

## ABSTRACT

### PRIMARY CARE APPROACHES TO PREVENTING TYPE 2 DIABETES MELLITUS IN ADULTS

By Danielle L. Vanevenhoven

Type 2 diabetes mellitus is a progressive metabolic disorder of the endocrine system, characterized by a natural progression of insulin resistance and impaired insulin secretion. Due to the slow and gradual onset of symptoms, most individuals are unaware they have diabetes until subsequent complications surface and they are diagnosed (Uphold & Graham, 2003). Type 2 diabetes is reaching epidemic proportions in the Western culture. At the turn of the century, it was estimated that approximately 150 million people worldwide had type 2 diabetes mellitus; this number is projected to double by the year 2025 (Boylan, 2006). The purpose of this study was to explore how primary healthcare providers (physicians, nurse practitioners) identify and intervene with risk-reduction behaviors with adults at risk for developing type 2 diabetes mellitus.

Pender's (2006) Health Promotion Model (HPM) served as the theoretical framework for this study. This model integrates nursing and behavioral science perspectives with concepts that influence health-promoting behaviors.

A descriptive qualitative design was used to conduct the study. Participants included a convenience sample of eight physicians and two nurse practitioners from a primary healthcare facility in Northeast Wisconsin. Data were collected through tape recorded interviews using open-ended questions to explore how primary healthcare providers identified and intervened with risk-reduction behaviors in adults at risk for developing type 2 diabetes mellitus. The interviews were then transcribed verbatim and used for data analysis. Colaizzi's method was used to extract meaningful statements describing the participant's experience (Polit & Beck, 2008). The data were further organized into the following themes: (a) *Identification: Who Is at Risk*, (b) *The Intervention: What Do We Need to Do*, (c) *Establishing Consistency: Continuing to Build Support*, and (d) *Extenuating Circumstances*. The emerging themes are meant to validate the participants' descriptions of how they identified and intervened with at-risk adults.

The findings of this study will be compiled into a brief handout that will be dispersed to the primary healthcare providers at the healthcare facility in Northeast Wisconsin, where the sample was obtained. The handout is intended to provide additional education and support to healthcare providers to further assist in identifying and providing interventions that reduce the risk of developing type 2 diabetes in adults.

PRIMARY CARE APPROACHES TO PREVENTING  
TYPE 2 DIABETES MELLITUS IN ADULTS

by

Danielle L. Vanevenhoven

A Clinical Paper Submitted  
In Partial Fulfillment of the Requirements  
For the Degree of

Master of Science in Nursing

Family Nurse Practitioner

at

University of Wisconsin Oshkosh  
Oshkosh, Wisconsin 54901-8621

May 2010

APPROVAL

Sharon Chappy Advisor

5-11-10 Date Approved

PROVOST  
AND VICE CHANCELLOR

J R Gu

5/11/2010

Date Approved

FORMAT APPROVAL

Gloria Splittgerber

5/6/2010  
Date Approved

## ACKNOWLEDGMENTS

I would just like to thank my family and friends for their unconditional love and support the past 3 years. The experience has been a challenge that I am proud to say I have accomplished.

To my husband Todd, thank you for always encouraging me to get through the difficult times even when I felt like giving up. Without your love and support, I don't think I could have done this. It has been a long road for us, and I'm glad we have arrived at our destination. I love ya babe!

I would like to thank my mom and in spirit, my fathers, who without them, I would not have had the opportunities throughout my life to get to where I am today. Your gentle and loving guidance has meant more to me than you can imagine. Thank you for everything you and "the dads" have sacrificed so that I could be the person that I am today. I love you!

Dr. Sharon Chappy, thank you for your guidance during the process of writing this paper. You have encouraged me to be a better practitioner and writer. Thank you for all the time and effort you have spent into making my paper something that I can be proud of!

More and more every day I am amazed at what I have accomplished. This experience has given me the courage to embrace the challenges in my future with confidence assuring that I can do anything, if only I put my mind to it.

## TABLE OF CONTENTS

	Page
LIST OF TABLES .....	v
LIST OF FIGURES .....	vi
CHAPTER I – INTRODUCTION .....	1
Significance to Nursing .....	3
Statement of Problem .....	4
Purpose .....	4
Research Question .....	4
Definitions of Terms .....	4
Conceptual Definitions .....	4
Operational Definitions .....	5
Assumptions .....	6
Summary .....	6
CHAPTER II – THEORETICAL FRAMEWORK AND LITERATURE REVIEW .....	8
Introduction .....	8
Theoretical Framework .....	8
Individual Characteristics and Experiences .....	10
Behavior-Specific Cognitions and Affect .....	10
Behavioral Outcome .....	11
Case Study .....	11
Literature Review .....	13
Lifestyle Modification/Social Support .....	13
Exercise .....	13
Diet .....	17
Social Support .....	18
Primary Prevention .....	19
Diabetic Education .....	22
Summary .....	23
CHAPTER III – METHODOLOGY .....	24
Introduction .....	24
Study Design .....	24
Population, Sample, and Setting .....	24
Data Collection Instrument .....	25
Data Collection Procedures .....	25
Data Analysis .....	26
Limitations .....	27
Summary .....	27

TABLE OF CONTENTS (Continued)

	Page
CHAPTER IV – FINDINGS AND DISCUSSION .....	28
Introduction .....	28
The Interview Process .....	28
Demographic Data .....	29
Results .....	29
Theme 1: Who Is at Risk? .....	29
Theme 2: The Intervention: What Do We do Now? .....	31
Theme 3: Establishing Consistency: Continuing to Build Support .....	33
Theme 4: Extenuating Circumstances .....	35
Discussion .....	37
Summary .....	39
CHAPTER V – SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS .....	40
Introduction .....	40
Summary of Study Findings .....	40
Implications for Nursing and Nursing Education .....	42
Recommendations for Future Research .....	43
Summary .....	43
APPENDICES	
Appendix A. Interview Guide .....	45
Appendix B. Informed Consent for Participants .....	47
Appendix D. University of Wisconsin Oshkosh IRB Approval .....	50
REFERENCES .....	52

LIST OF TABLES

	Page
Table 1. Participant Age and Years of Experience .....	29

## LIST OF FIGURES

	Page
Figure 1. Health Promotion Model .....	9

## CHAPTER I

### INTRODUCTION

Type 2 diabetes mellitus was previously called non-insulin-dependent diabetes mellitus (NIDDM), or adult-onset diabetes, and accounts for 90% to 95% of all diagnosed cases of diabetes. Type 2 diabetes is a metabolic heterogeneous condition that is associated with a state of hyperglycemia and a relative deficiency of insulin. Due to the gradual and progressive nature of diabetes, most adults are not diagnosed for approximately 9 to 12 years after the onset of symptoms (Chan & Abrahamson, 2003). In the majority of cases, adults will unknowingly present to their healthcare provider with symptoms that are characteristic of diabetes. Healthcare providers will often perform an in-depth physical assessment and diagnostic testing to evaluate for type 2 diabetes. Metabolic anomalies in diabetes disrupt the homeostasis of glucose production and utilization resulting in improper use of the body's natural insulin. This metabolic disruption causes impaired beta cell function, impaired insulin secretion, insulin resistance, and increased glucose production. As a result, insulin resistance can manifest with normal, high, or low levels of insulin. The pancreas will gradually lose its ability to produce sufficient amounts of insulin, producing a hyperglycemic state.

Advances in science have made preventing and treating diabetes more successful over the past several decades. Thirty years ago, scientists were unable to make a correlation between heredity and the specific genes that contribute to diabetes. Scientists have found that diabetes is genetically linked, and prevention strategies now exist that make it possible to reduce the risk of developing diabetes. While heredity plays an important role in diabetes, the National Institutes of Health (NIH) (2009) reported that obesity and physical inactivity significantly increased the risk of developing

type 2 diabetes. Researchers at the NIH discovered that lifestyle modification techniques were not implemented on a national level to prevent or delay the onset of this disease. A clinical trial done by the Diabetes Prevention Program (DPP) showed that with modest weight loss (5% to 7% of body weight) and regular physical activity, the risk for developing type 2 diabetes was reduced by 58% (NIH, 2009). In addition, the results of the study indicated that Caucasians and minority populations who are at high risk for diabetes have benefited from lifestyle modification and use of the oral anti-diabetic medication Metformin.

As the epidemic of obesity and physical inactivity emerges in the United States, type 2 diabetes is increasingly being diagnosed in children and adolescents. Historically, this chronic disease was associated with the aging obese and physically inactive adult. Individuals with a history of gestational diabetes and/or impaired glucose metabolism are at risk for developing diabetes. Those at the greatest risk for developing type 2 diabetes are African Americans, Hispanic/Latino Americans, American Indians, Asian Americans, and Native Hawaiians or other Pacific Islanders (Centers for Disease control [CDC] and Prevention, 2009a).

Often the early symptoms of type 2 diabetes are overlooked. Adults will often present to their healthcare provider with complaints of blurred vision, frequent skin infections, fatigue, or paresthesias. The most common clinical manifestations of type 2 diabetes are typically polyuria (excessive urination), polydipsia (excessive thirst), and polyphagia (excessive hunger), which trigger the healthcare provider to consider a diagnosis of diabetes.

Earlier testing should be considered for individuals who present in a high risk group with a strong family or personal history (gestational) for diabetes. In addition,

individuals who complain of symptoms that are consistent with the diagnosis of type 2 diabetes should have their blood glucose level monitored as recommended by their healthcare provider. The American Diabetes Association (ADA) (2009) and Uphold and Graham (2003) recommend a fasting (without food for 8 hours) blood glucose test measured on two separate occasions, with a result of 126 mg/dL or greater and a fasting glycosylated hemoglobin (HbA1c) measuring the average plasma glucose for the past 120 days with a result of 7.0% or greater as diagnostic for type 2 diabetes.

There are reports in the literature that lifestyle modifications through diet and exercise can prevent or delay the onset of type 2 diabetes (ADA, 2009; CDC, 2009a; CDC, 2009b; Cook, Girman, Stein, & Alexander, 2007). Yet, studies are lacking that address how primary healthcare providers identify and intervene with risk-reducing behaviors in adults who are high risk for developing type 2 diabetes.

### Significance to Nursing

Healthcare providers are in the unique position to influence adults at risk for developing type 2 diabetes by recommending lifestyle changes that can prevent the onset of this disease. Adults with type 2 diabetes continue to place a heavy financial and social burden on the United States healthcare system when they are not effectively taught to manage their disease (Fitzner et al., 2008). As a result of this economic and social burden on the healthcare system, healthcare providers are challenged to create care plans that will prevent and/or delay the onset type 2 diabetes.

## Statement of Problem

Research has shown that type 2 diabetes mellitus is a disease that can be prevented, yet the number of cases continues to rise dramatically. Primary healthcare providers have the opportunity to identify adults at risk and implement interventions that are aimed at reducing the risk of developing diabetes. Risk-reduction behaviors are tailored to accommodate personal needs that will enhance compliance with the plan of care.

## Purpose

The purpose of this qualitative study was to explore how primary healthcare providers (physicians, nurse practitioners) identify and intervene with risk-reduction behaviors in adults at risk for developing type 2 diabetes mellitus.

## Research Question

What are the actions that primary healthcare providers use to identify adults at risk for developing type 2 diabetes mellitus?

## Definitions of Terms

### *Conceptual Definitions*

*Adults:* One who is fully developed and mature (Merriam-Webster, 2009).

*Type 2 diabetes mellitus:* An endocrine disorder, formerly known as NIDDM or adult-onset diabetes, characterized by insulin sensitivity, insulin resistance, and impaired insulin secretion secondary to obesity and physical activity. As the need for insulin rises,

the pancreas gradually loses its ability to produce and utilize insulin properly (CDC, 2009b).

*Primary care:* Care that is provided by physicians and non-physician providers trained in comprehensive first contact and continuing care for persons with any undiagnosed sign, symptom, or health concern not limited by problem origin, organ system, or diagnosis. Primary care includes health promotion, disease prevention, health maintenance, counseling, patient education, and diagnosis and treatment of acute and chronic illnesses in a variety of healthcare settings. Primary care promotes effective communication with patients and encourages the role of the patient as a partner in health care (American Academy of Family Physicians, 2010).

*Physician:* A person skilled in the art of healing; specifically: one educated, clinically experienced, and licensed to practice medicine as usually distinguished from surgery (Merriam-Webster, 2009).

*Nurse practitioner (NP):* A registered nurse who is qualified through advanced education and clinical training to provide preventative and acute healthcare services to individuals of all ages. Nurse practitioners have graduate-level education and work independently and collaboratively with the healthcare team. Nurse practitioners promote a comprehensive approach to healthcare and emphasize the overall health and wellness of their patients (Mayo Clinic, 2009).

#### *Operational Definitions*

*Adult:* A male or female over the age of 18 who is seeking care at a primary healthcare facility in Northeast Wisconsin.

*Type 2 diabetes mellitus:* An endocrine disorder that is diagnosed by a primary healthcare provider when clinical manifestations, as well as physical and diagnostic criteria, are met for a diagnosis of the disease.

*Primary care:* Healthcare services that are provided by physicians, NPs, and other healthcare members within a small community setting.

*Physician:* A doctor of medicine who provides healthcare services and was employed by the primary healthcare facility in Northeast Wisconsin, where the study was conducted.

*Nurse practitioner (NP):* Advanced practice NP who provides healthcare services and was employed by the primary healthcare facility in Northeast Wisconsin, where the study was conducted.

#### Assumptions

1. The participants in the study were honest in describing the process they use to identify adult patients at risk for developing type 2 diabetes.
2. The participants verbalized risk-reducing modifications to prevent or delay the onset of type 2 diabetes in adults.
3. The participants verbalized an interest in health promoting activities to reduce the risk for developing type 2 diabetes in adults.

#### Summary

Research has shown that type 2 diabetes is a gradual and progressive disease that can be prevented or delayed through lifestyle modification. As the incidence of diabetes continues to rise, healthcare providers need to work collaboratively to identify

adults at risk through personal and family assessment and diagnostic testing. Behaviors that have shown to reduce the risk of type 2 diabetes are interventions, such as increasing physical activity, weight loss, and dietary modifications. Primary healthcare providers focus on prevention of disease across the continuum to focus on early detection, continuity of care, and treatment to prevent progression to disease in adults who are at risk for developing type 2 diabetes mellitus.

In this chapter, the researcher presented the significance to nursing, statement of the problem, purpose, and research question. In addition, a description of conceptual and operational terms and assumptions of this study were provided.

## CHAPTER II

### THEORETICAL FRAMEWORK AND LITERATURE REVIEW

#### Introduction

The purpose of this qualitative study was to explore how primary healthcare providers (physicians, NPs) identify and intervene with risk-reduction behaviors in adults at risk for developing type 2 diabetes mellitus. In this chapter, the use and relevance of Pender's Health-Promotion Model (HPM) as a theoretical framework for this study is addressed. In addition, a review of literature that contains pertinent research discussing methods of risk-reducing behaviors is presented. The literature review consists of the following categories: (a) lifestyle modification/social support, (b) primary prevention, and (c) diabetic education.

#### Theoretical Framework

The HPM by Pender, Murdaugh, and Parsons (2006) (Figure 1) was the theoretical framework used in this study. The HPM builds upon multidimensional characteristics of an individual's personal engagement within his or her own internal and external environment while pursuing a state of health. The HPM illustrates a collaborative relationship between the healthcare provider and the individual that promotes holistic human functioning. The HPM is based on the assumption that emphasis is placed on an active role by the client to shape and maintain health behaviors, while modifying the environment to promote these behaviors. The HPM is divided into three categories: (a) individual characteristics and experiences, (b) behavior-specific cognitions and affect, and (c) behavioral outcome.

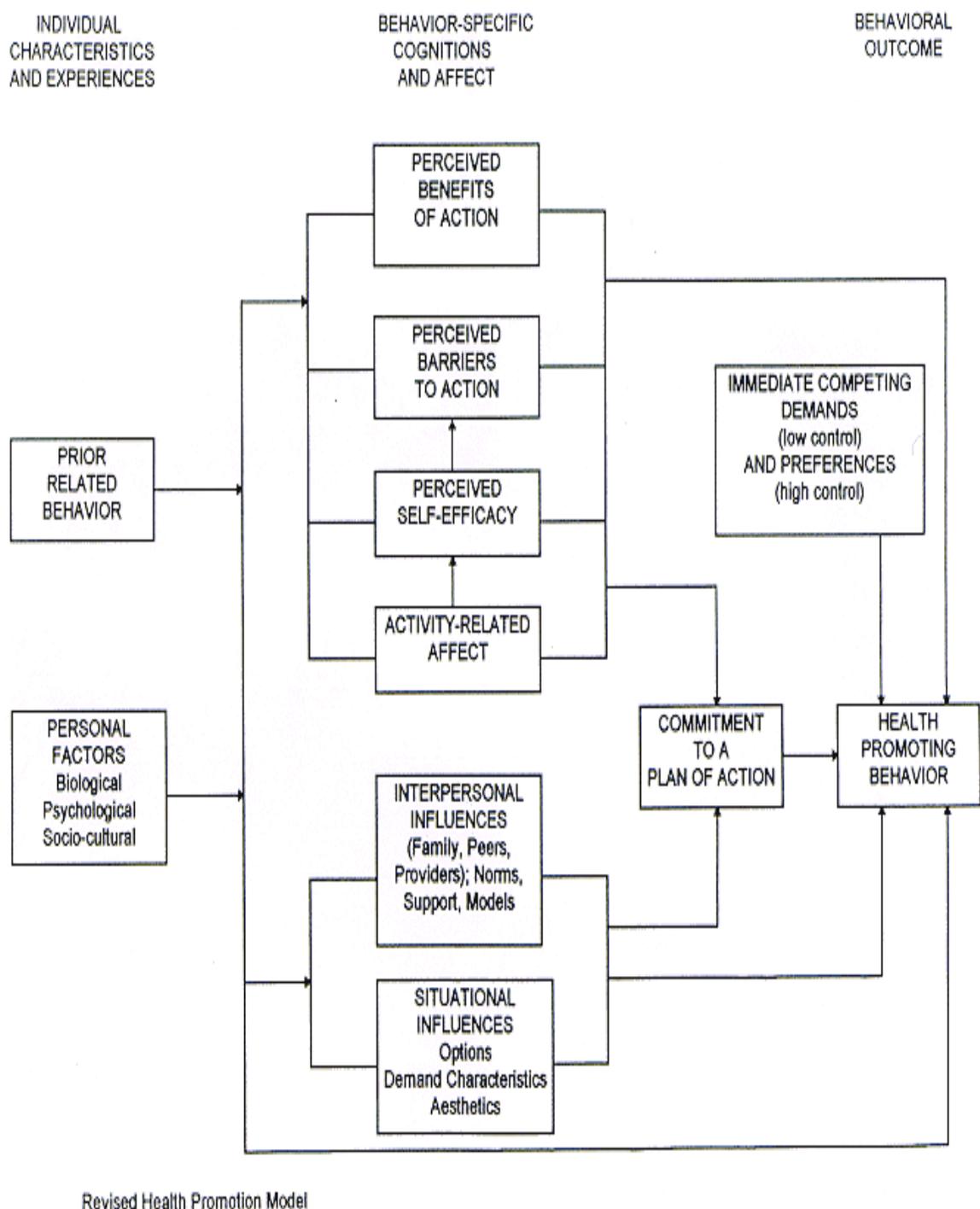


Figure 1. Health Promotion Model (Pender et al., 2006).

### *Individual Characteristics and Experience*

This category refers to the individual's unique experiences that have influenced subsequent behaviors. Using the HPM, healthcare providers incorporate the knowledge level of the individual with prior behavior and experiences that affect health-promoting behaviors. For example, if a person has a positive experience with health-promoting activities, the individual is more likely to repeat those activities as compared to activities that produce a negative experience. Personal factors in Pender's model include: biological, psychological, and sociocultural aspects. Biological factors are those that cannot be altered, such as age, gender, or hereditary. Psychological characteristics include self-esteem, self-motivation, and perceptions of health status. Sociocultural characteristics include ethnicity, race, education, income, and acculturation.

### *Behavior-Specific Cognitions and Affect*

This category is considered the nucleus of the model, because it reflects how the individual evolves as a result of the nursing intervention. The main components of this category are: (a) perceived benefits of action, (b) perceived barriers to action, (c) perceived self-efficacy, (d) activity-related affect, (e) interpersonal influences, and (f) situational influences. The reflection of the individual's experience of health-promoting behaviors will lead to the success or failure of those interventions. The subjective nature will often influence the perceptions of the nursing interventions and determine the environment in which the health-promoting behavior will occur. The individual will develop a sense of control over the behavior that initiates commitment to continuing health promoting behaviors.

### *Behavioral Outcome*

The last category of the HPM incorporates a philosophy of adoption and integration of health-promoting behavior(s) into the individual's lifestyle. The purpose of this category is to enhance functionality and improve quality of life through health promoting behaviors.

This study will incorporate the three main categories of the HPM. The researcher will describe what the physician and the NP do to identify adults at risk and how they intervene with risk-reducing behaviors in adults at risk for type 2 diabetes. The healthcare provider can assist the patient to identify biological, psychological, and sociocultural barriers that impede or promote health-promoting activities. The healthcare provider, working collaboratively with the patient, can develop a plan of care that is tailored to the patient to enhance risk-reducing behaviors while modifying the care plan when necessary. The desired behavioral outcome will include patients actively engaging in risk-reducing behaviors that will achieve an overall state of well-being and reduce their risk of developing type 2 diabetes mellitus.

### Case Study

RG is a 65-year-old married Caucasian male who works as a dispatcher at a local trucking company. He states that his job requires little physical activity, stating he often sits at his desk doing paperwork and managing trucking assignments. RG is 6' 1" tall and weighs 250 pounds, with a family history of diabetes. His calculated body mass index (BMI) is 33, which classifies RG as obese. RG states that his diet consists mainly of fast food and diet soda. He consumes an inadequate amount of fiber in his diet. RG states that he walks briskly once or twice a week for about 20 minutes each time and

feels a sense of accomplishment. He states that he does the majority of the cooking in his household. RG and his wife enjoy participating in physical activities.

RG presents to his healthcare provider for a routine physical exam. During the exam, the healthcare provider discusses RG's risk for developing type 2 diabetes due to his obesity, sedentary lifestyle, and diet. RG acknowledges that his poor eating habits and sedentary lifestyle are contributing factors to developing type 2 diabetes. RG acknowledges to his healthcare provider that he finds pleasure in exercising but does not know how to manage his dietary habits.

After a lengthy discussion with his healthcare provider about various lifestyle modifications, RG verbalizes interest in changing his behavior. RG states that he will set a goal to exercise at least three to five times a week for a minimum of 30 minutes each time. He states he will prepare meals that are high in fiber and low in fat, decreasing his fast food intake. RG verbalizes that he should make gradual changes in his lifestyle to encourage compliance with a healthy lifestyle. He states that if he makes too many changes at once, he may not continue with health-promoting behaviors. Lastly, RG and his healthcare provider discuss setting a goal of an eight pound weight loss before his next visit in 6 weeks.

Pender's HPM (2006) serves as a tool that guides healthcare providers and individuals to recognize, acknowledge, and implement personalized health-promoting behaviors. The HPM provides a framework for a realistic approach to managing health behaviors by acknowledging the unique characteristics of individuals while promoting healthy behaviors. It is essential that a plan of care is developed that is tailored to attain positive outcomes. The HPM incorporates a holistic approach to health-promoting behaviors by considering the mental, physical, social well-being of the individual.

## Literature Review

Researchers have found that obesity, physical inactivity, and poor dietary choices have contributed to the development of type 2 diabetes mellitus. Maintaining glycemic control through lifestyle modification can prevent or delay the onset of type 2 diabetes and prevent secondary complications from this progressive disease. Social support from healthcare providers can help to facilitate the management and reduce the risk factors for type 2 diabetes.

### *Lifestyle Modification/Social Support*

#### *Exercise*

Jallinoja, Pajari, and Absetz (2008) performed a qualitative study that explored whether individuals were capable of being autonomous in seeking a healthier lifestyle or dependent upon an external support system, such as a healthcare provider. The purpose of the study was to explore the experiences of individuals who were involved in a lifestyle modification program during and after a type 2 diabetes prevention intervention program. A total of 216 individuals between 52 and 65 years of age were recruited from primary healthcare facilities in southern Finland to participate. The researchers established the following goals for the participants in the lifestyle intervention program: to consume less than 30% of fat in daily intake and less than 10% from saturated fat in daily intake, 15g of fiber per 1,000 calories, to participate in 30 minutes a day of moderate physical activity, and a 5% weight reduction. The program included six counseling sessions over 8 months with a healthcare provider. Each session targeted motivation with risk perception, self-efficacy to change lifestyle habits, and expected outcomes of the program. Personal care plans were developed that established goals and developed step-by-step plans to implement changes. Evaluation

measures were used throughout the study to assess motivation of personal behaviors and to manage care plans for lifestyle change that included feedback from a licensed dietician.

Informational letters were mailed to the participants 1 ½ years after the intervention program ended, inviting them to participate in a study that would analyze their experience with the modification and maintenance of lifestyle changes. Tape recorded interviews were conducted over 2 months with 30 participants who responded to the mailed invitations. Preplanned structured questions guided each interview that lasted approximately 70 to 120 minutes. Participants were then divided into two groups, weight-reducers and weight-gainers. The interviewers were able to extract meaningful data from both groups and place the data into the following themes: hopelessness repertoire, struggle repertoire, and self-governing individual repertoire. The researchers found that the weight-gainers often described their experience with lifestyle change as difficult or impossible. Both groups described the balance of healthy and unhealthy lifestyle choices as a constant struggle of internal and external forces. Weight-losers reported that self-monitoring their body weight and food intake was part of a lifelong weight loss maintenance regimen. In conclusion, Jallinoja et al. (2008) found that both groups (weight-reducers and weight-gainers) understood the importance of lifestyle modification for the benefit of their health. With support of their healthcare provider, they ultimately took responsibility for their own health.

Gavi and Hensley (2009) presented a guideline that utilized evidence-based protocols to implement intensive behavioral lifestyle modifications to prevent or delay type 2 diabetes in adults. The management strategies included dietary modifications, physical activity, and patient education from licensed healthcare providers. These

evidence-based guidelines recommend that individuals should: (a) increase aerobic physical activity to 150 minutes per week, (b) achieve a moderate weight loss of 5% in individuals who are overweight or obese, (c) distribute carbohydrates evenly throughout the day, (d) limit sucrose containing foods, (e) consume 15% to 20% protein from total daily calories, (f) consume no more than 30% fat from total daily calories, (g) increase soluble fiber intake to 10g to 25g per day, and (h) limit sodium intake to 2g per day. Implementing these recommendations will improve the body's metabolic demands and have been shown to be effective in reducing the risk of type 2 diabetes.

Milat, O'Hara, and Develin (2009) analyzed the proposed initiatives of Australia's healthcare system to respond to the growing economic challenges of type 2 diabetes in that country. The purpose was to stimulate interest in promoting lifestyle intervention programs aimed at preventing type 2 diabetes in Australia. Based on their review of literature, they noted the importance of programs that focused on early detection, treatment, self-management, and continuity of care. Healthcare providers with the expertise to initiate health promotion plans with adults at risk for diabetes were able to form partnerships that promoted advocacy and empowerment. The authors concluded that although intensive lifestyle modification programs were expensive to initiate, they were significantly more cost-effective than pharmacologic-based therapy in adults with diabetes nationwide. Milat et al. (2009) noted that health promotion programs directed at reducing the incidence of type 2 diabetes met obstacles obtaining government funding, but have been proven to be effective and cost-effective. State and national governments are more willing to fund established programs that reduce the incidence of diabetes when they are cost-effective and implemented by healthcare providers who

have expert knowledge and provide individualized counseling. The success of such programs in Australia will be dependent upon greater engagement in health promotion.

Laaksonen et al. (2005) completed a post-hoc analysis to determine the role of leisure-time physical activity (LTPA) in the prevention of type 2 diabetes. They used data obtained from two randomized clinical trials, the Finnish Diabetes Prevention Study (DPS) and the DPP. Those trials were completed with a total of 522 overweight or obese participants between the ages of 40 and 65 years, who were randomly assigned to an intervention group and control group. In the original study, the intervention group was given advice on program goals, including moderate to vigorous exercise three times a week, a reduction in body weight by greater than or equal to 5%, decreasing total fat consumption by 30% of calories consumed per day, decrease fat consumption to less than 10% of total calories consumed, and increase fiber to at least 15g/1000 kcals. The intervention group was offered free exercise programs and was encouraged to participate in endurance exercise. The control group was given verbal and written information on diet and exercise at baseline and at subsequent healthcare visits. Results of that study showed that the intervention group had a 58% reduction in the risk of developing type 2 diabetes.

Laaksonen et al. (2005) focused solely on the effect of LTPA in the post-hoc analysis. Laaksonen et al. concluded that the two groups had similar baseline results; 41% in the intervention group and 40% in the control group reported a participation level at least 2 ½ hours of moderate to vigorous physical activity per week. The annual follow-up report revealed that 62% of the intervention group and 46% of the control group participated in moderate to vigorous physical activity at least 2 ½ hours per week and were 49% to 65% less likely to develop diabetes compared to low-intensity LTPA.

The results of the study revealed that weight loss was considered a powerful determinant to risk reduction for diabetes. The authors reported that the intervention and control groups who had increased their strenuous LTPA had a 57% decreased risk for diabetes. Participants who were more likely to continue with moderate to vigorous LTPA had a 49% lower risk for developing diabetes. The study continued on for 4 years, and the follow up period revealed 107 new cases of diabetes in all groups who participated in the study. Despite the new cases of diabetes, the authors reported that the benefits of promoting lifestyle changes that incorporate structured aerobic and resistance LTPA significantly decreased the risk of developing type 2 diabetes.

#### *Diet*

Laifer (2005) performed a literature review examining the benefits of fiber to reduce the risk for developing diabetes. It was estimated that approximately 65% of American adults are overweight or obese. Laifer reported that obese individuals who added fiber daily to their diet consumed fewer calories and lost more weight compared to those who did not. The researcher noted that increased dietary fiber intake slowed the absorption of food, maintained a healthy body weight, and prevented blood glucose levels from rising rapidly. Laifer noted that Americans are not consuming an adequate amount of fiber. Including fiber in the diet can help lower risk for heart disease and cancer and can prevent diseases, such as diabetes and hypertension. Increasing the fiber content in the diet can provide satiety and prevent binge eating. Laifer also noted that a high to moderate fiber diet could lead to a significant improvement in glycemic control and decreased hyperinsulinemia.

Boylan (2006) performed a literature review evaluating the efficacy of diet and lifestyle interventions that reduce the risk of developing type 2 diabetes. Glycemic index

is a measurement of the available carbohydrates in food and the body's glycemic response to the food consumed. Boylan found that diets with a high glycemic index increased the risk for developing type 2 diabetes. Furthermore, Boylan reported that glycemic index should not be the primary foundation when counseling adults at risk for diabetes. Although it is an excellent adjunct to lifestyle modification, diets with a low glycemic index have shown to be healthier. Low glycemic index diets are associated with increased amounts of unprocessed natural foods, higher amounts of fiber, lactose, and galactose, and decreased amounts of saturated fats.

### *Social Support*

Miller and Davis (2005) conducted a study that examined the experiences of adults with type 2 diabetes and the role of social support in diabetes management. A total of 44 participants between the ages of 21 and 65 years, with a diagnosis of type 2 diabetes for more than 1 year, participated in the study. All participants completed an interview that focused on their experiences of social support and diabetes management. Social support was defined by the participants as having positive interactions with family members (spouse, child, sibling), co-workers, or healthcare professionals. Social support acted as a buffer, protecting individuals from potentially harmful or stressful life events that could have led to lifestyle and medication non-compliance. Miller and Davis reported encouraging evidence that linked social support and glycemic control with a decreased risk for morbidity and mortality otherwise increased by diabetes. The authors concluded that having a support system that included healthcare providers encouraged motivation, accountability, and influenced self-management practices. Miller and Davis concluded that diabetes management is a lifelong practice that requires continuous vigilance to maintain glycemic control. Research supports the role of social support to

achieve and maintain a healthy lifestyle while providing praise and constructive feedback. Social support networks include, but are not limited to, educational, emotional, and physical. Reinforcing social support systems can help adults with diabetes to develop coping mechanisms and techniques that help them adapt to personal and professional changes within their environment.

### *Primary Prevention*

Koenigsberg, Bartlett, and Cramer (2004) presented evidenced-based interventions evaluating the effectiveness of lifestyle modification strategies in the prevention of type 2 diabetes. The authors reported that participants were evaluated in their readiness to change, stages of lifestyle changes, motivating factors, psychosocial factors that maximize adherence with individualize plans, and optimizing goals to maintain weight loss. The authors found encouraging evidence that using a team approach to obtain manageable long-term goals empowered adults to overcome personal barriers and build confidence to make positive lifestyle changes.

Clark, Gavin, Blonde, and Warren-Boulton (2006) performed a literature review evaluating how healthcare providers are encouraged to participate in educational and outreach programs aimed at reducing or eliminating the risk of developing type 2 diabetes in at-risk adults. The purpose of the program was to promote adherence to lifestyle modifications and reduce the risk of developing type 2 diabetes in adults. The National Diabetes Education Program (NDEP) offers various tools to healthcare providers that assist in treatment options, such as: (a) diet modification (low-fat, reduced caloric intake); (b) setting realistic goals for weight loss; and (c) providing sources of support (diabetic educator/nutritionist) for adults at risk for developing type 2 diabetes. (Clark et al., 2006). The authors concluded that the program offered by the NDEP is a

successful and cost-effective method to prevent or delay the onset of type 2 diabetes in at-risk adults.

Lakerveld et al. (2008) are conducting a 2-year prospective randomized clinical trial to evaluate the effectiveness of cognitive behavioral programs (CBP) that aim to improve lifestyle practices and reduce the risk of developing type 2 diabetes in at-risk adults. In all, 600 participants from the Netherlands between the ages of 30 and 50 years were recruited. Participants underwent a two-step screening process and were randomly assigned to either a control group or an intervention group. The intervention group was placed in CBPs assigned to general practice NPs who facilitated methods aimed at increasing motivation and changing unwanted behaviors. The intervention group had six individual 30-minute sessions over 2 to 4 months, with three monthly sessions by phone for the next year, which involved motivational interviewing and problem-solving treatment. Through these counseling sessions, participants were able to identify gaps in their behavior through reflection and make lifestyle changes. The control group received written information about their risk for developing type 2 diabetes. Subsequent information was mailed to participants in the control group regarding health promoting behaviors. The following tools used to measure diabetes risk were: (a) diabetes and cardiovascular risk score; (b) dietary behavior questionnaire and diary; (c) physical activity/lifestyle questionnaire; (d) quality of life questionnaire; and (e) physical measurements, i.e., anthropometric measurements, systolic/diastolic measurements, laboratory testing. Lakerveld et al. will evaluate effective and ineffective components of interventions. The authors noted that they expect the behavioral and counseling methods to be practical and evidence-based, and will be effective in reducing the risk of developing type 2 diabetes.

Qureshi and Kai (2008) investigated the effectiveness of physician advice in reinforcing health-promoting activities in adults with a familial risk for diabetes. The purpose of this study was to determine if adults modified their lifestyle after they were informed by a physician of their familial risk of diabetes, compared to adults who were not informed by a physician of their familial risk of diabetes. A survey targeting those from low-socioeconomic and minority groups was mailed to 6,175 random households. The survey consisted of 356 questions in 12 sections and measured the attitudes and behaviors regarding health-promoting activities in non-diabetic adults who were older than 18 years of age. A total of 4,345 respondents completed and returned the survey. Of these 3,323 were found eligible for the study. The authors reported a response rate of 70% for those who had completed and returned the survey. Of these, 90% were found eligible for the study. Respondents were asked to include previous encounters with a physician and if they discussed familial risk for diabetes. Results showed that 21% of respondents reported being informed of their familial risk by their physician. Fifty-six percent of the informed respondents were more likely to recognize their personal risk for diabetes after talking with a physician, compared to 14% of the uninformed respondents. Although 33% of the uninformed respondents met the DPP exercise recommendations, 50% of the informed group reported making lifestyle modifications to prevent diabetes. The authors concluded that the program was a cost-effective approach to prevent type 2 diabetes in underserved populations, and they anticipated that the program would increase further involvement of family and friends within the community.

### *Diabetic Education*

Rice (2005) performed a literature review that evaluated in-home educational tools used to prevent the onset of type 2 diabetes. The author reviewed a program called the Great Game Plan used to educate adults identified as pre-diabetic on how to make the necessary lifestyle changes to prevent or delay the onset of type 2 diabetes. The program utilized an educational, in-home device called the Health Buddy that connects the patient with a care coordinator through a toll-free internet connection. Periodically, this in-home device sends messages, questions, and short facts about diabetes, offering constructive feedback and valuable information regarding the benefits of exercise, healthy eating, and psychosocial well-being. Rice reported that participants of the Great Game Plan had an average of 10.75 pound weight loss, 1.59% decrease in BMI, and an average of 3.56 inches was lost in waist measurement in the 150 participants. The results showed that participants in this program continued to make progress and maintained a lifestyle that will reduce or eliminate the risk for developing type 2 diabetes. Rice found that this program was a valuable asset that encourages diabetes prevention and provides support for adults who struggle to modify their lifestyle.

Implementing risk-reduction strategies into daily routines can significantly reduce the risk of developing type 2 diabetes in adults. Lifestyle modification interventions, such as routine physical activity, weight loss, and careful dietary modification, have shown to reduce the risk of developing diabetes. In addition to lifestyle modification, professional support from healthcare providers can make the transition into a healthier lifestyle by implementing risk reduction strategies more successful.

## Summary

Pender's HPM provided the theoretical framework for this study that explored how primary healthcare providers identify and intervene with risk reducing behaviors in adults at risk for developing type 2 diabetes. The HPM assists healthcare providers and adults understand the internal and external forces that adults encounter as they pursue a state of health. As part of a collaborative relationship, healthcare providers and adults at risk work to develop a plan of care and intervene with risk-reduction behaviors that promote self-awareness, self-esteem, and accountability for the decisions that are made.

In this chapter, the researcher described how the theoretical framework illustrates a collaborative relationship between the healthcare provider and the individual that promotes holistic human functioning. A thorough review of literature was presented consisting of the following categories: (a) lifestyle modification/social support, (b) primary prevention, and (c) diabetic education.

## CHAPTER III

### METHODOLOGY

#### Introduction

The purpose of this qualitative study was to explore how primary healthcare providers (physicians, NPs) identify and intervene with risk-reduction behaviors in adults at risk for developing type 2 diabetes mellitus. In this chapter, the study design, setting, participants, instruments, data collection procedures, protection of human participants, data analysis, and limitations of the study are presented.

#### Study Design

A naturalistic, descriptive qualitative design was used to conduct this study where participants shared their rich experiences used to identify and intervene with risk-reducing behaviors in adults at risk for developing type 2 diabetes. The study was conducted using open-ended interviewing, asking physicians and NPs to describe the approaches used to identify and intervene with adults at risk for developing type 2 diabetes in the primary care setting.

#### Population, Sample, and Setting

This study was conducted using a convenience sample of physicians and NPs in primary healthcare in Northeast Wisconsin. Approval from the University of Wisconsin Oshkosh Institutional Review Board (IRB) for the Protection of Human Participants was obtained prior to data collection. The sample was obtained from a primary healthcare clinic in Northeast Wisconsin, where the researcher had access. The researcher invited ten participants to be interviewed using open-ended questions. Physicians and NPs with

various levels of expertise were invited to participate. The participants in the study were asked to choose the location for the interview, which allowed for privacy and minimal interruption.

#### Data Collection Instruments

Data were collected by using an interview guide (Appendix A) so that all content areas were covered with each participant. Questions focused on identification of at-risk adults and intervention techniques. A professional transcriptionist transcribed the interviews. The researcher used the transcripts to analyze the data and categorize the responses into themes.

#### Data Collection Procedures

After approval from the university IRB, the researcher approached and solicited each participant for this study. The researcher contacted the primary care clinic manager in order to gain access to the healthcare providers. The researcher approached each participant in person and identified herself as a student in the Family Nurse Practitioner (FNP) Master's Degree Program from the University of Wisconsin Oshkosh. The researcher assured all participants of confidentiality of the data. The study was explained, and written informed consent was obtained (Appendix B). The researcher obtained consent to tape-record the interviews. Each participant was assigned a random numerical code, and transcripts had a random numerical code that did not link the participant to the data. Informed consent documents were locked in a filing cabinet and kept separate from the transcripts. After the study was complete, all the data were destroyed by shredding paper documents and deleting taped recorded

information. The researcher informed participants that participation was voluntary and they could withdraw from the study at any point without being penalized.

The researcher enhanced the trustworthiness of the data obtained through the dimensions of credibility, dependability, confirmability, and transferability (Polit & Beck, 2008). Credibility was established through prolonged interaction with each participant. The researcher extracted significant statements from each interview that captured the rich experience of each participant while encompassing confidence in the truth and interpretations of the data. The researcher ensured the dependability of the data was consistent and stable, following the interview guide with every participant interview. The researcher established confirmability by ensuring accuracy of the participant's statements. Transferability of data may extend to healthcare providers in primary healthcare settings extending beyond the defined demographic region of Northeast Wisconsin. The researcher limited bias by avoiding personal opinion and avoiding questions that were out of the scope of this study to prevent distortion.

### Data Analysis

Colaizzi's method (Polit & Beck, 2008) was used to analyze the data. The researcher gained an understanding of the descriptive data through active listening and asking probing open-ended questions. The researcher thoroughly analyzed the transcribed interviews to gain a clear understanding of the experience. In a comprehensive approach to understand the experiences of the participants, the researcher became immersed in the data through writing notes on the transcripts to clarify data gathered. The researcher further identified and extracted significant data and placed key statements in a designated notebook that described how the participants

identified and intervened with risk-reducing behaviors in adults at risk for developing type 2 diabetes. Data from the transcripts were extracted and categorized into meaningful themes that accurately represented the participant's experiences.

### Limitations

The limitations of this study included:

1. Selection and sample bias exist in this research study. The sample only included primary healthcare providers from a healthcare facility in Northeast Wisconsin.
2. Level of experience with identifying and intervening with risk-reducing behaviors varied among the primary healthcare providers.

### Summary

In this chapter, the researcher explained the design of the study. The researcher further explained the process used to obtain the sample and setting for the study. Data collection instruments and procedures were thoroughly discussed. The dimensions of trustworthiness to ensure accuracy of the participant's experiences were explained. Data analysis was explained using Colaizzi's method.

## CHAPTER IV

### FINDINGS AND DISCUSSION

#### Introduction

The purpose of this qualitative study was to explore how primary healthcare providers (physicians, NPs) identify and intervene with risk-reduction behaviors in adults at risk for developing type 2 diabetes mellitus. In this chapter, the researcher will discuss the findings and discuss those findings as they relate to previous research.

#### The Interview Process

The researcher explained the following with each participant prior to starting the study: (a) purpose of the study; (b) interview procedure, including the consent and tape recording of the interview; and (c) measures to comply with confidentiality and anonymity. After consent was obtained, participants were asked several open-ended questions using an interview guide (Appendix A).

After the tape-recorded interviews were completed, the data were transcribed verbatim by a professional transcriptionist. Each transcript was thoroughly reviewed and used for data analysis. Meaningful statements were extracted from each transcript that explored how primary healthcare providers identify and intervene with risk reduction behaviors in adults at risk for developing type 2 diabetes. These meaningful statements were then organized into appropriate themes that accurately represented each participant's experience. Each transcript was color coded, and quotes from the interviews were placed appropriately into the themes identified.

### Demographic Data

A total of eight physicians and two NPs participated in the research study. The following table represents the participants' ages and length of experience in primary care.

Table 1

*Participant Age and Years of Experience*

	Age	Experience
Participant 1	30	8 months
Participant 2	54	26 ½ years
Participant 3	50	20 ½ years
Participant 4	42	9 ½ years
Participant 5	44	14 years
Participant 6	40	7 ½ years
Participant 7	44	14 ½ years
Participant 8	53	19 ½ years
Participant 9	34	3 years
Participant 10	32	7 months

### Results

All participants in the study were primary healthcare providers and were employed by the healthcare facility in Northeast Wisconsin where the sample was obtained. The following themes were extracted:

Theme 1: Identification: Who is at risk?

Theme 2: The Intervention: What do we need to do?

Theme 3: Establish Consistency: Continuing to build support

Theme 4: Extenuating Circumstances

*Theme 1: Identification: Who Is at Risk?*

The participants in this study verbalized the importance of identifying adults at risk for developing diabetes prior to onset of disease. All participants identified risk

factors for the development of type 2 diabetes and acknowledged that the majority of risk factors were modifiable lifestyle behaviors. The participants stated that physical features (obesity, age, skin tags, or acanthosis nigricans) and family history were the initial indicators to further investigate the patient's risk for developing diabetes.

Several participants reported that they considered several physical assessment data when they were evaluating an adult at risk for diabetes. Participants stated that family history, previous history of gestational diabetes, and BMI were among the most concerning risk factors for diabetes. Other participants stated that assessing beyond the most common risk factors for diabetes were just as important, such as assessing for metabolic syndrome, thyroid disorders, and hypertension. One participant stated:

I look at a couple different things, if they've got a BMI that's 26 or greater, family history, and/or previous history of gestational diabetes that puts them at a higher risk. Dyslipidemia, for me, that is looking at elevated triglycerides or low HDL. The body habitus, if they have more of that apple core, or the apple shape, versus the classic pear shape. What was the other big one, kind of the things you look at in metabolic syndrome, so elevated blood pressure would be a big thing. An excessive number of skin tags to me means risk factors for diabetes or any of the characteristic rashes that you would expect with diabetes, such as recurrent yeast infections or urinary tract infections.

Participants added that diagnostic measures were a crucial and useful piece to identify adults at risk for developing diabetes. Participants stated they typically use any of the following to support their physical assessment findings: (a) two-hour glucose tolerance test, (b) fasting blood sugar levels, (c) lipid panel, (d) basic metabolic panel (BMET), or (e) urine dip test. One participant further added that he/she relied on

national guidelines and/or expert sources to identify adults at risk. Participants stated that they relied on the education that they received in residency, learning about the ADA criteria and receiving information from the USDA Preventative Task Force, American Family Physician, and continuing medical education.

Healthcare providers are in the unique position to develop relationships with patients that promote risk-reducing behaviors based upon the physical and objective data that they obtain from the patient. Participants stated that it was important to identify adults at risk earlier in adulthood, so that they have better chance at reducing or eliminating the risk of developing diabetes.

*Theme 2: The Intervention: What Do We Need to Do?*

The second theme illustrates how healthcare providers implement a plan of action to help adults reduce their risk for developing diabetes. The participants stated that once they had objective evidence that the patient is at risk for developing diabetes, they needed to provide further support through lifestyle modification and health maintenance education to reduce the risk of developing diabetes.

Participants stated that information about type 2 diabetes prevention was available to support their recommendations for lifestyle changes, but participants said they were not given adequate resources and time to effectively educate their patients. Many participants stated that insurance companies and lack of accessibility to diabetic educators were the biggest factors that limited the amount of education that at-risk adults received, placing greater emphasis on teaching at each visit with primary healthcare providers. The participants stated that teaching risk-reducing behaviors began in the primary healthcare setting. A participant stated that it was important to discuss a healthy diet and what that actually consisted of. That participant commented:

A healthy diet is five servings of fruits and vegetables are what I typically try to recommend to patients, trying to eat smaller more frequent meals. Trying to drink more water because a lot of patients don't drink enough water and that tends to curb people's appetites too, trying to avoid...junk food...

Participants stated it was important to encourage risk-reducing behaviors that were enjoyable and cost-effective. Participants discussed and encouraged activities that their patients would remain compliant with. One participant commented:

I'll ask them what they've tried in the past, anyone who has had a weight problem is aware of it and usually they've tried something .... There's a book out several years ago called "The Idiot's Diet" and the book basically says that if you need to lose weight, do what you did before and lost weight, and there's some truth to that .... You don't need to always reinvent the wheel for people. I do encourage them to do as a baseline exercise program; to walk 30 minutes a day, something that anyone can do most all the time and if they can do that, eventually they can do more than that but I encourage them to do that as a minimum.

Another participant stated:

The exercise thing, so many people are so aware now and I think we have Biggest Loser to thank for that. I mean, it is just amazing how many people are embracing the can-do attitude that they know that they can do it. So at least in my practice I have seen some amazing changes ... with some of the fitness games that are out there. People just, at least in the last 6 months, are going out and having fun with trying to get more fit.

Participants in the study stated that by asking what patients had done in the past was important to individualize risk-reducing behaviors for the plans to be successful.

Tailoring risk-reducing behaviors to meet the needs of each individual proved to be more beneficial. Oftentimes, participants stated that patients needed further follow up after the initial visit to answer questions or reinforce risk reducing behaviors.

*Theme 3: Establishing Consistency: Continuing to Build Support*

A common theme throughout the interviews was that once the risk for potential disease processes was identified and interventions developed, establishing consistency and continuing to build support was crucial to preserve the state of health of the patient. The participants in the study stated that weight reduction had the biggest impact on reducing the risk for developing diabetes in adults. Participants said that it was not important to encourage a specific amount of weight loss but rather, restructure their eating and exercise habits to promote risk-reducing behaviors. The participants stated that establishing consistency with follow-up visits were crucial to the plan of care. Encouraging risk-reducing behaviors that are consistent and supportive to the patient's lifestyle were identified as key steps when reducing/eliminating the risk for developing type 2 diabetes.

Participants stated continuing risk-reducing behaviors was encouraged in adults at risk at each follow-up visit. A participant stated that the goal is always risk-factor modification and getting the patient to work toward their ideal body weight, blood pressure reduction, and dietary modification. Participants stated they will provide patients with written information about pre-diabetes or diabetes and occasionally, if they are interested, send them to the dietician for further monitoring. Participants stated that their approach to establishing a consistent, individualized care plan for successful risk reducing behaviors was essential. One participant stated:

Exercise is the hardest thing, I think, every patient is different in their ability to exercise. We have some patients who have limitations because of arthritis or because of a heart condition or lung problems, so I try to tailor exercise programs to patient's abilities. I am not going to ask a 92-year-old woman to start jogging 3 miles a day but that might be appropriate for somebody who is in their 20s who is a little bit overweight.

Participants said risk-reducing behaviors were not a one size fits all approach; not all patients are motivated to lose a large amount of weight in a short period of time. A participant stated that if they had an unmotivated person, they would recommend losing 10 pounds in 6 months as a reasonable option. Conversely, with a patient who is highly motivated, weight loss of 50 pounds over 6 months is also a reasonable option.

The participants stated that it was important to follow through on the interventions that they recommended. Participants stated both parties (healthcare provider and patient) held accountability to the interventions implemented and allowed for modification of risk-reducing interventions. Continuing to offer support and reinforcing risk-reducing behaviors that are consistent were found to be most beneficial to a successful plan of care. One participant noted:

I usually have people come back initially in 3 months for a weight and see how they're doing. It does two things: it forces them to actually pay attention to the regimen because they are coming back and they have to lose the weight and to see how they are doing activity wise. Depending on how they're doing at that stage, if they are improving and they're being active, I will just see them in another 3 months. If they are not doing anything, then I start trying to push the

nutrition aspect on them to try and get them to see either a diabetic educator or nutritionist.

Some participants stated that their follow up is inadequate, and they need to improve their process of following up with adults at risk for developing diabetes. One participant said:

I should do better on my follow up in terms of having my nurses call back or have them come back in a month. Often, I will put it in my notes that we discussed obesity at the previous visit so that the next time they come in, we make sure we say, so it looks like Mr. Joe we were going to be working on doing the 5,000 steps on the pedometer. How did you do with that?

Participants stated that it was important to continue to offer support and encouragement to adults who are at risk for developing diabetes. Participants would often reiterate pre-diabetes education and draw blood work at each visit to monitor progress. Additionally, participants stated that it was important to be consistent with risk-reducing behaviors and continue to re-evaluate the patient's progress over time, so that long-term risk reduction is stressed and continued.

#### *Theme 4: Extenuating Circumstances*

The last theme describes the circumstances when participants said that they would recommend more than risk-reducing behaviors to prevent or reduce the onset of type 2 diabetes. Extenuating circumstances, as explained by the researcher, provides a description of when participants identified adults at an increased risk for developing diabetes.

Participants stated that only in specific situations would they recommend more than lifestyle modification behaviors to reduce the risk of diabetes. One participant noted:

An example I would use would be a woman, say 50 years old, had gestational diabetes twice during childbearing years, then ends up with a blood sugar that is elevated but not to the diabetic standards or to the cut-off range, and exercise and diet wasn't working, I would start to use metformin earlier to try to stave off, and that pre-diabetes doesn't exist, that impaired glucose tolerance, to try and get them hopefully longer before they end up being officially diagnosed with diabetes.

Another participant stated that there are several reasons to consider enhanced risk-reduction behaviors in adults at risk, adding:

On occasion, and this is mostly for my [polycystic ovarian syndrome] PCOS women, put them on preventative metformin. I don't have much to back me up on that. We're doing it mainly to restore more balanced hormonal balance hopefully than that translates into prevention of diabetes but also prevention of endometrial carcinoma, improvement of fertility scores, and things like that, but that's the one circumstance where I have repeatedly put people on medication in addition to lifestyle management in order to help prevent diabetes.

Participants in the study stated that there were extenuating circumstances beyond physical and diagnostic assessment to warrant further risk-reducing behaviors to prevent diabetes. Some participants stated that Metformin, as a treatment modality for women with a history of PCOS and gestational diabetes is not clearly recommended for the treatment of diabetes prevention.

## Discussion

When comparing the themes identified in this study with existing literature, similarities were noted. The theme *The Intervention: What Do We Need to Do?* is consistent with Gavi and Hensley (2009) and the effectiveness of behavioral lifestyle modification strategies to prevent or delay the onset of type 2 diabetes in adults. Gavi and Hensley identified specific lifestyle strategies to reduce the risk of diabetes, just as the participants of the study provided specific examples to help their patient reduce their risk of developing diabetes.

Jallinoja et al. (2008) performed a qualitative study that explored the experiences of individuals who were involved in a lifestyle modification program during and after a type 2 diabetes prevention intervention program. Lifestyle programs aimed at reducing caloric intake of fat, increasing fiber intake, participating in 30 minutes a day of moderate physical activity, and achieving a 5% weight reduction have shown to decrease the risk for developing type 2 diabetes. The theme *The Intervention: What Do We Need to Do?* is consistent with these activities. The theme supports the recommended lifestyle changes to encourage and motivate individuals to implement the risk-reducing behaviors that will reduce their chances of developing type 2 diabetes.

Qureshi and Kai (2008) evaluated the effectiveness of physician advice in reinforcing health-promoting activities in adults with a familial risk for diabetes. This is supported by the theme *Establishing Consistency: Continuing to Build Support*. Emphasis in diabetes prevention has become the focus for primary healthcare providers, since cost-reducing initiatives may prevent referrals to other healthcare providers, such as licensed dieticians, to help at-risk adults reduce their potential for developing type 2 diabetes.

Miller and Davis (2005) examined the experiences of adults with type 2 diabetes and the role of social support in diabetes management. Miller and Davis found social support was defined as having positive interactions with family members (spouse, child, sibling), co-workers, or healthcare professionals. Social support acted as a buffer, protecting individuals from potentially harmful or stressful life events that could have led to lifestyle and medication non-compliance. Miller and Davis reported encouraging evidence that linked social support and glycemic control with a decreased risk for morbidity and mortality otherwise increased by diabetes. The theme *Establishing Consistency: Continuing to Build Support*, identified in the current study, is comparable to what Miller and Davis found. Having consistent support with risk-reducing behaviors is believed to promote a healthier lifestyle while reducing the risk of developing diabetes. Reinforcing support can help adults develop lifestyle habits to reduce their risk of developing type 2 diabetes on a long-term basis.

The themes identified in the study relate to the HPM, which builds upon multidimensional characteristics of individuals' engagement within their own environment while pursuing a state of health. The HPM illustrates a collaborative relationship between the healthcare provider and the individual that promotes holistic human functioning. The HPM is based on the assumption that emphasis is placed on an active role by the client to shape and maintain health behaviors, while modifying the environment to promote these behaviors. One participant stated that you do not have to reinvent the wheel when implementing risk-reducing behaviors, noting it is better to find something that has worked in the past and try to model that behavior again. Participants stated that reducing the risk for diabetes is a lifestyle change that is a work in progress. Participants stated that some adults at risk need motivation to change, whether it is the

patient's own desire or the healthcare provider's recommendation, the behavior needs to be modified. Once the adult at risk understands the need for lifestyle changes, he/she will be able to make the decision to implement behaviors to reduce the risk of developing type 2 diabetes.

### Summary

In this chapter, the interview process used for this study was described. Four themes emerged from the data: *Identification: Who Is at Risk*, *The Intervention: What Do We Need to Do*, *Establishing Consistency: Continuing to Build Support*, and *Extenuating Circumstance*. These themes were described and supported with quotes from participants. The study results were compared to previous literature and Pender's (2006) HPM.

## CHAPTER V

### SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

#### Introduction

The purpose of this study was to explore how primary healthcare providers identify and intervene with risk reduction behaviors in adults at risk for developing type 2 diabetes mellitus. In this chapter, the researcher will discuss the findings of the study as well as the implications for nurses and nurse educators for reducing the risk of developing type 2 diabetes. Lastly, recommendations for further research will be provided.

#### Summary of Study Findings

Eight physicians and two NPs were interviewed using open-ended interviewing. The participants were asked to describe the approaches used to identify and intervene with adults at risk for developing type 2 diabetes in the primary care setting. That data analysis revealed four themes: *Identification: Who Is at Risk*, *The Intervention: What Do We Need to Do*, *Establishing Consistency: Continuing to Build Support*, and *Extenuating Circumstances*.

The themes that emerged in this study described how healthcare providers identify adults at risk for developing type 2 diabetes and intervene with risk-reducing behaviors in the primary care setting. Early identification of adults at risk and intervening with risk-reducing behaviors has shown to significantly reduce the risk of developing type 2 diabetes. The first theme, *Identification: Who Is at Risk*, described how physicians and NPs identify adults at risk. Healthcare providers in this study used their assessment skills to appropriately identify adults at risk based upon the personal/family history and physical assessment of the patient. Participants stated that identifying adults at risk for

diabetes included multiple factors, such as family history, obesity, age, and history of gestational diabetes.

Once the participants in the study identified adults at risk, they stated it was important to begin the process of lifestyle modification to prevent the onset of type 2 diabetes. Subsequently, the second theme, *The Intervention: What Do We Need to Do*, addressed how healthcare providers presented a plan to implement risk-reducing behaviors with patients. The third theme, *Establishing Consistency: Continuing to Build Support*, addressed what the participants did to individualize care plans for each adult. Once risk-reducing behaviors were identified, participants stated that it was important to continue to re-evaluate the patient's progress and reinforce risk-reducing behaviors by having patients follow up at specified intervals. This follow up allowed the healthcare providers to continue to monitor the progress of lifestyle modifications and provide support for the patients' behaviors.

In the last theme, *Extenuating Circumstances*, healthcare providers described circumstances when typical risk-reducing behaviors were considered inadequate measures to prevent the risk of developing type 2 diabetes. Although healthcare providers described unique circumstances, such as a history of PCOS or more than two pregnancies with gestational diabetes, they found it appropriate to treat presumptively for diabetes. Participants noted it was necessary to consider all risk factors that could lead to the development of type 2 diabetes, and sometimes the typical measures were not adequate.

Participants in this study used in-depth assessment techniques to identify and intervene with risk-reducing behaviors in adults at risk for the development of type 2 diabetes. In order to prevent diseases such as diabetes, collaborative efforts of

healthcare providers and patients are necessary to improve quality of life and alleviate financial burden on the individual and society. Participants emphasized that it was important to be consistent with health assessment techniques and risk-reducing interventions to assist patients in reducing their risk of developing type 2 diabetes.

### Implications for Nursing and Nursing Education

The findings from this study have important implications for nursing practice. The rising incidence of type 2 diabetes will continue to place financial and other burdens on society. Primary healthcare providers use physical assessment and diagnostic tools to identify adults at risk for diabetes. The primary healthcare providers in this study had an understanding of identification, assessment, diagnosis, and planning for further prevention of type 2 diabetes in adults at risk, but graciously admit they need further support.

The implications for future advanced practice nurses are to continue to build support in their daily practice by using national guidelines and/or expert sources, such as the ADA, to assist them to identify and implement risk-reducing behaviors in adults at risk for developing type 2 diabetes. Advanced practice nurses could schedule follow up appointments that will allow sufficient time to teach adults at risk for developing type 2 diabetes. Implications for nurse educators are to increase healthcare providers' awareness of the predisposing factors, (obesity, family history, previous history of gestational diabetes) that may lead to adults developing type 2 diabetes. Nurse educators could implement national guidelines earlier in nursing programs and continue to reinforce these guidelines throughout the program.

### Recommendations for Future Research

The following are recommendations to consider for future research that will aid in the prevention and reduction of diabetes in at-risk adults.

1. Initiate a tailored lifestyle modification program from an expert source (ADA) that will allow each adult to follow a specific plan that is aimed to reduce the risk of developing diabetes. This could be implemented at a primary healthcare facility over a 6-month period to evaluate the effectiveness of tailored lifestyle modification programs.
2. Establish a diagnosis protocol using supporting ICD-9 codes for adults at risk for developing type 2 diabetes that justifies shorter time periods for follow-up visits with healthcare providers. Initiate a comparative study that will analyze the cost/benefit ratio assessing the potential benefits of spending more time educating patients about diabetes prevention.

### Summary

Eight physicians and two NPs from a primary healthcare facility in Northeast Wisconsin participated in this study. Open-ended interview were done to collect data from the participants regarding their experience identifying and intervening with risk-reducing behaviors in adults at risk for developing type 2 diabetes. The data analysis revealed four themes that included: *Identification: Who Is at Risk, The Intervention: What Do We Need to Do, Establishing Consistency: Continuing to Build Support, Extenuating Circumstances*. Nursing education and practice are essential to support primary healthcare initiatives to reduce the risk of developing type 2 diabetes and alleviate financial and other burdens on society.

In this chapter, a summary of study findings was presented, further explaining the themes identified during data analysis. Implications for nursing practice and nursing education were addressed as they relate to this study. Recommendations for future research were identified.

APPENDIX A  
Interview Guide

1. How do you identify adults who are at risk for type 2 diabetes mellitus?  
(Do they consider family history, personal history [gestational diabetes], obesity, physical inactivity, race, age)
2. What physical assessment tools or techniques do you use to identify those at risk for type 2 diabetes? (Monofilament test, foot exam, weight/BMI, blood pressure control, annual eye exam)
3. What diagnostic tools do you use to identify those at risk for type 2 diabetes?  
(hemoglobin A1C, basic metabolic panel, urine for microalbuminuria, glucose tolerance test)
4. Are there any national guidelines or expert sources that you use to support your process of identifying adults at risk for type 2 diabetes? (Centers for Disease Control; National Institutes of Health, Diabetes Prevention Program, American Diabetes Association)
5. When you identify a patient at risk for developing type 2 diabetes what do you do? (diet/exercise recommendations)
6. When you recommend risk reducing interventions, explain to me how you follow up? (When should they return to the clinic for re-evaluation)
7. What type of goals do you set with your patient at risk for developing type 2 diabetes?
8. What kind of counseling or support do you offer an adult at risk for developing type 2 diabetes?
9. Can you explain circumstances when you would recommend more than lifestyle modification to prevent or delay the onset of type 2 diabetes in at-risk adults?  
(What would you recommend)

APPENDIX B  
Informed Consent for Participants

University of Wisconsin Oshkosh  
Primary care approaches to preventing type 2 diabetes mellitus in adults  
INFORMED CONSENT

**Introduction**

You are invited to participate in a research study called, "Primary care approaches to preventing type 2 diabetes mellitus in adults." The purpose of this study is to explore how primary healthcare providers (physicians/nurse practitioners) identify and intervene with risk reduction behaviors in adults at risk for developing type 2 diabetes mellitus. The researcher will examine how healthcare providers identify adults at risk through physical/diagnostic assessment and how they implement risk reduction behaviors. This study will be conducted by Danielle L. Vanevenhoven, BSN, a student in the Family Nurse Practitioner Master's Degree Program at the University of Wisconsin Oshkosh College of Nursing, under the supervision of Sharon Chappy, RN, PhD, CNOR of the University of Wisconsin Oshkosh. Your participation would be appreciated.

**Selection**

Primary healthcare providers from Northeast Wisconsin are invited to participate in the study.

**Procedures**

The researcher will conduct a tape recorded interview that will be conducted privately in an office or a conference room. The interview will last approximately 30-60 minutes. Each participant will respond to several questions asking about approaches used to identify and intervene with risk reducing behaviors in adults at risk for developing type 2 diabetes.

**Participation**

Participation in this project is voluntary. Participants will choose an office or conference room at the affiliated healthcare facility that allows for privacy and limited interruption.

**Benefits**

While you may expect no direct benefits by participating in this study, the information obtained may be useful scientifically and helpful to others in the future. It is believed that your participation in this study will help physicians and nurse practitioners better understand the approaches used to identify and intervene with risk reducing behaviors in adults who are at risk for developing type 2 diabetes.

**Risks**

The anticipated risks of participation in this study could be peer evaluation/criticism of your practice or extended participation time of interview.

**Confidentiality**

Information you provide in this study will be kept confidential. All transcripts will be assigned a code so that participants cannot be identified on the transcripts. When the results of the study are published or shared, only aggregate data will be used. All information will be destroyed by shredding paper documents and deleting tape recorded interviews when the study is completed. Informed consent documents will be locked in a filing cabinet and kept separate from the transcripts that will be locked in a safe. Only Ms. Vanevenhoven and Dr. Chappy will have access to this information. University of Wisconsin Oshkosh Institutional Review Board may need to have access to collected data, in accordance with state and federal agencies.

**Right to Refuse, Withdraw, or Ask Questions**

Participating in this study is completely voluntary, and you may withdraw from the study and stop participating at any time without penalty. Also, you may choose not to answer any questions that

make you uncomfortable. You are able to have all your questions answered before signing this form, and you may ask any future questions by contacting Ms. Vanevenhoven or Dr. Chappy at:

Danielle L. Vanevenhoven, BSN  
University of Wisconsin Oshkosh  
College of Nursing-Graduate Studies  
800 Algoma Blvd.  
Oshkosh, WI 54901  
vanevd04@uwosh.edu or (920) 470-3993

Dr. Sharon Chappy, RN, PhD, CNOR  
University of Wisconsin Oshkosh  
College of Nursing-Graduate Studies  
800 Algoma Blvd.  
Oshkosh, WI 54901  
chappy@uwosh.edu or (920) 424-2125

If you have any concerns about your treatment as a participant in this study, please call or write:

Chair, Institutional Review Board for Protection of Human Participants  
c/o Grants Office  
UW Oshkosh  
Oshkosh, WI 54901  
(920) 424-1415

Although the chairperson may ask for your name, all complaints are kept in confidence.

This study has been explained to me by the following person(s):

---

(Principal investigator)

---

(Signature of principal investigator)

(Telephone)

(Date)

I, \_\_\_\_\_, have had the opportunity to read this consent form, ask questions about the research project and are prepared to participate in this project.

---

(Signature of Participant)

(Date)

I, \_\_\_\_\_, agree to a tape recorded interview.

---

(Signature of Participant)

(Date)

This research project has been approved by the University of Wisconsin Oshkosh Institutional Review Board for Protection of Human Participants. All data collected during the study will be retained for a period of one year after approval.

APPENDIX C

University of Wisconsin Oshkosh IRB Approval Letter



Ms. Danielle Vanevenhoven  
102 Fairway St.  
Combined Locks, WI 54113

Dear Ms. Vanevenhoven:

On behalf of the UW Oshkosh Institutional Review Board for Protection of Human Participants (IRB), I am pleased to inform you that your application has been approved for the following research: Primary Care Approaches to Preventing Type 2 Diabetes Mellitus in Adults.

Your research has been categorized as NON-EXEMPT, which means it is subject to compliance with federal regulations and University policy regarding the use of human participants as described in the IRB application material. Your protocol is approved for a period of 12 months from the date of this letter. A new application must be submitted to continue this research beyond the period of approval. In addition, you must retain all records relating to this research for at least three years after the project's completion..

Please note that it is the principal investigator's responsibility to promptly report to the IRB Committee any changes in the research project, whether these changes occur prior to undertaking, or during the research. In addition, if harm or discomfort to anyone becomes apparent during the research, the principal investigator must contact the IRB Committee Chairperson. Harm or discomfort includes, but is not limited to, adverse reactions to psychology experiments, biologics, radioisotopes, labeled drugs, or to medical or other devices used. Please contact me if you have any questions (PH# 920/424-7172 or e-mail: rauscher@uwosh.edu).

Sincerely,

Dr. Frances Rauscher  
IRB Chair

cc: Sharon Chappy  
1705

INSTITUTIONAL REVIEW BOARD  
UNIVERSITY OF WISCONSIN OSHKOSH • 800 ALGOMA BLVD • OSHKOSH WI 54901  
(920) 424-3215 • FAX (920) 424-3221

## REFERENCES

American Academy of Family Physicians. (2010). Primary care.

<http://www.aafp.org/online/en/home/policy/policies/p/primarycare.html#Parsys0002>

American Diabetes Association. (2009). Diabetes basics.

<http://www.diabetes.org/diabetes-basics/>

Boylan, M. (2006). Part 1: Dietary and lifestyle factors in the management of type 2 diabetes mellitus. *Journal of the Australian Traditional-Medicine Society*, 12, 189-193.

Centers for Disease Control and Prevention. (2009a). *Diabetes public health resource*.

Retrieved July 9, 2009 from <http://www.cdc.gov/diabetes>

Centers for Disease Control and Prevention. (2009b). *Diabetes & me*. Retrieved July 9, 2009 from <http://cdc.gov/diabetes/consumer/index.htm>

Chan, J. L., & Abrahamson, M. J. (2003). Pharmacological management of type 2 diabetes mellitus: Rationale for rational use of insulin. *Mayo Clinic Proceedings*, 78, 459-467.

Clark, C. M., Gavin, J. R., Blonde, L., & Warren-Boulton, W. (2006). Preventing type 2 diabetes requires practitioner involvement. *Biomechanics*, 51-58.

Cook, M. N, Girman, C. J., Stein, P. P., & Alexander, C. M. (2007). Initial monotherapy with either metformin or sulphonylureas often fails to achieve or maintain current glycaemic goals in patients with type 2 diabetes in UK primary care. *Diabetic Medicine*, 24, 350-358.

- Fitzner, K., Greenwood, D., Payne, H., Thomson, J., Vukovljak, L., McCulloch, A., & Specker, J.E. (2008). An assessment of patient education and self-management in diabetes disease management. *Population Health Management, 11*, 329-340.
- Gavi, S., & Hensley, J. (2009). Diagnosis and management of type 2 diabetes in adults: a review of the ICSI guideline. *Geriatrics, 64*, 12-29.
- Jallinoja, P., Pajari, P., & Absetz, P. (2008). Repertoires of lifestyle change and self-responsibility among participants in an intervention to prevent type 2 diabetes. *Nordic College of Caring Science, 22*, 455-462.
- Koenigsberg, M. R., Bartlett, D., & Cramer, J. S. (2004). Facilitating treatment adherence with lifestyle changes in diabetes. *American Family Physician, 69*, 309-316.
- Laaksonen, D. E., Lindstrom, J., Lakka, T. A., Eriksson, J. G., Niskanen, L., Wikstrom, K., et al. (2005). Physical activity in the prevention of type 2 diabetes: The Finnish Diabetes Prevention Study. *Diabetes, 54*, 158-165.
- Laifer, S. (2005). New findings on fiber: Research confirms benefits of fiber for weight loss, lower cholesterol, and reduced blood glucose. *Life Extension, 11*, 34-41.
- Lakerveld, J., Bot, S., Chinapaw, M.J., Van Tulder, M.W., Van Oppen, P., Dekker, J. M., et al. (2008). Primary prevention of diabetes mellitus type 2 and cardiovascular diseases using a cognitive behavior program aimed at lifestyle changes in people at risk: Design of a randomized controlled trial. *BMC Endocrine Disorders, 8*, 1-11.
- Mayo Clinic (2009). *Career exploration*. Retrieved December 20, 2009 from <http://www.mayoclinic.org/careerawareness/ce-nursepract.html>
- Merriam-Webster (2009). *Webster's collegiate dictionary*. Retrieved July 14, 2009 from <http://www.m-w.com>.

- Milat, A. J., O'Hara, B., & Develin, E. (2009). Concepts and new frontiers for development-what role should health promoters play in lifestyle-based diabetes prevention programs in Australia. *Health Promotion Journal of Australia, 20*, 86-91.
- Miller, C. K., & Davis, M. S. (2005). The influential role of social support in diabetes management. *Topics in Clinical Nutrition, 20*, 157-165.
- National Institutes of Health. (2009). *Type 2 diabetes fact sheet*. Retrieved July 15, 2009 from <http://nih.gov/about/researchresultsforthepublic/Type2Diabetes.pdf>.
- Pender, N. J., Murdaugh, C. L., & Parsons, M. A. (2006). *Health promotion in nursing practice* (5th ed.). Upper Saddle River: Prentice Hall.
- Polit, D. F., & Beck, C. T. (2008). *Nursing research: Generating and assessing evidence for nursing practice*. (8th ed.). Philadelphia: Lippincott Williams & Wilkins.
- Qureshi, N., & Kai, J. (2008). Informing patients of familial diabetes mellitus risk: How do they respond? A cross-sectional survey. *BMC Health Services Research, 8*, 1-8.
- Rice, C. A. (2005). Prevention: The most economical way to manage diabetes. *Nursing Economics, 23*, 327-329.
- Uphold, C. R., & Graham, M. V. (2003). *Clinical guidelines in family practice*. (4<sup>th</sup> ed.). Gainesville, FL: Barmarrae Books.