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A Staff Training Plan on Screening African Americans for Prediabetes

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Walden University

College of Health Sciences

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Valerie Berry

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

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2019

Abstract

A Staff Training Plan on Screening African Americans for Prediabetes

by

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MSN, Walden University, 2014

BSN, University of Phoenix, 2012

Project Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Nursing Practice

Walden University

November 2019

Abstract

African American adults have higher risks of undiagnosed Type 2 diabetes, uncontrolled Type 2 diabetes, and complications from Type 2 diabetes than members of other racial groups. Health care providers in rural Tennessee lack staff training plans for prediabetes screening of older African American adults. In addition, few rural Tennessee health care providers have programs in place to train staff in prediabetes screening, screening instrument use, and interventions for Type 2 diabetes prevention. The focus of this DNP project was on developing an evidence-based staff training program designed to improve knowledge regarding prediabetes screening in older African American adults. Concepts informing the doctoral project were Knowles' adult learning theory and the Joanna Briggs Institute's levels of evidence model. This project involved development of a staff training plan for using the American Diabetes Association Risk Calculator to screen for prediabetes. Three stakeholders at a rural Tennessee health care facility (one physician and two nurse practitioners) reviewed the staff training plan and provided feedback on its appropriateness and efficacy. The stakeholders unanimously approved the training plan, finding it an appropriate means of teaching their staff to use the American Diabetes Association Risk Calculator in screening high-risk patients for prediabetes. Once implemented, this staff training plan should contribute to positive social change by improving health outcomes for older African American adults with diabetes in rural Tennessee.

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Dedication

This project is dedicated to my parents, my family, and especially my mom and daughter, who provided me with the motivation and time needed to complete this journey.

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Section 1: Nature of the Project

Introduction

Type 2 diabetes adversely affects the health of Americans nationwide and is especially problematic for certain populations, including older African American adults (Selvin, Parrinello, Sacks, & Coresh, 2014). Type 2 diabetes is a metabolic disorder involving hyperglycemia (Hurtado & Vella, 2018). Elevated blood glucose levels accompany the inability to produce insulin naturally. Overall, African American individuals bear a 50% higher likelihood of having diabetes than people who identify as non-Hispanic White (American Diabetes Association [ADA], 2019). Type 2 diabetes prevalence in the United States is 14.3% for adults 45 to 64 years of age and 12% for adults over 65 years (Centers for Disease Control and Prevention, 2017); African American adults 20 years of age and older have a disease prevalence of 13.2% (Centers for Disease Control and Prevention, 2017). Consistent with these disparities, older African Americans have an estimated diabetes prevalence of more than 14% for men and 18% for women (Signorello et al., 2007). Furthermore, although diabetes is the seventh leading cause of death for all Americans, it is the fifth leading cause of death among African Americans (Flynt & Daepf, 2015).

Individuals with Type 2 diabetes are also at an increased risk of other serious diseases, including heart and renal disease, stroke, and peripheral neuropathy, among other conditions (Hurtado & Vella, 2018). Additional adverse outcomes may include amputation and blindness. African American adults have higher risks of undiagnosed Type 2 diabetes, uncontrolled Type 2 diabetes, and complications from Type 2 diabetes,

including renal disease and blindness, compared to members of other racial groups (Menke, Casagrande, Geiss, & Cowie, 2015; Wang, Geiss, Williams, & Gregg, 2015). Addressing the health disparities older African Americans experience with Type 2 diabetes, as well as improving Type 2 diabetes health outcomes for this at-risk population, are therefore important to address in nursing practice. Identifying prediabetes among older African American adults through proper screening could also help prevent many of these adverse outcomes.

In prediabetes, an individual's blood glucose levels are above normal but lower than in Type 2 diabetes. Although the individual with prediabetes experiences symptoms associated with Type 2 diabetes, such as impaired insulin production, pancreatic beta cell death, and insulin resistance, in prediabetes, these processes occur on a smaller scale; as such, prediabetes is asymptomatic (Khardori, 2012; Hurtado & Vella, 2018). Because individuals do not experience symptoms from prediabetes, they are unlikely to realize their risk for developing Type 2 diabetes unless they receive screenings and learn of their health status. With screening to identify prediabetes, health care providers and patients can collaborate on strategies to prevent the transition to Type 2 diabetes, such as changes to dietary habits and behavioral patterns (Hooks-Anderson, Crannage, Salas, & Scherrer, 2015).

Prediabetes screening is particularly important for the population of older African American adults. Although the national prevalence for prediabetes is around 30%, that percentage is closer to 50% among older African American adults (Kiefer, Silverman, Young, & Nelson, 2015). Moreover, African American adults are comparatively less

likely to undergo screening for prediabetes compared to White adults (Kiefer et al., 2015). According to some experts, having organizations educate their staff on screening practices would help overcome these disparities (Hooks-Anderson et al., 2015; Nhim et al., 2018). Because prediabetes screening can help prevent diabetes, there is a need for effective staff training for health care providers working with older African American adult populations.

The intent of this DNP project was to facilitate more informed prediabetes screening practices among health care providers providing service to older African American adults. The project involved the development of a staff training plan (see Appendix A) on the use of the ADA Risk Calculator (n.d.; see Appendix B) in the broader context of culturally appropriate prediabetes screening for older African American adults. The ADA Risk Calculator was an ideal tool for this study, as it enables the identification of prediabetes and Type 2 diabetes risk among this population. The focus of the training plan was on educating nursing staff and other clinicians at rural health clinics in the U.S. state of Tennessee about the risks posed by prediabetes and Type 2 diabetes to older African American adults. Rural Tennessee was an appropriate location for this project, as the state has the seventh highest prevalence of Type 2 diabetes in the United States (Menke et al., 2015). In addition, the low frequency of prediabetes screening in rural care clinics compounds the incidence of Type 2 diabetes among older adult African Americans, who comprise the majority of the patient population in the health care practice under study. Although the project entailed creation of a staff training plan, implementation, was not part of this DNP project.

Project findings may provide insight on how to standardize evidence-based screening practices for prediabetes among older African American adults. Among the potential positive social change implications from this project is that increasing health care staff's knowledge of diabetes screening may translate into better health outcomes for their patients. In addition, improved care may better equip patients to identify warning factors and seek appropriate treatment to prevent prediabetes from becoming diabetes. Patients may subsequently access preventive interventions and adhere to suggested treatments.

Problem Statement

Older African American adults in Tennessee have particularly high risks of developing Type 2 diabetes and experiencing negative health outcomes from this chronic disease. In the United States, Tennessee has the seventh highest prevalence of Type 2 diabetes among older African American adults (Menke et al., 2015). The mortality and complication rates for African American adults in Tennessee exceed the rates for African American adults nationwide. In addition, African American adults in Tennessee have a higher than average likelihood of requiring emergency care for hyperglycemia (Conway, May, & Blot, 2012; Haiman et al., 2012; Osborn et al., 2009).

Several factors contribute to the transition from prediabetes to diabetes, including limited access to health care providers and the absence of standard prediabetes screening practices by trained staff. Also problematic among older African American adults are cases of undiagnosed and uncontrolled Type 2 diabetes, which then increase the risk of lifelong health complications or mortality from diabetes (Hooks-Anderson et al., 2015;

Sherkat et al., 2005). Staff knowledge about prediabetes, as well as health care provider staff training practices and plans, influence these risks.

As Porterfield, Hinnant, Stevens, and Moy (2010) noted, health care provider facilities that lack proper staff training for prediabetes screening are less likely than those with training to provide screening to patients who would benefit from it; in addition, such facilities are less likely to administer screenings with associated Type 2 diabetes prevention interventions. Additionally, low levels of staff knowledge regarding prediabetes, Type 2 diabetes risk among patients, prediabetes screening criteria, and the use of screening tools have been associated with reduced frequency of patient screening for prediabetes (Tseng et al., 2017). Rural health clinics and other outpatient providers in Tennessee are therefore unlikely to offer screening for prediabetes and appropriate preventive interventions to older African American adults who would most benefit from these screenings. Evidence-based training plans, which have been shown to increase the use of screening tools and prevention interventions for Type 2 diabetes, can improve staff knowledge about prediabetes risk, screening, and management (O'Brien et al., 2018; Rariden, Lavin, & Yun, 2015).

The problem addressed by the DNP project was that health care providers in Tennessee lack staff training plans for prediabetes screening among older African American adults in rural communities. The project is significant for the larger field of nursing practice because of the potential for improvement in staff training and knowledge. Improved training and knowledge on the part of the providers could

contribute to better prediabetes and Type 2 diabetes outcomes among older African American adults.

Purpose

The purpose of the DNP project was to address the gap in practice related to the lack of prediabetes screening and care services delivered to older African American adults by rural health care providers in Tennessee. The guiding practice-focused question related to this gap in practice was, Will organizational stakeholders approve development of an evidence-based staff training program designed to improve knowledge regarding prediabetes screening in older African American adults?

The primary objective for the project was to develop a plan to train staff in using the ADA Risk Calculator (see Appendix B) to screen older African Americans for prediabetes, enabling providers to provide adequate health care to African Americans with prediabetes. The staff training plan (see Appendix A) included content related to prediabetes and Type 2 diabetes epidemiology and risks among older African American adults; prediabetes screening criteria, methods, and practices; the use of the ADA Risk Calculator as an instrument to screen for prediabetes risk; the use of follow-up blood glucose assessments to diagnose prediabetes; and the application of evidence-based prediabetes management and Type 2 diabetes prevention interventions that are culturally appropriate and tailored to the needs of older African American adults.

This doctoral project addressed the gap in practice through creation of a staff training plan using the ADA Risk Calculator (see Appendix B) for prediabetes screening and care services by rural health care providers. Because rural Tennessee health care

providers currently lack training plans in this area, it is likely their staff members lack current and comprehensive knowledge regarding older African American individuals' prediabetes and Type 2 diabetes screening and care needs (Tseng et al., 2017). Providing a staff training plan on content that makes use of adult learning theory (Knowles, 1950) could be an effective way to promote actual staff training among rural health care providers in Tennessee (see Cox, 2015; Rariden et al., 2015). Improved levels of staff training may increase prediabetes screening and preventive care service delivery by Tennessee rural health care providers who work with older African American adults.

Implementation of the staff training plan (see Appendix A) could aid health care provider staff in understanding the need to improve screenings and interventions for diabetes among the older African American adult patient population. In addition, training could provide the knowledge necessary for staff members to change their prediabetes screening practices by learning which patients need screening, which screening tools to use, and which preventive interventions would be appropriate (O'Brien et al., 2018). Moreover, developing screening knowledge could help to improve health care practitioners' confidence in utilizing these screening and intervention methods. Such confidence would facilitate higher levels of individual prediabetes screening behaviors among older African Americans, as well as improve efforts to formalize standard screening processes in rural practice settings (Rariden et al., 2015). These changes in practice would address the current gap in practice.

Nature of the Doctoral Project

The project required extensive evidence collection to fulfill the purpose of the project and address the gap in practice as described. The sources of evidence informed the development of a staff training plan that imparts knowledge and skills related to evidence-based practices in prediabetes screening and prevention services. Therefore, I used only sources reasonably considered sound bases of evidence. These sources include practice guidelines, clinical recommendations, information on prediabetes screening and intervention tools, and published research. Practice guidelines included only current editions of guidelines developed by health care provider organizations such as the ADA using published, peer-reviewed research studies as their sole sources of evidence. Similarly, clinical recommendations came from the most recent recommendations issued by public health agencies and medical centers such as the Mayo Clinic based only on published, peer-reviewed research. There is significant peer-reviewed evidence of the reliability and validity of the ADA Risk Calculator (see Appendix B) as used in American populations (e.g., Heikes, Eddy, Arondekar, & Schlessinger, 2008).

The published research used as sources in this project consisted of reliable, valid studies that reflected the current state of knowledge on the practice problem published in peer-reviewed, scholarly journals. Searches of multiple online databases provided access to full-text results for the study; databases included EBSCO Academic Search Complete, the Cumulative Index of Nursing and Allied Health Literature (CINAHL), PubMed, and databases available through the Agency for Healthcare Research and Quality. I used multiple combinations of relevant key words and limited results to publications from the

past 10 years. I reviewed the abstracts and publication information to assess for relevance and appropriateness for inclusion in the project before obtaining full-text versions of results to use as evidence.

My approach for organizing and analyzing evidence obtained from the collection process involved several steps. First, I read through the full text of the sources, making notes on key elements of the evidence. Then, based on the content—such as the reliability and validity of the methodology and findings, applicability to practice, relevance to the rural African American patient population and rural health care provider staff population, and strength of supporting evidence—I evaluated whether the source was appropriate for inclusion in the staff training plan. If so, I organized the source according to which aspects of the staff training plan it pertained. Rereading sources revealed evidence to inform the training plan and allowed for comparison to other sources in the same category. I used an evidence matrix to compare areas of agreement and disagreement, along with the strength of evidence for training and practice recommendations.

I used findings from the analysis to guide development of the staff training plan, thereby addressing the gap in practice. The lack of prediabetes screening, diagnosis, and preventive care services offered to older African American adults living in rural areas is often due to a lack of staff knowledge and training funds regarding the use of these practices and the need for them (O'Brien et al., 2018; Sherkat et al., 2005; Tseng et al., 2017). Data collection and analysis yielded results that reflected current evidence-based best practices in these domains of knowledge and clinical skills. Subsequently, these

findings informed development of a staff training plan to facilitate knowledge acquisition among clinical staff in these domains.

Properly presented, the training plan should promote knowledge acquisition and use through practice changes among health care staff. The development of the staff training plan benefited from the inclusion of adult learning theory (Knowles, 1950) principles in the plan's design and explanation of the reason for the training and common tasks inherent in the process, which enabled staff to make discoveries for themselves. The current prediabetes clinical practice recommendations supported by research evidence, as well as consideration of learner needs in the training plan, should allow for successful training implementation and promote meaningful practice change among the plan's intended audience of staff members at rural health care facilities in Tennessee (see Draganov, de Carvalho Andrade, Neves, & Sanna, 2013). Incorporating the training plan could help ameliorate the dearth of prediabetes clinical services available to older African American adults living in rural parts of Tennessee.

Significance

The project affected multiple stakeholder groups, which, along with the possible impacts from addressing this gap in practice, merited consideration. The primary stakeholder group comprised the three participants who evaluated the staff training plan: one physician and two nurse practitioners at a health care facility in rural Tennessee. Secondary stakeholders encompassed the intended audience of the staff training plan: nurses, medical assistants, and other rural health care providers working in health care settings in rural Tennessee. Following attendance at presentation of the staff training plan

(see Appendix A) in their practice settings, members of this group should have improved their levels of knowledge with regard to prediabetes health needs among their older African American adult patients, as well as prediabetes screening methods, diagnostic practices, and preventive interventions. Practitioners could also enjoy improved levels of confidence in using screening, diagnostic, and preventive care practices for prediabetes, as well as increased willingness to use these skills. The result would be members of the group offering and providing increased prediabetes and Type 2 diabetes screening and preventive services to older African American adults.

The administrators, quality improvement officers, nursing and physician supervisors, and owners or boards of directors members of health care settings in rural Tennessee comprise another stakeholder group benefiting from access to the staff training plan, as they may opt to implement training sessions, utilizing recommendations in the plan for implementing standardized processes to screen for, manage, and prevent prediabetes and Type 2 diabetes among older African American adults in their patient populations. A secondary stakeholder group consists of older African American adults in rural Tennessee. The individuals in this group have a high risk of prediabetes and Type 2 diabetes and currently lack sufficient access to screening and prevention services for these diseases, even when they have primary care access (Hooks-Anderson et al., 2015; Kiefer et al., 2015; Menke et al., 2015). Addressing the practice problem for this project could lead to positive social change by better preparing health care staff to recognize prediabetes before it becomes diabetes. There may also be improvements in patient access to these important prediabetes clinical services, increasing the level of prediabetes

screenings and the use of appropriate preventive interventions and adherence to associated treatments. Combined, these improvements could ultimately lower prediabetes and Type 2 diabetes incidence, prevalence, mortality, and disease burdens among the patient population of older African American adults (Nhim et al., 2018; O'Brien et al., 2018).

A related secondary stakeholder group comprises the family members of older African American adults living in rural communities. Family members may be able to recognize associated behavioral changes by learning more about prediabetes and Type 2 diabetes and assisting their loved ones with preventive care adherence. This group may subsequently experience reduced financial, emotional, and health burdens associated with living in a household with someone diagnosed with Type 2 diabetes (Bennich et al., 2017; Bhattacharya, 2012).

This doctoral project may make valuable contributions to nursing practice. The staff training plan (see Appendix A) could provide sufficient information in a format likely to facilitate positive learning outcomes among nursing staff. The plan may therefore encourage nurses to promote the use of staff training sessions in their practice settings that employ the training plan, or at least utilize the plan in their own professional self-education practices. Whether used informally or formally, the staff training plan could improve the levels of prediabetes screening and prevention knowledge among nursing staff working with African American populations in rural Tennessee. The plan could thereby improve nurses' increased use of screening, diagnostic, and preventive practices that adhere to current clinical guidelines and research evidence. These benefits

may occur directly through nurses learning from the plan, or indirectly by nurses using the plan to promote formal practice changes in their care settings. The project could also add to the knowledge in the domains of prediabetes prevention and care as well as nursing education.

The doctoral project could also have value in possible transferability to related practice areas. Physicians and other health care staff members working with rural African American adults may develop practice changes based on the staff training plan, as some of the content would also fall into the scope of practice of other care providers. Public health services staff could also utilize the plan to educate care providers or adapt the information for use in their own practice.

This project could have positive implications for desirable social change. Type 2 diabetes is an extreme burden on individuals with the diagnosis, but especially on older African American adults living in rural areas, because the disease leads to negative social changes, new behavioral and economic demands, and risks for other health and emotional comorbidities (Tang et al., 2008). The burden of disease for diabetes can affect entire African American households as well, all of whom are members of a population often socioeconomically disadvantaged and disempowered in the health care system (Bennich et al., 2017; Bhattacharya, 2012). Improving access to much-needed preventive care services for prediabetes and Type 2 diabetes through implementation of the staff training plan could reduce the social and economic burdens of disease among individuals and households, addressing a highly problematic health disparity in American society (Conway et al., 2012; Hooks-Anderson et al., 2015). This process may also help

empower older, rural African American adults within the health care system, increasing engagement with health care providers and improving care for other conditions, as well (Rariden et al., 2015). Although the social implications of the project are certainly relevant to the health care system, they extend beyond health care.

Summary

Type 2 diabetes presents a major health, social, and economic problem for older African American adults living in rural Tennessee. The members of this population have higher-than-average risks for Type 2 diabetes incidence, adverse health outcomes, and early mortality. Prediabetes, a state of elevated blood glucose levels that precedes the biological changes associated with Type 2 diabetes, represents a potentially useful point for preventive intervention. However, access to prediabetes screening, diagnosis, and care services is often limited for African American adults in rural areas, even among individuals who access primary care services on a regular basis. This lack of care services access reflects a lack of health care practitioner knowledge regarding prediabetes health needs and services among older African American adults, with further influence by the lack of training in these domains offered by health care provider facilities in rural Tennessee.

To address this gap in practice, I used this doctoral project for the development of a staff training plan (see Appendix A) to impart knowledge to health care providers working with the patient population of older African American adults in rural Tennessee. Following this training, providers will be more knowledgeable about prediabetes and Type 2 diabetes needs and health risks among this patient population. In addition, health

care practitioners will better understand prediabetes screening and diagnosis methods, prediabetes screening instruments, and appropriate preventive health interventions. The staff training plan incorporated current practice guidelines, clinical recommendations, validated instruments, and peer-reviewed research evidence obtained through online database searches. This project has the potential to positively influence multiple stakeholder groups, including health care practitioners and members of the patient population, as well as to promote positive social change. The next section includes a description of the context and background of the project.

Section 2: Background and Context

Introduction

Prediabetes and Type 2 diabetes pose serious and widespread health problems for African American individuals in rural Tennessee. In particular, older residents of rural Tennessee communities have high risks of Type 2 diabetes and adverse health outcomes, such as heart disease, stroke, renal disease, and early mortality (Hurtado & Vella, 2018). The risk of Type 2 diabetes for rural, older African American adults exceeds those of the general population, which is indicative of health disparities in addition to concerns with health care quality (Hooks-Anderson et al., 2015). Even though screening for prediabetes can be an effective way to identify Type 2 diabetes risks and implement interventions to reduce Type 2 diabetes from forming, rural adults with health insurance in Tennessee are unlikely to receive proper screening (Porterfield et al., 2010). This lack of assessment stems from inadequate provider knowledge and training in prediabetes screening and interventions (Tseng et al., 2017).

The practice problem was that Type 2 diabetes adversely affects the health of Americans nationwide, and is especially problematic for certain populations, including older African American adults. The purpose of the DNP project was to address the gap in practice related to the lack of prediabetes screening and care services delivered to older African American adults by rural health care providers in Tennessee through formulation of a staff training plan. To guide the project, I sought to answer the following practice-focused question: Will organizational stakeholders approve development of an evidence-

based staff training program designed to improve knowledge regarding prediabetes screening in older African American adults?

This section includes a discussion of the background and context for the DNP project. The first subsection provides the concepts, models, and theories used, along with the reasons for their use; the second subsection includes discussion of the relevance of the DNP project to nursing practice in terms of the broader practice problem, existing research on the topic, best practices in nursing for addressing prediabetes screening, and remaining gaps in practice; and the third subsection reflects the local context of the project with local evidence supporting the practice problem, the institutional context of the problem, and state contexts of the problem of Type 2 diabetes. The final subsection is a presentation of the DNP student's role, motivations, and biases in relation to the project. The section ends with a summary of its content and a transition to Section 3.

Concepts, Models, and Theories

Two concepts were appropriate for use in this DNP project: Knowles' (1950) adult learning theory and the Joanna Briggs Institute (2013) levels of evidence model. In accordance with adult learning theory, Knowles identified adults as often learning outside of standard academic environments; in this project, these adults may be health care trainers and providers. In addition, scholars use the Joanna Briggs Institute levels of evidence model (see Appendix C) as a framework for assessing the quality of prior published research. I used the levels of evidence model as a guide in selecting peer-reviewed articles relevant to evidence in nursing.

Adult Learning Theory

The main theory employed in the DNP project was Knowles' (1950) adult learning theory. According to adult learning theory, adults frequently engage in learning outside of traditional educational institutions, such as colleges or universities; adult learning may occur in the context of professional education and staff training instead (Knowles, 1950). Knowles also contended adult learners have unique needs and motivations worthy of consideration in the design of educational tools and curricula for successful learning. Adult learners are largely self-directed. They are capable of taking the lead when it comes to setting goals and engaging in learning practices, as long as they see the relevance of their activities to achieving desired outcomes related to practical applications (Cox, 2015; Knowles, 1950). Rather than providing detailed series of instructions to meet learning outcomes, educators may frame necessary outcomes and provide resources for learning to promote successful learning among adults (Knowles, 1950).

Adult learning theory was appropriate for the project because of its widespread use in the development and delivery of nurse training approaches, including those related to education on Type 2 diabetes prevention (Cox, 2015; Knowles, 1984). This theory was also a means to address the needs of nurses learning outside of traditional learning environments (i.e., in their workplace settings). I concluded that adult learning theory would be helpful for promoting learning in prediabetes screening that facilitates the use of evidence-based screening practices. For the purposes of this study, evidence-based

practices are health care services supported by peer review and deemed both valid and reliable (Schalock, Gomez, Verdugo, & Claes, 2017).

Scholars established adult learning theory within the framework of educational and professional training approaches. In 1833, Alexander Kapp conceived that adult learners had different learning needs and goals compared to children (Knowles, 1950). In the 1940s that Dusan Savicevic and Malcolm Knowles began to speak and write about adult learning in English, which introduced the theory to the United States (Knowles, 1950; Taylor & Kroth, 2009). Knowles was especially instrumental in developing approaches to utilize adult learning theory in the context of professional education (Taylor & Kroth, 2009). Nursing education theorists such as Sandra Millon Underwood (1987) applied adult learning theory in nursing by developing strategies for its use in nursing practice. Underwood also compared the use of adult learning theory to curricula created in line with other concepts, such as behavioral and cognitive learning theories. Based on detailed development and application to learning as a whole and the nursing field in particular, adult learning theory was an appropriate framework for the doctoral project.

Levels of Evidence Model

The Joanna Briggs Institute (2013) developed the levels of evidence model (see Appendix C) as a framework for rating the quality of published research evidence. I used this model to highlight the importance of peer-reviewed research as a basis for evidence in nursing. Individuals use the levels of evidence model to rate evidence in a meaningful way and facilitate its use in health care practice (Pearson, Wicula, Court, & Lockwood,

2005). Pearson et al. (2005) first developed the model in an analysis of evidence-based practice that described the reliability and validity of different forms of evidence. The model is a conceptualization of quantitative and qualitative evidence using two distinct, but related, hierarchies of evidence levels (Pearson et al., 2005). Since creation of the Joanna Briggs Institute levels of evidence model (see Appendix C), scholars have applied the model not only to nursing research but to research in other health care disciplines, as well (Jordan, Lockwood, Munn, & Aromataris, 2018). In this project, I applied the model to analyze the evidence used to develop the staff training program plan.

Relevance to Nursing Practice

The practice problem addressed by the DNP project—health care providers in Tennessee lack staff training plans for prediabetes screening among older African American adults in rural communities—has received extensive scholarly attention. Members of racial and ethnic groups in the United States have endured higher rates of Type 2 diabetes for more than 50 years (Menke et al., 2015). From 1960 to 1985, the percentage of the U.S. population affected by diabetes rose from 0.6% to 2.6%; during this time, the first disparities in diabetes prevalence for African Americans compared to the overall average began to emerge (Menke et al., 2015). In the last few decades, however, the racial and ethnic disparities for Type 2 diabetes prevalence grown more pronounced. From the mid-1980s to 2015, the prevalence of Type 2 diabetes increased by a factor of 3.5–4 for the U.S. population as a whole; however, for African Americans, the prevalence growth was almost five times that of 1985 (Menke et al., 2015). Due to improvements in data collection, researchers identified age and geographic disparities

with regard to Type 2 diabetes. Adults 45 years of age and older as well as residents of rural areas tend to have a higher risk of developing Type 2 diabetes and experiencing adverse health outcomes (Hooks-Anderson et al., 2015). These disease disparities are related to differences in levels of access to health care services, including prediabetes screening, researchers have found (Sherkat et al., 2005). During the last 10 to 15 years, more researchers have focused on health care systems and environmental factors, finding that providers' prediabetes screening practices relate to their staff members' levels of training and knowledge regarding screening tools and the roles of screening in preventing Type 2 diabetes (O'Brien et al., 2018). Therefore, this DNP project fits into the larger history of diabetes research in health care.

The current state of nursing practice with Type 2 diabetes is that many health care providers in rural areas display a gap between practice and knowledge. One recommendation for practice is for nurses to use prediabetes screening integrated with Type 2 diabetes prevention strategies, which reduce the risks of diabetes and subsequent complications and emergency room usage (Rariden et al., 2015). Staff training plans that successfully raise levels of staff knowledge about prediabetes screening practices can help increase the use of prediabetes screening practices and instruments when implemented into training processes (Conway et al., 2012; Hooks-Anderson et al., 2015). Although such training plans could therefore reduce the high disease burden of Type 2 diabetes among older African Americans living in rural communities, many rural health care providers lack staff training plans and sufficient prediabetes screening access among patients (Bennich et al., 2017; O'Brien et al., 2018). Therefore, the level of access to staff

training plans among rural nurses and health care providers can influence the degree to which older African American patients can obtain prediabetes screening.

At present, Type 2 diabetes prevention best practices largely relate to specific practices and training approaches as opposed to the staff training plans employed within training practices. Researchers have indicated that increasing the nursing staff's knowledge level of Type 2 diabetes risk and screening needs among older African American patients can bring about improvements in the use of specific instruments such as the ADA Risk Calculator (see Appendix B) to evaluate prediabetes risk (Tseng et al., 2017). Staff training programs for Type 2 diabetes prevention incorporating adult learning theory have proven effective in improving nurse learning outcomes and the use of prediabetes screening (Cox, 2015; Rariden et al., 2015). These approaches can particularly benefit nursing staff in facilities that previously lacked staff training programs related to Type 2 diabetes and showed low levels of prediabetes screening among staff members (O'Brien et al., 2018; Porterfield et al., 2010). The DNP project built on these research findings with a focus on the design of the staff training materials themselves.

The DNP project helps fill a gap in practice with regard to staff training plans. Previous researchers of staff training related to prediabetes screening and Type 2 diabetes prevention for nurses in rural areas have largely focused on training programs rather than training plans (Rariden et al., 2015; Tseng et al., 2017). According to these studies, staff training programs can benefit nurses and patients by promoting the acquisition of prediabetes screening skills, confidence in using screening tools and practices, and the

number of prediabetes screenings offered to patients (O'Brien et al., 2018; Tseng et al., 2017). However, researchers to date have not presented specific training plans and documents adaptable for use in other practices, complicating the translation to practice for these sources of evidence. The current project involved creation of a staff training plan (see Appendix A) designed to meet specific rural health care providers' needs for prediabetes screening of older African American patients. This type of resource could facilitate the development of training programs among rural health care providers and nurses.

Local Background and Context

The practice problem for the DNP project was relevant to the problem statement based on multiple sources of evidence. Rural health care providers in Tennessee are unlikely to engage in prediabetes screenings. They tend to have low knowledge levels regarding how to use screening instruments and practices, as well as limited understanding of the need for these resources (Porterfield et al., 2010). The lack of prediabetes screening among rural Tennessee health care providers is problematic, because older African American patients in that region have the highest risk and prevalence of Type 2 diabetes among at-risk populations in the United States (Menke et al., 2015). This patient population, therefore, is at greater risk than the general population for transitioning from prediabetes to Type 2 diabetes, even for insured individuals (Hooks-Anderson et al., 2015). In turn, older, rural African Americans in Tennessee have especially pronounced risks of health complications and potentially preventable hospitalizations for Type 2 diabetes (Conway et al., 2012; Haiman et al., 2012).

Addressing the factors that contribute to low levels of prediabetes screening tools and knowledge among rural health care providers in Tennessee was therefore a vital practice problem to consider and engage with.

The institutional context for this DNP project was also relevant to the practice problem. Rural health clinics outside Memphis, Tennessee, tend to have many older African American adult patients, indicating a need for prediabetes screening given the high rate of Type 2 diabetes among members of this population. At the same time, these clinics do not have staff training programs for prediabetes screening and associated interventions. Moreover, they lack training plans to employ in the development of these programs and, in many cases, the resources to develop such plans.

Tennessee has a significantly greater prevalence of diabetes than the rest of the United States. In fact, 14.6% of the state's adult population has diabetes, 20% of whom are unaware they have it (ADA, 2019). In addition, 1.733 million Tennessee residents have prediabetes, representing over one third of the population (ADA, 2019). Comparatively, 9.5% of the U.S. adult population has diagnosed diabetes (Kaiser Family Foundation, 2016).

Role of the DNP Student

My professional relationship to the project involved my working for a rural health care provider serving a predominantly older African American patient population. My role in the DNP project was to develop evidence-based training for using prediabetes screening instruments and practices based on organizational and patient needs. Having seen the need for improving prediabetes screening and preventing Type 2 diabetes

firsthand, I had a strong motivation to engage in the project. My personal experience with the high prevalence of Type 2 diabetes among older adult African American patients in rural Tennessee was a potential bias, as I recognized the need for prediabetes education and treatment. However, I used my experience in creating what I believe to be an effective training program.

Summary

Section 2 included a discussion of the background and context for the DNP project, describing Knowles' (1950) adult learning theory and justifying its use in the project. Also in this section was the current state of nursing knowledge regarding prediabetes screening, as well as the ongoing gap in knowledge of health care staff and successful training programs. Information presented pertained to the local context of the project to illustrate the need to make staff training plans available to health care providers in rural Tennessee. Training is especially important because of the high volume of older African American patients and the limited use of prediabetes screening tools by nurses employed with these providers. The project required the collection of evidence from prior studies, as discussed in Section 3, including information on the local problem and gap in practice. Means of data analysis and synthesis also appear in the following section.

Section 3: Collection and Analysis of Evidence

Introduction

The problem addressed by this DNP project was that health care providers in Tennessee lack staff training plans for prediabetes screening among older African American adults in rural communities. The purpose was to address the gap in practice related to the lack of prediabetes screening and care services delivered to older African American adults by rural health care providers in Tennessee. Compared to the general population, older adult patients have relatively high risks for developing Type 2 diabetes and experiencing adverse health outcomes following diagnosis (Menke et al., 2015; Osborn et al., 2009). Although staff training can increase knowledge related to prediabetes and improve screening behaviors for older African American patients, few rural care providers in Tennessee have staff training plans to educate practitioners on use of the ADA Risk Calculator (see Appendix B) and improve prediabetes outcomes for this population (O'Brien et al., 2018; Rariden et al., 2015). To address this practice problem, I sought to answer the following practice-focused question: Will organization stakeholders approve the development of an evidence-based staff training program designed to improve knowledge regarding prediabetes screening in older African American adults? Examining this practice-focused question fulfilled the purpose of addressing the current gap in practice for prediabetes screening services and related care services among the population of interest.

This section provides both introduction and discussion of several areas related to the collection and analysis of evidence for the DNP project. First is a restatement of the

practice-focused question within the context of local health care needs and problems related to the purpose of the project. Operational definitions help with reader understanding throughout the project. Also provided are sources of evidence used in the undertaking of this project, as well as discussion of how they relate to the project purpose and the data collection and analysis addressing the practice-focused question. The following subsection includes information on the analysis and synthesis of the evidence used in the DNP project, including systems for recording, organizing, and evaluating evidence; maintaining the evidence for integrity; and applying analytical processes to manage the practice-focused question. This section ends with a summary of presented information.

Practice-Focused Question

The local problem under investigation in the DNP project was the lack of evidence-based staff training materials dedicated to screening for prediabetes to prevent Type 2 diabetes at rural health care facilities in Tennessee. The gap in practice was that few rural Tennessee health care providers have staff training programs in place to impart the knowledge and skills needed for prediabetes screenings, screening instrument use, and interventions for Type 2 diabetes prevention. Furthermore, clinical staff and nurses at rural health care facilities tend to have low levels of knowledge regarding older patients' prediabetes screening needs; as such, they do not engage in frequent screenings connected to evidence-based Type 2 diabetes prevention interventions (Porterfield et al., 2010; Rariden et al., 2015), as was the case at the study site. This situation presents serious problems for patients at these rural clinics because of the high risk of older

African American patients developing Type 2 diabetes, with adverse health outcomes including disease complications, hospitalizations, and early mortality (Conway et al., 2012; Haiman et al., 2012). The practice-focused question for the DNP project was, Will organization stakeholders approve the development of an evidence-based staff training program designed to improve knowledge regarding prediabetes screening in older African American adults?

Purpose and Alignment

The purpose of the DNP project was to address the gap in practice related to the lack of prediabetes screening and care services delivered to older African American adults by rural health care providers in Tennessee. The DNP project resulted in the design of an evidence-based staff training plan (see Appendix A) to fulfill health care providers' learning needs and motivations. The plan came about through the application of adult learning theory principles and evidence-based prediabetes screening and health care delivery practices, including use of the ADA Risk Calculator (see Appendix B). The project purpose was in alignment with the practice-focused question. With a training plan, I expect staff members will have the confidence to increase the frequency of prediabetes screening and improve health care service delivery to the African American older adult patient population. The use of evidence-based practices in this regard would contribute to reducing Type 2 diabetes incidence, progression risks, and disparities among older adult African American patients in rural Tennessee. These benefits are possible through timely identification of prediabetes conditions and appropriate

interventions to prevent the transition from prediabetes to Type 2 diabetes in these individuals (see Hooks-Anderson et al., 2015).

Operational Definitions

The DNP project involved the collection and analysis of participant data from stakeholders during the formative evaluation process, hence the need for operationally defined variables. Definitions of important terms follow.

Care services or care practices: Actions and instructions given by a health care provider to a patient. In the case of this study, care services are those provided specifically by rural health care providers in Tennessee to their older African American adult patients with or at risk of prediabetes.

Clinic staff members' prediabetes screening knowledge: The health care provider staff members' understanding of prediabetes screening practices, screening instruments, and interventions that can be used to prevent Type 2 diabetes among patients, depending on their screening results (Tseng et al., 2017).

Culturally appropriate intervention: An intervention made with consideration of cultural, social, and economic influences on beliefs and behaviors (Bhatti-Sinclair, 2015), in this case, with regard to the health care of older African American patients currently living in rural Tennessee.

Evidence-based practices: Practices and services robustly supported by valid, reliable, peer-reviewed sources of evidence (Schalock et al., 2017). For purposes of this DNP project, such practices pertain to health care.

Sources of Evidence

Sources of evidence used to address the practice-focused question included health care and nursing articles published in peer-reviewed, scholarly journals; publicly available clinical practice guidelines based on peer-reviewed sources of evidence; and relevant published clinical recommendations from peer-reviewed assessment processes, including the use of prediabetes screening instruments such as the ADA Risk Calculator (see Appendix B). Previously published staff teaching and training content related to prediabetes risks, epidemiology, screening practices, assessment instruments, and postscreening interventions contributed to the content, design, and delivery of the staff training plan. Applicable published resources came from adult learning theory, incorporating adult learning styles, learning preferences, professional education pedagogies, and the development of readable and accessible content for adult learners from a variety of social, linguistic, and educational backgrounds.

Another source of evidence was questionnaire feedback from the plan evaluators. Stakeholders gave feedback during the training plan development process, providing sources of evidence for the project. Comparing the evidence allowed me to assess the staff training plan and determine the extent to which the plan achieved project learning objectives, met patient and project site needs, offered easy comprehension and use by stakeholders, promoted increased prediabetes screening, and facilitated positive social change. The physician and two nurse practitioners who took part in evaluating the staff training program conducted impact evaluation assessments based on the training plan,

providing forms of evidence to ascertain whether the training plan met staff education needs related to prediabetes screening and health care service delivery in practice.

These sources of evidence were relevant to the purpose of the project because they formed the core of the information linked to the gap in practice for prediabetes screening and care services available to older adult African Americans living in Tennessee. Existing evidence informed prediabetes screening services, including screening tools such as the ADA Risk Calculator (see Appendix B) and culturally appropriate interventions to prevent Type 2 diabetes among older African American patients. The clinical staff did not implement the education program for purposes of this DNP project. There is, however, a need to share this evidence with the health care staff at rural Tennessee clinics in an informative, engaging way to produce gains in staff knowledge and confidence for prediabetes screening and health care services. Clinic staff could then better incorporate this evidence into health care service behaviors (Porterfield et al., 2010; Rariden et al., 2015). Therefore, there is a direct relationship between the described sources of evidence and the ability of the DNP project to address the gap in practice.

The collection and analysis of this evidence were appropriate for addressing the practice-focused question, providing the types of evidence needed to improve health care provider staff knowledge of prediabetes screening and care at clinics in rural Tennessee. The types of evidence needed to develop staff training plans related to the practice-focused question existed in the present body of nursing knowledge; however, this evidence was only available in separate training plans, teaching strategies, learner

recommendations, and research studies. Before this project, researchers had not yet synthesized this evidence and developed it into a systematized format for staff education using evidence assessments and formal content evaluations (see O'Brien et al., 2018; Rariden et al., 2015). The lack of such work prevents rural health clinics, and indeed any clinics, from readily utilizing the evidence to train staff in prediabetes screening and management practices. Therefore, this project advanced industry knowledge through collection and analysis of the knowledge most relevant and necessary for improving staff awareness of prediabetes screening needs among older African American adult patients. Information generated for the project also includes how to deliver care services, such as prediabetes screening services, to the patients in that particular population. The collection and analysis of the evidence was necessary for developing a staff training plan (see Appendix A) capable of improving knowledge of prediabetes screening and care, which, in turn, is integral to increasing availability and use of these screening and care services to reduce Type 2 diabetes risks and disparities among older African American adult patients. This DNP project did not entail implementation of the education plan.

Published Outcomes and Research

Searches for relevant published research related to the practice problem began on the Walden University Library website. Primary databases used included EBSCO Academic Search Complete, CINAHL, and PubMed. Other sources of inquiry were the Agency for Healthcare Research and Quality, the American Diabetes Association, and Google Scholar. Key words and combinations of key words searched were *diabetes*, *Type 2 diabetes*, *prediabetes*, *rural diabetes*, *ADA Risk Calculator*, *prediabetes screening*,

prediabetes screening knowledge, adult incidence of diabetes, older adult African American diabetes, rural African American diabetes, primary care rural Tennessee, adult learning theory, and levels of evidence model.

The majority of searches were for sources with a publication date of 2015 or after, thus ensuring the most recent research for review; however, material from the preceding 5 years also underwent consideration. Information about theories or models had original dates of publication that may have extended beyond the 10-year window. In addition, historical studies and statistics often dated back further than 2015. The most heavily relied-upon material was valid and reliable articles from peer-reviewed, scholarly journals. Prior to full article evaluation, I reviewed the abstract for insight into the material's relevancy to the DNP project. Examining references listed on the more pivotal studies often led to additional sources, thus making for an exhaustive and comprehensive literature search.

Evidence Generated for the Doctoral Project

Participants and procedures. The participants in the DNP project were one physician and two nurse practitioners in a health care facility in rural Tennessee that employs 10 physicians, nurse supervisors, and nurses. The participants volunteered to take part in the project. Following completion of the informed consent form, I provided a preview of the training plan (see Appendix A) and had stakeholders complete a brief, six-question questionnaire (see Appendix D) to provide feedback on the effectiveness and appropriateness of the training plan.

Protections. I had a working relationship with employees at the rural health care facility of study; as such, only purposive sampling was necessary to gain the participation of the physician and nurse practitioners. Obtaining prior approval from the Walden University Institutional Review Board (IRB) was one means of ensuring ethical treatment of participants, as was adherence to the Belmont Report (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979) principles of respect for persons, justice, and beneficence.

Measures to ensure security of data were necessary. These included storing any electronic communications with the plan evaluators on a password-protected computer, as well as securing questionnaire responses and informed consent forms in a locked filing cabinet. According to Walden University guidelines, I will maintain study materials for 5 years, after which time I will delete or shred all documents, as applicable.

Prior to participation, the plan evaluators received an informed consent form detailing the purpose of the study, data storage and safeguarding procedures, and the right to withdraw from the study at any time without penalty. Signing the form was necessary prior to receipt of the staff training plan (see Appendix A) and questionnaire (see Appendix D). There were no financial incentives to participate in this study.

Development of Evidence-Based Training

In developing the staff training program for the project, I drew upon evidence from the literature regarding nursing staff education and patient care needs. A review of the literature helped me to identify rural health care staff education needs for prediabetes screening and care services regarding unmet health care needs for older African

American adults in rural Tennessee who have prediabetes. I aligned my research with the project course, gained evaluator support, and identified learning objectives for the training program. Following a comprehensive review of literature, I confirmed the participation of one physician and two nurse practitioners at the health care practice under study.

Content researched encompassed African American elderly adult prediabetes epidemiology, prediabetes screening methods and criteria, the use of the ADA Risk Calculator (see Appendix B) to screen for prediabetes, and the application of culturally appropriate, evidence-based interventions to manage prediabetes and prevent progression into Type 2 diabetes. I also addressed patient factors influencing the delivery of successful prediabetes screening and care in the training content. Some of these factors included patient health literacy, common health beliefs and behaviors among older African American adults living in rural areas, and geographic and socioeconomic influences on patient access to healthy foods and exercise resources (Bhattacharya, 2012; Tang et al., 2008). In all cases, previously developed and validated training materials merited consideration. After thorough research, I used all materials pertinent to the identified learning outcomes to create a preliminary staff training plan.

Formative Evaluation

Following identification of the educational content included in the staff training plan (see Appendix A) and before assembly into the final plan, the training plan underwent formative review, a process that involved data collection from stakeholders at the project site. I submitted a request for project approval from the Walden University

IRB before proceeding with the formative review. After the IRB granted approval for the project, I began the review process by providing the staff training plan to one physician and two nurse practitioners at the study site. These stakeholders responded to six questions on a questionnaire (see Appendix D) to provide feedback on training plan content, determine whether the plan met their needs, and offer suggestions for improvement. Analyzing and comparing questionnaire responses facilitated assessment of the training plan in terms of six variables: content quality, content applicability to the learning objectives, contextual relevance to the patient population and project setting, ability to promote social change, easy to read and understand, and easy use in the project setting. In-person administration of the questionnaire allowed respondents to provide additional feedback if they chose.

Based on feedback from the initial formative review process, no staff training plan revisions were necessary with regard to content and its delivery. I had a discussion of training plan implementation resource requirements and results of the questionnaires with clinic leadership. Participants provided insight as to whether the staff training plan was sufficient to meet the stated learning objectives, address project site staff training and learning needs, and facilitate prediabetes screening practice changes and positive social change.

Analysis and Synthesis

Data used in developing the staff training plan underwent analysis and synthesis over the course of the project. I developed and implemented the system used for recording and organizing as well as gathered evidence from published sources. Following collection

of evidence from the aforementioned data source types, I annotated and recorded the information in digital files created for this project, organizing sources by topic type and evaluating according to their level of evidence and applicability within the project setting. I input source evaluations into in an evidence table (see Appendix E) clearly displaying the evidence used in the project; through the process of evaluation, I ensured the validity and relevancy of evidence used in the project.

The evidence table in Appendix E provides an overview of evidence sources from the literature used to develop this DNP project, with a discussion of findings from evaluating the sources. The evidence validity and reliability criteria applied in the project and as shown in Appendix E come from an established evaluation framework: the Joanna Briggs Institute levels of evidence model (2013; see Appendix C). The Briggs model helped to ensure the integrity of data collected from published sources for the project.

My analytical process of the DNP project included the levels of evidence model along with assessments of the evidence sources for reliability, validity, and project applicability. The DNP project involved the collection of evaluation data from reviewers during the formal evaluation process. To fully protect the human participants' rights and welfare, I submitted the project proposal to the Walden University IRB, obtaining approval before providing the three participants with the staff training plan (see Appendix A) and follow-up questionnaire (see Appendix D).

The formal evaluation process involved the use of a questionnaire administered to stakeholders to assess the training plan. Through a discussion with the stakeholders, I determined the extent to which they thought the staff training plan addressed the

objectives of the project at the clinic site, met patient population and project site needs, and was easy to read and utilize by project site stakeholders. Data integrity came from comparisons of responses among the three evaluators (see Appendix F).

Summary

This section provided a discussion of the evidence collection and analysis processes for the DNP project. First was a restatement of the practice-focused question with clarification in the context of local health care provider needs in rural Tennessee regarding to staff knowledge about prediabetes screening and prevention. Descriptions of the published, peer-reviewed sources of evidence and their relevance to the project appeared, as did the sources of evidence derived from the evaluation processes. A discussion of the data analysis processes included my use of the levels of evidence model, shown in Appendix C, when evaluating evidence for the purposes of the project. The assessment approach to the project, including the application of the levels of evidence model, appears in an evidence table (see Appendix E), with an analysis of the sources used to develop this project. Also described was the treatment of data related to the formative evaluation process.

Section 4 provides study findings based on data analysis and synthesis. Implications discussed pertained to health care providers' use of prediabetes screening in older adult African American patients in rural communities in Tennessee. Also included are recommendations to address the gap in practice by providing training to rural health care facility nurses to improve their knowledge of prediabetes screening. Finally, I discuss strengths and limitations of the DNP project.

Section 4: Findings and Recommendations

Introduction

The local problem under investigation in this DNP project was the lack of evidence-based staff training materials dedicated to screening for prediabetes to prevent Type 2 diabetes at rural health care facilities in Tennessee. The gap in practice was that few rural Tennessee health care providers have staff training programs in place to impart the knowledge and skills needed for prediabetes screenings, screening instrument use, and interventions for Type 2 diabetes prevention. The purpose of the DNP project was to address the gap in practice related to the lack of prediabetes screening and care services delivered to older African American adults by rural health care providers in Tennessee.

Creation of the staff training plan (see Appendix A) involved in-depth research into the risk of prediabetes and Type 2 diabetes, particularly with regard to older African American adults in Tennessee. In addition to the ADA Risk Calculator (see Appendix B), sources of information included current editions of guidelines developed by health care organizations such as the ADA. Also researched and considered were peer-reviewed studies. Clinical recommendations from medical centers such as the Mayo Clinic also served as material for consideration,

Following review and selection of information most relevant for teaching health care providers how to screen for prediabetes using the ADA Risk Calculator (see Appendix B), I created an educational PowerPoint presentation (see Appendix G) for clinic leaders to administer to their staff. Stakeholders evaluated the presentation through questionnaire responses and feedback on training plan development. One physician and

two nurse practitioners reviewed the training plan to ascertain whether the plan met staff education needs related to prediabetes screening. I personally administered a questionnaire (see Appendix D) to stakeholders following the presentation of the plan (see Appendix G). Responses to the questionnaire (see Appendix F) provided sufficient information to assess the training plan's usefulness.

Findings and Implications

After reviewing the training plan, the three stakeholders provided oral responses to a questionnaire as feedback on the material, which I recorded and transcribed verbatim. Questions pertained to six variables: content quality, content applicability to the learning objectives, contextual relevance to the patient population and project setting, ability to promote social change, easy to read and understand, and easy use in the project setting. Respondents also had the option to provide overall feedback on the training materials.

Findings

The one physician and two nurse participants reported the efficacy of the training plan across all six variables. Each stakeholder was able to verbalize understanding of the tool, including how to identify at-risk individuals in need of prediabetes screening. They conveyed that the material was appropriate for use in their clinic, and likely others throughout the region. As such, I made no adjustments to the staff training plan. Stakeholders expressed the intention of administering the training to the medical assistants at their facility. Responses to the six questionnaire questions follow.

Question 1 was Is the PowerPoint training presentation written at the appropriate level for rural care providers? All three evaluators responded in the affirmative, with Nurse Practitioner 1 (NP1) adding that the training was “easy to understand and follow.”

In response to Question 2—Is the language clear and unambiguous?—the physician answered “yes” and NP1 said, “I think so.” Nurse Practitioner 2 (NP2) expounded in her response, saying, “I had no trouble understanding the training.”

Question 3—Does the training plan fully explain the benefits of using the ADA Risk Calculator?—also received positive responses. The physician agreed, “It’s definitely a good tool,” and NP2 said, “I think so.” NP1 asserted, “Saving lives is a big benefit.”

Responses to Question 4—Is the ADA Risk Calculator clear and easy to use?—included “It’s beyond easy” and “It’s very simple.” NP2 agreed, saying “I think our staff will be able to use it just fine.”

Question 5—What questions do you foresee care providers having regarding use of the ADA Risk Calculator?—required plan evaluators to predict what their staff would say when presented the tool. Both the physician and NP1 expressed concern that staff members would be unclear on which patients should receive the ADA Risk Calculator. NP1 reported that another concern might be the added time to complete the calculator. NP2 did not “foresee any questions. It’s very straightforward.”

Responses for Question 6, the final question in the questionnaire—If care providers have questions regarding the ADA Risk Calculator, where can they go for help?—were less definitive. The physician speculated that “I suppose they could ask [NP1] or [NP2],” after which NP1 said, “If I have the time, I’m happy to help.” NP2

expressed no ownership as a source of help, instead suggesting, “They could probably go to the ADA website.”

Limitations

Although plan evaluator responses were overwhelmingly positive with regard to the training plan for use of the ADA Risk Calculator (see Appendix B), one limitation stood out. Despite help with the tool being available from a range of sources, including clinic stakeholders and the ADA itself, the physician and nurse practitioners were speculative with regard to where staff could turn for help with the tool. The staff training plan administrator may therefore wish to clarify available resources with trainees.

Implications From the Findings

Findings from this study may have wide-ranging implications for individuals, communities, and health care providers. Individually, patients may benefit from the use of the ADA Risk Calculator as a means to diagnose prediabetes. With early diagnosis and proper care, patients may be able to change their eating and lifestyle habits, thus preventing Type 2 diabetes and the accompanying health complications. This potential benefit is particularly relevant to older African American adults in rural Tennessee, who may otherwise not receive proper diagnosis and counsel (see Porterfield et al., 2010).

With the staff training plan presented at a single rural health care facility in Tennessee, immediate benefits would be to the community surrounding the clinic. As a large portion of the area’s residents are African American adults, many of them older, training clinic staff on the use of the ADA Risk Calculator (see Appendix A) could impact not just patients, but family members, friends, and employers, as well. Finally, by

learning how to use the ADA Risk Calculator to measure the diabetes risk in older African American adult patients, among others, health care provider staff will benefit from knowing they are doing more to help their patients improve their health.

Implications for Positive Social Change

Potential implications for positive social change abound as a result of creating this training plan and having it evaluated by three clinic stakeholders. Chief among these effects is that providing health care staff members with increased knowledge of diabetes screening through use of the ADA Risk Calculator may produce better health outcomes for patients. Use of the ADA Risk Calculator should allow health care practitioners to diagnose prediabetes before it becomes Type 2 diabetes, possibly preventing the health complications and burdens that accompany full-blown diabetes (Hooks-Anderson et al., 2015). By extension, proper and consistent use of the ADA Risk Calculator may empower older African American adults in rural Tennessee to increase their engagement with health care providers and better manage other conditions, as well. Researchers have found that providers who use the ADA Risk Calculator with their patients are better able to diagnose prediabetes in their patients, subsequently providing treatment and preventing the development of full-blown Type 2 diabetes (e.g., Heikes et al., 2008; Hooks-Anderson et al., 2015).

Recommendations

As a result of this DNP project, I created and evaluated a staff training plan (see Appendix A) to train health care providers on how to use the ADA Risk Calculator (see Appendix B) to screen older African Americans with prediabetes. The intent was to

create a plan for administration by rural health care providers in Tennessee. Based on the stakeholders' unanimous approval of the training plan, the chief recommendation is for health care facility leaders to administer the training to their staff. Following staff education, facility leaders can measure the success of plan implementation by recording the number of prediabetes screening tools administered and the number of patients diagnosed with prediabetes, especially among older African American adults.

Strengths and Limitations of the Project

The chief strength of this project was the creation of a staff training plan based on valid and reliable scholarly research and industry statistics and standards. Another strength was that all three stakeholders approved the training plan without modifications. Creation of a successful training plan thus fulfilled the project purpose: to address the gap in practice related to the lack of prediabetes screening and care services delivered to older African American adults by rural health care providers in Tennessee.

A limitation of the project is that it included only creation and assessment of the training plan and not implementation. As such, I was unable to directly measure the success of the training plan in improving the frequency of prediabetes screening in the rural health care facility under study. In addition, there was no collection of patient data. Improved staff knowledge of how to diagnose and treat prediabetes will quite likely have a positive impact on patient health (see Hooks-Anderson et al., 2015), although that is undetermined.

Students and scholars may wish to implement this training plan among a group of practitioners, perhaps in a highly populated area or in communities outside of the state of

Tennessee. One means of assessing nurses' and medical assistants' levels of knowledge following training could be to administer pre- and posttests. Additional researchers could also measure the impact of consistent use of the ADA Risk Calculator on patients' health. With increased use of prediabetes screening tools, rural health care nurses will be better able to provide education and intervention to their older adult African American patients, thus preventing the development of Type 2 diabetes.

Section 5: Dissemination Plan

This DNP project entailed the creation of a staff training plan (see Appendix A) to improve nurses' use of the ADA Risk Calculator (see Appendix B) in assessing their patients for prediabetes. Based on my personal experience and expertise working in a rural health care clinic, rural health care providers in Tennessee either use the ADA Risk Calculator infrequently or not at all. The clinics' older African American adult patients, who are at higher risk of Type 2 diabetes than the general population (see Menke et al., 2015), are particularly affected by this practice.

Dissemination of the work of this DNP project occurred via distribution of the training plan to one physician and two nurse practitioners at a rural Tennessee health care clinic. After providing feedback, the stakeholders were free to administer the training plan to their staff. I will also make the training plan available to other health care providers in Tennessee. Additional audiences and venues appropriate for training plan receipt include any institutions providing health care services to patients at risk of prediabetes.

Analysis of Self

In the process of completing this study, I grew from being a practitioner and scholar into a project manager. I drew upon my professional experience working for a rural health care provider serving a predominantly older African American patient population. I was aware of the gaps in assessing for and diagnosing prediabetes in rural facilities and sought to develop training materials to improve staff knowledge and better patient prognosis. Based on my enthusiasm in conducting this project, my professional

goal was and is to provide staff training materials to health care providers in other rural Tennessee communities. I would also enjoy conducting training sessions for staff members as a means of sharing my knowledge of the topic.

Insights gained on this scholarly journey include learning that I was capable of identifying a gap in practice, conducting large-scale research, and creating a training plan to increase provider knowledge and, by extension, likely improve the lives of older African American adults in a rural Tennessee community. The project was challenging, as such intensive research and practice was previously unfamiliar to me. Among the insights I have gained is that I can use my understanding and motivation to create training plans for health care providers to improve the lives of their patients.

Summary

There is an identified gap in practice related to the lack of prediabetes screening and care services delivered to older African American adults by rural health care providers in Tennessee (Menke et al., 2015). This is especially problematic, given that older African American adults have high risks of developing Type 2 diabetes and the subsequent adverse health conditions that follow (ADA, 2019; Centers for Disease Control and Prevention, 2017; Flynt & Daepf, 2015). With this DNP project, I created a staff training plan to train nurses, medical assistants, and other rural health care providers to use the ADA Risk Calculator (see Appendix B) to assess for prediabetes in their patients. The staff training plan, if successfully administered and applied, could lead to improved patient health outcomes in rural Tennessee and beyond.

References

- ADA Risk Calculator. (n.d.). MDCalc. Retrieved from <https://www.mdcalc.com/american-diabetes-association-ada-risk-calculator>
- American Diabetes Association. (2019, March 26). The burden of diabetes in Tennessee. Retrieved from <http://www.diabetes.org/assets/pdfs/advocacy/state-fact-sheets/tennessee-state-fact-sheet.pdf>
- Bennich, B. B., Røder, M. E., Overgaard, D., Egerod, I., Munch, L., Knop, F. K., . . . Konradsen, H. (2017). Supportive and non-supportive interactions in families with a type 2 diabetes patient: An integrative review. *Diabetology & Metabolic Syndrome, 9*, 1–9. doi:10.1186/s13098-017-0256-7
- Bhattacharya, G. (2012). Psychosocial impacts of type 2 diabetes self-management in a rural African American population. *Journal of Immigrant & Minority Health, 14*, 1071–1081. doi:10.1007/s10903-012-9585-7
- Bhatti-Sinclair, K. (2015). Culturally appropriate interventions in social work. In J. Wright (Ed.), *International encyclopedia of the social & behavioral sciences* (2nd ed., pp. 516–522). doi:10.1016/B978-0-08-097086-8.28023-9
- Centers for Disease Control and Prevention. (2017). *National diabetes statistics report, 2017: Estimates of diabetes and its burden in the United States*. Retrieved from <https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf>

- Conway, B. N., May, M. E., & Blot, W. J. (2012). Mortality among low-income African Americans and whites with diabetes. *Diabetes Care*, *35*, 2293–2299.
doi:10.2337/dc11-2495
- Cox, T. D. (2015). Adult education philosophy: The case of self-directed learning strategies in graduate teaching. *Journal of Learning in Higher Education*, *11*(1), 17–22. Retrieved from ERIC database. (EJ1141923)
- Draganov, P. B., de Carvalho Andrade, A., Neves, V. R., & Sanna, M. C. (2013). Andragogy in nursing: A literature review. *Investigación y Educacion En Enfermería*, *31*(1), 86–94. Retrieved from
<http://aprendeonline.udea.edu.co/revistas/index.php/iee/index>
- Flynt, A., & Daepf, M. G. (2015). Diet-related chronic disease in the northeastern United States: A model-based clustering approach. *International Journal of Health Geographics*, *14*(1), 1–14. doi:10.1186/s12942-015-0017-5
- Haiman, C. A., Fesinmeyer, M. D., Spencer, K. L., Bužková, P., Voruganti, V. S., Wan, P., . . . Mukamal, K. J. (2012). Consistent directions of effect for established type 2 diabetes risk variants across populations. *Diabetes*, *61*, 1642–1647.
doi:10.2337/db11-1296
- Heikes, K. E., Eddy, D. M., Arondekar, B., & Schlessinger, L. (2008). Diabetes risk calculator: A simple tool for detecting undiagnosed diabetes and pre-diabetes. *Diabetes Care*, *31*, 1040–1045. doi:10.2337/dc07-1150

Hooks-Anderson, D. R., Crannage, E. F., Salas, J., & Scherrer, J. F. (2015). Race and referral to diabetes education in primary care patients with prediabetes and diabetes. *Diabetes Educator, 41*, 281–289. doi:10.1177/0145721715574604

Hurtado, M. D., & Vella, A. (2018). What is type 2 diabetes? Retrieved from [https://www.medicinejournal.co.uk/article/S1357-3039\(18\)30270-6/pdf](https://www.medicinejournal.co.uk/article/S1357-3039(18)30270-6/pdf)

Joanna Briggs Institute (2013, October). JBI levels of evidence. Retrieved from https://joannabriggs.org/sites/default/files/2019-05/JBI-Levels-of-evidence_2014_0.pdf

Jordan, Z., Lockwood, C., Munn, Z., & Aromataris, E. (2018). Redeveloping the JBI model of evidence-based healthcare. *International Journal of Evidence-based Healthcare, 16*(1), 13–22. doi:10.1097.XEB.000000000000139

Kaiser Family Foundation. (2016). Percentage of adults with diagnosed diabetes. Retrieved from <https://www.kff.org/other/state-indicator/adults-with-diabetes-by-age/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D>

Khardori, R. (2012). Type 2 diabetes mellitus. *New England Journal of Medicine, 365*, 1509–1519. Retrieved from <https://www.nejm.org/>

Kiefer, M., Silverman, J., Young, B., & Nelson, K. (2015). National patterns in diabetes screening: Data from the National Health and Nutrition Examination Survey (NHANES) 2005-2012. *JGIM: Journal of General Internal Medicine, 30*, 612–618. doi:10.1007/s11606-014-3147-8

- Knowles, M. S. (1950). *Informal adult education: A guide for administrators, leaders, and teachers*. New York, NY: Association Press.
- Knowles, M. S. (1984). *Andragogy in action: Applying modern principles of adult education*. San Francisco, CA: Jossey-Bass.
- Menke, A., Casagrande, S., Geiss, L., & Cowie, C. C. (2015). Prevalence of and trends in diabetes among adults in the United States, 1988–2012. *Journal of the American Medical Association, 314*, 1021–1029. doi:10.1001/jama.2015.10029
- National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. (1979). *The Belmont report: Ethical principles and guidelines for the protection of human subjects of research*. Retrieved from <https://www.hhs.gov/ohrp/regulations-and-policy/belmont-report/read-the-belmont-report/index.html>
- Nhim, K., Khan, T., Gruss, S. M., Wozniak, G., Kirley, K., Schumacher, P., . . . Albright, A. (2018). Primary care providers' prediabetes screening, testing, and referral behaviors. *American Journal of Preventive Medicine, 55*(2), e39–e47. doi:10.1016/j.amepre.2018.04.017
- O'Brien, M. J., Bullard, K. M., Zhang, Y., Gregg, E. W., Carnethon, M. R., Kandula, N. R., & Ackerman, R. J. (2018). Performance of the 2015 U. S. preventive services task force screening criteria for prediabetes and undiagnosed diabetes. *Journal of General Internal Medicine, 33*, 1100–1108. doi:10.1007/s11606-018-4436-4
- Osborn, C. Y., Cavanaugh, K., Wallston, K. A., White, R. O., & Rothman, R. L. (2009). Diabetes numeracy. *Diabetes Care, 32*, 1614–1619. doi:10.2337/dc09-0425

- Pearson, A., Wiechula, R., Court, A., & Lockwood, C. (2005). The JBI model of evidence-based healthcare. *International Journal of Evidence-Based Healthcare*, 3, 207–215. doi:10.1111/j.1479-6988.2005.00026.x
- Porterfield, D. S., Hinnant, L., Stevens, D., & Moy, M. E. (2010). The Diabetes Primary Prevention Initiative intervention focus area: A case study and recommendations. *American Journal of Preventive Medicine*, 39, 235–242. doi:10.1016/j.amepre.2010.05.005
- Rariden, C., Lavin, M., & Yun, S. (2015). Improving prediabetes screenings at rural Missouri county health departments. *Journal of Community Health*, 40, 1107–1114. doi:10.1007/s10900-015-0036-y
- Schalock, R. L., Gomez, L. E., Verdugo, M. A., & Claes, C. (2017). Evidence and evidence-based practices: Are we there yet?. *Intellectual and Developmental Disabilities*, 55, 112–119. doi:10.1352/1934-9556-55.2.112
- Selvin, E., Parrinello, C. M., Sacks, D. B., & Coresh, J. (2014). Trends in prevalence and control of diabetes in the United States, 1988-1994 and 1999-2010. *Annals of Internal Medicine*, 160, 517–526. Retrieved from <https://annals.org/aim/article-abstract/1860528/trends-prevalence-control-diabetes-united-states-1988-1994-1999-2010>
- Sherkat, D. E., Kilbourne, B. S., Cain, V. A., Hull, P. C., Levine, R. S., & Husaini, B. A. (2005). Explaining race differences in mortality among the Tennessee Medicare elderly: The role of physician services. *Journal of Health Care for the Poor & Underserved*, 16(4), 50–53. doi:10.1353/hpu.2005.0072

- Signorello, L. B., Schlundt, D. G., Cohen, S. S., Steinwandel, M. D., Buchowski, M. S., McLaughlin, J. K., . . . Blot, W. J. (2007). Comparing diabetes prevalence between African Americans and whites of similar socioeconomic status. *American Journal of Public Health, 97*, 2260–2267. doi:10.2105/AJPH.2006.094482
- Taylor, B., & Kroth, M. (2009). Andragogy's transition into the future: Meta-analysis of andragogy and its search for a measurable instrument. *Journal of Adult Education, 38*, 1–11. Retrieved from ERIC database. (EJ891073)
- Tang, T. S., Brown, M. B., Funnell, M. M., & Anderson, R. M. (2008). Social support, quality of life, and self-care behaviors among African Americans with type 2 diabetes. *Diabetes Educator, 34*, 266–276. doi:10.1177/0145721708315680
- Tseng, E., Greer, R., O'Rourke, P., Yeh, H. C., McGuire, M., Clark, J., . . . Maruthur, N. M. (2017). Survey of primary care providers' knowledge of screening for, diagnosing, and managing prediabetes. *Journal of General Internal Medicine, 32*, 1172–1178. doi:10.1007/s11606-017-4103-1
- Underwood, S. M. (1987). *Application of learning style theory to nursing education and nursing practice*. Washington, DC: United States Department of Education.
- Wang, J., Geiss, L. S., Williams, D. E., & Gregg, E. W. (2015). Trends in emergency department visit rates for hypoglycemia and hyperglycemic crisis among adults with diabetes, United States, 2006–2011. *PloS ONE, 10*(8), 1–10. doi:10.1371/journal.pone.0134917

Appendix A: Staff Training Plan

The training plan was a PowerPoint presentation that included the following elements:

- definitions of diabetes, Type 2 diabetes, and prediabetes;
- frequency of diabetes in the United States;
- frequency of diabetes in Tennessee;
- frequency of diabetes among older African American adults;
- why it is important to catch and diagnose prediabetes before it becomes diabetes Type 2;
- asymptomology of prediabetes;
- symptoms and outcomes of diabetes Type 2;
- providers' role in stopping the advancement of diabetes Type 2 and better caring for their older African American adult patient population; and
- the ADA Risk Calculator (see Appendix B) training.

Appendix B: ADA Risk Calculator

Predicts risk of undiagnosed diabetes to determine who should be screened.

Age, years	<input checked="" type="radio"/> <40 0	<input type="radio"/> 40-49 +1	<input type="radio"/> 50-59 +2	<input type="radio"/> ≥60 +3
Gender	<input type="radio"/> Female 0		<input type="radio"/> Male +1	
1st degree relative with diabetes	<input checked="" type="radio"/> No 0		<input type="radio"/> Yes +1	
Hypertension Self-reported history of hypertension, prescribed antihypertensive medication, and/or BP ≥140/90	<input checked="" type="radio"/> No 0		<input type="radio"/> Yes +1	
Physically active Self-reported by patient	<input type="radio"/> No +1		<input checked="" type="radio"/> Yes 0	
BMI , kg/m ²	<input checked="" type="radio"/> <25 0		<input type="radio"/> 25 to <30 +1	
	<input type="radio"/> 30 to <40 +2		<input type="radio"/> ≥40 +3	

Result:

Please fill out required fields.

ADA Risk Calculator. (n.d.). MDCalc. Retrieved from <https://www.mdcalc.com/american-diabetes-association-ada-risk-calculator>

Appendix C: Joanna Briggs Institute Levels of Evidence Model

Levels of Evidence for Effectiveness

Level 1 – Experimental Designs

Level 1.a – Systematic review of randomized controlled trials (RCTs)

Level 1.b – Systematic review of RCTs and other study designs

Level 1.c – RCT

Level 1.d – Pseudo-RCT

Level 2 – Quasi-experimental Designs

Level 2.a – Systematic review of quasi-experimental studies

Level 2.b – Systematic review of quasi-experimental and other lower study designs

Level 2.c – Quasi-experimental prospectively controlled study

Level 2.d – Pre-test – post-test or historic/retrospective control group study

Level 3 – Observational – Analytic Designs

Level 3.a – Systematic review of comparable cohort studies

Level 3.b – Systematic review of comparable cohort and other lower study designs

Level 3.c – Cohort study with control group

Level 3.d – Case-controlled study

Level 3.e – Observational study without a control group

Level 4 – Observational – Descriptive Studies

Level 4.a – Systematic review of descriptive studies

Level 4.b – Cross-sectional study

Level 4.c – Case series

Level 4.d – Case study

Level 5 – Expert Opinion and Bench Research

Level 5.a – Systematic review of expert opinions

Level 5.b – Expert consensus

Level 5.c – Bench research or single expert opinion

Joanna Briggs Institute (2013, October). JBI levels of evidence. Retrieved from https://joannabriggs.org/sites/default/files/2019-05/JBI-Levels-of-evidence_2014_0.pdf

Appendix D: Plan Evaluator Questionnaire

Training plan evaluators answered the following six questions following review of the staff training plan.

1. Is the PowerPoint training presentation written at the appropriate level for rural care providers?
2. Is the language clear and unambiguous?
3. Does the training plan fully explain the benefits of using the ADA Risk Calculator?
4. Is the ADA Risk Calculator clear and easy to use?
5. What questions do you foresee care providers having regarding use of the ADA Risk Calculator?
6. If care providers have questions regarding the ADA Risk Calculator, where can they go for help?

Appendix E: Evidence Table

Author(s) and year	Level of evidence and design	Purpose	Sample	Findings	Validity and relevance
Bennich, B. B., Røder, M. E., Overgaard, D., Egerod, I., Munch, L., Knop, F. K., Be... Konradsen, H. (2017)	Level 1.b – Systematic review of RCTs and other study designs	To evaluate research on social behaviors in families of Type 2 diabetes patients, and identify behaviors that are facilitators and barriers to self-care	Five quantitative and mixed methods studies meeting topical and research quality criteria	Facilitators of diabetes self-care in terms of patient care behaviors could be taught via interventions and included blood glucose monitoring, medication adherence, emotional involvement, and supportive communication; barriers included negative emotional and communication responses	Benefits to validity include the use of quantitative and mixed methods studies, triangulation of researcher opinion on including studies in the review, and quality standards for inclusion such as measurement of patient outcomes. However, some studies had small sample sizes, limiting generalizability. That said, the interventions would be relevant and beneficial for prediabetes intervention strategies, and staff could be trained to teach them to stakeholders.
Heikes, K. E., Eddy, D. M., Arondekar, B., & Schlessinger, L. (2008)	Level 2.d – Historic/retrospective control group study	To develop a prediabetes and Type 2 diabetes screening tool based on demographics, family history, and lifestyle factors	Convenience sample of 7,092 American adults ≥20 years of age in the NHANES survey	The Diabetes Risk Calculator variables have good specificity and sensitivity, although there is a slight tendency to underestimate prediabetes risk at the population level	The use of a national sample with a large sample size and a control group with known blood sugar readings promotes validity, and the researchers confirmed the sensitivity and specificity with post-hoc analysis. The tool and findings are highly useful for staff training in the project.

(table continues)

Author(s) and year	Level of evidence and design	Purpose	Sample	Findings	Validity and relevance
Hooks-Anderson, D. R., Crannage, E. F., Salas, J., & Scherrer, J. F. (2015)	Level 2.d – Historic/retrospective control group study	To determine the referral rates for African Americans and patients of other races for educational interventions following prediabetes and Type 2 diabetes diagnosis	Convenience sample of 3,967 patients 15-89 years of age receiving care from a large academic medical center between 2008-2013 who were diagnosed with prediabetes or Type 2 diabetes	Regression models revealed that there were significantly higher referral rates to educational interventions among African American patients with diabetes or Type 2 diabetes	Although the sample was drawn from just one health system, the large sample size, appropriate analytical method, and length of time participants were sampled promotes validity. These findings are potentially relevant to staff training information of patient needs after prediabetes diagnosis.
O'Brien, M. J., Bullard, K. M., Zhang, Y., Gregg, E. W., Carnethon, M. R., Kandula, N. R., & Ackerman, R. J. (2018).	Level 4.b – Cross-sectional study	To determine screening criteria performance for U.S. Preventive Services Task Force prediabetes screening recommendations	Convenience sample of 3,643 American adults 40-70 years of age who do not have diagnosed diabetes, but who were overweight or obese and showed at least one risk factor for Type 2 diabetes, from a nationwide sample	Assessments of hemoglobin A1c, fasting plasma glucose, and two-hour plasma glucose revealed higher sensitivity but lower specificity for expanded screening criteria compared to limited criteria. Limited criteria also had lower sensitivity when screening members of minority racial and ethnic groups	The nationwide sample, large sample size, multiple screening methods for blood glucose, and assessment of screening tools while controlling for race contribute to good validity. The findings are relevant to the training plan development as they could indicate a need to use expanded screening with the patient population of interest.

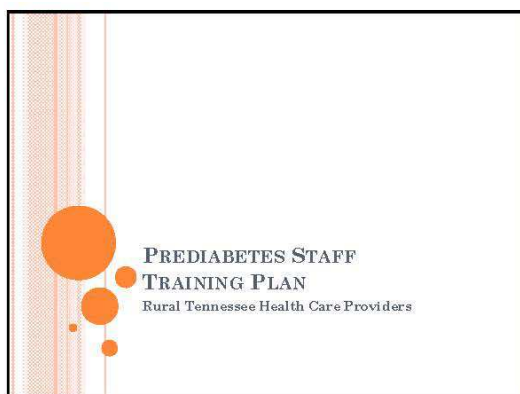
(table continues)

Author(s) and year	Level of evidence and design	Purpose	Sample	Findings	Validity and relevance
Porterfield, D. S., Hinnant, L., Stevens, D., & Moy, M. E. (2010)	Level 4.d – Case study	To provide an evaluation of Diabetes Primary Prevention Interventions implementation among care providers	Exhaustive sample of 54 health care providers in five American states delivering diabetes care to African American patients	The findings from two-day observations at all sites, interviews with 59 staff members, and organizational data analysis indicated that prediabetes awareness, screening, and patient education are central to reducing diabetes. Prevention program planning, external partnerships, and funding are necessary for prevention success, but ensuring lifestyle intervention adherence was difficult	The assessment of all health care providers in the five states of interest, a combination of observations, interviews, and organizational data analysis helps to improve the validity of the research despite the use of a case study format. The findings are relevant to the staff training plan by indicating issues staff are likely to face when changing prediabetes screening practices.
Rariden, C., Lavin, M., & Yun, S. (2015)	Level 2.d – Pre-test – post-test	To improve nurse participant knowledge of clinical guidelines and knowledge for prediabetes and increase prediabetes screening behaviors	Convenience sample of 22 nurses providing care to African American patients in rural Missouri	The nursing education intervention significantly improved mean knowledge scores for prediabetes and relevant clinical guidelines, and significantly increased prediabetes screening among patients, both immediately after the intervention and at a 7-8 week follow-up	The assessment of both staff knowledge and patient screening behaviors and pretest/posttest design with a follow up assessment helps to improve validity despite small sample size and limited sampling frame. These findings indicate the materials used in training with this study could be useful for the project’s staff training plan.

Appendix F: Plan Evaluators' Questionnaire Responses

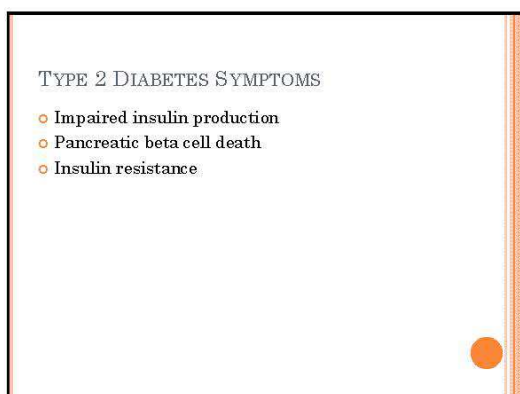
Question	Physician	Nurse Practitioner 1	Nurse Practitioner 2
1. Is the PowerPoint training presentation written at the appropriate level for rural care providers?	Yes.	Yes. It is easy to understand and follow.	Yes.
2. Is the language clear and unambiguous?	Yes.	I think so.	I had no trouble understanding the training.
3. Does the training plan fully explain the benefits of using the ADA Risk Calculator?	Yes. It's definitely a good tool.	The only other benefits would be saving lives, but you'd have to scare them into keeping the patients from dying.	I think so.
4. Is the ADA Risk Calculator clear and easy to use?	It's beyond easy.	It's very simple.	Yes. I think our staff will be able to use it just fine.
5. What questions do you foresee care providers having regarding use of the ADA Risk Calculator?	Probably the biggest question will be, "How do I know who to give it to?"	I agree. Also, they might wonder how they can find time to use it.	I don't foresee any questions. It's very straightforward.
6. If care providers have questions regarding the ADA Risk Calculator, where can they go for help?	I suppose they could ask [Nurse Practitioner 1] or [Nurse Practitioner 2].	If I have the time, I'm happy to help.	They could probably go to the ADA website.

Appendix G: Prediabetes Staff Training Presentation



TYPE 2 DIABETES

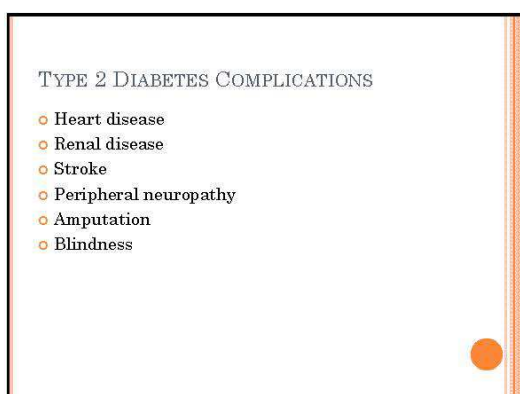
- Metabolic disorder involving hyperglycemia
- Elevated blood glucose levels
- Inability to produce insulin naturally



TYPE 2 DIABETES: RISK FACTORS

- Age (45+ years)
- Sedentary lifestyle
- Overweight/obese
- Unhealthy eating
- Family history
- Medical history
- Race
- Prediabetes

Medical News Today



PREDIABETES

- Asymptomatic—symptoms of type 2 diabetes occur on a lesser scale
- Individuals are unlikely to realize their risk for developing type 2 diabetes without health screening

FREQUENCY OF TYPE 2 DIABETES IN THE UNITED STATES

- Adults 45–64 years: 14.3%
- Adults 65+ years: 12%
- African American adults 20+ years
 - Men: 14%
 - Women: 18%

FREQUENCY OF PREDIABETES IN THE UNITED STATES

- National prevalence: 30%
- Older African American adults: 50%

FREQUENCY OF TYPE 2 DIABETES IN TENNESSEE

- Seventh-highest prevalence of type 2 diabetes among older African American adults
- Rates of mortality and complications for African American adults in Tennessee exceed nationwide rates

FREQUENCY OF TYPE 2 DIABETES AMONG OLDER AFRICAN AMERICAN ADULTS

- 50% increased likelihood of diabetes compared to White individuals
- Greatest difference between Black and White women

FACTORS CONTRIBUTING TO THE TRANSITION TO TYPE 2 DIABETES

- Limited access to health care providers
- Lack of standard prediabetes screening practices by trained staff

WHAT YOU CAN DO

- Learn to provide diabetes screening to at-risk patients
- Educate patients on type 2 diabetes prevention interventions
- Engage with patients to manage prediabetes

PREDIABETES SCREENING

- ADA Risk Calculator
- Blood tests

ADA RISK CALCULATOR

Age, years: +60 0 40-49 -1 50-59 +2 60+ +3

Gender: Female 0 Male +1

1st degree relative with diabetes: No 0 Yes +1

Hypertension: Self-reported history of hypertension, antihypertensive medication, and/or BP >160/90: No 0 Yes +1

Physically active: Self-reported by patient: No +1 Yes 0

Weight, kg/m²: <25 0 25 to <30 +1 30 to <40 +2 ≥40 +3

American Diabetes Association, MD+ Calc

STRATEGIES TO PREVENT THE TRANSITION TO TYPE 2 DIABETES

- Eat healthy foods
 - Fiber
 - Whole grains
- Be more active
- Lose excess weight
- Stop smoking
- Take medications, as needed

Mayo Clinic, American Diabetes Association

STAKEHOLDERS

- Patients
 - Older African American adults in rural Tennessee
- Patients' families
- Nursing staff and health care providers
 - Rural Tennessee and beyond
- Related practice areas
- Medicare/Medicaid

REFERENCES

American Diabetes Association (ADA) Risk Calculator. (2019). MD+ Calc. Retrieved from mdcalc.com

Factors contributing to higher incidence of diabetes for black Americans (2018, January 9). National Institutes of Health. Retrieved from nih.gov

Get smart about risks and diabetes prevention. (2019). American Diabetes Association. Retrieved from diabetes.org

Mayo Clinic Staff. (2019). Diabetes prevention: 5 tips for taking control. Mayo Clinic. Retrieved from mayoclinic.org

McBean, E. (2019, May 3). Type 2, type 2, and gestational diabetes risk factors. *Medical News Today*. Retrieved from medicalnewstoday.com