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Type 2 Diabetes Prevention and Management Educational Toolkit

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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Walden University
2020

Abstract

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MSN, California State University Long Beach, 2010

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Abstract

Diabetes is one of the chronic diseases that are challenging to prevent and manage. Approximately 8.3% of the United States' population has type 2 diabetes. One of the primary challenges in managing the disease entails reducing the associated financial and human costs by preventing new cases and enacting social change. Prevention and management education programs using enhanced toolkit may have positive effects on type 2 diabetes patients, who start enjoying a good quality of life, as well as positive social change in their communities and families. The purpose of this project was to develop and evaluate a type 2 diabetes prevention and management education toolkit. The project was guided by the Chronic Care Model. The toolkit consists of evidence-based materials for type 2 diabetes prevention and management from the American Diabetes Association and it was reviewed by 20 nurses for their feedback and suggestions for improvement. The nurses noted that the toolkit provides comprehensive information on prevention and management of diabetes on aspects such as risk factors, insulin management, appropriate diet, and carbohydrate counting and meal planning, among others. However, it needs to be improved by including details on types of glucometers and translation into other languages. The toolkit may increase nursing knowledge and serve as a functional guide for nurses to prevent type 2 diabetes and manage care for this patient population. Social change implications for this DNP project may lead to better education of nursing staff so they can help improve self-management behaviors among patients with type 2 diabetes; thereby reducing the diseases' burden in the society.

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Dedication

I dedicate this capstone project to Almighty God my creator, alpha and omega, my source of inspiration, wisdom, knowledge, and understanding. Almighty God has been the source of my strength throughout of this DNP program. I also dedicate this dissertation to my honorable husband, Mr. Longinus Orjiakor, who has encouraged and supported me all the way and who has made sure that I give it all and get to finish what I started. I love you and appreciate you so much for being my pillar. I thank you for supporting me.

To my five children, Nneka (pediatrician), Emeka (attorney), Chioma (dental hygienist), Ike (attorney), Chijioke (economist); my four grandchildren, Master Anayo, Master Chidozie, Miss Ezinne and Miss Sochima; and my daughter in-law, Nicole Orjiakor (attorney), my son in-law, Augustin Kamdem (computer engineer), and my son in-law Mr. Kelvin Odii (Economist): thank you for being there for me throughout the entire doctoral program. You have been my rocks. The endless love I have for you can never be quantified. To my brothers and my sisters, thank you for all your prayers throughout the process.

Finally, I dedicate this to my lovely late parents, Cyprian Obiako and Ezinne Rosaline Obiako, who made me what I am in education. I thank my Dad, whose push for persistence during my high school years still rings in my ears today. I thank my mother especially, who was with me during this DNP program and whose encouragement will never be forgotten. Both of you passed away too soon and did not live to see me reach my terminal education. You will never be forgotten. Thank you all.

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Section 1: Nature of the Project

Introduction

Type 2 diabetes mellitus (T2DM) is a chronic disease associated with insulin resistance and hyperglycemia. The disease is also linked to different macrovascular and microvascular complications, low quality of life, as well as reduced life expectancy (Howells, Musaddaq, McKay, & Majeed, 2016). The global prevalence of diabetes has increased rapidly over the past four decades due to an increase in obesity and the elderly population, as well as changes in ethnic composition. In 2014, the global diabetes prevalence among adults was 8.5%, and an estimated 90% of the reported cases were T2DM (Howells et al., 2016). The prevalence rate is expected to increase to 9.9% by 2030. In 2012, diabetes was associated with 1.5 million deaths while an additional 2.2 million deaths were linked to hyperglycemia. In 2014, the global expenditure on the disease was 11% of the total health budget, and this expenditure is expected to increase due to elevated levels of disease burden (Howells et al., 2016).

Diabetes is managed through different interventions including educational, psychosocial, and behavioral interventions. Diabetes self-management education (DSME) involves empowering patients with the knowledge, skills, and ability required for diabetes self-care (Powers et al., 2015). Diabetes self-management support (DSMS) refers to the support necessary for adopting and sustaining behaviors and skills required for diabetes self-management. Health care professionals contribute to this process. As such, notes that it is crucial for the health care providers to have the necessary knowledge and resources to ensure that diabetic patients receive both DSME and DSMS consistently (Lin et al., 2018; Powers et al., 2015). DSME is particularly provided by health care

professionals within a practice whereas DSMS programs focus patients' health beliefs, current knowledge, and culture needs among other factors that hinder their self-management capabilities (Powers et al., 2015). With proper training, nurses can teach evidence-based, self-management practices to type 2 diabetes patients, which will reduce the cost of diabetes, improve documentation, and improve diabetes management.

Diabetes is a threat to most U.S citizens. The American Diabetes Association (ADA) and Centers for Disease Control and Prevention (CDC) have developed numerous educational materials and activities to reduce the prevalence and incidence of type 2 diabetes. Despite all the education available, diabetes remains a significant health problem and is the seventh-leading cause of death in the United States (U.S. Department of Health and Human Services, 2018). In 2013, there were 29.1 million people in the U.S. with diabetes of which, 21 million were diagnosed (with 8.1 million undiagnosed) and 28.9 million were 20 years of age or older. The age aggregated statistics show that 4.3 million patients were 20-44 years old, 13.4 million were 45-65 years old, and 11.2 million were 65 years or older (CDC, 2014). Additionally, 15.5 million people with diabetes were men and 13.4 million were women.

When data on diabetes prevalence from 2010 to 2012 were aggregated by race and ethnicity, 7.6% of the diabetic patients were European Americans, 9% were Asian Americans, 12% were Hispanic Americans, 13.2% were African Americans, and 15.9% were Native Americans. Among the Asian American population, the CDC reported the rate of diagnosis was 4.4% for Chinese Americans, 13.8% for Asian Indians, 11.3% for Filipino Americans, and 8.8% for other Asian American populations. The diagnosis rate for Alaskan Natives was 6.0%, while the American Indians in Southern Arizona had a

rate of 24.1% (CDC, 2014). The increase in the number of diabetic patients from 2010 to 2012 is an indication that diabetes is a healthcare problem that requires attention.

The key challenge in managing diabetes entails reducing the human and financial costs associated with the disease. Diabetes is associated with 15-year reduction in life span (Lin et al., 2018). Besides, diabetic patients have a high risk of developing comorbidities such as blindness, kidney failure, heart disease, diabetic ulcers, strokes, and gangrene or amputation of a lower limb (CDC, 2014; Maryniuk, Mending, Imershein, Gregory, & Jackson, 2013). Additionally, the CDC reported that in 2012, the total cost of diabetes in the U.S. (direct and indirect) was $245 billion and direct medical expenses associated with the disease amounted to $176 billion in 2014 whereas the indirect cost arising from work loss, disability and death amounted to $69 billion.

The correct projection of diabetes cost and healthcare burden is important for future planning of healthcare needs and costs. Lin et al. (2018) conducted a study projecting the costs of diabetes among U.S. adults up to the year 2060. The projected number and percentage of adults diagnosed with diabetes will increase from 22.3 million (9.1%) in 2014 to 39.7 million (13.9%) in 2030. The researchers predicted that the number will rise to 60.6 million (17.9%) in 2060. Notwithstanding, the number of people with diabetes aged 65 years and above will increase from 9.2 million in 2014 to 21.0 million in 2030, and to 35.2 million in 2060. The percent prevalence will increase across all race-sex groups, with black women and men continuing to have the highest diabetes percent prevalence, and black women and women of other races having the largest relative increases. Lin et al. (2018) concluded that that by 2016, the number of U.S. adults diagnosed with diabetes was projected to triple. Such projections are important as

they indicate the significance of planning health services to cater for the growing diabetes burden and plan public health programs aimed at reducing it in the future.

Problem Statement

The increased prevalence of diabetes across the globe, and particularly in the U.S. indicates there is a need to empower health care professionals and patients on diabetes care (Howells et al., 2016). The disease is associated with morbidity and mortality, micro and macrovascular damage as well as psychosocial problems (Howells et al., 2016). Notably, patients should be educated on appropriate prevention and self-management measures by healthcare providers since poor control of the disease can lead to low quality of life.

Diabetes prevention and management education is one way of empowering the population at risk for type 2 diabetes and those who already have type 2 diabetes (Powers et al., 2016). Poor self-care is associated with non-adherence with lifestyle interventions recommended for managing the disease. Research has established that healthcare providers lack sufficient knowledge on diabetes management. Consequently, they are unable to educate or empower their patients with the necessary self-management knowledge and skills leading to failure to initiate appropriate diabetes self-care (Abduelkarem & El-Shareif, 2013; Yacoub et al., 2014).

Action has been taken by healthcare providers to educate diabetic adults about preventative healthcare. Nurses and certified diabetes nurse educators are trained to provide diabetes education to the population with diabetes or those at risk for diabetes. However, one-third to one-half of the population with diabetes or at risk for diabetes never had formal diabetes education from nurses (Maryniuk et al., 2013). Additionally,

nurses may not be aware of the resources available for the effective prevention and management of type 2 diabetes. This project involves development of a toolkit for type 2 diabetes prevention and management kit.

Purpose Statement

The purpose of this project was to develop a nursing toolkit based on best practices in type 2 diabetes prevention. Further, the toolkit was evaluated by nurses. Health care providers must know best practices and interventions for diabetic patients that are aimed at changing unhealthy lifestyles so they can advise the patients on how to manage the disease effectively. A toolkit to educate nurses about prediabetes and type 2 diabetes management can potentially equip them with the appropriate self-management knowledge and skills (Lavoie et al., 2013).

Project Objectives

The first objective of the DNP project was the development of a toolkit on T2DM to guide and help the nurses in a medical clinic office to teach their patients about the disease and self-management strategies. The second objective was to engage nurses in the evaluation of the toolkit.

Nature of Doctoral Project

This project entails the development of a toolkit to help medical clinic office nurses teach adult patients with type 2 diabetes and their families how to prevent and manage prediabetes and type 2 diabetes. The toolkit provides a blueprint and tools that nurses can use to advance their knowledge about type 2 diabetes and apply in their daily clinical practice with adult patients who have prediabetes and type 2 diabetes.

Nurses are encouraged to embrace lifelong learning by seeking opportunities to advance their qualifications and capabilities to provide care to diverse societies. Lifelong learning entails actively seeking for knowledge and understanding through formal and in-formal learning to meet one's professional needs (Qalehsari, Khaghanizadeh, & Ebadi, 2017). Through this project, nurses get an opportunity to enhance their diabetes prevention and management knowledge. The DNP project enhances nurses' knowledge and confidence levels regarding their role in diabetes care.

Significance

Healthy lifestyle practices could prevent 80 to 90% of type 2 diabetes cases (Kerrison et al., 2017). In high-risk populations, the risk of progressing to type 2 diabetes could be reduced by up to 60% with lifestyle interventions aimed at a healthy diet, moderate to vigorous physical activity, and weight loss or weight maintenance (Yates et al., 2012). According to Hamasaki (2016), physical exercise enhances glycemic control and minimizes the risk of cardiovascular disease as well as mortality among diabetic patients. The researcher established that walking for at least 30 minutes daily minimizes the risk of the T2D by 50%.

Nurses have significant opportunities to improve awareness of disease prevention and management for adult patients with type 2 diabetes. Staff nurses, nurse practitioners, and certified diabetes nurse educators can use the toolkit for patients' first visit and on each follow-up visit to assess and evaluate patients' and families' knowledge related to type 2 diabetes prevention and management. Nurses play a significant role in educating patients on the trajectory of diabetes and fostering self-management (Powers et al., 2015). The toolkit developed through this DNP project may enhance nurses' and patients'

knowledge and allow nurses, patients, and family members to collaborate to make healthcare decisions for diabetes prevention and management. The toolkit may enhance nurses' knowledge and confidence levels regarding their role in diabetes care and supporting diabetic patients in self-management of the condition.

Practice-Focused Question

The question for the DNP project is: After the development of a toolkit, do the nurses in the field deem the toolkit as effective?

Implication for Social Change

The development of the diabetes toolkit may lead to better education of nursing staff so they can help improve self-management behaviors among patients with type 2 diabetes. These patients are at an increased risk of developing complications like cardiovascular disease, poor circulation, kidney failure, diabetic ulcers, blindness, pulmonary tuberculosis, and disorders of lipid metabolism (Chen et al., 2016). Lack of proper diabetes self-care increases the disease burden on the patients, their family members, as well as the society in general as it elevates the expenditure associated with the disease. The toolkit may help individuals with prediabetes to engage in lifestyle modification behavior, thus creating a healthier community. Healthier lifestyles in pre-diabetic and diabetic patients can create happier and healthier families and reduce the strain on medical facilities and care costs to communities.

Proper diabetes management enhances the quality of life and the patients' well-being (Powers et al., 2015). Lifestyle interventions for type 2 diabetes are designed with a focus on behavioral and diet modification such as diet and exercise. These interventions are associated with positive outcomes such as weight reduction, reduced diabetes risk,

better sleep patterns, and lowered cardiovascular risk. Besides, the interventions result in a decrease in the severity of stress and depression (Hamasaki, 2016).

Summary

Diabetes is a major health problem in the U.S. with significant human and financial costs that could be mitigated through effective disease management and prevention education. Healthcare organizations are increasingly advocating the need to implement behavioral changes that are based on evidence-based practices that will improve disease prevention and management among adults with type 2 diabetes. Medical clinic care providers play a vital role in diabetes management by motivating, educating, and providing feedback to individuals with the disease. The purpose of this project was to develop a toolkit for medical clinic nurses so they can better teach adult patients with type 2 diabetes about prevention and management and address lifestyle modifications to prevent and manage diabetes-related complications. The next section presents the literature review and evidence-based framework underlying the diabetes management content for the toolkit.

Section 2: Background and Context

Introduction

Diabetes and its complications can be significantly delayed or prevented through simple, cost-effective interventions. The purpose of this DNP project was to develop a toolkit based on best practices in type 2 diabetes prevention and have it evaluated by nurses. This section presents the evidence-based framework underlying the diabetes prevention and management program in the medical clinic setting and its relevance to nursing. The section also reviews literature on diabetes and diabetes management as well as education. A search of the literature on diabetes education and prevention strategies was conducted using the electronic databases such as CINAHL, Ovid Plus, ERIC, and PubMed databases in addition to the Cochrane Library, Google Scholar, and the ADA and CDC websites. The keywords used to query the databases included *type 2 diabetes, pre-diabetes, healthcare professionals, practice nurses, medical clinic office, diabetes prevention, diabetes knowledge, lifestyle modification, diabetes belief, adherence and compliance to lifestyle interventions, diabetic diet,* and *self-efficacy.* The articles selected specifically addressed the knowledge of healthcare experts regarding diabetes prevention and education, population beliefs about diabetes, lifestyle modification, and the burden of diabetes. The search was limited to articles published in English between 2015 and 2020. Evidence-based practice should be current hence, it was important to use sources published within the last five years. A total of 31 relevant articles were obtained for the review as indicated in the PRIMA diagram below.

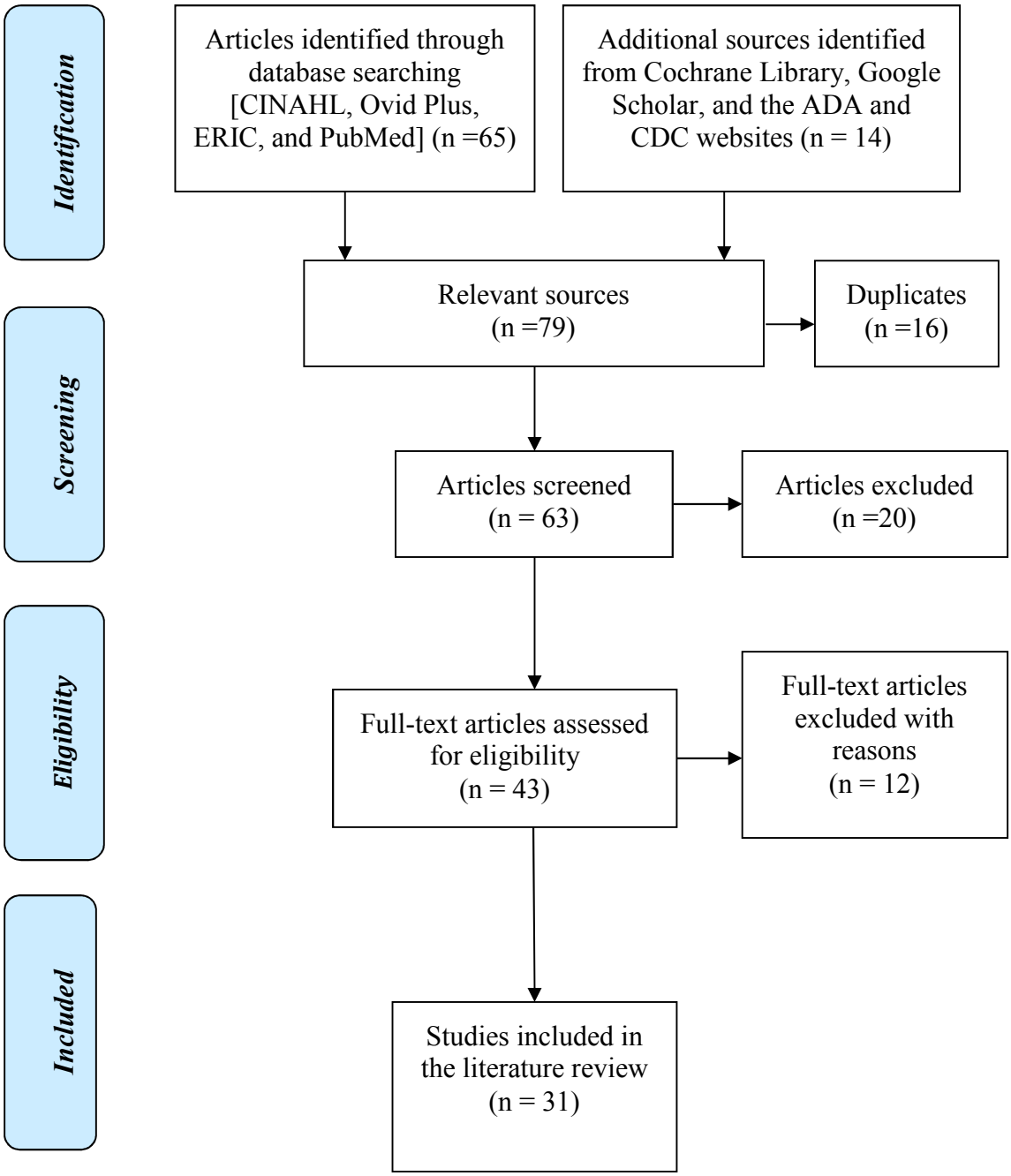

Figure 1. PRISMA diagram

The literature review focused on studies that support the benefits of diabetes education and monitoring labs using a toolkit for type 2 diabetes prevention and management in clinical settings. The literature review also addressed studies exploring

the impact of diabetes education and social support in education programs and interventions, the effectiveness of type 2 diabetes lifestyle interventions, and factors influencing patient adherence to medication and treatment regimens.

Review of Literature

Diabetes Education, Family, and Social Support

Diabetes self-management training and education plays a significant role in improving management of the disease. The training ensures that diabetic patients are aware of the nature, treatment, risk factors, and the complications associated with the disease and the measures for alleviating them. Diabetes self-management education does not only involve relaying information, but also encompass dynamic, holistic, and patient-centered approach (Kosti & Kanakari, 2012). Education promotes self-management as well as health-related behavioral modification. However, diabetes education should align with the patients' learning capabilities and psychosocial state, and should be enhanced to improve the patients' understanding of the importance of check-up and follow-up (Kosti & Kanakari, 2012).

Nazar et al. (2016) investigated the effectiveness of diabetes education in the United Kingdom. The researchers' key objective was to assess the role of knowledge and awareness of diabetes in combating the disease. Nazar et al. (2016) conducted a systematic review of available evidence on effectiveness of diabetes education. The findings indicated that there are various diabetes education programs in the UK such as Dose Adjustment for Normal Eating (DAFNE), Diabetes Education and Self-Management for Ongoing and Newly Diagnosed (DESMOND) and X-PERT Diabetes Program. The programs are developed to empower diabetic patients to manage their

conditions. The findings further indicated that the education programs can minimize the risk factors as well as the chances for developing diabetes complications leading to reduced morbidity and mortality.

Ehrmann et al. (2016) compared the effectiveness of diabetes education program for Type 1 Diabetes (PRIMAS) in a randomized controlled trial setting and routine care setting. The experimental group contained 75 patients whereas the control had 179 patients. The evaluation focused on improvement of HbA1c, hypoglycemia challenges, and diabetes-related distress at the baseline and 6-month follow-up. The findings indicated that the patients in the both groups had a significant longer diabetes duration (18.7±12.3 vs. 13.8±12.7 yrs., p = .005), lower self-efficacy scores (21.9±4.7 vs. 23.7±6.1, p = .02) and more diabetes complications (0.8±1.3 vs. 0.4±0.9, p = .02) (Ehrmann et al., 2016). PRIMAS led to considerable improvements in HbA1c (-0.36%±1.1 vs. -0.37±1.2; Δ -0.01, 95% CI -0.33 to 0.31) as well as hypoglycemia unawareness (-0.5±1.4 vs. -0.3±1.4; Δ 0.18, 95% CI -0.21 to 0.57) (Ehrmann et al., 2016). The researchers concluded that diabetes education of PRIMAS was effective in both RCT and routine care settings.

Social support is defined as the exchange of valuable resources between family members, partners, friends, and nurses to provide a caring, loving, encouraging, motivating, and teaching environment for patients who need support in the medical clinic (Kirk et al., 2013). Wagner, Tennen, Feinn, and Osborn (2015) conducted a study to investigate whether self-reported racial discrimination was associated with continuous glucose levels and variability in individuals with diabetes, and whether diabetes distress mediated these associations. Seventy-four Black and White women with type 2 diabetes

completed the Experience of Discrimination Scale, a measure of lifetime racial discrimination, and the problem areas in diabetes, a measure of diabetes distress. Participants wore a continuous glucose monitor for 24 h after 8 h of fasting, a standard meal, and a 4-h run in period. Higher discrimination predicted higher continuous mean glucose and higher standard deviation of glucose. For both mean and standard deviation of glucose, race and discrimination interaction indicated a stronger relationship between discrimination and glucose for Whites than for Blacks. Diabetes distress mediated the discrimination–mean glucose relationship. Whites who report discrimination may be uniquely sensitive to distress. These preliminary findings suggest that racial discrimination adversely affects glucose control in women with diabetes, and does so indirectly through diabetes distress. Diabetes distress may be an important therapeutic target to reduce the ill effects of racial discrimination in persons with diabetes.

Lee, Piette, Heisler, and Rosland (2018) conducted a study to examine whether autonomy support (defined as social support for an individual's personal agency) for diabetes management from informal health supporters (family/friends) reduces the detrimental effects of diabetes distress on glycemic control. In this study, three hundred and eight veterans with type 2 diabetes and one or more risk factors for diabetes complications completed a survey that included measures of diabetes distress and perceived autonomy support from their main informal health supporter. Hemoglobin A_{1c} (HbA_{1c}) data from 12 months before and after the survey were extracted from electronic medical records. Linear mixed modeling examined the main effects and interaction of autonomy support and diabetes distress on repeated measures of HbA_{1c} over the 12 months after the survey, controlling for mean prior 12-month HbA_{1c},

time, insulin use, age, and race/ethnicity. Lee et al. (2018) established that diabetes distress (B = 0.12 [SE 0.05]; P = 0.023) was associated with higher and autonomy support (B = −0.16 [SE 0.07]; P = 0.032), and lower subsequent HbA_{1c} levels. Autonomy support moderated the relationship between diabetes distress and HbA_{1c} (B = −0.13 [SE 0.06]; P = 0.027). Greater diabetes distress was associated with higher HbA_{1c} at low (B = 0.21 [SE 07]; P = 0.002), but not high (B = 0.01 [SE 0.07]; P = 0.890) autonomy support. Lee et al. (2018) concluded that autonomy support from main health supporters may contribute to better glycemic control by ameliorating the effects of diabetes distress. Interventions that reduce diabetes distress and enhance the autonomy supportiveness of informal supporters may be effective approaches to improving glycemic control.

Vaccaro, Exebio, Zarini, and Huffman (2014) investigated how ethnicity, perceived family/friend social support (FSS), and health behaviors are associated with diabetes self-management (DSM) in minorities. The participants were recruited through community outreach methods and included 174 Cuban-Americans, 121 Haitian-Americans, and 110 African-Americans with type 2 diabetes. The results indicated that ethnicity and FSS were associated with DSM. Higher FSS scores were associated with higher DSM scores, independent of ethnicity. There were ethnic differences in several elements of FSS. DSM was highest in Haitian-Americans as compared to African-Americans; yet Haitian-Americans had poorer glycemic control. The findings suggested that FSS together with ethnicity may influence critical health practices. Based on these findings, there is a great need for more studies to further investigate the relationships among minorities with diabetes, their intimate network (family and friends) and the diabetes care process.

Effectiveness of Lifestyle Interventions

Lifestyle modification with weight control, moderate exercise, and dietary changes can decrease type 2 diabetes. Physical activity and nutrition for diabetes in Alberta (PANDA) menu plan is one of the lifestyle interventions that have been adopted to improve diabetes management among patients in Canada. The menu plan focuses on recipes and foods that are readily available and acceptable (Asaad, Soria-Contreras, Bell, & Chan, 2016). Asaad et al. (2016) conducted a single-arm, pre-post intervention study to determine the effectiveness of the PANDA menu plan on blood glucose control and dietary adherence and quality among type 2 diabetes patients. The study was conducted among 73 patients who were taken through interactive education on Canadian Diabetes Association (CDA) nutrition therapy guidelines. Post-intervention follow-up was done after three and six months. The findings indicated positive changes in A1c (-0.7%), body mass index (BMI, -0.6kg/ m^2), and diastolic blood pressure (-4mmHg), as well as total cholesterol (-63 mg/dL) (Asaad et al., 2016). Additionally, positive changes were noted in HDL-(+28 mg/dL) and LDL cholesterol (-89 mg/dL), health eating index (+2.1 score), as well as the perceived dietary adherence (+8.5 score) at 0.05 significance level (Asaad et al., 2016). These improvements were maintained at six months demonstrating the intervention's effectiveness in facilitating glycemic control and diet quality. The findings further indicated that dietary intervention including interactive education sessions is effective in improving diabetes management.

In another study, Ndwiga, MacMillan, McBride, and Simmons (2018) conducted a meta-analysis of available evidence to demonstrate that lifestyle interventions can be used to reduce diabetes incidence and complications among Polynesian people. The

researchers reviewed eight studies: four RCTs and four pre-post studies with 1590 participants. The studies focused on health outcomes such as systolic blood pressure (SBP), body mass index, weight, waist circumference, and glycated hemoglobin. The meta-analysis showed that the lifestyle interventions led to statistically significant reductions in blood pressure. Additionally, the interventions led to reductions in weight and glycated hemoglobin though the changes were not statistically significant. Ndwiga et al. (2018) also noted that lifestyle interventions led to modest reductions in SBP among the patients.

Kerrison et al. (2017) adopted a systematic review approach to investigate the effectiveness of lifestyle adaptation on prevention of pre-diabetes among adults. The researchers focused on the effect of exercise and dietary intervention on glycemic control and incidence of type 2 diabetes mellitus (T2DM). The secondary outcomes in the study included body mass index, weight change, and physical exercise capacity after the intervention. Kerrison et al. (2017) identified a sample of 1,780 studies out of which nine met the inclusion criteria. The findings indicated that lifestyle adaptation minimizes the incidence of diabetes development. Additionally, the intervention enhanced glycemic control, improved physical exercise capacity, and amplified weight reduction.

In another study, Fianu et al. (2016) explored the effectiveness of a lifestyle intervention in preventing Type 2 diabetes in Reunion Island. The study focused on body weight and waist circumference among obese adults who were at high-risk of developing the disease. The experimental study was conducted among 445 adults categorized into the intervention and the control group. The intervention involved a healthy diet, physical exercise, as well as improved living conditions. The results indicated a significant

reduction in adiposity, body weight loss, BMI reduction, and waist circumference reduction in the intervention group.

Howells et al. (2016) evaluated the clinical impact of lifestyle interventions adopted to prevent diabetes. The researchers assessed systematic reviews of studies conducted among adults at high risk of diabetes. The interventions adopted in the systematic reviews ranged from dietary and physical activity interventions and the primary measures included glycaemia, and diabetes incidence whereas the secondary measures were behavior change, adiposity, vascular disease, and mortality. Howells et al. (2016) identified 19 reviews for inclusion in the study, most of which only focused on randomized control trials. The findings of most of the reviews indicated that lifestyle interventions were linked with a reduction in diabetes incidence as well as measures of glycaemia and adiposity. However, Howells et al. (2016) noted that the studies infrequently reported the effects of such interventions on behavior change, vascular disease, and mortality leading to minimal evidence for the secondary outcomes.

Lavoie et al. (2013) conducted interviews with 34 providers and 29 patients who were engaged in group medical appointment (GMAs). They used a cross-sectional design that included a sample of 29 adult patients who had type 2 diabetes. This study showed that the GMA approach is an alternative for diabetes care that reflects ideal patient-centered care. This study's main finding was that patients form voluntary relationships of care with their providers, which facilitate respect and enable autonomy, accountability, fidelity, and humanity.

Factors Influencing Medication/Treatment Regimen Adherence

Kassahun (2016) conducted a study to assess non-adherence and factors affecting adherence of diabetic patients to anti-diabetic medication in Assela General Hospital (AGH), Oromia Region, Ethiopia. Among the respondents, 149 (52.3%) and 136 (47.7%) were female and male, respectively. The majority of the study participants 189 (66.3%) were in the age group of 30–60 years. Two-hundred nineteen (76.8%) of respondents were married currently. The majority, 237 (83.2%) of respondents did not have blood glucose self-monitoring equipment (glucometer). A total of 196 (68.8%) respondents adhered to anti-diabetic medication. There was a significant association between adherence to the medication and side effects, level of education, monthly income, and presence of glucometer at home ($P < 0.05$). Kassahun et al. (2016) concluded that the participants in the area of study were moderately adherent to their anti-diabetic medications with a non-adherence rate of 31.2%. Different factors of medication non-adherence were identified such as side effects and complexity of regimen, failure to remember, and socio-demographic factors such as educational level and monthly income.

Gonzalez, Tanenbaum, and Commissariat (2016) explored the psychosocial factors influencing medication adherence and diabetes self-management. The researchers emphasized that health behaviors including medication adherence, diet, physical activity, as well as blood glucose self-monitoring are crucial towards attaining optimal glycemic control. However, most patients experience challenges attaining recommended standards for diabetes management. Gonzalez et al. (2016) argued that diabetes self-management is influenced by factors in three broad domains including knowledge, beliefs, and related cognitive constructs, emotional distress and wellbeing, as well as behavioral skills and

coping. Diabetes self-management requires robust health literacy skills and an understanding of the effects of the disease on the body, the treatment goals, and the impacts of different behaviors on glucose regulation. Self-management is influenced by factors relating to emotional distress and well-being such as depressive symptoms, fear of hypoglycemia, optimism, self-esteem, and sense of purpose (Gonzalez et al., 2016). Additionally, the researchers emphasized that family-context and social relationship factors also determine the effectiveness of self-management. The researchers recommend continued emphasis on research to improving psychosocial aspects of living with diabetes, with greater attention to the situational context in which the self-regulatory processes underlying self-management occur.

Sweileh et al. (2014) conducted a study that focused on the serious health problems associated with diabetes and medication non-adherence. The main goal of the study was to improve medication adherence among adult patients with type 2 diabetes. Sweileh et al. (2014) interviewed 405 patients diagnosed with type 2 diabetes using the eight-item Morisky Medication Adherence Scale and found 42.7% of the participants were considered non-adherent to their medication regimen. As a result of the study, participants showed significant improvement in awareness about their medications and knowledge about their illness which was displayed as a positive change in their medication adherence.

To address the challenge and gap in the management of T2DM, stakeholders have, proposed, enacted, and evaluated a number of interventions. For instance, Chrvala, Sherr, and Lipman (2018) conducted a study to implement and evaluate the short-term effectiveness of a diabetes self-management education intervention on diabetes-related

knowledge and accepted behavioral changes to decrease risk for complications. The education intervention was intended to enhance diabetes-related knowledge and self-management behaviors. A convenience sample of 15 patients with T2DM was used pre and post analysis was conducted to evaluate its effect. The findings showed that there was an increase in the patients' knowledge level increased.

Similarly, Emokidi (2020) undertook a study to identify patients' concerns related T2DM and to develop an education program for providers to address these concerns. The study involved five providers who conducted assessments during a primary care visit or 22 patients diagnosed with T2DM. The findings showed that there were concerns on diet, exercise, medication, taking shots, blood sugar checks, comprehending diabetes, follow-up appointments, depression, requiring a new insulin pump and the need for lifestyle change. Consequently, an education program was developed and delivered to the 5 providers to address the raised concerns. All practitioners agreed or strongly agreed that the education program provided information they could use to educate and support their T2DM patients.

Given the importance of staff in management of T2DM, Williams (2020) sought to develop staff Education on the same. After a review of the literature an evidence-based education program was developed that covered the current standards of care for T2DM. A posttest analysis showed that the staff education significantly increased staff knowledge. The knowledge led to effective management of positive social change may result when staff are knowledgeable of T2DM where staff can provide informed support to patients and family and in so doing enable patients to lead healthier lifestyles.

In their study Moura et al (2019) sought to evaluate the effect of educational intervention in the adherence to self-care activities and functional health literacy and numeracy in people with T2DM. The researchers conducted a quasi-experimental where the interventions were delivered in three weekly meetings lasting 60 minutes on average. The findings showed that educational interventions had a positive effect on adherence to self-care and functional literacy in health. Further Bene et al (2019) found that mobile health applications on self-management in patients T2DM. The mobile health applications efficiently deliver knowledge on healthy eating, blood sugar monitoring, physical activity, good problem-solving skills, risk-reduction behaviors, healthy coping skills and medication adherence.

Concepts, Models, and Theories

This evidence-based project was guided by the Chronic Care Model (CCM) developed by Wagner in 2001. The model was developed as a means of introducing comprehensive strategies for managing chronic diseases and improving care delivery for such diseases (Davy et al., 2015). The model utilizes a systematic approach towards restricting medical care to establish partnerships between health systems and communities (Stellefson, Dipnarine, & Stopka, 2013). CCM has been designed to build on the inter-relationships between six evidence-based pillars that lead to improved clinical quality and outcomes regarding disease management. It has also improved care in health systems at the community, organizational, primary care, practice, and patient levels (Wagner, Austin, Schaefer, & Bonomi, 2001).

The six pillars of CCM include first; healthcare system/organization, which creates a culture to promote safe, high quality of care. The second pillar is the delivery

system design, which ensures efficient clinical care and self- management support. The third pillar is decision support, which fosters clinical care with consistent scientific evidence and patient preferences. The fourth pillar is clinical information systems, which facilitate access to patient and population data to cultivate improvement of efficient and effective patient care. The fifth pillar is community resources and policies, which activate various resources to meet patients' needs. The sixth pillar is self-management support, which is essential to empower patients with chronic disease to effectively manage their healthcare needs (Zhang, Van Leuven, & Neidlinger, 2012). CCM has been used for diabetes care in U.S. primary care settings with positive patient outcomes such as decreased HGB AIC levels (Stellefson et al., 2013). All six pillars of the CCM will be applied to this project to create a diabetic care toolkit for nursing staff.

Pillar One: Healthcare System and Organization

The healthcare system must identify methods that have been used to improve quality and access to care. The advanced practice nurse (APN) provides leadership and education on diabetes which builds patients' confidence in their understanding of the disease process. It is a priority for the APN to intervene with patients at risk for developing type 2 diabetes complications by providing education to improve clinical and behavioral outcomes. According to Stellefson et al. (2013), a systemic review indicated that healthcare systems in support of the CCM approach found positive benefits associated with improved foot care and HGB AIC reductions of at least 1% during a 12-month period. The researchers also found positive changes associated with improved blood pressure, cholesterol levels, weight reduction, and body mass index (BMI) reduction.

Pillar Two: Delivery System Design

A delivery system design is intended to facilitate skill-based learning for nursing staff so they can effectively educate diabetic patients about glycerin and hemoglobin AIC monitoring as well as nutrition and lifestyle changes. This step involves coordination of care, which includes recommendations for eye care, foot care, nutritional counseling, and follow-up recommendations. Each patient is encouraged to take control of his or her diabetes and learn self-management skills. Healthcare providers should focus on providing optimal care of diabetes through management of complications. This is accomplished by addressing barriers to care such as lack of knowledge and awareness of services available for diabetes (Stellefson et al., 2013).

Pillar Three: Decision Support

Decision support provides guidance for implementing comprehensive, evidence-based care. This pillar covers education on risk factors; regular follow-up with primary providers; and information about risk factors and identifying barriers (Stellefson et al., 2013). The toolkit provides comprehensive information for nurses to integrate evidence-based diabetes care guidelines into clinical practice.

Pillar Four: Clinical Information Systems

A clinical information system tracks progress through reporting outcomes to patients and providers. Stellefson et al. (2013) claimed that clinical information systems using disease process registries and Electronic Medical Records (EMRs) can help patients and providers set self-management goals and review progress reports to determine whether patients met their goals. This pillar is accomplished through a recommendation of the strategies for evaluating the toolkit.

Pillar Five: Community Resources and Policies

Community resources include a variety of services and resources that are available within an organization. Nurses will gain comprehensive information about effective services in the community such as relevant agencies and cost-effective services for patients, nutritional counseling, and peer support groups (Stellefson et al., 2013). Upon completion of the toolkit, nurses can refer patients to community resources that offer different services such as eye care, foot care, and patient assistance programs essential for diabetic patients.

Pillar Six: Self-Management Support

Evidence indicates that nursing staff should emphasize patient empowerment and the acquisition of self-management skills because they are effective in diabetes care (Wagner et al., 2001). Nurses who are properly educated about type 2 diabetes can educate and work with patients on issues such as medication compliance, foot care, diabetic diet and exercise, interpretation of laboratory results, and goal setting for better healthcare outcomes. A review of literature indicated diabetes self-management education can generally improve psychosocial and clinical outcomes in patients with pre-diabetes, diabetes, and disease progression (Stellefson et al., 2013).

Strengths and Limitations of the CCM

CCM is an evidence-based guideline and a synthesis of system changes to guide quality improvement (Wagner et al., 2001). The model is associated with several strengths including facilitation of community and family support to meet the needs of patients, improvement of health systems, delivery system design, and clinical information systems to meet the needs of both health care providers and patients, as well as enhanced

health care professional case management to meet patients' needs (Davy et al., 2015). Additionally, the model promotes effective delivery of care, facilitates self-management of care, and provides evidence-based tools and techniques for care provision while controlling costs and resources. Besides, the model promotes implementation of systems for improving quality of life for individual patients and populations. A limitation of the model may be that it has only been utilized in healthcare since 2001, compared with other theoretical models that have been utilized and tested for decades.

Due to the impact of chronic illnesses on the healthcare system, researchers should explore additional comprehensive diabetes education strategies using CCM to improve patient satisfaction and patient outcomes. CCM is ideally equipped to handle education about chronic illnesses because it has "provided guidance regarding chronic illness such as diabetes as well as a systematic approach to improve care" (Wagner et al., 2001, pp. 64-78). Stuckey, Adelman, and Gabbay (2011) noted that the model has been most effective in translating evidence-based recommendations into clinical practice, particularly in relation to diabetes management both in the U.S. and internationally. CCM is particularly suitable for this project as it hypothesizes "that the productive interactions of a prepared proactive practice team and an informed empowered patient and family lead to improved outcomes" (Stuckey et al., 2011 p. 49). The diabetes prevention and management education program will impart essential knowledge to the participating nurses who will be in a position to empower their patients leading to improved health outcomes.

Relevance to Nursing Practice

Nurses play a significant role in patient education, which is perceived as one of the means of promoting health. Health education entails creating awareness among patients on diverse issues as a way of preventing diseases and improving well-being. Diabetes self-management education is a collaborative process through which diabetic patients acquire the knowledge and skills required to modify their behavior and manage the disease (Burke, Sherr, & Lipman, 2014). Kemppainen, Tossavainen, and Turunen (2013) emphasized that nursing practitioners should adopt practical actions to promote health through the use of a holistic or patient-centered approach. Notably, nurses should utilize the available opportunities to educate diabetic patients about the disease, the risk factors, and the self-management interventions.

As integral stakeholders in the healthcare system, nurses are concerned by issues affecting the health care sector such as high costs. Nurses can contribute towards reducing hospital admissions and readmissions by educating patients about diabetes self-management. Patient education leads to a reduction in estimated lifetime health care costs due to a lower risk for complications. The cost of diabetes in the U.S. was $245 billion in 2012, and patient education provides an opportunity for minimizing the costs (Powers et al., 2015). Projections indicate that one in three persons will develop type 2 diabetes by 2050. Diabetes costs will overwhelm the country's health care system creating the need to reduce the incidence rates and diabetes-related complications.

Local Background and Context

Diabetes threatens the health of many people living in the U.S. (ADA, 2011; CDC, 2014). Although the ADA (2011) and CDC (2014) have developed numerous

educational materials and activities to decrease the prevalence and incidence of type 2 diabetes, diabetes is still a significant health problem. Not only is the disease the seventh leading cause of death in the U.S. (U.S. Department of Health and Human Services, 2018), it is associated with an estimated 15-year reduction in lifespan and a high risk of developing stroke, heart disease, blindness, kidney failure, gangrene, and lower-limb amputations (CDC, 2014).

The prevalence of diabetes varies by gender and ethnic group, but also varies by education level and geographic location. The prevalence of the disease is higher in individuals without high school education compared to those who have attended high school or tertiary education. Geographically, the prevalence of diabetes in 1994 was 4.5% in 25 states, 4.5% to 6.0% in 24 states, and over 6.0% in one state; however, in 2010, all states had a prevalence of diabetes over 6.0%, and 15 states exceeded 9.0% (CDC, 2014). The CDC also revealed that Mississippi had the highest rate of diagnosed diabetes at 11.3%, followed by Alabama at 11.1%. The lowest rate of diagnosed diabetes was in Vermont at 5.8%, followed by Montana and Minnesota at 6.2%, respectively. The distribution of diabetes across the states also showed an increase in the prevalence of diabetes, especially in the southeast. The medical clinic of interest in this project provides care to approximately 3,150 patients who are part of an underserved community and 8% of those patients are diabetic, annually.

Nurses have the same responsibility in providing care to diabetic patients whether in an inpatient or outpatient care setting. Healthcare facilities depend on nurses to provide diabetes education to individuals at risk for type 2 diabetes or pre-diabetes. However, Abduelkarem and El-Shareif (2013) posited that nurses lack sufficient diabetes

management skills, particularly on insulin therapy. The researchers maintain there is a need for advancing general diabetes knowledge among nurses in hospital settings. Empowering nurses with this knowledge would enable them to convey accurate information to diabetic patients.

Yacoub et al. (2014) conducted a study to assess the level of Jordanian nurses' perceived and actual knowledge of diabetes and examined the relationship between nurses' actual knowledge of diabetes and their different characteristics. A total of 277 out of the 450 eligible registered nurses accepted to participate and returned questionnaires from seven hospitals in Jordan. Nurses in this study mostly demonstrated a knowledge deficit in clinical and theoretical-based topics, such as initial treatment of hypoglycemia, insulin storage and preparation, meal planning, and duration of action with hypoglycemic agents. Nurses' actual knowledge of diabetes was positively correlated with their perceived knowledge, perceived competence, and level of education. The researchers concluded that a knowledge deficit regarding diabetes was demonstrated by the nurses. The role of continuing education is essential to supporting nurses' knowledge of complex clinical conditions, such as diabetes. Adequate implementation and dissemination of evidence-based guidelines on caring for people with diabetes is a prerequisite to improve the nurses' knowledge.

Carney, Stein, and Quinlan (2013) examined nurses perceived and actual knowledge of diabetes. A total of 245 nurses completed a structured questionnaire measuring their experience, perception of diabetes, and diabetes knowledge. The researchers established a need to enhance the nurses’ and nursing students’ nutritional knowledge in relation to diabetes management. Nurses are not registered dieticians, but

they should maintain basic knowledge of diabetes nutrition to care for patients with diabetes.

Young-Hyman et al. (2016) conducted a needs assessment to determine nurses' knowledge of diabetes care and found a gap between staff nurses' perceived knowledge and their actual knowledge of diabetes mellitus. Alotaibi, Gholizadeh, Al-Ganmi, and Perry (2018) explored the factors nurses perceive as influencing their knowledge acquisition in relation to diabetes care and its management in Saudi Arabia. Three main themes emerged: (a) diabetes care and education, (b) barriers affecting nurses' acquisition of diabetes knowledge and (c) factors to support nurses' acquisition of diabetes knowledge (Alotaibi et al., 2018). The researchers concluded that to pursue the goal of continued improvement in diabetes management in the challenging settings of acute care, there is a need to develop good practice in diabetes care among nursing professionals. Understanding of the complexity of factors that influence nurses' knowledge acquisition in relation to diabetes care and its management provides clinical nurses and nursing managers with directions for future education, policy development, and research (Alotaibi et al., 2018).

According to Powers et al. (2015), some of the mental health nurses' felt that they did not receive appropriate diabetes care training and a majority hold the belief that they need further training in diabetes care. For this reason, nurses working with populations at increased risk for diabetes or type 2 diabetes must be equipped with the knowledge of providing evidence-based diabetes prevention education to the population (Powers et al., 2015).

Nurses must also be knowledgeable about current evidence-based practices and resources to provide competent, effective, and culturally sensitive education. American Diabetes Association (2016) emphasized the importance of adapting programs to meet the educational needs of specific healthcare providers, arguing that nurses and medical clinic staff must be knowledgeable about current evidence-based practices and resources to provide competent, effective, and culturally sensitive education on type 2 diabetes. Chiang, Kirkman, Laffel, and Peters (2014) asserted that the high prevalence, increased complication, and poor outcomes of diabetes among African Americans and Hispanic Americans is a result of a lack of culturally sensitive and population-specific intervention by healthcare providers as well as a lack of knowledge about the disease process and treatment regime specific to African Americans and Hispanic Americans. Tovar and Clark (2015) examined these populations' beliefs and knowledge about diabetes and found that participants did not consider exercise, weight control, and physical activity as factors that could influence diabetes. The researchers also found that participants lacked knowledge regarding the cure for diabetes and suggested the lack of knowledge about the causes and treatment of diabetes contributes to poor health outcomes.

Role of the DNP Student

During the clinical nursing experience, I questioned diabetes patients about their type 2 diabetes care and some of them had little to say or did not know about their diabetic treatment, which further highlighted the lack of awareness among them. I conducted tests from which I found that both patients and staff lacked knowledge of type 2 diabetes prevention and management. This discovery emphasized the need to develop a toolkit for nurses to improve their knowledge about type 2 diabetes so that they can be in

a better position to educate the patients who visit medical clinic office with pre-diabetes and type 2 diabetes. My main area of interest is the use of EBPs to make decisions about effective pre-diabetes to type 2 diabetes treatment and education.

There is a need to create a type 2 diabetes toolkit, choose an assessment, and have the toolkit evaluated by nurses. If the toolkit is accepted and used in the future at this medical clinic office, the organization will be supported in the implementation of the planned staff education program. Efforts will be made to ensure that nurses are working closely with patients as diabetic champions and participating in continue education or training to improve their knowledge of pre-diabetes and type 2 diabetes so they can better serve their patients.

Definition of Terms

Diabetes: A group of metabolic disorders in which the level of blood sugar is high, which is a result of inadequate insulin production or body cells do not respond properly to insulin, or both (Asmat, Abad, & Ismail, 2016).

Diabetes self-management education (DSME). This is the process of empowering diabetic patients with information aimed at improving their knowledge, attitudes, self-efficacy, and decision making leading to healthy behaviors and improved clinical outcomes (Sherifali, Berard, Gucciardi, MacDonald, & MacNeill, 2018).

Diabetes self-management support (DSMS). This involves sustained efforts to help diabetic patients to maintain effective self-management throughout their lifetime (Piatt, Rodgers, Xue, & Zgibor, 2018).

Insulin: A hormone produced by the pancreases that allows the body to utilize glucose for energy (Craft & Rhoads, 2016).

Prediabetes: If an individual has pre-diabetes, this means that his or her blood sugar level is higher than normal but not yet high enough to be type 2 diabetes (Bansal, 2015).

Type 2 diabetes: This is a disorder in the body that causes the level of blood sugar to rise beyond normal levels. If an individual has type 2 diabetes, this means that his or her body does not utilize insulin properly (Chatterjee, Khunti, & Davies, 2017).

Assumptions and Limitations

The primary limitation is that toolkit was only developed, but was not used by nurses at this time. There are multiple assumptions related to the toolkit. First, it was assumed that the clinic staff may accept and value the program and apply the acquired knowledge on diabetic patients. Next, it was assumed patients who visit the clinic may accept the self-management recommendations from nurses and make lifestyle modifications to prevent or manage diabetes. Finally, it was assumed these nurses evaluated the toolkit correctly and honestly.

Summary

The literature review has indicated that type 2 diabetes can be prevented and managed with lifestyle modification. Unsuccessful type 2 diabetes management has been attributed to a knowledge deficit about management for populations with prediabetes and type 2 diabetes. The literature further indicates that educating nurses about diabetes and self-management can improve patient outcomes since the nurses would be able to empower their patients with the acquired knowledge (Kosti & Kanakari, 2012; Nazar et al., 2016). Developing a toolkit for diabetes self-management based on CCM can ensure that nurses and patients are empowered to manage the disease. The next section presents

the project design and methods, the target population, intervention outline, and evaluation plan.

Section 3: Collection and Analysis of Evidence

Introduction

The purpose of this DNP project was to develop a nursing toolkit based on best practices in type 2 diabetes prevention and care and have the toolkit evaluated by the nurses. Using the results of a 2015 needs assessment of the project setting, the DNP student found a high number of patients with pre-diabetes converted to type 2 diabetes. Clinic staff had no specific intervention or practice protocol aimed at decreasing type 2 diabetes in adult patients. A discussion with the clinic medical director revealed the need to develop an implementation and evaluation plan for type 2 diabetes management education with the goal of decreasing the number of patients who develop type 2 diabetes. The clinic nurses may use the toolkit when educating patients with type 2 diabetes. This section covers the practice-focused question, sources of evidence, and analysis and synthesis.

The initial step in planning the development of the educational intervention (toolkit) included gathering the learning material and constructing objectives to be used for the toolkit (See Appendix A for the sample outline for the toolkit). Staff education is often used to help inform and improve knowledge and skills relating to the best clinical practice. The primary key stakeholders were the nurses, clinical nursing director, nursing manager in the medical clinic office, and the evaluation team, which consists of the clinic administrators and staff who may review the plan and provide input for the development of a toolkit. The DNP student was responsible for the step-by-step planning of the project, including the evaluation plan and gathering best practices information from multiple sources, creating the toolkit, presenting it to the evaluation team, and making the

necessary revisions. The information was appropriate for the patients' age, literacy level, education, and language skills. Patient educational materials was written at the sixth to eighth grade reading levels. The nurses avoided the use of medical terminology or jargon. Printed and audiovisual materials will be useful due to the patients' short clinic visits which limit the time for teaching. Printed materials are useful for reinforcing information provided to patients while in the medical clinic office and serve as a ready resource. Printed materials provide an important reminder of key points after patients go home. Families, which include any people who play an important role in the patient's life, must be included in discussions and demonstrations.

The toolkit (Appendix A) present a description of type 2 diabetes and the risk factors associated with the disease. The toolkit further outlines evidence-based practices for preventing the disease and the importance of preventing or delaying the disease.

Practice-Focused Question

The question for the DNP project is: After the development of a toolkit, do the nurses in the field deem the toolkit as effective?

Sources of Evidence

Population and Sampling

This evidence-based DNP project targeted nurses working in a family clinic located in South Central California and that has served vulnerable populations since 2007. The type 2 diabetes toolkit was reviewed by a convenience sample of 20 nurses. The nurses included nurse educators and registered nurses with expansive knowledge and experience on diabetes.

Data Collection

The DNP student communicated with the nurses in person to invite them to participate in evaluation of the toolkit. An invitational letter was given to the potential participant. DNP student hand delivered the surveys and the toolkit to the nurses and then come back in a one week to collect feedback from the nurses who may have reviewed the toolkit developed through the project. The nurses were instructed to put their completed surveys in a sealed envelope at a designated place in nursing conference room. There was a total of 20 nurses who reviewed the toolkit and offered input for improvement. Data collection was achieved using a five-point Likert scale questionnaire which also contained two-open questions which enabled the nurses to provide feedback in narrative form (Appendix B).

Protection of the Human Subjects

The DNP student sought approval from Walden University Institutional Review Board before collecting data from the nurses who reviewed the toolkit. The project is educational as it followed Walden's DNP Manual for staff Education. The DNP student sought the permission of the clinic's management before implementing the project at the facility. The nurses' confidentiality and privacy were protected since identifiers such as names were not required for the project purposes.

Analysis and Synthesis

Data Analysis

The evaluation data from the nurses were analyzed through descriptive statistics to determine if the toolkit is effective. The evaluation data was analyzed through frequencies and percentages to determine how the nurses rated the toolkit. The analysis

was achieved through Microsoft Excel. The evaluation results are presented through the use of tables and graphs.

Evaluation Plan

The educational module toolkit was reviewed by the nurses to determine whether it provided nurses with diabetes-related knowledge so that they can pass the knowledge to their patients. The evaluation also determined whether the tool may be used in future studies on diabetes knowledge and self-management. The evaluation also highlighted the strengths and weaknesses of the toolkit and how it will contribute to nursing practice.

Outcome Evaluation

The toolkit was reviewed by the nurses who commented on the content and give recommendations with regards to the additional content that should be integrated into kit. The project consisted of two plans: (1) the development of the toolkit, and (2) the assessment and feedback of the toolkit by the 20 nurses. Evaluation of this project was necessary in order to assess the strength and weakness of the educational toolkit and its benefit to nursing practice. The DNP student evaluated the project by interpreting the results and determine the applicability of results for the organization and for the patients' social change. Particularly, the interpretation focused on the applicability of the toolkit in enhancing nurses' and patients' diabetes and diabetes self-management knowledge. DNP student communicated the results and recommendations to organizational leaders and program stakeholders through a systematic presentation and poster.

Summary

With the large number of diabetic patients in the U.S., healthcare providers must be innovative in addressing the burden of diabetes-complicated outcomes using

comprehensive approaches that will not only address the management of diabetes, but the factors leading to the disease. The best approach to diabetes care is prevention and management through lifestyle modification. Nurses and patients should be educated about diabetes self-management. The proposed toolkit is one way to provide nurses with resources to improve management of diabetes among patients in the clinic.

Section 4: Findings and Recommendations

Introduction

The primary role of the DNP is to prepare nurse practitioners for advanced doctoral practice in nursing. It provides nurses with unique skills and ensures that they fully understand the dynamics of the health care sector and how different issues can be handled. Primarily, the DNP empowers nurses to develop critical skills-set that enable them to evaluate, design, disseminate, and implement the findings from research to improve the standards of care and enhance efficiency in health care. In the current DNP project, the primary objective was first to develop a toolkit on T2DM to guide the nurses in a medical clinic office in teaching their patients about the disease and self-management strategies. Secondly, the project sought to engage the nurses in the evaluation of the toolkit. The findings below are aimed at meeting these two project objectives as well as providing detailed information about the toolkit.

Findings of the Project

In the current DNP project, a total of 20 nurses were recruited for the project. The nurses considered to be well-informed about diabetes and had also taken part in caring and treating patients diagnosed with diabetes. The project was implemented with the help of nurses from a family clinic in South Central California, which has been serving the vulnerable population since 2007. The nurses, who were the respondents in the project, comprised of the nurse educators, and the registered nurses within the care facility. The group was selected based on their vast knowledge and experience in the management of diabetic patients within the facility. In this project, the nurses were invited to participate in the evaluation of the T2DM toolkit. The nurses were given the guide on how to use the

toolkit together with the survey questions. The information was collected after one week to evaluate the feedback from the respondents. There were seven items on the survey which used a 5-point Likert scale to develop the responses. The summary tables below provide the detailed analysis of the data collected from the respondents.

Quantitative Analysis

The findings below show the nurses' views regarding the overall effectiveness of the toolkit. The findings in Table 1 show 18 respondents agreed that the educational module toolkit will help improve nurses' knowledge on causes of diabetes and its complications.

Table 1

*Evaluation of Overall Effectiveness of Toolkit (*N = *20)*

Question	**Yes**	**No**
1. The educational module toolkit will help improve nurses' knowledge on causes of diabetes and its complications.	18	2

The results of the 7-item survey results of the review and evaluation completed by the 20 nurses who participated are displayed in Table 2 with a summary of the findings by item.

Table 2

*Survey Evaluation of Toolkit Results (*N = *20)*

Question	Strongly Disagree 1-SD	Disagree 2- D	Neutral 3-N	Agree 4-A	Strongly Agree 5-SA	Mean
1.The toolkit comprehensively informs nurses on the role of insulin.	2	2	1	8	7	3.8
2.The toolkit provides comprehensive information on the management of type 2 diabetes.	1	1	1	7	10	4.2
3.The educational module toolkit contains comprehensive tips on monitoring blood sugar and how to use Glucometer.	1	1	1	10	7	4.05
4.The diabetes food pyramid presented in the toolkit comprehensively addresses the foods that should be taken by diabetic patients.	1	1	1	10	7	4.05
5. The toolkit comprehensively addresses the healthy lifestyle changes proposed for diabetic patients to manage the disease.	1	1	1	9	8	4.1
6.The toolkit presents sufficient information on meal planning.	2	1	1	8	8	3.95
7.Overall, I am satisfied with the quality of the education module toolkit.	3	1	2	7	7	3.7

As noted in Table 2, the respondents were asked whether or not the toolkit comprehensively informs on the role of insulin. Based on their responses, it emerged that 10% of the respondents strongly disagreed with the question while another 10 % disagreed. On the positive side, an accumulative percentage of 75% agreed that the toolkit was useful in informing the nurses on the role of insulin in the management of diabetes.

The respondents were asked whether the toolkit offered comprehensive information in regard to the management of type 2 diabetes. The management of the condition is highly dependent on time to time information which is often provided by the various healthcare providers. Hence, having a toolkit that includes critical information helps in providing better health care services to the patients. Based on this question, it emerged that an accumulative percentage of 85% (Table 2) of the respondents alluded that the toolkit was critical in providing certain important information.

The respondents were asked to evaluate the diabetes food pyramid, which was presented in the toolkit. The management of a diet for a diabetic patient plays a crucial role in ensuring that the patients achieve a stable state. The food taken plays a vital role in enhancing the health of the patient by improving the immune system. Based on the information that was provided by the toolkit regarding the food types for diabetic patients, the respondents were in agreement that the set of food types provided adequate information on the type of food that should be consumed by diabetic patients.

The toolkit was also evaluated in terms of how efficient it addresses healthy lifestyle changes. Diabetic patients have to adopt healthy lifestyles to manage the disease. This helps in reducing the extreme impacts of diabetes on their health. The respondents

were asked to evaluate the toolkit regarding how best it addresses the healthy lifestyle changes in its proposal. Based on their responses as noted in Table 2, 85% of them were confident that the toolkit had provided a better plan on the changes in lifestyle that patients had to adhere to manage the disease.

Meals are also an essential segment in part of the management of diabetic patients. The toolkit had a section that provided information on meal planning. The respondents were required to evaluate the toolkit on its ability to provide the appropriate plan of meals for diabetic patients. The findings (see Table 2) reveal that the nurse practitioners were in agreement that the toolkit provided sufficient information regarding the meal plans for the patients. The data showed that a cumulative percentage of 80% of the respondents confirmed that the toolkit was useful in helping the healthcare plan the meals for diabetic patients.

Finally, the respondents were asked to rate the education module kit in regards to their level of satisfaction. Based on this question, 70% of the respondents were satisfied with the education module toolkit (Table 2). However, 15% were not happy with the toolkit, implying that there are a few changes that need to be done to ensure that it becomes effective in enhancing the management of diabetic patients.

The above results have shown the perception of the nurses towards the toolkit. The findings show that nurses are receptive to the toolkit and they perceive it as informative. Also, in terms of satisfaction, the respondents have shown a greater level of satisfaction with the toolkit. Furthermore, the toolkit covers several critical issues that always make it hard to provide quality care for diabetic patients. The toolkit empowers

nurses to provide patients with the correct information on diabetes; thereby, fostering proper self-management among Type II DM patients.

Qualitative Findings

Do you agree or disagree with the assertion that the educational module toolkit will help improve nurses' knowledge on causes of diabetes and its complications?

One respondent who agreed said "*The tool kit provides comprehensive information on the minimization of chances of getting diabetes and also how one can manage the condition once they have it*". Another respondent with similar opinion said "*Generally the tool improves nurses' knowledge on the causes of diabetes given that it shows the role of genes and lifestyles.* One nurse who disagreed said "*The tool does not provide new information from that which I have read and been taught in other trainings."*

The toolkit comprehensively informs nurses on the role of insulin.

One of the nurses who strongly agreed said "*there is information on how insulin can be used when diet and exercise are not effective in managing blood sugar level".* Another respondent with similar opinion said "the *tool shows that insulin is one of the remedies that can be used to manage diabetes especially when other approaches are not effective".* Another nurse added "*in the overview the tool somehow defines the role of insulin generated by the body and also goes further to outline the use of medical insulin in managing of diabetes as a compliment of other regimens. There is information on types of insulin*, *insulin onset peak duration and the consideration when administering it."*

The toolkit provides comprehensive information on management of type 2 diabetes.

A nurse who agreed said "*the tool provides information on the causes, of diabetes, how it can be prevented and when it sets it how it can be managed".* Another nurse with similar opinion said, "*The tool provides information on the precursors of diabetes, the prevention method and the treatment approach by medical practitioners as well as those that can be implemented by the patients themselves."* This was comparable to the nurse who said "*The tool offers all-inclusive information on the causes of diabetes and the medical and non-medical approaches to prevent and manage it. Of importance is the role of nutrition and physical activity noted in prevention and management. There is need for lifestyle change".*

The educational module toolkit contains comprehensive tips on monitoring blood sugar and how to use Glucometer.

A nurse who agreed to that the toolkit contains comprehensive tips on monitoring blood sugar and how to use Glucometer said, "*there is information which helps one should know while monitoring sugar levels and how to do it".* Five nurses said that the information in steps of using glucometer was useful where one respondent was of the opinion "*I found the steps to be used when testing sugar levels to be informative and very useful".* One respondent who disagreed said "*the information is not clear on how a medical practitioner should monitor sugar levels"* which was similar to one who said "*there is useful information but it is not comprehensive".*

The diabetes food pyramid presented in the toolkit comprehensively addresses the foods that should be taken by diabetic patients.

The findings showed that 17 of the respondents agreed that the food pyramid presented in the toolkit comprehensively addresses the foods that should be taken by diabetic patients. One of the respondents said "*the pyramid provides information on all types of food and their usefulness in causing, preventing or managing diabetes. I think all foods are included".* Another respondent added "*the food pyramid includes all type of foods where it shows examples in each classification and how they can be consumed".* A respondent who disagreed said "*even though all foods are included it is not clear how they should be consumed, the frequency and the quantities. It is also not clear what foods to avoid."*

The toolkit comprehensively addresses the healthy lifestyle changes proposed for diabetic patients to manage the disease.

The findings showed that 17 of the respondents were positive that the toolkit comprehensively addressed the healthy lifestyle changes proposed for diabetic patients to manage the disease. In particular one respondent said, "there *is information on what types of foods one should consume, the quantities and also the inclusion of physical activity".* Another respondent added "*the tool shows that those seeking to manage diabetes should eat some types of foods, those which they should avoid or minimize and how the importance of physical activity in managing the condition".* Another similar respondent added " *There is comprehensive information on change of lifestyle which include better eating by reducing carbohydrates intake to maintain a healthy weight an increasing physical activity by walking or simply moving around more to achieve good blood glucose levels."*

The toolkit presents sufficient information on meal planning.

One respondent who agreed there is adequate information on meal planning said "*There is information on the types of foods to be consumed and a plan that one can follow. Notably the tool notes that there is no single ideal dietary distribution of all diabetic patients as such meal plans should be customized to fit individual needs as long as the quantity to each type is achieved".* Similarly, another respondent added "*the information on meal plan can be used by all people from all walks of life."* This was comparable to the response; "*the tool has information on how one can plan to consume carbohydrates, fats, and proteins for people with diabetes and the details can be understood by all patients"*

In overall, I am satisfied with the quality of the education module toolkit.

The findings showed that 16 of those who took part agreed that they were satisfied with the quality of the education module toolkit. One respondent said, "*the education provides an all-round perspective of prevention and management of diabetes"* which was similar to the response; "*The toolkit starts with a brief introduction of what is diabetes, provides information on role of insulin, monitoring sugar levels and a healthy lifestyle can be achieved".* Another respondent added that "*I am satisfied with the education provided with the tool given it shows that patients have an important role in preventing and managing of diabetes."*

Strengths and Weaknesses of the Toolkit

Strengths. The main strength of the tool was that it provides comprehensive information on prevention and management of diabetes. One respondent said "*the tool provides comprehensive on the strategies which can be taken to prevent diabetes and*

how the condition can be managed. Of importance is the information on lifestyle changes, food intake and meal plan as well as the significance of physical activity". Another respondent said "*The tool has important information which patients can take to prevent diabetes and on self- management. The tool outlines that patients have a prominent role in the process".*

The weakness of the tool is that it does not provide specific information on some members of society as inferred from one respondent who said "*the tool assumes that all members of society have the same traits. There is no information on how those who are economically disadvantaged can use the tool."* One respondent noted that the tool assumes that patients only have diabetes but it is known that it is possible for someone to have other ailments. In this regard, the respondent said, "*the tool does not include information on people who have comorbidities, those who have physical disabilities hence cannot exercise".* One respondent said: "*the tool does not provide comprehensive information on the use of different types of glucometers given that there are self-monitoring blood glucose glucometers, continuous glucose monitors, and non-invasive glucose meters."* This was similar to the respondent who said, "*there is no information on how one can choose a glucometer which fits their needs and diabetes condition".*

Weaknesses. One of the major impacts of the toolkit as evidenced by the data from the respondents is that it is more detailed and highly focused. In this context, the toolkit offers sound advice on self-management for patients with Type II DM. Additionally, the toolkit is easy to read as it uses simple language to explain the different components. This allows the nurses and the patients to gain a better understanding of the toolkit thus increasing the chances of comprehension. Finally, the respondents added that

the toolkit provided critical information that would increase self-management compliance among the patients.

The respondents argued that the toolkit was too long. This was due to the fact that it had to provide detailed information to enhance its effectiveness. The depth of the information provided in the toolkit made it too long and this could reduce the willingness of the patient to go through the information keenly. Another challenge with the toolkit as identified from the nurses' responses was language barrier. The respondents argued that the use of one language in designing the toolkit would impact negatively on the patients who do not understand English.

Recommendations for Improvement of the Toolkit

One recommendation was that; "*The tool should include more information on the use of various types of glucometers and the comparison between the glucometers to enable patients use various products given that not all are equally accessible".* Another recommendation was that "*the tool should include information on how diabetes management practices can be combined with those of common conditions such as cardiovascular, obesity and overweight, HIV/AIDS among others".* Another respondent said, "*the tool should add information on people who come from disadvantages backgrounds, different ethnicities, and also those who are unable to exercise due to given disabilities."*

Based on the challenges that were identified by the respondents, it is important to make some changes to the toolkit to increase its effectiveness. First, there is need to develop the toolkit in different languages. This is intended at solving the problem of language barrier. By providing the information in different languages, it will offer non-

English speaking patients a better chance to learn about diabetes self-management. Additionally, due to the complexity of the information, there is need to simplify, use a simple language and make it more precise. The tool will be improved by adding information on how people with physical disabilities can use it. In addition, it will be translated to other languages to meet the needs of non-English speakers.

Findings and Implications

Nursing practice faces a number of challenges as a result of the growing number of lifestyle-related conditions. However, with rigorous research, there are greater chances of overcoming some of the critical challenges in the management of health conditions around the world. The implementation of the project will hopefully be a resource for nurses to help educate patients which has the potential of increasing self-management knowledge among diabetic patients (Kemppainen et al., 2013).

Use of the tool which provides more information on self-care management has a potential of increasing quality care. The best way to ensure there is success in the management of diabetes is to empower the patients themselves to be aware of their conditions and the best strategies to manage the disease. This can be done through the use of the toolkit by healthcare providers. Through this empowerment process, the patients will gain more confidence and get more involved in the management of their conditions. The process will eventually ease off the burden on the nurses and their assistants who have, in the past, do everything with little input from the patients. The current project, therefore, may have greater benefits to health care as it seeks to not only enhance the quality of care but may secure ensure that patients become part of the care delivery journey.

Recommendations

The findings on the evaluation of the education module toolkit reveals that the nursing practice would benefit as a result of its adoption. The process of adopting the toolkit in the current health care setting requires a great deal of co-operation from both the health care staff and the patients. Every tool has its weaknesses and challenges. It is, therefore, critical to determine some of the underlying challenges that would make the toolkit more efficient.

Implementation of toolkits is a team effort which needs cooperation and coordination of all practitioners directly and indirectly involved. As such, with a proper team in place, the toolkit can be effectively adopted by the health care systems and perform constant monitoring. Furthermore, it is recommended that patients receive proper education about the benefits of the toolkit in their self-management journey. Other patients might be uncooperative and the best way is to empower them with the right information. Proper communication can help them understand the toolkit and cooperate for better health care outcomes.

Strengths and Limitations of the Project

The current project had its strengths and weakness. One of the greatest strengths was the use of nurses in the evaluation of the toolkit. The respondents were in two categories, the registered nurses and the nurse educators. This is the group that deals with diabetic patients daily, and therefore, they understand very well the nature of the condition, including its management. By involving this group in the evaluation of the toolkit, they would provide the right information that would reflect the level of effectiveness of the education module toolkit. Also, by implementing the project in the

family clinic that has many patients with diabetes, it would make it easier to implement several self-management practices and evaluate the toolkit over time.

One of the greatest limitations of the project was that the setting was limited to only one health care. Additionally, the nature of the healthcare facility, which is a clinic would limit the generalization of the results. Furthermore, it would limit the application of the findings to other bigger hospitals. However, with this being an education module toolkit, further application of the project in larger health care settings would be critical to develop comparative results. Also, there is a need to implement the toolkit and monitor it over a longer time. The process would include closer monitoring and follow-up of patients over time to determine its effectiveness. Also, the sample used was only 20 respondents. If the research findings are to be adopted widely, there is a need to further conduct the same process with a bigger sample of nurses to develop unbiased results. Also, this would help in identifying other unique challenges such as the language barrier which could adversely affect effective communication. Despite these challenges and limitations, the current project is viable and should be implemented to support the provision of care to diabetic patients.

Summary

The educational module toolkit was developed to help the nurses to teach their patients about the disease and self-management strategies, and the second aim of the project was to engage the nurses in the evaluation of the toolkit. In the project, a total of 20 nurses, who comprised of the nurse educators and the registered nurses were recruited to take part in the project. The implementation of the project was undertaken in a family clinic in California. The facility has served the vulnerable population for over a decade.

During the implementation stage of the project, the selected nurses were provided with questionnaires in which they were expected to give their responses. The questions were designed in the form of rated items using the Likert scale format. There were a total of 7 questions that focused on the management of diabetes and the education of the patients.

The questions further focused on the overall satisfaction of the educational module toolkit, its ability to provide sufficient information about meal planning, the diabetes food pyramid, and issues about lifestyle changes. It also comprised questions on its ability to provide general tips on monitoring the blood, and how to use the Glucometer and, finally, the role of insulin in the management of the condition. The nurses were given one week to evaluate the toolkit and familiarize themselves with it. The responses they gave were used to gauge the effectiveness of the toolkit in advancing diabetes self-management knowledge among the nurses and the patients as well as improving the management of diabetes among the patients.

The findings showed that the toolkit was useful but needed improvement to make it more effective. First, it provided critical information about diabetes. It also gave information on the suitable food types and the lifestyle changes that are required to keep the patients in stable condition. Also, the nurses were comfortable with the toolkit and had no difficulties using it to educate the patients. The toolkit provided the appropriate information required to educate and empower the patients to manage their own health. Particularly, the toolkit presents information on crucial aspects of diabetes self-management including pre-diabetes, risk factors and symptoms for type 2 diabetes, American Diabetes Association Standards of Care Guidelines, oral medications and types of insulin, using a glucometer, carbohydrate counting, and meal planning, among others.

It is, therefore, important to devise a plan on how the toolkit will be implemented in other health care settings. The only challenge that was identified was the fact that the sample was small, and the setting was a family clinic, thus limiting the generalization of the results.

Section 5: Dissemination Plan

Introduction

The role of the DNP program is to equip nurses with the right skills to advance their nursing practice. It is the role of a nurse to adopt evidence-based practices that seek to improve the management of health care. The current project is aimed at enhancing the management of diabetic patients. With the educational module toolkit, it may become easier for the nurses to manage their patients. The toolkit may ensure that the patient is well-informed about the condition and its management strategies. Patients fully equipped with the information will take care of themselves and stick to the strategies of managing the condition.

The full implementation which entails sharing it with patients and making follow-ups to ensure they have comprehended the information and offering clarification has the potential of changing how diabetic patients are treated. It seeks to reduce the burden on the nurses who have to do everything on their own. It provides information on shared roles between the diabetic patient and the nurse, thus improving the standards of care. The project findings will be shared with the administrators of the primary care clinic through use of an executive summary. After improvement of the toolkit as per the recommendations and weaknesses identified, the findings will also be shared with other nurses in California through nursing seminars and workshops, which fall among the key avenues for disseminating research findings (Brownson et al., 2018). Based on the recommendations from the reviewers, the toolkit will be revised. After these revisions, I plan on presenting my project to a local conference.

The outlined dissemination plan primarily targets nurses, nursing scholars, and nurse leaders or family clinic administrators. Family clinic and primary care nurses are in the front line in the management of diabetes, emphasizing the need to provide them with a toolkit that they can use to educate diabetic patients on self-management. On the other hand, nursing scholars could benefit from the project findings and the toolkit due to improved type 2 diabetes self-management knowledge. The nurse leaders and administrators in family clinics are an appropriate audience for the project findings since their support towards implementing evidence-based practice is fundamental.

Analysis of Self

As a DNP student, this project has been one of the most fulfilling achievements so far. I must admit that at first, things were tough as I had challenges figuring out how to start. However, after engaging my peers and doing detailed online research, I came up with a path to follow. I am happy to be part of the changes in health care through research. As a scholar, the current project not only meets my educational requirements but also contribute immensely to the management of diabetic patients in society. I am happy to have identified a problem in health care, evaluated it, and eventually developed a solution. This may not be the last step in the development of the toolkit. Since many dynamic factors affect our healthcare, the toolkit will be modified based on the findings from the evaluation process. In addition, future research could improve the educational module toolkit and enhance it to be more efficient than its current state. I plan to continue conducting further research in nursing practice and solve various problems. There are many challenges in the field of nursing, and these setbacks can only be overcome through research. The current project was an eye-opener for me as it helped in developing critical

research skills. The skill-set that I have developed throughout the project includes the research skills of problem-solving and evaluation. These are the essential skills that help in improving quality studies that are critical in making health care changes.

The current project gave me a unique opportunity to develop an educational module toolkit. This is one of my greatest achievements. It helps me demonstrate and apply the skills learned in a classroom setting to the real problems affecting health care systems. The toolkit is meant to improve the management of patients with Type II DM and seeks to enhance communication and coordination between the nurses and the patients. There were many challenges in the development of the project. First, I experienced the problem of finding the right setting where the project could be implemented. However, I finally found a family clinic that matched the requirements of the project. Also, another challenge had to do with a small sample. I only managed to recruit 20 nurses. In the future, the research studies aimed at improving the toolkit should focus on increasing the sample. I am happy to have been part of a process that results in change within the health care setting. I am proud of my current achievements, and I am convinced that with this experience, I will continue contributing to further development of the toolkit.

By developing the toolkit, I have demonstrated the ability to operate as a monitoring and evaluation player. I have acquired skills helpful in identifying health challenges and developing evidence-based solutions. Also, engaging in the project has expanded my knowledge base and understanding of diabetes. It has helped in developing and transforming nursing knowledge into clinical practice. I am looking forward to developing more toolkits for other conditions and reduce the burden on the nurses.

Throughout the project, I engaged in knowledge evaluation and synthesis. The project is all about transforming the management of Type II DM through knowledge dissemination.

Summary

The primary aim of the current project was to develop a toolkit on Type II DM to offer guidance to the medical nurses treating patients with diabetes. Furthermore, it was aimed at engaging the nurses in an evaluation process of the toolkit. The toolkit provides information on Type II DM, its symptoms, risk factors, and management of the disease.

In the project, 20 nurses were selected from a family clinic in California. They were expected to use the toolkit for a week, and give their feedback on the set of questions that accompanied the toolkit. Based on the results obtained from the nurses, it was evident that the tool was a critical resource that would result in a change in how diabetic patients are managed. The nurses acknowledge the fact that the tool provided the most necessary information for the patients and empowered them with knowledge regarding their meal plans and lifestyle changes needed to maintain stable health.

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Appendix A: Sample Toolkit Information

Objective

The toolkit seeks to empower Registered Nurses with the knowledge for caring for diabetic patients.

Learning Outcomes

1. Attain awareness of diabetes as a chronic disease.
2. Attain awareness of the American Diabetes Association Standard of Care Guidelines.
3. Develop awareness of oral medications and types of insulin.
4. Attain awareness of how to use a glucometer and document results.
5. Develop an understanding of the Diabetes Food Pyramid.
6. Develop an understanding of a low carbohydrate diet.
7. Attain awareness about t resources regarding diabetes meal Plans.
8. Develop an understanding of what hemoglobin A1C levels are and how to monitor.

Overview of Diabetes

Type 2 diabetes, once known as *adult-onset* or *noninsulin-dependent diabetes*, is a chronic condition that affects the way the body metabolizes glucose, which is the body's source of fuel. With type 2 diabetes, the body either resists the effects of *insulin*—a hormone that regulates the movement of sugar into the cell—or doesn't produce enough insulin to maintain a normal glucose level.

While it is more common in adults, type 2 diabetes increasingly affects children as childhood obesity increases. There's no cure for type 2 diabetes, but the condition can be managed through dietary changes, exercise, and maintaining a healthy weight. If diet

and exercise aren't enough to manage blood sugar level well, individuals with diabetes may need medication or insulin therapy.

Prevalence of Diabetes in the United States

In 2013, 29.1 million people in the United States had diabetes, among whom 21 million were diagnosed while 8.1 million were undiagnosed. Additionally, 28.9 million of the diabetic patients were aged 20 years and above. In terms of age, 4.3 million of the patients were aged 20-44 years, 13.4 million were aged 45-65 years, and 11.2 million were aged 65 years and above. In terms of age, 15.5 million were males while 13.4 million were females (Centers for Disease Control and Prevention [CDC], 2014).

An aggregate of 2010 to 2012 diabetes prevalence data by race and ethnicity indicated that 7.6% of the patients were European Americans, 9% were Asian Americans, 12% were Hispanic Americans, 13.2% were African Americans, and 15.9% were Native Americans (CDC, 2014). Among the Asian American population, the CDC reported the rate of diagnosis was 4.4% for Chinese Americans, 13.8% for Asian Indians, 11.3% for Filipino Americans, and 8.8% for other Asian American populations. The diagnosis rate for Alaskan Natives was 6.0%, while the American Indians in Southern Arizona had a rate of 24.1% (CDC, 2014).

Prediabetes: What Is It?

People with blood glucose levels that are higher than normal but not yet in the diabetic range have "prediabetes." This condition is also called *impaired fasting glucose* (IFG) or *impaired glucose tolerance* (IGT). Insulin resistance and prediabetes usually have no symptoms. Patients may have one or both conditions for several years without noticing any clinical symptoms.

If you have prediabetes, you have a higher risk of developing type 2 diabetes and you may also have a higher risk of heart disease. However, progression to diabetes among people with prediabetes is not inevitable. Studies suggest that weight loss and increased physical activity among people with prediabetes can prevent or delay diabetes and may return blood glucose levels to normal.

Prediabetes: Should We Care About It?

Prediabetes is a condition that almost always precedes type 2 diabetes and is identified by a laboratory fasting blood glucose level that is higher than normal but not high enough to be diagnosed as diabetes. Current research suggests that damage to the blood vessels in the body may already be occurring during prediabetes. People with prediabetes often have no symptoms but are more likely to develop type 2 diabetes over time. Having type 2 diabetes increases your risk for many serious health problems that can affect your heart, eyes, nerves, skin, kidneys, and more. People with type 2 diabetes have a higher risk of dying from complications that arise from the disease, if not cared for.

Any Good News about Preventing or Delaying the Onset of Type 2 Diabetes?

The good news is that you can prevent or delay the onset of type 2 diabetes by adopting a healthier lifestyle through diet and exercise. Genetics plays a role in developing type 2 diabetes, but so do lifestyle factors. You cannot change your genetics BUT you can change your lifestyle to include better eating and exercise habits.

In general, maintaining a healthy weight through reducing “sugars” or “carbs” in your diet is a first step towards maintaining good glucose control. Increasing your physical activity by walking or simply moving around more can also help you maintain your blood glucose levels. Those already diagnosed with type 2 diabetes can manage

their disease through a combination of treatments, including diet control, exercise, self-monitoring of blood glucose, and in some cases, oral drugs or insulin.

Risk Factors for Type 2 Diabetes

There are several factors that predispose individuals to contract Type 2 diabetes. These include:

Being overweight or obese. Being overweight is a primary risk factor for type 2 diabetes. The fattier tissue you have, the more resistant your cells become to insulin. However, you don't have to be overweight to develop type 2 diabetes.

Fat distribution. If your body stores fat primarily in your abdomen, your risk of type 2 diabetes is greater than if your body stores fat elsewhere, such as your hips and thighs.

Physical inactivity. Physical inactivity, and in particular, exercising fewer than three times a week is a risk factor for type 2 diabetes. The less active a person is, the greater the risk of type 2 diabetes. Physical activity helps control weight, uses up glucose as energy, and makes cells more sensitive to insulin.

Family history. The risk of type 2 diabetes increases if parents or sibling has type 2 diabetes.

Race and ethnicity. Although it's unclear why, people of certain races are more likely to develop type 2 diabetes. Specifically, those of African American, American Indian, Asian American, Pacific Islander or Hispanic American/Latino heritage are at greater risk for type 2 diabetes.

Age. The risk of type 2 diabetes increases with age, especially after age 45. That's probably because people tend to exercise less, lose muscle mass and gain weight as they

age. However, type 2 diabetes is also increasing dramatically among children, adolescents, and younger adults.

Prediabetes. Prediabetes is a condition in which your blood sugar level is higher than normal, but not high enough to be classified as diabetes. Left untreated, prediabetes often progresses to type 2 diabetes.

Prior history of gestational diabetes or birth of at least one baby weighing more than nine pounds. Gestational diabetes while pregnant and giving birth to a baby weighing more than 9 pounds both increase risk of developing type 2 diabetes.

Polycystic ovarian syndrome. For women, having polycystic ovarian syndrome (PCOS)—a common condition characterized by irregular menstrual periods, excess hair growth, and obesity—increases the risk of diabetes.

High blood pressure and cholesterol. Having high blood pressure (measuring 140/90 or higher) and abnormal cholesterol with HDL ("good") cholesterol of 35 or lower, or triglyceride levels of 250 or higher, increases the risk of diabetes.

Clinical Symptoms of Type 2 Diabetes

Signs and symptoms of type 2 diabetes often develop slowly. In fact, you can have type 2 diabetes for years and not know it. Some of the signs include:

Increased hunger. Without enough insulin to move sugar into your cells, your muscles and organs become depleted of energy. This triggers intense hunger.

Blurred vision. If your blood sugar is too high, fluid may be pulled from the lenses of your eyes. This may affect your ability to focus.

Fatigue. If your cells are deprived of sugar, you may become tired and irritable.

Increased thirst and frequent urination. Excess sugar building up in your bloodstream causes fluid to be pulled from the tissues. This may leave you thirsty. As a result, you may drink and urinate more than usual.

Areas of darkened skin. Some people with type 2 diabetes have patches of dark, velvety skin in the folds and creases of their bodies – usually in the armpits and neck. This condition, called acanthosis nigricans, may be a sign of insulin resistance.

Weight loss. Although some patients with diabetes eat more than usual to relieve hunger, some may lose weight. Without the ability to metabolize glucose, the body uses alternative fuels stored in muscle and fat. Calories are lost as excess glucose is released in the urine.

Slow-healing sores or frequent infections. Type 2 diabetes affects the body's ability to heal and resist infections (Mayo Clinic, 2020; Weatherspoon, 2019).

References:

American Diabetes Association. Retrieved from http://www.diabetes.org/diabetes-basics/diagnosis

Fareed, M., Salam, N., Khoja, A. T., Mahmoud, A. M., & Ahamed, M. (2017). Life style related risk factors of type 2 diabetes mellitus and its increased prevalence in Saudi Arabia: A brief review. *International Journal of Medical Research & Health Sciences*, *6*(3), 125-132.

Mayo Clinic (2020). Type 2 diabetes. Retrieved from https://www.mayoclinic.org/diseases-conditions/type-2-diabetes/symptoms-causes/syc-20351193

Weatherspoon, D. (2019). What are the symptoms of type 2 diabetes? *Medical News Today*. Retrieved from https://www.medicalnewstoday.com/articles/317462

American Diabetes Association Standards of Care Guidelines

In 2019, the American Diabetes Association (ADA) issued an updated version of the guidelines that should be followed in provision of nursing care to Type 2 diabetes patients. These guidelines include:

Diabetes and Population Health

- Ensure treatment decisions are timely, rely on evidence-based guidelines, and are made collaboratively with patients based on individual preferences, prognoses, and comorbidities.
- Align approaches to diabetes management with the Chronic Care Model, emphasizing productive interactions between a prepared proactive care team and an informed activated patient.
- Care systems should facilitate team-based care, patient registries, decision support tools, and community involvement to meet patient needs.
- Efforts to assess the quality of diabetes care and create quality improvement strategies should incorporate reliable data metrics, to promote improved processes of care and health outcomes, with simultaneous emphasis on costs.

Tailoring Treatment for Social Context

- Providers should assess social context, including potential food insecurity, housing stability, and financial barriers, and apply that information to treatment decisions.
- Refer patients to local community resources when available.

- Provide patients with self-management support from lay health coaches, navigators, or community health workers when available.

Diagnostic Tests for Diabetes

AIC

- To avoid misdiagnosis or missed diagnosis, the A1C test should be performed using a method that is certified by the NGSP and standardized to the Diabetes Control and Complications Trial (DCCT) assay.
- Marked discordance between measured A1C and plasma glucose levels should raise the possibility of A1C assay interference due to hemoglobin variants (i.e., hemoglobinopathies) and consideration of using an assay without interference or plasma blood glucose criteria to diagnose diabetes.
- In conditions associated with an altered relationship between A1Cand glycemia, such as sickle cell disease, pregnancy (second and third trimesters and the post par-tum period), glucose-6-phosphatedehydrogenase deficiency, HIV, hemodialysis, recent blood loss or transfusion, or erythropoietin therapy, only plasma blood glucose criteria should be used to diagnose diabetes.

Pre-diabetes and Type 2 Diabetes

- Screening for prediabetes and type 2 diabetes with an informal assessment of risk factors or validated tools should be considered in asymptomatic adults.
- Testing for prediabetes and/or type 2 diabetes in asymptomatic people should be considered in adults of any age who are over-weight or obese (BMI$25kg/m2or$23 kg/m2in Asian Americans) and who have one or more additional risk factors for diabetes.

- For all people, testing should be-gin at age 45 years.
- If tests are normal, repeat testing carried out at a minimum of 3-year intervals is reasonable.C2.11To test for prediabetes and type 2 diabetes, fasting plasma glucose, 2-h plasma glucose during 75-g oral glucose tolerance test, and A1C are equally appropriate.
- In patients with prediabetes and type 2 diabetes, identify and, if appropriate, treat other cardio-vascular disease risk factors.
- Risk-based screening for pre-diabetes and/or type 2 diabetes should be considered after the onset of puberty or after 10 years of age, whichever occurs earlier, in children and adolescents who are overweight(BMI$85thper-centile) or obese (BMI$95thpercentile) and who have additional risk factors for diabetes.

Prevention and Delay of Type 2 Diabetes

- At least annual monitoring for the development of type 2 diabetes in those with prediabetes is suggested.

Lifestyle interventions

- Refer patients with prediabetes to an intensive behavioral lifestyle intervention program modeled on the Diabetes Prevention Program (DPP) to achieve and maintain 7% loss of initial body weight and increase moderate-intensity physical activity (such as brisk walking) to at least 150 min/week.
- Based on patient preference, technology-assisted diabetes prevention interventions maybe effective in preventing type2 diabetes and should be considered.

- Given the cost-effectiveness of diabetes prevention, such intervention programs should be covered by third-party payers.

Pharmacologic interventions

- Metformin therapy for prevention of type 2 diabetes should be considered in those with prediabetes, especially for those withBMI$35 kg/m2, those aged, 60 years, and women with prior gestational diabetes mellitus.
- Long-term use of metformin maybe associated with biochemicalvitamin B12 deficiency, and periodic measurement of vitaminB12 levels should be considered in metformin-treated patients, especially in those with anemia or peripheral neuropathy

Diabetes Self-Management Education and Support

- Diabetes self-management education and support programs maybe appropriate venues for people with prediabetes to receive education and support to develop and maintain behaviors that can prevent or delay the development of type 2 diabetes.
- In accordance with the national standards for diabetes self-management education and support, all people with diabetes should participate in diabetes self-management education to facilitate the knowledge, skills, and ability necessary for diabetes self-care. Diabetes self-management support is additionally recommended to assist with implementing and sustaining skills and behaviors needed for ongoing self-management.

- There are four critical times to evaluate the need for diabetes self-management education and support: at diagnosis, annually, when complicating factors arise, and when transitions in care occur.
- Clinical outcomes, health status, and quality of life are key goals of diabetes self-management education and support that should be measured as part of routine care.
- Diabetes self-management education and support should be patient centered, may be given in group or individual settings or using technology, and should be communicated with the entire diabetes care team.

Nutrition Therapy Recommendations

Table 5.1—Medical nutrition therapy recommendations

Topic	Recommendations	Evidence rating
Effectiveness of nutrition therapy	5.6 An individualized medical nutrition therapy program as needed to achieve treatment goals, preferably provided by a registered dietitian, is recommended for all people with type 1 or type 2 diabetes, prediabetes, and gestational diabetes mellitus.	A
	5.7 A simple and effective approach to glycemia and weight management emphasizing portion control and healthy food choices may be considered for those with type 2 diabetes who are not taking insulin, who have limited health literacy or numeracy, or who are older and prone to hypoglycemia.	B
	5.8 Because diabetes nutrition therapy can result in cost savings B and improved outcomes (e.g., A1C reduction) A, medical nutrition therapy should be adequately reimbursed by insurance and other payers. E	B, A, E
Energy balance	5.9 Weight loss (5%) achievable by the combination of reduction of calorie intake and lifestyle modification benefits overweight or obese adults with type 2 diabetes and also those with prediabetes. Intervention programs to facilitate weight loss are recommended.	A
Eating patterns and macronutrient distribution	5.10 There is no single ideal dietary distribution of calories among carbohydrates, fats, and proteins for people with diabetes; therefore, meal plans should be individualized while keeping total calorie and metabolic goals in mind.	E
	5.11 A variety of eating patterns are acceptable for the management of type 2 diabetes and prediabetes.	B
Carbohydrates	5.12 Carbohydrate intake should emphasize nutrient-dense carbohydrate sources that are high in fiber, including vegetables, fruits, legumes, whole grains, as well as dairy products.	B
	5.13 For people with type 1 diabetes and those with type 2 diabetes who are prescribed a flexible insulin therapy program, education on how to use carbohydrate counting A and in some cases how to consider fat and protein content B to determine mealtime insulin dosing is recommended to improve glycemic control.	A, B
	5.14 For individuals whose daily insulin dosing is fixed, a consistent pattern of carbohydrate intake with respect to time and amount may be recommended to improve glycemic control and reduce the risk of hypoglycemia.	B
	5.15 People with diabetes and those at risk are advised to avoid sugar-sweetened beverages (including fruit juices) in order to control glycemia and weight and reduce their risk for cardiovascular disease	B, A

	and fatty liver B and should minimize the consumption of foods with added sugar that have the capacity to displace healthier, more nutrient-dense food choices. A	
Protein	5.16 In individuals with type 2 diabetes, ingested protein appears to increase insulin response without increasing plasma glucose concentrations. Therefore, carbohydrate sources high in protein should be avoided when trying to treat or prevent hypoglycemia.	B
Dietary fat	5.17 Data on the ideal total dietary fat content for people with diabetes are inconclusive, so an eating plan emphasizing elements of a Mediterranean-style diet rich in monounsaturated and polyunsaturated fats may be considered to improve glucose metabolism and lower cardiovascular disease risk and can be an effective alternative to a diet low in total fat but relatively high in carbohydrates.	B
	5.18 Eating foods rich in long-chain n-3 fatty acids, such as fatty fish (EPA and DHA) and nuts and seeds (ALA), is recommended to prevent or treat cardiovascular disease B; however, evidence does not support a beneficial role for the routine use of n-3 dietary supplements. A	B, A
Micronutrients and herbal supplements	5.19 There is no clear evidence that dietary supplementation with vitamins, minerals (such as chromium and vitamin D), herbs, or spices (such as cinnamon or aloe vera) can improve outcomes in people with diabetes who do not have underlying deficiencies and they are not generally recommended for glycemic control.	C
Alcohol	5.20 Adults with diabetes who drink alcohol should do so in moderation (no more than one drink per day for adult women and no more than two drinks per day for adult men).	C B
	5.21 Alcohol consumption may place people with diabetes at increased risk for hypoglycemia, especially if taking insulin or insulin secretagogues. Education and awareness regarding the recognition and management of delayed hypoglycemia are warranted.	
Sodium	5.22 As for the general population, people with diabetes should limit sodium consumption to ¸ 2,300 mg/day.	B
Nonnutritive sweeteners	5.23 The use of nonnutritive sweeteners may have the potential to reduce overall calorie and carbohydrate intake if substituted for caloric (sugar) sweeteners and without compensation by intake of additional calories from other food sources. For those who consume sugar-sweetened beverages regularly, a low-calorie or nonnutritive-sweetened beverage may serve as a short-term replacement strategy, but overall, people are encouraged to decrease both sweetened and nonnutritive-sweetened beverages and use other alternatives, with an emphasis on water intake.	B

Physical activity

- Children and adolescents with type 1 or type 2 diabetes or prediabetes should engage in 60 min/day or more of moderate- or vigorous-intensity aerobic activity, with vigorous muscle-strengthening and bone-strengthening activities at least 3 days/week.
- Most adults with type 1Candtype 2Bdiabetes should engage in 150 min or more of moderate-to-vigorous intensity aerobic ac-tivity per week, spread over atleast3days/week, with no more than 2 consecutive days without activity. Shorter

durations (minimum 75 min/week) of vigorous-intensity or interval training maybe sufficient for younger and more physically fit individuals.

- Adults with type 1 and type 2 diabetes should engage in 2–3sessions/week of resistance exercise on nonconsecutive days.
- All adults, and particularly those with type 2 diabetes, should decrease the amount of time spent in daily sedentary behavior. Prolonged sitting should be interrupted every 30 min for blood glucose benefits, particularly in adults with type 2 diabetes.
- Flexibility training and balance training are recommended 2–3times/week for older adults with diabetes. Yoga and tai chi maybe included based on individual preferences to increase flexibility muscular strength, and balance.

Patient-centered collaborative care

- A patient-centered communication style that uses person-centered and strength-based language, active listening, elicits patient preferences and beliefs, and assesses literacy, numeracy, and potential barriers to care should be used to optimize patient health outcomes and health-related quality of life.

Reference:

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Oral Medications and Types of Insulin

Oral Medications

- Sulfonylureas
- Biguanides
- Thiazolidinedione's TZD
- Alpha-glycosidase inhibitors
- Meglitinides
- Incretin Drugs
- DPP4 Inhibitors
- GLP-1, Byetta and Victoza

Role of Insulin

- Insulin is a hormone that comes from the *pancreas*, the gland situated behind and below the stomach.
- The pancreas secretes insulin into the bloodstream.
- The insulin circulates, enabling sugar to enter your cells.
- Insulin lowers the amount of sugar in your bloodstream.
- As your blood sugar level drops, so does the secretion of insulin from your pancreas.

Types of Insulin

- Rapid Insulin, Humalog, Novolog and Apidra
- Regular Insulin
- Combination Rapid and Intermediate
    - Humalog 75/25
    - Novolog 70/30
- Long acting Insulin or Basal Insulin,
    - Lantus
    - Levemir

Insulin Onset Peak Duration

Rapid Insulin	<15 min	1.2-1-hour	3-5 hour
Regular Insulin	30-60 min	1-2 hours	5-8 hours
Combination	<15	60 min	Up to 12 hours
Basal Insulin	1 hour		

General Considerations

- Oral diabetes medications are not recommended for pregnant women. Such women should use non-pharmacological interventions such as diet and exercise or use of insulin.

- Oral medications may not be effective during stressful live events such as when a patient is experiencing a severe infection or when s/he needs surgery. Patients may still need to use insulin during such instances.

- Some patients may need a combination of oral medications or oral medication plus insulin to manage the disease.

- Diabetes medication may interact with other drugs and it is advisable for patients to inform their physicians about all the other medicines they could be taking.

References

American Diabetes Association (2020). Oral medication. Retrieved from https://www.diabetes.org/diabetes/medication-management/oral-medication

Mayo Clinic (2019). Type 2 diabetes. Retrieved from https://www.mayoclinic.org/diseases-conditions/type-2-diabetes/diagnosis-treatment/drc-20351199

How to Use a Glucometer

One of the most important tools a person with diabetes can have is a blood glucose meter (glucometer). This handheld machine allows you to monitor the amount of glucose in your blood, which is critical in determining what food you can eat and how well any medication is working in controlling high blood sugar levels.

Things You Need

- Diabetic glucometer
- Test strips
- Lancets
- Alcohol
- Cotton Balls
- Sharps Disposal Container
- Paper and pencil (if your meter does not automatically store your results)

Steps

1. Obtain a glucometer and test strips. You can purchase these from any drugstore. Many insurance companies will pay for your meter and test strips if you obtain a prescription from your doctor.
2. Read the materials and directions that come with your meter. Familiarize yourself with all the functions of your blood glucose meter. Determine where to insert your test strip and where to view the results.

3. Test the glucometer before using it. Most glucometers include a way to test to make sure they are reading correctly. This could be in the form of a premade test strip or a liquid you place on a test strip then insert into the machine to determine if the test reading is within acceptable limits.

4. Wash your hands thoroughly, including the area from which you are going to draw blood. Most diabetic glucometers instruct you to prick your finger for a sample, but some newer blood glucose meters let you use an area on your arm. Determine which of these areas are acceptable for your meter.

5. Place alcohol on a cotton ball.

6. Place a test strip into the slot provided on the glucometer.

7. Swab the area you are going to use to draw your sample from with the cotton ball. Alcohol evaporates rapidly, so do not dry the area or you will re-contaminate it.

8. Wait for the readout on the diabetic glucometer to tell you to put the drop of blood on the strip. The readout may actually say, “Place sample on strip,” or it may give a symbol such as an icon that looks like a droplet of liquid.

9. Use the lancet provided with the diabetic glucose meter and prick the area for the sample.

10. Place a drop of blood on the test strip. Newer strips offer a “wicking” action that will draw the blood up into the test strip. Older meters and strips require you to actually drop blood into the strip. Most diabetic glucose meters require no more than a drop of blood to test.

11. Wait for results. The meter will begin a countdown in seconds once the sample hits the strip and the meter detects it. For newer meters, it will be 5 seconds, but older meters could need 10-30 seconds. The meter will sound a tone or beep when your reading is ready.

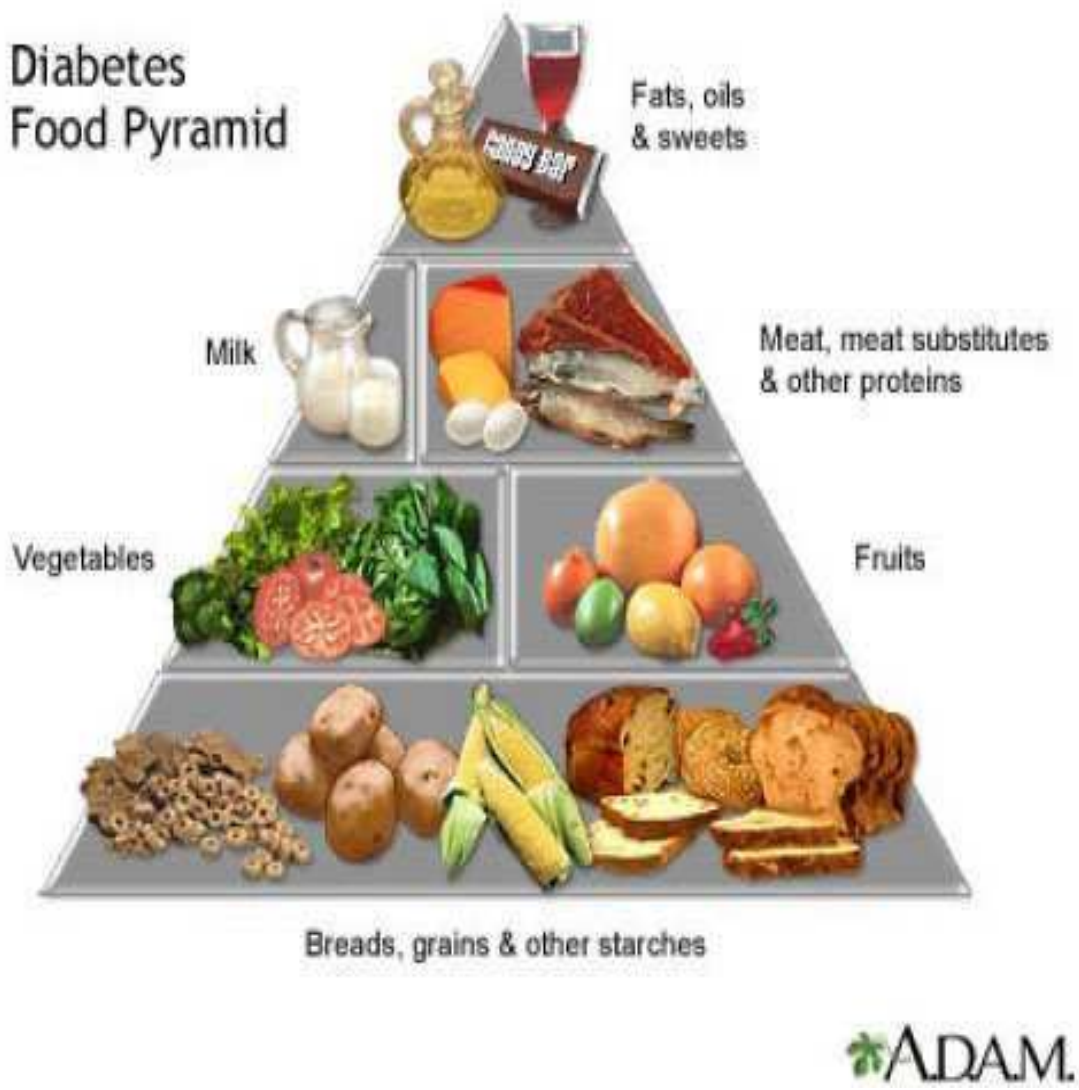
References

Health Hub (n.d.). How to use a glucose meter. Retrieved from https://www.healthhub.sg/live-healthy/1431/how-to-use-a-glucose-meter

Manzella, D. (October, 2019). How to use a glucometer. *Verywell Health*. Retrieved from https://www.verywellhealth.com/how-to-use-a-glucometer-1087304

Diabetes Food Pyramid

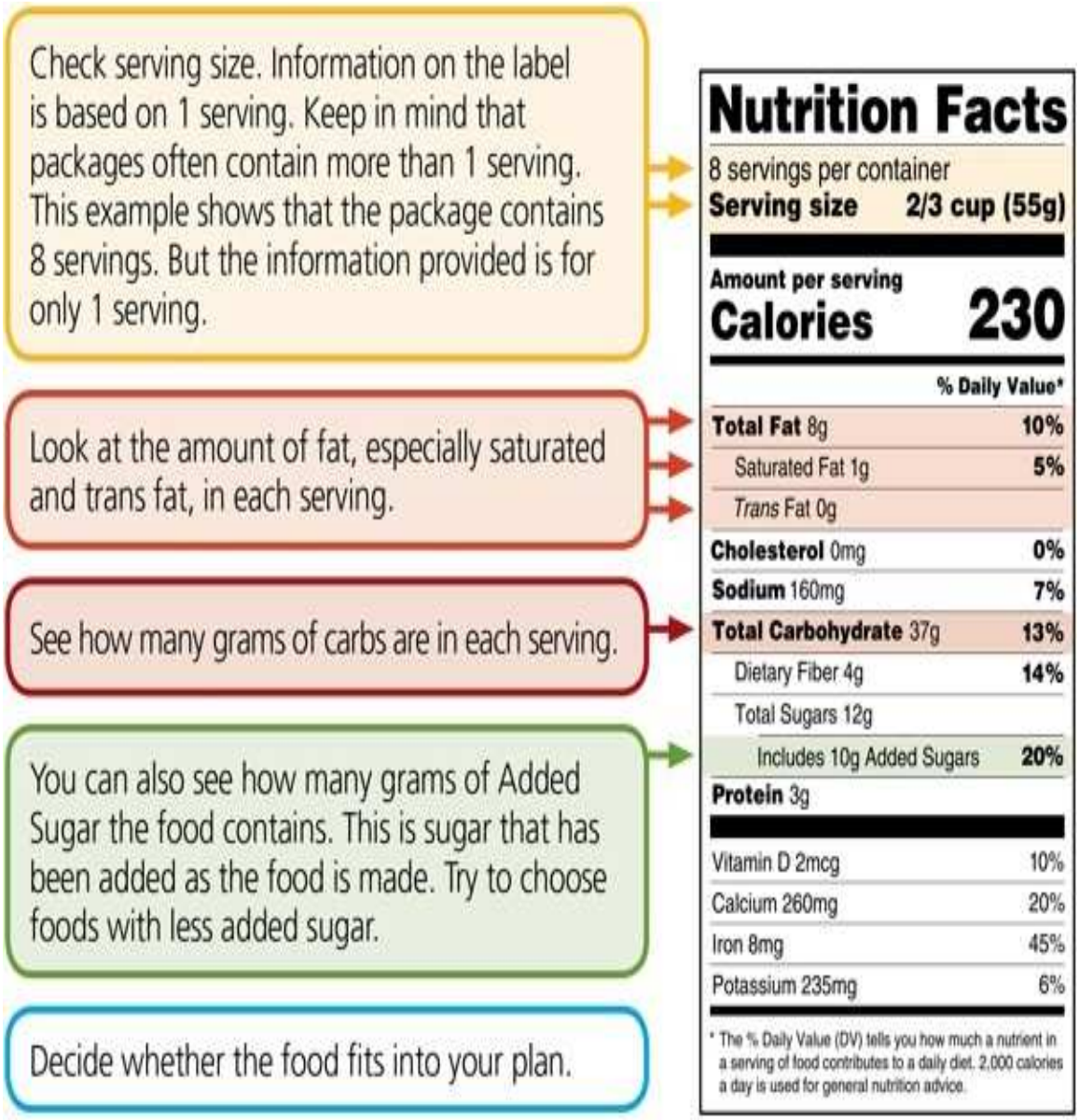
Source: Pure Garcinia Cambogia Online (2016). Diabetic foods: Lets discover truth about some past myths. Retrieved from https://puregarciniacambogiaonline.com/diabetic-foods-lets-discover-truth-about-some-past-myths/



Source: Penn State Hershey (2011). Healthy eating for people with diabetes. Retrieved from http://pennstatehershey.adam.com/content.aspx?productid=112&pid=28&gid=000246

Low Carbohydrate Handout

Read food labels to determine the carbs serving in foods. Keep in mind that sugars and fiber grams are included in the total carb number.



Source: Cornerstones4care (2020). Nutrition and diabetes: It's all on the label. Retrieved from https://www.cornerstones4care.com/healthy-eating/what-to-do/nutrition-and-diabetes.html

How to Count Carbohydrates

Carbohydrate counting is vital to maintaining healthy blood sugar levels. In diabetes meal planning, 1 serving of a food with carbohydrate has approximately 15 grams of carbohydrates. Take these steps to count your carbohydrates:

- Check serving sizes with measuring cups and spoons or a food scale.
- Read the nutrition facts on food labels to find out how many grams of carbohydrates are in the foods you eat.
- Use the food list in this handout to see portions of foods that have about 15 grams of carbohydrates.

Food Lists for Carbohydrates

1 serving=15 grams of carbohydrates.

Starches

- 1 slice bread (1 ounce)
- 1 tortilla (6-inch diameter)
- ¼ large bagel (1 ounce)
- 2 hard taco shells (5-inch)
- ½ hamburger of hot dog bun (1 ounce)
- ¾ cup ready-to-eat cereal
- ½ cup cooked cereal
- 1 cup broth
- 4 –6 crackers

Fruit

- 1 small fresh fruit (4 ounces)
- ½ cup canned fruit
- ¼ cup dried fruit (2 tablespoons)
- 17 small grapes (3 ounces)
- 1 cup melon or berries
- 2 tablespoons of raisins
- ½ cup fruit juice

Milk

- 1 cup fat-free or reduced fat milk
- 1 cup soy milk
- 2/3 cup fat-free yogurt sweetened with sugar free sweetener (6 ounces)

Sweets and Desserts

- 2-inch square cake (unfrosted)
- 2small cookies (2/3 ounce)
- ½ cup ice cream or frozen yogurt
- 1 tablespoon syrup, jam, jelly, table sugar, or honey
- 2 tablespoons light syrup

Other foods

- Count 1 cup raw vegetable or ½ cup cooked non-starchy vegetables as zero carbohydrate servings or "free" foods. If you eat 3 or more servings at one meal, count them as 1 carbohydrate serving.
- Foods that have less than 20 calories in each serving also may be counted as zero carbohydrate servings or "free foods".
- Count 1 cup of casserole or other mixed foods as 2 carbohydrate servings.

Remember to avoid the following at all times:

- Most carb foods: grains like rice, oatmeal, and barley.
- Grain-based food such as bread, cereal, pasta, and crackers.
- Starchy vegetables like potatoes and corn.
- Beans and peas (e.g. black beans, garbanzo beans, kidney beans, pinto beans, split peas).

The NO Carb Food Group includes these foods to eat most: meats, eggs, cheese, fats, and green leafy vegetables.

Healthy food choices. Eat more fiber by eating more whole-grain foods. Whole grains can be found in:

- Oatmeal
- Whole-wheat bread, bagels, pita bread, tortillas
- Breakfast cereals made with 100% whole grains
- Whole grain rice

Eat fruits and vegetables daily. Choose fresh, frozen, canned, or dried fruits and 100% fruit juices most of the time. Eat plenty of veggies like these:

- Orange veggies (e.g., carrots, sweet potatoes, pumpkin, winter squash).
- Dark green veggies (e.g., broccoli, spinach, Brussels sprouts).

Avoid foods high in sugars. Eat fewer foods that are high in sugar, such as:

- Sodas
- Fruit-flavored drinks
- Tea/coffee sweetened with sugar

Cooking and table salt. Use minimal salt while cooking or while at the table. Eat fewer foods that are high in salt such as:

- Canned pickles
- Processed meats
- Canned vegetables
- Canned and packaged soups (Ditch the Carbs, 2013; Maynard, n.d.).

References

Maynard, B. (n.d.). Carbohydrate counting. *New Hanover Regional Medical Center*. Retrieved from https://www.nhrmc.org/-/media/files/employees/diabetes-health-plan/class-materials/diet-exercise-and-fitness-class/carbohydrate-counting-handout.pdf?la=en

Ditch the Carbs (2013). Low-carb diet sheet. Retrieved from https://www.ditchthecarbs.com/wp-content/uploads/2013/12/02a-LowCarbDietSheet-A4-Final.pdf

Diabetic Meal Plan

Meal planning involves creating a plan that shows how many carbohydrate servings one should eat during meals and snacks. For many adults, eating 3-5 carbohydrate servings at each meal and 1 to 2 carbohydrate servings for each snacks works well.

In a health daily meal plan, most carbohydrates come from:

- 5 servings of fruits and vegetables
- 3 servings of whole grains
- 2-4 servings of milk or milk products

Meal Planning Tips

Meal Planning Tips:

- Check your blood glucose level regularly. It can tell you if you need to adjust the timing of when you eat carbohydrates.
- Eat foods that have fiber, such as whole grains.
- Have very few salty foods.

- Eat 4 to 6 ounces of meat or other protein foods (such as soybean burgers) each day. Choose low-fat sources of protein, such as lean beef, lean pork, chicken, fish, low-fat cheese, or vegetarian foods such as soy.
- Eat some healthy fats such as olive oil, canola oil, and nuts.
- Eat very little saturated fats. These unhealthy fats are found in butter, cream and high-fat meats such as bacon and sausage.
- Eat very little or no trans fats. These unhealthy fats are found in all foods that list "partially hydrogenated" oil as an ingredient.

LABEL READING:

- The Nutrition Facts panel on a label lists the grams of total carbohydrate in 1 standard serving. The label's standard serving may be larger or smaller than 1 carbohydrate serving.
- To figure out how many carbohydrate servings are in a food:

Look first at the label's standard serving size.

Then check the grams of total carbohydrates. This is the amount of carbohydrates in a standard serving.

Divide the grams of total carbohydrates by 15.

This number equals the number of carbohydrate servings in 1 standard serving.

Remember: 1 carbohydrate serving is 15 grams of carbohydrates.

Note: You may ignore the grams of sugar on the Nutrition Facts panel because they are included in the total grams of carbohydrates (University of Virginia Health System, 2015).

Sample Meal Plan

SAMPLE MEAL PLAN:

Total Carbohydrate Servings = 15

Breakfast
1 small banana (1 carbohydrate serving) ¾ cup corn flakes (1 carbohydrate serving) 1 cup fat-free or low-fat milk (1 carbohydrate serving) 1 slice whole wheat bread (1 carbohydrate serving) 1 teaspoon soft margarine
Lunch
2 ounces lean meat (for sandwich) 2 slices whole wheat bread (2 carbohydrate servings) Raw vegetables: 3-4 carrot sticks, 3-4 celery sticks, 2 lettuce leaves 1 cup fat-free or low-fat milk (1 carbohydrate serving) 1 small apple (1 carbohydrate serving)
Snack
¼ cup canned apricots (1 carbohydrate serving) ¾ ounce unsalted mini-pretzels (1 carbohydrate serving)
Evening Meal
3 ounces lean roast beef ½ large baked potato (2 carbohydrate servings) 1 tablespoon reduced-fat sour cream ½ cup green beans 1 vegetable salad: lettuce, ½ cup raw vegetables, and 1 tablespoon light salad dressing 1 small whole wheat dinner roll (1 carbohydrate serving) 1 teaspoon soft margarine 1 cup melon balls (1 carbohydrate serving)
Snack
6 ounces low-fat yogurt with sugar free sweetener (1 carbohydrate serving) 2 tablespoons unsalted nuts

Source: University of Virginia Health System (2015). Nutrition basics handout. Retrieved from https://med.virginia.edu/vcdpe/wp-content/uploads/sites/287/2015/11/Nutrition-Basics-Handout.pdf

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How to Monitor AIC Levels

What is a A1C Level?

A1C indicates that amount of blood sugar levels in a patient. AIC levels show the percentage of a patient's hemoglobin that is glycated or coated with sugar. The higher a patient's A1C level, the poorer his/her blood sugar control and the higher the risk of experiencing diabetes complications.

A1C Test

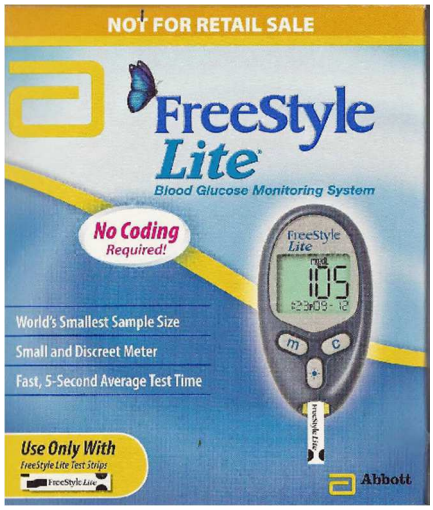
A1C test also referred to as glycated hemoglobin, hemoglobin A1C, glycosylated hemoglobin, and HbA1C is a blood test that is commonly used to diagnose and monitor Type 1 and Type 2 Diabetes. The test results show a patients average blood sugar level over the past two to three months. The test is done once every year among pre-diabetes patients, twice per year among those with type 2 diabetes and they don't use insulin and their blood sugar level is consistently within the target range. The test can also be done four times a year among type 2 diabetes patients who use insulin and have challenges maintaining the targeted blood sugar levels. More frequent A1C tests may be necessary in scenarios where a patient's treatment plan or medication are changed.

Targeted A1C Levels

A1C levels vary across patients due to factors such as age and diabetes management. However, the target A1C target for diabetic adults is less than 7%. In normal persons, the A1C level should be 5.7% and below. In persons with pre-diabetes, the A1C level falls between 5.7% and 6.5%. Diabetic patients usually have A1C levels ranging between 6.5% and above.

Monitoring A1C Levels at Home

Patients can use A1C test kits to monitor their blood sugars at home. There are a number of approved kits including CVS at Home A1C Test Kit, Relion Fast A1C Test, Bio-Rad System Analyzer Prescription Home Use, and HemoCue Hb 801 System. Blood glucose meters can also be used to measure blood glucose levels. The test usually require a small blood sample which can be acquired by pricking a finger. The figure below shows an example of a glucose meter.



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Measures for Lowering your A1C Levels

Diabetic patients whose A1C levels rise beyond the 7% average can use the following measures to lower the levels:

- Physical activity
- Diet
- Taking medication

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Appendix B: Toolkit Evaluation Tool/Questionnaire

This questionnaire gives you an opportunity to express your views regarding the education module toolkit developed through this DNP project. The questionnaire will provide data on how well the toolkit will provide guidance for nurses to teach adult patients with type II diabetes. The questionnaire is based on a five-point Likert scale where 1=Strongly Agree (SD), 2=Agree (2), 3=Neutral (N), 4=Agree (A), and 5=Strongly Agree (SA).

Question	**Yes**		**No**		
1. Do you agree or disagree with the assertion that the educational module toolkit will help improve nurses' knowledge on causes of diabetes and its complications. **Comment**:					
Likert Scale Questions	**SD** **1**	**D** **2**	**N** **3**	**A** **4**	**SA** **5**
2. The toolkit comprehensively informs nurses on the role of insulin. **Comment:**					
3. The toolkit provides comprehensive information on management of type 2 diabetes. **Comment:**					

4. The educational module toolkit contains comprehensive tips on monitoring blood sugar and how to use Glucometer. **Comment**:					
5. The diabetes food pyramid presented in the toolkit comprehensively addresses the foods that should be taken by diabetic patients. **Comment:**					
6. The toolkit comprehensively addresses the healthy lifestyle changes proposed for diabetic patients to manage the disease. **Comment:**					
7. The toolkit presents sufficient information on meal planning. **Comment**:					
8. In overall, I am satisfied with the quality of the education module toolkit. **Comment:**					
8. What do you see as the educational toolkit's strengths and weaknesses? **Comment:**					
9. In your opinion, what are the strengths and weaknesses of the educational module toolkit?					

Comment:
10. What recommendations would you offer to improve the toolkit? **Comment:**

Appendix C: Informed Consent Letter

Dear Diabetes Healthcare Providers,

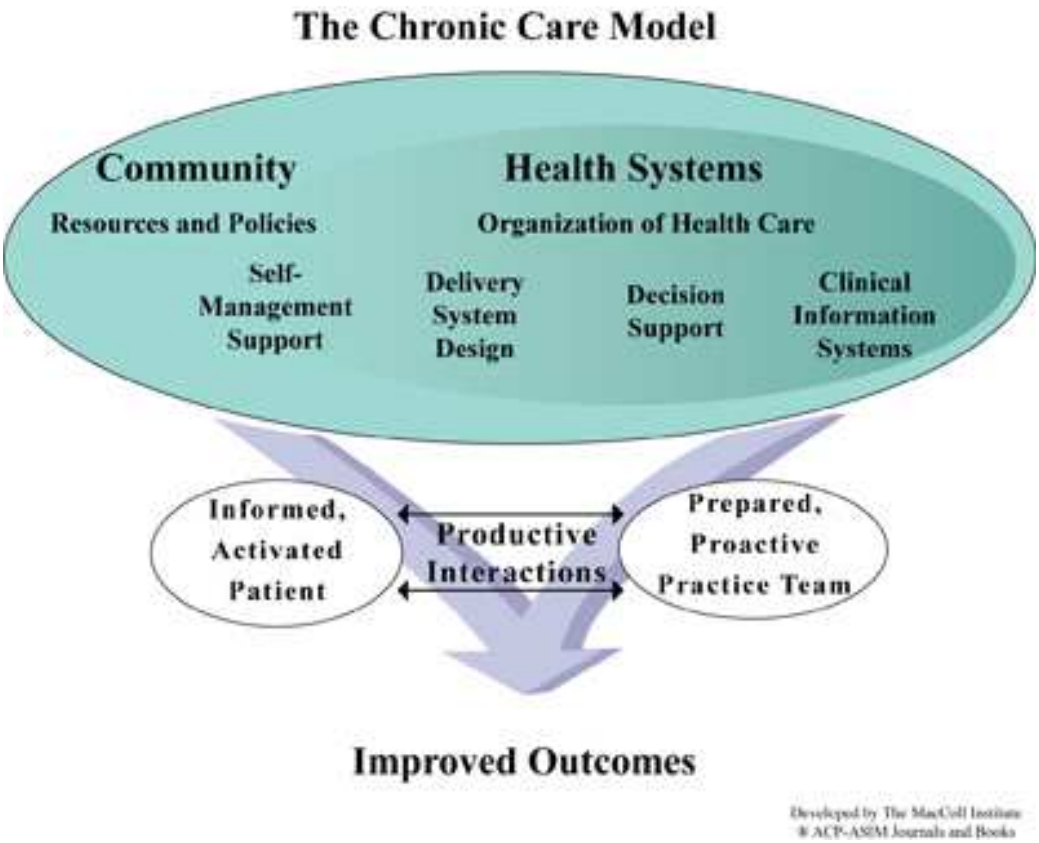
You are being asked to participate in this DNP project that involves developing an educational module toolkit for educating nurses on Type II diabetes. Your role will involve assessing the toolkit to establish its strengths and weaknesses and making recommendations for improving the kit. I have created 11 short questions that will take a few minutes to complete. The outcome of the toolkit is to inform nurses about type II diabetes. The toolkit will be delivered to you after our one on one meeting.

Thanks in advance.

Best regards,

Orjiakor, Theresa

Appendix D: The Chronic Care Model



Source: Wagner, E.H. (1998). Chronic disease management: What will it take to improve care for chronic illness? *Effective Clinical Practice, 1* (1), 2-4.