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An Evaluation of the Effectiveness of Providing Foot Care Education in a Rural Clinic Setting

Gloria Green-Morris

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The University of Southern Mississippi

AN EVALUATION OF THE EFFECTIVENESS OF PROVIDING FOOT CARE
EDUCATION IN A RURAL CLINIC SETTING

by

Gloria Green-Morris

Abstract of Capstone Project
Submitted to the Graduate School
of The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Nursing Practice

May 2014

ABSTRACT

EVALUATION OF THE EFFECTIVENESS OF PROVIDING FOOT CARE EDUCATION IN A RURAL CLINIC SETTING

by Gloria Green-Morris

May 2014

Diabetes is one of the most frequently diagnosed metabolic disorders and is currently at pandemic magnitude. Approximately 1.4 million adults are diagnosed with diabetes each year. According to the American Diabetes Association (2011), the numbers of diagnoses will more than double by 2030. Because of the high prevalence of diabetes, the perceptions of risk factors and healthy behaviors are important. A good understanding of written and verbal healthcare instructions, healthcare accessibility, and socio-economic status have a direct effect on patient health outcomes and the overall health of the population (Jovic-Vranes, Bjegovic-Marinkovic & Marinkovic, 2009).

Diabetic foot complications are common concerns in diabetic disease management. The management of diabetic foot ulcers poses a challenge to the medical and nursing staff of a wound care center in a rural Mississippi Delta community. Currently, there is a lack of consistency in the education provided to diabetic patients regarding their foot health. This lack of consistency substantiated the need to empower patients with the knowledge necessary to prevent diabetic foot ulcers. Frustrations with the fragmented education provided led to high rates of failed attempts in the prevention of diabetic foot ulcers.

Because of reimbursement constraints from the Centers for Medicare and Medicaid Services (CMS) and private insurance companies, most patients with diabetic

foot ulcers are not eligible for structured education. Since structured diabetic education is not covered, beneficiaries are also not eligible for the two-year follow-up course. As a result, the number of foot ulcers and subsequent lower limb amputations continued to increase. The goal of this project was to evaluate the effectiveness of an evidence-based diabetic foot education provided to diabetic patients in a rural wound care clinic. When evidence-based foot education was provided, the participants' knowledge of basic foot care increased.

This capstone project was based upon the CIPP Model of Evaluation. Qualitative and quantitative data was analyzed using descriptive statistics and frequency distribution. The qualitative themes were used to evaluate the effectiveness of the program and to capture participants' perceptions of their experiences. Findings from this project proved the effectiveness of providing basic foot care instructions as a pedagogical method of increasing patients' knowledge of preventing foot ulcer formation.

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TABLE OF CONTENTS

ABSTRACT	ii
ACKNOWLEDGMENTS	iv
LIST OF TABLES	vii
LIST OF ILLUSTRATIONS	viii
LIST OF ABBREVIATIONS.....	ix
CHAPTER	
I. INTRODUCTION.....	1
Evidence of Problem	
Significance of the Problem	
II. LITERATURE REVIEW	9
Type 2 Diabetes	
Diabetes Education	
Diabetic Foot Ulcers	
Education Program Evaluation	
Theoretical Framework	
III. PROJECT DESIGN AND STUDY	24
Population	
Setting	
Project Activities	
Data Collection	
Data Analysis	
Ethics and Human Subjects Protection	
Timeline of Project	
Project Evaluation Plan	
IV. RESULTS	34
Demographic Data	
Focus Group Analysis	
Diabetes History Survey	
V. DISCUSSIONS.....	44

Limitations
Recommendations
Implications
Implications for Nursing Practice
Implications for Research
Implications for Education
Conclusions
Cost Benefit Analysis
Plans for Dissemination

APPENDIXES	55
REFERENCES	67

LIST OF TABLES

Table

1. Timeline of Project	32
2. Project Evaluation Plan	33
3. PIN Questionnaire Results Prior to Intervention.....	36
4. DAS-3 Results Prior to Intervention.....	42
5. Cost Benefit Analysis.....	54

LIST OF ILLUSTRATIONS

Figure

1. Fishbone Diagram of Identified Needs.....8
2. Basic Foot Care Education Program Development Model.....23
3. Frequency Distribution of Checking Feet Daily (Pre-Intervention).....37
4. Frequency Distribution of Checking Feet Daily (Post-Intervention).....38

LIST OF ABBREVIATIONS

American Association of Diabetes Educators.....	AADE
American Diabetes Association.....	ADA
Agency of Healthcare and Quality.....	AHRQ
Centers for Medicare and Medicaid Services.....	CMS
Context, Input, Process, Product Model.....	CIPP
Continuous Quality Improvement.....	CQI
Cumulative Index of Nursing and Allied Health Literature.....	CINAHL
Department of Health and Human Services.....	DHHS
Diabetes Attitude Scale.....	DAS-3
Diabetes Mellitus.....	DM
Diabetes Self-Management Education.....	DSME
Diabetic Foot Ulcer.....	DFU
Institute of Medicine.....	IOM
National Institute of Diabetes Digestive & Kidney Disease.....	NIDDK
Patient Interpretation of Neuropathy.....	PIN
Statistical Package for Social Science.....	SPSS

CHAPTER I

INTRODUCTION

Diabetes is an incurable disease that affects multiple organ systems when not therapeutically managed. Marked high levels of blood glucose create a cluster of symptoms known as diabetes mellitus (DM). Blood glucose levels in diabetes are high because of a deficiency in insulin production, insulin action, or a combination of both (World Health Organization, 2005). Diabetes is one of the most frequently diagnosed metabolic disorders and is now at pandemic magnitude with 1.4 million adults diagnosed each year. The numbers of diagnoses will more than double by 2030 (American Diabetes Association, 2011). The high prevalence of diabetes increases the importance of perception of risk factors and healthy behaviors.

There has been much discussion on the effectiveness of patient education and health outcomes. Over the past decades, patient participation in their healthcare process has been recognized as a critical determinant of successful disease management (Ishikawa, Takeuchi, & Yano, 2008). Disease management requires extensive, ongoing patient self-care. Health information is an important resource for helping patients understand and engage in the management of a health condition. This is especially true for diabetes.

A good understanding of written and spoken healthcare instructions, the availability of healthcare, and socio-economic status have been proven to have a direct effect on disease management, patient health outcomes, and the overall health of the population (Jovic-Vranes et al., 2009). Diabetic foot complications are common concerns in diabetic disease management. The management of diabetic foot ulcers poses

a challenge to the medical and nursing staff in a wound care center in a rural Mississippi Delta community. The lack of consistency in the education provided to diabetic patients regarding their foot health substantiated the need to empower patients with the knowledge necessary to prevent diabetic foot ulcers. Frustrations with the fragmented education provided led to high rates of failed attempts in the prevention of diabetic foot ulcers. As a result, the number of foot ulcers and subsequent lower limb amputations continued to increase.

Evidence of Problem

Foot complications from diabetes are the leading cause of amputation in hospitals in the Mississippi Delta. The Mississippi Delta is in the north central part of the state of Mississippi between the Mississippi River and the Yazoo River. It includes a health service area of 18 counties (Delta Health Alliance, 2013). The population is predominantly African American and is in an area plagued by high unemployment rates, high poverty rates, and the most healthcare disparities in the country. The Mississippi Delta has the second highest rate of diabetes and the sickest people in the country (Mississippi State Department of Health, 2011).

Diabetic foot ulcers (DFUs) account for 68% of visits to the wound care center in a rural North Central Mississippi community and are the most common diagnosed complication at the wound care center. Of the 288 patients currently registered at the clinic, 198 were diabetic. Of the 198 diabetic patients in the wound care center, 143 had type 2 diabetes and ulcerations to a lower extremity.

An assessment of patients at the rural health center documented that foot ulcerations were related to the loss of sensation in lower extremities. Barriers such as not

understanding signs of decreased sensation, how to perform daily foot inspections, and care of the feet and nails were factors that affect foot ulcer formation. It is important to note that complications from failure to manage diabetic foot ulcers have caused an increase in the amputation of diabetic limbs among clinic patients.

While patients within the clinic understood that diabetes could not be cured and that self-care was important in the management of diabetes, several patients frequently informed the nurse that they believed their increase in foot ulcerations were related to the lack of understanding of home care instructions. When asked by the nurse, patients denied being offered education on self-practices to prevent diabetic ulcer formation. Patients also admitted to the failure of healthcare providers to explain diabetic management practices that included appropriate foot care instructions.

Patients in the wound care clinic recognized the complication and fragmentation of the healthcare system (Okun et al., 2013). However, they failed to realize that the opportunity to learn from the education provided while in the hospital, clinic, and doctor's office was not sufficient for prevention of foot ulcerations. As a result of the lack of understanding of education provided, the number of ulcerations on lower extremities and subsequent amputations continued to increase.

Since there were no recorded data regarding the effectiveness of education on foot ulcer prevention provided to patients in the clinic network, the verbalization of the lack of education raised concerns surrounding the ability of patients to care for their diabetic feet upon returning home. These concerns further prompted the need for an assessment of the patients' level of knowledge regarding daily foot care. Further, there was evidence that

indicated that education on basic foot care during clinic visits might positively impact the management of diabetic foot complications.

In meeting with clinic directors and other stakeholders, it was evident that there was a need to decrease the number of lower limb amputations that were secondary to diabetic foot ulcerations. Stakeholders believed preventing foot ulcers would decrease amputations, subsequently decreasing overall facility costs. A study on self-care of the diabetic foot had not previously been conducted in the wound care center or in any other clinic in the hospital's network. While listening to the interactions between the nurses and their patients, it was clear that the patients did not understand how to inspect or care for their feet daily. Patients in the clinic continued to suffer from ulcer formation to one or both lower extremities even though there was documentation of completion of diabetes self-management education (DSME) programs.

Significance of the Problem

Diabetes is not just an international or national problem; it also affects people within local communities. According to the Mississippi State Department of Health (2011), Mississippi ranked the second highest in the United States for overall diabetes prevalence. Diabetes contributed to the deaths of 926 Mississippians in 2010. Many more live with life limiting and life-threatening complications of diabetes (Mississippi State Department of Health, 2011). This significant rise in the number of people affected by diabetes and insufficient healthcare resources makes it progressively necessary to improve education on the prevention of diabetic foot complications.

Because Americans have adopted more sedentary lifestyles and have become more obese, the incidence and prevalence of diabetes continue to increase. Lower limb

amputations secondary to diabetic foot ulceration have also become a common occurrence. This global burden is expected to increase with the world facing an epidemic of type 2 diabetes (Perrin, Swerissen, & Payne, 2009). People with diabetes-related foot problems use significantly more health services than individuals with diabetes without foot problems. There is strong historical and anecdotal suggestion that certain foot-care behaviors can prevent diabetes-related foot pathology. At the same time, evidence suggests that people with diabetes fail to implement behavior strategies suggested in educational interventions (Perrin et al., 2009).

Currently, foot care education targets patients with pre-existing complications of the foot and lower extremities. There is little or no education provided on basic foot care or the prevention of foot ulcerations. Even though diabetic foot complications develop quickly, most primary care providers consider foot health education as costly and opt out on consistently providing education. If provided effectively and consistently, preventative and prophylactic foot care decreases patient morbidity, the utilization of expensive resources, and the risk for amputation (Wu, Driver, James, & Armstrong, 2007). Jeffcoate et al. (2011) found that daily foot inspection was the most common preventative measure in the prevention of foot ulcerations. Poor socio-economic condition, lack of proper diabetic foot care education, and incorrect footwear are factors associated with the development of diabetic foot ulcers.

The cost associated with diabetic foot ulcers is exceedingly high. The cost of treatment for diabetes and its complications is \$10.9 billion, and one-third of this cost is related to the treatment of diabetic foot ulcers (Centers for Disease Control and Prevention, 2011). The cost of care for patients with diabetes increases drastically after

the appearance of the first foot ulcer and rises even higher during the second year (Maderal, Vivas, Zwick, & Krisner, 2012). Diabetic patients with foot ulcers have more frequent visits by healthcare providers and admissions to the hospital. Patients with diabetic foot complications also experience longer hospital stays when compared to diabetics without foot ulcers (Maderal et al., 2012).

Since diabetes is a chronic disease, cost associated with management can be very expensive. Chronic illnesses such as heart disease, cancer, diabetes, stroke, and chronic lung disease account for 70% of deaths and 75% of healthcare costs (Institute of Medicine, 2012). According to Gattullo and McDevitt (2012), diabetes is a costly problem in the United States that places an economic burden on the individual, healthcare organizations, and society. In 2007, The Centers for Disease Control and Prevention (2011), found the total direct and indirect diabetic cost in the United States to be \$174 billion. Direct medical costs totaled \$116 billion and indirect costs at \$58 billion. The cost of diabetes care and complications to the United States healthcare system is approximately \$10.9 billion annually, with \$16,488 to \$66,215 per amputation. Amputation is a much higher cost to the health system secondary to multiple, prolonged hospitalizations than the lower cost of a preventative approach to care of patients with diabetes and related ulcers (Heitzman, 2010).

Patient education on appropriate self-care has the potential to play a key role in preventing foot complications. Understanding the factors that contribute to sub-optimal behavioral outcomes in foot care is important if ulceration and amputation rates are to be decreased (Perrin et al., 2009). Educating and training diabetic patients and their family members increased their knowledge of diabetic foot care and helped bridge the gap

between knowledge and integration into daily activities. Previous research showed that providing effective education to diabetic patients and their family members could help decrease the incidence of ulcer formation.

The purpose of this project is to evaluate the effectiveness of evidence-based basic foot education provided to type 2 diabetic patients in a rural wound care clinic. Providing effective basic foot care education during routine clinic visits, will: (a) improve the patients' knowledge of diabetic foot care (b) improve overall foot health (c) decrease direct and indirect diabetic costs (d) improve the economic status of patients and the facility (e) Increase the opportunities for shared learning experiences and (f) narrow the gap between knowledge and practice. Specifically, providing the appropriate evidence based foot care education for the patients in the clinic can help increase participants knowledge of foot ulcer prevention. Increasing participants' knowledge of basic foot care can increase the probability of decreased healthcare costs and improve overall health outcomes of the population.

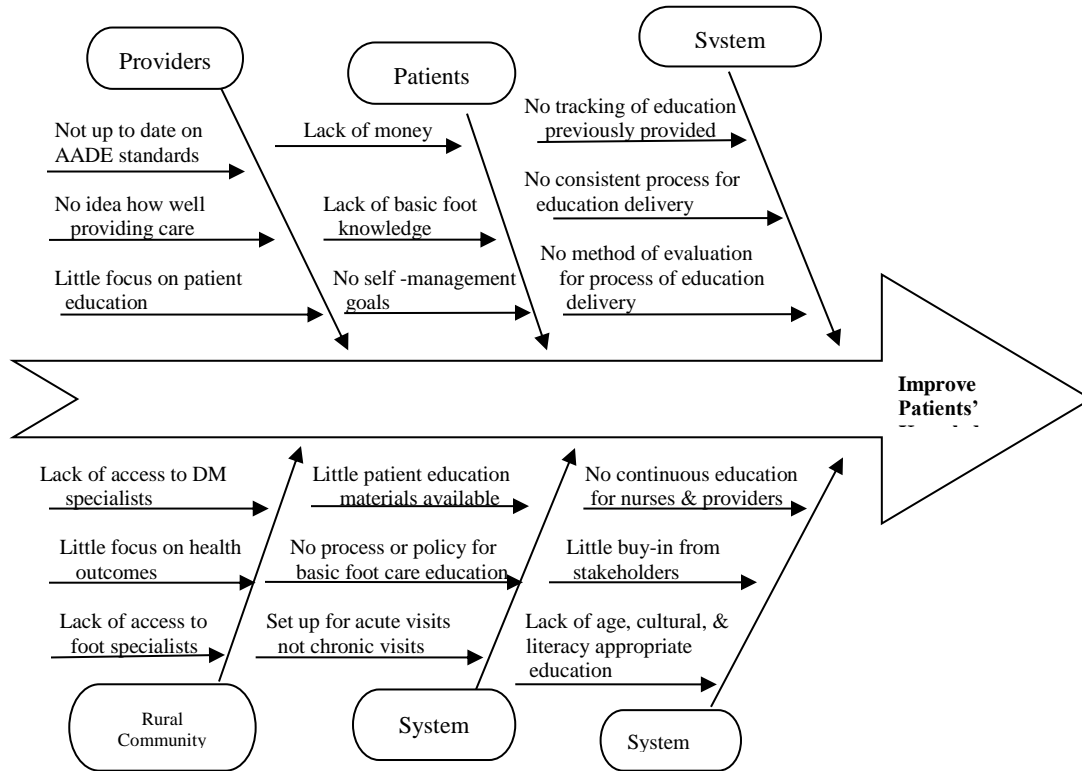


Figure 1. Fishbone Diagram of Identified Needs. Several categories were identified to have areas that need improvement prior to implementation of the basic foot care intervention. The areas in need of improvement were made up of internal and external factors that had an adverse effect on the patients' ability to obtain knowledge.

CHAPTER II

LITERATURE REVIEW

The central purpose of diabetes self-management education is to help patients make knowledgeable healthcare decisions and to define their self-care activities. The rapid increase in the number of people affected by diabetes compels the healthcare provider to be more perceptive to the need for effective self-management education. It is predicted that, globally, the number of people with diabetes will increase by 35% by the year 2025 (American Association of Diabetes Educators, 2012, p. 2)

Historically, diabetes education has been recognized as the best practice for effective diabetes care. Since the paradigm for diabetes education has shifted from a content-driven practice to an outcome-driven practice, the need for evaluation of disease management programs is necessary. Mandates from federal and accreditation agencies influence the need to evaluate the outcomes of diabetes care (Beebe & Schmitt, 2011). Federal and accreditation agencies refer to Diabetes Self-Management Education (DSME) programs as a process measure. Since diabetes education is a distinct healthcare specialty, the members of DSME teams are positioned strategically to advance the standards of practice, the quality of diabetic care and the overall improvement of the health of patients.

An extensive examination of literature identified the standards for the chosen intervention and delivery of evidence-based foot care education. This review of evidence includes only studies published in English. Databases of Cumulative Index of Nursing and Allied Health Literature (CINAHL), Academic Search Premier, Google Scholar, MEDLINE, PubMed, and Agency of Healthcare and Quality (AHRQ) were used in the

search for supporting literature. Search terms were diabetes, self-management, foot ulcers, diabetic foot ulcers, diabetes knowledge and control, self-care, neuropathy, diabetes education, CIPP Model, and amputation. The summary of literature addressed the positive effects of diabetic foot care education on the prevention of foot ulcer formation.

For the purpose of this project, and consistency with agency standards, the Context, Input, Process, and Product (CIPP) model and the DSME guiding principles will be used to evaluate the implementation of an evidence-based basic foot care education that is informative and consistent in rural healthcare settings and across DSME programs nationally.

Type 2 Diabetes

Because diabetes is an incurable disease that affects multiple organ systems when not therapeutically managed, excessively high levels of blood glucose create a group of symptoms that causes life-threatening complications. Blood glucose levels in diabetes are high because of a deficiency in insulin production, insulin action, or a combination of both (World Health Organization, 2005). Diabetes is a chronic illness that affects both the young and the old. Type 2 diabetes is the most common form of the disease. In type 2 diabetes, the body makes insufficient quantities of insulin, or the body is not able to process the insulin and use it properly (Lollar, 2012). The Mayo Clinic (2013) defines type 2 diabetes as “the body either resisting the effects of insulin — a hormone that regulates the movement of sugar into your cells — or failing to produce enough insulin to maintain a normal glucose level”. While there are many causes of type 2 diabetes,

including environmental and genetic factors, obesity and lack of physical activity and education are by far the most common reasons for developing the disease.

Diabetes Education

Diabetes is a chronic disease that requires patient education to achieve adequate control and prevention of adverse health outcomes. Education, which is the formal process of learning facts or instructions (Bastable, 2008), has been an essential component of action to promote health and prevent disease throughout this century (Nutbeam, 2006). Education is only effective if the characteristics of the patient in terms of knowledge, attitude and practice about diabetes are clear (Shah, Kamdar, & Shah, 2009). Knowledge will involve general understanding of diabetes and foot care and is the informal application of facts and instructions learned (Ornstein, Levine, Gutek, & Vocke, 2011). Knowledge and education are synonymous and may be used interchangeably. For this project, knowledge in the prevention of foot ulceration is defined as the patients' understanding of foot care management.

The research supports the understanding that knowledge and education are related. Findings from a descriptive correlation study measuring knowledge foot care practices in Bangladesh, showed a high level mean ($M = 84.55$) of the total level of foot care knowledge. All of the questions were basic foot care and personal hygiene related. The study revealed that there is a statistically significant positive low relationship between total knowledge and total foot care (Begum, Kong, & Manasurakan, 2010). However, a study of 110 patients that were affected by diabetic foot disease showed that non-healing ulcers were present among 82.7% and amputations amounted to 38.2%. More than 50% of the study sample had knowledge on diabetic foot care principles but

practice was sub-standard. There was a statistically significant difference between foot care knowledge and foot care practice scores ($p < 0.001$, $z = -8.151$); nevertheless, only 51% of the participants had not received diabetes education prior to the occurrence of foot complications (Jinadasa & Jeewantha, 2011).

A study to measure knowledge before and after diabetes education showed a significant increase ($p < 0.05$) in participants' knowledge regarding their disease (Otero, Zanetti, & Ogrizio, 2008). This study proved that there is a need to provide diabetic patients with continuous follow-up and support. The continuation of follow-up and support avoided or delayed chronic complications in diabetic patients. There is evidence that long-term diabetic patients, with glycosylated hemoglobin of 7% or higher, had improved outcomes and a greater likelihood of achieving better control when they were educated using evidence-based methods (Sperl-Hillen et al., 2011). A study by Shah et al. (2009) reveals that of the 238 Gujarat subjects, nearly 40% were below the poverty line and could not afford minimal standard care. Of the subjects in this cross-sectional study, 63% did not know about diabetes. Another 63% did not know what the long term consequences of diabetes were. This study proves that the most powerful factor in the inability to manage diabetes and its complications was the low level of education. Even though it was not the aim of the study, the researchers also studied subjects' dissatisfaction with time spent with healthcare providers. It was evident that healthcare providers spent less than five minutes in nearly 50% of the office visits. During office visits, the healthcare provider did not suggest reporting foot care complications.

A cross-sectional study in Nigeria proves that 30.1% had good knowledge and 10.2% had a good practice of diabetes foot care. The majority of the patients (78.4%)

with poor practice had poor knowledge of foot care. With regard to knowledge, 68.8% were unaware of the first thing to do when they had redness or bleeding between their toes. Sixty-one (61.4) percent were unaware of the importance of inspecting the inside of their shoes for objects. This study also highlights the association between poor knowledge and poor practice of foot care in diabetes patients (Desalu et al., 2011).

Over the years, research has shown a direct correlation between positive self-care behaviors and positive patient outcomes. The expectation is that those with the greatest knowledge will have a fuller understanding of how to manage their diabetes on a daily basis. Having a fuller understanding enables individuals to slow or halt the progression of the disease and their risk of complications. As a result, nurses must focus their teaching on health promotion and finding innovative ways to encourage patients to assume more responsibility in their care (Hohdorf, 2010).

The American Association of Clinical Endocrinologists emphasizes the importance of patients becoming active, knowledgeable participants in their care (Rodbard et al., 2009). Likewise, the World Health Organization's Joint Task Force for Diabetes (2011) recognized the importance of patients learning to manage their diabetes. The American Diabetes Associations Task Force (as cited in a position statement by American Association of Diabetes Educators, 2012) reviewed the National Standards of Diabetes Self-Management Education and found that there was a massive increase in diabetic complications for individuals who did not receive formal education concerning self-care practices. With the rapid growth of an aging population, healthcare professionals must fill an increasing demand for specialized training in educating on

chronic illnesses. Self-care or the lack of it plays an essential role in the outcomes of diabetic patients.

Since the inability to read and write at a competent level is common in patients with type 2 diabetes, there is little consistency in the education provided to patients with diabetes. Hence, it is important to empower patients with the knowledge necessary to remove educational barriers regarding foot health. There are few studies with supporting evidence regarding the provisions of foot care for diabetic patients with no clinical symptoms of neuropathy. Therefore, the need for the development of innovative, low literacy, didactics, to prevent complicated foot problems is imperative. Having the knowledge to remove educational barriers will have a positive impact on diabetic foot health and overall health outcomes of persons affected.

Diabetic Foot Ulcers

In primary prevention, the goal is to protect healthy people from developing a disease or experiencing an injury. Education and early detection are key elements in identifying, treating, and preventing complications in diabetes. Signs and symptoms of diabetes are usually present during the chronic stages of the disease but may be present during pre-diabetes. Therefore, patients should have exams upon diagnosis and during regular checkups. Routine exams for people with diabetes may consist of a series or combination of system focused assessments and diagnostic tests. The integumentary system is one of the most commonly reviewed for early detection of complications in diabetic patients (Apelquist, Bakker, vanHoutum, & Schaper, 2008).

Regardless of efforts to prevent diabetes, there are millions of people in the United States treated for non-healing foot ulcers. Chronic wounds can have an annual

cost of over \$25 billion. Diabetic foot ulcers and their complications not only represent a major personal tragedy for the person experiencing an ulcer, but also place a considerable financial burden on the healthcare system and society (Bakker & Schaper, 2011). Brower et al. (2011) explained that non-healing wounds, regardless of their etiology, come from an impaired stage of prevention in the pathological healing process. After ulcerations have formed, there is only a 50% healing rate achieved in chronic wounds (Brower et al., 2011). As a result, a large segment of this population is at risk for infection, sepsis, and amputation.

Patients with a history of foot ulceration are at higher risk for the formation of new ulcers. Within one year of wound healing following ulceration, up to 40% of the clinic's patients with a positive ulcer history developed another ulcer (Brower et al., 2011). Literature supports the fact that recurrent ulcerations are due to decreased resilience and inability of tissue to withstand repetitive stress and pressure from daily activities. Diabetic foot ulcers (DFU) are one of the most common complications of diabetes and represent a significant economic problem worldwide (Maderal et al., 2012).

The increase in the number of people affected by diabetes and the rise in foot ulcerations prompts the need for extensive studies of persons with diabetes. A study by Lavery, Peters, and Williams (2008) found that if a person has diabetes and no other complication, he or she has a 2% risk of developing a foot ulcer. Similar studies serve as evidence that emphasize the need for continuous diabetes education (Apelqvist et al., 2008). However, there are studies that were aimed at prevention of ulcer formation on feet in diabetic patients through education that have not been able to show significant effects of the interventions (Gershater, Pilhammar, Apelqvist, & Alm-Roijer, 2011).

Education Program Evaluation

The spectrum of foot lesions varies from region to region because of the differences in socio-economic conditions, standards of foot care, and quality of footwear. Therefore, diabetic foot care guidelines are the most cost-effective form of healthcare expenditure. These diabetic foot care guidelines must be goal focused and properly implemented (Bakker & Schaper, 2011). It is the overarching goal of those within the healthcare realm to improve patient health outcomes.

In order to achieve better patient outcomes, there must be better system performance (provision of care) and better professional development (education). Improvement in the care and education provided to patients involves a substantial shift in our idea of the role of healthcare (Batalden & Davidoff, 2007). The improvement of healthcare is a challenging task and requires the use of a wide variety of methods. Because of the emphasis placed on the need for improving the present state of healthcare, it is important to measure the change in practice to ensure that an improvement happens.

There have been numerous studies that evaluated the effectiveness of education program components. A meta-analysis on the effectiveness of a diabetes management program documented that despite well-established recommendations for diabetes care, quality of care still needed to be improved (Pimouguet, LeGoff, Thiebaut, Dartigues, & Helmer, 2011). A cross-sectional study using the context, input, process, and product (CIPP) evaluation model showed an overall satisfaction with the training objectives and the teaching methods used (Dukhail & Khathami, 2012), thus proving program evaluation is required to assess its ability to maintain a high quality of education or training provided to its participants.

Theoretical Framework

The theoretical framework for this project was a representation of a combination of principles of four models: Knowles Adult Learning Theory, Orem's Theory of Self-Care, The American Diabetes Association (ADA) and The American Association of Diabetes Educators (AADE) National Standards of Diabetes Self-Management Education, and Stufflebeam's Context, Input, Process, and Product (CIPP) program evaluation model. Knowles' adult learning theory was selected to help guide the delivery of the education that was provided during this intervention. In 1950, Knowles defined his theory of *andragogy* as the art and science of teaching adults (Bastable, 2008). The andragogy model is based on the notion that adults learn best when treated as adults and that the ultimate purpose of andragogical education is to empower individuals through the process of learning (Milligan, 1997).

Orem's theory of self-care helps to identify internal and external factors that must be changed in order for type 2 diabetic patients to perform activities to maintain a healthy lifestyle. The self-care theory was also used to identify ways to provide supportive foot care education. When supportive foot care education was received, the patients were able to change conditions that affected their ability to care for their feet and make better health decisions.

The National Standards of Diabetes Self-Management Education provided a framework for the provision of education that was evidence-based and culturally and age appropriate. The standards also helped outline goals for meeting the educational needs of the given population over a short period of time.

The CIPP model for program evaluation was used to look at systematic ways to measure the effectiveness of the basic foot care education provided to patients within the wound care clinic. In this project, Stufflebeam's Context, Input, Process, and Product (CIPP) evaluation model systematically guides the conception, design, implementation, and assessment of basic foot care education, and provides feedback and judgment of the project's effectiveness for continuous improvement (Mertens & Wilson, 2012).

Adult Learning Theory

Knowles' model guided the design of a delivery method that fostered a mutual relationship between the nurses and the patient. The education provided was based on the patients' lived experiences and was presented in a manner that allowed for active learning and prompt feedback to questions and concerns. Knowles' theory of *andragogy* helped ensure that the education was patient-centered and that patients understood the nurses were only available to assist them with their learning needs.

When Knowles' andragogy theory is applied to diabetic foot care education, adults learn best if: (a) the education provided relates to a lived experience and an immediate need or problem, (b) the nurse or physician understands learning or participation is self-initiated, (c) new foot care instructions represent past experiences and are related to something the patient already knows, (d) the patient is able to participate actively in the learning process, and (e) diabetic foot education is reinforced by application and prompt feedback. On the contrary, adults will resist new concepts if they clash with established habits and experience (Bastable, 2008). Knowles believed that learning strategies should be less involved with theory, and more focused on putting into practice applications of knowledge relevant to the real world (Thompson & Deis, 2004).

Therefore, the education provided during this project has been adjusted to the Knowles' principles of adult learning.

Orem's Theory of Self-Care

Dorothea Orem's theory of self-care was used to identify factors that affect patient education. Orem's theory defined nursing as an art, a science that helps individuals or groups to maintain or change conditions in themselves or their environment (Fawcett, 2001). Orem's theory of nursing has three interrelated parts: theory of self-care, theory of self-care deficit, and theory of nursing systems.

Orem defined self-care as a practice of activities that an individual initiates and performs on their own to maintain life and well-being (Fawcett, 2001). Diabetes self-care is necessary to meet the continuous requirements for daily care that regulates life processes, and promote well-being in persons affected. Providing diabetic education during each clinic visit will increase patients' knowledge of activities that need to be incorporated into daily care of the diabetic foot, therefore eliminating self-care deficits.

Self-care deficit restricts patients' ability to perform activities of daily living. In diabetes, self-care deficits in foot health cause latent symptoms and more serious complications (Orem, 1991). Orem's theory refers to self-care deficits as a relationship, not a disorder of the person. The most important aspect of self-care deficit in the diabetic patient is that it identifies the need for a nurse. Even though the need for a nurse is only in the case of an existing diabetic-related deficit, the education they provide is vital in the prevention of potential deficit.

Orem's theory of nursing systems describes how education provided by the nurse meets the patient's self-care needs. This theory suggests that nursing systems form when

nurses provide nursing care to patients that otherwise would not be provided. The nursing care provided improves and regulates the individual's self-care capabilities and meets therapeutic self-care needs. Thus, nursing systems cannot be formed or maintained without patients being active in the development of skills that constitute self-care.

There are three categories of Orem's theory of nursing systems. The wholly compensatory systems are for individuals who are unable to control and monitor their environment or process information. The partly compensatory systems are for individuals who are unable to perform some (but not all) self-care activities. Finally, the supportive-educative (developmental) systems are for persons who need to learn to perform self-care activities (Taylor, 2007).

The focus of this project was the supportive-educative category of Orem's theory of nursing systems. The paradigm of poor supportive-education in diabetes self-care is not solely the patients' failure to make knowledgeable healthcare decisions. Patients are also unable to attain the knowledge required to perform daily activities. Failure to manage self-care activities increases patients' risks of poor health status as it relates to diabetes and its complications. Evaluation of the level of knowledge retained by patients is required to (a) measure the understanding of diabetic foot care by the patients, (b) measure the effectiveness of the education provided by nurses and providers, and ultimately, (c) increase patients' knowledge of prevention of diabetic foot ulcers. Accordingly, this project conceptualized that an assessment of knowledge is helpful in planning and developing an education program to prevent diabetic foot ulcers.

National Standards for Diabetes Self-Management Education

Guiding principles from the ADA (2011) and AADE's National Standards for Diabetes Self-Management Education (2012) were used to guide the evaluation for review and revision of the intervention. This project followed the five guiding principles used to review and revise DSME. DSME principle one states that diabetes education is effective for improving short-term clinical outcomes and quality of life. This principle ascertained that the diabetes education was effective in improving clinical outcomes within a short period of time. This principle guided the concept of providing footcare education during routine clinic visits for a period of four weeks.

Principle two explains the evolution of DSME from primarily didactic presentations to more theoretical based empowerment models. The increase in frequency of clinic visits provided an increased opportunity to provide foot-care education and allow return demonstrations of all skills introduced to patients.

Principle three explained that there is not a *best* education program or approach. This principle supports the theory that programs incorporating behavioral and psychosocial strategies demonstrate improved patient outcomes. Principle three also supports the importance of incorporating behavioral and psychosocial strategies and offer culturally and age appropriate information. Each session consisted of simple instructions on how to keep diabetic feet healthy and how to identify symptoms to report to the healthcare provider. The material was designed for a low literacy population and was available on the ADA, AADE, and the Department of Health and Human Services (DHHS) websites.

Principle four states that ongoing support is critical to sustain progress made by participants during the DSME program. This principle guided the assessment of each monitored indicator to demonstrate the interrelationship between DSME and behavior change in the care of individuals with diabetes. The continuous assessments identified the ongoing support required to maintain the progress participants made while in the program.

Principle five encourages the effective use of behavioral goal-setting strategies to support self-management behaviors. Using appropriate measurement techniques as a measurement of patient-defined goals and patient outcomes at regular intervals evaluates the effectiveness of the educational intervention (Funnel et al., 2012). The guiding principle was not used in this project.

CIPP Evaluation Model

The CIPP model represents the context, input, process, and product of the program being evaluated. The CIPP model for evaluation is a comprehensive framework for guiding formative and summative evaluations of programs, projects, personnel, products, institutions, and systems. This model was introduced by Daniel Stufflebeam in 1966 to guide mandated evaluations of U.S. federally funded projects because these emergent projects could not meet requirements for controlled, variable-manipulating experiments, which then were considered the gold standard for program evaluations (Fitzpatrick, Sanders, & Worthen, 2011). The CIPP model is a holistic approach to conducting evaluations of education, health, and other public programs. Specifically this model has been used to examine the context, goals, resources, implementation, and outcomes of health education programs. The context component of the CIPP model

identifies the patients' and healthcare providers' needs. The input evaluation component provides data used in recommending an appropriate project that best addresses the identified program needs or strategy (i.e., evidence-based, easy readability, culturally and age appropriate foot care education). The next component, process evaluation, monitors the project implementation and assists in the identification of potential procedural barriers and needs for project adjustments (e.g., socio-economic constraints, time constraints, availability of resources, staff buy-in). The last component of the CIPP model, product evaluation, measures, interprets, and judges project outcomes as it relates to effectiveness, significance, and participant satisfaction.



Figure 2. Basic Foot Care Education Program Development Theory & Stufflebeam's CIPP Model of Program Evaluation. This figure illustrates how the Basic Foot Care Education Development Theory reflects the CIPP Model of Program Evaluation. This theory may be used as the framework for assessing, planning, implementing, and evaluating diabetes education programs as an evidence-based education program redesign model to improve patient knowledge and healthcare outcomes. CIPP concepts were adopted from Stufflebeam's (2003) CIPP Model.

CHAPTER III

PROJECT DESIGN AND STUDY

The purpose of this project was to evaluate the effectiveness of providing evidence-based basic foot care education to type 2 diabetic patients in a rural wound care clinic. This project design was the implementation and evaluation of an evidence based intervention to increase basic foot care knowledge in a rural clinic setting. Knowles's adult learning theory and Orem's theory of self-care guided the design and plan for the education. The CIPP model of program evaluation and The National Standards for Diabetes Self-Management Education (AADE, 2012) were used as the framework for guiding the implementation and measuring the effectiveness of the intervention. Quantitative data was used to evaluate the amount of knowledge gained and satisfaction with the intervention. Qualitative analysis was used to evaluate the quality and success of the intervention. Demographic information was collected from each participant.

Population

This project targeted nine type 2 diabetic patients who attended a wound care center in a rural Mississippi Delta community and who had completed a formal diabetes self-management education program. The patients had a Mayo Clinic (2013) defined diagnoses of type 2 diabetes for six months or more with one or more ulcers to the lower extremities. The population also consisted of four clinic nurses who were required to attend an information session related to the diabetic foot health education provided to participants. The Associate Director of Nursing Services, the clinic's medical directors, and director of hospital education were asked to complete the Diabetes Attitude Scale because of their indirect role within the clinic.

Setting

The setting for this project was a hospital-based wound care center within the delta region of Mississippi. Geographically, the Mississippi Delta is the northwest section of the state bordered on one side by the Mississippi River and the Yazoo River on the other side. The Mississippi Delta is described as one of the poorest rural areas in the country, with mortality rates and chronic disease rates exceeding national averages (Brown, 2006). This region has one of the highest frequencies of diabetes in the state of Mississippi. Challenges already inherent in this region characterized by mismatched supply and demand are intensified by poor health literacy, adding greatly to healthcare disparities and threatening patient outcomes.

The hospital was a publicly-owned, non-profit healthcare organization. The 208-bed facility had accreditation by the Joint Commission on Accreditation of Healthcare Organizations and employed over 900 employees. The hospital offered a wide range of medical and surgical services across a five-county network of clinics. The wound care clinic provided inpatient and outpatient services. This clinic was targeted because it is a part of what is considered a *safety net hospital* that provides healthcare for mainly low-income, underinsured, and vulnerable populations.

Project Activities

This capstone project was implemented based upon the concepts of Knowles' adult learning theory (Milligan, 1997) and Orem's theory of self-care (Orem, 1991). The frameworks for evaluation of the project utilized the CIPP model of evaluation (Mertens & Wilson, 2012) and the five DSME guiding principles (American Association of Diabetes Educators, 2003).

This basic foot care education module was based on the standards of National Standards for Diabetes Self-Management Education (AADE, 2012). This module was chosen for type 2 diabetic patients in rural clinic settings in the Mississippi Delta. The module was ideal to meet the targeted population's need for easy readability, appropriateness for age, cultural, socio-economic status, and the time constraints of clinic visits.

Prior to implementation of this intervention, all clinic nurses were required to attend a roundtable discussion on the purpose of the project as it relates to the education currently provided during routine clinic visits. The nurses also received instructions on the project's expected outcomes. Each nurse was asked to provide recommendations for the development of methods of delivery for the basic foot care education. The clinic nurses were also required to complete the Diabetes Attitude Scale (DAS-3) before leaving the meeting room.

During the first clinic visit, diabetes patients were confidentially approached to extend the offer to participate in the project. Each consenting participant was asked to complete an informed consent, demographic sheet, and received an information sheet. Clinic appointments were not staggered or altered, as the original appointment schedule was convenient to the clinic staff and the patients. It took approximately two weeks to recruit participants.

After the selection of participants was complete and prior to the implementation of the basic foot care module, each participant was asked to complete the Patient Interpretation of Neuropathy (PIN) Questionnaire using pen and paper. Once the questionnaires were secured in a locked filing system, the intervention began. There was

a formal introduction prior to the beginning of the education session. All participants received a diabetic foot screen for loss of protective sensation and standard information provided by the facilitator. The information provided consisted of oral and written instructions on foot care and the prevention of foot complications associated with diabetes. The module's oral and written instructions were based on standards from the American Diabetes Association, the American Association of Diabetes Educators, and the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). The NIDDK's *Take Care of Your Feet for a Lifetime* booklet was used as a visual aid and teaching guide during the intervention. For purposes of consistency for evaluation, the facilitator provided all verbal and written information.

During the intervention, the participants actively participated in the discussions, asked questions, and gave return demonstrations of skills taught. The active participation was encouraged to help build self-confidence, facilitate self-care, and enable participants to manage different care situations. The original education program consisted of six sessions. In order to provide the education program within the normal duration of clinic visits, education sessions were combined to be offered in three sessions. The order or content of each of each session was not altered. Specifically, the first session provided an introduction and overview of the diabetic foot and provides instructions and demonstrations on daily foot checks. The second session provided instructions on and demonstrations of foot hygiene, skin and toenail care, shoe and sock selection, and the avoidance of temperature extremes. The third session provided instructions on diabetic foot complications to report to the healthcare provider. The two additional, optional meetings for participants with missed appointments were not utilized due to patient

compliance. Each session lasted approximately 15 minutes of the amount of time scheduled for each visit to the wound care clinic.

The sessions were formative one-on-one interaction between the facilitator and the participants. Each exam room displayed the Sensation Pattern poster and the NIDDK's *Take Care of Your Feet for a Lifetime* booklet. After the completion of the didactic portion of the basic foot education module, the participants were asked to complete the second PIN questionnaire using pen and paper.

One week after the completion of the second PIN questionnaire, the participants returned to the clinic to complete a satisfaction survey (section III of the Diabetes Health Survey) and attend a focus group. The responses were recorded during the focus group and later transcribed verbatim to identify common themes. The data was then analyzed and presented to the facility's stakeholders during a scheduled roundtable discussion one week later. The evaluation of this project was based upon data collected from three tools and responses from the focus group.

Data Collection

Data collection for this project included a formative one group, pre-test/post-test approach using transcripts from the focus group, descriptive statistics from the demographic sheet, the PIN questionnaire, the DAS-3, and section III of the Diabetes Health Survey. All questionnaires were administered using pen and paper. The data collection process for this project was completed within four weeks.

The Diabetes Attitude Scale (DAS-3) was administered to the clinic nurses prior to the beginning of the intervention. This questionnaire was used to determine the level of foot care knowledge the nurses possess and to foster a supportive attitude from the

nursing staff. The DAS-3 was also used to measure the general diabetes-related attitudes of the nurses providing patient education and care to the patients within the clinic.

The DAS-3 includes 33 statements that by different combinations are resolved into five discrete subscales, namely, attitude toward (a) need for special training to provide diabetes care, (b) seriousness of type 2 diabetes, (c) value of tight glucose control, (d) psychosocial impact of diabetes, and (e) patient autonomy. Each subscale is classified according to the following possible scores: strongly agree = 5, agree = 4, neutral = 3, disagree = 2, and strongly disagree = 1. The 33-item survey was rewritten in 1998 and has since been used in studies that yielded Cronbach's alpha that equals 0.65-0.80 and a Pearson's *r* that equals 0.40-0.63 (Anderson, Funnell, Fitzgerald, & Grupper, 1998).

The Patient Interpretation of Neuropathy (PIN) questionnaire was selected to collect pre- and post- intervention data. The PIN questionnaires were administered at two specific times: first in July 2013 and again in August 2013, after implementing the intervention. Because the PIN questionnaire was short and focused on foot care it was appropriate for the adult learner in the clinic setting. The PIN questionnaire is an instrument that measures the level of understanding of the link between foot ulceration and self-care deficit. This questionnaire is an assessment of cognitive and emotional representation of diabetic peripheral neuropathy, which influences adherence to foot care (Vileikyte et al., 2006). Other research studies using the PIN questionnaire (McInnes et al., 2011; Perrin & Swerrisen, 2008) proved it as a reliable and valid measurement tool. PIN scales have shown a significant association with foot ulcerations and foot self-care behaviors with a Cronbach's alpha that equals 0.62-0.90 and test-retest reliability or

Pearson's r that equals 0.51-0.64 (Vileikyte et al., 2006). The data obtained from this questionnaire was used as baseline and summative data.

Section III of the Diabetes Health Survey was used to measure participants' satisfaction with education provided during the intervention. Section III of the Diabetes Health Survey was created by the Michigan Diabetes Research and Training Center (2012) to collect information on patient satisfaction related to diabetes care. The survey was based on a 5-point Likert scale (strongly agree = 5, agree = 4, neutral = 3, disagree = 2, and strongly disagree = 1). The survey was designed to be self-administered. This survey was answered during the participants' focus group. The focus group allowed the participants to interact as a group to provide feedback about the education received during the intervention, as well as, other aspects of care received in the clinic. The participants' focus group was used to gather information that could not be disclosed through the single use of a tool or satisfaction survey.

Following the completion of the basic foot education module, a roundtable discussion was held with the hospital's Chief Nursing Officer, Clinic Nursing Director, Education Director, Regional Clinical Director, and Clinic Medical Director. This discussion was scheduled to provide an overview of the results from the intervention and to give a summative presentation as to how the implementation of this project would benefit the clinic and organization. The presentation included a list of problems identified with diabetes education currently provided within the clinic, including the absence of education.

Data Analysis

Data analysis used in this project consisted of descriptive analysis. The Statistical Package for the Social Sciences (SPSS) 20.0 was used to analyze the data. Variables were calculated using central tendency of mean, median, and mode in order to measure frequency distributions and clarify patterns (Polit & Beck, 2008). Descriptive statistics were used also to analyze the demographic data as well as the knowledge retained. Mean scores, ranges, and percentages were calculated using frequency distribution. Mean scores of the individual items in the subscales were calculated for statistical purposes. Additionally, graphs and tables were used to help present the results of the project. Transcripts were read repeatedly by the facilitator and cross-compared both during and after data collection to identify common themes. The analysis of qualitative and quantitative data provided representation of the effects of basic foot education on patient level of knowledge.

Ethics and Human Subjects Protection

Following formal approval from the clinical facility, the University of Southern Mississippi Institutional Review Board, and the facility's Chief Nursing Officer, the project implementation began (see Table 1). There were minimal risks to participants anticipated during the implementation of this project. No participant identifiers were used to collect or analyze data. All information was handled with strict confidentiality and was only disseminated as aggregate data. Access to raw data was limited to the author and committee members. The author completed all transcriptions and recorded data was destroyed after completion of this project.

Timeline of Project

Table 1

Timeline of Project

Month	Activity
January 2013	Beginning of Semester: Get Guidelines for Proposal Defense
February 2013	Prepare Capstone Proposal for Chair
March 2013	Submit Copy of Proposal to Chair & Committee Members
April 2013	Revise Proposal
May 2013	Organize Capstone Proposal and Meet with Stakeholders about Beginning Project
June 2013	Defend Capstone Proposal Apply for IRB Approval
July 2013	Obtain IRB Approval Implement Project Collect Data for Project Apply for Application of Degree by July 5, 2013 Analyze & Evaluate Outcomes of Capstone Project
August 2013	Begin Writing Results Complete Final Draft to Chair
September 2013	Revisions of Final Draft after Review from Chair
October 2013	Defer Graduation
November 2013	Revisions of Draft of Final Paper
December 2013	Reevaluate Project Outcomes Revisions of Draft of Final Paper Submit Final Draft to Chair & Committee
January 2014	Begin Writing Capstone Defense Complete Final Copy of Defense to Chair & Committee
February 2014	Revisions of Final Paper after Review from Chair & Committee
March 2014	Defend Capstone Final Copy of Paper to Graduate Reader
May 2014	Graduate

Project Evaluation Plan

The purpose of this project was to evaluate the effectiveness of evidence-based basic foot education provided to type 2 diabetic patients in a rural wound care clinic. In this project, Stufflebeam's Context, Input, Process, and Product (CIPP) evaluation model (see Table 2) was used as a framework to systematically guide the conception, design, implementation, and assessment of basic foot care education, and to provide feedback and judgment of the project's effectiveness for continuous improvement. In addition, the DSME guiding principles were used in conjunction with the collected data in the context of the CIPP model to determine the effectiveness of the education provided.

Table 2

Project Evaluation Plan

	Formative	Summative
Context Assess barriers to achieve goals objectives & patient needs	Basic foot care education model for rural population with low literacy & socio-economic level	Identify innovations/body of knowledge & key factors/barriers of program success
Input Plan alternate procedural design for content & education sessions	Use theoretical principles to guide 6 sessions that are easy to read & age, culture, & time appropriate	↑Support from staff & stakeholders for successful completion of 3 sessions with easy accessibility
Process Implement learning activities	Oral & written basic foot education during clinic visits with return demonstrations	↓Need for revision of program activities; set requirements for next cohort & setting
Product Evaluate overall satisfaction of program and fit of the program	Satisfaction of participants, stakeholders, & staff	Completion by 9 participants Knowledge/understanding from baseline

CHAPTER IV

RESULTS

The purpose of this project was to evaluate the effectiveness of evidence-based basic foot education provided to type 2 diabetic patients in a rural wound care clinic. The CIPP model of evaluation and the DMSE guiding principles were used for the project evaluation. This project not only measured the patients' knowledge obtained from education, but it also provided information related to the appropriateness of the intervention, considering the target setting and population. SPSS version 20.0 was used to analyze quantitative data. Variables were calculated using measures of central tendency including mean, median, and mode in order to measure frequency distributions and clarify patterns (Polit & Beck, 2008). Descriptive statistics were used also to analyze the demographic data as well as the level of knowledge retained. Mean scores, ranges, and percentages were calculated using frequency distribution. Mean scores of the individual items in the subscales were also calculated for statistical purposes. Differences at baseline and after the intervention were examined using chi-square analysis. Identification of themes was used to analyze qualitative data. Graphs and tables were used to help present the results.

Demographic Data

Descriptive data were collected from tools given to nine participants with type 2 diabetes between the ages of 46 and 70 years of age, with the median age of 56 years. Six (66.6%) participants were female, with a median of 80.5 years. Male participants made up 33.3% of the sample, with a median of 54 years. Among the total participants,

the greatest number of participants was in the age group of 68-79 years (44.4%), followed by 44-55 years (33.3%) and 56-67 years (22.2%).

A majority of the participants (55.5%) were married, and 44.5% were single or divorced. The data indicates that most families had annual incomes ranging from \$30-\$49,000 (55.5%) and 44.4% had annual incomes less than or equal to \$20,000-\$29,000. Occupation status revealed that 44.4% of the participants were disabled, 33.3% were unemployed, and 22.2% were retired.

Of the participants, 57.1% lived with their spouses, 42.9% lived with their children and 22.2% did not respond to the item. None of them had been hospitalized for complications of diabetes or had amputations. A majority (78.8%) of the participants reported that their health status was fair, while only 22.2% felt their health status was good. Thus, 78.8% of the participants believed that their quality of life was fair, while only 22.2% of the participants believed their quality of life was good.

Each of the participants had a diagnosis of type 2 diabetes for greater than six months and had received formal diabetes education prior to the implementation of this project. Baseline and post-intervention differences were measured using chi-square. Cross tabulations revealed there was an increase in knowledge; however, due to the size of the sample, the *P*-value was not found to be statistically significant. The educational levels of the participants ranged from primary to higher education. Thirty-three (33.3%) percent of the participants had educational levels below grade 12 (primary), 44.4% had actually graduated high school (secondary), and 22.2% had some college education (higher).

Table 3

PIN Questionnaire Results Prior to Intervention

	Descriptive Statistics				
	N	Min	Max	Mean	Std. Deviation
Can examine feet daily	9	1	5	3.44	1.424
Can improve circulation	9	1	5	3.44	1.236
Can keep podiatrist appointments	9	1	5	3.78	1.202
Can choose shoes that fit my feet	9	2	5	4.11	.928
Can moisturize feet regularly	9	3	5	3.89	.601
Can have hard skin removed	9	2	5	3.56	1.236
Diabetes doctor prevent lost feeling	9	1	4	3.22	1.093
My GP prevent feet from getting worse	9	1	4	2.89	1.167
Nobody prevent feet from getting worse	9	2	4	2.78	.972
I can prevent feet from getting worse	9	2	5	3.11	1.269
I can keep appointments w/diabetes doc	9	1	5	3.89	1.269
Good diabetes control prevent feet	9	1	5	3.33	1.323
Improve circulation can prevent	9	2	4	3.11	.928
Can keep my GP appointments	9	2	5	4.00	.866
I can keep my blood sugars controlled	9	1	5	2.89	1.453
I can prevent foot ulcers from occurring	9	2	5	2.78	1.093
Diabetes doctor can prevent foot ulcers	9	2	4	2.56	.882
GP can prevent foot ulcers	9	2	5	2.56	1.014
Podiatrists prevent foot ulcers	9	2	5	2.89	1.269
Checking feet can prevent foot ulcers	9	1	5	3.00	1.323
Nobody can prevent foot ulcers	9	1	4	2.67	1.225
Seeing podiatrist prevent foot ulcers	9	1	4	2.33	.866
Wearing shoes that fit prevent ulcers	9	2	5	3.78	.972
Moisturizing feet prevent foot ulcers	9	2	5	3.11	1.054
Removing hard skin prevent foot ulcers	9	1	4	2.78	.972
Valid N	9				

Note. Baseline responses of participants (n = 9)

Data from the pre-PIN questionnaire showed that of the total participants, 66.6% agreed that foot ulcers resulted from not taking care of their feet. Of the participants,

44.4% agreed that checking their feet daily decreases the likelihood of ulcer formation (see Figure 3). Most (88.9%) of the participants either agreed or strongly agreed that they were able to choose shoes that fit their feet, but only 66.6% knew that wearing shoes that fit prevent foot ulcers. Only 33.3% believed that moisturizing skin prevents ulcer formation. Six (66.6%) of the participants understood the importance of having hard skin removed from feet regularly. Of the nine participants, only 44.4% believed that good diabetes and blood sugar control prevent lost or reduced feeling in their feet. Only 22.2% of the participants agree that they can prevent foot ulcers from occurring, while 66.6% either agreed or strongly agreed that foot ulcers and other complications were the result of poor medical care (see Table 3).

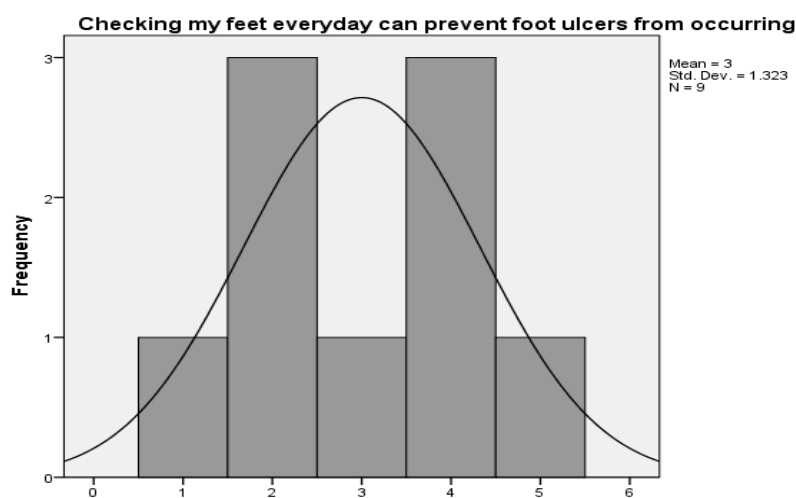


Figure 3. Frequency distribution of checking feet daily. This chart shows the frequency, mean, and standard deviation of participants' knowledge of the importance of checking their feet every day in the prevention of foot ulcer formation based on the response to the pre-PIN questionnaire.

In the subscale regarding symptoms, 77.8% were unable to associate the inability to feel objects with their feet, the inability to differentiate between hot and cold, and the formation of foot ulcers to decreased circulation and nerve damage caused by diabetes

(diabetes neuropathy). These participants associated such symptoms with age or denied having these symptoms altogether.

Post-intervention data from the PIN questionnaire revealed that 100% of participants agreed that foot ulcers are caused by not taking care their feet. The number of participants that agreed or strongly agreed that checking their feet decreased the likelihood of foot ulcer formation increased from 44.4% to 77.8% (see Figure 4). All of the participants had the ability to choose shoes that properly fit their feet and believed that wearing shoes that fit properly prevent foot ulcers from occurring. All of the participants believed that moisturizing skin prevents ulcer formation. All understood the importance of having hard skin removed from feet regularly.

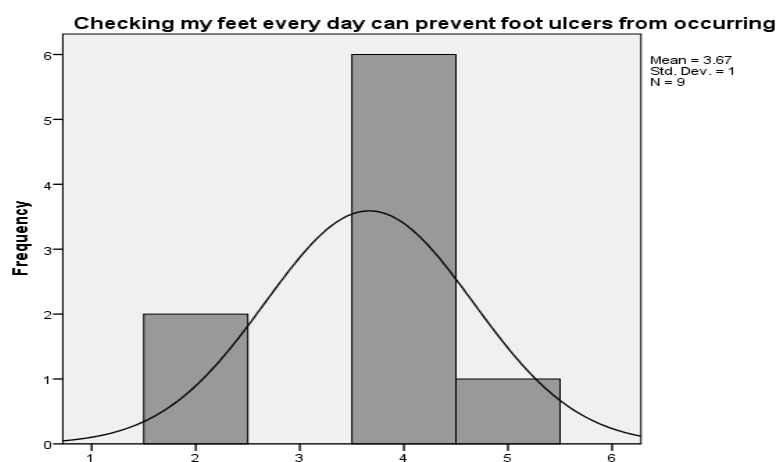


Figure 4. Frequency distribution of checking feet daily. This chart shows the frequency, mean, and standard deviation of participants' knowledge of the importance of checking their feet every day in the prevention of foot ulcer formation based on the response to the post-PIN questionnaire.

Of the nine participants, 100% believed that diabetes and blood sugar control prevent lost or reduced feeling in their feet. Each of the participants agreed they could prevent foot ulcers from occurring. Only 11.1% of participants either agreed or strongly

agreed that foot ulcers and other complications were the result of poor medical care. Most (88.9%) disagreed that foot ulcer formation was caused by poor medical care. In the subscale regarding symptoms, 100% of the participants were able to associate the inability to differentiate between hot and cold to either poor circulation or nerve damage caused by diabetes. All (100%) of participants were able to associate the inability to feel objects with their feet to either poor circulation or nerve damage secondary to diabetes. A majority (88.9%) of participants were able to associate foot ulcer formation to poor circulation caused by diabetes, while 11.1% participants associated foot ulcer formation with an increase in age.

Focus Group Analysis

After collection and analysis of the pre- and post-questionnaires, a focus group was held with the project participants. From the focus group the following initial themes emerged: Time (needed more time to talk to physician each visit), Listening (physician never tried to understand what the patient was telling them; education was not patient centered), Supportiveness (talk about what patients are doing right as well as what they can improve on), and Language (use language the patients understand but also positive language when providing care instruction).

Time

Participants thought they would be able to better manage their diabetes if the provider did not over schedule patient visits. Patients verbalized that they have stayed in the waiting area for over an hour to have the provider spend less than five minutes attending to their needs. The participants felt the increase in patients scheduled decreased the time the provider had to listen to their concerns and discuss their care. One

participant commented, “The girl took time to talk about my diabetes and answer questions about what is going on with my feet” (Participant, personal communication, August 24, 2013). Another participant also commented, “Diabetes foot ulcers are hard to prevent, and it takes a lot of time and money to make sure that you do everything like you suppose to” (Participant, personal communication, August 24, 2013). All the participants agreed that the education provided encouraged the acquisition of basic foot care knowledge. It also increased their desire to learn new approaches to improve the care of their feet.

Listening

Participants believed that the researcher’s repetition of information, active listening, and answering questions was helpful in their understanding of basic foot care education. A participant commented, “The education was a good reminder of how to care for my feet and the girl listened to all my concerns and answered my questions promptly” (Participant, personal communication, August 24, 2013). Another participant commented, “Listening to the information every visit helped me remember what steps to take to prevent foot ulcers” (Participant, personal communication, August 24, 2013). Participants agreed that good listening skills of the researcher and participants were helpful in the delivery and understanding of foot care education.

Supportiveness

Another area of concern for the participants was supportiveness of the facilitator compared to primary doctors. One participant commented, “The instructor showed more concern about what is going on with me than my doctor” (Participant, personal communication, August 24, 2013). The participants verbalized concern that the provider

was not supportive and criticized their efforts to care for their feet frequently. Several participants agreed that the facilitator and the education provided were supportive in their efforts to properly care for their feet. It was unanimous that the supportiveness of the facilitator and effectiveness of the education synonymously enhanced the participants' willingness to learn.

Language

The participants verbalized that the difficulty understanding the words the provider used when explaining topics related to their diabetes and foot health made it hard for them to care for their feet. Participants felt that nurses should be responsible for providing foot care education because of their ability to speak to their level of understanding. One participant commented, "The handouts were easy to read and the instructions provided were easy to understand and the booklet serves as a reminder of how to care for my feet daily" (Participant, personal communication, August 24, 2013). Another participant commented, "If my doctor provided foot care education, this would be ideal to help prevent foot ulcers and other foot problems" (Participant, personal communication, August 24, 2013). The participants agreed that the language used to explain how to care for their feet should be on the level of the patient's understanding.

Diabetes History Survey

Participants' satisfaction was measured using Section III of the Diabetes History Survey. All (100%) of participants either agree or strongly agree that they were very satisfied with the diabetes care they received during the project. The majority (56.6%) of the participants agreed that the education provided during the project could have been better.

The participants verbalized satisfaction with the education they received during the project; however, they agreed that the sessions needed to be longer in duration and offered routinely and more frequently.

The results of the DAS-3 survey completed by the staff and topics discussed during the participants' group were shared with the stakeholders at the roundtable discussion with the hospital administrators. The results of the DAS-3 revealed that the staff agreed that good communication is necessary when educating patients to manage diabetes.

Table 4

DAS-3 Results (Staff Nurses) Prior to Implementation of Intervention

	N	Descriptive Statistics			
		Min	Max	Mean	Std. Deviation
...communicate well with patients	7	4	5	4.71	.488
...no insulin means mild disease	7	1	5	2.86	1.464
...diabetes complications will happen	7	1	5	2.14	1.345
...affects almost every part of life	7	4	5	4.71	.488
...decision made by person with diabetes	7	2	5	3.71	1.113
...daily diabetes care affects patient lives	7	4	5	4.43	.535
...do not usually get complications	7	1	5	2.43	1.813
... help prevent complications of diabetes	7	2	5	4.00	1.000
...make informed choices about care	7	2	5	4.29	1.113
...nurses and RD learn counseling skills	7	4	5	4.43	.535
...worry about long term complications	7	1	5	3.00	1.633
...keep blood sugar close to normal	7	4	5	4.57	.535
...emotional effects are small	7	1	5	2.57	1.397
...final say in setting goals	7	4	5	4.29	.488
...blood sugar testing not needed	7	1	5	2.57	1.512
...tight control too risky for most	7	2	5	4.00	1.000
...learn how to set goals with patients	7	4	5	4.43	.535
...never get a break from diabetes	7	4	5	4.43	.535

Table 4 continued.

...most important member of care team	7	4	5	4.71	.488
...should learn a lot about being teachers	7	4	5	4.71	.488
...type 2 diabetes is very a serious	7	4	5	4.43	.535
...having diabetes changes outlook	7	3	5	4.29	.756
...payoff from tight control of blood sugars	7	1	5	2.57	1.718
...type 2 is as serious as type 1	7	4	5	4.71	.488
...tight control is too much work	7	1	5	2.57	1.397
...what patient does has more effect	7	4	5	4.29	.488
...tight control only make sense to type 1	7	1	5	2.86	1.773
...it is frustrating to take care of disease	7	2	5	4.29	1.113
...decide how hard they work to control	7	2	5	4.00	1.000
...people who take diabetes pills	7	4	5	4.71	.488
...right not to take good care of diabetes	7	3	5	4.29	.756
...important in dealing with diabetes	7	4	5	4.71	.488
Valid N	7				

Note. Subscales were abbreviated (Michigan Diabetes Research and Training Center, 2012) to show staff nurses responses to questions used to determine the level of foot care knowledge the nurses possess and to foster a supportive attitude from the nursing staff. Staff nurses strongly agreed that healthcare professionals should be taught how daily diabetes care affects patients' lives (see Appendix H).

CHAPTER V

DISCUSSION

The purpose of this project was to evaluate the effectiveness of basic foot education provided to type 2 diabetic patients in a rural wound care clinic. The median age of the nine patients with type 2 diabetes was 56 years. Thus, the study population consisted of adults and elderly participants.

Initially, this project was scheduled to consist of six lessons taught for a three week period and consist of five to six participants. The participants were to complete a combined total of 12 hours (1.33 hours per participant) of education and the education was to be completed within the first 15 minutes of the office visit. Due to changes in the clinical facility's organizational structure and time constraints placed on the evaluator by stakeholders, the project consisted of three lessons, nine participants and four weeks of implementation. All the information was provided and all participants received the same information.

During this intervention, there was a cumulative percentage increase in the amount of knowledge obtained from the education provided. Due to the size of the sample and the length of the education sessions the data was not found statistically significant. However, the results of this project are consistent with the findings of other studies on the lack of knowledge diabetic patients had on foot care. This project looked at common descriptive characteristics identified by previous studies on knowledge of prevention of diabetic foot ulcers.

In terms of gender, most of the participants were women. However, the findings in this study was consistent with the findings of a national study that proved there was no

significant difference (mean = 1.67, SD = .500) regarding the prevalence of poor foot care knowledge in regards to gender (Desalu et al., 2011). The fact that women are the majority in the wound care clinic may have increased the probability female to male ratio in this project. Also the fact that males are less likely to seek medical advice during an illness or engage in fewer health promoting activities may have influenced the female to male ratio (Perrin et al., 2009).

A quasi-experimental study of adults and elderly subjects by Otero et al. (2008) revealed that of the 54 participants, knowledge regarding their primary disease increased significantly. The increase in knowledge was in general topics concerning diabetes mellitus. Similar to this project, the mean age of participants was 60 years, 74.1% were female, 68.5% were married, 42.6% were retired, and 59.3% had incomplete primary education. This project did not show a significant difference in age and knowledge of diabetic foot care. In this study by Otero et al. (2008) and similar studies, family support was a fundamental aspect for diabetic patients to achieve self-management. It was important for the caregivers to understand that knowledge about the disease was the basis to achieve diabetes self-management, but knowledge acquisition did not necessarily mean a change in behavior. Similar to Otero's study, this project showed a cumulative increase in the knowledge on how to detect signs and symptoms of diabetes.

In a cross-sectional study of 352 diabetic patients, gaps in the knowledge and practice of foot care were identified. The study also underscored the need for an educational program designed to help reduce diabetic foot complications (Desalu et al., 2011). Patients with poor practice (78.4 %) had poor knowledge of foot care. Some of the patients (61.4%) were unaware of the importance of inspecting the inside of their

shoes for objects. A majority of the patients (89.2%) failed to receive advice when purchasing shoes and, as a result, 88.6% failed to get the appropriate size shoes. This study proved that illiteracy and low socio-economic status were significantly associated with poor knowledge and practice of foot care.

A cross-sectional study investigating the relationships between foot care self-efficacy beliefs, self-reported foot care behavior, and history of diabetes-related foot pathology in diabetes patients with loss of protective sensation in their feet was performed. This study proved that there was little association between foot-care self-efficacy beliefs and actual foot-care behavior. It was found that only 20% of the participants with diabetes inspected their feet daily and 23-25% never inspected their feet. Even though wearing protective footwear was a significant issue in patients with diabetes, only 22% of the patients at risk for foot complications with custom-made footwear wore them all day. Patients not at risk (53%) wore their footwear most of the day (Perrin et al., 2009).

Because knowledge acquisition does not necessitate a change in healthcare behaviors, it is the responsibility of the healthcare provider to supply patients with all necessary information about their diabetes. The healthcare provider is also responsible for providing an in-depth explanation of planned care and scheduling frequent follow-up appointments. Based on themes gathered from the participants' focus group, participants do not feel they are receiving the care necessary to manage their diabetes. Even though the participants felt their concerns were not being heard, they were willing to speak freely.

Participants thought that their diabetes health status would be improved if the healthcare provider decreased the number of scheduled appointments to allow more time for discussion of issues. The themes from the focus group were consistent with the findings from a study of 238 type 2 diabetic patients that were dissatisfied with the consultation time given by their treating providers. The study showed the providers could spare only a very limited amount of time for their patients. However, in that limited amount of time, the search for complications was ignored by most providers (Shah et al., 2009).

Participants also felt that their healthcare providers were slow to praise them for accomplishments, but quick to ridicule them for their inability to meet goals set by the provider. The participants were also concerned that the language the healthcare providers used was hard for them to understand. When asked to elaborate more on the topic, some participants verbalized the inability to understand the big words while others could not understand the dialect. A qualitative study of 40 newly diagnosed type 2 diabetics in Scotland supports the themes of this project in that the patients felt that the general practice and clinic diabetic specialists were unable to explain diabetes and its complications. In this study, the failure to receive preliminary knowledge on the management and treatment of diabetes led to lengthy hospitalizations after repeated visits to the clinic (Parry, Peel, Douglas, & Lawton, 2004).

While analyzing the themes from the participants' focus group and the results from the DAS-3, it was apparent that the participants' needs and the stakeholders' beliefs of the type education that should be provided were congruent. Data from the DAS-3 proved that staff nurses strongly agreed that what the patient does has more effect on the

outcome of diabetes care than anything a health professional does. When asked, staff nurses agreed that diabetes education should be provided to patients at each visit to facilitate learning through repetition. Based on the results from the PIN questionnaire and the DAS-3, stakeholders decided that a foot care education should be provided during each clinic visit.

After sharing the evaluation of this project, the stakeholders agreed that there was a need to develop a basic diabetic foot care education program for each clinic in the network that included education for each provider and nurse within the clinic.

Limitations

Several limitations regarding this evaluation of education effectiveness were identified. This study was generalized to only one geographical area and targeted only type 2 diabetic patients. The length of the education sessions were 1.33 hours (per participant). Administration of the post-questionnaire after only two weeks of education was adequate to measure an increase in knowledge but not adequate enough to obtain positive improvements in self-management of foot care. Another limitation was the small population sample size. The clinic also lacked funding for education material. The educational material used was purchased by the facilitator and left in the clinic for future use. This intervention should be implemented on a larger sample and over a longer period of time for generalization and significance of effective foot health education in all clinic settings. The Centers of Medicare and Medicaid Services (CMS) limited reimbursement for follow-up DSME training placed limitations on time and funding for the intervention.

Recommendations

The main goal of evaluation is to ascertain that the product meets the needs or helps to obtain desired outcomes. The results of the evaluation should be used to correct deficiencies continuously and with uniformity (Dukhail & Khathami, 2012). Basic foot care education should be provided to a larger cohort in different clinic settings over a longer period of time. Further research is needed to determine at which time during care basic foot care should be implemented and re-enforced. There should be long-term follow-up to evaluate the results of the intervention (6-12 months) and remediation if warranted. If the follow-up education is provided during routine clinic visits the constraints on DSME training would not affect the effectiveness or outcome of this education module. Increasing the number of face-to-face contacts with patients has implications for development of future diabetes education program guidelines, and clinical and reimbursement policies regarding individual education.

Implications

Diabetes is an incurable disease that affects multiple organ systems when not therapeutically managed. Diabetes is one of the most frequently diagnosed metabolic disorders. Diabetes is now at pandemic levels. People with diabetes are more prone to foot problems because diabetes causes damage to nerves and blood vessels. Damage to the nerves and blood vessels leads to foot ulcers that are difficult to treat and manage due to the effects of diabetes on multiple organ systems. Diabetic foot ulcers precede 80% of all non-traumatic amputations of the lower extremities.

Most foot ulcers and subsequent amputations can be prevented by providing diabetic foot health education to high risk patients. Because foot education is imperative

in the prevention of foot ulcers, it is important that patients are provided this education early in the disease process and routinely thereafter. With education being one of the most important roles of the nurse, it is the nurse's responsibility to ensure that the patient has the knowledge necessary to manage their diabetes and improve health outcomes. The findings in this study have implications in various areas of nursing.

Implications for Nursing Practice

Nurses are patient advocates and are the liaison between the provider and the patient. Nurses are caring by nature and provide holistic care. The holistic approach to nursing requires the nurse to provide preventive, curative, and rehabilitative care. The role of the doctoral prepared nurse is to generate evidence through practice to guide improvements in practice and outcomes of care. In doing so, doctoral nurses use existent resources to prevent without increasing financial strain on the facility and patients. In light of the decline in the health status of the population, prevention has become the primary role of community health, nurses, and all other members of the healthcare team. Instead of treating or curing the patient after the foot ulcer has formed, it is the role of the nurse to facilitate the evidence-based education necessary to enable the patient to care for themselves. By facilitating foot health education, the patients become active participants in their healthcare and increase the probability of prevention of foot ulcers. Nurses play an integral part in providing knowledge and developing the patients' abilities and skills required to perform self-care tasks and lead more independent lives.

Implications for Research

This project proves that patient education on the prevention of foot ulceration is imperative and should be incorporated into the routine care of patients with diabetes both in the hospital and in the community. This project has also highlighted gaps in patient knowledge and practice. The doctoral prepared nurse must disseminate findings from evidence-based practice and research to improve healthcare outcomes. The doctoral prepared nurse designs and implements evidence-based guidelines from research to improve healthcare outcomes and determine at which time in the plan of care the education needs to be implemented. Clarity of the time of education implementation could also clarify the role of the provider and nurse in reinforcement of diabetes education.

Implication for Education

Patient knowledge empowers the drive to manage their diabetes. Nursing education should be designed to provide the knowledge patients and providers need to prevent, manage, and/or treat diabetes complications of the foot. Nursing education shapes the role of the doctoral prepared nurse in the evaluation of clinical education to improve healthcare delivery. The lack of consistency in foot health education intensifies the need to empower patients with knowledge that removes educational barriers. This education should focus on the prevention of diabetic foot complications. The provision of preventative education to nurses and patients emphasizes the doctoral prepared nurse role as the highest clinical degree to influence scholarship in nursing education.

Implementing and evaluating the effectiveness of the education delivery approach ensure

that the current needs of the diabetic patients are met. This foot health education should focus on scientific, economic, and organizational sciences.

Conclusion

This evaluation study expresses to what extent the intervention was effective in meeting the needs of the identified population. The purpose of this project was to evaluate the effectiveness of evidence-based basic foot education provided to type 2 diabetic patients in a rural wound care clinic. This project has proven that type 2 diabetics have an increase in knowledge when basic foot health education is provided. Based on concepts from Knowles' adult learning theory, this project supported the assumption that participants learn best when they perceive the need to learn. The fact that each participant had ulcerations and was seeking knowledge on how to prevent subsequent ulcer formation or amputation enhanced their willingness to actively participate in this intervention. Quantitative and qualitative data revealed that time spent in face-to-face contact with providers and the ability to understand the spoken instructions were internal and external factors that affected their ability to perform self-care activities. The use of Orem's self-care theory to identify the internal and external barriers that inhibited healthy lifestyles also helped prove that when provided evidence based foot care instructions, participants showed an increase in foot care knowledge. After the intervention, there was an increase in the number of participants that understood wearing shoes that fit could prevent foot ulcer formation (mean 3.78 SD .972). The National Standards of Diabetes Self-Management Education (AADE, 2012) was useful in developing culturally, age appropriate, and brief (only 15 minutes per session) instructions that allowed simple return demonstrations. Thus, the standards outline the

goals for meeting the educational needs of the given population over a short period of time. The CIPP model evaluated the effectiveness of the education provided. Once evaluated using the CIPP format, the evidence-based education provided to participants: identified knowledge base and key barriers to program success; increased support from staff and stakeholders; eased the accessibility of understandable, age, culture, and time appropriate education; and decreased the need for revision of program activities while setting requirements for the next cohort and setting. Despite the limitations mentioned above, there were conclusive findings from the education program. For example, all participants' mean scores increased after the intervention. Patient satisfaction was measured via questionnaire after the education session. The overall score for satisfaction with the education provided had a mean of 4.56 and SD of .527. Detailed prospective research is required to determine if implementing education early in the patient's plan of care will improve the patient's healthcare status, thus decreasing facility costs. Implementation of diabetes foot care education is a challenging task for healthcare providers. When providing diabetes education, it is important to understand that knowledge acquisition does not necessary mean the patients will change their behavior.

Cost Benefit Analysis

The cost of care for patients with diabetes increases drastically after the appearance of the first foot ulcer and rise even higher during the second year (Maderal et al., 2012). Providing basic foot care education during routine clinic visits decreased patients' cost by \$1148 to \$1537 annually. Training staff to provide basic foot care instructions during clinic visits alleviates the need for CMS reimbursements for

structured education and empowers patients to take better care of their feet. A facility could potentially have a savings of \$23,062 to \$41,301 per treatment plan annually.

Table 5

Cost Benefit of Providing Basic Foot Education in Routine Clinic Visit

	Expense
Direct Cost	\$116 billion
Indirect Cost	\$58 billion
Complications Annually	\$10.9 billion
Amputation	\$16,488 to \$66,215
First Year Savings	\$23,062 to \$41,301 per treatment plan
Providing Basic Foot Education During Routine Clinic Visits Savings	\$1148 to \$1537 per patient

Note. These numbers were retrieved from the projected budget Excel worksheet for the Wound Care Clinic.

Plans for Dissemination

As a result of the recommendations from this project, the hospitals education department plans to create an education module for diabetes foot care. The Nurse Manager in the pilot clinic will be responsible for the three and six month continuous quality improvement (CQI) tracking. The CQI Department will follow-up annually using the hospital's Plan, Do, Study, Act to show organizational system leadership for clinical prevention of foot ulcer formation in type 2 diabetic patients.

APPENDIX A

CAPSTONE PROJECT RELATED DNP ESSENTIALS

<i>DNP Essentials</i>	<i>DNP Capstone Essentials Outcomes</i>
Essential I – Scientific Underpinnings for Practice	The management of diabetes continues to pose a challenge to the medical and nursing staff and individuals it affects. Frustrations with the mixed results for interventions that attempt to improve diabetes foot health have led to high rates of failed attempts. This intervention will allow medical staff, nurses, patients and their caregivers to integrate evidence based knowledge into daily practice, thus produce positive clinical outcomes.
Essential II – Organizational and System Leadership for Quality Improvement and Systems Thinking	The lack of consistency in the foot health education provided to diabetic patients intensifies the need to empower patients with the knowledge necessary to remove educational barriers. Implementing and evaluating education delivery approach meets the current needs of diabetic patients. This education focuses on scientific, economic, and organizational sciences.
Essential III – Clinical Scholarship and Analytical Methods for Evidence-Based Practice	The lack of modeling of successful prevention guidelines for ulcer formation to lower extremities has created the need to review existing literature. From the literature, integrate knowledge regarding diabetic foot health across disciplines to encourage the application of knowledge necessary to improve health outcomes.
Essential IV – Information Systems/Technology and Patient Care Technology for the improvement and Transformation Healthcare	Analyze, select, and use data retrieved from healthcare information systems. Ascertain the accuracy, timeliness, and appropriateness of the data received to the increase in knowledge of diabetic foot care.
Essential V – Healthcare Policy for Advocacy in Healthcare	Educate others on diabetic foot care guidelines and develop policies that will constitute a practice change and improve patient care outcomes and organizational financial outcomes.
Essential VI – Inter-professional Collaboration for Improving Patient and Population Health Outcomes	Through increased education of diabetic foot care, this intervention meets the IOM's mandate for safe, timely, effective, efficient, equitable, and patient centered care.
Essential VII – Clinical Prevention and Population Health for Improving the Nation's Health	An increased level of knowledge of how to care for the diabetic foot in a culturally diverse population increases the likelihood of clinical prevention. Increased knowledge bridges the gap between knowing the importance of caring for diabetic feet and actually understanding how to care for diabetic feet, hence promoting diabetic patients' health outcomes.
Essential VIII – Advanced Nursing Practice	The increase in knowledge provided by this intervention results in a greater need for specialized nursing practice in diabetic foot care education. Upon completion of this project, the education provided to patients with diabetic foot ulcers can be disseminated across the hospital's clinic network.

APPENDIX B

PERMISSION FOR PIN QUESTIONNAIRE

Green, Gloria

From: Vileikyte, Loretta <LVileikyte@med.miami.edu>
Sent: Tuesday, May 07, 2013 4:47 PM
To: Green, Gloria
Subject: RE: Patient Interpretation of Neuropathy (PIN) Questionnaire
Attachments: NPI FINAL.rtf

Dear Gloria,
 Attached please find the Patient Interpretation of Neuropathy (PIN) questionnaire which at the time of development used to be called the Neuropathy Perception Inventory (NPI).
 Please let me know if I can be of any further assistance.

Loretta
 Loretta Vileikyte, MD, PhD
 Senior Lecturer in Medicine
 School of Clinical and Laboratory Sciences, University of Manchester, Manchester, UK
 phone: +44 (0) 161 276 8953
 fax: +44 (0) 161 274 4740
 email: lvileikyte@med.miami.edu

From: Green, Gloria [ggreen@glh.org]
Sent: 06 May 2013 18:04
To: Vileikyte, Loretta
Subject: Patient Interpretation of Neuropathy (PIN) Questionnaire

Good afternoon,
 My name is Gloria Green and I am a student in a Doctor of Nursing Practice Program in Mississippi. I have proposed to meet my graduation requirements by developing an education program specific to the care of diabetic feet. This correspondence was initiated to ask permission to use your PIN Questionnaire as a tool to aid in my data collection. If you are willing to allow me to use your tool, would you be so kind as to provide me with a copy of the entire tool or a link in which I can find the entire tool.
 Thanking you in advance for your time and consideration, Gloria Green MSN, RN Director of Wound Care/Hyperbaric Oxygen Center Greenwood Leflore Hospital
 1401 River Road
 Greenwood, MS 38930
 662-459-2733 or 662-451-7572 (office)
 662-459-7283 (fax)
ggreen@glh.org<<mailto:ggreen@glh.org>>

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APPENDIX C

THE UNIVERSITY OF SOUTHERN MISSISSIPPI IRB APPROVAL LETTER

**INSTITUTIONAL REVIEW BOARD**

118 College Drive #5147 | Hattiesburg, MS 39406-0001

Phone: 601.266.6820 | Fax: 601.266.4377 | www.usm.edu/irb

NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.

Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 13070901**PROJECT TITLE: Knowledge Level of Prevention of Diabetic Foot Ulcers among Patients with Type 2****PROJECT TYPE: New Project****RESEARCHER(S): Gloria Green****COLLEGE/DIVISION: College of Nursing****DEPARTMENT: Department of System Leadership****FUNDING AGENCY/SPONSOR: N/A****IRB COMMITTEE ACTION: Expedited Review Approval****PERIOD OF APPROVAL: 07/29/2013 to 07/28/2014****Lawrence A. Hosman, Ph.D.****Institutional Review Board**

APPENDIX D
PERMISSION LETTER FOR GREENWOOD LEFLORE
HOSPITAL CLINIC NETWORK



Greenwood Leflore
Hospital

So Far Advanced So Close To Home

P.O. Box 1410
Greenwood, MS
38935-1410
662-459-7000

June 19, 2013

Dear Gloria,

I am pleased to write a letter of support for your proposal regarding your research on measuring the Knowledge Level of Prevention of Foot Ulcers among Patients with Type 2 Diabetes Mellitus in the Mississippi Delta. As you are aware, Greenwood Leflore Hospital is dedicated to innovated evidenced based quality improvement projects that advance the nursing profession.

If your application is successful, it will provide us with an opportunity to also assess the holistic view of disease prevention and to embark on new projects to determine the importance of improving patient diabetes education efforts in the clinic setting. Your initiative is well positioned within one of our goals to improve health care delivery and patient outcomes for the population we serve.

Sincerely,

Rebecca Edwards, MSN, RN
Associate Director of Nursing Services
Greenwood Leflore Hospital

APPENDIX E

PARTICIPANT'S INFORMATION SHEET

My name is Gloria Green. I am a registered nurse (RN) and a Doctorate of Nursing Practice (DNP) student at The University of Southern Mississippi College of Nursing. As part of my degree requirements, I will be conducting a project to evaluate the effectiveness of self-management education session specific to care of the diabetic foot on the prevention of foot ulcerations in type 2 diabetics. I respectfully ask you to consider participating in this research project. If you participate in this project, you will be asked to complete a questionnaire prior to the start of the project, as well as a questionnaire after completion of the project.

It is your choice to participate in this project. Your participation is strictly voluntary, and if you choose to participate your identity will remain unknown to other participants or anyone else outside of this project. Do not place your name or other identifying information on any documents that are to be turned in to the researchers. It is necessary for you to read this document and the consent form in their entirety and sign the consent form to be included within this project.

You are not obligated in any way to participate in this project. Your choice to participate or decline participation will not, in any way, influence your current medical treatment or the type of care you receive from any of your healthcare providers. However, I do ask that if you choose to participate in this project that you participate openly and honestly at all times.

Below is my contact information. If you choose to participate, or if you have any additional questions at any point, please feel free to contact me using the information listed below. Please let me thank you in advance for your consideration and participation in this research project.

CONTACT INFORMATION:

Gloria Green, MSN, RN (662) 299-3641
gloriaigreen@yahoo.com or Gloria.Green@eagles.usm.edu

APPENDIX F

THE UNIVERSITY OF SOUTHERN MISSISSIPPI AUTHORIZATION TO
PARTICIPATE IN RESEARCH PROJECT

In signing this document, I agree and indicate that my participation in this project is strictly voluntary and that my expectations within this project have been clearly stated as indicated within the content of this consent form. I know that my participation in this project will no way influence the medical treatment that I receive, and I will not be subjected to any kind of physical, mental, or emotional harm as a result of my participation in this project. Also, I understand that I have the right to withdraw from this project at any point within the project.

I have been informed that the purpose of this project is to evaluate the effectiveness of self-management education session specific to care of the diabetic foot on the prevention of foot ulcerations in type 2 diabetics. I have been provided with an information sheet with the researcher's contact information as well as a detailed description of the purpose and the expectation of this project. I understand that should I have any additional questions or concerns at any point during this project, I can contact the researcher with the information in which I have been provided. Any new information that develops during the project will be provided if that information may affect the willingness to continue participation in the project.

In signing this form, I agree to fully disclose all required information honestly and to the best of my knowledge. I agree to complete all required documentation, fill out questionnaires, surveys, or any other similar data collection tools. In addition, I understand that any information in regards to my participation within this project will be held strictly confidential and will only be shared between me and the researchers conducting this project. I have been assured that no personal information will be shared with anyone else without my prior written consent.

If sharing of information or recollection of events shared cause me emotional distress or anguish, I understand that resources are available upon request. Questions concerning the research, at any time during or after the project, should be directed to Gloria Green at (662) 299-3641 or my project chairperson Dr. Katherine Nugent at (601) 266-5457. This project and this consent form have been reviewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research participant should be directed to the Chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5147, Hattiesburg, MS 39406-0001, (601) 266-6820.

Date _____ Participant's Signature _____

Date _____ Researcher's Signature _____

APPENDIX G

DEMOGRAPHIC SHEET

1. What is your age? 18-30 31-43 44-55 56-67 68-79
2. Gender: Male Female
3. Ethnic Background: Black Hispanic White Other
4. What is the highest level of education attained?
Below 12th grade High School College Post College
5. What is your marital status?
Married Single Widowed Divorced
6. What is your annual income?
 Less than \$5, 000 \$30,000-\$39,000
 \$5,000-\$9,999 \$40,000-\$49,000
 \$10,000-\$19,999 \$50,000 or above
 \$20,000-29,000
7. What is your present employment status:
Employed Disabled Retired Other
8. What is your source of income: (Check all that apply)
Job Pension Welfare Disability Social Security Other
9. Do you live alone? Yes No
If no, who do you live with?
Spouse Son/Daughter Family Significant Other(s)
10. Do you have type 2 diabetes? Yes No
11. Have you had any type of formal diabetes education?
Yes No
12. Do you have a diabetic ulcer on your foot?
Yes No
13. Have you ever had an amputation because of a diabetic ulcer?
Yes No
14. How many times a month do you visit the wound care clinic?
 Fewer than 2 3-4 5-6 7-8 9-10 More than 10
15. Within the past year, how many times have you been hospitalized for your diabetic ulcer(s)?
 None 1 2 3 4 5 or more
16. How would you evaluate your present health status according to your diabetes?
 Poor Fair Good Excellent
17. How would you evaluate your quality of life according to your diabetes?
 Poor Fair Good Excellent

APPENDIX H

ORIGINAL MICHIGAN DIABETES ATTITUDE SURVEY

Below are some statements about diabetes. Each numbered statement finishes the sentence “In general, I believe that...” You may believe that a statement is true for one person but not for another person or may be true one time but not be true another time. Mark the answer that you believe is true most of the time or is true for most people. Place a check mark in the box below the word or phrase that is closest to your opinion about each statement. It is important that you answer every statement.

Note: The term “healthcare professionals” in this survey refers to doctors, nurses, and dietitians.

In general, I believe that:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. ...healthcare professionals who treat people with diabetes should be trained to communicate well with their patients.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. ...people who do <u>not</u> need to take insulin to treat their diabetes have a pretty mild disease.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. ...there is not much use in trying to have good blood sugar control because the complications of diabetes will happen anyway.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. ...diabetes affects almost every part of a diabetic person’s life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. ...the important decisions regarding daily diabetes care should be made by the person with diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. ...healthcare professionals should be taught how daily diabetes care affects patients’ lives.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

In general, I believe that:		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
7.	...older people with Type 2* diabetes do not usually get complications.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	...keeping the blood sugar close to normal can help to prevent the complications of diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	...healthcare professionals should help patients make informed choices about their care plans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	...it is important for the nurses and dietitians who teach people with diabetes to learn counseling skills.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.	...people whose diabetes is treated by just a diet do not have to worry about getting many long-term complications.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.	...almost everyone with diabetes should do whatever it takes to keep their blood sugar close to normal.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	...the emotional effects of diabetes are pretty small.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

* Type 2 diabetes usually begins after age 40. Many patients are overweight and weight loss is often an important part of the treatment. Insulin and/or diabetes pills are sometimes used in the treatment. Type 2 diabetes is also called noninsulin-dependent diabetes mellitus or NIDDM; formerly it was called "adult diabetes."

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
In general, I believe that:					
14. ...people with diabetes should have the final say in setting their blood glucose goals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. ...blood sugar testing is not needed for people with Type 2* diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. ...low blood sugar reactions make tight control too risky for most people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. ...healthcare professionals should learn how to set goals with patients, not just tell them what to do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. ...diabetes is hard because you never get a break from it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. ...the person with diabetes is the most important member of the diabetes care team.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. ...to do a good job, diabetes educators should learn a lot about being teachers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. ...Type 2* diabetes is a very serious disease.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. ...having diabetes changes a person's outlook on life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

* Type 2 diabetes usually begins after age 40. Many patients are overweight and weight loss is often an important part of the treatment. Insulin and/or diabetes pills are sometimes used in the treatment. Type 2 diabetes is also called noninsulin-dependent diabetes mellitus or NIDDM; formerly it was called "adult diabetes."

In general, I believe that:		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
23.	...people who have Type 2* diabetes will probably not get much payoff from tight control of their blood sugars.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.	...people with diabetes should learn a lot about the disease so that they can be in charge of their own diabetes care.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25.	...Type 2* is as serious as Type 1† diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26.	...tight control is too much work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27.	...what the patient does has more effect on the outcome of diabetes care than anything a health professional does.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28.	...tight control of blood sugar makes sense only for people with Type 1† diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

* Type 2 diabetes usually begins after age 40. Many patients are overweight and weight loss is often an important part of the treatment. Insulin and/or diabetes pills are sometimes used in the treatment. Type 2 diabetes is also called noninsulin-dependent diabetes mellitus or NIDDM; formerly it was called “adult diabetes.”

† Type 1 diabetes usually begins before age 40 and always requires insulin as part of the treatment. Patients are usually not overweight. Type 1 diabetes is also called insulin-dependent diabetes mellitus or IDDM; formerly it was called “juvenile diabetes.”

In general, I believe that:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
29. ...it is frustrating for people with diabetes to take care of their disease.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. ...people with diabetes have a right to decide how hard they will work to control their blood sugar.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. ...people who take diabetes pills should be as concerned about their blood sugar as people who take insulin.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. ...people with diabetes have the right <u>not</u> to take good care of their diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. ...support from family and friends is important in dealing with diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Tool Revised 12/18/98

Retrieved with permission from the Michigan Diabetes Research Training Center (2012) website:
<http://www.med.umich.edu/mdrtc/profs/survey.html>

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