Walden Dissertations and Doctoral Studies

Walden Dissertations and Doctoral Studies Collection

2021

Improving Nurses' Knowledge to Provide Diabetes Self-Management Education for African Americans

Jakeyla Reed
Walden University

Walden University

College of Nursing

This is to certify that the doctoral study by

Jakeyla Reed

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Sue Bell, Committee Chairperson, Nursing Faculty
Dr. Deborah Lewis, Committee Member, Nursing Faculty
Dr. Cheryl Holly, University Reviewer, Nursing Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2021

Abstract

Improving Nurses' Knowledge to Provide Diabetes Self-Management Education for

African Americans

by

Jakeyla Reed

MSN, Walden University, 2018

BSN, Chamberlain University, 2016

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

August 2021

Abstract

African Americans are at high risk for type II diabetes compared to other ethnic groups due to biological, socioeconomic, and psychosocial risks. Specifically, African American adults are nearly two times more likely than White individuals to develop type II diabetes. The meaningful gap-in-practice addressed by this doctoral project was nurses' lack of diabetes knowledge affecting their ability to provide diabetes care and diabetes self-management education (DSME) to their patients with diabetes. The clinical practice-focused question asked whether an education intervention for outpatient clinic nurses could improve their knowledge of DSME. Orem's self-care model, Bandura's self-efficacy theory, and Lewin's change theory guided the project. Eighteen subjects were recruited from the outpatient care facility located in the Midwest United States. A pretest on basic diabetes knowledge using the revised diabetes knowledge tool kit was administered to the participants. Participants then attended a 30-minute PowerPoint presentation on diabetic education either in person or streamed on Zoom. Subjects were then given an informational handout on type II diabetes as a reference to use in practice. After the education, a posttest was administered. The pretest and posttest data generated by the participants ($n = 18$) were analyzed and showed an 18.6% gain score change in knowledge from pretest to posttest. The project promoted social change by improving the nurses' knowledge, enabling them to treat and teach African American patients with type II diabetes effectively. Enhanced ability of patients and their families to perform self-management of diabetes is anticipated to foster optimal control of the disease and reduce the current disparities in diabetes outcomes.

Improving Nurses' Knowledge to Provide Diabetes Self-Management Education for

African Americans

by

Jakeyla Reed

MSN, Walden University, 2018

BSN, Chamberlain University, 2016

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

August 2021

Dedication

   This doctoral capstone is dedicated to my two children, Anthony and Robert, who are the driving force behind my ability to persevere through difficult times. I would also like to give a special acknowledgment to my oldest son Anthony who has been incredibly supportive throughout this doctoral process. I want to continue to dedicate this study to my partner Keith who has been my biggest supporter in this process and helps me maintain emotional balance and reminds me of my strength. Lastly, I would like to dedicate this journey and process to my parents, who remind me of my uniqueness and shower me with love.

Acknowledgments

I would like to acknowledge all the professors who have helped me complete this project. I am incredibly grateful for their encouraging words of wisdom and guidance throughout this journey.

Table of Contents

List of Tables

Section 1: Nature of the Project

Diabetes mellitus is a chronic illness affecting the human body's ability to process blood sugar effectively (Centers for Disease Control and Prevention [CDC], 2017). Failure to generate adequate insulin levels and underutilization of the cells' secreted insulin can increase blood sugar. Immediate response to diabetes is required to prevent related diseases, including stroke and heart failure (CDC, 2017). According to the CDC (2017), diabetes affects 34.2 million people in the United States, an equivalent of 10.5% of the population (CDC, 2020). Also, more than 26 million people are diagnosed, while 7.3 million are undiagnosed. The statistics further indicate that 88 million (34.5% of the adult U.S. population) people aged 18 years and above have prediabetes (CDC, 2020). The cost of diagnosed diabetes in the United States, as reported in 2017, was $327 billion, whereby $237 billion was for direct medical costs, and $90 billion was associated with reduced productivity (American Diabetes Association [ADA], 2018). Providing adequate care and education on type II diabetes management can significantly reduce the symptoms, deaths, and human-related productivity and medical costs (ADA, 2018).

Obesity is linked with type II diabetes and insulin resistance, and African Americans have a high risk of type II diabetes (National Institute of Health [NIH], 2018). Insulin resistance, genetic traits, and the prevalence of obesity all contribute to the risk of diabetes among the African American population (NIH, 2018). The rate of diabetic complications among African Americans is high due to poor lifestyle choices, including unhealthy eating habits and lack of exercise (NIH, 2018). Also, poor glycemic control and racial disparities significantly contribute to a higher incidence of diabetes among African Americans. Bancks et al. (2017) established that African Americans are also

susceptible to type II diabetes because of the biological, neighborhood, psychosocial, socioeconomic, and behavioral factors. According to ADA (2018), diabetes is the seventh leading cause of death in the United States with between 35% and 40% of the people with diabetes dying prematurely due to this chronic disease (ADA, 2018).

This Doctor of Nursing Practice (DNP) project was a quality improvement project to educate nurses to implement the Diabetes Self-Management Education (DSME) program. Lack of adequate knowledge to provide diabetes care was a significant issue experienced by nurses, affecting adversely patients' experience with diabetes (Lange & Peacer, 2017). Kaya and Karaca (2018) contended that this gap in practice signified a need to organize practical and theoretical training programs to encourage nurses to provide quality diabetes care. There was a need to educate the clinicians, especially with the increase in the number of patients diagnosed with type II diabetes (Powers et al., 2016), as equipping nurses with DSME knowledge was integral to improving the quality of life of African American patients living with type II diabetes.

The doctoral project had potential positive social change implications in the field of nursing. Reducing health disparities is one of the challenges nurses face in the healthcare sector and improving their knowledge can enhance self-management practices for type II diabetes among African Americans. The NIH (2018) explained that African American adults in the United States are at a higher biological, socioeconomic, and psychosocial risk of being diagnosed with type II diabetes than Whites. Specifically, African American adults are nearly twice as likely as White individuals to develop type II diabetes (NIH, 2018). One of the factors that prevents adherence to the recommended self-management practices among African American adults with type II diabetes is the

lack of adequate nurses' knowledge to teach patients and their families how to self-manage the disease. The lack of sufficient expertise hinders the provision of DSME that focuses on the patient's health beliefs, current knowledge, financial status, cultural needs, physical limitations, and emotional concerns (Powers et al., 2016).

The project was expected to promote social change by improving the nurses' knowledge, enabling them to treat and teach African American patients with type II diabetes effectively. Teaching patients to perform self-management was anticipated to foster optimal control of the disease (Chester et al., 2018). The project was congruent with Walden University's mission to promote social change and the quality of care provided at the target outpatient setting and enhance the patients' care experience by providing them with adequate education to mitigate diabetes-related complications and reduce the associated costs.

The approach currently used for delivering diabetes education at the clinical site was not patient-focused. Outpatient clinical nurses lacked a comprehensive understanding of their patients' needs; hence, they could not deliver diabetes education effectively. For instance, nurses were unaware of their parents' beliefs, current knowledge, financial status, cultural needs, physical limitations, and emotional concerns. Therefore, in this project, it was presumed that introducing an educational program based on chronic disease management would significantly improve the healthcare providers' knowledge and, subsequently, there would be an improvement in the quality of life of African American patients living with type II diabetes.

Problem Statement

The clinical practice problem to be address by this project was the lack of diabetes knowledge among outpatient nurses. The outcomes of training outpatient clinical nurses using a type II diabetes management education program to improve their knowledge and ability to encourage adherence to the recommended regimens among African American adults remained unknown. Cardwell et al. (2016) and Lange and Pearce (2017) found significant knowledge gaps among nurses about managing diabetes effectively. Lange and Pearce (2017) identified a discrepancy in the nurses' actual and perceived diabetes knowledge. The researchers also found that not all study nurses were aware of the current best practices for managing type II diabetes. Similarly, Alotaibi et al. (2017) found a significant gap in the nurses' actual and perceived diabetes knowledge.

The problem of limited knowledge among outpatient nurses to manage diabetes and provide African American patients with proper DSME was also evident in the Midwest U.S. clinic. The main concern was the nurses' lack of training in dealing with type II diabetes mellitus, which affected the treatment and management of the chronic disease among the patients seeking medical attention from the clinic. As a result, lack of provider education led to an increase in the prevalence of insufficiently controlled type II diabetes among African Americans, who are the majority population at risk for type II diabetes in the clinical setting.

The chronic nature of diabetes requires patients to make self-management decisions and adhere to complex healthcare activities (Powers et al., 2016). As a result, it is essential for healthcare providers at outpatient care facilities to have knowledge and resources to ensure that the patients diagnosed with type II diabetes receive adequate care

and diabetes self-management support. Cardwell et al. (2016) and Lange and Pearce (2017) reinforced the need to educate nurses to ensure that they possess current knowledge of the best diabetes management practices. It was presumed that training and educating nurses would enhance their ability to perform diabetes care roles effectively, including the ability to provide advanced clinical services and offer psychological support. Moreover, through training, the nurses became better positioned to impart self-management knowledge to patients and families, ultimately resulting in improved outcomes (Nikitara et al., 2019).

At the target outpatient clinic setting, the need to educate the nurses was supported by the fact that nurses did not provide comprehensive and personalized care and information to the patients nor equip them with practical coping and self-management skills. Increasing the knowledge of the outpatient clinic nurses was, therefore, required to help the nurses support African American patients with type II diabetes. The project was aimed at increasing the nurses' knowledge and understanding of the current and best practices to provide diabetes care and DSME. Educating nurses has been shown to significantly increase their knowledge of managing diabetes (Cardwell et al., 2016; Lange & Pearce, 2017; Nikitara et al., 2019). In turn, patients can gain knowledge from the nurses and may be empowered to manage diabetes more effectively by eating healthfully, regularly checking blood sugar, complying with prescribed medications, and handling stress more effectively (Chrvala et al., 2016; Gutierrez et al., 2019). The educational programs can improve patients' quality of life, lower hemoglobin A1c (A1C) levels, prevent diabetes complications, and reduce medical costs (Chrvala et al., 2016; Cunningham et al., 2018; Gutierrez et al., 2019).

Purpose Statement

The meaningful gap-in-practice that this doctoral project sought to address was nurses' lack of knowledge to provide quality diabetes care and DSME. In the target outpatient setting, the nurses lacked adequate knowledge to manage diabetes and provide the patients, predominantly African American, with proper DSME. Increasing nurses' knowledge should decrease uncontrolled diabetes-related symptoms such as disease progression, complications, and hospitalizations. The anticipated outcome after the educational program intervention implementation was improved nurses' knowledge. The clinical practice question guiding the project was, "Among outpatient clinical nurses, does an educational program improve the nurses' knowledge?"

This doctoral project had the potential to address that gap-in-practice by improving the knowledge of the nurses. Educating outpatient clinical nurses using a DSME program could promote their knowledge and ability to provide DSME to African American adults disproportionately affected by the diabetes. Use of the knowledge acquired will help African Americans develop self-management behaviors, thereby reducing the symptoms of diabetes (Chrvala et al., 2016). Equipping outpatient nurses with new knowledge was significant in addressing the lack of effective use of DSME programs among African American patients, subsequently contributing to the patients' inability to manage diabetes effectively.

Nature of the Doctoral Project

Two sources of evidence were used in this project. The first source of evidence was the recent literature related to type II diabetes control and patient teaching. The second source of evidence was derived from evaluating nurses' knowledge before and

after the educational intervention. For the literature review, I sourced journal articles from electronic databases, including the Cochrane Library, PubMed central, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Emerald-Full Central. An inclusion and exclusion evaluative criteria were used when searching for relevant articles in the review. Under the inclusion criteria, articles were

- published in the English language,

- scholarly and peer-reviewed,

- written in full text,

- related to diabetes mellitus, and

- published within the last 5 years.

Applying the exclusion criteria, all articles not written in English, not peer-reviewed, published longer than 5 years ago, and not in the full text were excluded from the list.

The second source of evidence entailed collecting data from the nurses to establish the effectiveness of the education intervention in improving their knowledge. The Walden University Institutional Review Board (IRB) provided approval for implementing the outpatient clinic intervention. After approval, I approached the targeted population and acquire informed consent. I also collected the nurses' baseline knowledge using the revised Diabetes Knowledge Test (DKT2) developed by Diabetes Research and Training Center at the University of Michigan in 2015. The baseline data were assessed to determine the areas upon which the educational program should focus. The postintervention data were collected and compared to the preintervention data. The collected data were assessed to demonstrate whether the education program improved the nurses' knowledge in the outpatient clinic.

Significance

African Americans have a higher risk of type II diabetes than other ethnic groups in the United States. According to the CDC (2017), approximately 30.3 million Americans in 2015 had diabetes, and the affected population was expected to increase significantly by 2025. In addition to being a significant cause of death in the United States, diabetes mellitus is also linked to increased unproductivity (ADA, 2018). Addressing the local problem of nursing knowledge, enabled clinical outpatient nurses to provide appropriate diabetes care and DSME to manage the chronic disease more effectively. Gutierrez et al. (2019) established that patients who receive DSME were more likely to experience improved wellbeing and a decline in diabetes symptoms. After the intervention, more patients were expected to enroll in DSME programs, make dietary changes, and engage in regular physical exercise (Chrvala et al., 2016).

The primary stakeholders impacted by addressing the local problem included patients and their family members, outpatient clinical nurses, and the health care facility. Diabetes management knowledge is significantly lacking among nurses in outpatient and inpatient settings (Alotaibi et al., 2018). The DNP project impacted the outpatient clinical nurses by increasing their knowledge related to diabetes care and the use of DSME. It was presumed that the educational program would improve nurses' knowledge and, the nurses, in turn, could empower patients to make informed decisions regarding physical activities, medications, and diet. As a result of the education, the clinic nurses could confidently provide diabetes care and educate patients using the DSME, which would help patients to lower their A1C levels, prevent diabetes complications, and reduce medical costs, thereby improving their quality of life (Gutierrez et al., 2019).

Addressing the local problem also contributed to nursing practice. Nurses were involved in the care of patients with diabetes in the primary care setting and implementing the education intervention improved their knowledge of diabetes care and increased their self-efficacy in diagnosing and treating African American patients with diabetes. The DNP project had transferability to similar practice areas. Acquisition of knowledge by nurses on diabetes care and its management can be replicated in other healthcare organizations and enhance patients' wellbeing. The program's purpose is aligned with the Healthy People 2020 goals of reducing the incidence of type II diabetes and improving the quality of life of persons with this chronic illness and its complications (Healthy People, 2020). Therefore, the DNP project played a significant role in transferring knowledge related to diabetes care and DSME to reduce type II diabetes progression and complications in the at-risk population.

The implementation of the DNP project into the outpatient clinic had implications for positive social change. First, the project met Walden University's goal for social change to be realized by the DNP project. Second, increasing nurses' knowledge to support diabetes care, management, and DSME among African Americans is a positive social change. Chester et al. (2018) explained that DSME enhances self-care management of diabetes, hence improving patients' wellbeing and quality of life. As the project leader, I aimed to ensure that the project's findings positively impacted the patients, the outpatient clinic, and the community by reducing diabetes-related complications and costs. Acquisition of adequate diabetes knowledge and expertise in DSME enhanced the nurses' ability to address patient's health beliefs, improve their knowledge, address cultural needs, and mitigate both physical limitations and emotional issues.

Summary

Type II diabetes is a health issue that is more prevalent among African Americans than other racial and ethnic groups in the United States. Limited knowledge among outpatient nurses is a significant challenge that hinders quality care and the provision of DSME to patients. The clinical question that guided the project was, "Among outpatient clinic nurses, does an educational program improve the nurses' knowledge?" The proposed project aimed to increase the knowledge of the outpatient clinic nurses and their expertise in using the DSME program. Two sources of evidence for the project were the current literature on the effectiveness of education to improve nurses' knowledge and evaluation of nurses' knowledge from outpatient clinic nurses before and after implementing the education intervention. The DNP project outcomes have implications for positive social change. The outcomes also contributed to nursing practice and enhanced the findings' transferability to similar practice areas. Section 2 of this project presents the background and context of the project; concepts, models, and theories used in the project; relevance to nursing practice; local background and context; the role played by the DNP student; and the project team's role.

Section 2: Background and Context

Nurses in both inpatient and outpatient settings lack diabetes management knowledge (Alotaibi et al., 2018). Evidence suggested that nurses have significant knowledge gaps in effectively managing diabetes (Cardwell et al., 2016; Lange & Pearce, 2017). The chronic nature of type II diabetes requires patients to engage in self-management and adhere to complex healthcare guidelines (Powers et al., 2016). The nurses at the outpatient facility needed to have the knowledge and resources required to ensure that the patients diagnosed with type II diabetes received adequate care and diabetes self-management support.

The project assessed the effectiveness of an education intervention to increase the nurses' knowledge about DSME for African American patients diagnosed with type II diabetes. Improving the knowledge of outpatient clinic nurses helped improve confidence in guiding self-care management among African American patients with type II diabetes. It was necessary to educate the nurses at the target outpatient setting to ensure that they could provide comprehensive and personalized care and information to the patients based on practical coping and self-management skills. The doctoral question guiding the proposed project was, "Among outpatient clinical nurses, will an educational program improve the nurses' knowledge?"

This section of the DNP project proposal is focused on the background and context of the project. The topics covered include the concepts, theories, and models that informed the project, relevance of the issue to nursing practice, and information on the

project's local setting and background. Information on my role in the DNP project as well as the role of the project team is also provided in the section.

Concepts, Models, and Theories

Nursing theory and models offer the framework for understanding the relationships among ideas and concepts (Smith & Liehr, 2018). Nursing theoretical systems play a role in providing direction for practitioners in understanding the nature of nursing practice and best care (Korukcu et al., 2017). The DNP project was guided by Orem's (1991) self-care model (SCM), Bandura's (1977) self-efficacy theory, and Lewin's (1947) change theory. The theories were significant in implementing the education intervention and improving the knowledge of the nurses employed in the outpatient clinic.

Orem's SCM

The SCM model (see Appendix A) was developed by Dorothea Orem in 1971. Orem's theory focuses on the personal ability to perform self-care. According to Orem (1991), self-care is the practice of activities whereby persons start and execute initiatives that maintain life, health, and wellbeing. The self-care deficit theory of nursing comprises three interconnected theories: (a) the self-care deficit theory, (b) the theory of self-care, and (c) the nursing systems theory. Orem believed that people have the capability to perform self-care. However, when the patient's capacity is diminished, nurses play a significant role in helping them regain this ability by providing direct and compensatory care as well as educational support (Orem, 2001).

For instance, when patients in the clinic lack understanding of diabetes care, they consult with their healthcare providers. Therefore, nurses should have the knowledge

required to promote self-care management and provide DSME activities (Powers et al., 2016). The nurse's role among patients with diabetes is that of a change agent and a facilitator. Self-care is vital for the control and management of diabetes and entails self-monitoring of diet, the dosage of insulin, and regular physical activity (Borji et al., 2017). Learning self-care skills is vital for patients with diabetes and can be achieved when nurses have adequate knowledge of providing DSME. Given the significant link between quality of life, self-care, and lifespan for patients with type II diabetes, nurses must be equipped with knowledge and skills to motivate and train patients for self-care (Babazadeh et al., 2017). One approach to encouraging nurses is training them using the educational programs they are expected to use with their patients.

The emphasis of Orem's SCM on promoting patient self-care was foundational to this project. The theory was validated and used to support self-care for patients with diabetes (Borji et al., 2017). Equipping nurses with DSME knowledge will help patients realize the need for engaging in a lifestyle that allows the formation of healthy habits and positive health outcomes (Eller et al., 2018). Therefore, efforts to offer health literacy and enhanced self-efficacy among both nurses and their patients with type II diabetes are recommended (Lee et al., 2016). The SCM can help regulate the influential factors of knowledge development and patients' performance relative to wellbeing, life, and health (Borji et al., 2017). Therefore, SCM concepts are applied to enhance self-care management after the patients are equipped with information on diabetes care and expected self-management activities.

Bandura's Self-Efficacy Theory

Psychologist Albert Bandura developed the self-efficacy theory (see Appendix B). According to Bandura (1977), self-efficacy is an individual's particular set of beliefs that determine the ability to execute a plan of action in prospective situations. According to Bandura's theory, people learn through observation, modeling, and imitation. Continuous interaction between personal factors, the environment, and behaviors is required for an effective observational learning process. The influence of a person's behavior is crucial in promoting self-efficacy (Tougas et al., 2015). The model is based on the premise that nurses with high self-efficacy levels can provide diabetes care to patients (Bandura, 1977). Also, implementing the educational plan using the model will help offer knowledge required to improve the effectiveness of diabetes care and DSME delivered by outpatient nurses.

In the DNP project, self-efficacy is a nurse's confidence to perform professional self-care management behaviors for African American patients with type II diabetes. Self-efficacy is a critical predictor of clinical performance, including providing diabetes care and obesity management (Zhu et al., 2013). Bandura's model applies to this DNP project because knowledge will directly and positively improve nurses' self-efficacy for providing diabetes management and DSME. Considering that clinical nurses provide care for many chronic diseases, adequate knowledge and self-efficacy are required to ensure effective performance in their roles (Woo et al., 2017). In this project, self-efficacy among the nurses was promoted through the educational program on diabetes care (Bandura, 1977).

Lewin's Change Theory

Lewin's three-step framework guided the implementation of the change within the outpatient care clinic. Kurt Lewin developed the three-step model in 1947 (Lewin, 1947). According to Lewin, change is composed of three phases: unfreezing, moving, and refreezing. Lewin (1951) explained that behavior change was a dynamic balance of forces that work in opposing directions. Driving forces facilitated the change process, while restraining forces hindered the change process (Wojciechowski et al., 2016). In the DNP project, driving forces for the change included an increased prevalence of type II diabetes and limited knowledge among outpatient nurses on diabetes care and the use of DSME. The restraining forces included resistance from the nurses, limited resources, and lack of support from the outpatient care facility's leadership.

The first stage, unfreezing, depends on personal psychological resistance and perceptual defenses. During this phase, the need for change is created and then assessed (Lewin, 1951). Effective communication was used to prepare the nurses for the shift that entails implementing the education program. The nurses were informed that the education program would improve their knowledge to provide quality diabetes care and DSME to mitigate the risks of resistance (Powers et al., 2016). The nurses were also informed of the possible implications of not addressing the identified DNP practice issue, including long-term complications that would affect the patients' health, quality of life and healthcare costs.

The second stage entails determining where change is needed and moving the changes forward (Lewin, 1951). This step aimed to change the behaviors, feelings, and thoughts of the outpatient clinic nurses. I encouraged the nurses to embrace the change.

My involvement and consistent communication were applied during this phase to minimize the nurses' resistance to the change. Lectures were provided to the nurses on the importance of the change. The nurses were also reminded of the importance of improving their knowledge of diabetes care and DSME (Wojciechowski et al., 2016). Implementing the educational program helped the outpatient nurses, the clinic, and the cohort of African American patients.

The third step is refreezing, compromising, and stabilizing the nurses' instilled behaviors (Lewin, 1951). The management of the outpatient care facility was involved to ensure the sustainability of the change. The staff were motivated and rewarded based on their efforts to use the acquired knowledge to promote diabetes care and DSME (Powers et al., 2017). Therefore, Lewin's model reliably supported the project change and helped solve the identified clinical practice issue.

Concepts

DSME

DSME is an evidence-based standard and ongoing process applied to improve patients' knowledge and their ability to self-manage the disease (Beck et al., 2017). In this project, the main goal of DSME was to promote active participation in chronic disease management through staff education, communication, active collaboration with other healthcare providers, and behavior modification (Beck et al., 2017).

Self-Management

According to Russell-Jones et al. (2017), this practice is an ongoing process applied to facilitate skills and knowledge needed for diabetes self-care. In this DNP project, the concept implied that self-management comprises taking care of and

responsibility for one's wellbeing and behaviors. The self-management process integrates the needs, goals, and life experiences of individuals diagnosed with diabetes. Evidence-based standards are used as a part of self-management practices. Staff education plays a critical role in ensuring patients have a comprehensive understanding of various self-management approaches for diabetes control.

Relevance to Nursing Practice

DDSME is the primary approach that can delay comorbidities and improve glycemic control in African Americans with type II diabetes (ADA, 2017). According to Nikitara et al. (2019), diabetes is a significant healthcare issue that can be improved through improved knowledge among healthcare providers. However, nurses may not be aware of the current best practices for type II diabetes management and care. Black et al. (2015) stressed the significance of knowledge and its importance in promoting self-care. Cardwell et al. (2016) and Lange and Pearce (2017) agreed that knowledge gaps among nurses about diabetes management must be addressed. The nurses' diabetes knowledge deficit, therefore, hinders them from providing patients with appropriate diabetes care and DSME. Alotaibi et al. (2017) explained that training is required to improve on the significant gap in the nurses' diabetes knowledge.

Currently, the knowledge barrier is a significant challenge in the clinic setting for this project. Adverse outcomes associated with limited knowledge of diabetes care have included long-term complications that negatively impact quality of life, increased healthcare costs, and increased early mortality rates (Powers et al., 2016). Adequate knowledge allows nurses to provide quality diabetes care and DSME, thereby reducing the incidence of adverse outcomes (Nikitara et al., 2019).

Standardized national diabetes guidelines have in the past been used to address this gap in practice (Grady & Gough, 2014). Grady and Gough (2014) explained that evidence-based protocols are applied in nursing practice to improve the knowledge of diabetes care. Standardized guidelines to educate nursing staff helps equip them with the necessary knowledge to provide best practice for diabetes management. Alotaibi et al. (2017) posited that improving nurses' knowledge is required to reduce the complications associated with poor diabetes management. The nurses can transfer the acquired knowledge to patients who use it for long-term care and self-management of type II diabetes. Guidelines help improve self-efficacy in treating chronic conditions such as diabetes and sustaining the patients' wellness (Grady & Gough, 2014). Nikitara et al. (2019) found that better nursing training and education supported by adequate time, resources, and synergies between nurses and diabetes specialists can improve diabetes care. The doctoral project advanced nursing practice and filled the gap-in-practice by improving the outpatient nurses' knowledge and self-efficacy. Therefore, implementation of the nurse education is expected to mitigate in the long term the nurses' diabetes knowledge gaps to promote self-care among patients.

Local Background and Context

Diabetes affects 34.2 million people in the United States, among whom 26.9 million are diagnosed, whereas 7.3 million are undiagnosed (CDC, 2020). According to the World Health Organization (WHO, 2020), diabetes is a global issue associated with blindness, heart attacks, kidney failure, stroke, and lower limb amputation. In 2016, nearly 1.6 million deaths resulted from diabetes, and 2.2 million were linked to high blood glucose. The WHO (2016) posited that diabetes can be treated and managed, and

its consequences avoided with diet, medication, physical activity, and regular screening. In the United States, one in every 10 people has diabetes (CDC, 2019). Approximately 90% to 95% of these 34.2 million people have type II diabetes that developed after 45 years of age. However, children, teenagers, and young adults are also prone to developing type II diabetes.

African Americans have a higher risk of developing type II diabetes (NIH, 2020). The prevalence of obesity, genetic traits, poverty, and insulin resistance contribute to increased risks of diabetes. The U.S. Department of Health and Human Services (HHS, 2019) estimated that African American adults are 60% more likely than non-Hispanic White adults to be diagnosed with diabetes. In the year 2017, it was estimated that African Americans were twice as likely to die from diabetes compared to non-Hispanic whites (CDC, 2017).

Type II diabetes is a significant issue at both state and federal levels of the government. In 2017, the total cost of diabetes was $327 billion, with $237 million resulting from direct medical costs. Diabetes is also associated with $90 billion in reduced productivity. Gurka et al. (2018) established that type II diabetes was a significant health issue in the Midwestern and Southern regions of the United States. The evidence further suggested that Midwest non-Hispanic Whites (87% of the Midwest population) recorded a high prevalence of obesity (males, 34.2%; females, 35.2%).

At the local level, type II diabetes is a significant issue that must be addressed through DSME. At the target facility, African Americans are the majority population and at a higher risk of type II diabetes. The main challenge faced locally is that outpatient nurses lack the skills and knowledge required for diabetes care and the use of DSME with

patients. Lack of knowledge among the nurses increases the risk of complications from type II diabetes because African American patients do not receive adequate care and education on self-management of the disease. Nurses in outpatient healthcare facilities are responsible for providing diabetes care and educating the patients. Therefore, education-based programs are essential for these healthcare providers to improve their knowledge. The DNP project's goal is to equip nurses with knowledge that will be imparted to African American patients to enhance the practice of self-management diabetes care. As a result, the patients will be able to monitor their blood glucose effectively, engage in regular physical activities, consume healthful diets, and adhere to medication regimens, subsequently leading to improved health outcomes (Powers et al., 2016).

According to Bandura (1977), self-efficacy is the belief in personal capabilities to establish and execute a plan needed for managing prospective situations. Improving knowledge among nurses will enhance their self-efficacy to provide diabetes care and DSME. The responsibility of outpatient nurses includes the overall care of patients in need of medical attention, including attention to social behavioral determinants of health.

Role of the DNP Student

My primary role was to serve as the project's team leader. The role entailed developing an educational program in collaboration with the target facility's nurse educator. The educational program was based on evidence-based interventions that promote improved knowledge among nurses. My role in the proposed project was linked to nursing practice; a DNP-prepared nurse is equipped with skills, clinical knowledge, training, and experience to facilitate change (American Association of Colleges of

Nursing [AACN], 2006). The DNP student also has a role in ensuring patient management and achievement of better patient outcomes. Using the knowledge acquired during the DNP program, I translated evidence into clinical practice. Improving clinical nurses' knowledge in the outpatient facility aligns with my training to implement changes using evidence-based practice models.

The prevalence of type II diabetes among African Americans and lack of knowledge among nurses were the primary motivations for this doctoral project. Type II diabetes is more prevalent among African Americans, particularly African American women, than whites (Harrington et al., 2017). Addressing the knowledge gap experienced by nurses in the facility motivated me to conduct the proposed project. Improving the nurses' knowledge about diabetes care through educational programs is expected to increase their self-efficacy and management of the disease among African American patients.

Summary

Type II diabetes is a significant health problem affecting African Americans. Lack of diabetes knowledge management among outpatient clinic nurses was the identified DNP gap-in-practice issue. Patients require appropriate education about the nature of diabetes and the treatment of the condition through self-care. Training nurses can improve their knowledge and allow transferability into the outpatient clinic treatment and patient education. The project aimed to assess the effectiveness of an education intervention to improve nurses' knowledge of type II diabetes. The question guiding the proposed project was: Among outpatient clinical nurses, does an educational program improve the nurses' knowledge of diabetes care and use of the DSME tool? Improving

nurses' knowledge within the facility is expected to reduce type II diabetes symptoms, complications, and hospitalizations among African American patients. Orem's self-care model and Bandura's self-efficacy theory provided the foundational framework needed to determine the educational program's effectiveness in improving the nurses' knowledge. Lewin's change theory provided a framework for assessing the participants' behaviors toward adopting the educational intervention.

Section 3 of the project paper is focused on collecting and analyzing evidence based on the stated gap-in-practice. The main areas covered include the practice-focused question, sources of evidence, analysis of pretest and posttest data, and synthesis of the findings.

Section 3: Collection and Analysis of Evidence

There are significant knowledge gaps among outpatient clinic nurses on managing diabetes effectively (Cardwell et al., 2016; Lange & Pearce, 2017). The nurses' actual and perceived diabetes knowledge discrepancy hinders nurses' ability to provide diabetes care and DSME. The meaningful gap-in-practice that this doctoral project addressed was nurses' knowledge affecting their ability to provide quality care and DSME. The project aimed to assess an education program's effectiveness to improve knowledge necessary to treat, educate, and support African American patients diagnosed with type II diabetes.

Knowledge gaps hinder nurses' facilitation of DSME among African American patients with type II diabetes. Knowledge improvement gained from the project will help address the challenges faced by both nurses and patients during diabetes care. The projected outcome is improved knowledge among outpatient nurses to enable diabetes care and self-efficacy to promote the facility's DSME. This section of the paper will include the practice-focused question and the sources of evidence for the DNP project. The other areas covered include the analysis and synthesis of the evidence to address the practice-focused questions and a summary.

Practice-Focused Question

This doctoral project's gap-in-practice was the lack of adequate knowledge among outpatient care nurses on type II diabetes care and management. The project aimed to assess the effectiveness of nurse education to improve knowledge to support African American patients diagnosed with type II diabetes. The purpose aligned with the practice-focused question, which was, "Among outpatient clinic nurses, does an educational program improve nurses' knowledge of diabetes care and use of the DMSE

tool?" The use of an education program will guide the assessment of the identified gap-in-practice.

Sources of Evidence

The two sources of evidence used in this DNP project were literature reviewed and data collected before and after implementing the educational program. I analyzed the most recent literature about type II diabetes control, education of practicing nurses, and nurse education effectiveness on knowledge. Search engines were used to retrieve evidence from the literature; databases searched included Cochrane Library, PubMed Central, CINAHL, and Emerald-Full Central.

The inclusion criteria were that articles had to be

- published in the English language,

- peer-reviewed and scholarly,

- available in full text,

- related to diabetes mellitus, and

- published within the last 5 years.

The exclusion criteria entailed articles not written in English, not peer-reviewed, published longer than 5 years ago, and not available in full text. The search terms included *diabetes management*, *nursing education*, *diabetes knowledge skills*, *diabetes educators*, and *current standards of diabetes care*. The diabetes pretest and posttest DKT2 scores were used for assessing the knowledge levels and self-efficacy of the outpatient nurses, emphasizing self-care. The collection and analysis of this evidence provided the appropriate way to address the practice-focused question by comparing the

pretest and posttest scores to determine the education's effectiveness in improving nurses' knowledge.

Participants

The individuals targeted for participation in the project were outpatient registered nurses holding a baccalaureate degree or higher, providing care for type II diabetic patients. The 18 nurses employed in the targeted outpatient facility were asked to participate in the educational intervention and complete a pretest and posttest knowledge instrument.

Procedures

Data were collected using the revised DKT2 (see Appendix C), developed by Diabetes Research and Training Center at University of Michigan in 2015. This standardized instrument is used to assess registered nurses' knowledge of diabetes. The original instrument was developed by Drass et al. (1989) after modifications from the Diabetes Knowledge Test (DKT), designed by Scheiderich et al. (1983). The DKT2 has been updated to reflect current diabetes care and education guidelines. The instrument has two components: a 14-item general knowledge test and a nine-item insulin use subscale. The 23 questions are designed in a multiple-choice format. The instrument is scored by assigning 1 point for every correct answer and 0 points for every incorrect answer; an answer of "I do not know" is counted as wrong. For the DNP project, the pretest and posttest DKT2 instruments were administered to the outpatient nurses before and after the education intervention.

Participants was recruited at a Midwest U.S. outpatient care facility. The recruitment criteria included clinic nurses managing patients with a type II diabetes

diagnosis who had the ability to read, write, and communicate fluently in English. The
pretest was given to the consenting participants at the same time, in paper and computer
format. The pretest comprised questions related to diabetes type II self-care management.
I presented the PowerPoint education program, which lasted for approximately 30
minutes, after which the posttest was administered immediately. The number of questions
answered correctly and incorrectly was recorded in a Microsoft Excel spreadsheet. A gain
score was used to compare the difference in scores following the educational PowerPoint.
I then analyzed the findings from the intervention. The analysis showed there was a gain
in knowledge of 18.6% following the educational PowerPoint.

Protections

The project was conducted in adherence to the IRB and the *Belmont Report*
principle of respect for persons (The National Commission for the Protection of Human
Subjects of Biomedical and Behavioral Research, 1979). Adhering to respect for persons
ensured that nurses were treated as autonomous agents who could make their own
choices. The recruited nurses were asked to sign a consent form, which indicated their
willingness to participate. Additionally, the DKT2 does not collect individually
identifiable data that can be used to identify the responses of specific participants.
Participants were identified by number to match pre/posttest scores.

The data collected from the nurses at the outpatient facility will be stored in a
secure home office. Software copies of the data are stored in a password-protected
personal computer that only the student investigator can access. The project was not
associated with any ethical issues because only nurses who signed the consent form
participated in the project. Additionally, the project did not expose the participants to any

risk above the minimum expected in daily life. The Walden University IRB provided approval (Approval No. 06-23-21-0721438) after ensuring all the ethical considerations for the project were met.

Analysis and Synthesis

Evidence that supported the DNP project was analyzed and synthesized to report findings. I compared the pretest and posttest scores using a gain score showing the number of participants and the mean score of correct answers (posttest scores). The difference in the subjects' knowledge levels before and after the education intervention addressed the clinical practice-focused question.

Summary

The practice-focused question was, "Among outpatient clinical nurses, does an educational program improve the nurses' knowledge about diabetes and use of the DSME tool?" The two sources of evidence include the current literature and data collected using the DKT2. Walden University's IRB provided approval prior to implementation of the project. Permission was obtained from Michigan Diabetes Research Center (MDRC) to use the data collection tool on March 30, 2021. Confidentiality and informed consent considerations were ensured throughout the data collection process. Section 4 focuses on the finding and recommendations from the DNP project. The section will also include a discussion of the project's strengths and limitations.

Section 4: Findings and Recommendations

The lack of nursing knowledge to manage patients diagnosed with type II diabetes and to apply DSME with diabetic patients was an issue at a local practice. Because there was a deficit in nursing education, diabetic patients at the clinic received various treatment advice and options from different clinicians. The lack of standardized care and using the evidence in the literature known to increase the quality of treatment and patient outcomes was caused by a gap in nurse education on diabetes management. The practice-focused question that guided the project was, "Among outpatient clinical nurses, does an educational program improve diabetes and DSME tool knowledge?"

The goal of this DNP project was to assess nurses' diabetes care knowledge and their understanding of application of the DSME tool. The ADA Standards of Medical Care in Diabetes (ADA, 2020), which were also recognized as indicators of quality diabetes care, provided evidence to support the staff education (see Appendix D). The literature on diabetes care was reviewed to find techniques for improving patient outcomes. Evidence from recent research (within the last 5 years) suggested beneficial results from the use of DSME. The practice-focused question was answered by gathering and analyzing data from the DKT2 pretest and posttest questionnaires (see Appendix C).

Findings and Implications

Summary of the Project Findings

The presentation caused a shift in knowledge from the pretest to the posttest. Participants' knowledge obtained from the staff education presentation was demonstrated by the pretest/posttest changes in knowledge scores. When all the gain scores were added

together and divided by the number of participants, the group mean gain of correct answers was 18.6%. The pretest mean score for correct responses was 80.17% and the posttest mean score was 98.77%. Calculated by summing all the participants' valid answer scores and dividing by the number of participants, the group average gain score was 18.6% ($n = 18$).

The pretest/posttest results from the 18 participants, who were bachelor-prepared registered nurses, can be found in Table 1. The pretest revealed that all participants had a rudimentary understanding of the clinic's outcomes of diabetic patient management. The pretest findings revealed that 11 of the 18 participants were unaware that the health ratings of the clinic were impacted by a lack of staff knowledge on DSME care. The PowerPoint presentation described the ADA (2020) evidence-based clinical practice recommendations, which filled the knowledge gap found among the nurses.

Table 1

Findings from the Pretest/Posttest

Participant	Pretest % score	Posttest % score	Percent gain of correct answers (gain score)
1	86.9	100	13.1
2	86.9	100	13.1
3	69.6	100	30.4
4	82.6	100	17.4
5	82.6	95.6	13.0
6	82.6	95.6	13.0
7	95.6	100	4.4
8	73.9	100	26.1
9	82.6	95.6	13
10	82.6	100	17.4
11	95.6	100	4.4
12	73.9	100	26.1
13	82.6	100	17.4
14	69.6	95.6	26
15	73.9	100	26.1
16	86.9	100	13.1
17	69.6	95.6	26
18	65.2	100	34.8

Limitations

Due to schedule changes connected to the COVID-19 clinic disruptions, four

nurses participated in the education remotely via Zoom, which was an unforeseen

constraint of the DNP project. The goal was to have all nurses attend the live education to

participate, engage with the question-and-answer session after the PowerPoint

presentation, and obtain hard copies of PowerPoint presentation for self-study and

reference.

Another limitation to full implementation of the project plan was that the clinic's

electronic medical record is a basic package, which cannot be updated to add built-in

standard recommendations or links to websites with diabetic resources. This limitation

creates a barrier to project dissemination and orientation of new nurses and continuing educational reinforcement of the content for all nurses. Links to the ADA Standards of Medical Care in Diabetes would be helpful in the electronic medical records for nurses to use regularly throughout patient care.

Recommendations

Patients would obtain improved continuity of care if a standardized model of diabetes care and use of the DSME tool were implemented into practice. Nurses are expected to display an increased level of competence to manage diabetic risk factors and decrease complications following the staff education presentation. Social change will occur on two levels: the clinic's served population will be healthier with improved teaching about diabetes and application of the DSME tool, and the staff nurses will have increased awareness of the financial penalties of poor-quality treatment, which could lead to widespread adoption of the ADA (2020) recommendations to increase reimbursement of their diabetes care. Because the clinic lacks resources for built-in guidelines as hard stops, the educational PowerPoint created for this project could create a diabetes-specific resource to aid the nurses in their teaching.

Extending the Project Beyond the DNP Doctoral Project

The quality improvement nurse educator at the facility may extend this initiative beyond the DNP educational PowerPoint. The Medical Director and Certified Diabetes Educator can help to expand this project by conducting quarterly chart reviews to assess patients' compliance with DSME teaching evidenced by glycemic control (A1C). Also, conducting peer reviews for nurses will improve documentation and the adherence to the ADA standards of care. As a compliance checklist among peers, clinicians might use an

evaluation tool incorporating the ADA (2020) recommendations or diabetic performance metrics and continue to use the project PowerPoint as a reference if updates are assigned to ensure that the references and content are current.

Strengths and Limitations of the Project

The project implementation was successful due to the outstanding support from the management team at the facility and the participants. The project was hampered by unforeseen COVID-19 pandemic disruptions, which resulted in four clinicians participating via Zoom. The four participants took the pretest ahead of the education intervention and were not monitored; true pretest scores of those four participants may be skewed, which makes their reliability limited. Future diabetes studies at the facility should expand on interventions that reinforce clinic standards of care for diabetic patients, involving all registered nurses for a successful practice improvement.

Summary

The pretest/posttest findings showed that the participants' awareness of type II diabetes management and use of DSME was high before the education and improved to nearly 100% after the educational intervention. Annually diabetic educational in-services will hopefully be incorporated into the practice to maintain these high levels of knowledge to provide treatment and DSME. Conducting quarterly chart reviews in collaboration with clinic leaders will promote standard care at the clinic. If these recommendations are implemented in the long term, the clinic's patient population will be healthier, and the facility will have standard practices in place for diabetic care.

Section 5: Dissemination Plan

The final step in translating evidence to practice is dissemination of the materials and findings so that practice gains can be sustained. The nurse educator at the facility (who will be taking over the maintenance of diabetic care practices) and the medical director were given a copy of the PowerPoint (electronically filed). The PowerPoint was linked to the research evidence supporting the ADA Standards of Medical Care in Diabetes along with the DNP project. All policies and documentation are stored electronically and will be printed when necessary. Links to sites such as the ADA Standards of Medical Care in Diabetes were chosen because these websites will be updated, keeping the material current for future use in the clinic.

In addition to providing materials for in-service staff education, I will submit the completed and approved DNP final paper to ProQuest, which is a requirement for Walden University graduation. An article in the ADA journal *Clinical Diabetes* would be an excellent way to get the word out to a larger professional audience of primary care clinicians about this study. All practitioners caring for diabetic patients, particularly those working in underserved communities with limited resources and low publicly reported health scores and organizations where EMRs lack "smart" built-in evidence-based guidelines or alerts that promote access to ADA Standards of Medical Care in Diabetes will find the process used in this project supportive of efforts to improve staff knowledge. In primary care clinics with limited resources, rapid in-service education and sharing links to the materials used (e.g., the ADA website) can improve care. Like the targeted practice, local member clinics face similar diabetes care concerns. Thus far, the work that

has been done and the availability of rapid reference recommendations might be used to create a built-in template for clinicians who have overbooked schedules, no sophisticated electronic health systems, and little time for research.

Analysis of Self

The skills and information gained during the DNP education and project process will serve as the foundation for a career of scholarship and practice. This project's completion indicates the combination of nursing science with knowledge and abilities to apply best practice and has a beneficial impact on my desire to improve diabetes care quality. By taking on this project, I feel empowered to participate, lead, design, and implement quality improvement projects. Advanced practice registered nurses are expected to share their knowledge of translating research into practice to overcome practice issues. Due to unforeseen events, I realized that educational activity schedules must be flexible. This project demonstrated two fundamental DNP competencies that the American Association of Colleges of Nursing recommends for DNP students, and which are requirements for Walden University graduation: organizational and systems leadership (Essential II) and the capacity to use existing literature and other evidence to develop and execute the best evidence for practice (Essential III). Clinical Prevention and Population Health for Improving the Nation's Health (Essential VII) is congruent with eradicating health inequities, improving patient safety, and ensuring excellence in practice (American Association of Colleges of Nursing, 2006). Overall, the academic journey revealed practical solutions for improving diabetic patient outcomes, independent of the clinical setting or provider resources.

Summary

I developed this project to improve patient outcomes with type II diabetes care. The discovered practice gap was a lack of nursing knowledge of diabetes management and literature known to enhance quality of patient care, ability to provide patient education, and the likelihood of improved patient outcomes. Nurses were given a pretest and a posttest and were invited to attend the presentation in person or through Zoom. As a result of the gains in nurses' knowledge from the educational intervention, diabetic patients and their families will have better lives when the new guidelines have been fully integrated into practice, resulting in a beneficial societal shift. This DNP project was created to meet the Walden University DNP graduation requirement of employing skills and expertise to affect positive social change. The project aimed to minimize the prevalence of uncontrolled diabetes in a medically challenged population by promoting evidence-based practice in a setting were variance in practice impacts patient outcomes.

References

Alotaibi, A., Gholizadeh, L., Al-Ganmi, A., & Perry, L. (2018). Factors influencing

    nurses' knowledge acquisition of diabetes care and its management: A qualitative

    study. *Journal of Clinical Nursing, 27*(23-24), 4340–4352.

    https://doi.org/10.1111/jocn.14544

American Association of Colleges of Nursing. (2006). *The essentials of doctoral*

    education for advanced nursing practice.

    http://www.aacnnursing.org/Portals/42/Publications/DNPEssentials.pdf

American Diabetes Association. (2018). *Statistics about diabetes*.

    https://www.diabetes.org/resources/statistics/statistics-about-diabetes

Babazadeh, T., Dianatinasab, M., Daemi, A., Nikbakht, H. A., Moradi, F., & Ghaffari-

    Fam, S. (2017). Association of self-care behaviors and quality of life among

    patients with type 2 diabetes mellitus: Chaldoran County, Iran. *Diabetes &*

    Metabolism Journal, 41(6), 449–456. https://doi.org/10.4093/dmj.2017.41.6.449

Bancks, M. P., Kershaw, K., Carson, A. P., Gordon-Larsen, P., Schreiner, P. J., &

    Carnethon, M. R. (2017). Association of modifiable risk factors in young

    adulthood with racial disparity in incident type 2 diabetes during middle

    adulthood. *Journal of the American Medical Association, 318*(24), 2457–2465.

    https://doi.org/10.1001/jama.2017.19546

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change.

    Psychological Review, 84(2), 191-215. https://doi.org/10.1037/0033-

    295X.84.2.191

Beck, J., Greenwood, D. A., Blanton, L., Bollinger, S. T., Butcher, M. K., Condon, J. E.,

Cypress, M., Faulkner, P., Fischl, A. H., Francis, T., Kolb, L. E., Lavin-Tompkins, J. M., MacLeod, J., Maryniuk, M., Mensing, C., Orzeck, E. A., Pope, D. D., Pulizzi, J. L., Reed, A. A., ... & Wang, J. (2018). 2017 national standards for diabetes self-management education and support. *The Diabetes Educator, 44*(1), 35-50. https://doi.org/10.1177/0145721717722968

Borji, M., Otaghi, M., & Kazembeigi, S. (2013). The impact of Orem's self-care model on the quality of life in patients with type II diabetes. *Biomedical Pharmacology Journal, 10*(1), 1-14. http://biomedpharmajournal.org/?p=13576

Cardwell, J., Hardy, K., Ford, N., & O'Brien, S. (2016). Assessment of diabetes knowledge in trained and untrained ward nurses before and after intensive specialist support. *Journal of Diabetes Nursing, 20,* 60-64. https://pdfs.semanticscholar.org/dd38/9c58ab8fb12641b9e8b7fa7bbb5231d1eb87.pdf

Centers for Disease Control and Prevention. (2017). *National diabetes statistics report: Estimates of diabetes and its burden in the United States.* http://www.diabetes/pubs/statsreport14/national diabetes-report-web.pdf

Centers for Disease Control and Prevention. (2019). *Type 2 diabetes.* https://www.cdc.gov/diabetes/basics/type2.html

Centers for Disease Control and Prevention. (2020). *National diabetes statistics report, 2020.* https://www.cdc.gov/diabetes/data/statistics-report/index.html

Chester, B., Stanely, W. G., & Geetha, T. (2018). A quick guide to type 2 diabetes self-management education: Creating an interdisciplinary diabetes management team. *Diabetes, Metabolic Syndrome, and Obesity: Targets and Therapy, 11,* 641-645.

https://doi.org/10.2147/DMSO.S178556

Chrvala, C. A., Sherr, D., & Lipman, R. D. (2016). Diabetes self-management education for adults with type 2 diabetes mellitus: A systematic review of the effect on glycemic control. *Patient Education and Counseling, 99*(6), 926-943. https://doi.org/10.1016/j.pec.2015.11.003

Cunningham, A. T., Crittendon, D. R., White, N., Mills, G. D., Diaz, V., & LaNoue, M. D. (2018). The effect of diabetes self-management education on HbA1c and quality of life in African-Americans: A systematic review and meta-analysis. *BMC Health Services Research, 18*(1), 367-377. https://doi.org/10.1186/s12913-018-3186-7

Drass, J. A., Muir-Nash, J., Boykin, P. C., Turek, J. M., & Baker, K. L. (1989). Perceived and actual level of knowledge of diabetes mellitus among nurses. *Diabetes Care, 12*(5), 351-356. https://doi.org/10.2337/diacare.12.5.351

Eller, L. S., Lev, E. L., Yuan, C., & Watkins, A. V. (2018). Describing self-care self-efficacy: Definition, measurement, outcomes, and implications. *International Journal of Nursing Knowledge, 29*(1), 38–48. https://doi.org/10.1111/2047-3095.12143

Francisco, M. A. (2013). Instruments that measure nurses' knowledge about diabetes: An integrative review. *Journal of Nursing Measurement, 21*(1), 137–152. https://doi.org/10.1891/1061-3749.21.1.137

Fitzgerald, J. T., Funnell, M. M., Anderson, R. M., Nwankwo, R., Stansfield, R. B., & Piatt, G. A. (2016). Validation of the Revised Brief Diabetes Knowledge Test (DKT2). *The Diabetes Educator*, *42*(2), 178-187.

doi:10.1177/0145721715624968

Grady, P. A., & Gough, L. L. (2014). Self-management: A comprehensive approach to the management of chronic conditions. *American Journal of Public Health, 104*(8), e25–e31. https://doi.org/10.2105/AJPH.2014.302041

Gurka, M. J., Filipp, S. L., & DeBoer, M. D. (2018). Geographical variation in the prevalence of obesity, metabolic syndrome, and diabetes among US adults. *Nutrition & Diabetes, 8*(1), 14. https://doi.org/10.1038/s41387-018-0024-2

Gutierrez, A. P., Fortmann, A. L., Savin, K., Clark, T. L., & Gallo, L. C. (2019). Effectiveness of diabetes self-management education programs for US Latinos at improving emotional distress: A systematic review. *The Diabetes Educator, 45*(1), 13-33. https://doi.org/10.1177/0145721718819451

Harrington, C., Carter-Templeton, H. D., & Appel, S. J. (2017). Diabetes self-management education and self-efficacy among African American women living with type 2 diabetes in rural primary care. *Journal of Doctoral Nursing Practice, 10*(1), 11–16. https://doi.org/10.1891/2380-9418.10.1.11

Health and Human Services. (2019). *Diabetes and African Americans.* https://minorityhealth.hhs.gov/omh/browse.aspx?lvl=4&lvlid=18

Healthy People. (2020). *Diabetes.* https://www.healthypeople.gov/2020/topics-objectives/topic/diabetes

Kaya, Z., & Karaca, A. (2018). Evaluation of nurses' knowledge levels of diabetic foot care management. *Nursing Research and Practice, 1,* 1-10. https://doi.org/10.1155/2018/8549567

Korukcu, O., Deliktas, A., Aydin, R., & Kabukcuoğlu, K. (2017). *Samples of hospital*

management based on nursing theories: A literature study.

https://www.researchgate.net/profile/Rueveyda_Aydin/publication/318461423_Sa
mples_of_Hospital_Management_Based_on_Nursing_Theories_A_Literature_Stu
dy/links/596c58bbaca2728ca68625d7/Samples-of-Hospital-Management-Based-
on-Nursing-Theories-A-Literature-Study.pdf

Lange, C., & Pearce, R. (2017). Exploration of diabetes knowledge among registered

nurses working in an NHS Trust. *Journal of Diabetes Nursing, 21*(6).

https://www.diabetesonthenet.com/uploads/resources/234fdb3aaf171393876418a
48217faab.pdf

Lee, E. H., Lee, Y. W., & Moon, S. H. (2016). A structural equation model linking health

literacy to self-efficacy, self-care activities, and health-related quality of life in

patients with type 2 diabetes. *Asian Nursing Research, 10*(1), 82–87.

https://doi.org/10.1016/j.anr.2016.01.005

Lewin, K. (1947). Frontiers in group dynamics: Concept, method, and reality in social

science; social equilibria, and social change. *Human Relations, 1*(1), 5–41.

https://doi.org/10.1177/001872674700100103

Lewin, K. (1951). *Field theory in social sciences.* Harper and Row.

National Institutes of Health. (2018). *Factors contributing to a higher incidence of*

diabetes for Black Americans. https://www.nih.gov/news-events/nih-research-
matters/factors-contributing-higher-incidence-diabetes-black-americans

Nikitara, M., Constantinou, C. S., Andreou, E., & Diomidous, M. (2019). The role of

nurses and the facilitators and barriers in diabetes care: A mixed-methods

systematic literature review. *Behavioral Sciences, 9*(6), 61.

https://doi.org/10.3390/bs9060061

Orem, D. E. (1991). *Nursing: Concepts of practice (4th ed.)*. Mosby-Year Book.

Powers, M. A., Bardsley, J., Cypress, M., Duker, P., Funnell, M. M., Fischl, A. H.,

Maryniuk, M. D., Siminerio, L., & Vivian, E. (2016). Diabetes self-management

education and support in type 2 diabetes: A joint position statement of the

American Diabetes Association, the American Association of Diabetes Educators,

and the Academy of Nutrition and Dietetics. *Clinical Diabetes. American*

Diabetes Association, 34(2), 70–80. https://doi.org/10.2337/diaclin.34.2.70

Russell-Jones, D., Bode, B. W., De Block, C., Franek, E., Heller, S. R., Mathieu, C.,

Philis-Tsimikas, A., Rose, L., Woo, V. C., Østerskov, A. B., Graungaard, T., &

Bergenstal, R. M. (2017). Fast-acting insulin apart improves glycemic control in

basal-bolus treatment for Type 1 diabetes: Results of a 26-week multicenter,

active-controlled, treat-to-target, randomized, parallel-group trial (onset 1).

Diabetes Care, 40(7), 943–950. https://doi.org/10.2337/dc16-1771

Smith, M., & Liehr, P. (2018). *Middle range theory for nursing (4th ed.)*. Springer.

The National Commission for the Protection of Human Subjects of Biomedical and

Behavioral Research. (1979). *The Belmont Report: Ethical principles and*

guidelines for the protection of human subjects of research.

https://www.hhs.gov/ohrp/regulations-and-policy/belmont-report/read-the-

belmont-report/index.html

Tougas, M. E., Hayden, J. A., McGrath, P. J., Huguet, A., & Rozario, S. (2015). A

systematic review exploring the social cognitive theory of self-regulation as a

framework for chronic health condition interventions. *PLoS One, 10*(8),

e0134977. https://doi.org/10.1371/journal.pone.0134977

Wojciechowski, E., Pearsall, T., Murphy, P., & French, E. (2016). A case review:
Integrating Lewin's theory with Lean's system approach for change. *Online
Journal of Issues in Nursing, 21*(2), 1-12.
https://doi.org/10.3912/OJIN.Vol21No02Man04

Woo, B., Lee, J., & Tam, W. (2017). The impact of the advanced practice nursing role on
the quality of care, clinical outcomes, patient satisfaction, and cost in the
emergency and critical care settings: A systematic review. *Human Resources for
Health, 15*(1), 63. https://doi.org/10.1186/s12960-017-0237-9

World Health Organization. (2020). *Diabetes.* https://www.who.int/news-room/fact-
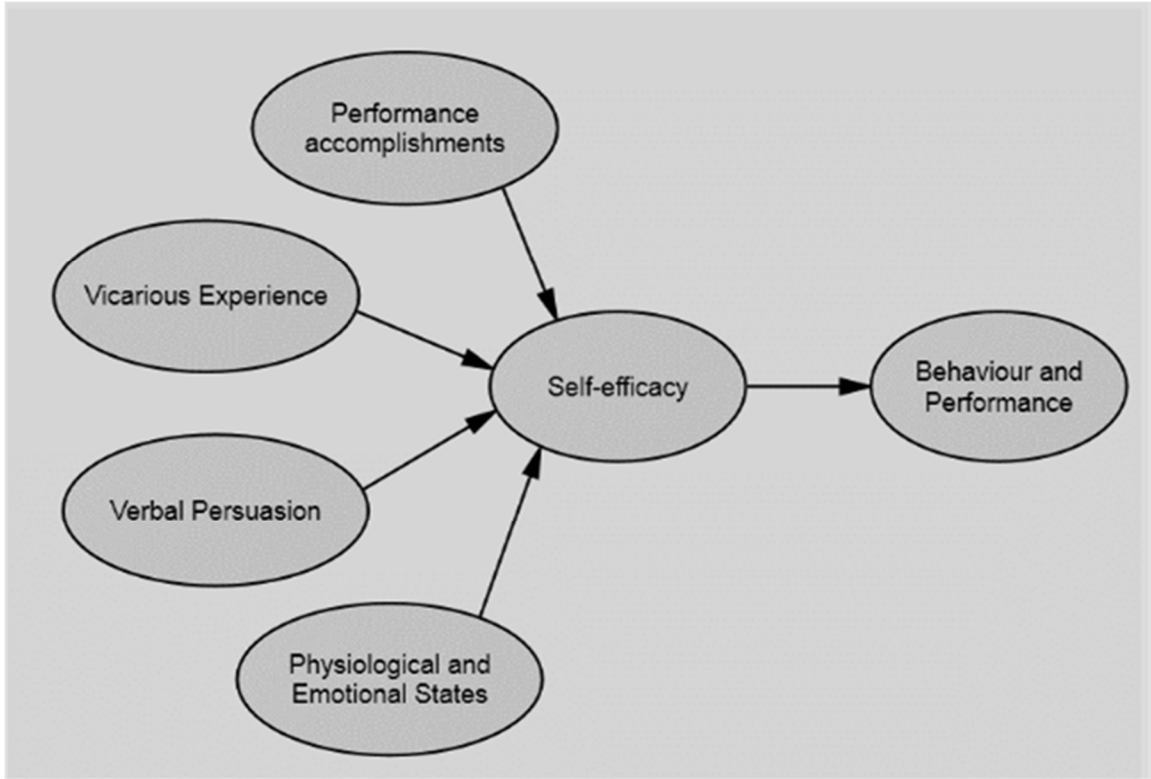sheets/detail/diabetes

Zhu, D. Q., Norman, I. J., & While, A. E. (2013). Nurses' self-efficacy and practices
relating to weight management of adult patients: A path analysis. *International
Journal of Behavioral Nutrition and Physical Activity, 10,* 131.
https://doi.org/10.1186/1479-5868-10-131

Appendix A: Orem's Self-Care Model
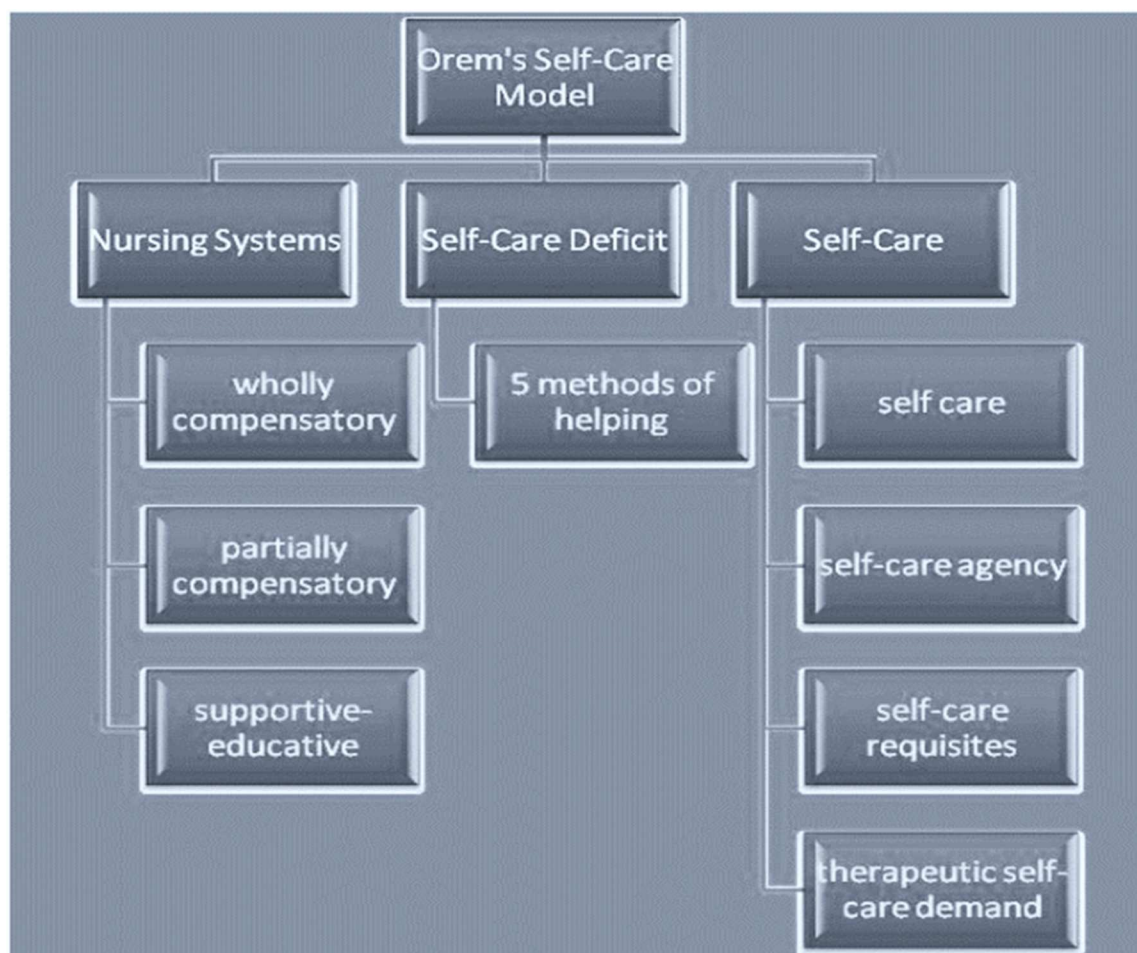
Appendix B: Bandura's Self-Efficacy Model

Appendix C: Pretest and Posttest

Michigan Diabetes Research and Training Center's Revised Diabetes Knowledge Test

1. The diabetes diet is:
   a. the way most American people eat
   b. a healthy diet for most people
   c. too high in carbohydrate for most people
   d. too high in protein for most people

2. Which of the following is highest in carbohydrate?
   a. Baked chicken
   b. Swiss cheese
   c. Baked potato
   d. Peanut butter

3. Which of the following is highest in fat?
   a. Low fat (2%) milk
   b. Orange juice
   c. Corn
   d. Honey

4. Which of the following is a "free food"?
   a. Any unsweetened food
   b. Any food that has "fat free" on the label
   c. Any food that has "sugar free" on the label
   d. Any food that has less than 20 calories per serving

5. A1C is a measure of your average blood glucose level for the past:
   a. day
   b. week
   c. 6-12 weeks
   d. 6 months

6. Which is the best method for home glucose testing?
   a. Urine testing
   b. Blood testing
   c. Both are equally good

7. What effect does unsweetened fruit juice have on blood glucose?
   a. Lowers it
   b. Raises it
   c. Has no effect

8. Which should not be used to treat a low blood glucose?
   a. 3 hard candies
   b. 1/2 cup orange juice
   c. 1 cup diet soft drink
   d. 1 cup skim milk

9. For a person in good control, what effect does exercise have on blood glucose?
   a. Lowers it
   b. Raises it
   c. Has no effect

10. What effect will an infection most likely have on blood glucose?
    a. Lowers it
    b. Raises it
    c. Has no effect

11. The best way to take care of your feet is to:
    a. look at and wash them each day
    b. massage them with alcohol each day
    c. soak them for one hour each day
    d. buy shoes a size larger than usual

12. Eating foods lower in fat decreases your risk for:
    a. nerve disease
    b. kidney disease
    c. heart disease
    d. eye disease

13. Numbness and tingling may be symptoms of:
    a. kidney disease
    b. nerve disease
    c. eye disease
    d. liver disease

14. Which of the following is usually not associated with diabetes:
    a. vision problems
    b. kidney problems
    c. nerve problems
    d. lung problems

15. Signs of ketoacidosis (DKA) include:
    a. shakiness
    b. sweating
    c. vomiting
    d. low blood glucose

16. If you are sick with the flu, you should:
    a. Take less insulin
    b. Drink less liquids
    c. Eat more proteins
    d. Test blood glucose more often

17. If you have taken rapid-acting insulin, you are most likely to have a low blood glucose reaction in:
    a. Less than 2 hours
    b. 3-5 hours
    c. 6-12 hours
    d. More than 13 hours

18. You realize just before lunch that you forgot to take your insulin at breakfast. What should you do now?
    a. Skip lunch to lower your blood glucose
    b. Take the insulin that you usually take at breakfast
    c. Take twice as much insulin as you usually take at breakfast
    d. Check your blood glucose level to decide how much insulin to take

19. If you are beginning to have a low blood glucose reaction, you should:
    a. exercise
    b. lie down and rest
    c. drink some juice
    d. take rapid-acting insulin

20. A low blood glucose reaction may be caused by:
    a. too much insulin
    b. too little insulin
    c. too much food
    d. too little exercise

21. If you take your morning insulin but skip breakfast, your blood glucose level will usually:
    a. increase
    b. decrease
    c. remain the same

22. High blood glucose may be caused by:
    a. not enough insulin
    b. skipping meals
    c. delaying your snack
    d. skipping your exercise

23. A low blood glucose reaction may be caused by:
    a. heavy exercise
    b. infection
    c. overeating
    d. not taking your insulin

Note: For non-US patient populations, we recommend reviewing the terms used in items 1, 2, 3, 4 and 8 for appropriateness.

Appendix D: Power Point Presentation

WHAT IS DIABETES?

DIABETES IS A SERIOUS CHRONIC DISEASE. IT HAPPENS WHEN TOO MUCH GLUCOSE STAYS IN THE BLOOD STREAM BECAUSE THERE IS EITHER NO INSULIN OR NOT ENOUGH INSULIN THAT CAN MOVE THE GLUCOSE INTO THE BODY'S CELLS. MOST OF THE FOOD PEOPLE EAT IS CHANGED INTO SIMPLER PROTEINS, FATS, OR A SIMPLE CARBOHYDRATE CALLED GLUCOSE. GLUCOSE IS THE FORM OF SUGAR THAT CELLS NEED TO MAKE ENERGY. THE PANCREAS, A GLAND NEAR THE STOMACH, NORMALLY MAKES INSULIN TO MOVE GLUCOSE FROM THE BLOOD STREAM INTO THE CELLS. IN DIABETES, THE BODY CANNOT MAKE INSULIN OR PROPERLY USE THE INSULIN IT HAS. CONTROLLING BLOOD GLUCOSE HELPS TO PREVENT THE DAMAGE TO BLOOD VESSELS AND NERVES THAT LEAD TO COMPLICATION.

TYPES OF DIABETES THERE ARE 2 MAJOR TYPES OF DIABETES.

Type 1 Diabetes

- Characterized by absolute insulin deficiency. This occurs as an autoimmune process destroys the pancreas' ability to produce insulin.
- The person with type 1 diabetes must inject insulin daily. Onset occurs most often in childhood or adolescence but can occur at any age.
- Typical onset may be dramatic with polyuria, polydipsia, and polyphagia. Patients may report rapid weight loss regardless of them oral intake and poor energy/exercise tolerance.
- If untreated, can progress to diabetic ketoacidosis (DKA) and coma.
- Does not usually run-in families, but there is a higher risk.
- Usually occurs in normal-weight individuals.
- Accounts for up to 10% of all diagnosed cases of diabetes.
- Was called Insulin Dependent Diabetes (IDDM) or Juvenile Onset until 1997.

TYPE II DIABETES

- Characterized by relative insulin deficiency. Type 2 diabetes is a progressive disease of insulin resistance in combination with insulin deficiency. The body may produce some insulin, but the body is unable to use it properly

- Lifestyle modification— nutrition and exercise are fundamental to diabetes therapy.

- The person with type 2 diabetes may begin their medical treatment with a variety of oral, inhaled, or injected therapies.

- Onset occurs most often in people over age 30, but is being found more frequently in youth who are overweight.

- Typical onset gradual. Patients may report mild fatigue, blurred vision, frequent yeast infections or no specific symptoms. Months to years of gradually increasing hyperglycemia contributes to approximately 50% of newly diagnosed patients already having a serious diabetes complication at time of diagnosis.

RISK FACTORS INCLUDE:

- Being overweight (≥ 30 pounds overweight or a Body Mass Index (BMI) ≥25)

- Family history of diabetes

- Hispanic, African American, Asian American, or Native American origin

- Older than 30 years of age

- Sedentary lifestyle

- Increases the risk for heart attack and stroke because many with type 2 also have hypertension and hyperlipidemia.

- Accounts for most (90%) of all diagnosed cases of diabetes.

- Was called Non-insulin Dependent Diabetes (NIDDM) or Adult Onset until 1997

48

FACTS ABOUT DIABETES

- Diabetes is a chronic disease. It affects daily life, most body systems, and is a family concern.
- Diabetes affects 25.8 million adults (8.3%) in the United States, 7.0 million of whom do not yet know it.

Complications of diabetes in the United States:

- Diabetes is the leading cause of kidney failure.
- Diabetes is the leading cause of blindness among adults aged 20-74 years.
- Diabetes causes mild to severe forms of nervous system damage in 60-70 percent of persons with diabetes.
- Diabetes causes more than 60% of nontraumatic lower-limb amputations.
- Diabetes increases heart disease death rates among adults (2 to 4 times higher than adults without diabetes.
- Diabetes increases risk for stroke (2 to 4 times higher among people with diabetes)

PREVALENCE OF DIABETES BY AGE GROUPS:

- Age 65 or older— 26.9%
- Age 20 or older— 11.3%
- Prevalence of diabetes by race/ethnicity in people 20 years or older:
- 1. Non-Hispanic whites — 7.1%
- 2. Non-Hispanic blacks — 12.6%
- 3. Hispanic/Latino — 11.8%
- 4. American Indians and Alaska Natives — 14.2% (Indian Health Services) varies among regions. Ranges from 5.5% (Alaska Natives) to 33.5% among American Indian adults in southern Arizona.
- 5. Asian American and Pacific Islanders— 8.4%

WHY IS THIS IMPORTANT ?

- In 2007, 5,105 deaths were directly attributed to diabetes. Diabetes was also the sixth leading cause of death nationally in 2002 through 2004 and 2006, and seventh in 2005. Diabetes is believed to be under-reported in death certificates in the nation, both as a condition and as a cause of death.

DIRECT COST

- Direct and indirect costs of diabetes in the United States (2007) were almost $174 billion, including:

- $116 billion in direct costs (includes Medicaid and other state programs)

- $58 billion in indirect costs (lost wages and early death)

WHAT COULD WE DO TO HELP?

Educate ourselves so we can educate our patients!

"WHAT CAN I EAT?"

is one of the top questions asked by people with diabetes when they are diagnosed—and our goal is to help answer that question!

HEALTHY FOOD CHOICES (THE DIABETIC DIET)

- There is no "diabetes diet." Really!

- Diabetics have choices—lots. Many different eating patterns can help them manage their diabetes—from Mediterranean to low-carbohydrate to vegetarian ,non-starchy vegetables, minimize added sugars and refined grains, and choose whole, minimally processed foods.

- Having a "diabetes diet" simply means having a healthy diet

CARBS ARE NOT ONE-SIZE-FITS-ALL

- While there is growing evidence to show that low-carbohydrate eating patterns can benefit people with diabetes and prediabetes, there is no one definition for "low carb." For some, following an eating pattern lower in carbs (26–45% of total calories from carbohydrate) showed better blood sugars and a reduction in diabetes medications, among other benefits.

*Making healthy carbohydrate choices such as choosing to eat baked chicken, swiss cheese and peanut butter over having a baked potato.

TWEAKING FOOD CHOICES CAN HELP REDUCE RISK FACTORS FOR COMPLICATIONS.

- Food swaps are easy ways for people with diabetes to reduce their risk for cardiovascular disease and kidney disease. For example, consider replacing foods high in saturated fat, such as butter, Low fat milk and fatty beef, with foods rich in unsaturated fats, like olive oil and fish. Eating food lower in fat significantly decreases your risk for developing heart disease.

- Fat free is not always "free food"

- Free food is defined as food having less than 20 calories per serving. Food labels that reads Fat free maybe still be high in carbs. So read your labels!

TESTING AND MANAGING TYPE II DIABETES

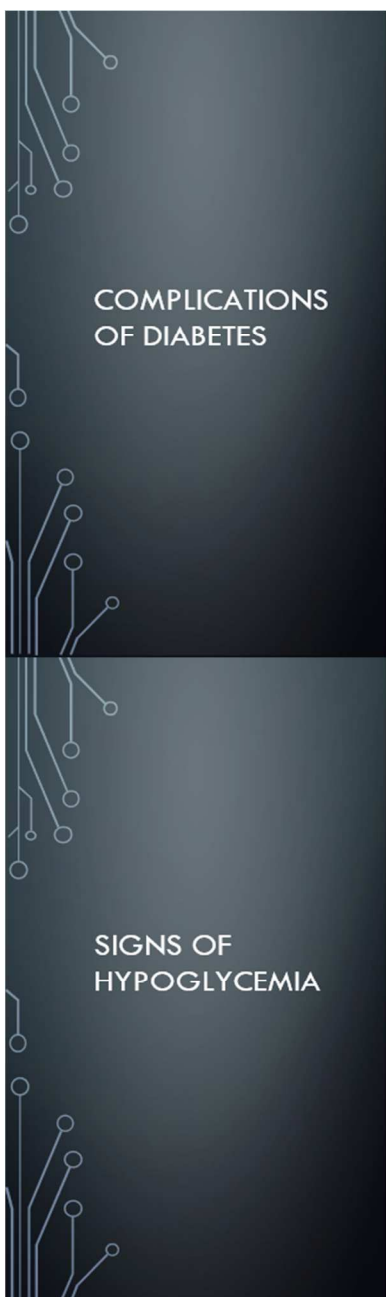The best method for home testing for type II diabetes is blood testing.

Patient should get their A1C checked every 6-12 weeks

A1C testing could be done at 6 weeks if illness occurs or a patient had a recent change in medications

COMPLICATIONS OF DIABETES

Hypoglycemia/Hyperglycemia symptoms

Nerve damage (Numbness and tingling) Neuropathy

Cardiovascular disease

Eye damage (retinopathy)

Kidney damage (nephropathy)

Skin conditions

Alzheimer's disease

Foot damage

SIGNS OF HYPOGLYCEMIA

Shakiness

Dizziness

Sweating

Hunger

Fast heartbeat

Inability to concentrate

Confusion

Irritability or moodiness

Anxiety or nervousness

Headache

COMMON CAUSES OF DIABETIC HYPOGLYCEMIA INCLUDE:

- Taking too much insulin or diabetes medication
- Not eating enough
- Postponing or skipping a meal or snack
- Increasing exercise or physical activity without eating more or adjusting your medications
- Drinking alcohol

*Low blood sugar is most common among people who take insulin, but it can also occur if you're taking certain oral diabetes medications

TREATING HYPOGLYCEMIA

Eat Candy

Drink Skim Milk

Drink Juice (Particularly Orange juice if available)
UNSWEETENED FRUIT JUICES WILL RAISE BLOOD GLUCOSE

DO NOT....

DRINK Soda

CONSUME Alcohol

HYPERGLYCEMIA AND DKA

Recognizing early signs and symptoms of hyperglycemia can help you treat the condition promptly.

WATCH FOR

- Frequent urination
- Increased thirst
- Blurred vision
- Fatigue
- Headache

LATER SIGNS AND SYMPTOMS

If hyperglycemia goes untreated, it can cause toxic acids (ketones) to build up in your blood and urine (ketoacidosis). Signs and symptoms include:

- Fruity-smelling breath
- Nausea and vomiting
- Shortness of breath
- Dry mouth
- Weakness
- Confusion
- Coma
- Abdominal pain

MANY FACTORS CAN CONTRIBUTE TO HYPERGLYCEMIA

- Not using enough insulin or oral diabetes medication
- Not injecting insulin properly or using expired insulin
- Not following your diabetes eating plan
- Being inactive
- Having an illness or infection
- Using certain medications, such as steroids
- Being injured or having surgery
- Experiencing emotional stress, such as family conflict or workplace challenges

EMERGENCY COMPLICATIONS

If blood sugar rises high enough or for a prolonged period, it can lead to two serious conditions

- Diabetic ketoacidosis. Diabetic ketoacidosis develops when you don't have enough insulin in your body. When this happens, sugar (glucose) can't enter your cells for energy. Your blood sugar level rises, and your body begins to break down fat for energy.

- This process produces toxic acids known as ketones. Excess ketones accumulate in the blood and eventually "spill over" into the urine. Left untreated, diabetic ketoacidosis can lead to a diabetic coma and be life-threatening.

- Hyperglycemic hyperosmolar state. This condition occurs when people produce insulin, but it doesn't work properly. Blood glucose levels may become very high— greater than 1,000 mg/dL (55.6 mmol/L). Because insulin is present but not working properly, the body can't use either glucose or fat for energy.

- Glucose is then spilled into the urine, causing increased urination. Left untreated, diabetic hyperglycemic hyperosmolar state can lead to life threatening dehydration and coma. Prompt medical care is essential.

COMPLICATION PREVENTION

The following suggestions can help keep your blood sugar within target range

- Take insulin or oral diabetes medication as prescribed.

- Monitor your blood sugar. Depending on your treatment plan, you may check and record your blood sugar level several times a week or several times a day. If Ill check blood sugars more frequently as blood sugar rises when sick.

- Adjust your medication if you change your physical activity. The adjustment depends on the blood sugar test results and on the type and length of the activity.

- Exercise- having an exercise regimen lowers blood sugar levels

- Wash and look at feet daily

DIABETES MANAGEMENT GOALS OF THERAPY
*AMERICAN DIABETES ASSOCIATION: CLINICAL PRACTICE RECOMMENDATIONS, 2008, AACE (2007) AND THE TEXAS DIABETES COUNCIL (2009)

- Blood Sugar Before Meals 70-130 mg/dL (normal: < 100 mg/dL)* < 110 mg/dL**

- Blood Sugar 2 hrs. After Meals < 180 mg/dL* (peak)< 140 mg/dL**

- Blood Sugar at Bedtime 110-150 mg/dL* (normal < 110 mg/dL)

- Blood Sugar at 3:30 a.m. goal = 100 mg/dL*

- Blood Sugar Before Exercising 100 mg/dL*

- If < 100 mg/dL, snack before exercising (one carb [15 g] for every 30 minutes).

- If type 1 diabetes with blood sugar > 250 mg/dL, caution against exercise, check ketones, drink water, and notify doctor (may need to increase insulin).

58

DIABETES MANAGEMENT GOALS OF THERAPY

A1c ≤ 6.5%	Ketones Negative	Blood Pressure ≤ 130/80 mmHg; if ≥ 1 g proteinuria, ≤ 125/75 mmHg	Triglycerides < 150 mg/dL	LDL-Cholesterol < 100 mg/dL
HDL-Cholesterol ≥ 40 mg/dL	Microalbuminuria < 30 mg/24 hour	eGFR ≥ 60 **	Body Mass Index (BMI) < 25 (Overweight 25-29.9; Obesity ≥ 30)	

SELF MONITORING BLOOD GLUCOSE (SMBG)

- Since diabetes is primarily a disease controlled by the patient, it is extremely important for the patients to monitor their diabetes on a day-to-day basis. The frequency of self monitoring blood glucose (SMBG) depends on the type of diabetes and the level of blood glucose control desired. One of the main purposes of blood glucose measurements is to assist in adjusting in treatment, through either dietary intake, medications, activity levels or a combination of all 3 factors.

FREQUENCY OF TESTING

Depending on degree of control desired, test glucose before breakfast and before supper. Some patients may require testing before each meal and at bedtime. For those patients on bedtime insulin, checking blood sugar at 3:00 a.m. is necessary at least 1x/week.

If the patient is awakened during the night with signs and symptoms of hypoglycemia, if the fasting glucose continues to rise with increasing bedtime insulin, or if the patient complains of restless sleep or awakening with a headache, a glucose check at 3:00 a.m. is required to better determine the correct insulin dosage.

More frequent blood glucose measurements are indicated when changes are made in medication or insulin. If blood glucose levels are stable, test before breakfast and before supper, 2-3x/week.

*Patient who take rapid-acting insulin could potentially have a hypoglycemic episode in less than 2 hours

REASONS TO CHECK BLOOD GLUCOSE MORE FREQUENTLY

- When diabetes medicine changes
- When initiating other kinds of medicines
- When making dietary changes
- When exercise routine or activity level changes
- When level of stress increases
- When the patient is sick. When ill, even without eating, glucose levels may run high, so testing is important!

SPECIAL CONSIDERATIONS IN SMBG

- It is often helpful for patients to document their glucose results in a written log. This activity can assist patients in seeing glucose patterns during certain times of the day. It can also be helpful in making correlations between medications, dietary intake, activity and resulting glucose levels.

- If available, patients can benefit from utilizing computer-downloading features of the meters. The glucose data can be grouped based on time of day, day of the week, weekends vs. weekdays, as well as providing markers of meals, activity and medication times. These computer programs are available for health care professionals' use in the office as well as being available to the patients to use at home.

- Assess your patient's level of competence and select a glucose meter that best meets their needs. Not all patients will benefit from added features and the "extras" may just confuse the patient more.

- Instruct the patient on the proper use of their particular glucose meter. Encourage the patient to read the instruction manual and know how to set the correct date and time, how to recall data, how to change the battery and how to trouble-shoot the meter for problems. Be sure the patient is aware that some meters may read the glucose results in mmol rather than mg/dL.

- Instruct patients to check the expiration date and the proper means of storage and handling for their glucose monitoring strips

- Instruct patients on interpreting the glucose results. It is not enough to just monitor the glucose. The patient needs to understand the correlation between the food they eat, the medications they take, their activity level and the resulting glucose level. The patient must be provided with guidelines on adjusting their insulin dosages for optimal glucose control.

- Burant, C. (2012). Medical management of type 2 diabetes. American Diabetes Association.

- Diabetes - Symptoms and causes. (2018, August 8). Mayo Clinic. https://www.mayoclinic.org/diseases-conditions/diabetes/symptoms-causes/syc-20371444

- Dunning, T. (2013). Care of people with diabetes: A manual of nursing practice. John Wiley & Sons.

- Hyperglycemia in diabetes - Symptoms and causes. (2020, June 27). Mayo Clinic. https://www.mayoclinic.org/diseases-conditions/hyperglycemia/symptoms-causes/syc-20373631

- Recipes & nutrition. (2021). ADA. https://www.diabetes.org/healthy-living/recipes-nutrition

- Type 2 diabetes - Symptoms, causes, treatment. (2021). ADA. https://www.diabetes.org/diabetes/type-2

REFERENCES