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Awareness of Diabetes Risk Associated with Individuals 18 and Older

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This is to certify that the doctoral study by

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Abstract

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by

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Project Submitted in Partial Fulfillment

of the Requirement of the Degree of

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Abstract

The risk of developing Type 2 diabetes is increasing at epidemic proportions, and is 12-17% higher in Marion County Florida than it is across the state, based on Florida Department of Health statistics. The purpose of this DNP project was to determine if awareness of individual risk of developing Type 2 diabetes through a questionnaire would result in high-risk participants agreeing to attend a diabetes prevention program (DPP) at a local medical clinic. The health belief model and Rosswurm and Larrabee's model for change were used as frameworks. The review of the literature showed that prevention programs were highly effective in reducing the risk of developing diabetes. A validated diabetes risk questionnaire was placed at reception desks at 3 clinic sites. Forty-four anonymous participants completed the questionnaire. The convenience sample obtained from the questionnaire provided a score that categorized individuals into a high-risk and a low-risk group. Quantitative data from the participants were analyzed using descriptive statistics. Twenty-one of the participants indicated they were at high risk of developing diabetes. Ninety-five percent of those who received a high-score on the diabetes risk questionnaire responded that they would be interested in participating in a DPP at a local medical clinic. As a result of the DNP project completion, a DPP with the goal of reducing the risk of developing Type 2 diabetes will be implemented in the Marion County medical clinic. Future collaboration with health care and community organizations will assist to expand DPP's, bring awareness of diabetes risk, and promote social change.

Awareness of Diabetes Risk Associated with Obesity in Individuals Age 18 and Older

by

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Dedication

I would like to thank my friends and family, who have supported me throughout my academics and motivated to me achieve what I have so far.

Acknowledgments

I, Rebecca Boone, would like to declare that all the material of this study is solely my own work that has been performed without any aid. This work had not been submitted previously at any academic or professional level. The views represented in this study are my own and not those associated with Walden University. I would like to pay my wholehearted gratitude to Dr. Harris, my project chair, for the unlimited guidance, committee member Dr. Bell, and my mentor, Dr. Vesely, whose immense support has been a foundation of continuous inspiration and guidance.

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Section 1: Introduction to the Study

The foundation of any research resides in the topic that is being studied. It is essential to develop an understanding of the background of the research that has resulted in my motivation for selecting the topic. The background of the study, based on the prevalence of obesity, is presented in this section. This section also includes information regarding obesity and diabetes, and the significance of the lifestyle programs to reduce the risk of Type 2 diabetes development. The aim and objectives of the change project were also provided followed by the project question. The purpose of the project has been discussed to develop an understanding of the project being performed. The significance of this study has also been provided besides the outline of the study.

Background of the Study

According to the Institute of Medicine (IOM, 2013), obesity is one of the greatest challenges to society and public health. "Over a third of U.S. adults are obese (defined by a BMI > 30), and over 11% of people aged >/20 years have diabetes" (Eckel et al., 2011, p. 1655). Worldwide adaptation of sedentary lifestyles and unhealthy eating habits resulted in the rapid growth of obesity (Hill et al., 2013). Obesity is the leading factor contributing to the increase in Type 2 diabetes, in the United States (Eckel et al., 2011). Evidence-based lifestyle intervention programs involving behavior modification can result in successful weight loss and reduction of obesity as well as the risk of Type 2 diabetes (Beaser & Jackson, 2010; Holman et al., 2008; Jakicik et al., 2012; Piatt, Seidel, Powell, & Zgibor, 2012).

Obesity is an increase in the BMI of an individual of up to 30 kg/m^2. It results as a consequence of the chronic imbalance of calories due to the consumption of calories more than the normal amount required by the body. Numerous factors play a key role in the development of obesity. History of obesity, metabolism, socioeconomic status, hereditary factors, behavior, environment, and culture are the important factors that are related with the increased prevalence of obesity (Burdge, 2013). There is a strong association between obesity in adults with childhood and adolescent obesity (IOM, 2012). It has been observed that most of the obese adults had also been obese during their adolescence. Similarly, those individuals who were obese during adolescence were also obese in their childhood, which predisposes them to the risk of Type 2 diabetes (Rooney et al., 2011).

Obesity is not only a public health concern in itself, but is also related with the incidence of several other health problems including cardiovascular diseases, diabetes mellitus, increased level of cholesterol, and high blood pressure (Hossain, 2007). Sleep apnea and shortness of breath can also be caused by obesity (Kirkman et al., 2012). Psychological impacts of obesity are also significant as obese individuals develop lower self-esteem due to the negative image of their body (Dodani & Fields, 2010). This is also related with stigmatization and social discrimination of the obese individuals that must be addressed for improving the quality of life of obese people (Karnik & Kanekar, 2012).

The term Type 2 diabetes was earlier recognized as noninsulin dependent diabetes mellitus that is a preventable and predominant type of disease that accounts for 90-95% of diabetes in the United States (Holman et al., 2008). It is linked traditionally with

physical inactivity, family history of diabetes, older age, and obesity (IOM, 2012). It occurs in all ages and ethnic groups, including African-Americans, Hispanics, and south Asians (Hossain, 2007; Marshall, 2005). With an emerging obesity epidemic, Type 2 diabetes continues to rise in all ethnicities and age groups, thus, predisposing them to the risk of Type 2 diabetes mellitus (Evans, 2010).

From the combination of insulin deficiency, Type 2 diabetes occurs due to an inadequate production of insulin by the cells of pancreas along with insulin resistance, as well as insufficient use of insulin available by the cells (National Institute of Diabetes, 2008). The production of insulin at the onset of Type 2 diabetes is adequate; but, due to increased resistance of insulin, the cells of the body do not effectively employ the insulin available, hence resulting in hyperglycemia (Beaser & Jackson, 2010; Zhou, Zhang, & Hoeger, 2013). The pancreas for dealing with the elevated blood glucose levels produces more insulin (Boyle et al., 2010). This causes starvation of energy by the cells resulting in production of signals. The production of the process of hepatic glucose additionally increases the levels of blood glucose (Beaser & Jackson, 2010). It is considered that the liver may become resistant to insulin, thus decreasing the uptake of blood glucose and restricting sensitivity to glucose (2010). The prolonged over working of pancreatic â cells leads to decreased production of insulin and decreased functioning that might consequently lead to the requirement of insulin therapy (Burdge, 2013).

Lifestyle is an important aspect of the human life as most of the health related problems are a consequence of the lifestyle that is adopted by the individuals. Lifestyle is the way in which a person performs daily activities (Hill et al., 2013; Kramer et al.,

2011). Sedentary lifestyle defined, as one with irregular or no physical activity is one of the major factors that are responsible for the increased prevalence of obesity, which consequently leads to the development of Type 2 diabetes (Madden, Loeb, & Smith, 2008). Variations in the lifestyle related to work like automation and mechanization in the workplace has made the population more vulnerable to obesity (Cheong et al., 2010).

Working environment has influenced physical activity and dietary patterns of the workers (Quintiliani et al., 2010). Large proportion of the time spent at work involved in sedentary activities like sitting during work and reduced activity has significantly contributed to the development of obesity among the population of developed countries like the U.S (Boyle et al., 2010). These changes in the physical activity of the people due to modernization have played an important role in the prevalence of obesity (Cheong et al., 2010). There are evidences that suggest that there is an association of lifestyle with the development of obesity and subsequently it is related with an increased risk of Type 2 diabetes mellitus in the obese individuals (Absetz et al., 2007).

Various lifestyle intervention based programs have been developed for reducing the risk of Type 2 diabetes in obese individuals. It has been observed that there is a decrease of approximately 58% in the individuals with risk of Type 2 diabetes in the group that received lifestyle intervention as compared to the control group (Tuomilehto et al., 2001). The basis for the lifestyle program has been presented by the CDC (2011) that suggests that there must be a change in the lifestyle of the obese individuals for preventing the risk of Type 2 diabetes.

These variations in the lifestyle must include the development of knowledge regarding the development of healthy habits of eating (Brug, Oenema, & Ferreira, 2005). It also includes improvement in physical activities to reduce weight and learn the basics of healthy diet. These interventions are based on the realization and recognition of the facts that are related with the knowledge of a diet that is healthy for the individual and must be consumed (Kramer et al., 2011; Ma et al., 2013). It also involves addressing the barriers that are presented in the way of healthy eating and increased physical activities. The major focus of these programs is dependent on the change in habits and the provision of support to the obese individuals to remain adherent to healthy lifestyle (CDC, 1996; Kramer et al., 2011; Ma et al., 2013).

Statement of the Problem

The epidemic of obesity and Type 2 diabetes continues to grow (ADA, 2013). Members of the healthcare community as well as the public continue to acknowledge awareness of the growing burden to society and the economy that is associated with obesity and Type 2 diabetes (Dormandy, 2008; Florida Department of Health of Marion County Well Florida Council, 2012). The gap in practice that the project addressed was availability of lifestyle programs, individuals risk, awareness, and if at high risk would attendants agree to participate in a risk reduction program in the medical clinic.

The increased prevalence of obesity in the United States has resulted in the requirement for performing an assessment of the risk of development of Type 2 diabetes in obese individuals (Jakicik et al., 2012; IOM, 2013). Considering the association of obesity with the risk of Type 2 diabetes, it is essential to determine the relation of

lifestyle factors with this phenomenon (Kazak, 2013). There is a rise of the need for the development of a program that can reduce the risk of Type 2 diabetes development in obese individuals (FDHMC, 2013). It is also important to bring awareness of risks to individuals and the community to emphasize the importance of improving health and lifestyle habits. The benefits obtained from improving the quality of health and lifestyle of the obese individuals can be improved by eliminating his or her risk of Type 2 diabetes (ADA, 2013; Hill et al., 2013; WHO, 2013).

Purpose of the Project

Lifestyle programs are based on the interventions that are aimed at increasing physical activities and loss of weight because these factors are involved in the reduction of risk of Type 2 diabetes (McTigue, 2009). They are targeted at the reduction of development of disease through the management of lifestyle (Ma et al., 2013). The purpose of the DNP project is to bring awareness of risk of developing Type 2 diabetes and provide access to a risk-reducing program in our heart and internal medicine clinic. Preliminary assessment of the target population was performed by review of the Florida Department of Health Marion County (FDOHMC) needs assessment compiled in 2012.

The health assessment included data on age, race, ethnicity, socioeconomic status, morbidity, and mortality (FDOHMC, 2012). One-third of adults over the age of 18 were overweight or obese. Type 2 diabetes was diagnosed annually at a rate of 12% to 17% higher than reported from the rest of the state (Florida Department of Health Marion County, 2013). Local physicians concurred that obesity and Type 2 diabetes were in the top 5 contributors to disease and mortality. Marion County ranks 9% higher

than the overall state mortality rate. Contributing factors include an estimated 1 in 3 Medicare patients has diabetes, one-third of the population is over 50 years of age, and a higher than the state average of individuals living at or below the poverty level. In addition to obesity, other contributing factors to type 2 diabetes in Marion County, Florida, included the following: 41% of adults have hyperlipidemia, 38.5% suffer from hypertension, 26% of the population is on Medicare, 25% is on Medicaid, and 24% of the population is uninsured (FDHMC, 2013).

Aim and Objectives of the Change Project

The aim and objective of this project was to bring awareness of the risk of developing Type 2 diabetes and provide access to a prevention program.

Project Question

Will obese individuals age 18 and older who are at high risk of developing Type 2 diabetes based on a Diabetes Risk Assessment attend a prevention program in the Marion County medical clinic?

Significance of the Project

Obese individuals benefit from participation in a lifestyle prevention program reducing the risk of developing Type 2 diabetes (CDC, 2012; Kramer et al., 2012). Associated long-term complications such as myocardial infarctions, stroke, kidney disease, blindness, hypertension, poor wound healing, infection, and death can also be prevented through lifestyle modification that reduce risk of both obesity and Type 2 diabetes (Kirkman et al., 2012). Awareness of individual risk of developing Type 2 diabetes through completion of a diabetes risk assessment would influence participation

in a diabetes prevention program (IOM, 2013). Determining health priorities of the population and willingness to change behaviors must be evaluated before a plan for change can be implemented (Hodges & Videto, 2011). Gathering data through performing a diabetes risk assessment would further determine if a risk-reducing program would be implemented in the medical clinic.

Definition of Terms

Obesity: An increase in the BMI of an individual of up to 30 kg/m^2 (Rooney et al., 2011).

Type 2 diabetes: The reduction of insulin due to development of insulin resistance by the pancreatic cells (National Institute of Diabetes, 2008).

Lifestyle programs: Such programs are dependent on the interventions that are intended to escalate the physical activities and reduce the BMI of a person because these factors are implicated in the decline of risk of type 2 diabetes (Ma et al., 2013).

A1C: Otherwise known as the glycohemoglobin level and refers to the two to three month control average of glucose that is measured quarterly (Beaser & Jackson, 2010; Shay, Shobert, Seibert, & Thomas, 2009).

Blood pressure (BP): Pressure in the arteries when the heart contracts and relaxes (Jarvis, 2008, Shay et al., 2009).

Body mass index (BMI): The relationship between weight and height calculated for associated health risk. Weight in kilograms/height in meters (CDC, 2012; Shay et al., 2009).

Cardiac risk factors: Hyperglycemia, hypertension, and hyperlipidemia that may increase the risk of heart attack, stroke, or death (CDC, 2012; Zitkus, 2012).

Diabetic fasting glucose: Greater than or equal to 125, a random glucose over 200, or anA1C greater than or equal to 6.5 (ADA, 2013; Shay et al., 2009).

Fasting blood glucose: A blood glucose level drawn 8 after no caloric intake (Shay et al., 2009).

Normal blood glucose: Level is less than 100 and more than 70 is normal (ADA, 2013;

Shay et al., 2009).

Fitness coach: A certified trainer volunteering to participate in the start-up program

(Kirkman et al., 2012).

Homogeneity: The degree to which one individual population resembles another in regards to characteristics being studied (Terry, 2012).

Hyperglycemia: Blood glucose or blood sugar over a determined normal level (ADA,

2013; Shay et al., 2009).

Impaired fasting blood glucose: A level of 100 to and including 125 (Bakerman, 2002;

Shay et al., 2009).

Normal A1C: Less than 5.7 (ADA, 2013; Shay et al., 2009).

Obesity: A BMI greater than 29.5 (CDC, 2012; Shay et al., 2009).

Prediabetes: An A1C of 5.7 to 6.4, impaired fasting glucose, or an impaired glucose tolerance test (ADA, 2013; Zitkus, 2012).

Post-prandial glucose: Reading is a glucose reading taken two hours after a meal (Bakerman, 2002; Zitkus, 2012).

Random glucose: A glucose level taken any time of day or night to monitor level (Bakerman, 2002; Zitkus, 2012).

Outline of the Study

This section was a discussion of the background, which formed the basis for the study. The statement of problem along with the purpose for performing this project was also provided to justify the selection of the particular topic. This section also provided the aim and objectives of the change project to present an outline of the study. The project question and significance of the research were also discussed.

Section 2 is a literature review that involved an assessment of the studies that are related to risk of Type 2 diabetes in the obese individuals. It includes the model of change to determine if individuals would be motivated to attend a lifestyle balance program to reduce the risk of Type 2 diabetes in obese people. Chapter 3 is an explanation of the methodology used for performing this research was presented in this section. It also included the strategy used for sampling followed by the inclusion and exclusion criteria of the study. The process of implementation of the proposed project was also presented. Recruitment of the participants and the ethical considerations of the project were also discussed in this section.

The results of the study are presented in section 4 and based on data analysis of a convenience sample. Results regarding the interest and potential attendance of a lifestyle balance program for reducing the risk of Type 2 diabetes in obese individuals age 18 and older are presented. Implications to practice, research and social impact as well as social implications, and limitations of study are discussed. An analysis of personal growth, self as a professional and practitioner, as well as planner of current project and developer of future practice improvement are included. Appendix C is the diabetes risk assessment algorithm. Section 5 is an executive summary of the project that contains the synopsis of the findings. It also provides the recommendations for further research and implementation of this project in to society.

Summary

The individual's perception of the ability to overcome illness or disease based on beliefs can occur through successful behavioral modifications (Deavenport et al., 2010). Collaborative members of the healthcare team, patients, and community provide guidance to determine an interest in attending a prevention program (Ma et al., 2013). Reduction of obesity and risk of Type 2 diabetes leads to wellness, healthy weight maintenance, active lifestyle, as well as a reduction in the overall cost to socioeconomic infrastructure of the community (Kramer et al., 2011). Stakeholders with accessibility to the services and knowledge of programs available will have healthier outcomes. Research supports the implementation of a modified Group Lifestyle Balance (GLB) program to promote glycemic control, decrease obesity along with risk factors associated with development of Type 2 diabetes (Piatt et al., 2013; Seidel et al., 2008). The

appropriateness of implementing a prevention program in the medical clinic will be determined through feedback of obese individuals age 18 and older that participate in the diabetes risk assessment.

Section 2: Literature Review

Literature was important for developing an understanding of the topic, which was being studied in the research. A review of the literature is provided in this chapter, which includes the discussion regarding the prevalence of obesity and the current lifestyle programs for reducing the risk of development of Type 2 diabetes in obese individuals. The theoretical framework of the project is also presented along with the presentation of the model that has been recommended in the literature to address the process of change. The significance of this model was also demonstrated that has formed the basis for utilization of this model in the proposed project.

Strategy Used for Search of Literature

The literature review was obtained from Cumulative Index, Nursing and Allied Health Literature (CINAHL), Proust, MEDLINE, OVID, the World Health Organization, American Diabetes Association, and the International Diabetes Federation. Search terms used were *obesity* and *risk of Type 2 diabetes, diabetes prevention programs, group lifestyle balance program, Rosswurm and Larrabee's change model, obesity national* and *Florida statistics, Type 2 diabetes national and Florida statistics,* and *Marion County Florida obesity and Type 2 diabetes*. Articles were reviewed that included the search terms. Appendix D provides a table of articles that were pertinent to in consideration of using a change model however was redundant, lack relevance to topic, or review summaries and was omitted from review. The articles that pertained specifically to the topic of interest, obesity and risk of developing Type 2 diabetes and related prevention programs are summarized below.

Specific Literature

The Florida Department of Health Marion County (2013) and collaborating health providers, and community and governmental agencies participated in a yearlong study to determine local health disparities. Social, environmental, racial, ethnic, economical, educational, and health issues data revealed marked disparities. Factors listed as specific disparities included close to 45% of the population were uninsured or on Medicaid; in the 6th percentile for Florida with access to recreational activities; higher rates of children at or below poverty level although percentage was not listed; and reported higher that the state level of unemployment, though number not reported. Obesity, age-related illnesses, hypertension, heart disease, and diabetes were the top five health related complications countywide (The Florida Department of Health Marion County, 2013).

A regression study determined greater weight loss in a Diabetes Prevention Program (DPP) of 8.1% compared to weight loss in a standard program of 6.9% (Kramer, 2011). Group counseling improved weight reduction in combination with low caloric intake, exercise prescription, and dietary monitoring. Lifestyle modification including dietary changes and exercise was determined to be extremely cost effective (2011). A standard weight loss program composed of a developed nutritional menu and fitness routine that is based on a specific calorie count that meets daily nutritional requirements; exercise designed to burn calories than taken in, and improve physique; as well as meet goals set by the participant and program coordinator as to amount of weight loss and fitness goals (Jakicik et al., 2012).

The condition of Type 2 diabetes has been considered to become one of a global epidemic creating recent global figures that reaches up to 284 million individuals in the year 2010 (International Diabetes Federation, 2011). Approximately 6.4% population of the world is suffering from Type 2 diabetes (2011). Numerous diabetic patients have a higher than previous projections as they have been predicted to increase in the upcoming years having projections of about 400 million individuals who may get afflicted by the year 2030 (WHO, 2013). The occurrence of the condition of diabetes is thought to visibly modify an individual's quality of life affected by the disease because of reduced functions related to health (Boyle et al., 2010). Currently, Type 1 and Type 2 diabetes is connected with major complications which can be grouped as microvascular including macro vascular, retinopathy, nephropathy, neuropathies, as well as atherosclerotic situations such as cerebrovascular disease, peripheral vascular disease, metabolic syndrome, and coronary artery disease (Dormandy et al., 2005; Piatt et al., 2012). The combination and presences of such conditions often leads to an ultimate complication as well as premature death (Farag & Gaballa, 2010).

Type 2 diabetes is costly disease directly related to the increased burden on healthcare services and mortality at an early age (Evans, 2010). The increased utilization of healthcare services by the individuals with Type 2 diabetes is associated with complications of diabetes, which include retinopathy, neuropathy, renal failure, and an increased risk of cardiovascular disease (Boyle et al., 2010;). It is being widely observed that the majority of the people with Type 2 diabetes also suffer from obesity (Bang et al., 2009; CDC, 2012). This provides the evidence for explaining the association of the

increased burden of obesity with increased rates of Type 2 diabetes prevalence (ADA, 2013).

At present, nearly 34% population of the US is obese with the incidence of Type 2 diabetes in nearly 11% of the individuals aged 20 years and above (CDC, 2011). It has been estimated that there will be a rise in the prevalence of diabetes to approximately 21% by the year 2050 (Boyle et al., 2010). It is however, unclear though what mechanisms are responsible for the association of incidence of Type 2 diabetes with obesity (Eckel et al., 2011). The development of the understanding regarding the association of obesity and Type 2 diabetes enables the health care team to develop the interventions that can provide significant results for reducing the incidence of Type 2 diabetes in obese individuals (Hill et al., 2013).

Obesity is related to the incidence of Type 2 diabetes (ADA, 2013; Hossain, 2007). Some of the studies performed recently have become successful in understanding this relationship between obesity and Type 2 diabetes (IOM, 2012). The resistance of insulin, metabolism of the deranged fatty acids, proinflammatory cytokines, and several cellular processes including stress of the endoplasmic reticulum and dysfunction of the mitochondria play a part in the relationship between obesity and Type 2 diabetes (Beaser & Jackson, 2010; IOM, 2012). It is difficult to understand these interactions as they are complex and the importance of each of these interactions is also unclear (IOM, 2012).

It is possible to prevent many risk factors that are associated with Type 2 diabetes (Absetz, et al., 2007). Early intervention at the onset of disease reduces complications. Modifications in the lifestyle that are particularly related with an

elevation in the physical activities and loss in weight have been observed to be significant for reducing the risk of Type 2 diabetes in people with obesity (Knowler et al., 2002). Effectiveness of the lifestyle based intervention program has proven to be more as compared to that of the pharmacological interventions for decreasing the risk of Type 2 diabetes in the obese people (Dormandy et al., 2005; Gerstein et al., 2006; The Diabetes Prevention Program Research Group, 2005). The duration of these interventions is based on several years such as the period of intervention in the DPS trial was 3 years and the number of sessions was 20 (Tuomilehto et al., 2001). The cost of the treatment in this trial on annual basis was $4700 (Gerstein et al., 2006).

It was important to determine the ability of implementation of the lifestyle intervention based programs designed for clinical trials in the real world (Britt-Pipe et al., 2005). This evaluation was performed through an intervention-based study called GOAL, which was a trial of the lifestyle intervention (Uutela et al., 2004). This program was designed in Finland and based on structured groups for the delivery of intervention. There is a great challenge posed to the implementation of the lifestyle interventions in the usual healthcare (Glasgow et al., 2003); but, the result of this study demonstrated that it is possible to implement the lifestyle based interventions in the real world. Lifestyle interventions can be utilized for reducing the risk of Type 2 diabetes in the obese individuals (Absetz et al., 2007).

The efficacy of the interventions based on modifications in the lifestyle has been evaluated in various trials that were aimed at observing the significance of these interventions for reducing risk of Type 2 diabetes (Tuomilehto et al., 2001). This

eliminated the need for further randomized control trial (Absetz, 2007). There is a need to study the modes of implementation of the lifestyle interventions for reducing Type 2 diabetes risks among high-risk obese individuals (2007).

It has been estimated that there are approximately 79 million adult individuals in the United States, aged 20 years and above, who have diabetes (CDC, 2011). Considering the increased rates of obesity in the population, it is expected that there will be a rise in these rates. Educators of diabetes have the ability to deliver information of the self-management in diabetes care while often lack the training and time that is necessary for delivering the information regarding the lifestyle interventions for preventing the development of Type 2 diabetes (2011).

Modification of lifestyle behavior is a complex process (Brug et al., 2005) that is associated with increased costs that serve as barriers to the implementation of the lifestyle modification-based intervention programs for reducing the risk of Type 2 diabetes in obese people (Penn et al., 2008; Simmons et al., 2010). A better insight into the process of behavioral change can provide the opportunity for improving the interventions so that the effectiveness these interventions can also be improved (Rosal et al., 2008). However, there is a limited availability of the literature regarding the evaluation of the lifestyle intervention based programs (Simmons et al., 2010).

The successful development and implementation of the lifestyle intervention programs has been evaluated by numerous clinical trials so that the risk of Type 2 diabetes can be prevented (Kramer et al., 2011). The basics of all these programs included the provision of information regarding the incorporation of balanced measures

of diet and nutrition, loss of weight, increase in physical activity to serve as the fundamental elements for reducing the risk of Type 2 diabetes (Ramachandran et al., 2006). A randomized controlled trial has been conducted with 3234 people who were overweight (Knowler et al., 2002). This program was based on the prevention of diabetes among the obese people aged 25 or above. This trial demonstrated that there was a reduction in the risk of Type 2 diabetes development by the implementation of the lifestyle interventions (2002).

Risk factors of a cardiovascular disease declined through the lifestyle interventions implemented in the Diabetes Prevention Program (DPP), according to Diabetes Prevention Program Research Group (2005). With regards to the probability of further increase in the number of obese people in the country, it is important to increase the skills of the healthcare professionals who are already serving the community (Dodani & Fields, 2010). A lifestyle balance program was developed by the DPP to reduce the risk of Type 2 diabetes in the individuals at high risk due to obesity. The delivery of the interventions in this program is performed through workshops that are followed by implementation of the program even after training (Kramer et al., 2009). The DPP was based on behavioral intervention delivery provided through 12 sessions. The basis for this program was the original DPP intervention, which is delivered through 16 sessions. This program based on the behavioral interventions has been implemented successfully in various community healthcare settings. However, further research has been recommended regarding the long-term effectiveness of this program reducing risk of

Type 2 diabetes in obese individuals (Dodani & Fields, 2010; McTigue et al., 2009; Seidel et al., 2008).

A health belief model (HBM) approach to education and compliance utilizing participant beliefs and cultural habits proved successful for reducing the risk of Type 2 diabetes in obese people (Sharifirad et al., 2009). The management of diabetes through nutritional health and active lifestyle continues to reduce complications. The method of the study consisted of 88 randomly selected Type 2 diabetic participants in seminars; equally divided into an intervention and control group. A total of two sessions lasting 80 minutes were conducted, each of which provided education to the participants. The intervention group that received education on nutrition, a significant improvement was seen [(-14.7+/- 13.3 vs 13.9, P <0.001)] (Sharifirad et al., 2009, p. 3). Validity and reliability was insured by data collected from a questionnaire. Nutritional practices improved significantly post intervention (2009).

An integrative review determined health care professionals, nutritionists, and community health leaders must collaborate effectively to promote a preventive approach to diabetes (Madden, Loeb, & Smith, 2008). Over 12-lifestyle prevention programs were reviewed that demonstrated weight reduction by all participants. Programs consisted of counseling and diet as well as exercise, along with behavior change education. A 6-year follow up of one study reviewed demonstrated a 6-year persistence of weight loss and healthy behaviors. A long-term solution is needed in order to sustain ideal weight control and prevention of Type 2 diabetes. Overall consensus was that behavior change must occur and be consistent for lifetime success (2008).

A group of 555 individuals from rural communities who were predominantly female, white, and obese participated in three lifestyle intervention programs (Piatt et al., 2012). The Group Lifestyle Balance program chosen by the self-selection group had the best results a 14-pound weight loss ($p < 0.0001$). Other groups included face-to-face and Internet participants with an average of 12% weight loss. A framework of behavioral self-management promoted goal setting that resulted in a weight loss of 5% for all participants. Weight loss was significant and maintained by more than 90% of participants at the 6 month follow up. Participants also reported a reduction of at least one risk factor such as lipids, blood pressure (BP), and glucose readings (2012).

The Healthy People 2020 goal for older adults is the improvement of health, overall function, and quality of life (U.S. Department of Health and Human Services, 2013). Obesity and Type 2 diabetes ranked as the top causes of chronic illness and disabilities. Many ethnic and racial groups do not utilize preventive services. Self-care management and behavior change have been shown to promote health at any age.

The CDC (2011) recommended diabetes prevention and control within the community. Glucose control and screening for complications were stressed as provider and patient duties. A systemic review provided a consensus that diligent participation in lifestyle management aimed at prevention continued to reduce cost (2011).

Current Obesity and Type 2 Diabetes Prevention Programs

Current treatment options for obesity and prevention of Type 2 diabetes include a mixture of behavior modification, healthy dietary habits, exercise, weight-loss drugs, and surgery, according to the U.S. Department of Health and Human Services (2012).

Nutritional and behavioral counseling e-mails combined to produce an average weight loss of 4 to 5 kg over a 12-month period with no long-term adverse effects reported (Madden et al., 2008). Data were not collected that would have determined "the impact on diabetes incidence" (Madden et al., 2008, p. 2252). Weight loss programs that encourage participants to follow a strict caloric intake of 800-1200 kcal daily and incorporate supervised walking up to one hour twice weekly demonstrated a decrease of approximately 10 kg at 6 months. A 12-month follow up revealed an average increase of 2.9 kg, indicating a decreased adherence to program (Madden et al., 2008). A combination of nutritional and behavioral modification, along with activity resulted in consistent weight loss and decreased incidence of Type 2 diabetes (Piatt et al., 2013).

Qsymia, a weight loss drug that is a combination of phentermine and Topamax, is advertised as a newer, safer pharmaceutical addition to weight loss. Patients must have a BMI over 30 or 27 with hypertension, hyperlipidemia, or Type 2 diabetes to qualify for this drug. Primary risks associated with Qysmia include stroke and cleft palate and lip birth defects. Patient support is also available via the Internet for patients on Qysmia (Vivus, 2010). Popular surgical options to treat obesity and Type 2 diabetes are Roux-en-Y gastric bypass and biliaripancreatic diversion and have resulted in remission of Type 2 diabetes (Mingrone et al., 2012). Remission rates at 12 months or more were reported 75% from those who had the Roux-en-Y procedure and 95% from the biliaripancreatic diversion procedure. While medical therapy alone reduced risk and amount of medication needed, remission did not occur (Mingrone et al., 2012).

Local Obesity and Type 2 Diabetes Prevention Programs

Research on local health care facilities included a hospital as well as clinic, an Internet search, e-mail, and telephone collaboration with other health care providers. Current obesity and Type 2 diabetes programs available in the community of Marion County Florida were identified. A program, Diabetes Healthway's, at the Munroe Regional Medical Center (MRMC) provides diabetic patients information designed to prevent complications and manage the disease (Diane Thompson, personal communication, October 26, 2013). Diabetic Healthway's consists of one 10-hour session that can be divided into hourly increments. Topics discussed include pathophysiology of diabetes, self-management of nutrition, medication, activity, and associated illnesses (Diane Thompson, personal communication, October 26, 2013). Patients insured by Medicare have no cost for a once in his or her Medicare lifetime education program (Medicare, 2013). Complications and changes from oral medications to insulin or a full year since previous training qualify the individuals for a 2-hour follow-up clinic visit. Diabetic Healthway's also provides the diabetes education to the Marion County School Board employees covered under Florida Blue Cross and Blue Shield insurance (Diane Thompson, personal communication, October 26, 2013).

MRMC's diabetic educators in collaboration with the local YMCA, assisted to establish the National Diabetes Prevention Program (DPP). The CDC is also partnering with the local YMCA to promote the DPP, evidence-based program to prevent Type 2 diabetes. The DPP program design consists of 16 weekly sessions provided by a lifestyle coach who will assist individuals in groups learn lifestyle behaviors for healthy living,

nutrition, and activity to reduce weight and risk of the development of Type 2 diabetes. Criteria to participate in the program are two of the following: BP 140/90, diagnosis of hypertension, high cholesterol levels, physically active less than three days per week, have a parent or sibling with diabetes, personal history of gestational diabetes, delivered a child weighing more than 9 pounds, or 45 years of age or older (YMCA, 2013). An undisclosed fee is required of participants who attend the DPP program at the YMCA.

Kumari, a board certified bariatric and weight loss specialist, offers a medically supervised weight loss program (K. Kumari, personal communication, September 19, 2013). The program includes nutritional and behavioral counseling, a diet restriction of 50 grams of carbohydrates per day, exercise at least 30 minutes per day, and weekly follow up visits until goals are met. The initial fee for Kumari's weight loss program is $300, which covers patient history; physical examination; blood work that includes a complete blood count, electrolyte panel, blood lipid levels, vitamin D 3 hydroxy, and thyroid stimulating hormone; urinalysis; and electrocardiogram. Weekly follow-up visits are $30 each and are covered with Medicare if patients' BMI is 30 or more; commercial insurers have not covered the cost (K. Kumari personal communication, September 19, 2013). Patients not progressing toward the decided goal are prescribed Qysmia after 4 weeks if appropriate. Success of the program has varied based on patient continued compliance with the healthy diet and behavioral change. Data analysis has not been performed to provide outcome statistics (K. Kumari, personal communication, September, 2013).

The "Group Lifestyle Balance (GLB) program is a modification of the Diabetes Prevention Program's Lifestyle Change" (Kramer et al., 2011, p. 1). Participants in the original program followed for 3 years had documented success. More than 3000 adults participated in the program. Half of the participants were African American, American Indian, Asian, Hispanic, and Pacific Islanders. Assigned by a change to three groups: one weight loss and increased activity; another group took metformin (a pill for diabetes), while the third group served as placebo. Individuals under 60 had a 58% loss in risk of developing Type 2 diabetes while those over 60 had a 71% reduction. No further information was provided on how the data was measured and analyzed. The GLB program was designed to provide lifestyle coaching that informed and brought awareness to behaviors and nutritional health as well as risks associated with obesity and Type 2 diabetes (Piatt et al., 2013). A 7% weight loss, along with exercise at least 150 minutes per week, lowers the risk of development of Type 2 diabetes (Kramer et al., 2011). Twelve weekly meetings were held and participants were followed monthly for 1 year. The group setting provided support and promoted change. Weekly food logs, calculating fat and calories, and assisting to identify areas to modify were discussed either individually or in a group. Interactive problem solving exercises, safe exercise, use of a pedometer, and resistance training were discussed with a fitness coach. Participants were encouraged to participate in a relaxed and positive atmosphere (2011).

The preceding introduction to the GLB program provides the background of the program, its success record, the rationale for the program, along with the risks of obesity and development of Type 2 diabetes, and the benefits of prevention through lifestyle

modification (Piatt et al., 2013). The cost of the program is determined by the provider and typically ranges from $600 to $1000 per participant. Medicare covers the cost of treatment if patients' BMI is over 30, while other commercial plans cover program costs at a limited rate requiring patient to pay difference in coverage. Many companies have implemented such preventive programs to reduce cost of insurance, lost productivity, and time lost with employees off related to illness (2013).

Theoretical Framework

Positive influence, effective leadership, and collaboration of stakeholders assists to identify the appropriate theory based on the problem, program design, objectives established, and the diabetes risk assessment. Personal perception of health and wellness, illness, and acceptable treatment may present as barriers to care (Current Nursing, 2012). The health belief model (HBM) focuses on beliefs and values of the individual or group (Deavenport et al., 2010). Specific dimensions of the HBM are, perceived severity of illness, susceptibility, benefit of treatment options, cost, and barriers to care resulting in action or reaction (Harvey & Lawson, 2009). A lifestyle balance program such as the Group Lifestyle Balance program provides the participant with resources and an interactive opportunity to change awareness and behaviors incorporating habits into daily life that results in improved health and wellness (Kramer et al., 2011). The collaborative team's understanding of participant willingness to attend a risk reducing program assisted to determine if such a program would be implemented in the medical clinic.

Rosswurm and Larrabee's Model for Change

Change in beliefs, behaviors, and self-management can prevent illness and promote healthy outcomes. Rosswurm and Larrabee's (1999) model for change guides the practitioner through an evidence-based approach. A literature search performed did provide results depicting the use of Rosswurm and Larrabee's change model in nursing practice documenting evidence of behavior change. Utilization of the model for change provided evidence that behaviors could be changed in an adolescent eating disorder clinic (MacPhee, 2002). Many other articles cited use and evidence of successful behavioral change utilizing Rosswurm and Larrrabee's model for change. Articles referenced activity, staffing patterns and behaviors (Titler, 2008). The six steps of the change model include: determining a need for behavior and practice change, connecting the problem with interventions, synthesizing the evidence, developing a plan for change, implementing and evaluating the proposed change, and integrating and maintaining the change (Britt-Pipe et al., 2005).

Explanation of Rosswurm and Larrabee's Model for Change in the Proposed Project

Step 1

Determine needs for behavior and practice change (Rosswurm & Larrabee, 1999). Did the evidence support a need to implement a risk reducing program in our medical clinic? A diabetes risk assessment questionnaire was distributed, collected, and reviewed.

Data analysis determined if individual awareness of risk of developing Type 2 diabetes risk would result in implementation of a risk reducing program in our medical clinic.

Step 2

Connecting the problem with the proposed intervention (Rosswurm & Larrabee, 1999). Cost of care, potential complications, and burden to patients, families, communities, and the health care system related to current trends were discussed. The benefits of prevention and lifestyle improvement to the overall health and wellness to society were also discussed.

Step 3

Synthesize the best-practice evidence (Rosswurm & Larrabee, 1999). The Cumulative Index of Nursing and Allied Health (CINAHL), MEDLINE, CDC, Florida Department of Health, FDHMCF, and WHO were databases and websites utilized in search of reliable data. A Group Lifestyle Balance program and similar programs have proven effective in reduction of obesity and risk of development of Type 2 diabetes, according to the literature reviewed. Data based on evidence was weighed to assist in determining if a lifestyle prevention program would implemented in our clinic and community.

Step 4

Change in practice (Rosswurm & Larrabee, 1999). Health beliefs and values, perceived priorities, and seriousness of disease influence ones willingness to change behaviors (Current Nursing, 2012). Results from the Diabetes Risk assessment questionnaire were evaluated. A disappointingly small number of patients and

community members participated in the questionnaire. The results were reflective of larger studies based on the diabetes risk tool utilized (Bash, 2009). Implications, strengths, and limitations of project were considered in determining if a diabetes risk reduction program would be implemented in our medical clinic.

Step 5

Implementation and evaluation of change in practice (Rosswurm & Larrabee, 1999). The evidence supported attendance by those who participated in the Diabetes Risk Questionnaire, although a significantly smaller number individuals participated than was anticipated. Post project analysis and review of data left doubt as to the sustainability of a risk-reducing program in our medical clinic. Data collected from the diabetes risk questionnaire were presented to practice staff and providers to evaluate benefits of changing current practice.

Step 6

Integration and maintenance of practice change (Rosswurm & Larrabee, 1999). The implementation, evaluation, and feedback from practice and community assist to determine appropriateness of integrating a diabetes risk reduction program. A recent community based health needs assessment identified obesity and Type 2 diabetes as prominent health risks to the community. A diabetes risk assessment to gather feedback as to willingness of those at high risk (score 5 or more) to attend a group lifestyle balance program assisted to determine need for practice change. Promotion of individual, group, and community involvement further supports a comprehensive weight reduction program, according to the Florida Department of Health Marion County Well Florida

Council, 2012; Kramer et al., 2011; Piatt et al., 2012. In brief, implementation of a program that emphasizes behavioral modification, nutritional health education, and an active lifestyle has been an effective approach to reduce the risk of obesity and Type 2 diabetes. Data collected from a diabetes risk assessment questionnaire provided information to determine if individuals would attend a risk-reducing program that would then be implemented in the medical clinic and community.

Summary

The review of the literature has provided evidence that there is an increased prevalence of obesity in the United States. This is also related with the prevalence of Type 2 diabetes because there is an association of type 2 diabetes and obesity. Therefore, it is crucial to design the interventions that are targeted at reducing the incidence of Type 2 diabetes in obese individuals. This can be achieved through modification in the lifestyle of the obese individuals. Changes in the lifestyle have been observed to bring a drastic change in the reduction of the risk of Type 2 diabetes in the individuals with obesity. Various studies have been performed to evaluate the significance of the lifestyle interventions in prevention of Type 2 diabetes. The theoretical framework of this study was formed by these interventions that emphasize the changes in the dietary habits and increasing the physical activities to decrease the weight. Thus, by reduction in the weight of the obese individuals, it is possible to overcome the factors that are responsible for the development of Type 2 diabetes in the obese people. Models have been presented in the literature to suggest the implementation of lifestyle modification based interventions reduces Type 2 diabetes risk. Rosswurm and Larrabee's model for change served as the

basis for this project representing the method for determining if awareness of high risk score of developing Type 2 diabetes would result in the implementation of a lifestyle program reducing risk in our medical clinic.

Section 3: Methodology

The methodology section is a description of how I used quantitative data. A diabetes risk assessment provided supportive data that resulted in the decision made by our medical practice regarding implementation of a diabetes risk reduction program. It also provided the strategy that was used for the sampling of appropriate participants.

The inclusion and exclusion criteria of the project was also presented in this section along with the implementation plan that was be used to determine willingness to attend a lifestyle intervention program. The presumed limitations of the project were discussed followed by the evaluation of the project. Description of the diabetes risk assessment (Appendix A), budget plan (Appendix B), data collection and analysis, as well as evaluation plan provided further insight into the proposal and project implementation. Descriptive statistics were used to evaluate data from a convenience sample to compare results of participants of the diabetes risk assessment (Terry, 2012).

Quantitative Research

Quantitative research is represented in numbers and statistical methods. Its measurements are numerically based while its findings are used to test causal hypothesis. Experimental design and careful sampling strategies are main aspect of quantitative research in order to generalize outcomes. Quantitative research focused on information gathered from the diabetes risk assessment questionnaire as an effective approach to determine if people would be motivated to attend a diabetes risk reducing program (Terry, 2012). Measurement of information collected from questionnaires allowed the investigator to analyze the correlation of data obtained. Statistical significance was

determined through analysis of data collected. Clear instruction by the researcher was provided to maintain the validity of the question: Will obese individuals age 18 and older who are at high risk of developing Type 2 diabetes based on a diabetes risk assessment indicated that they would attend a prevention program in our medical clinic?

Sampling Strategy

Convenience sampling was used as the method of sampling for this project. It is used for recruiting the participants with capability to convey sources of data that are enriched with extensive information (Aral et al., 2008). This method was used because it enabled selection of the target population for the study (Gerrish & Lacey, 2010). Participants with obesity were preferred for inclusion, based on their risk for the development of Type 2 diabetes. This sampling approach allowed the selection of those participants who could provide considerable amount of data regarding the aim of the study, thus, enabling the process of quantitative analysis.

Inclusion and Exclusion Criteria

The participants of the study were selected according to their gender and age. It was considered that only those participants are selected who are covered under the target population of the study. The target population of the study was obese people because they might be at risk of developing Type 2 diabetes.

Excluded from diabetes risk assessment were the individuals who were unwilling to participate in the project, have inability to comprehend information provided, and those who already have diabetes (IOM, 2013; WHO, 2013). Obese participants aged 18

and older meeting two or more of the following criteria were included in the study. Obesity, which is calculated by height and weight, as well as a sedentary lifestyle defined as one with irregular or no physical activity, a history of diabetes during pregnancy, or a family history of diabetes were predictors of future diabetes.

Goals of the Project

Primary Goal

The primary goal of this project were to assess if obese individuals age 18 and older who were at high risk for development of Type 2 diabetes would attend a risk reducing program in our Marion County, Florida internal medicine clinic.

Secondary Goals

The secondary goal was to determine the perception of participants in terms of the adequacy of current weight loss and behavioral modification programs in our community.

Assumptions and Limitations

I assumed that increased awareness of the risk of developing Type 2 diabetes would motivate individuals to participate in a lifestyle change program. Access to resources would increase patient involvement, knowledge, and a healthier lifestyle. Patients would follow recommendations when resources were available. Patient knowledge of disease and recurrent illness would result in compliance. Increased patient, provider, clinic, and community awareness of perceived health needs would assist to change behavior and actions promoting healthy outcomes.

Limitations included population unwillingness to participate in diabetes risk assessment survey. Other potential limitations included lack of reimbursement in primary care to encourage implementation of preventive program. Clinic administration and financial supporters' skepticism that population would be motivated to attend a Diabetes risk reducing program (Zitkus, 2012).

Lack of education and interest among the current community that includes healthcare providers, patients, and families to be able to access available resources to improve health was also a limitation. Cultural values and beliefs that conflict with a program such as group participation, food selections, activity, and perception of size in relationship to health were the perceived barriers (Shay et al., 2009). Economic barriers such as poverty, unemployment, and financial strain currently in existence may further deter interest and participation (Florida Department of Health Marion County, 2013; Shay et al., 2009; Zitkus, 2012). My interpretation of literature review and selection of the diabetes risk assessment tool utilized may have resulted in limitations of project (Bash et al., 2009; Hodges & Videto, 2011; Kramer, 2011; Shay et al., 2009; Terry, 2012; Zitkus, 2012).

The Social Changes Impact of the Project

Project implementation and completion of a diabetes risk assessment were expected to increase individual awareness of risk of developing Type 2 diabetes. Awareness of risk of developing Type 2 diabetes would ideally promote behaviors that improve health for life. Participant increased healthy behaviors resulting in decreased obesity and risk of Type 2 diabetes are expected to impact society through decreased cost

of health care, lower economic costs that results from chronic illness and days away from work, as well as improve patient, family, and community health and lifestyle. Health care clinics, providers, and communities that collaborate to provide needed resources, have a positive impact on the community and society (Hodges & Videto, 2011).

Implementation of the Diabetes Risk Assessment

A diabetes risk assessment provided information to assist in determining if people would attend a Lifestyle Balance (risk reducing) program intended to reduce obesity and risk of Type 2 diabetes. The diabetes risk tool developed and validated by Bang et al. (2009) would be utilized. The diabetes risk assessment was validated by using standard measures of "proportion of high risk, sensitivity, specificity, and predictive value, likelihood ratio for positive test, discrimination statistics, and use of a regression model" (p. 7). Comparison of other assessment tools occurred to evaluate transferability of validation to population. Sensitivity 76% and specificity of 80% for those under 45 years of age with a sensitivity 97% and specificity of 20% for those over 45 years of age. Bang et al.'s risk assessment scoring system yielded slightly high scores than those compared including the Atherosclerosis Risk in Communities study, Cardiovascular Health Study, and the National Health and Nutrition Examination Survey to compare validity and reliability. While Bang et al. (2009) determined their tool be an effective predictor of those at risk of developing Type 2 diabetes, the group admits a universal tool must be developed that will increase ability to identify and treat those at risk.

A county health needs assessment has provided a review of current "administrative policy and alignment with proposed intervention; educational and

ecological assessment; epidemiological, behavioral, and environmental assessment, social assessment and situational analysis, implementation; evaluation; impact, and outcome" (Department of Health Marion County, 2012; Hodges & Video, 2011, p. 12). Appendix A is a copy of the diabetes risk assessment questionnaire that was used. The Diabetes Risk Assessment questionnaire was developed and validated by Bang et al. (2009). The study that resulted in the diabetes risk assessment questionnaire focused on undiagnosed diabetes. Simplicity and user-friendliness of the tool resulted in better accuracy, successful implementation and utilization by lay persons (Bang, et al., 2009). The additional question following the risk assessment individualized it to the specific patient population (Appendix A).

Data that would promote awareness of diabetes risk increase likelihood of attendance of a risk reducing Lifestyle Balance program. Response of the participants assessed from the questionnaire with assist to determine willingness to participate in a group program for reducing diabetes risk would serve as the data.

Recruitment of participants

A medical clinic staff in-service provided information on distribution of questionnaire to promote facility awareness. Fliers were posted in the clinic as to distribution of questionnaires and request for voluntary participants to complete the diabetes risk assessment. A booth at the local farmer's market was thought to increase likelihood of broader community participation of diabetes risk assessment. Presentation of diabetes risk and having questionnaires available to participants at a rural health clinic further broadened community involvement and the probability of collecting data from a

more diverse population base. Small seminars took place in the medical clinic to discuss and recruit participants for the potential implementation of a Lifestyle Balance program that would reduce risk developing diabetes. The diabetes risk assessment questionnaire (Appendix A) was distributed on clinic site as well as in the community. A collection box was be set up at each reception area that was sealed from others for individuals to place questionnaire in prior to leaving the facility. Collection boxes were also used at community gathering and meeting. The diabetes risk assessment was offered to all patients within the clinic for two weeks. An e-mail to staff served as a reminder prior to implementing week collection of the diabetes risk assessment. Clinic and stakeholder buy-in had support of the practice endocrinologist (J. Vesely, personal communication, August 20, 2013).

Distributive data determining population willingness to attend a Group Lifestyle Balance program

Appendix A provides information of data collected from a convenience sample. Participant response to risk scored on the diabetes risk assessment assisted in determining implementation of a Group Lifestyle Balance program otherwise known as the diabetes risk reducing program. Implementation of a diabetes risk reducing program in the medical clinic and community would be determined based on 60% willing to participate, accessibility, and lack of availability of established programs.

Ethical Considerations

Questionnaires were placed at receptionist counters and in the waiting room to allow voluntary participation. The completed questionnaires were placed in a closed container. Questionnaires were identified as completed by a male or female. Acknowledging the need for privacy, no other identification was requested of the participants. The Institutional Review Board (IRB) reviewed the project proposal and approved the project prior to implementation and data collection. IRB approval number (*11-12-14 0369906)*. I have completed the required course on research and protection of human subjects.

Budget and Time Constraints

Budget considerations for the diabetes risk assessment included the cost of supplies to print the diabetes risk assessment that include paper, ink, and tape. Postage paid envelopes for those who chose to return questionnaire via mail, staff participation, and location to place questionnaires and return boxes were also considered. Appendix B includes an estimated budget of project costs. Employee time was not added into the cost as the health needs assessment was distributed during the DNP student's clinical time not taking away from regular clinic activities. A clinic-based staff in service during regular office hours already allotted one Friday per month was utilized to inform clinic staff of the plan to implement the diabetes risk assessment and how questionnaires were to be gathered. The timeline to perform the diabetes risk assessment and data collection was 1 week as approved by the IRB.

Data Analysis

Data were collected from the diabetes risk assessment questionnaire. A compilation of data reviewed resulted in selection of the diabetes risk assessment questionnaire developed by Bang et al. (2009). Individualization of a question specific to population was included at the bottom of page with the diabetes risk assessment. Analysis of the data was performed by calculation of the number of questionnaires returned. Inputting numerical data into an Excel spreadsheet provide a visual picture of the data obtained.

The anticipated number of participants in completion of the diabetes risk questionnaire was 150. More participants would have been included, but fewer participants did not prevent completion of the project. The Marion County internal medicine clinic where the questionnaire was implemented has five providers with an average of 22 patients per day per provider. The questionnaires were also available at local farmer's market and community center, as well as Citra rural clinic. An expected 20 individuals per day were anticipated to participate by completing the questionnaire.

A small although positive response resulted from a week long distribution of the diabetes risk assessment to all patients entering the clinics, farmer's market, and community center. Voluntary participation decreased bias of the study. Implementation of the project in the medical clinic and outlying settings provided a convenience sampling of participants. Diversity of the medical clinic patient population and community-based participation were expected to increase sample size.

An alternate data collection method was to return the questionnaire by mail in postage paid, clinic-addressed envelope for participants unable to complete the questionnaire at the time of the clinic visit. The questionnaire asked specific questions designed to bring awareness of risk of developing Type 2 diabetes and to determine if stakeholders would attend a risk reducing program in our medical clinic.

Project Evaluation Plan

Evaluation of the results from the Diabetes Risk Assessment questionnaire (Appendix A) provided feedback that assisted to determine if individuals would attend a risk-reducing program in our medical clinic. A summative evaluation occurred after project completion. Project plan evaluation was conducted based on distributive data collected from a convenience sample. Evaluation would determine the projects' reflection of the clinic and community. Further evaluation would determine the projects' adequate service to subgroups such as women, and related population 18 and older. Cost of a Group Lifestyle Balance program had been determined as $600 to 1000.00 (Kramer et al., 2011). Review of returned diabetes risk assessment tool assisted to determine to that the project goals were met.

Primary Goal

To determine if obese individuals age 18 and older with a high-risk score of five or more on a diabetes risk assessment would attend a program to reduce risks associated with obesity and development of Type 2 diabetes in the Marion County, Florida clinic.

Secondary Goals

To promote awareness of the risk of developing Type 2 diabetes, a potentially fatal and often preventable chronic disease. For instance, more than 60% of the population studied with high risk of developing Type 2 diabetes agreed to attend a risk-reducing program. I decided on 60% based on the need for a majority to perceive benefit of program attendance before clinic administration would consider implementation of the program. Equity of the study project will be determined by the community population diversity. Participation of women, elderly and those with disabilities that were willing to participate in completion of the diabetes risk assessment questionnaire was possible by placement of questionnaires in easily accessible locations for all entering the sites.

Deliverables of the Project to the Organization and Final Project

Data processing occurred through evaluation of the number of questionnaires received. Advertisement, materials such as computer, projector, paper, notebooks, and program coordinator fees were considered in determining acceptance of program to practice. Clinic resources such as ancillary staff, electronic record, and space to conduct meetings will be available to meet the needs of participants. Poster presentation at the completion of the project informed participants of the results. Final results of study were presented as a power point format to clinic staff. A poster presentation was also presented in the main clinic lobby for patient participants to view.

Notice of the pending meeting to discuss results was posted in the clinics' electronic intra office message board. Cost of program implementation and projected reimbursement from insurance providers would be reviewed with providers, office

management, and other stakeholders. Finally, the answer to the question: Will obese individuals age 18 and older who are at high risk of developing Type 2 diabetes based on a Diabetes Risk Assessment attend a prevention program in our medical clinic?

A diabetes risk assessment questionnaire was distributed to determine if obese individuals age 18 and older would be willing to attend a risk-reducing program. Review of data collected from the diabetes risk assessment assisted in promoting change that potentially will result in positive health outcomes, increased positive mental outlook and lifestyle, and encouragement of stakeholders to improve nutritional health and activity. Availability of space and resources, encouragement of mentor, and the collaborative health team prior to implementing the risk-reducing program would be considered. Cost containment and program accessibility through utilization of clinic space would promote administrative buy-in. Individuals' commitment to participate in a risk reduction program would assist to establish lifestyle modification and healthy behaviors that will further prevent the risk of developing Type 2 diabetes and further health complications.

Conclusion

Obesity continues to grow as a leading health concern worldwide (IOM, 2013). Type 2 diabetes is a leading risk factor of obesity. An estimated 1 in 3 adults will be diagnosed with type 2 diabetes by 2030 (CDC, 2013). A lifestyle of inactivity and unhealthy food choices increases the likelihood of developing obesity and risk of developing Type 2 diabetes. Marion County Florida's higher than average prevalence of obesity and Type 2 diabetes is contributed to socioeconomic, cultural, and behavioral choices, according to the Florida Department of Health (2012). The DNP project

proposed to distribute a Diabetes Risk Assessment questionnaire to determine if individual age 18 and older who score 5 or higher risk would attend a risk-reducing program in the medical clinic.

A literature search of Internet databases Cumulative Index to Nursing and Allied Health Literature (CINAHL), MEDLINE, ProQuest, OVID, the World Health Organization, American Diabetes Association, and the International Diabetes Federation were performed. A literature review summarized current literature available regarding evidence-based lifestyle change and weight loss programs. Recruitment of participants would occur in our medical clinic and community through educational seminars, staff in service, booth at local farmer's market/community event, rural health clinic through seminars, flier and poster notification. Ethical consideration would be maintained through IRB approval and guidance, voluntary participation, no identifying data as to individual information. The theoretical framework of the health belief model and Rosswurm and Larrabee's model for change would be incorporated in the diabetes risk assessment questionnaire. Quantitative research would provide analysis of data through a distribution approach to answer the project question. Would obese individuals age 18 and older who are at high risk of developing Type 2 diabetes based on a Diabetes Risk Assessment attend a prevention program in our medical clinic?

Section 4 is a review of the project results, implications to practice, and limitations of project. Analysis as related to scholarly growth, as a practitioner, project developer and leader, as well as plan for future professional development. Section 5 is an executive summary of the project.

Section 4: Findings, Discussion, and Implications

Summary of Findings

The project plan to promote awareness and reduce risk of Type 2 diabetes was implemented at a Marion County, Florida medical clinic, a community-based rural clinic, and a local community market over a 1-week period. A diabetes risk tool, the Diabetes Risk Assessment (Appendix A), validated by Bang et al. (2009) was used. The Diabetes Risk Assessment questionnaire developed from the Bang et al. self-assessment screening score for undiagnosed diabetes or pre-diabetes tool was utilized to determine if obese individuals age 18 and older who are at high risk of developing Type 2 diabetes would attend a prevention program in the medical clinic. The data collected were intended to assist in determining the benefit to our patients, community, and the medical clinic. Primary and secondary goals were established for the project.

The primary goal was to assess if obese individuals age 18 and older who were at high risk for developing Type 2 diabetes would agree to attend a risk-reducing program in the Marion County, Florida internal medicine clinic. The secondary goal was to determine the perception of participants in terms of adequacy of weight loss and behavioral modification programs currently in place.

Prior to project implementation an explanation of the project was again provided to staff and potential participants through staff meetings, phone calls, and e-mail reminders to clinic and community participants of the project implementation plan. Seminars, talking with members of the community as well as those in the rural health

clinic indicated a higher response rate and willingness to participate in a diabetes risk-reducing program than the response rate to the project questionnaire would indicate. The importance of anonymous and voluntary completion of the questionnaire was emphasized to clinic and community participants. Posters announcing the project purpose along with questionnaires were placed at site locations for a total of 1 week. Project implementation in three sites was expected to result in participation of 150 subjects. The Internal Medicine clinic had five providers who saw an average of 20 patients per day. The community-based rural clinic averaged 18 to 20 patients per day. Finally, along with over 200 daily patrons of the local community market, it was projected that at least 150 subjects would complete the Diabetes Risk Questionnaire. Of all the patients and participants of the clinic and community sites, only 44 persons completed the questionnaire.

Demographic summary Marion County, Florida.

According to a 2013 Department of Health Marion County Florida Health Assessment, approximately 46% of the Marion County, Florida population is insured by Medicaid or Medicare, another 25% have other insurance, and 24% are uninsured. Diabetes was reported in an average of 1 in 3 of those on Medicare; mortality was reported at a rate 9% higher than state of Florida average. Obesity and diabetes were ranked among the top five contributing factors to chronic illness and mortality. Review of a 2015 revised U.S. Census Bureau and Economic Census Report comparing Marion County to the state of Florida indicated similar statistics. While the validated diabetes

risk assessment tool utilized for this DNP practice improvement project did not ask specifics related to insurance, race, or economic status, the percentage of obesity and other risk factors remained consistent with the 2013 data. For example, the 2013 health assessment reported 1 in 3 or 33.3% were obese compared to 43% and hypertension was reported of 38.5% compared to 50%. While a larger sample size would have provided more supportive evidence, the percentages were consistent among the voluntary participants of the DNP project.

The internal medicine clinic demographic was consistent with the Marion County, Florida census. Demographic data was obtained reported from clinic management since project participation was anonymous. I was unable to determine if demographics were similar at the community event as personal economic information was not included on the Diabetes Risk Assessment questionnaire. The rural clinic demographics were that Medicaid covered 65% of the patients and 30% were covered by Medicare. The remainder of the patients paid cash according to information provided by Clinic owner; patient records were not accessible for this DNP project. Of the 44 completed questionnaires, 15 were from the patients of the internal medicine clinic, 25 were from the community event, and 4 were from the patients of the rural clinic.
The validated assessment tool is provided in Appendix A. I performed data analysis using descriptive statistics after completion of collection process. The small number of actual participants led to a manual calculation of the convenience sample data. Data were put into an Excel spreadsheet. Age of participants ranged from less than 40 to over 60. Of the 44 participants, 32% of were over 60 years of age, 55% were female, 33%

had a family history of diabetes, 50% had HTN, 55% were physically active, and 48% of scored higher than 5 on the diabetes risk assessment. The participants who scored 5 or more were considered at high risk of developing Type 2 diabetes (n = 21). Of those at high risk, 43% were obese, 39% were overweight, and 18% were classified as of normal weight based on self-reported BMI based criteria from the Bang et al. (2009) validated diabetes risk tool. Agreement to participate in a diabetes risk-reducing program at our internal medicine clinic was 95% of the high-risk group. Table 1 highlights the data analyzed.

Table 1

Distribution Data

Age	Frequency (*f*)	Percentage (%)
<40	9	20
40-49	11	25
50-59	10	23
60 and over	14	32
Sex		
Female	24	55
Male	20	45
Family History of Diabetes		
Yes	34	75
No	10	25
Have Hypertension (HTN) or are on medication for HTN		
No	22	50
Yes	22	50
Participants who are overweight or obese		
Overweight	17	39
Obese	19	43
Normal weight	8	18
Physically Active		
No	20	45
Yes	24	55
Risk Score		
<5	23	52
5 or higher	21	48
	N=44=f	44=100%
Score 5 or higher willing to attend a Diabetes risk-reducing program in our medical clinic		
Yes	20	95
No	1	5

*N (total number of participants)
∑ = sum of *f*= frequencies, N= sample size
Parentage calculation: % = (f ÷ N) x 100
Pilot, D. (2010)

A larger sample size would have provided increased assurance as to representativeness of the overall population (Terry, 2012). The utilization of a previously validated questionnaire increased reliability of the smaller sample size (Bragg et al., 2009). Probability of accuracy and reliability of data was increased through anonymous and voluntary participation. Extended length of time for data collection, increased promotion of project implementation through email utilization, and distribution of the questionnaires to all patients entering the clinics at time of check in would have increased likelihood of participation. However, actively pursuing participant involvement would have potentially resulted in a sense of obligation or coercion among participants.

Inclusion criteria included those within the target population of age 18 and older, overweight or obese based on BMI as indicated on the Bragg et al. (2009) risk assessment tool. Also included as criteria for participation was family history of Diabetes, hypertension (HTN) or treatment to control, age, and sex of participants. Excluded were those who already had diabetes, declined participation, or did not complete the questionnaire.

Implications

For Practice

The lack of participation in the diabetes risk assessment questionnaire raises economic and practice concerns as to the sustainability of a stand-alone Diabetes Prevention Program in the Medical Clinic. Practitioners must not only consider the implications to patient health but also cost-effectiveness and reimbursement of

implemented programs (DiCenso, Guyatt, & Ciliska, 2005). Incorporating a Diabetes Prevention Program with a Diabetes Self-Management Education program has proven to be more sustainable in both the clinic and community setting (ADA, 2013; CDC, 2013). Continued collaboration with other providers, the community, and patients to bring an increased awareness of the importance of promoting healthy lifestyle habits must occur. Incorporation of individual and community health beliefs and perceived health risks and priorities will influence change (Hodges & Video, 2011; Kirkman et al., 2012). Reducing risk of the development of Type 2 diabetes, heart disease, and other potentially deadly or debilitating illnesses can occur through maintaining ideal health (ADA, 2014; IOM, 2013). Cost savings though prevention of the development of Type 2 diabetes is an estimated at $65,000 over 25 years per person, according to Zhou, Xhang, and Hoeger et al. (2013).

The 2013 Florida Department of Health, Marion County Florida study of local health and economic disparities had determined 45% of the population to be on Medicaid or uninsured. Obesity and diabetes were among the top five health-related diseases found in the study. In consideration of the known disparities and lack of response to the DNP project questionnaire, the implications for practice are an ongoing struggle to meet the needs of our patients and community. Nurse practitioner collaboration with physicians, registered dieticians, and community leaders through an organized campaign to further promote awareness of the risk of developing diabetes must occur to increase a buy-in of all stakeholders. Recently made available funding from the National Institute of Health (2014) to underserved counties, for which Marion County, Florida qualifies, would

potentially fund program implementation. The implication to practice of this funding is the removal of economic risk to the internal medicine clinic and ability to provide an evidence-based diabetes prevention program to our patients and members of the community.

For Future Research

The small clinical and community site survey revealed the need for further research. Larger numbers of participants in the risk assessment would have provided a more reliable measurement of the overall population need (Pilot, 2010). Determining the factors that resulted in lack of response to the questionnaire could help planning for an increased response in any future surveys. Posting an announcement on the organization website, e-mailing questionnaire to all web-enabled patients, and making questionnaire available in examination rooms potentially would increase response to future surveys. A survey submitted via mail or an e-mailed link to Survey Monkey questions might also increase participation. Maintaining anonymous and voluntary participation prevented patient interaction and recruitment by me. Future implementation and participation leading to completion of the questionnaire would be to obtain consent of patients to review their medical record. Expansion of the diabetes risk assessment questionnaire to include inquiry of insurance coverage and type, transportation, and job or childcare conflicts with attendance at a diabetes prevention program would be useful for planning. A focus group of stakeholders to provide additional feedback and awareness as to patients' and community nonparticipatory behavior would also be helpful.

Social Change

The implementation and completion of the project was proposed to bring awareness to individuals and the community of the risk of developing Type 2 diabetes. Lack of participation in the questionnaire is reflective of the populations' readiness for behavior change. An increase in the education and awareness to the clinic patrons, as well as the community is further emphasized by the sample number of those who participated in the survey. Nurse practitioners, as well as other stakeholders, must continue to bring awareness to our patients during office visits. Taking the information to the community is required to reach those who are unwilling or able to participate in a clinic-based diabetes risk-reducing program (CDC, 2013). Seeking grant approval to cover provision of alternate times and site locations may increase the likelihood of participation by those whose work schedule does not allow participation during office hours will also be required for success of a diabetes prevention program (Bash et al., 2009; Hodges & Videto, 2011; Kramer, 2011; Shay et al., 2009; Terry, 2012). Education and training in self-management of health has been shown to be most likely to reduce risk of disease development and complications (Dodani, & Fields, 2010; Kazak, 2013).

Project Strengths and Limitations

Strengths

The results of the diabetes risk assessment questionnaire supported the data reported by the Florida Department of Health Marion County's 2013 community health assessment. Participants with a family history of diabetes was 75%, the number who were overweight or obese was 82%, sedentary lifestyle reported was 45%, age-related

risk was similar with an increase in those over 60 years of age (see Table 1). Anonymous participation reduced risk of bias by the clinic, the community participants, or me. Willingness to participate in a diabetes risk-reducing program by those who scored higher than 5 on the questionnaire gives strength to the perceived need for implementing such a program.

Limitations

The anonymous nature of the project did not allow for discussion with patients regarding lack of participation. One possible answer as to lack of participation could be that patients with multiple health problems are resistant to participate in questionnaires (Burns & Grove, 2009). No accurate way to count patrons of the community event left an indeterminate number of those who declined participation versus those who completed questionnaires. The validated tool used as questionnaire, Appendix A, did not ask race, socioeconomic status, or cultural background. Diversity of the participants would have been more easily determined through assessment of race, socioeconomic status, and cultural background.

Recommendations for Remediation of Limitations in Future Work

To address the limitations of the project, I suggest scheduling a voluntary meeting 1-month after completion of the questionnaire to obtain feedback regarding participation or lack thereof, at the clinic and community partner sites. A mailed Diabetes Risk Assessment questionnaire to all patients of the clinic and community partner sites who have provided home addresses could increase the number of potential participants in future project improvement plans. It might be helpful to negotiate with clinics and

community partners to place questionnaires in patient rooms and various locations throughout the community to increase likelihood or participation while reducing limitations. Interest in participation might be increased by providing potential participants with information on insurance coverage and cost of the program along with potential cost of diabetes and related complications over a lifetime.

Analysis of Self

Opportunities for learning occurred throughout the project development, implementation, and evaluation. Analysis of self and the project provided an opportunity to define strengths and weaknesses. Reflection of lessons learned and changes needed to improve future projects and research increased personal and professional growth.

Evaluation of Scholarly Growth

I have grown through an increased understanding of current practice guidelines, implementation of evidence-based research, and transition to clinical practice. I have developed an enhanced awareness of the burden to health care, individuals and families, as well as the economic burden, on a local, state, national, and international levels as the epidemic of obesity and risk of developing Type 2 diabetes continues to escalate. Scholarly growth has enhanced my ability to appraise the data collected critically, make evidence-based decisions, and formulate strategies that will allow dissemination into practice (AACN, 2006).

As Practitioner

This project has expanded my knowledge and understanding of the broader scope of health care practice. My decision-making has a more direct focus with a continued and increased awareness of the impact on my community, state, and beyond. Reflection on not only my patients, but also my own willingness to change health beliefs, values, and transiting of learning into evidence-based practice has helped me grow both personally as well as professionally. The journey through this DNP project has been challenging and rewarding. The expertise, support, and guidance of my program chair and committee have been invaluable. I am further committed to a collaborative pursuit to bring awareness, education, and training to those at risk of developing Type 2 diabetes in my medical clinic and community.

As Project Developer

Successful project development involves examination and research of real world problems; review of the literature; determining a topic, such as diabetes prevention and management; cost-effective strategies; and collaboration with stakeholders to implement evidence-based programs into practice and the community (Burns & Grove, 2009). Development of the project, its implementation, analysis of the results, and dissemination of data has refined my skill and expertise as an advanced practice nurse into a broader role as a clinician and leader. Continued collaboration with members of the health care team, potential program participants, and community are needed to increase participation. I was successful in evaluating the primary goal to determine if obese individuals age 18 and older with a high risk score of five or more on a diabetes risk assessment would

attend a program to reduce risks associated with obesity and development of Type 2 diabetes among our clinic's patients. Refining my skill in project planning and development will increase the likelihood of future funding as well as stakeholder buy-in that is needed for successful and sustainable future practice improvement projects.

Future Professional Development Related to Reducing Diabetes Risk

Transformation as a leader will occur through collaboration with my organization's administration, providers, patients, and community members. We can use our collective creativity to adapt evidence in projects at the local level (Zaccagnini & White, 2011). Utilization of current electronic medical record (EMR) and technology such as video conferencing could assist to bring programs into patients' homes and the community. Continued development and improvement of patient outcomes by initiation and participation in a program that will reduce risk of developing Type 2 diabetes requires dissemination of the findings beyond the medical clinic setting and into the community. Support of practice physicians, staff, and participating patients has been encouraging. Participation in educational programs focused on establishment and maintaining a successful diabetes prevention program have increased my knowledge and awareness of the needed support from other member of the collaborative team. Combining diabetes self-management education with a diabetes prevention program will be more productive and financially sustainable for our medical practice, patients, and community. My recent successful passing of the certified Diabetes educators (CDE) examination will further expand our medical clinic's future implementation of a diabetes prevention program. Administration awareness of Medicare and Medicaid reimbursement

for education by a CDE for treatment of diabetes-related risk factors will assist in getting the financial backing to market and expand future programs (Medicare, 2013).

Conclusions

Diabetes awareness and prevention, the central focus of my DNP scholarly path and practice improvement project, was an easy choice. Determining the direction required systemic research of literature, demographics of practice and community, collaboration with professional and lay people with the community as well as guidance and support from my program chair, committee, and mentor. Evaluation of a county-wide health needs assessment comparing Marion County, Florida to state and national statistics enhanced my determination to proceed with the practice improvement plan (Florida Department of Health of Marion County Well Florida Council, 2012).

The theoretical framework of the project focused on the health belief model and Rosswurm and Larrabee's (1999) model for change (Deavenport et al., 2010). Evidence has shown that behaviors will only change when individuals, families, cultures, and communities perceive change as a benefit or unavoidable necessity (Hill et al., 2013). Quantitative data from a convenience sample were calculated using descriptive statistics. Although the response rate and participation were disappointingly low, I am confident that bias was avoided through the anonymous collection of data. Results calculated for the diabetes risk assessment questionnaire were consistent with the previous county health assessment performed (FDHMCWFC, 2012). Of the 44 persons who participated, 21 (48%) scored over 5, which is high risk for development of Type 2 diabetes. Ninety-

five percent of the persons identified as being in the high-risk group had a positive response to intent to participate in a diabetes risk-reducing program at the clinic. A response rate of at least 60% with an intention to participate was needed to implement a diabetes prevention program at our Marion County, Florida internal medicine clinic.

The primary project goal: to assess if obese individuals age 18 and older who were at high risk for development of type 2 diabetes would attend a risk reducing program. While participation in completion of the questionnaire was less than hoped for, data collected correlated with statistical data from the 2012 - 2013 Marion County Health Assessment. Data from the current study revealed a family history of diabetes in 75% of the participants, HTN in 50%, obesity 43%, and a high-risk score of developing Type 2 diabetes 48%. Of those who scored 5 or higher which indicated high risk of developing Type 2 diabetes, 95% were willing to attend a risk-reducing program in our medical clinic.

An initial review by the medical clinical finance and administrative board determined that based on the small number of participants responding to the DNP project questionnaire moving forward with implementation of a diabetes risk reducing program would not be an economically advisable investment. Stakeholders including the providers, patients, and families overwhelmingly disappointed with the decision to not move forward with implementation of the program. The clinic owner along with administrative staff and providers reconsidered initial decision to fore go implementation of a diabetes risk-reducing program. The overall benefit to practice, patients, and the community resulted in a plan to proceed with the implementation of a prevention

program in combination with a diabetes self-management program in the Marion County, Florida internal medicine clinic. Once established, a plan to provide group sessions at satellite locations of our community partners will be implemented as well. Future practice improvement projects and research must include increased visibility through marketing and distribution of information through available resources such as our electronic health record (EMR). Utilization of patient e-mail through the web-enabled EMR portal, a mailed out survey to all patients in the practice and citizens of the community through mass mailing and self-addressed, postage-paid return envelops, and an increased budget are needed to support this project and other practice improvements that will promote social change in diabetes self-care management.

Growth as a practitioner, professional, project planner, and scholar has been vast. Personal reflection and ability to critique self and performance remains a painful process. Knowledge gained has included not only refinement to succeed at the highest level of our health care profession, but also to contribute as a member of my practice and community.

The cost of diabetes care per individual over 25 years is an estimated $85,000 (Zhou, Xhang, Hoeger, 2013). The Center for Disease Control and Prevention (2012) estimated that over 200 billion dollars had been spent on care and treatment of Diabetes and related complications. The implications and conclusion are that the cost to all people demands a change in behavior resulting in reduction of obesity and risk of developing diabetes for our world health and socioeconomic future sustainability.

Section 5: Executive Summary

Project summary

Obesity and the risk of developing Type 2 diabetes are increasing at epidemic proportions. One-third of all adults in Marion County, Florida are overweight or obese and 12% to 17% more are diagnosed with type 2 diabetes than the state average. The purpose of this DNP project was to bring awareness to community members of the high risk of developing diabetes and to determine the feasibility of implementing a prevention program in an internal medicine clinic.

Background

According to the Institute of Medicine (IOM; 2013), obesity is one of the greatest challenges to society and public health. "Over a third of U.S. adults are obese (defined by a BMI > 30), and over 11% of people aged >/20 years have diabetes" (Eckel et al., 2011, p. 1655). Worldwide adaptation of sedentary lifestyles and unhealthy eating habits resulted in the rapid growth of obesity (Hill et al., 2013). Socioeconomic status, hereditary factors, behavior, environment, and culture are the important factors, which are related with the increased prevalence of obesity. Obesity is the leading factor contributing to the increase in Type 2 diabetes, in the United States (Eckel et al., 2011). According to the ADA (2014), 1 in 3 individuals will develop diabetes during his or her lifetime. Evidence-based programs have shown that healthy lifestyle behaviors reduce risk of obesity as well as development of type 2 diabetes, improve economic and health outcomes, and reduce the burden and cost of care to all stakeholders (Boyle et al., 2010).

Diabetes and risk

Type 2 diabetes previously recognized, as non-insulin dependent diabetes mellitus is a preventable and predominant type of disease that accounts for 90-95% of diabetes in the United States. Furthermore, it is linked traditionally with physical inactivity, family history of diabetes, older age, and obesity. It occurs in all ages and ethnic groups, including African-Americans, Hispanics, and south Asians (Hossain, 2007; Marshall, 2005). With an emerging obesity epidemic, type 2 diabetes continues to rise in all ethnicities and age groups, thus, predisposing them to the risk of type 2 diabetes mellitus. Long-term complications such as myocardial infarctions, stroke, kidney disease, blindness, hypertension, poor wound healing, infection, and death can also be prevented through lifestyle modification that reduce risk of both obesity and type 2 diabetes (Kirkman et al., 2012). Cost savings though prevention of the development of type 2 diabetes is an estimated at $65,000 over 25 years per person, according to Zhou, Xhang, and Hoeger, 2013. Research and evidence based practice has proven approximately 58% reduction in the risk of developing type 2 diabetes through awareness and lifestyle change (Tuomilehto et al., 2001 & CDC, 2011). The project explored the gap in practice regarding availability of lifestyle programs, individual risk of developing Type 2 diabetes, and awareness. The aim and objective of the DNP project was to bring awareness of risk of developing Type 2 diabetes resulting in practice change.

Demographic of target population

Preliminary assessment of the target population was performed by review of the Florida Department of Health Marion County (FDOHMC) needs assessment compiled in 2012.

The health assessment included data on age, race, ethnicity, socioeconomic status, morbidity, and mortality. One-third of adults over the age of 18 were overweight or obese. Type 2 diabetes was diagnosed annually at a rate of 12% to 17% higher than reported from the rest of the state. Local physicians concurred that obesity and Type 2 diabetes were in the top 5 contributors to disease and mortality. Marion County ranks 9% higher than the overall state mortality rate. Contributing factors include an estimated 1 in 3 Medicare patients has diabetes, one-third of the population is over 50 years of age, and a higher than the state average of individuals living at or below the poverty level. In addition to obesity, other contributing factors to Type 2 diabetes in Marion County, Florida, included the following: 41% of adults have hyperlipidemia, 38.5% suffer from hypertension, 26% of the population is on Medicare, 25% is on Medicaid, and 24% of the population is uninsured (Florida Department of Health Marion County, 2013). Review of a 2015 revised U.S. Census Bureau and Economic Census Report comparing Marion County to the state of Florida indicated similar statistics. While the validated Diabetes Risk Assessment tool utilized for this DNP practice improvement project did not ask specifics related to insurance, race, or economic status, the percentage of obesity and other risk factors remained consistent with the 2013 data. Clinic demographic was consistent with the Marion County, Florida census.

Literature review

Literature review included Cumulative Index, Nursing and Allied Health Literature (CINAHL), ProQuest, MEDLINE, OVID, the World Health Organization, American Diabetes Association, and the International Diabetes Federation. Search terms used were

obesity and risk of Type 2 diabetes, diabetes prevention programs, group lifestyle balance program, Rosswurm and Larrabee's change model, obesity national and Florida statistics, type 2 diabetes national and Florida statistics, Marion County Florida obesity and type 2 diabetes. Literature consistently reflected concern and consensus of the growing epidemic of obesity and development of type 2 diabetes. Lifestyle and behavioral change resulting in a more active lifestyle and healthy nutritional habits were key themes of success. Barriers and challenges were cited as motivation, beliefs, culture, economic, and accessibility (Seidel et al., 2008; McTigue et al., 2009; Dodani & Fields, 2010, Shay et al., 2009, Deavenport et al., 2010, Bang et al., 2009, Rosswurm and Larrabee, 1999).

Review of obesity and diabetes risk reducing programs

Current national and local hospital, community, and clinic based obesity and diabetes prevention programs were reviewed. While all reported varied rates of success, agreed was the ongoing challenge and epidemic of obesity and risk of type 2 diabetes (Madden et al., 2008, Piatt et al., 2013, K. Kumari, personal communication, September 19, 2013, D. Thompson, personal interview, October, 26, 2013). Reported cost of programs, when available, ranged from $600 to 1000.00 (Kramer et al., 2011).

Theoretical framework

Perception of health and wellness, illness, and acceptable treatment based on individual and cultural beliefs and values result in acceptance or barriers to care (Current Nursing, 2012). The health belief model (HBM) focused beliefs and values of the individual or group served as the framework (Deavenport et al., 2010). Rosswurm and Larrabee's

change model provided an evidence-based approach determining a need for behavior and practice change. Connecting the problem and intervention as synthesis of the evidence.

Recruitment and data collection

A validated Diabetes Risk Assessment questionnaire developed by Bang et al. (2009) was chosen to determine if individual age 18 and older who score 5 or higher risk would attend a risk-reducing program in our medical clinic. Recruitment of participants at our medical clinic, community event and rural health clinic provided me the site locations to distribute the diabetes risk assessment questionnaire. The timeline to perform the diabetes risk assessment and data collection was 1 week as approved by the IRB (#11-12-14 0369906). Seminars were held at clinic and community partner sites throughout two weeks prior to distribution of the questionnaire promoting awareness to diabetes risk during the month of Novembers' diabetes awareness campaign. The diabetes risk assessment questionnaire was then placed at the site locations for voluntary and anonymous participation.

Sampling and method

Quantitative data was collected from the convenience sample utilizing Bang et al.s' Diabetes Risk Assessment questionnaire (2009). Descriptive statistics were used to evaluate results (Terry, 2012). Data was analyzed to determine if an interest of 60% or more to participate which was the determine percentage needed to implement a risk reducing program in our medical clinic had been reached (table1 p. 44).

Inclusive and exclusive data

Inclusive data were age, gender, self reported as overweight or obese based on BMI and criteria from the diabetes risk assessment questionnaire (Appendix A), hypertension, family history of diabetes, and level of risk were analyzed. Excluded were those who declined to participate, pregnant, or unable to complete questionnaire.

Assumptions and limitations

The researcher had assumed awareness of the risk of developing Type 2 diabetes and future access to services would motivate change. Limitations included unwillingness of participants, skepticism of providers and clinic administration regarding patient participation, lack of funds and reimbursement of services, limited income and education, beliefs and values, willingness to change behaviors, and researcher interpretation of data. (Bash et al., 2009; Zitkus, 2012; Kramer, 2011; Shay et al., 2009; Terry, 2012, & Hodges & Videto, 2011).

Findings and conclusions

The question addressed by this DNP project was: Will obese individuals age 18 and older who are at high risk of developing Type 2 diabetes based on a diabetes risk assessment attend a prevention program in our medical clinic? Subgroups such as women, and related population 18 and older were represented. Cost of a Group Lifestyle Balance program had been determined as $600 to 1000.00 (Kramer et al., 2011). Data gathered through performing a diabetes risk assessment determined if a risk reducing program would be implemented in our medical clinic. Voluntary participation decreased bias of the study. The results of the diabetes risk questionnaire confirmed the data reported by

the Florida Department of Health Marion County's 2013 community health assessment. Participants with a family history of diabetes was 75%, the number who were overweight or obese was 82%, sedentary lifestyle reported was 45%, age-related risk was similar with an increase in those over 60 years of age (see Table 1). 44 completed questionnaires, 15 were from the patients of the internal medicine clinic, 25 were from the community event, and 4 were from the patients of the rural clinic. Age of participants ranged from less than 40 to over 60. Of the 44 participants, 32% of were over 60 years of age, 55% were female, 33% had a family history of diabetes, 50% had HTN, 55% were physically active, and 48% of scored higher than 5 on the diabetes risk assessment. The participants who scored 5 or more were considered at high risk of developing type 2 diabetes (n = 21). Of those at high risk, 43% were obese, 39% were overweight, and 18% were classified as of normal weight based on self-reported BMI based criteria from Bang et al's validated diabetes risk tool (2009).

Outcome of results

Agreement to participate in a diabetes risk-reducing program at our internal medicine clinic was 95% of the high-risk group. Results were presented the staff and community partners through power point and poster presentation of results to clinic staff and community partners. The project goal was met. The overall benefit to practice, patients, and the community resulted in a plan to proceed with the implementation of a prevention program in combination with a diabetes self-management program in the Marion County, Florida internal medicine clinic.

Recommendations for future action

The DNP project emphasized the need for further research. Larger number of participants would have provided a more reliable measurement of the overall population need (Pilot, 2010). Future practice improvement projects and research must include increased visibility through marketing and distribution of information through available resources such as our electronic health record (EMR). Nurse practitioners in collaboration with other stakeholders, must continue to promote awareness and motivate member of our communities to take an actively participate in reducing the obesity epidemic and leads to risk of diabetes (CDC, 2013). Practitioners must not only consider the implications to patient health but also cost-effectiveness and reimbursement of implemented programs (DiCenso, Guyatt, & Ciliska, 2005). Incorporation of individual and community health beliefs and perceived health risks and priorities will influence change (Hodges & Video, 2011; Kirkman et al., 2012). Combining diabetes self-management education with a diabetes prevention program will be more productive and financially sustainable for our medical practice, patients, and community.

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Appendix A: Diabetes Risk Assessment Questionnaire

Diabetes Risk Assessment Questionnaire

Question	Score	Enter your score (enter 0, if you don't know)
1. How old are you?	<40 years (0 point) 40-49 years (1 point) 50-59 years (2 points) 60 years or older (3 points)	
2. Are you a woman or man?	Woman (0 point) Man (1 point)	
3. Do your family members (parent or sibling) have diabetes?	No (0 point) Yes (1 point)	
4. Do you have high blood pressure or are you on medication for high blood pressure?	No (0 point) Yes (1 point)	
5. Are you overweight or obese? (see chart below to answer this question more accurately)	Not overweight or obese (0 point) Overweight (1 point) Obese (2 points) Extremely obese (3 points)	
6. Are you physically active?	No (0 point) Yes (-1 point)	
TOTAL SCORE (add points from questions 1-6)		
If your TOTAL SCORE is ≥4, you are at high risk of having undiagnosed diabetes or pre-diabetes. If your TOTAL SCORE is ≥5, you are at high risk of having undiagnosed diabetes. See your doctor for a blood test to look for diabetes if your score is high.		

Obesity definition:
if (BMI≥40 kg/m^2) or (waist≥50 inches for male) or (waist≥49 inches for female) then extremely obese;
else if (30≤BMI<40) or (40≤waist<50 for male) or (35≤waist<49 for female) then obese;
else if (25≤BMI<30) or (37≤waist<40 for male) or (31.5≤waist<35 for female) then overweight;
else not overweight or obese.

<Body Mass Index (BMI) Chart>

WEIGHT lbs	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215
kgs	45.5	47.7	50.0	52.3	54.5	56.8	59.1	61.4	63.6	65.9	68.2	70.5	72.7	75.0	77.3	79.5	81.8	84.1	86.4	88.6	90.9	93.2	95.5	97.7
HEIGHT in/cm	Underweight					Healthy					Overweight					Obese					Extremely obese			
5'0" - 152.4	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
5'1" - 154.9	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	36	37	38	39	40
5'2" - 157.4	18	19	20	21	22	22	23	24	25	26	27	28	29	30	31	32	33	33	34	35	36	37	38	39
5'3" - 160.0	17	18	19	20	21	22	23	24	24	25	26	27	28	29	30	31	32	32	33	34	35	36	37	38
5'4" - 162.5	17	18	18	19	20	21	22	23	24	24	25	26	27	28	29	30	31	31	32	33	34	35	36	37
5'5" - 165.1	16	17	18	19	20	20	21	22	23	24	25	25	26	27	28	29	30	30	31	32	33	34	35	35
5'6" - 167.6	16	17	17	18	19	20	21	21	22	23	24	25	25	26	27	28	29	29	30	31	32	33	34	34
5'7" - 170.1	15	16	17	18	18	19	20	21	22	22	23	24	25	25	26	27	28	29	29	30	31	32	33	33
5'8" - 172.7	15	16	16	17	18	19	19	20	21	22	22	23	24	25	25	26	27	28	28	29	30	31	32	32
5'9" - 175.2	14	15	16	17	17	18	19	20	20	21	22	22	23	24	25	25	26	27	28	28	29	30	31	31
5'10" - 177.8	14	15	15	16	17	18	18	19	20	20	21	22	23	23	24	25	25	26	27	28	28	29	30	30
5'11" - 180.3	14	14	15	16	16	17	18	18	19	20	21	21	22	23	23	24	25	25	26	27	28	28	29	30
6'0" - 182.8	13	14	14	15	16	17	17	18	19	19	20	21	21	22	23	23	24	25	25	26	27	27	28	29
6'1" - 185.4	13	13	14	15	15	16	17	17	18	19	19	20	21	21	22	23	23	24	25	25	26	27	27	28
6'2" - 187.9	12	13	14	14	15	16	16	17	18	18	19	19	20	21	21	22	23	23	24	25	25	26	27	27
6'3" - 190.5	12	13	13	14	15	15	16	16	17	18	18	19	20	20	21	21	22	23	23	24	25	25	26	26
6'4" - 193.0	12	12	13	14	14	15	15	16	17	17	18	18	19	20	20	21	22	22	23	23	24	25	25	26

(Bang et al., 2009). If your risk score is 5 or more, would you commit to participate in a 12 week program in our medical clinic to reduce your risks? Yes ____ No _____

Appendix B: Appendix Title

Budget for health needs assessment survey

1. Paper - $3.00

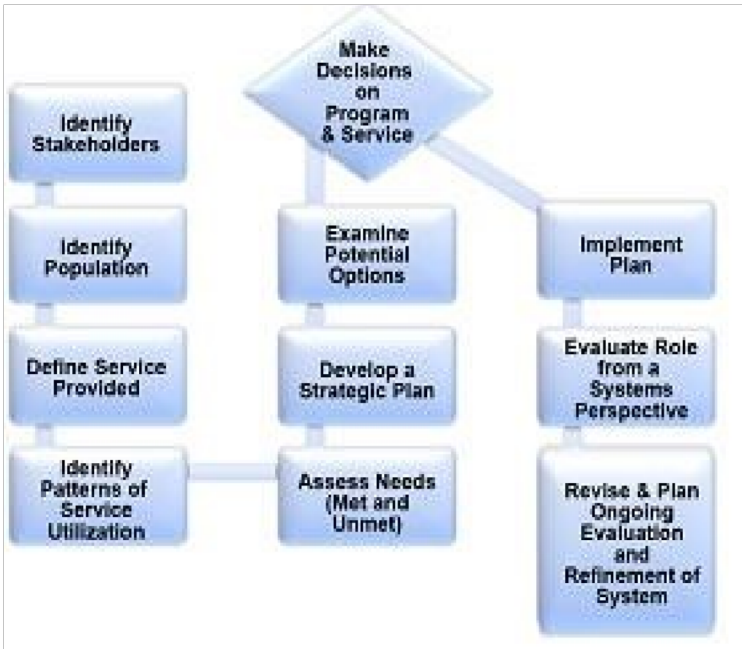
2. Ink - $.50

3. Envelops - $2.00

4. Stamps - $36.00

Computer and excel program already in place. The DNP student responsible for collection of data and survey input.

Appendix C: Diabetes Risk Assessment Algorithm



(Bryant-Lukosius, 2004; Meyer, 1988).

Appendix D

Author/ Date	Theoret-ical/ Concept-ual Frame-work	Research Quest-ion/ Hypoth-esis	Method-ology	Analy-sis & Results		Conclusion	Implica-tions for Future re-search	Implic a-tions For prac-tice

Health Belief Model/ Value expectancy theory of social psychology	What is the association between health belief model's and compliance levels of patients chronically who have diabetes ?	Interview survey of 30 patients on insulin, followed by physician , 18 or older, responsible for selfcare	Standardized questionnaire/ direct Observation / Likert scale. Over half report compliance by 70%, less than 7% demonstated essential compliance for diabetic control. Subjected who considered Diabetes more serious were more compliant.	All participants had attended a diabetic class in the past 6-12 months. Many did not considered nutrition part of treatment Health belief motivators and compliance did not correlate for more than 25%. Attitude toward importance of compliance was found to be a greater motivation than awareness of health risk of non-compliance		Behavior change is facilitated through longterm followup.	Longterm follow up must occur in all health care setting to insure compliance.

Chen, M., Huang, W., Peng, Y., Guo, J., Chen, C., Jong, M., & Lin, H. (2011).	Selfcare/ Health promo-tion	Will imple-mentation of group health Prom-otion program improve diabetes control and self care	Longit-udinal cohort study. Patient sessions on diet, medica-tion, activity	Simple random sampling, t-test, multidisc-iplinary approach. Indicator s of control normal glycemic levels, BMI, Waist circumfer-ence, neurovas-cular assess-ment, ability to perform foot care. SPSS version 11.0 used for analysis	Six month evalua-tion of program indic ated improve ment of statistical signifi-cance except vascular, although some improve-ment was docu-mented. Poor glyce-mic control persisted among elders and was hypoth-esized as result of lack of time spent with diabetic educator and cultural differ-ences	Longitud-inal study to assess effici-ency of group health promotion program	Commun-ity-based health promo-tion program improve overall glycemic control. Early interven-tion reduces and may reverse periph-eralopathies.

Hayes, E., McCah-on, C., Panahi, M., Hammer, T., & Pullman, K (2008).	Self-care, behavior change	Will coaching to promote behavior change improve patient self-care in the	Liter - nature review	Glycemic control, challenge for providers, peer review of practice guidelines	Liter-nature review conclude-end stream lining practice systems to promote	Promote coaching within a frame-work of behavior al change by nurse practitioners in	Coaching strategies by nurse practitioners is a feasible alternative to
		primary care setting?			patient lifestyle changes and intense education resulted in mixed outcomes .	primary care.	Improve-In patient outcome.

Kaliope ouzos, M. & Walker, E. (2009).	Practice theory and self-care	Do patients' memory of family attitude toward diabetes influx-once patient percept-tion?	Selfcare study Instru-ment	Cross sectional descriptive design/ conven-ience sample. Illness perception question-naire. Two-tailed test calculating Pearson's correlation. Memory of family perception significantly affected dietary adherence but no other self-care behaviors .	Family influence s behavior, particu-larly in those who perceived heredity to be the primary contribute or to diabetes develop-ment	Long-term group coaching sessions with patient and family on improve ment and preven-tion of diabetes risks.	Provider awareness of patient perception family history related to disease progres-sion will assist to promote and improve outcome
Madden, S., Loeb, S., & Smith, C. (2008).	Behavior change	Do pro-grams promo-ting lifestyle change	Inte-grative review	Electronic database search. Nutrition and	Long-term mainten-ance and follow-up must	Long term mainten-ance studies beyond	Nurse practi-tioners are in an ideal position to

		prevent develop-ment of Type 2 diabetes?		exercise along with maintain-ing behavior change showed initial improve ments but no longterm sustain-ability based on a 6 year follow up.	occur to maintain behavior al change	Six-years.	promote as assist patients in maintain-ing lifestyle behav-ioral change and healthy outcome.

New, N. (2010).	Self-care/ Behavior change	Will use of co-created learning techniques improve adherence to selfcare regimens?	Pilot study, quasiexperimenal descriptive qualitative self-management, focus group sessions	Adults over 40 who had been diagnosed at least one year prior to study were recruited. SPSS was used to process data and analysis. Chis-quare and indep-endent test. Sample group was typical of popu-lation base. Outcomes varied	Participants were reflective of the population. While no significant overall improve-ments resulted, individual improve-ments were docu-mented indica-ting a benefit to a need driven approach.	Identific-ation of unique learning need of adults with Type 2 diabetes.	Providers must first assess patient needs, resources and motiv-ating factors to maintain a successful self-care program for the adult diabetes popu-lation.

				from knowing what to do but not consider realistic to daily lifestyle, reported fear of complic-ations, fixed incomes limited ability to afford prescribed medica-tions, prepost intervene-tions did not demon-strate a significant improve-ment.			

Rein-eck, C. (2007).	Model of change/ Behavior change/ Patient-focused care	Is promoting change that results in positive change reflective of leadership compe-tency?	Review of change models: Patient focused care, rehabilita-tive improve-ment, and change through power.	Unit shared leader-ship, partici-pant manage ment, and empower-ment.	Imple-menting change is key to leadership compe-tency.		Knowledge learned assists to avoid change fatigue and promotes sustained success.

Walden University Writing Center (2010)