if the digestive tract is not able to absorb prescribed supplements, they may need to be administered via injection (Mayo Clinic, 2020a).

If the small intestine has sustained severe damage, steroids may be prescribed to control inflammation. Steroids can help to reduce severe signs and symptoms. If the patient has refractory celiac disease the small intestine will not heal. Patients with refractory celiac disease should be evaluated in a specialized center. This disease can be very serious. To date, there is no proven effective treatment (Mayo, 2020a).

There are a significant number of foods that are allowed on a gluten-free diet. These include the following (Mayo Clinic, 2020a):

- Eggs.
- Fresh meats, fish, and poultry that have not been breaded, batter-coated, or marinated.
- Fruits.
- Lentils.
- Most dairy products, unless some of the products exacerbate symptoms.
- Nuts.
- Potatoes.
- Vegetables.
- Wine, distilled liquors, ciders, and spirits.

The grains and starches allowed on a gluten-free diet include the following (Mayo Clinic, 2020a):

- Amaranth.
- Buckwheat.
- Corn.
- Cornmeal.
- Gluten-free flours (rice, soy, corn, potato, bean).
- Pure corn tortillas.
- Quinoa.
- Rice.
- Tapioca.
- Wild rice.

Self-Assessment Question 2

Which of the following actions is acceptable for a person with celiac disease?

a. Incorporate farina into the diet.
b. Eliminate corn from the diet.
c. Reduce the amount of zinc ingested in the diet.
d. Include buckwheat in the diet

Nursing Interventions

Emotional support is critical for patients and their loved ones. Nurses, via education and empathy, must help patients and families to deal with a chronic disease that requires life-style changes for life. Ensuring a consult with a nutritionist is also critical. The complexities of diet for patients with celiac disease necessitate professional consultation and ongoing monitoring (Meadows-Oliver, 2019).

Patients and families should be educated to avoid packaged foods unless they are clearly labeled as gluten-free or have no gluten-containing ingredients such as emulsifiers. Reading labels is an essential skill when purchasing food. In addition to cereals, pastas, and baked goods, other packaged foods that can contain gluten include the following (Mayo Clinic, 2020a):

- Beers, lagers, ales, and malt vinegars.
- Candies.
- Gravies.
- Imitation meats and seafood.
- Processed luncheon meats.
- Rice mixes.
- Salad dressings and sauces, including soy sauce.
- Seasoned snack foods (e.g., potato chips).
- Seitan (a food made from gluten).
- Self-basting poultry.
- Soups.

Nursing consideration: Although pure oats are not harmful for the majority of patients with celiac disease, oats may be contaminated by wheat during growing and processing. Patients and families should consult with their healthcare providers regarding eating small amounts of pure oat products (Mayo Clinic, 2020a).

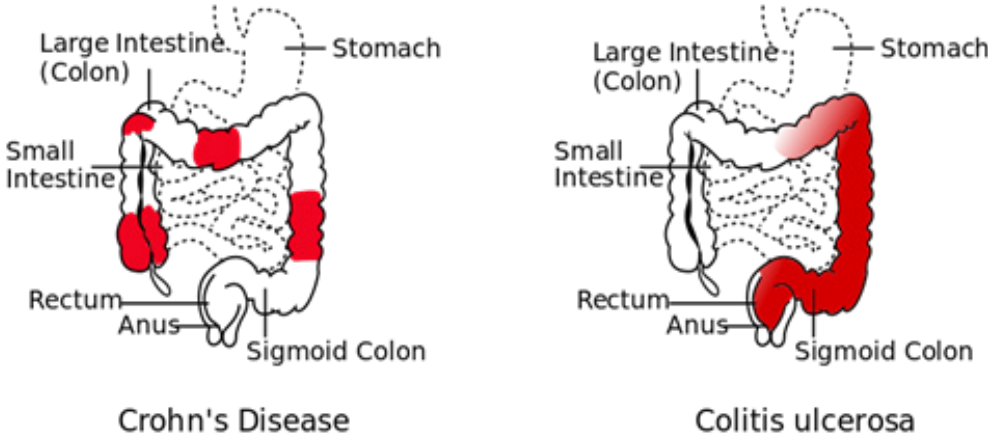
Patients and families may benefit from participating in a support group. Support resources include the following:

- National Celiac Association: 1-888-4-CELIAC https://nationalceliac.org/celiac-disease-support-groups/
- Gluten Intolerance Group: 1-253-833-6655 https://gluten.org/
- Hospitals, social services organizations, and healthcare providers can make recommendations regarding local support groups.

Crohn's disease

Crohn's disease is a chronic, idiopathic inflammatory bowel disease and is categorized under the spectrum of chronic idiopathic inflammatory bowel disease (IBD; Feuerstein & Cheifetz, 2017). The other most common type IBD is colitis ulcerose, which will be discussed later in this education program (Mayo Clinic, 2021d). The differences between Crohn's disease and colitis ulcerosa are shown in Figure 3.

Figure 3. Crohn's Disease vs Colitis Ulcerosa



Note. The red areas indicate the portions of the colon that are typically inflamed.
(Wikipedia Commons, 2021)v

Crohn's disease typically affects the distal ileum and colon but may occur in any part of the gastrointestinal (GI) tract. Effects of Crohn's disease can extend through all layers of the intestinal wall and may also involve regional lymph nodes and the mesentery (Gersch et al., 2017; Merck Manual, 2020a).

Evidence-based practice! Research shows that Crohn's disease peaks at two specific age ranges: between 15 and 30 and again at 60 to 70 years of age. Women are more often affected than men during the age range of 60-70 (Gersch et al., 2017). These age ranges should be considered when evaluating patients. The disease is most often diagnosed in adolescents and adults between the ages of 20 and 30 (Crohn's & Colitis Foundation, 2021b).

Pathophysiology and Assessment

Crohn's disease starts with crypt (glands of the intestinal lining) inflammation and abscesses, which evolve into tiny focal aphthoid ulcers (mucosal lesions). These lesions may advance into deep longitudinal and transverse ulcers accompanied by mucosal edema, which creates the characteristic cobblestoned appearance of the bowel (Merck Manual, 2020a).

Bowel thickening causes stenosis of the bowel, which can occur in any part of the intestine and cause varying degrees of intestinal obstruction (Rebar et al., 2019).

Abscesses are common. Fistulas frequently penetrate adjoining structures and may even extend into the skin of the anterior abdomen or flanks (Merck Manual, 2020a).

Evidence-based practice! Research shows that perianal fistulas and abscesses occur in 25% to 33% of cases of Crohn's disease. These complications can be the most problematic aspects of the disease (Merck Manual, 2020a).

- As the inflammation of Crohn's disease progresses, evident pathophysiology includes the following (Rebar et al., 2019):
- As lymph nodes enlarge the lymph flow in the submucosa is impeded.
- Lymph flow obstruction leads to edema, ulceration of the mucosa, fissures, abscesses, and, possibly, granulomas.
- Peyer's patches form. These patches are oval, elevated, closely packed lymph follicles.
- Fibrosis develops, causing further thickening of the walls of the bowel, stenosis, and/or narrowing of the lumen.
- Inflamed loops of the bowel adhere to not only other diseased portions of the bowel, but to healthy portions as well.
- The diseased parts of the bowel continue to thicken and narrow.

Complications. Anal fistula is the most common complication. Fistulas may develop to the bladder, vagina, or even in the area of an old scar. Additional complications include the following (Rebar et al., 2019):

- Intestinal obstruction.
- Nutrient deficiencies.
- Fluid and electrolyte imbalances.
- Peritonitis.

There is also a long-term risk of colorectal cancer (Merck Manual, 2020a). Patients and families should be taught to monitor for signs and symptoms of colorectal cancer and adhere to screening guidelines.

Risk factors. Crohn's disease appears to be initiated by alterations in intestinal microbes or alterations in the mucosa of the intestine. Gastrointestinal (GI) infections, nonsteroidal anti-inflammatory drugs, and antibiotics have been implicated in the development of inflammatory bowel disease (IBD). However, none of these types of associations have been substantiated with large epidemiological studies (Feuerstein & Cheifetz, 2017).

Cigarette smoking, the best-studied environmental risk factor, doubles the risk of developing Crohn's disease. It is important to note that the risk is increased in both current and former smokers (Feuerstein & Cheifetz, 2017).

Nursing consideration: Family history may be linked to an increased risk for the development of Crohn's disease. However, only 10% to 25% of patients with IBD have a first-degree relative with the disease. More than 200 genes have been associated with IBD development, making genetic specificity difficult (Feuerstein & Cheigetz, 2017).

Diagnosis and Treatment.

Diagnosis. Various conditions can mimic Crohn's disease. Examples of conditions that present with similar signs and symptoms include appendicitis, Behcet disease, and ulcerative colitis (Feuerstein & Cheifetz, 2017).

The diagnosis of Crohn's disease is made based on signs and symptoms and some diagnostic tests. It is important to know

which part of the gastrointestinal tract is affected by the disease. Signs and symptoms may vary depending on what type of Crohn's disease a patient has (Crohn's & Colitis Foundation, 2021a)

Types of Crohn's disease based on affected part of the gastrointestinal tract are as follows (Crohn's & Colitis Foundation, 2021a):

- **Ileocolitis**: Ileocolitis is the most common type of Crohn's disease. It affects the terminal ileum and the colon. Symptoms associated with ileocolitis include cramps, diarrhea, and pain in the lower right abdominal quadrant.
- **Ileitis**: Ileitis affects only the ileum. Symptoms are the same as ileocolitis. If the disease is severe, complications may develop including fistulas or inflammatory abscesses in the right lower abdominal quadrant.
- **Gastroduodenal Crohn's Disease**: Gastroduodenal Crohn's disease affects the stomach and the duodenum. Symptoms may include nausea, vomiting, loss of appetite, and weight loss.
- **Jejunoileitis**: Characterized by patchy areas of inflammation of the jejunum, jejunoileitis may cause mild to intense abdominal pain and cramps after meals, diarrhea, and fistulas that may form in severe cases or after lengthy periods of inflammation.
- **Crohn's (Granulomatous) Colitis**: Crohn's colitis affects only the colon. Its symptoms may include diarrhea, rectal bleeding, and disease around the anus (e.g., abscess, fistulas, and ulcers). Skin lesions and joint pain are more common in this type of Crohn's disease than others.

Both types of IBD (Crohn's disease and ulcerative colitis) have similar symptoms but are not the same disease and affect different areas of the gastrointestinal tract. Differences include the following (Crohn's & Colitis Foundation, 2021a):

- **Crohn's Disease**: May affect any part of the gastrointestinal tract from mouth to anus. Can affect the entire thickness of the bowel wall.
- **Ulcerative Colitis**: Only the colon and rectum are affected. The disease affects the inner-most lining of the colon.

Nurses must be aware of these differences, which are important as part of the diagnostic and treatment process.

Self-Assessment Question 3

Which type of Crohn's disease affects the terminal ileum and the colon?

a. Ileitis.
b. Ileocolitis.
c. Jejunoileitis.
d. Gastrointestinal.

Various diagnostic test results support a diagnosis of Crohn's disease. These include the following (Rebar et al., 2019):

- **Fecal occult test**: Minute amounts of blood in the stool.
- **X-rays of the small intestine**: Irregular mucosa, ulceration, and stiffening.
- **Barium enema**: The string sign, which occurs when segments of stricture are separated by normal bowel. Fissures, ulceration, and narrowing of the bowel may be observed.
- **Sigmoidoscopy and colonoscopy**: Patchy areas of inflammation are observed. (This sign helps to rule out ulcerative colitis). The surface of the mucosa has a cobblestone appearance. Ulcers may be seen if the colon is affected.

Nursing consideration: Colonoscopy has been found to be more accurate than barium enema in assessing the degree of inflammation present (Rebar et al., 2017). Since repeated testing can be quite stressful, patients need to understand that a combination of these test are typically used since no one test is definitive.

Treatment. Lab tests should be conducted every 1 to 2 years to detect vitamin D and B12 deficiencies. Additional lab tests are conducted to screen for anemia, hypoalbuminemia, additional vitamin deficiencies, and electrolyte abnormalities. Any nutritional deficiencies may be treated with supplements and, possibly, dietary alterations (Merck Manual, 2020a).

Nursing consideration: In general, treatment requires drug therapy, lifestyle changes, and, possibly, surgery. When acute attacks occur, it is imperative that fluid and electrolyte balance is maintained. If patients are debilitated, parenteral nutrition is prescribed to ensure adequate caloric and nutrition intake while allowing the bowel to rest (Merck Manual, 2020a; Rebar et al., 2019).

General Treatment Interventions. For relief of cramps and diarrhea, oral loperamide, 2 to 4 mg or antispasmodic drugs can be taken up to four times a day, preferably before meals. These drugs are typically safe for patients. However, if the patient is suffering from severe, acute Crohn colitis (that may progress to toxic colitis and bowel obstruction), antidiarrheal and antispasmodic drugs are not used (Comerford & Durkin, 2021; Merck Manual, 2020).

Hydrophillic mucilloids such as methylcellulose are sometimes given to help prevent anal irritation by increasing the firmness of the stool. Patients should avoid dietary roughage in cases of structuring or active colonic inflammation (Merck Manual, 2020a).

Mild to Moderate Disease. Patients with mild to moderate disease are ambulatory, tolerate oral intake, and are without signs of toxicity, tenderness, masses, or obstruction. In mild to moderate disease cases, first-line treatment is 5-ASA (mesalamine). However, benefits from 5-ASA drugs appear to be limited. Several experts do not recommend using them in small-bowel Crohn disease (Comerford & Durkin, 2021; Merck Manual, 2020a). Antidiarrheals are used to control diarrhea, but not in patients who have significant bowel obstruction (Rebar et al., 2019).

Some experts prescribe antibiotics as first-line treatment, while others reserve antibiotics for patients not responding to 4 weeks of 5-ASA (Merck Manual, 2020a). The use of antibiotics is not definitive. Results from a 2019 study suggest that benefits provided by antibiotics in active Crohn's disease are probably very modest. The effects of antibiotics on preventing Crohn's disease relapse are uncertain. No definitive conclusions were drawn, and more research is needed to identify the risks and benefits of antibiotic therapy in Crohn's disease (Cochrane, 2019).

Moderate to Severe Disease. Patients are considered to have moderate to severe disease if they are without fistulas or abscesses but are in significant pain and have tenderness, fever, and/or vomiting, or patients who have been non-responsive to mild disease treatment interventions (Merck Manual, 2020a).

Administration of corticosteroids, either oral or parenteral, frequently provides swift relief of symptoms. Corticosteroids such as prednisone or prednisolone reduce diarrhea, pain, and bleeding by decreasing inflammation. If patients do not respond to corticosteroids, they must not be maintained on these types of drugs (Comerford & Durkin, 2021; Merck Manual, 2020a). Aminosalicylates such as sulfasalazine (Azulfidine) are also used to decrease inflammation (Rebar et al., 2019).

Immunosuppressants such as azathioprine (Azasan) and mercaptopurine (Purinethol) are prescribed to suppress the body's response to antigens (Rebar et al., 2019). These types of drugs have a positive impact for most patients. If immunosuppressant therapy does not work in patients who are not candidates for surgery, biologic agents such as vedolizumab may be used (Merck Manual, 2020a). If patients fail to respond to conventional treatment, an antitumor necrosis factor agent (infliximab) may be given (Rebar et al., 2019).

Bowel obstruction is managed with nasogastric suction and intravenous (IV) fluids. Obstruction in uncomplicated Crohn disease should resolve within a few days, However, failure to respond suggests a complication or other etiologies and immediate surgery is required (Merck Manual, 2020a).

Fulminant Disease, Abscesses, Fistulas. Fistulas are typically treated with metronidazole and ciprofloxacin. If patients fail to respond within 3 to 4 weeks they may receive an immunomodulator (e.g., azathioprine). Fistulas often relapse (Merck Manual, 2020a).

Patients who present with toxicity, high fever, persistent vomiting, or a tender or palpable mass must be hospitalized for administration of IV fluids and antibiotics. Abscesses must be drained either percutaneously or surgically (Merck Manual, 2020a).

Nursing consideration: Surgery is necessary in cases of bowel perforation, massive hemorrhage, fistulas unresponsive to medication, or acute intestinal obstruction. A colectomy with ileostomy may be performed in patients who have extensive disease of the colon and rectum (Rebar et al., 2019).

Lifestyle Changes. Lifestyle changes are an integral part of the treatment plan. Patients must try to reduce the stressors in their lives as well as reducing physical activity to allow the bowel to rest (Rebar et al., 2019).

Dietary changes are implemented to decrease bowel activity while still providing adequate nutrition. Suggestions for meal planning and intake include recommending the following actions for patients to implement (Crohn's & Colitis Foundation, 2021c):

- Eat four to six small meals daily rather than three large meals.
- Stay hydrated with water, broth, tomato juice, or a reduction solution.
- Drink beverages slowly. Avoid using a straw, which can cause the ingestion of air that leads to flatulence.
- Prepare meals in advance. Keep foods that are well tolerated on hand.
- Use simple methods to cook such as boiling, grilling, steaming, and poaching.
- Use a food journal to keep track of what is eaten and what foods cause or exacerbate symptoms.

The Crohn's and Colitis Foundation (2021c) suggests that patients avoid the following foods when experiencing a flare-up of the disease:

- Insoluble fiber foods that are difficult to digest including raw green vegetables, fruits with skin and seeds, whole nuts, and whole grains.
- Lactose, the sugar found in dairy products such as milk and cream.
- Non-absorbable sugars that are found in sorbitol, mannitol, sugar-free gum, candy, and ice cream.
- Foods that are high in sugar such as baked goods, candy, and juices.
- High-fat foods including butter, coconut, margarine, cream, and foods that are fatty, fried, or greasy.
- Alcohol and caffeinated beverages including beer, wine, liquor, coffee, and soda.

Nursing Interventions

Nurses have a great deal of responsibility to provide effective patient/family education. Education topics of particular importance include the following (Rebar et al., 2019):

- Medication.
- Stress reduction.
- Diet and nutrients.
- Emotional support and counseling.
- Lifestyle changes and how to implement them.

During hospitalization nurses should carefully monitor patients' intake and output and weight and monitor for signs of dehydration. It is important for patients to be monitored for fever and pain on urination, which may suggest the development of a bladder fistula. Abdominal pain, fever, and a hard distended abdomen are signals of an intestinal obstruction (Rebar et al., 2019).

If patients have an ileostomy, they must be able to demonstrate proper ostomy care and should have a consultation with an ostomy therapist. Patients should also be referred to support groups and counseling as needed (Rebar et al., 2019).

Type 1 diabetes

James Patten is a 25-year-old who has recently accepted his first position as a clinical engineer. He has worked hard to earn this job and is eager to excel. He has developed annoying symptoms over the past 4 weeks. These include severe thirst, extreme hunger, frequent urination, and unintentional weight loss. James' healthcare provider told him he has type 1 diabetes. His first response is, "That can't be right. Only kids get this kind of diabetes! You have made a mistake." James's response is not unusual. However, experts now know that type 1 diabetes can also develop in adults.

Type 1 diabetes (T1D) is an autoimmune disease that develops when the pancreas stops producing insulin. People can be diagnosed with T1D at any age, but it is the most common childhood endocrine disorder (Meadows-Oliver, 2019).

An estimated 1.6 million Americans are living with T1D, including about 200,000 youth (people less than 20 years of age) and 1.4 million adults (people 20 years of age and older; JDRF, n.d.).

Statistics that indicate the probable future development of T1D and its significance include the following (JDRF, n.d.):

- About 64,000 people in the US are diagnosed with T1D each year.
- It is expected that five million people in the US will have T1D by 2050, including almost 6,000,000 youth.
- In the US, there are $16 billion in T1D-associated healthcare costs and lost income annually.
- Less than 33% of people with T1D in the US are consistently achieving target blood-glucose control levels.

Pathophysiology

In T1D, the beta cells of the pancreas are destroyed or suppressed. The disease is divided into two types: idiopathic and immune-mediated. Idiopathic T1D causes a permanent insulin deficiency with no evidence of autoimmunity. In immune-mediated T1D there is an autoimmune attack on beta cells. This type of attack causes an inflammatory response known as insulitis (Rebar et al., 2019).

Evidence-based practice! Research shows that by the time signs and symptoms are evident, 80% of beta cells have been destroyed (Rebar et al., 2019).

Although signs and symptoms occur rather abruptly, it can take months or even years for enough beta cells to be destroyed before these signs and symptoms appear. Signs and symptoms, once evident, can be severe (Centers for Disease Control and Prevention (CDC)), (2021c).

Nursing consideration: Symptoms of T1D are similar to those of other health conditions. Nurses must encourage patients to immediately seek medical help if signs and symptoms develop. Untreated T1D can lead to severe, even fatal, health conditions (CDC, 2021c).

The development of T1D typically occurs in three stages (Lucier & Weinstock, 2021):

- **Stage 1**: Stage 1 is characterized by a lack of symptoms and a normal fasting glucose, normal glucose tolerance, and the presence of greater than, or equal to, two pancreatic autoantibodies.
- **Stage 2**: Stage 2 diagnostic criteria include the presence of greater than or equal to 2 pancreatic autoantibodies and dysglycemia (glucose of 100 to 125 mg/dl), impaired glucose tolerance (2-hour PG of 140 to 199 mg/dL), or a hemoglobin A1C between 5.7% to 6.4%. Patients remain asymptomatic.

- **Stage 3**: In Stage 3 the patient has hyperglycemia with clinical symptoms and two or more pancreatic autoantibodies.

Etiology. The exact cause of T1D is unknown. However, several risk factors and possible trigger factors have been identified, including the following:

- **Genetics**: Having a family history of T1D puts people at greater risk of developing the disease. However, the majority of diagnoses are found in people who have no family members with the disease (JDRF, n.d.).
- **Viral Infections**: Viral infections may be triggers for T1D development (JDRF, n.d.).
- **Geography**: The further away from the equator a person lives, the greater the incidence of T1D (Mayo Clinic, 2021c).
- **Age**: Although T1D can occur at any age, it seems to peak at two specific age ranges. The first peak appears in children between the ages of 4 and 7 years old. The second peak is in children between the ages of 10 and 14 years old (Mayo Clinic, 2021c).

Nursing consideration: Unlike type 2 diabetes, no dietary changes can be made to prevent the onset of T1D. Likewise, lifestyle factors such as exercise and weight do not contribute to T1D development (JDRF, n.d.). Some insulin regimens can be very expensive, so this should be discussed with patients to help them avoid skipping doses.

Complications. Maintaining a normal blood glucose level can significantly reduce the occurrence of complications. Such complications may be disabling or even fatal. Without insulin to facilitate the entry of glucose into the cells, blood glucose levels increase and complications may be likely (Mayo Clinic, 2021c).

Complications linked to T1D include the following (Mayo Clinic, 2021c):

- **Cardiac and vascular diseases**: T1D radically increases the risk of cardiovascular diseases such as coronary artery disease (CAD), angina, heart attack, stroke, atherosclerosis, and hypertension.
- **Neuropathy**: Excessive blood glucose levels may injure the capillaries that nourish the nerves. Symptoms of neuropathy include tingling, numbness, and burning or pain that typically starts at the tips of the toes or fingers and spreads gradually. If blood glucose levels are not controlled, all sensation may be lost in the affected limbs. If the nerves of the gastrointestinal tract are damaged, patients may suffer from nausea, vomiting, diarrhea, or constipation. In men, erectile dysfunction may occur.
- **Diabetic retinopathy**: If the blood vessels of the retina are damaged, the patient may go blind. Other conditions linked to diabetic retinopathy include cataracts and glaucoma.
- **Damage to the feet**: Nerve damage or reduced blood flow to the lower extremities increases the risk of complications to the feet. Without treatment, even minor cuts and blisters can become quite serious, leading to infections that may eventually require the amputation of toes, feet, or leg(s).
- **Skin and mouth issues**: Patients may be more vulnerable to skin and mouth infections including those caused by bacteria and fungi. Disease of the gums and dry mouth are also likely.
- **Pregnancy issues**: If the T1D is poorly controlled in pregnant females, the risk of miscarriage, stillbirth, and birth defects increases. The risk of diabetic ketoacidosis, retinopathy, pregnancy induced hypertension, and preeclampsia may also increase.

Diabetic ketoacidosis (DKA) is a serious, acute metabolic complication characterized by hyperglycemia, hyperketonemia, and metabolic acidosis. DKA is most common in patients with T1D and occurs when insulin levels are inadequate to meet the body's basic metabolic requirements. Hyperglycemia causes osmotic diuresis with severe fluid and electrolyte loss (Merck Manual, 2020b).

Signs and symptoms of DKA include nausea, vomiting, and (especially in children) abdominal pain. If untreated, significant decompensation can occur. Patients may display hypotension and tachycardia because of dehydration and acidosis. To compensate for acidemia, respirations increase in rate and depth (Kussmaul respirations). The patient's breath may have a fruity odor because of exhaled acetone (Merck Manual, 2020b).

Treatment consists of rapid intravascular volume repletion with 0.9% saline given IV, correction of hyperglycemia and acidosis, and prevention of hypokalemia. Treatment should take place in critical care settings because of the need for hourly clinical and laboratory assessments with necessary adjustments indicated by assessment results (Merck Manual, 2020b).

Assessment and Diagnosis

Patients are assessed for common symptoms of T1D. These include the following (Mayo Clinic, 2021c; Rebar et al., 2019):

- Increased thirst.
- Extreme hunger.
- Frequent urination.
- Unintended weight loss
- Fatigue.
- Weakness.
- Blurred vision.
- Irritability.
- Mood changes.
- In children, bed-wetting in those who did not previously wet the bed at night.

A thorough history and physical are conducted to help rule out other conditions. In addition to history, physical, and a review of signs and symptoms, several diagnostic tests are performed. These include the following (Mayo Clinic, 2021c; Rebar et al., 2019):

- **Glycated hemoglobin (A1C) test**: The A1C is a blood test that reports average blood glucose levels for the past 2 to 3 months. The test measures the percentage of blood glucose that is attached to the body's hemoglobin. The higher the glucose levels, the higher the percentage of hemoglobin with attached glucose. An A1C level of 6.5% or higher on two separate tests is an indicator of T1D.
- **Random blood glucose test**: This test requires that a blood sample be obtained at a random time and confirmed by repeat testing. A random blood glucose level of 200 mg/dL or higher suggests T1D, particularly if the patient has signs and symptoms of T1D.
- **Fasting blood glucose test:** The fasting blood glucose test requires that a blood sample be obtained following an overnight fast. A fasting blood glucose level of less than 100 mg/dL is normal. A level from 100-125 mg/dL is classified as prediabetes. A level of 126 mg/dL or higher on two separate tests is diagnostic for T1D.
- **Antibody test:** If a diagnosis of diabetes is made, the healthcare provider may order blood tests to check for antibodies that are common in T1D. Presence of antibodies helps to differentiate between T1D and type 2 diabetes when the diagnosis is uncertain.

Nursing consideration: Certain conditions such as pregnancy or having a hemoglobin variant may interfere with the accuracy of the A1C test. In these types of cases, the healthcare providers will rely on additional blood tests to determine an accurate diagnosis.

Self-Assessment Question 4

A young pregnant female is being evaluated for T1D. Which of the following statements are accurate in this situation?

a. Two separate fasting blood glucose tests with a result of 126 mg/dL are diagnostic for diabetes.
b. The A1C test is the best diagnostic test to determine T1D in pregnant females.
c. Random blood glucose tests are contraindicated for pregnant females.
d. The glycated hemoglobin test indicates the average blood sugar for the past 2 to 4 weeks.

Treatment

T1D is managed with a variety of insulins. Patients, families, and the healthcare team must work together to find the best treatment regimen. Types of insulin may include the following (JDRF, n.d.):

- **Rapid acting**: Starts working in about 15 minutes after injection. It peaks in about 1 hour and continues for about 2 to 4 hours after injection. Examples include aspart (Novolog), glulisine (Apidra), and lispro (Humalog).
- **Regular or short acting**: Starts working 30 minutes after injection, peaks from 2 to 3 hours after injection, and continues to work for about 3 to 6 hours. An example is Humulin R.
- **Intermediate acting**: Starts working 2 to 4 hours after injection. It peaks about to 12 hours later and lasts 12 to 18 hours. An example is Novolin N.
- **Long acting**: Long acting is often combined with rapid or short acting insulin. It starts to work several hours after injection and tends to lower glucose levels up to 24 hours. An example is Lantus.
- **Ultra-long lasting**: Starts to work in 6 hours, but it does not peak and lasts an estimated 36 hours. An example is Tresiba.

Insulin is administered in a variety of ways. Historically, insulin was administered via injection using a syringe. Today, other options are available including the following (CDC, 2021a; JDRF, n.d.):

- **Insulin pen**: Some pens use cartridges that are inserted into the pen while others are pre-filled and discarded after all insulin is used. The dose of insulin is dialed on the pen and the insulin is injected through a needle.
- **Insulin pump**: About the size of a small cell phone, insulin pumps provide a basal dose of short or rapid-acting insulin per hour. When blood sugar is high, the patient calculates the dose and the insulin in the pump delivers the bolus.
- **Artificial pancreas**: The artificial pancreas is a hybrid closed-loop system that requires minimal patient intervention. It is a combination of the technology of a pump with that of a continuous glucose monitor.
- **Inhaled insulin**: Inhaled insulin is taken by using an oral inhaler to deliver ultra-rapid-acting insulin at the start of meals. Inhaled insulin is used in conjunction with an injectable long-acting insulin.
- Additional treatment interventions include having personalized meal plans designed to meet nutritional needs, control blood glucose levels, and help patients maintain ideal body weight. With the guidance of healthcare providers, patients should participate in regular exercise. Patients should be cautioned that physical activity lowers blood glucose levels. Thus, blood glucose levels should be monitored frequently. Patients may need to adjust their meal plans or insulin to compensate for increased physical activity (Mayo Clinic, 2021c; Rebar et al., 2019).

Nursing Interventions

Nursing interventions focus on education and emotional support. Patients and families need education pertaining to meal planning, exercise, and insulin administration. Emotional support is also critical to the success of any treatment regimen (Rebar et al., 2019).

Patients and families also need information about potential complications, how to recognize them, and what to do if they occur. It is recommended that families pay special attention to the issue of complications. Teachers should be informed that a child is diabetic and they must be aware of emergency procedures. In some cases, patients experiencing complications (such as DKA) may not be able to articulate the need for help or describe their symptoms at the time. It is, therefore, absolutely essential that family members and other caretakers be able to intervene correctly in the event that complications occur (Rebar et al., 2019). DKA is a medical emergency and must be treated immediately.

Systemic lupus erythematosus

Systemic lupus erythematosus (commonly referred to as lupus) is a chronic, inflammatory, autoimmune disorder that affects the connective tissues (Rebar et al., 2019). The determination of incidence and prevalence of lupus is a challenge. There are several issues that make it difficult to collect accurate data. These include the following (Lupus Foundation of America, 2020; National Resource Center on Lupus, 2021):

- Difficulty in deciding what constitutes a case of lupus. There are multiple types of lupus and they have overlapping signs and symptoms.
- There is no specific test for the diagnosis of lupus. An estimated 40% of people with lupus report that their healthcare providers initially said that they had some disorder other than lupus.
- Twenty-three percent of patients were told that their problems were psychological, not physical.
- No two cases of lupus are the same, which makes it difficult to recognize and diagnosis the disease.

Nursing consideration: The Lupus Foundation of America estimates that 1.5 million Americans are living with a form of lupus (National Resource Center on Lupus, 2021). Nurses must support ongoing lupus research and be alert to the signs and symptoms that suggest the disease.

Lupus can affect anyone. It is diagnosed in women, men, children, and even newborns. It is much more common in women than in men. About 90% of diagnosed cases of lupus are women of reproductive age. Women are often diagnosed between the ages of 15 and 44. Lupus is also more prominent in certain ethnicities including African American, Hispanic, Asian, and Native American women compared to Caucasian women (Cleveland Clinic, 2021).

Pathophysiology

The exact etiology of lupus is unknown. However, experts believe that the primary cause is autoimmunity, along with environmental, hormonal, genetic, and (possibly) viral factors. In autoimmune diseases, the body produces antibodies against its own cells. A significant factor in the pathophysiology of lupus is the production of antibodies that attack various tissues of the body. These include red blood cells (RBCs), neutrophils, platelets, lymphocytes, or almost any organ or tissue (Rebar et al., 2019).

Risk Factors. The majority of people with lupus have a genetic predisposition for the disease (Rebar et al., 2019). Additional risk factors include the following (Cleveland Clinic, 2021; Mayo Clinic, 2021a):

- **Sex**: Lupus is more common in females.
- **Age**: Although lupus is diagnosed in all age groups, it is most often diagnosed between the ages of 15 and 45.
- **Race**: Lupus is more common in African Americans, Hispanics, and Asian Americans.
- **Environmental factors:** Although not specifically identified, environmental factors such as the amount of sunlight a person is exposed to, medications taken, stress, and viral infections are being investigated as contributing to the development of lupus.
- **Smoking**: A history of smoking may also increase risk of lupus.

Types of Lupus. Although systemic lupus erythematosus is the most common type of lupus, there are several additional types. These include the following (Cleveland Clinic, 2021):

- **Cutaneous lupus erythematosus**: This type of lupus affects the skin. It is characterized by various skin issues such as photosensitivity and rashes. Hair loss may also occur.
- **Drug-induced lupus**: Certain medications may cause lupus. Rather than being a chronic disease, drug-induced lupus is

typically temporary. Usually, this type of lupus resolves after the medication is discontinued. However, in rare instances, symptoms continue even after the medications are stopped.

- **Neonatal lupus**: Neonatal lupus is quite rare. When it does occur, it is found in infants at birth. Infants born with neonatal lupus have antibodies that were passed to them from their mothers, who either had lupus at the time of pregnancy or developed the disease later in life.

Organs Affected by Lupus/Complications. Lupus can affect many different areas of the body, which can lead to complications of various degrees of severity. These include the following (Cleveland Clinic, 2021; Mayo Clinic, 2021a):

- **Blood and blood vessels**: Lupus may cause serious reductions in the number of red blood cells (RBCs), white blood cells (WBCs), and/or platelets. Blood vessel inflammation may also occur.
  These alterations in blood counts may lead to fatigue, anemia, serious infections, and/or easy bruising. Patients are also prone to deep vein thrombosis, pulmonary embolus, and stroke. Blood clot development may be linked to the production of antibodies. Note that patients may not have symptoms that suggest blood and blood vessel abnormalities.
- **Brain and central nervous system (CNS)**: Brain involvement is characterized by headaches, dizziness, behavior changes, vision problems, strokes, and seizures. Memory problems may become evident and patients may have trouble expressing themselves.
- **Heart**: Lupus may cause inflammation of the heart muscle, pericardium, and arteries.
- **Joints**: Arthritis is a common finding in patients who have lupus. Joint pain (with or without swelling) and stiffness are noted, especially in the morning after awakening. Arthritis may last for days or weeks or become permanent.
- **Kidneys**: Kidney complications are found in half of patients with lupus. In fact, kidney damage and kidney failure are one of the leading causes of death in patients with lupus. Kidney disease does not typically cause symptoms until the disease is in the advanced stages.
- **Lungs**: Lung involvement may cause pleural inflammation, pneumonia, and bleeding into the lungs.
- **Skin**: Skin problems are common in patients with lupus. These include a characteristic red rash over the cheeks and the bridge of the nose, plaques, skin rashes exacerbated by sunlight, hair loss, and mouth sores.

Other types of complications associated with lupus include the following (Mayo Clinic, 2021a):

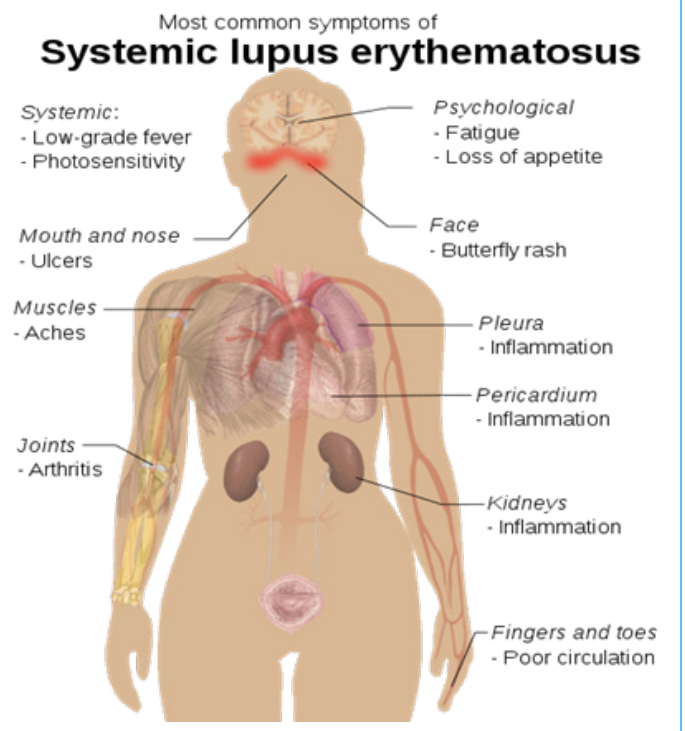
- **Infection**: Patients with lupus are more susceptible to infections because the disease and its treatments weaken the immune system.
- **Malignancies**: Having lupus leads to a small risk of increased vulnerability to malignancies.
- **Death of bone tissue**: When the bone's blood supply is reduced, tiny breaks in the bone may occur, leading to the collapse of the bones.
- **Complications of pregnancy**: Lupus increases the risk of miscarriage, pregnancy-induced hypertension, and preterm birth. Healthcare providers often recommend that women should delay pregnancy until the disease has been under control for at least 6 months.

Assessment and Diagnosis

Making a diagnosis of lupus is challenging because signs and symptoms vary considerably among patients and may change overtime. These signs and symptoms are also common to many other diseases (Mayo Clinic, 2021a).

Healthcare providers will conduct a thorough history and physical and carefully review patients' signs and symptoms. Detailed descriptions of signs and symptoms are found in the section on pathophysiology. As a summary, Figure 4 displays the most common signs and symptoms of lupus.

Figure 4. Most Common Symptoms of Lupus Erythematosus



Note. From Haggstrom, M., 2009

Laboratory Tests. Although no single test can diagnose lupus, several tests are used to help determine diagnosis. Tests include the following (Mayo Clinic, 2021a; Rebar et al., 2019):

- **Complete blood count (CBC)**: Results may show anemia and/or a reduced white blood count (WBC), both of which may occur in lupus.
- **Serum electrophoresis**: Serum electrophoresis may show hypergammaglobulinema.
- **Chest X-rays**: Chest X-rays may reveal pleurisy or lupus pneumonitis.
- **Kidney and liver assessment**: Blood tests may be ordered to help assess kidney and liver functioning.
- **Urinalysis**: Urinalysis may show elevated protein levels or the presence of RBCs in the urine.
- **Antinuclear antibody (ANA) Test**: A positive test for the presence of antibodies suggests a stimulated immune system. Most people with lupus have a positive ANA test. However, most people with a positive ANA test do not have lupus. A positive ANA test calls for more-specific antibody testing.
- **Echocardiogram**: Echocardiograms may show cardiac abnormalities.

Treatment

Lupus is a chronic condition that needs ongoing management. The overall goals of treatment are to promote remission of symptoms and limit the damage that the disease does to patients' organs (Cleveland Clinic, 2021).

Nursing consideration: Lupus is an unpredictable disease that can change with time. This means that treatment interventions may need to be changed to meet the current state of the disease (Cleveland Clinic, 2021

Medications are the foundation of treatment for lupus. Medications most often prescribed to treat lupus include the following (Cleveland Clinic, 2021; Mayo Clinic, 2021a; Rebar et al., 2019):

- **Corticosteroids**: Corticosteroids such as prednisone are prescribed to reduce the inflammatory process. Steroid creams can be applied directly to rashes. Steroid pills in low doses may be effective for patients with mild to moderate forms of the disease. High doses of steroids such as methylprednisolone (Medrol) are frequently used to control serious disease involving the kidneys and brain and other internal organs. Unfortunately, high doses of steroids often produce side effects. Side effects include weight gain, bruising easily, hypertension, diabetes, and bone diseases such as osteoporosis.

Nursing consideration: Initial prednisone doses of 60 mg or more are typical. Noticeable improvement of the patient's condition is usually apparent within 48 hours. After symptoms are controlled, the dosage is tapered gradually and then discontinued (Rebar et al., 2019).

- **Hydroxychloroquine (Plaquenil)**: Hydroxychloroquine is an antimalarial drug that has been prescribed to help keep lupus-related skin and joint disease under control. It has also been found to be effective in the treatment of fatigue and mouth sores.
- **Azathioprine (Imuran)**: An immunosuppressant, azathioprine (originally used to prevent transplanted organ rejection) is generally used to treat the more serious aspects of the disease.
- **Methotrexate (Rheumatrex)**: Methotrexate is an antineoplastic drug used to suppress the immune system. It has been found to be helpful in the treatment of lupus-related skin disease, arthritis, and other forms of the disease that are not life-threatening. This medication is used for patients who have not responded to drugs such as hydroxychloroquine or low doses of prednisone.
- **Cyclophosphamide (Cytoxan) and mycophenolate mofetil (CellCept)**: These are antineoplastic drugs that significantly reduce immune system activity. They are used to treat more severe forms of lupus, particularly if there is kidney involvement.
- **Belimumab (Benlysta)**: Belimumab is a monoclonal antibody used to reduce the activity of lymphocytes, which produce autoantibodies. Autoantibodies cause tissue damage and their suppression is the reason they are prescribed to treat lupus. Belimumab is used to treat lupus that does not involve the kidneys and has not responded to other interventions.
- **Rituximab (Rituxan)**: Rituximab is a monoclonal antibody that reduces lymphatic activity. It is occasionally used to treat lupus that has not responded to other types of treatments.

Some complementary treatments for lupus include the following (Cleveland Clinic, 2021):

- **Dehydroepiandrosterone (DHEA)**: Supplements that contain this hormone, in conjunction with conventional treatment, may help reduce the occurrence of flares of lupus. DHEA may cause acne in women.
- **Fish oil**: Fish oil supplements that contain omega-3 fatty acids may have some beneficial effects. Research is underway to identify specific effects and how these effects occur. Side effects of fish oil supplements include nausea, belching, and a "fishy" taste.
- **Acupuncture**: Acupuncture may help to ease the muscle pain that is associated with lupus.

Nursing Interventions

Patients may have a difficult time adjusting to a disease that is a life-long problem. Nurses should assess the effectiveness of patients' support systems, which are critical to the health and wellness of a patient with lupus (Mayo Clinic, 2021a; Rebar et al., 2019)

Feelings of helplessness, anger, fear, and frustration are common in patients who have lupus. They are at risk of mental health problems such as depression, anxiety, and low self-esteem. Patients' mental health should be monitored and referrals made to mental health professionals as needed (Mayo Clinic, 2021a).

Nurses are usually the members of the healthcare team who provide medication education to patients and families. Patients and families must demonstrate knowledge of what medications have been prescribed, route, dose, side effects, and what to do if side effects occur (Rebar et al., 2019).

Patients and families should learn all they can about their disease and how to monitor their signs and symptoms. Regular appointments with their healthcare providers are essential for ongoing monitoring and treatment adjustments (Rebar et al., 2019).

Self-Assessment Question 5

An antimalarial drug used to keep lupus-related skin and joint disease under control is:

a. Methotrexate.
b. Azathioprine.
c. Hydroxychloroquine.
d. Belimumab.

Multiple sclerosis (MS)

Multiple sclerosis (MS) is an immune-mediated disease in which an abnormal immune system response is directed against the central nervous system (CNS; National Multiple Sclerosis Society [MS], 2020a). MS is characterized by a progressive demyelination of the white matter of the brain and spinal cord, which can lead to widespread neurological dysfunction (Rebar et al., 2019).

An estimated 2.8 million people throughout the world live with MS. Prevalence of the disease has increased in every region of the world since 2013.The mean age at diagnosis is 32 years of age. Females are twice as likely to live with MS compared to males (Walton et al., 2020).

In the US, results from a recent study funded by the National MS Society confirmed that nearly one million people are living with the disease. This is double the estimate from an earlier study (National MS Society, 2020b).

The majority of people with MS have a relapsing-remitting disease course. These patients experience periods of new symptoms or exacerbations of previous symptoms that take place over days or weeks. Patients usually improve partially or completely after each relapsing period. Relapses are typically followed by periods of disease remission. Remissions can last for months or even years. Other persons may be diagnosed with primary-progressive MS, which is characterized by a steady progression of signs and symptoms without relapse (Mayo Clinic, 2020b).

Evidence-based practice! At least half of patients with relapsing-remitting MS eventually experience a steady progression of symptoms without periods of remission. This is referred to as secondary-progressive MS (Mayo Clinic, 2020b).

Pathophysiology

In MS the immune system destroys myelin (the fatty substance that coats and protects nerve fibers in the spinal cord and brain). Myelin is critical to the transport of electrical impulses to the brain for interpretation. The myelin sheath is a lipoprotein complex that is formed by glial cells. It protects the nerve axon (the neuron's long nerve fiber) similarly to the insulation on electrical wires. (Rebar et al., 2019).

Myelin can be damaged by hypoxemia, toxic chemicals, vascular insufficiency, or autoimmune responses such as those with MS. A summary of the pathological process that occurs when myelin is damaged is as follows (National MS Society, 2020a; Rebar et al., 2019):

- When myelin is damaged the myelin sheath becomes inflamed.
- Inflammation causes the membrane layers of the myelin sheath to break into smaller components.
- The smaller components become circumscribed plaques, which are filled with lymphocytes, microglial elements, and macroglia. This is referred to as demyelination.
- The damaged myelin sheath is unable to appropriately transport messages to the brain. Messages within the CNS are either altered or stopped completely.
- Damage to areas of the CNS produce various neurological symptoms that vary in type and severity.
- Damaged areas develop scar tissue. Areas are multiple, which leads to the name of the disease: multiple sclerosis.

Assessment and Diagnosis

To date, there are no signs, symptoms, physical findings, or laboratory tests that can make a definitive diagnosis of MS. Diagnosis is made based on the findings of a careful physical and mental examination/history, a neurologic exam, lab studies, and imaging studies (National MS Society, 2021).

Before MS can be diagnosed, other causes must be excluded since there are many causes of neurological signs and symptoms. For some people, the diagnostic process may be fairly rapid. For others, it may take quite a bit longer. Waiting for a diagnosis is stressful and frightening. It is crucial that a diagnosis be made as accurately and as quickly as possible so that patients can begin to adjust to the reality of having the disease and treatment can begin as early as possible (National MS Society, 2021).

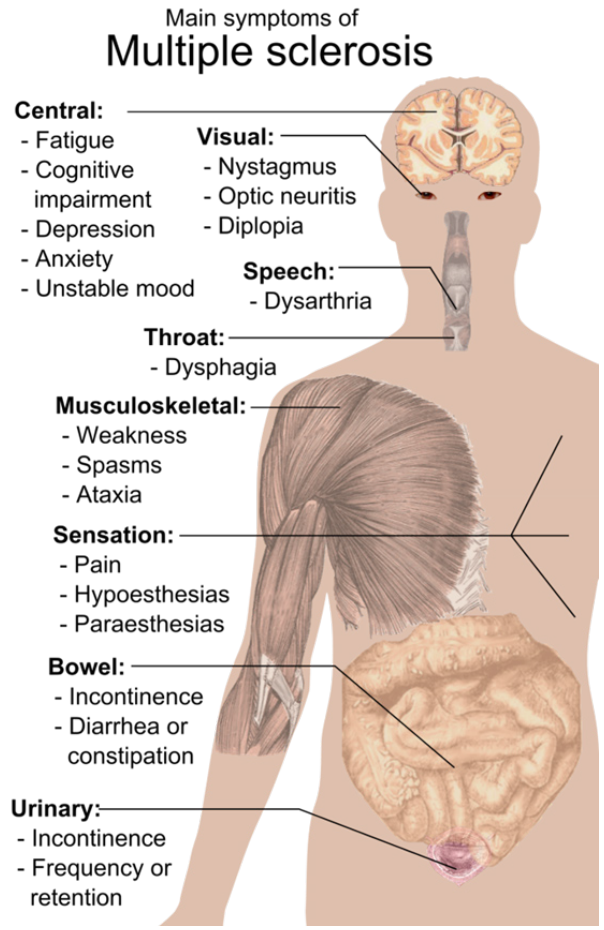
Signs and Symptoms. Assessment of signs and symptoms can be challenging because they are both unpredictable and hard for the patients to describe. Signs and symptoms may be transient or may last for hours or weeks. Typically, there are two general categories of initial symptoms: vision problems (because of optic neuritis) and sensory impairment such as paresthesia (Rebar et al., 2019).

Patients experience a variety of signs and symptoms including the following (Rebar et al., 2019):

- Vision issues such as blurred vision, scotoma, ophthalmoplegia.
- Emotional lability.
- Dysphagia.
- Poorly articulated speech.
- Muscle weakness.
- Muscle spasticity.
- Hyperreflexia.
- Urinary problems.
- Intention tremors.
- Ataxia.
- Bowel problems.
- Cognitive dysfunction.
- Fatigue.
- Varying degrees of paralysis.

Figure 5 provides an overview of the main symptoms of MS.

Figure 5. Main Symptoms of Multiple Sclerosis



Note. From Häggström, 2014

Blood and Imaging Tests. The following tests, while not definitive, can help to make the diagnosis of MS (Mayo Clinic, 2020b; Rebar et al., 2019):

- **MRI**: MRI is the most sensitive method to identify areas of MS lesions on the brain and spinal cord. It is also used to evaluate the progression of the disease.
- **Lumbar puncture**: A sample of cerebrospinal fluid can show elevated immunoglobulin G levels, but normal protein levels. This is significant only when serum gamma O levels are normal, and it reflects immune system hyperactivity because of chronic demyelination. The WBC count may be slightly elevated. Results of a lumbar puncture can help to rule out infections and other disorders with signs and symptoms similar to MS.
- **Evoked potential tests**: These tests record electrical activity produced by the CNS. CNS damage may cause slowing of electrical conduction.
- **Blood tests**: Blood tests help to rule out other disorders with signs and symptoms similar to those of MS. Blood tests may also be used to check for specific biomarkers associated with MS.

Diagnostic Criteria: The Revised McDonald Criteria, published in 2017 by the International Panel on the Diagnosis of Multiple Sclerosis, includes guidelines for using findings from MRIs and lumbar puncture. These can help to speed up the diagnostic process (National MS Society, 2021).

According to these criteria, in order to make a diagnosis of MS there must be (National MS Society, 2021):

- Evidence of damage in at least two separate areas of the CNS.
- Evidence that the damage occurred at different points in time.
- Elimination of all other possible diagnoses.

Risk Factors. There are a number of risk factors associated with MS that may be used in the diagnostic process. These include the following (Mayo Clinic, 2020b):

- **Age**: Although MS can occur at any age, its onset typically occurs around the ages of 20-40 years of age.
- **Certain autoimmune diseases**: A higher risk of MS is associated with people who have other autoimmune disorders such as thyroid disease, type 1 diabetes, or inflammatory bowel disease.
- **Certain infections**: Viral infections have been linked to MS development. An example is infection with the Epstein-Barr virus, which causes infectious mononucleosis.
- **Climate**: MS is more common in countries with temperate climates, including the northern US, Canada, New Zealand, Europe, and southeastern Australia.
- **Race**: Whites, especially those of Northern European ancestry, have the greatest risk of developing MS. People of Asian, African American, or Native American descent have the lowest risk.
- **Family history**: Risk increases if one's parents or siblings were diagnosed with MS.
- **Sex**: Research shows that women are more than two to three times as likely as men to have relapsing-remitting MS.
- **Smoking**: Research shows that smokers are more likely than non-smokers to have a second event that confirms a diagnosis of relapsing-remitting MS.
- **Vitamin D**: Low levels of vitamin D and low exposure to sunlight increases the risk of MS.

Complications. Complications associated with MS include the following (Mayo Clinic, 2020b):

- Muscle stiffness and spasticity.
- Paralysis.
- Bowel and bladder problems.
- Sexual dysfunction.
- Mental changes such as forgetfulness and/or mood swings.
- Depression.
- Epilepsy.

Treatment

Treatment goals are to shorten exacerbations, relieve neurologic deficits (if possible), and facilitate the maintenance of maximum health and wellness (Rebar et al., 2019). To date, MS treatment falls into three categories: abortive therapies, preventive therapies, and symptomatic therapies (Johns Hopkins Medicine, n.d.).

Abortive Therapies. An MS exacerbation is defined as "new or returning neurological symptoms that have evolved over at least 24-48 hours and have not been provoked by a metabolic cause, such as a fever" (Johns Hopkins Medicine, n.d.).

For acute exacerbations of symptoms, steroids may be prescribed to shorten both the duration and the intensity of the attack. The typical regimen involves intravenous administration of methylprednisolone once a day for 3 to 5days. Intravenous therapy may be followed with oral steroids such as oral prednisone. These oral steroid pills are given in tapering doses for an additional 1 to 2 weeks (Johns Hopkins Medicine, n.d.; Mayo Clinic, 2020b).

Plasma exchange (plasmapheresis) may also be used during acute attacks following steroid therapy. During plasmapheresis, blood plasma is removed from the body and separated from the blood cells. The blood cells are mixed with albumin and returned to the body. Plasmapheresis is most often used if patients' symptoms are new, severe, and have not responded to steroids (Johns Hopkins Medicine, n.d.; Mayo Clinic, 2020b).

Preventive Therapies. The Food and Drug Administration (FDA) has approved, to date, a number of preventive therapies to reduce the frequency and severity of exacerbations or to treat worsening MS (Johns Hopkins Medicine, n.d.).

The FDA-approved preventive therapies include the following (Johns Hopkins Medicine, n.d.; Rebar et al., 2019):

- **Interferon beta-1-a**: This beta interferon is given once a week by intramuscular (IM) injection or beta interferon administered via injection under the skin three times a week.
- **Interferon beta-1b**: This therapy may be administered via injection every other day. Frequency depends on specific therapy and patient needs.

Nursing consideration: Interferon betas have various side effects. In addition to redness and discomfort at the injection site, side effects include fever, chills, achiness, fatigue, depression, and changes in liver function. While patients are receiving interferon, they need to be monitored for changes in liver function on a regular basis. All interferons work by interfering with the immune system's ability to cause inflammatory processes (Johns Hopkins Medicine, n.d.).

- **Glatiramer acetate**: This drug is a synthetic protein that is similar to a component of myelin. Given subcutaneously, glatiramer acetate is believed to work by modifying the immune system so that it produces more anti-inflammation immune cells. Side effects include redness, swelling, and itching at the injection site. A small number of patients may experience a "post injection reaction," which is a brief period of flushing, racing of the heart, feeling faint, and shortness of breath.
- **Natalizumab**: Natalizumab is a monoclonal antibody administered intravenously once every 4 weeks. This drug is believed to work by preventing lymphocytes from entering the CNS. Natalizumab may produce a rare, but serious, possibly fatal, infection of the brain called progressive multifocal leukoencephalopathy (PML).
- **Mitoxantrone**: Mitoxantrone is a chemotherapeutic drug that is used for patients experiencing worsening forms of relapsing MS and secondary progressive MS. It is given intravenously every 3 months. The potential for toxicity is high, so patients may receive a limited number of doses throughout their lifespan. The drug is believed to work by suppressing the immune system to reduce the number of immune cells that might be causing inflammation. Mitoxantrone is associated with cardiotoxicity.

There are also a number of oral medications administered to reduce relapse rates. These include the following (Comerford & Durkin, 2021; Mayo Clinic, 2020b):

- **Fingolimod (Gilenya)**: This drug is taken once daily. The patient's heart rate and blood pressure are monitored for 6 hours after the first dose because there is the potential for reduction in heart rate. Additional side effects include infections, headaches, hypertension, and blurred vision.
- **Teriflunomide (Aubagio)**: This is an oral medication taken once daily to reduce relapse rates. Teriflunomide can cause liver damage and hair loss, when taken by men or women or birth defects in the infants of pregnant women . Contraception should be used while taking this medication and up to 2 years afterward.
- **Siponimod (Mayzent)**: Siponimod can help to reduce the rate of relapse and slow progression of MS. It is also approved for use in secondary-progressive MS. This drug is harmful to a developing fetus. Contraception is advised while taking this medication and for 10 days after the medication is discontinued. Associated side effects include viral infections, liver dysfunction, and low WBC counts. Changes in heart rate, headaches, and vision problems may also occur.
- **Cladribine (Mavenclad)**: Cladribine is usually prescribed as a second line treatment for patients with relapsing-remitting MS as well as for secondary-progressive MS. It is administered in two treatment courses spread over a 2-week

period over a period of 2 years. This drug is contraindicated in patients who have chronic infections, cancer, or who are pregnant or breastfeeding. Both men and women should use contraception while taking this drug and for 6 months after the medication is stopped. Side effects include upper respiratory infections, headaches, tumors, serious infections, and reduced levels of WBCs.

Symptomatic Therapies. Certain medications may be administered to control symptoms. Such medications include drugs for bladder issues, antidepressants, vertigo, and fatigue (Rebar et al., 2019).

Medications are not the only treatment initiative for patients with MS. It is important that an interdisciplinary team approach be used in the treatment of patients. Additional treatment initiatives may include the following:

- Physical therapy.
- Occupational therapy.
- Speech-language therapy.
- Neuropsychology therapy.

Complementary Medicine. Many people with MS use various alternative or complementary therapies to help manage systems. Complementary therapies include the following (Mayo Clinic, 2020b):

- Exercise.
- Meditation.
- Yoga.
- Massage.
- Acupuncture.
- Relaxation techniques.

Research findings suggest that maintaining adequate levels of vitamin D may have a protective effect and may lower the risk of developing MS. Some experts consider vitamin D supplementation as a modifiable risk factor for MS development (Mayo Clinic, 2021e).

Daily intake of vitamin D3 of 2,000-5,000 international units daily is recommended for patients with MS (Mayo Clinic, 2020b). However, it is important to note that very large doses of vitamin D over a long period of time may lead to toxicity. Signs and symptoms of vitamin D toxicity include nausea, vomiting, constipation, reduced appetite, weakness, and weight loss. Toxicity can also cause increased levels of blood calcium, which, in turn, can cause kidney stones (Mayo Clinic, 2021e).

Nursing Interventions

As mentioned throughout this education program, nurses often take the lead in medication administration education. Patients and families both need education regarding medication administration. Nurses should emphasize the importance of adhering to the prescribed regimen and how to recognize and report side effects (Comerford & Durkin, 2021).

Providing emotional support is critical. Patients' mental health should be monitored and appropriate interventions and referrals to mental health professionals made.

Family members/caregivers should also be monitored for mental health issues since they, too, are under emotional stress (Rebar et al., 2017).

- Educate and support patients and family with the following recommendations (Mayo Clinic, 2021b).
- Encourage patients to maintain normal daily activities as able.
- Encourage patients to interact and maintain contact with family and friends, but to avoid those with infections or contagious diseases while taking immunosuppressing medications
- Encourage patients to pursue hobbies that they enjoy and are able to do.
- Facilitate connections with support groups.
- Encourage patients and families to discuss feelings and concerns regarding living with MS.
- Explain that it is important for patients and families to monitor signs and symptoms, what causes them to become worse, and what, if anything, helps to reduce the symptoms.
- Explain that patients and families should write down questions and concerns to ask the healthcare team in order to avoid forgetting important issues.

Encourage patients to bring a family member or friend with them when they have appointments with healthcare team members.

Self-Assessment Question 6

A patient who has MS also has cardiac disease. Which of the following drugs would probably NOT be appropriate for this patient?

a. Mitoxantrone.
b. Teriflunomide.
c. Natalizumab.
d. Cladribine.

Psoriasis

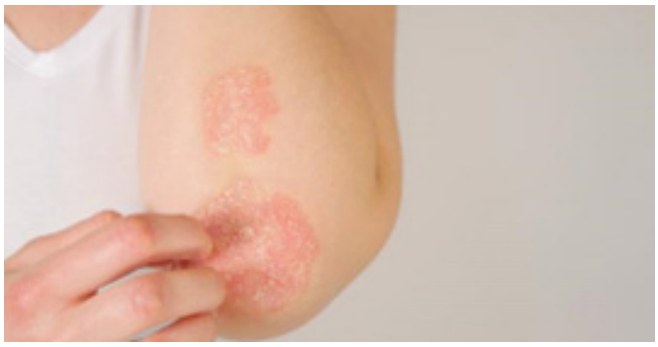
Psoriasis is a chronic autoimmune skin disease characterized by an acceleration of the growth cycle of skin cells. Although psoriasis can be treated, there is no cure. A dermatologist is often the best healthcare provider to diagnosis psoriasis because it has been confused with other skin disease, such as eczema (CDC, 2020b).

Psoriasis is characterized by raised, red, itchy, scaly patches on various parts of the body. Psoriasis patches can range from a few spots of dandruff-like scaling to major plaques that cover large areas. The areas most commonly affected are the lower back, elbows, knees, legs, soles of the feet, scalp, face, and palms (Mayo Clinic, 2020c).

An estimated 125 million people throughout the world (two to three percent of the total population) have psoriasis. In the US, more than three percent of the adult population is affected by psoriasis; this translates to more than 7.5 million adults (National Psoriasis Foundation, 2021).

Figure 6 is a picture of the characteristic patches on the skin of a patient with psoriasis.

Figure 6. Psoriasis Skin Patches



Note. image from Unsplash opensource

Pathophysiology
Psoriasis is a complex disease that appears to be influenced by genetic and immune-mediated facets. The exact trigger or triggers of the disease are unknown, but experts believe that triggers may include an infectious episode, traumatic insult, or stressful life events. Once triggered, a substantial number of leukocytes gather at the dermis and epidermis, which leads to characteristic psoriatic plaques. Many patients, however, have no obvious trigger (Habashy, 2021).

Possible Triggers. Many patients who are vulnerable to the development of psoriasis may be free of signs and symptoms for years until the disease is triggered by various environmental factors (Mayo clinic, 2020c). Common triggers include the following (Mayo Clinic, 2020c):

- Infections such as bacterial or skin infections.
- The weather, particularly a cold, dry environment.
- Injury to the skin such as severe sunburn, lacerations, or bug bites.
- Stress.
- Smoking as well as exposure to second-hand smoke.
- Heavy alcohol consumption.
- Certain medications such as lithium, anti-hypertensive medications, and antimalarial drugs.
- Swift withdrawal of oral or systemic corticosteroids.

Psoriasis can develop in anyone. An estimated 33% of cases begin in the pediatric years. The following factors increase risk of psoriasis (Mayo Clinic, 2020c:.

- **Family history**: Having one parent with psoriasis increases risk. If both parents have psoriasis, the risk increases even higher.
- **Stress**: Since stress can impact the immune system, high levels of stress may increase the risk of disease development.
- **Smoking**: Smoking tobacco products increases risk and may also increase the severity of the disease. Smoking may even play a part in the initial development of the disease.

Complications. Psoriasis increases the risk of developing other diseases including the following (Mayo Clinic, 2020c):

- Eye conditions such as conjunctivitis and blepharitis.
- Obesity.
- Type 2 siabetes.
- Hypertension.
- Cardiovascular disease.
- Other autoimmune diseases such as inflammatory bowel disease.
- Mental health disorders such as depression.

Pathogenesis. The epidermis is infiltrated by large numbers of activated T cells. These T cells seem to be capable of causing keratinocyte proliferation. Psoriatic plaques reveal large amounts of T cells within the psoriasis lesions. An uncontrolled inflammatory process occurs. Important findings in the affected skin include vascular engorgement because of superficial blood vessel dilation and a changed epidermal cell cycle (Habashy, 2021).

Assessment and Diagnosis
Patients are assessed for characteristic signs and symptoms of the disease and possible other causes of these signs and symptoms are investigated. It is important to rule out other skin conditions before making a diagnosis of psoriasis (Habashy, 2021).

Signs and Symptoms. There are several types of psoriasis. During patient assessment, it is important to differentiate among the various psoriasis types. These include the following (Mayo Clinic, 2020c):

- **Plaque psoriasis**: Plaque psoriasis is the most common type of psoriasis. It is characterized by dry, raised, red skin patches that are covered with silver-looking scales. The most common sites affected are elbows, knees, lower back, and scalp.
- **Guttate psoriasis**: Guttate psoriasis typically affects children and young adults. It is often triggered by a bacterial infection (e.g., strep throat) and is characterized by small, scaling lesions shaped like drops that are located on the trunk, arms, or legs.
- **Inverse psoriasis**: Inverse psoriasis usually affects the skin folds of the groin, buttocks, and breasts. It is characterized by smooth, red patches of skin. These patches become worse with friction and sweating. It is suspected that fungal infections trigger inverse psoriasis.
- **Nail psoriasis**: Nail psoriasis is characterized by pitting, abnormal nail growth, and discoloration. Affected nails may loosen and separate from the nail bed (onycholysis). Severe cases of nail psoriasis may cause affected nails to crumble
- **Psoriatic arthritis**: Psoriatic arthritis is characterized by swollen, painful joints that are the typical signs of arthritis. Symptoms range from mild to severe. Psoriatic arthritis can affect any joint and causes stiffness and progressive joint damage. The joint damage may be permanent.
- **Pustular psoriasis**: Pustular psoriasis is a rare form of the disease. It is characterized by well-defined lesions that are filled with pus. These lesions are widespread patches or occur in smaller areas on the palms of the hands or the soles of the feet.
- **Erythrodermic psoriasis**: This is the least common type of psoriasis. Erythrodermic psoriasis can cover the whole body with a red, peeling rash, which can burn or itch intensely.

Common, general signs and symptoms of psoriasis are (Mayo Clinic, 2020c):

- Red patches of skin that are covered with thick, silvery scales.
- Small scaling spots that are commonly seen in children.
- Skin that is dry and cracked, and may bleed.
- Itching, burning, or soreness.
- Thick, pitted, or ridged nails.
- Joints that are swollen and stiff.

Diagnostic Tests. Laboratory studies and findings for patients with psoriasis may include the following (Habashy, 2021):

- Rheumatoid factor (RF) to differential psoriatic arthritis from rheumatoid arthritis. It is negative in psoriasis.
- Erythrocyte sedimentation rate (RF) is negative .
- Uric acid level may be elevated, especially with pustular and erythrodermic psoriasis.
- Fluid from pustules is sterile with neutrophilic infiltrate.
- Fungal studies may show infection.

Various other tests may be ordered to identify psoriasis. A biopsy of the skin lesion may show basal cell hyperplasia, absence of normal cell maturation, and keratinization. A considerable number of activated T cells are found in the epidermis. Joint x-rays can hasten the diagnosis of psoriatic arthritis. Bone scans are used for the early recognition of joint involvement (Habashy, 2021).

Treatment
Treatment of psoriasis is individualized to each patient. The goals of treatment are to relieve pain, remove scales, reduce swelling, maintain joint functioning, and prevent additional damage to joints (National Psoriasis Foundation, n.d.).

Topicals. Topical medications are typically the first treatment recommended to someone who is newly diagnosed. Topical medications can be purchased over the counter or by prescription (National Psoriasis Foundation, n.d.).

The following is a summary of topical therapy medications (Comerford & Durkin, 2021; Mayo Clinic, 2020c; National Psoriasis Foundation, n.d.):

- **Corticosteroids**: Topical steroids are one of the most common topical treatments for psoriasis. They come in a variety of ranges from very strong to very weak. Corticosteroids are available as ointments, creams, lotions, gels, foams, sprays, and shampoos. Topical corticosteroids are typically applied once daily during exacerbations and on alternate days or weekends to maintain remission. Mild corticosteroid ointments (e.g., hydrocortisone) may be purchased over the counter. However, prescription creams or ointments may be needed. Examples of prescription corticosteroids include triamcinolone (Trianex) and clobetasol (Clobex).

Nursing consideration: Patients should be advised to apply only a small amount of the steroid on affected areas only; not to use a topical steroid for longer than 3 weeks without the approval of healthcare providers; not to abruptly discontinue a topical steroid because it may cause a psoriasis exacerbation; avoid using steroids in or around the eyes unless the medication is specifically for the eyes; know that the more potent the steroid, the more effective it is, but the risk of side effects is greater (National Psoriasis Foundation, n.d.).

- **Vitamin D analogues**: Synthetic forms of vitamin D are prescribed to slow skin cell growth.
- **Calcineurin inhibitors**: Calcineurin inhibitors (e.g., tacrolimus [Protopic]) reduce both inflammation and plaque build-up. These medications are particularly useful in treating delicate areas of thin skin such as around the eyes.
- **Coal tar**: Coal tar is given to reduce scaling, itching, and inflammation. It comes in over-the-counter and prescription formats such as shampoo, cream, and oil. Unfortunately, these products can cause skin irritation, stain clothing and bedding, and have a strong odor. Coal tar is contraindicated for pregnant women and for those who are breastfeeding.
- **Goeckerman therapy**: This is a combination of coal tar treatment and phototherapy (light therapy). This combined treatment is more effective than either of them alone.

Phototherapy. There are various types of phototherapies (light therapy) used in the treatment of psoriasis. The following list provides descriptions of some of the types of phototherapies used in the treatment of psoriasis:

- **Sunlight**: Brief, daily exposures to sunlight (heliotherapy) might improve psoriasis, but precautions should be taken. Before beginning treatment with sunlight, healthcare providers should be consulted about the most effective and the safest way to expose skin to the sun (Mayo Clinic, 2020c).
- **UVB phototherapy**: This treatment involves exposing affected skin to an artificial UVB light source for an established length of time or a regular basis. UVB phototherapy can be administered in the healthcare provider's office, outpatient clinic, or at home with a phototherapy unit (National Psoriasis Foundation, n.d.).
- **Psoralen plus ultraviolet A (PUVA)**: PUVA treatment involves taking a light-sensitizing medication (psoralen) before exposure to UVA light. This light penetrates deeper into the skin than does UVB light. Psoralen increases the skin's response to UVA exposure (Mayo Clinic, 2020c).
- **Excimer laser**: With this type of phototherapy, a strong UVB light specifically targets only the affected skin. Excimer laser therapy requires fewer treatment sessions than traditional phototherapy because a more powerful UVB light is used (Mayo Clinic, 2020c).

Oral or Injected Medications. If the patient has moderate to severe psoriasis that has not responded to other treatments, oral or injected medications may be prescribed. Severe side effects may occur, so these medications are only used for brief periods of time and might be alternated with other forms of treatment (Mayo Clinic, 2020c).

Oral and injected medications include the following (Comerford & Durkin, 2021; Mayo Clinic, 2020c; National Psoriasis Foundation, n.d.):

- **Steroids**: A few small and persistent psoriasis patches may be treated with a steroid injection directly into lesions.
- **Retinoids**: Retinoids are oral medications given to decrease skin cell production. These types of drugs are not recommended for females or for those who are breastfeeding.
- **Methotrexate**: Methotrexate is typically administered as a single oral dose. This drug works by decreasing skin cell production and suppressing inflammation. Both men and women should stop taking methotrexate at least 3 months before trying to conceive.
- **Biologics**: Biologics such as infliximab (Remicade) are used for patients who have moderate to severe psoriasis and have not responded to first-line therapies. They are usually given by injection. It is important that biologics be administered with caution. They may suppress the immune system to the point that increases the risk of serious infections. Patients must be screened for tuberculosis. Biologics are expensive and may or may not be covered by health insurance.

Alternative/Complementary Interventions. Several alternative therapies may be used to ease psoriasis signs and symptoms. None have been proved to be effective by scientific research, but they are generally safe and may reduce symptoms in patients with mild to moderate psoriasis (Mayo Clinic, 2020c).

Examples of alternative therapies include the following (Mayo Clinic, 2020c):

- **Aloes extract cream**: This cream may reduce redness, inflammation, scaling, and itching. Aloe extract cream is typically applied several times a day. Patients should know that it may take a month or more to notice improvement.
- **Fish oil supplements**: Fish oil supplements used in conjunction with UVB therapy may reduce the amount of skin that is affected. Typically, fish oil is applied to the affected skin and covered with a dressing for 6 hours a day for 4 weeks.
- **Essential oils**: Essential oils used for aromatherapy (e.g., lavender) have been associated with stress and anxiety reduction.

Nursing consideration: Patients must be cautioned that before adding alternative therapies to their treatment regimens they must consult with their healthcare providers.

Nursing Interventions

Nursing interventions include, as always, patient/family education regarding medication and other aspects of the treatment regimen. Nurses should assess the patients' support network. It is important that they have the support of family and friends (Rebar et al., 2019).

Patients also need to know that self-care measures are available. With the approval of the healthcare providers, nurses can explain the value of the following lifestyle and home remedies (Mayo Clinic, 2020c):

- **Daily baths**: Daily baths help to remove scales as well as calm inflamed skin. Bath oil, colloidal oatmeal, and Epsom salts can be added to the water, and patients should soak in this water for at least 15 minutes. Lukewarm water and mild soaps that have additional oils and fats are recommended.
- **Moisturizers**: After gently patting nearly dry, a heavy ointment-based moisturizer should be applied when the skin is still moist. If moisturizing has positive results, a moisturizer may be applied one to three times a day.
- **Overnight coverage**: An ointment-based moisturize should be applied to the affected skin and wrapped with plastic wrap before going to bed. Upon awakening, the plastic wrap is removed and scales are washed away.
- **Medicated ointments**: To reduce itching and inflammation, over-the-counter hydrocortisone creams may be applied to the affected skin.
- **Triggers**: Patients should identify personal triggers and make plans to avoid them. Infections, stress, and smoking can exacerbate signs and symptoms.
- **Alcohol**: Alcohol may interfere with the effectiveness of treatment regimens. Alcohol should be avoided.

Self-Assessment Question 7

A nurse is conducting a patient/family education session for a patient recently diagnosed with psoriasis. The topic of discussion is medication. Which of the following statements would be appropriate to tell the patient and family?

a. Vitamin D Analogues are prescribed to decrease itching.
b. Coal tar is contraindicated for pregnant women.
c. Biologics are prescribed for patients with mild psoriasis.
d. Methotrexate is typically administered daily for 6 weeks.

Rheumatoid arthritis (RA)

Rheumatoid arthritis is a chronic, systemic, inflammatory disorder that usually affects the joints, the cervical spine, and surrounding muscles, tendons, ligaments, and blood vessels (Rebar et al., 2019). In some people RA can damage a number of body systems, including the skin, eyes, lungs, heart, and blood vessels (Mayo Clinic, 2021b).

The annual incidence of RA on a global scale is about three cases per 10,000 population. The prevalence rate is about one percent. Prevalence increases with age, peaking between the ages of 35 and 50 years.

RA affects all populations but is thought to be more prevalent in some groups (e.g., Native Americans) and less prevalent in others (e.g., dark-skinned persons from the Caribbean region; Smith, 2021b).

In the US, various types of arthritis are quite prevalent. Osteoarthritis is the most common form of arthritis. Gout, fibromyalgia, and RA are other common rheumatic conditions in the US (CDC, 2021b).

The CDC (2021b) has compiled and published the following arthritis related statistics:

- From 2013-2015, an estimated 58.5 million US adults (22.7%) annually had ever been told by a doctor that they had some form of arthritis.
- Prevalence by age: From 2013 to 2015 in the US:
  - Of people aged 18 to 44 years, 7.1% ever reported doctor-diagnosed arthritis.
  - Of people aged 45 to 64 years, 29.3% ever reported doctor-diagnosed arthritis.
  - Of people aged 65 years or older, 49.6% ever reported doctor-diagnosed arthritis.
- From 2013 to 2015 in the US, 26% of women and 19.1% of men ever reported doctor-diagnosed arthritis.
- Adults aged 18 years or older who are overweight or obese report doctor-diagnosed arthritis more often than adults with a lower body mass index (BMI).
- More than 16% of under/normal weight adults report doctor-diagnosed arthritis.
- Almost 23% of overweight and 31% of obese US adults report doctor-diagnosed arthritis.
- In 2015, 15 million adults reported severe joint pain because of arthritis.
- Arthritis and other rheumatic conditions are a leading cause of work disability among US adults.
- One in 25 working-age adults aged 18 to 64 years face work limitations they attribute to arthritis.
- Arthritis limits the activities of 23.7 million US adults.
- Adults with arthritis were about 2.5 times more likely to have two or more falls and suffer a fall injury in the past 12 months compared with adults without arthritis.
- In 2013, the national costs of arthritis were $304 billion.

Regarding RA statistics in the US, it is estimated that RA affects between 1.28 and 1.36 million Americans. Women are affected more often than men, and its peak onset is highest in people in their sixties (Rebar et al., 2019).

Pathophysiology

Pathogenesis. The pathogenesis of RA is not completely understood, but infections, genetics, and endocrine factors may influence its development (Rebar et al., 2019). An external trigger such as cigarette smoking, infection, or trauma may set off an autoimmune reaction, which leads to synovial hypertrophy and chronic joint inflammation. There is also potential for extra-articular manifestations to develop in individuals who are genetically susceptible (Smith, 2021a). Susceptible people may develop abnormal or altered IgG antibodies. The person's immune system does not recognize these antibodies as "self" and forms an antibody (the rheumatoid factor) against the person's own antibodies.

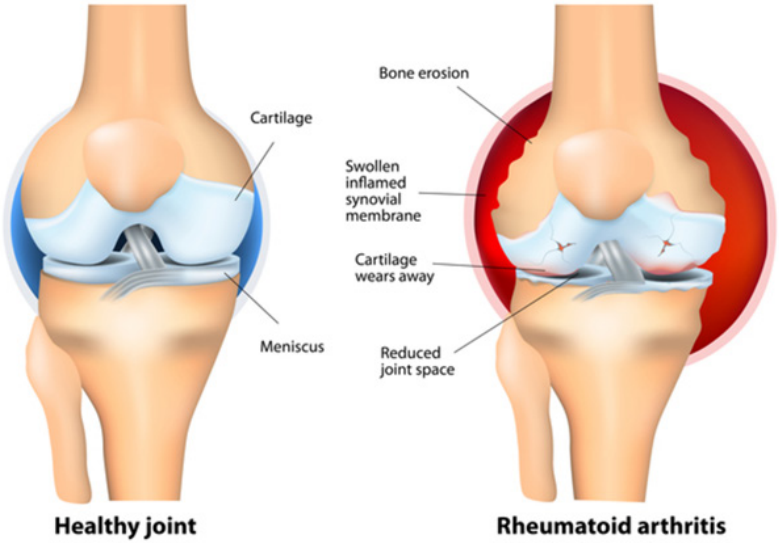
The rheumatoid factor causes inflammation, which leads to cartilage damage (Rebar et al., 2019).

Joint inflammation occurs in four stages (Rebar et al., 2019; Smith, 2021a):

- **Phase 1**: Interaction occurs between genetic and environmental risk factors of RA. Initial inflammation in the joint capsule occurs in conjunction with swelling of the synovial tissue. This causes joint pain, swelling, and stiffness.
- **Phase 2**: RA antibodies are produced. Pannus (thickened layers of granulation tissue) covers and invades cartilage, eventually destroying the joint capsule and bone.
- **Phase 3**: This stage is characterized by arthralgia (joint stiffness), fibrous ankylosis, bone atrophy, and misalignment that causes visible deformities.
- **Phase 4**: This stage is characterized by fibrous tissue calcification, which leads to bony ankylosis (joint fixation). Pain, restricted joint movement, soft-tissue contractures, and joint deformities are evident.

Figure 7 shows the joint damage caused by RA.

Figure 7. Rheumatoid Arthritis



Note. From National Library of Medicine U.S., 2013.

Etiology. The exact cause of RA is not known. However, experts propose that genetic, environmental, hormonal, immunologic, and infectious factors may contribute to its development (Smith, 2021a).

The following descriptions show how contributing factors may contribute to RA development (Smith, 2021a):

- **Genetics**: Genetic factors account for 50% of the risk of developing RA. Various genes are thought to contribute to the development of RA.
- **Infectious agents**: Various infectious pathogens have been suggested to be possible causes of RA. These include the rubella virus and the Epstein-Barr virus (EBV). The proposal that infectious pathogens can be a cause of RA is supported by the following:
  - Reports of flulike illnesses before the start of RA.
  - The ability to produce RA in experimental animals using various bacteria.
  - The presence of bacterial products in patients' joints
- **Hormonal factors**: Sex hormones may play a part in the development of RA. Evidence to support this includes the disproportionate number of females with RA, improvement of signs and symptoms during pregnancy, and their recurrence after giving birth.
- **Lifestyle factors**: The main lifestyle contributory possible cause is the use of tobacco. Risk of developing RA is significantly higher in people who use tobacco.

Nursing consideration: Patients and families should be aware that in former smokers, the risk for RA may not return to the level of non-smokers for up to 20 years after ceasing to smoke (Smith, 2021a).

- **Immunologic factors**: The autoimmune response possibly triggers the formation of immune factors that activate the inflammatory process to a significantly greater degree than is normal.

Risk Factors. A number of risk factors are associated with the development of RA. These include the following (CDC, 2020a; Mayo Clinic, 2021b):

- **Sex**: New cases of RA are usually two to three times higher in women compared to men.
- **Age**: Although RA can begin at any age, occurrence increases with age. Onset of RA is highest among adults in their sixties.
- **Inherited traits**: People born with genes called human leukocyte antigen (HLA) class II genotypes are more likely to develop RA. These genes can also make RA worse. The risk may be highest when people with these genes are exposed to environmental factors such as tobacco use, or when the person is obese.
- **Smoking**: Tobacco use increases risk of developing RA and can also make the disease worse.
- **History of live births**: Women who have never given birth may be at greater risk for developing RA.
- **Exposures early in life**: Research suggests that some early life exposures may increase the risk of developing RA in adulthood. One study found that children whose mothers had smoked had twice the risk of developing RA as adults. Children of lower income parents also seem to be at increased risk of developing RA.
- **Obesity**: Research shows that the more overweight a person is, the greater the risk of developing RA.

Evidence-based practice! Research shows that women who have breastfed their infants have a decreased risk of developing RA (CDC, 2020a).

Self-Assessment Question 8

Which of the following people is most likely to develop RA?

a. A man in his sixties.
b. A woman who has given birth to three children.
c. A woman who smokes one pack of cigarettes per day.
d. A man who is underweight.

Complications. RA increases the risk of developing several complications. These include the following (Mayo Clinic, 2021b):

- **Osteoporosis**: RA and medications used to treat RA can increase the risk of osteoporosis.
- **Rheumatoid nodules**: These firm tissue nodules are usually found around pressure points. However, these nodules can form anywhere in the body, even in the heart and lungs.
- **Dry eyes and mouth**: RA increases the risk of developing Sjogren's syndrome, which is a disorder that decreases the amount of moisture in the eyes and mouth.
- **Infections**: RA and medications used in its treatment can impair the immune system, which leads to increased risk of infections. Patients are urged to get recommended vaccines such as influenza, pneumonia, shingles, and COVID-19.
- **Body composition**: The ratio of fat to lean body mass is often higher in people with RA. This is true even for persons who have a normal body mass index (BMI).
- **Carpal tunnel syndrome**: If RA affects the patient's wrists, the resulting inflammation can compress the nerves that serve the hands and fingers.
- **Cardiac issues**: RA increases the risk of atherosclerosis and arteriosclerosis. RA can also cause inflammation of the pericardium.
- **Lung disease**: People who have RA have an increased risk of inflammation and scarring of lung tissue. This can compromise respiratory status.
- **Lymphoma**: RA increases the risk of lymphoma.

Assessment and Diagnosis

Assessment. The primary characteristic of RA is persistent polyarthritis (synovitis) that affects any joint lined by a synovial membrane. In many patients, RA has an insidious onset (Smith, 2020a). Initially, patients may complain of non-specific symptoms that are seen in multiple disorders. These symptoms include fatigue, malaise, anorexia, low-grade fever, and weight loss. As the inflammatory process progresses, more specific symptoms develop (Rebar et al., 2019).

Nursing consideration: About 10% of patients with RA experience an abrupt onset with acute development of synovitis as well as extra-articular manifestations (Smith, 2021a).

During physical assessment patients are assessed for the following more specific signs and symptoms (Smith, 2020a):

- Stiffness.
- Tenderness.
- Pain with motion.
- Warmth of affected joints.
- Swelling.
- Deformity.
- Limitations of range-of-motion.
- Extra-articular manifestations.
- Rheumatoid nodules.
- Muscle atrophy.
- As joints and tendons are destroyed, deformities such as ulnar deviation, boutonniere deformation (the middle joint of the injured finger will not straighten, while the fingertip bends back), swan-neck deformity (flexion of the base of the finger, extension of the middle joint, and flexion of the outermost joint), hammer toe deformities (toe is bent at the middle joint, resembling a hammer), and, sometimes, joint ankylosis.

Symptoms usually occur bilaterally and symmetrically, typically involving fingers, wrists, elbows, knees, and ankles (Rebar et al., 2019). Many patients have muscle atrophy secondary to joint inflammation (Smith, 2021a).

Diagnostic Tests. No test specifically identifies RA. However, the following tests may be useful in making a diagnosis (Rebar et al., 2019):

- X-rays may show bone demineralization and soft tissue swelling.
- A rheumatoid factor is often positive in patients with RA. A positive test is indicated by a value of less than 60 units/ml.
- Analysis of synovial fluid shows an increase in volume and turbidity but decreased viscosity and complement levels. WBC count is often greater than 10,000/mm3.
- Serum protein electrophoresis may show an elevation in serum globulin levels.
- Erythrocyte sedimentation rate (ESR) is elevated in many patients with RA. The ESR helps in the monitoring of patients' response to therapy.

Treatment

There is no cure for RA. Research indicates that symptom remission is more likely when treatment begins early with disease-modifying antirheumatic drugs (DMARDs; Mayo Clinic, 2021b).

Medications. Medications are prescribed based on the severity of the symptoms and how long the patient has had RA. Medications include the following (Comerford & Durkin, 2021; Mayo Clinic, 2021b; Rebar et al., 2019):

- **Nonsteroidal anti-inflammatory drugs (NSAIDs)**: NSAIDs are administered to relieve pain and reduce inflammation. Over-the-counter options include ibuprofen (e.g., Advil) and naproxen sodium (Aleve). Stronger prescription NSAIDs such as celecoxib (Celebrex) may be given with caution. Side effects of prescription NSAIDs include stomach irritation, cardiac issues, and kidney damage.
- **Steroids**: Corticosteroids, such as prednisone, are taken to reduce inflammation and pain as well as to slow joint damage. Side effects of corticosteroids include osteoporosis, weight gain, and diabetes. Therefore, corticosteroids are typically given to quickly relieve symptoms and are gradually tapered off in an attempt to prevent or reduce side effects.
- **Conventional DMARDs**: DMARDs are taken to slow disease progression and to protect the joints and other body tissues from permanent damage. Examples of conventional DMARDs include methotrexate (Otexup), leflunomide (Arava), and hydroxychloroquine (Plaquenil). Side effects may include hepatic damage and severe respiratory infections.
- **Biologic agents**: Also known as biologic response modifiers, biologic agents are a new class of DMARDs. Examples include abatacept (Orencia), certolizumab (Cimzia), and rituximab (Rituxan).

Nursing consideration: Biologic DMARDs are typically most effective when paired with a conventional DMARD (Mayo Clinic, 2021b).

Targeted synthetic DMARDs: If conventional DMARDs and biologics are not effective, targeted synthetic DMARDs may be prescribed. An example is tofacitnib (Xeljanz).

Therapy. Physical and occupational therapies may be prescribed. In addition to keeping joints flexible, patients may be taught to use assistive devices that do not stress painful joints and make performing activities of daily living (ADLs) easier. For example, cutlery with hand grips make cooking and eating easier. Buttonhooks can help to make dressing easier (Mayo Clinic, 2021b).

Surgery. Various surgical procedures may be performed. These include the following (Mayo Clinic, 2021b; Rebar et al., 2019):

- **Synovectomy**: Synovectomy is the removal of the inflamed lining of joints (synovium). The goal of this surgery can help to reduce pain and improve flexibility of joints.
- **Tendon repair**: Inflammation and damage to the joints may cause tendons around the joints to rupture or loosen. Repair of the tendons may be possible with this type of procedure.
- **Joint fusion**: Joint fusion may be performed to stabilize or realign joints for the relief of pain. This procedure is generally performed when joint replacement is not an appropriate option.
- **Total joint Replacement**: This procedure involves the removal of damaged parts of joints and insertion of a prosthesis. Such prostheses are generally made of metal and plastic.

Nursing Interventions

Support for patients with a chronic, potentially disfiguring disease is critical. Nurses need to encourage patients to seek medical help as soon as possible, not only when symptoms first start, but if and when signs and symptoms change. Families must also be involved in and support healthcare visits (Rebar et al., 2019).

In conjunction with the primary healthcare provider and other members of the healthcare team, the following suggestions for symptom management may be provided by nurses (Mayo Clinic, 2020e):

- **Exercise**: Staying physically active is essential to strengthening muscles and keeping joints flexible. Physical therapists may be consulted for the recommendation of specific exercises. No exercise program should be initiated without the knowledge and consent of the primary healthcare provider.
- **Heat or cold therapy**: Warm baths, showers, and heating pads can help to ease pain and joint stiffness. In the event of periods of symptom exacerbation, cold packs rather than heat are recommended to reduce pain and inflammation.
- **Joint support**: Splints are typically used for joint support. Occupational and physical therapists can recommend the splint that is best suited to individual patient needs.
- **Self-help devices**: Several self-help devices may be used to facilitate movement and reduce joint stress. Examples include hand grips, long-handled shoehorns, and raised toilet seats.
- **Healthy lifestyle**: Patients should be encouraged to get enough rest and sleep, avoid tobacco products, adhere to medication regimens, and eat a healthy diet.

Scleroderma

Scleroderma is an autoimmune connective tissue and rheumatic disease. It is characterized by inflammation in the skin leading to patches of tight, hard skin. Scleroderma develops as the result of overproduction and accumulation of collagen in body tissues (Mayo Clinic, 2019). Scleroderma is not contagious, infectious, cancerous, or malignant (Scleroderma Foundation, 2021). Scleroderma can involve multiple body systems or just one area of the body (National Institute of Arthritis and Musculoskeletal and Skin Diseases, 2020).

When scleroderma affects multiple body systems it is referred to as systemic scleroderma (National Institute of Arthritis and Musculoskeletal and Skin Diseases, 2020)..

The estimated incidence of systemic scleroderma in the US is 20 cases per million population. Its prevalence is estimated at 276 cases per million population. Incidence and prevalence of systemic scleroderma in the US has been increasing in the last 50 years (Jimenez, 2020).

Systemic scleroderma is not particularly common. An estimated 75,000 to 100,000 people in the US have the disease. Most patients are women between the ages of 30 and 50 (American College of Rheumatology, 2019). Localized scleroderma is more common in children. Systemic scleroderma is more common in adults. However, scleroderma can develop in every age group from infants to older adults (Scleroderma Foundation, 2021).

Pathophysiology

There are two major classifications of scleroderma: localized scleroderma and systemic sclerosis (SSc). Each classification has

its own characteristics and prognosis (Scleroderma Foundation, 2021).

Localized Scleroderma. The changes associated with localized scleroderma are found in only a few places on the skin or muscles. It rarely spreads elsewhere in the body. Usually, localized scleroderma is rather mild (Scleroderma Foundation, 2021).

There are two forms of localized scleroderma: morphea and linear scleroderma (Scleroderma Foundation, 2021).

Morphea. Morphea is characterized by waxy patches on the skin that vary in size, shape, and color. These patches may grow or shrink and may even disappear spontaneously. Skin underneath patches may thicken. Morphea typically develops between the ages of 20 and 50 but is often found in young children (Scleroderma Foundation, 2021).

Linear Scleroderma. This form of localized scleroderma often starts as a streak of hardened, waxy skin. It typically appears on the arm, leg, or forehead. It may form as a long crease on the head or neck that resembles a wound caused by a sword. Linear scleroderma usually involves the deeper layers of the skin as well as the surface layers of the skin. Linear scleroderma typically develops in childhood, and growth of affected limbs may be affected (Scleroderma Foundation, 2021).

Systemic Scleroderma (Systemic Sclerosis). Systemic scleroderma is characterized by changes in connective tissue that occur in many parts of the body. Systemic sclerosis can involve the skin, esophagus, gastrointestinal tract, lungs, kidneys, heart, and other internal organs. The disease can also affect blood vessels, muscles, and joints (Scleroderma Foundation, 2021).

Affected tissues become hard and fibrous, leading to functional impairment. There are two major patterns that systemic scleroderma can take-- diffuse or limited patterns (Scleroderma Foundation, 2021).

- **Diffuse scleroderma**: In diffuse scleroderma thickening of the skin occurs at a rapid rate and involves more areas of the skin than the limited disease. People with diffuse scleroderma are at higher risk of developing sclerosis or fibrous hardening of the internal organs.
- **Limited scleroderma**: Limited scleroderma affects about 50% of persons who have scleroderma. It progresses more slowly and is a more benign illness than diffuse scleroderma. Internal issues may evolve, but they are typically less frequent and less severe compared to diffuse scleroderma. However, patients with limited scleroderma can develop pulmonary hypertension, which causes a narrowing of the blood vessels of the lungs, impaired blood flow to the lungs, and shortness of breath.

Risk Factors. Several factors may influence the risk of developing scleroderma. These include the following (Mayo Clinic, 2019):

- **Genetics**: It is possible that gene variations may be a risk factor for the development of scleroderma. A small number of cases of scleroderma seem to run in families. The disease also appears more often in certain ethnic groups. For example, Choctaw Native Americans are more likely to develop scleroderma that affects the internal organs of the body.
- **Environmental triggers**: Research findings indicate that scleroderma symptoms may be triggered by exposure to some viruses, medications, or drugs. Work exposure to harmful chemicals may also increase the risk of scleroderma development.
- **Immune system issues**: As an autoimmune disease, the body's immune system negatively impacts its own connective tissues. In about 15% to 20% of cases, someone who has scleroderma also has symptoms of another autoimmune disease such as lupus or rheumatoid arthritis.

Complications. Scleroderma complications range from mild to severe. These include the following (Mayo Clinic, 2019):

- **Raynaud's Disease**: A form of Raynaud's disease sometimes occurs with systemic scleroderma. Raynaud's disease in these patients can be so severe that impaired blood flow permanently damages fingertip tissue, leading to pits and/or skin sores. In some patients, fingertip tissue may die and amputation may be necessary.
- **Lungs**: If lung tissue is scarred, respiratory function can be impaired, leading to respiratory distress and possible pulmonary hypertension.
- **Kidneys**: If kidneys are impacted by scleroderma, hypertension may occur as well as increased protein levels in the urine. Kidney damage may also cause renal crisis that involves rapid kidney failure.
- **Cardiac**: If the tissue of the heart is scarred, arrhythmias, congestive heart failure, and pericarditis may occur.
- **Teeth**: If scleroderma causes severe facial skin tightening, the mouth may become smaller and narrower. If this occurs, it may be difficult for patients to brush their teeth or have dental work. Frequently, patients do not produce adequate amounts of saliva, which increases the risk of tooth decay.
- **Gastrointestinal system**: Digestive issues may cause heartburn and dysphagia. Cramps, bloating, constipation, or diarrhea may also occur.
- **Sexual dysfunction**: Men may experience erectile dysfunction. In women, sexual lubrication may decrease and the vaginal opening may narrow.

Assessment and Diagnosis

A complete history and physical is conducted. Assessment of patients for various signs and symptoms are a critical part of the assessment and diagnostic process

Signs and symptoms may include the following (Mayo, 2019):

- **Skin changes**: Almost all patients with scleroderma have a hardening and tightening of patches of skin. Patches present as ovals, straight lines, or wide areas that may cover the trunk and limbs. Skin may also appear shiny because it is so tight. There may be restriction of movement of affected areas.
- **Fingers or toes**: Raynaud's disease is one of the earliest signs of systemic scleroderma. The small blood vessels of the fingers and toes contract when exposed to cold temperatures or when patients experience emotional distress. Fingers and toes may turn blue or become painful or numb.
- **Gastrointestinal system**: Symptoms depend on what part of the gastrointestinal system is affected. For example, an affected esophagus may lead to heartburn or dysphagia. If intestines are affected, cramping, bloating, diarrhea, and/or constipation may occur. There may be problems with absorption of nutrients if intestinal muscles fail to move food through the intestines in an efficient manner.
- **Body systems**: Scleroderma can affect any body organ or tissue. There may be heart, lungs, or kidney problems. If not treated, life-threatening complications may develop.

Diagnostic Tests. Some diagnostic tests may be ordered to aid in diagnosis. These may include the following (American College of Rheumatology, 2019):

- **X-rays and computerized tomography (CT) scans**: These tests are ordered to look for abnormalities in the body.
- **Thermography**: Thermography can detect differences in skin temperature between affected and non-affected tissue.
- **Ultrasound and magnetic resonance imaging (MRI)**: These tests can help in the assessment of soft tissue.

Treatment

Signs and symptoms vary according to the severity of the disease and the areas of the body that are affected.

Medications. Various medications may be administered. These include the following (Gardner, 2020; Mayo Clinic, 2019):

- **Steroidal creams or pills**: Steroid preparations are administered to reduce swelling, pain, and inflammation. Steroids may also loosen tight, stiff skin and slow the progression of new skin changes.
- **Nonsteroidal anti-inflammatory drugs (NSAIDs)**: NSAIDs are given to reduce pain and swelling.
- **Anti-hypertensive medications**: These medications help to dilate blood vessels and increase circulation. They may help in the prevention of lung and kidney issues and treat Raynaud's disease.

- **Acid reducers**: Medications (e.g., protein pump inhibitors) reduce gastric acid to help to relieve heartburn.
- **Immune system suppressants**: Medications given to suppress the immune system (such as those taken after organ transplants) may help with symptom reductions.
- **Analgesics**: Analgesics are taken to reduce pain.
- **Gastrointestinal stimulants**: These drugs increase motility of the gastrointestinal muscle. They work to move the contents of the gastrointestinal tract more rapidly without acting as a purgative.

Therapies. Physical and occupational therapies may be ordered. These therapies are designed to help patients manage pain, improve their strength and mobility, and maintain independence with ADLs (Mayo Clinic, 2019).

Surgery. Surgery is typically considered to be a last resort to use for severe scleroderma complications. Amputation may be necessary if Raynaud's disease has progressed to the point of tissue death. Lung transplants may be indicated for patients with severe respiratory system issues (Mayo Clinic, 2019).

Nursing Interventions

In addition to typical patient/family education initiatives such as medication education, nurses are also viewed as healthcare professionals who provide much-needed emotional support. A chronic disease with potentially serious complications leads to stress and anxiety. Patients and families may benefit from joining support groups and obtaining mental health counseling (American College of Rheumatology, 2019; Rebar et al., 2019).

Nurses should be instrumental in helping patients to lead a healthy lifestyle. Patients are encouraged to (Mayo Clinic, 2019):

- **Stay active**: Exercise helps to maintain flexibility, improve circulation, and relieve stiffness. Patients should be taught to perform self-range-of-motion exercises to help keep skin and joints flexible. Before starting an exercise program, the primary healthcare provider should be consulted.
- **Protect their skin**: Patients should avoid hot baths and showers and avoid using strong soaps, which can dry out the skin and cause further damage. Sunscreen should be used to protect the skin as well.
- **Avoid tobacco products**: Nicotine causes blood vessel contraction, which can worsen Raynaud's disease. Smoking can also cause permanent narrowing of blood vessels and lead to or exacerbate lung issues.
- **Manage heartburn**: Patients should avoid spicy foods and beverages. They should be taught to identify and avoid other foods and beverages that trigger heartburn. Late night meals should be avoided as well. Sleeping with the head of the bed elevated helps to prevent gastric acid from backing up into the esophagus. Antacids or protein pump inhibitors may be suggested to relieve symptoms of heartburn.
- **Protect from cold**: Mittens should be worn anytime hands are exposed to cold, even when reaching into a freezer. If outside in cold weather several layers of warm clothing are recommended, and the face and head should be covered as much as possible.

Self-Assessment Question 9

A form of scleroderma that affects 50% of persons with the disease and is a more benign form of scleroderma is:

a. Morphea.
b. Linear scleroderma.
c. Diffuse scleroderma.
d. Limited scleroderma.

Ulcerative colitis

Ulcerative colitis is a chronic inflammatory bowel disease (IBD). An autoimmune disease, ulcerative colitis causes inflammation and ulcerations of the mucosa in the colon. Ulcerative colitis affects the innermost lining of the colon and rectum (Mayo Clinic, 2021d; National Institute of Diabetes and Digestive and Kidney Diseases [NIDDK], n.d.; Rebar et al., 2019).

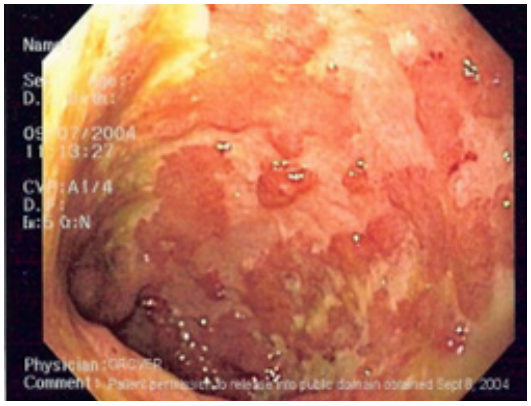
Ulcerative colitis can develop at any age, but peak occurrence is between the ages of 15 and 30 and between 50 and 70. The disease is slightly more prevalent in men compared to women. An estimated 238 per 100,000 adults in the US may have ulcerative colitis (Rebar et al., 2019).

Pathophysiology

The exact cause of ulcerative colitis is not known but is likely linked to an abnormal immune response in the gastrointestinal tract (Rebar et al., 2019). Ulcerative colitis typically begins in the rectum, where it may remain localized (ulcerative proctitis) or extend proximally, progressing to involve the entire colon. Inflammation affects the mucosa and submucosa. There is a distinct border between normal and affected tissue (Merck Manual, 2020c). Figure 8 shows a picture of damage that occurs as the result of the disease.

Nursing consideration: Stress does not cause ulcerative colitis. However, stress can increase the severity of the attack (Rebar et al., 2019). Patients should take steps to reduce stress whenever possible.

Figure 8 Ulcerative Colitis



Note. Wikimedia Commons., 2006.

Early in the course of the disease, the mucous membrane is erythematous and finely granular. There is a loss of normal vascular pattern often accompanied by scattered hemorrhagic areas. Severe disease is characterized by large mucosal ulcers with copious purulent exudate. Fistulas and abscesses do not occur (Merck Manual, 2020c).

A summary of the disease progression is as follows (Rebar et al., 2019):

- The disease typically originates in the rectum. It may progress to involve the entire colon.
- The colon's mucosa develops diffuse ulceration with hemorrhage, congestion, edema, and exudative inflammation.
- Large mucosal ulcers form and drain purulent pus and become necrotic.
- Sloughing of the mucosa occurs, leading to bloody, mucous-filled stools.

Progression of the disease may cause intestinal obstruction, dehydration, and significant fluid and electrolyte imbalances. Malabsorption is common and anemia may develop because of blood loss in the stools (Rebar et al., 2019).

Ulcerative colitis is often classified according to its location. Types of ulcerative colitis include the following (Mayo Clinic, 2021d):

- **Ulcerative proctitis:** Inflammation is confined to the area that is closest to the anus. Rectal bleeding may be the only sign of the disease.
- **Proctosigmoiditis**: Inflammation involves the rectum and sigmoid colon. Bloody diarrhea, abdominal cramps and pain, and constipation are signs and symptoms of proctosigmoiditis.
- **Left-sided colitis**: Inflammation extends from the rectum through the sigmoid and descending colon. Signs and symptoms include bloody diarrhea, abdominal cramping and pain on the left side, and an urgent need to defecate.
- **Pancolitis**: The entire colon is affected, causing bloody diarrhea that may be severe, abdominal cramping and pain, fatigue, and weight loss.

Risk Factors. There are several risk factors associated with the development of ulcerative colitis. These include the following (Mayo Clinic, 2021d):

- **Age**: Ulcerative colitis typically begins before the age of 30. However, it can occur at any stage in life. Some patients may not develop the disease until after the age of 60.
- **Race or ethnicity**: Whites develop the disease most often, although it can occur in any race or ethnicity. The risk is even higher if someone is of Ashkenazi Jewish descent.
- **Family history/Gemetocs**: Risk increases if a parent, sibling, or child has the disease.

Complications. Complications that may occur with ulcerative colitis. These include the following (Mayo Clinic, 2021d):

- Hemorrhage.
- Perforated colon.
- Severe dehydration.
- Osteoporosis.
- Skin, joint, and eye inflammation.
- An increase in the risk for colon cancer.
- Toxic megacolon.
- Increased risk of blood clots.

Assessment and Diagnosis

In order to diagnose ulcerative colitis, a complete history and physical is performed, family history obtained, symptoms reviewed, and some diagnostic tests ordered (NIDDK, n.d.).

Signs and Symptoms. Patients are assessed for the following symptoms, which vary depending on the severity of the disease and its location. Signs and symptoms may include the following (Mayo Clinic, 2021d):

- Diarrhea, often containing blood or pus.
- Abdominal pain and cramping.
- Rectal pain.
- Rectal bleeding.
- Urgency with defecation.
- Unable to defecate despite urgency feelings.
- Weight loss.
- Malaise.
- Fever.
- In children, failure to grow.

Most people with ulcerative colitis have mild to moderate symptoms. Additionally, the course of the disease may vary from person-to-person, and some patients have long periods of remission (Mayo Clinic, 2021d).

Diagnostic Tests. Stool cultures for enteric pathogens should be done to identify a pathogenic cause of the disease. In women who are using oral contraceptives, contraception-induced colitis is possible. This type of ulcerative colitis usually resolves spontaneously after hormone therapy is stopped (Merck Manual, 2020c).

Additional diagnostic tests include the following (Mayo Clinic, 2021d; Merck Manual, 2020c):

- **Flexible sigmoidoscopy**: Flexible sigmoidoscopy is used to visually confirm the diagnosis and allows direct sampling of stool or mucous for culture and microscopic evaluation. If the sigmoid colon is severely inflamed, a flexible sigmoidoscopy may be performed instead of a full colonoscopy.
- **Colonoscopy**: Colonoscopy allows visualization of the entire colon. Tissue samples are obtained for laboratory analysis, which is necessary to make an accurate diagnosis.
- **X-rays**: If patients have severe symptoms an X-ray of the abdominal area can help to rule out serious complications, such as a perforated colon.
- **CT scan**: A CT scan is typically used if complications are suspected. It can also show how much of the colon is inflamed.
- **Computerized tomography (CT) enterography and magnetic resonance imagery (MRI)**: These non-invasive tests may be performed to exclude inflammation of the small intestine.

Treatment

Treatment goals are to control inflammation, replace lost nutrients and blood, and prevent complications. General supportive initiatives include bed rest, IV fluid replacement, and, if needed, blood transfusions (Rebar et al., 2019).

Medications. Several classifications of drugs are used in the treatment of ulcerative colitis. Medications prescribed depend on the severity of the disease and need to be individualized to each patient (Mayo Clinic, 2021d; Rebar et al., 2019). Drugs include the following:

- **Corticosteroids**: Corticosteroids such as prednisone are used to control inflammation when the patient does not respond to other treatments. They are usually used in patients who have moderate to severe ulcerative colitis. Corticosteroids are not given long-term and must be tapered off, not abruptly discontinued.
- **Aminosalicylates**: These medications (e.g., mesalamine [Asacol]) are taken to reduce inflammation.
- **Anti-diarrheal medications**: These are prescribed for patients who have frequent, troublesome diarrhea and whose ulcerative colitis is otherwise under control.
- **Immune system suppressors**: In addition to reducing inflammation, immune system suppressors suppress the immune response that initiates the inflammation process.
- **Iron supplements**: Iron supplements are given to correct anemia.
- **Biologics**: Biologics target proteins manufactured by the immune system. These drugs (e.g., infliximab [Remicade]) help to heal the intestinal lining and, hopefully, to induce remission.
- **Antispasmodics**: Antispasmodics are given to help reduce cramping.
- **Pain relievers**: For mild pain, acetaminophen (Tylenol) may be taken. However, ibuprofen (e.g., Advil, Motrin) is contraindicated since it can exacerbate symptoms and increase disease severity.

Diet. Patients may find that limiting or eliminating dairy products may help to improve issues such as diarrhea. Patients affected by severe disease may need total parenteral nutrition (TPN) and to take nothing by mouth. Patients with moderate disease may benefit from supplemental drinks. A low-residue diet may be ordered for patients who have mild disease (Rebar et al., 2019).

Surgery. If massive dilation of the colon (toxic megacolon) occurs, surgery may be indicated. The most common surgical procedure is proctocolectomy with colostomy or ileostomy (Rebar et al., 2019).

Nursing Interventions

In addition to facilitating adherence to treatment regimens, nurses need to help patients modify their lifestyles to help reduce symptoms and increase quality of life. Diet modifications may be of significant help. Keeping a food diary is recommended. Patients should keep track of what they eat and how they feel after eating. By doing this, patients may be able to identify what foods exacerbate their symptoms and learn to avoid them (Mayo Clinic, 2021d).

Rather than eating two or three large meals, eating five or six small meals a day may help to reduce symptoms. Patients should also be encouraged to drink plenty of fluids. Water is the beverage of choice. Alcohol and beverages containing caffeine stimulate the intestines, which can exacerbate diarrhea. Carbonated drinks may cause flatulence and increase cramping (Mayo Clinic, 2021d; Rebar et al., 2019).

Stress reduction is important. Stress can worsen symptoms and trigger disease flare-ups. To help control stress patients may find the following interventions helpful (Mayo Clinic, 2019d):

- **Exercise**: Exercise can help to reduce stress, relieve depression, and restore some normalcy to bowel functioning. Patients should consult their healthcare providers before beginning exercise programs.
- **Biofeedback**: Biofeedback helps to reduce muscle tension and reduce heart rate. The goal of biofeedback is to achieve a relaxed state so that stress is reduced.
- **Relaxation and breathing exercises**: Relaxation breathing, yoga, and meditation may help to reduce stress and alleviate symptoms.

Vitiligo

Vitiligo is a painless autoimmune skin disorder that causes the skin to lose its color. It typically begins with a few small white patches that may gradually spread over the body over a period of several months (Cleveland Clinic, 2020). Vitiligo can affect the skin on any part of the body as well as the hair and the inside of the mouth (Mayo Clinic, 2020d).

Vitiligo occurs in about one percent of the world's population. The disease affects all races equally, but it is more visible in people whose skin is darker. Vitiligo affects men and women equally (Cleveland Clinic, 2020). Vitiligo is not life-threatening nor is it contagious. However, the obvious loss of pigment can be stressful and reduce self-esteem. It may even lead to patients being teased or bullied (Mayo Clinic, 2020d).

Vitiligo can develop at any age. It appears most often in people 10 to 30 years of age. The disease seldom appears in the very young or the very old (Cleveland Clinic, 2020).

Nursing consideration: Treatment may restore color to the affected skin in persons with vitiligo. However, it does not prevent continued loss of skin color or a recurrence of the disease (Mayo Clinic, 2020d).

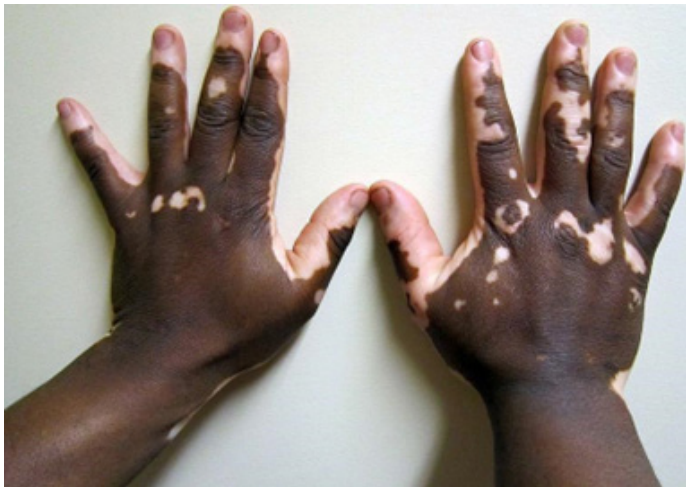
Pathophysiology

Vitiligo occurs when the body's melanocytes are destroyed by the body's immune system. Smooth white areas on the skin are called macules if less than 5 mm, or patches if they are larger than 5mm (Cleveland Clinic, 2020). There are several types of vitiligo that are classified by the extent and location of the pigment loss, as follows (Cleveland Clinic, 2020; Mayo Clinic, 2020d):

- **Universal vitiligo**: This type of vitiligo is characterized by a loss of color over nearly all (more than 80%) skin surfaces.
- **Generalized vitiligo**: This is the most common form of vitiligo. Generalized vitiligo is characterized by discolored patches (loss of pigmented skin) that generally progress symmetrically on corresponding body parts.
- **Segmental vitiligo**: Only one side or part of the body is affected. This type of vitiligo usually occurs at a younger age, progresses for a year or two, then stops.
- **Localized vitiligo**: Localized (focal) vitiligo affects one or only a few areas of the body.
- **Acrofacial vitiligo**: This form of vitiligo is characterized by a loss of pigment on the face and hands, and around body openings such as the eyes and nose.
- **Mucosal vitiligo**: Mucosal vitiligo affects mucous membranes of the mouth and/or the genitals.
- **Trichome vitiligo**: This type of vitiligo is characterized by a white or colorless center, an area of lighter pigmentation, and then an area of normally colored skin.

Predicting the progress of the disease is difficult. The patches may stop forming without treatment. In most people, pigment loss spreads, eventually involving most of the skin (Mayo Clinic, 2020d). Figure 9 shows how a loss of pigmentation looks.

Figure 9. Vitiligo



Note. Heilman, 2015.

Nursing consideration: Patients have varying amounts of skin affected by vitiligo. Some people have few depigmented areas, while others experience widespread loss of skin color (Cleveland Clinic, 2020).

Etiology. The exact cause of vitiligo is unknown. However, experts propose several theories about why it develops, including the following (Cleveland Clinic, 2020):

- **Autoimmunity**: Autoimmunity is the destruction of melanocytes by the body's immune system.
- **Genetics**: About 30% of vitiligo cases run in families.
- **Neurogenics**: A substance toxic to melanocytes may be released at nerve endings in the skin.
- **Self-sestruction**: A defect in the melanocytes causes them to self-destruct.

Complications. Because of the lack of melanocytes, affected skin is more sensitive to the sun's rays than normal skin and will burn easily instead of tan. People with vitiligo may have retinal abnormalities that cause inflammation of the retina or iris, but vision is typically not affected. Patients with vitiligo may be more likely to develop other autoimmune diseases. Finally, changes in appearance caused by vitiligo may cause embarrassment and anxiety. Patients may face bullying or rude questions. Such factors may lead to anxiety, excessive stress, and depression (Cleveland Clinic, 2020).

Assessment and Diagnosis

The disease is often recognized from its physical appearance. A history and physical is performed, and a skin biopsy may be taken to confirm diagnosis or to differentiate vitiligo from other skin conditions (Mayo Clinic, 2020d).

Healthcare providers will also assess presenting signs and symptoms to make a diagnosis. Signs include the following (Mayo Clinic, 2020d):

- Patchy loss of skin color that usually first appears on the hands, face, and areas around body openings and genitalia.
- Premature whitening or graying of hair on the scalp, eyelashes, eyebrows, or beard.
- Loss of color in the mucous membranes of the mouth.

Treatment

There is no cure for vitiligo. The goal of treatment is to create a uniform skin tone by either repigmentation or by eliminating remaining color (depigmentation). The goal can be achieved by the following methods:

- **Camouflage therapy**: This therapy involves using sunscreen with an SPF of 30 or higher. Use of sunscreens minimizes tanning, thus limiting the contrast between normal and affected skin. Makeup can help to camouflage depigmented areas. Hair dyes can be used if the disease affects the hair. Depigmentation therapy with the medication monobenzone can be used to treat extensive disease. The medication is applied to pigmented patches of skin to turn them white to match affected areas of skin (Cleveland Clinic, 2020).
- **Medications**: Corticosteroids can be used in oral or topical forms to promote repigmentation. It may take up to 3 months to show results. Topical vitamin D analogs may also be helpful. Topical immunomodulators may be useful for treating small areas of pigmentation. However, there may be a possible link between these kinds of drugs and lymphoma and skin cancer (Mayo Clinic, 2020d).
- **Light therapy**: Phototherapy with narrow band ultraviolet B may stop or slow progression of the disease. Effectiveness might be enhanced when used with corticosteroids or calcineurin inhibitors. Light therapy is administered two to three times a week. It may take 1 to 3 months before any change is noticed. However, there is a possible risk of skin cancer with the use of calcineurin inhibitors (Mayo Clinic, 2020d).
- **Depigmentation**: For widespread vitiligo that has not been treated successfully with other options, a depigmenting agent is applied to unaffected areas of skin. The skin is gradually lightened so that it blends with discolored areas. This type of therapy is done once or twice a day for 9 months or longer (Cleveland Clinic, 2020).

If medications and light therapy do not work, surgery may be performed. Possible procedures include the following (Mayo Clinic, 2020d):

- **Skin grafting**: Small sections of healthy, pigmented skin are grafted to affected areas. Risks include infection, scarring, a cobblestone appearance, spotty color, and failure of the area to recover.
- **Blister grafting**: Blisters are creating on pigmented skin and then the tops of the blisters are transplanted to affected areas. Risks include scarring, a cobblestone appearance, and failure of the area to recover.
- **Cellular suspension transplant**: Tissue is taken from pigmented skin, cells from the skin are placed into solution, and then are transplanted onto affected areas. Results start to show within 4 weeks.

Self-Assessment Question 10

A nurse is providing education to a patient newly diagnosed with vitiligo. The nurse should tell the patient that:

a. Vitiligo often causes mild to moderate pain.
b. Vitiligo appears most often in people over 65 years of age.
c. The most common form of vitiligo is universal vitiligo.
d. Corticosteroids are used to promote repigmentation.

Nursing Interventions

Nurses need to teach patients and families about lifestyle modifications and home remedies. These include the following (Mayo Clinic, 2020d):

- Skin must be protected from the sun and artificial sources of UV light. A broad-spectrum, water-resistant sunscreen with an SPR of at least 30 is recommended.
- Makeup and self-tanning products can help to reduce differences in skin color. If a self-tanner is used, one should be chosen that contains the Food and Drug Administration (FDA) approved ingredient dihydroxyacetone.
- Patients should not get tattoos. Any skin damage may cause new patches of vitiligo to appear.
- Patients should seek emotional support in the form of family and friend support, vitiligo support groups, and/or professional counseling.

Conclusion

Autoimmune diseases can cause a wide range of effects from mild to serious and, in some cases, life-threatening. Nurses and other members of the healthcare team must work together to provide a coordinated approach to patient care and help patients attain the best possible outcomes. To do this, the healthcare team must keep abreast of the effects of autoimmune diseases, how to recognize them, and treatment advances.

References

- American Academy of Dermatology Association (AAD). (2021a). Hair loss types: Alopecia areata causes. https://www.aad.org/public/diseases/hair-loss/types/alopecia/causes
- American Academy of Dermatology Association (AAD). (2021b). Hair loss types: Alopecia areata diagnosis and treatment. https://www.aad.org/public/diseases/hair-loss/types/alopecia/treatment
- American College of Rheumatology. (2019). Scleroderma. https://www.rheumatology.org/I-Am-A/Patient-Caregiver/Diseases-Conditions/Scleroderma
- American College of Rheumatology. (2021). Rheumatoid arthritis. https://www.rheumatology.org/I-Am-A/Patient-Caregiver/Diseases-Conditions/Rheumatoid-Arthritis
- Andrzej. (2011). Alopecia areata.JPG https://commons.wikimedia.org/wiki/File:Allopecia_areata.JPG
- Celiac Disease Foundation. (n.d.a). Diagnosis (celiac disease). https://celiac.org/about-celiac-disease/screening-and-diagnosis/diagnosis/
- Celiac Disease Foundation. (n.d.b). What is celiac disease? https://celiac.org/about-celiac-disease/what-is-celiac-disease/
- Celiac Disease Foundation. (2018). Global prevalence of celiac disease. https://celiac.org/about-the-foundation/featured-news/2018/08/global-prevalence-of-celiac-disease/
- Celiac Disease Foundation. (2021). Celiac disease. https://celiac.org/
- Centers for Disease Control and Prevention (CDC). (2020a). Rheumatoid Arthritis (RA). https://www.cdc.gov/arthritis/basics/rheumatoid-arthritis.html
- Centers for Disease Control and Prevention (CDC). (2020b). What is psoriasis? https://www.cdc.gov/psoriasis/index.htm
- Centers for Disease Control and Prevention (CDC). (2021a). 4 ways to take insulin. https://www.cdc.gov/diabetes/basics/type-1-4-ways-to-take-insulin.html
- Centers for Disease Control and Prevention (CDC). (2021b). Arthritis related statistics. https://www.cdc.gov/arthritis/data_statistics/arthritis-related-stats.htm
- Centers for Disease Control and Prevention (CDC). (2021c). What is type 1 diabetes? https://www.cdc.gov/diabetes/basics/what-is-type-1-diabetes.html
- Cleveland Clinic. (2020). Vitiligo. https://my.clevelandclinic.org/health/diseases/12419-vitiligo
- Cleveland Clinic. (2021). Lupus (systemic lupus erythematosus). https://my.clevelandclinic.org/health/diseases/4875-lupus
- Cochrane. (2019). Antibiotics for the treatment of Crohn's disease. https://www.cochrane.org/CD012730/IBD_antibiotics-treatment-crohns-disease
- Comerford, K. C. & Durkin, M. T. (Eds.). (2021). Nursing 2021 drug handbook. Wolters Kluwer.
- Crohn's & Colitis Foundation. (2021a). Overview of Crohn's disease. https://www.crohnscolitisfoundation.org/what-is-crohns-disease/overview
- Crohn's & Colitis Foundation. (2021b). Overview of ulcerative colitis. https://www.crohnscolitisfoundation.org/what-is-ulcerative-colitis/overview
- Crohn's & Colitis Foundation. (2021c). What should I eat? https://www.crohnscolitisfoundation.org/diet-and-nutrition/what-should-i-eat
- Entringer, S. (2020). Methotrexate. https://www.aad.org/public/diseases/hair-loss/types/alopecia/treatment
- Feuerstein, J. D. & Cheifetz, A. S. (2017). Crohn disease: Epidemiology, diagnosis, and management. https://www.mayoclinicproceedings.org/article/S0025-6196(17)30313-0/fulltext
- Gardner, S. (2020). Scleroderma. https://www.webmd.com/skin-problems-and-treatments/scleroderma
- Gersch, C., Heimgartner, N. M., Rebar, C. R., & Willis, L. M. (Clinical Eds.). (2017). Medical-surgical nursing made incredibly easy. Wolters Kluwer.
- Goebel, S. U. (2019). Celiac disease (sprue) workup. https://emedicine.medscape.com/article/171805-workup#cL
- Habashy, J. (2021). Psoriasis. https://emedicine.medscape.com/article/1943419-overview#a1
- Haggstrom, M. (2009). Most common symptoms of systemic lupus erythematosus. (All used images are in the public domain.) https://commons.wikimedia.org/wiki/File:Symptoms_of_SLE.svg
- Heilman, J. (2015). Vitiligo. https://commons.wikimedia.org/wiki/File:Vitiligo2.JPG Permission is granted to copy, distribute, and/or modify this document under the terms of the GNU Free Documentation License, Version 1.2 or any later version published by the Free Software Foundation.
- JDRF. (n.d.a.). Insulin types and usage. https://www.jdrf.org/t1d-resources/about/insulin/
- JDRF. (n.d.b.). Type 1 diabetes facts. https://www.jdrf.org/t1d-resources/about/facts/
- JDRF. (n.d.c.). Type 1 diabetes treatments. https://www.jdrf.org/t1d-resources/about/treatment/
- JDRF. (n.d.d.). What is the cause of diabetes type 1? https://www.jdrf.org/t1d-resources/about/causes/
- Jimenez, S. A. (2020). What is the prevalence of scleroderma in the U.S.? https://www.medscape.com/answers/331864-163573/what-is-the-prevalence-of-scleroderma-in-the-us
- Johns Hopkins Medicine. (n.d.). Treating multiple sclerosis (MS). https://www.hopkinsmedicine.org/neurology_neurosurgery/centers_clinics/multiple_sclerosis/conditions/multiple_sclerosis_treatments.html
- Lucier, J. & Weinstock, R. S. (2021). Diabetes mellitus type 1. https://www.ncbi.nlm.nih.gov/books/NBK507713/
- Lupus Foundation of America. (2020). What is lupus? https://www.lupus.org/resources/what-is-lupus#
- Mayo Clinic. (2019). Scleroderma. https://www.mayoclinic.org/diseases-conditions/scleroderma/symptoms-causes/syc-20351952
- Mayo Clinic. (2020a). Celiac disease. https://www.mayoclinic.org/diseases-conditions/celiac-disease/symptoms-causes/syc-20352220
- Mayo Clinic. (2020b). Multiple sclerosis. https://www.mayoclinic.org/diseases-conditions/multiple-sclerosis/symptoms-causes/syc-2035026
- Mayo Clinic. (2020c). Psoriasis. https://www.mayoclinic.org/diseases-conditions/psoriasis/symptoms-causes/syc-20355840
- Mayo Clinic. (2020d). Vitiligo. https://www.mayoclinic.org/diseases-conditions/vitiligo/symptoms-causes/syc-20355912
- Mayo Clinic. (2020e). 6 steps to manage rheumatoid arthritis symptoms. https://www.mayoclinic.org/diseases-conditions/rheumatoid-arthritis/in-depth/6-tips-to-manage-rheumatoid-arthritis-symptoms/art-20486824
- Mayo Clinic. (2021a). Lupus. https://www.mayoclinic.org/diseases-conditions/lupus/symptoms-causes/syc-20365789
- Mayo Clinic. (2021b). Rheumatoid arthritis. https://www.mayoclinic.org/diseases-conditions/rheumatoid-arthritis/symptoms-causes/syc-20353648
- Mayo Clinic. (2021c). Type 1 diabetes. https://www.mayoclinic.org/diseases-conditions/type-1-diabetes/symptoms-causes/syc-20353011
- Mayo Clinic. (2021d). Ulcerative colitis. https://www.mayoclinic.org/diseases-conditions/ulcerative-colitis/symptoms-causes/syc-20353326
- Mayo Clinic. (2021e). Vitamin D and MS: Is there any connection? https://www.mayoclinic.org/diseases-conditions/multiple-sclerosis/expert-answers/vitamin-d-and-ms/faq-20058258
- Meadows-Oliver, M. (Clinical Ed.). (2019). Pediatric nursing made incredibly easy (3rd ed.). Wolters Kluwer.
- Merck Manual. (2020a). Crohn disease. https://www.merckmanuals.com/professional/gastrointestinal-disorders/inflammatory-bowel-disease-ibd/crohn-disease
- Merck Manual. (2020b). Diabetic ketoacidosis (DKA). https://www.merckmanuals.com/professional/endocrine-and-metabolic-disorders/diabetes-mellitus-and-disorders-of-carbohydrate-metabolism/diabetic-ketoacidosis-dka
- Merck Manual. (2020c). Ulcerative colitis. https://www.merckmanuals.com/professional/gastrointestinal-disorders/inflammatory-bowel-disease-ibd/ulcerative-colitis
- Messenger, A. G. (2021). Alopecia areata: Clinical manifestations and diagnosis. https://www.uptodate.com/contents/alopecia-areata-clinical-manifestations-and-diagnosis#H953523891
- My Health Alberta. (2021). Celiac disease: Care instructions. https://myhealth.alberta.ca/Health/aftercareinformation/pages/conditions.aspx?hwid=abp7938
- National Alopecia Areata Foundation. (n.d.). Alopecia areata and emotional wellness. https://www.naaf.org/emotional-wellness
- National Cancer Institute. (n.d.). Autoimmune disease. https://www.cancer.gov/publications/dictionaries/cancer-terms/def/autoimmune-disease
- National Institute of Arthritis and Musculoskeletal and Skin Diseases. (2020). Scleroderma. https://www.niams.nih.gov/health-topics/scleroderma
- National Institute of Diabetes and Digestive and Kidney Diseases. (n.d.). Ulcerative colitis. https://www.niddk.nih.gov/health-information/digestive-diseases/ulcerative-colitis/all-content
- National Institutes of Health (NIH). (2020). Autoimmunity may be rising in the United States. https://www.nih.gov/news-events/news-releases/autoimmunity-may-be-rising-united-states
- National Library of Medicine U.S. (2013). Rheumatoid-arthritis.png. https://commons.wikimedia.org/wiki/File:Rheumatoid-Arthritis.png. This file has been identified as being free of known restrictions under copyright law, including all related and neighboring rights.
- National Multiple Sclerosis Society. (2020a). Definition of MS. https://www.nationalmssociety.org/What-is-MS/Definition-of-MS
- National Multiple Sclerosis Society. (2020b). Prevalence of MS more than doubles estimate. https://www.nationalmssociety.org/About-the-Society/MS-Prevalence
- National Multiple Sclerosis Society. (2021). How MS is diagnosed. https://www.nationalmssociety.org/Symptoms-Diagnosis/Diagnosing-MS#section-0
- National Organization for Rare Disorders. (2021). Refractory celiac disease. https://rarediseases.org/rare-diseases/refractory-celiac-disease/
- National Psoriasis Foundation. (n.d.). Treatments for psoriatic disease. https://www.psoriasis.org/treatments-for-psoriatic-disease/
- National Psoriasis Foundation. (2021). About psoriasis. https://www.psoriasis.org/about-psoriasis/
- National Resource Center on Lupus. (2021). Why it's difficult to determine exactly how many people are living with lupus in the U.S. https://www.lupus.org/resources/how-many-people-are-living-with-lupus-in-united-states-us
- National Stem Cell Foundation (NSCF). (2021). Autoimmune disease. https://nationalstemcellfoundation.org/glossary/autoimmune-disease/
- Nazario, B. (2020). Dermatitis herpetiformis. https://www.webmd.com/skin-problems-and-treatments/what-is-dermatitis-herpetiformis
- Rebar, C. R., Heimgartner, N. M., & Gersch, C. J. (Clinical Eds.). (2019). Pathophysiology made incredibly easy. (6th ed.). Wolters Kluwer.
- Scleroderma Foundation. (2021). What is scleroderma? https://www.scleroderma.org/site/SPageServer/?pagename=patients_whatis
- Singam, V., Patel, K. R., Lee, H. H., Rastogi, S., & Silverberg, J. (2018). Association of alopecia areata with hospitalization for mental health disorders in US adults. Journal of the American Academy of Dermatology, 80(3), 792-794. https://doi.org/10.1016/j.jaad.2018.07.044.
- Smith, H.R. (2021a). Rheumatoid arthritis (RA). https://emedicine.medscape.com/article/331715-overview#a1
- Smith, H. R. (2021b). What is the global prevalence of rheumatoid arthritis (RA) among different age groups and ethnicities? https://www.medscape.com/answers/331715-5335/what-is-the-global-prevalence-of-rheumatoid-arthritis-ra-among-different-age-groups-and-ethnicities
- Stringer, K. (2016). 80,000 kids just replied to a survey about bullying. Here's what surprised their educators most. https://www.the74million.org/article/80000-kids-just-replied-to-a-survey-about-bullying-heres-what-surprised-their-educators-most/
- Walker N. P. (2010). Scleroderma. https://commons.wikimedia.org/wiki/File:An_introduction_to_dermatology_(1905)_scleroderma.jpg This media file is in the public domain in the United States.
- Walton, C., King, R., Rechtman, L., Kaye, W., Leray, E., Marnie, R.A., Robertson, N., La Rocca, N., Uitdehaag, B., van der Mei, I., Wallin, M., Helme, A., Napier, C. A., Rijke, N., & Baneke, Pl. (2020). Multisclerosis, 26(14), 1816-1821. https://doi.org/10.1177/1352458520970841
- Wikimedia Commons. (2006). Ulcerative colitis. https://commons.wikimedia.org/wiki/File:Ulcerative_colitis.jpg. Endoscopic image of ulcerative colitis affecting the left side of the colon, released with permission of patient into public domain, Sept. 8, 2004.
- WikipedianProlific. (2006). Coeliac Disease.png: Upper jejunal mucosal immunopathology. https://commons.wikimedia.org/wiki/File:Coeliac_Disease.png
- Yakovlev, M. (n.d.). Psoriasis. Royalty-free stock photo https://www.dreamstime.com/photos-images/psoriasis.html

NURSING ASSESSMENT, MANAGEMENT AND TREATMENT OF AUTOIMMUNE DISEASES

Self-Assessment Answers and Rationales

1. The correct answer is B.
Rationale: An estimated four percent of the world's population is affected by one of more than 80 different autoimmune diseases. In the United States, autoimmune diseases are the third most common cause of chronic illness.

2. The correct answer is D.
Rationale: There are various grains and starches allowed on a gluten-free diet. These include buckwheat.

3. The correct answer is B.
Rationale: Ileocolitis is the most common type of Crohn's disease. It affects the terminal ileum and the colon.

4. The correct answer is A.
Rationale: The A1C is a blood test that reports average blood glucose levels for the past 2 to 3 months. However, certain conditions such as pregnancy or having a hemoglobin variant may interfere with the accuracy of the A1C test.

5. The correct answer is C.
Rationale: Hydroxychloroquine is antimalarial drug that has been prescribed to help keep lupus-related skin and joint disease under control. It has also been found to be effective in the treatment of fatigue and mouth sores.

6. The correct answer is A**.**
Rationale: Mitoxantrone is a chemotherapeutic drug that is used for patients experiencing worsening forms of relapsing MS and secondary progressive MS. It is given intravenously every 3 months. The potential for toxicity is high, so patients may receive a limited number of doses throughout the lifespan. Mitoxantrone is associated with cardiotoxicity.

7. The correct answer is B.
Rationale: Over-the-counter and prescription formats such as shampoo, cream, and oil, unfortunately, can cause skin irritation, stain clothing and bedding, and have a strong odor. Coal tar is contraindicated for pregnant women and for those who are breastfeeding.

8. The correct answer is C.
Rationale: Women are diagnosed with RA more frequently than men. Tobacco use is associated with a significant increase in risk for the development of RA.

9. The correct answer is D.
Rationale: Limited scleroderma affects about 50% of persons who have scleroderma. It progresses more slowly and is a more benign illness than diffuse scleroderma. Internal issues may evolve, but they are typically less frequent and less severe compared to diffuse scleroderma.

10. The correct answer is D.
Rationale: Corticosteroids can be used in oral or topical forms to promote repigmentation. It may take up to 3 months to show results.

Course Code: ANCCCA06AD

Elite
PO Box 37 | Ormond Beach, FL 32175
Questions? Call us toll-free: 1-866-344-0971

California Nursing CE Correspondence Package
Course Participant Sheet

Please fill in all the information below in CAPITAL LETTERS. Upon completion, please return this sheet, along with payment and mail to the address above. If paying by check or money order, please make payable to Elite for $38.95. For even faster service, we offer this course participant affirmation sheet online with instant certificate issuance. Please visit **EliteLearning.com/Book** to complete your affirmation online.

Please PRINT NEATLY in the areas below using black or blue pen only:

First Name **M.I.** **Last Name**

Mailing Address

Suite / Floor / Apt Number **City (do not abbreviate)** **State**

Zip Code **Telephone Number (Please include area code)** **CA Nursing License Number (Please provide for course credit)**

E-Mail address (include to receive processing confirmation and instant certificate access).

Payment Method

- ☐ Check / M.O. Enclosed for:
- ☐ Visa / Mastercard / AMEX / Discover

☐ Entire Package only $38.95 or

- ☐ Asthma: A Comprehensive Overview - $26.95
- ☐ Basic Psychiatric Concepts - $35.95
- ☐ Diabetes Prevention and Management for Healthcare Professionals - $29.95
- ☐ Ethics and Moral Distress for Healthcare Professionals - $26.95
- ☐ Evidence-Based Implicit Bias Implications for Physicians and Healthcare Professionals - $12.95
- ☐ Hypertension Management: Evidence-Based Guidelines - $31.95
- ☐ Nursing Assessment, Management and Treatment of Autoimmune Diseases - $35.95

Visa / Mastercard / AMEX / Discover Number

Credit Card Expiration Date

Cardholder Signature: _____

Important Note:
The box below must be checked for verification sheet to be processed.

☐ By checking this box and signing below, I hereby affirm that I have completed this educational activity, including the self-assessment.

_____

Signature

For Internal Use Only - Please Do Not Mark In This Area

ANCCCA3023C

3079218022

Test Expiration Date: 5/5/2024

1. ANCCCA04AC 2. ANCCCA06PC 3. ANCCCA05DM 4. ANCCCA04EM 5. ANCCCA01IB 6. ANCCCA04HT 7. ANCCCA06AD

NURSING - COURSE EVALUATION (ANCCCA3023C - Required)

To receive continuing education credits for this program, this mandatory evaluation form must be completed.

Licensee Name: _____ **License #**_____

Your honest feedback is vital for the planning, evaluation, and design of future educational programs.

SECTION I: Demographics: Your current license type and education level: ❍LPN/LVN ❍RN - Associate degree ❍RN - Bachelor's degree ❍RN - Master's degree ❍APRN - Master's degree ❍Doctorate / DNP / Other Doctorate ❍Other (specify)_____

How long have your been a nurse: ❍Less than 5 years ❍6 to 10 years ❍11 to 15 years ❍16 to 20 years ❍Over 20 years ❍Not a nurse

SECTION II: Course Evaluation
Please complete the following for each course you have completed. Mark the circle that best matches your evaluation of the question.

1. After completing this course, I am able to meet each of the Learning Outcomes.	7. The course demonstrated the author's knowledge of the subject.
2. The course content was unbiased and balanced.	8. I intend to apply the knowledge from this course to my practice.
3. The course was relevant to my practice.	9. What I have learned from this course will have an impact on my knowledge.
4. I would recommend this course to my peers.	10. What I have learned from this course will have an impact on patient outcome.
5. What I have learned from this course will have an impact on my practice.	11. The overall rating for this course.
6. The course was well-organized and clear.	

	Asthma: A Comprehensive Overview 4 Contact Hours					Basic Psychiatric Concepts 6 Contact Hours					Diabetes Prevention and Management for Healthcare Professionals 5 contact hours				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
3	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
4	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
5	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
6	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
7	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
8	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
9	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
10	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
	Excellent	Good	Average	Below Average	Poor	Excellent	Good	Average	Below Average	Poor	Excellent	Good	Average	Below Average	Poor
11	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
12	How many total hours did it take you to complete this course? Please indicate the number of hours: _____														
13	Please provide any additional feedback on this course: _____														

SECTION III: General

Fill in the circle below numbers **0=Not likely at all, 5=Neutral and 10=Extremely likely**

How likely is it that you would recommend Elite to a friend or colleague?..... 0 1 2 3 4 5 6 7 8 9 10

If your response is less than a 10, what about the course could we change to score a 10? _____

_____

List other topics that you would like to see provided: _____

❑ I agree to allow Elite to use my comments. If you agree, please provide your name and title as you would like to see them to appear.

_____

NURSING - COURSE EVALUATION (ANCCCA3023C - Required)

To receive continuing education credits for this program, this mandatory evaluation form must be completed.

Licensee Name: _____ **License #**_____

Your honest feedback is vital for the planning, evaluation, and design of future educational programs.

SECTION I: Demographics: Your current license type and education level: ❍LPN/LVN ❍RN - Associate degree ❍RN - Bachelor's degree ❍RN - Master's degree ❍APRN - Master's degree ❍Doctorate / DNP / Other Doctorate ❍Other (specify)_____

How long have your been a nurse: ❍Less than 5 years ❍6 to 10 years ❍11 to 15 years ❍16 to 20 years ❍Over 20 years ❍Not a nurse

SECTION II: Course Evaluation
Please complete the following for each course you have completed. Mark the circle that best matches your evaluation of the question.

1. After completing this course, I am able to meet each of the Learning Outcomes.	7. The course demonstrated the author's knowledge of the subject.
2. The course content was unbiased and balanced.	8. I intend to apply the knowledge from this course to my practice.
3. The course was relevant to my practice.	9. What I have learned from this course will have an impact on my knowledge.
4. I would recommend this course to my peers.	10. What I have learned from this course will have an impact on patient outcome.
5. What I have learned from this course will have an impact on my practice.	11. The overall rating for this course.
6. The course was well-organized and clear.	

	Ethics and Moral Distress for Healthcare Professionals 4 Contact Hours					Evidence-Based Implicit Bias Implications for Physicians and Healthcare Professionals 1 Contact Hour				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
3	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
4	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
5	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
6	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
7	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
8	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
9	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
10	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
	Excellent	Good	Average	Below Average	Poor	Excellent	Good	Average	Below Average	Poor
11	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
12	How many total hours did it take you to complete this course? Please indicate the number of hours: _____									
13	Please provide any additional feedback on this course: _____									

SECTION III: General

Fill in the circle below numbers **0=Not likely at all, 5=Neutral and 10=Extremely likely**

How likely is it that you would recommend Elite to a friend or colleague?..... 0 1 2 3 4 5 6 7 8 9 10

If your response is less than a 10, what about the course could we change to score a 10? _____

_____

List other topics that you would like to see provided: _____

❑ I agree to allow Elite to use my comments. If you agree, please provide your name and title as you would like to see them to appear.

_____

NURSING - COURSE EVALUATION (ANCCCA3023C - Required)

To receive continuing education credits for this program, this mandatory evaluation form must be completed.

Licensee Name: _____ **License #**_____

Your honest feedback is vital for the planning, evaluation, and design of future educational programs.

SECTION I: Demographics: Your current license type and education level: ❍LPN/LVN ❍RN - Associate degree ❍RN - Bachelor's degree ❍RN - Master's degree ❍APRN - Master's degree ❍Doctorate / DNP / Other Doctorate ❍Other (specify)_____

How long have your been a nurse: ❍Less than 5 years ❍6 to 10 years ❍11 to 15 years ❍16 to 20 years ❍Over 20 years ❍Not a nurse

SECTION II: Course Evaluation
Please complete the following for each course you have completed. Mark the circle that best matches your evaluation of the question.

1. After completing this course, I am able to meet each of the Learning Outcomes.	7. The course demonstrated the author's knowledge of the subject.
2. The course content was unbiased and balanced.	8. I intend to apply the knowledge from this course to my practice.
3. The course was relevant to my practice.	9. What I have learned from this course will have an impact on my knowledge.
4. I would recommend this course to my peers.	10. What I have learned from this course will have an impact on patient outcome.
5. What I have learned from this course will have an impact on my practice.	11. The overall rating for this course.
6. The course was well-organized and clear.	

	Hypertension Management: Evidence-Based Guidelines 4 Contact Hours (4 Pharmaceutical Hours)					Nursing Assessment, Management and Treatment of Autoimmune Diseases 6 Contact Hours				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
3	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
4	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
5	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
6	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
7	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
8	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
9	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
10	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
	Excellent	Good	Average	Below Average	Poor	Excellent	Good	Average	Below Average	Poor
11	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
12	How many total hours did it take you to complete this course? Please indicate the number of hours: _____									
13	Please provide any additional feedback on this course: _____									

SECTION III: General

Fill in the circle below numbers **0=Not likely at all, 5=Neutral and 10=Extremely likely**

How likely is it that you would recommend Elite to a friend or colleague?..... 0 1 2 3 4 5 6 7 8 9 10

If your response is less than a 10, what about the course could we change to score a 10? _____

_____

List other topics that you would like to see provided: _____

❑ I agree to allow Elite to use my comments. If you agree, please provide your name and title as you would like to see them to appear.

_____