

Spring 4-2018

Prevalence and Prevention of Diabetes in School Age Children: A Parent Education Module

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Abstract

The Center for Disease Control reports that there continues to be an increasing number of children being diagnosed with childhood-onset Type Two Diabetes Mellitus (T2DM).

The recommendation is to provide education to parents regarding the risks and possible risk factors of T2DM, and strategies to prevent and treat these risk factors (Center for Disease Control [CDC], 2014). Educating parents of school age children on T2DM risk factors, and prevention practices may help to slow down this rising number of new cases. The Aim is to provide educational modules that may increase knowledge which *could* in-turn change behavior, that *may* prevent children from being at risk for weight inactivity or have a family history of T2DM.

A qualitative and quantitative study was conducted in a multipurpose room, presentation was provided to parents via PowerPoint regarding risk factors and prevention strategies. The method of analysis was quantitative pre-and posttest survey, with an exploratory qualitative component via questionnaire. Participants (who will be known as parents for this study) were recruited who have children between the ages of eight and ten years old. The goal of this project was to provide education to parents and increase their knowledge on T2DM risk factors for their children. The statistical analyses were significant in this study. There was a significant difference between the pre-and post-test scores, that showed an increase knowledge and an intention to change their behaviors.

Keywords: Type 2 diabetes, prevention, obesity, risk factors, children, parent education

Christine Whitmyer
April 2018

Prevalence and Prevention of Diabetes in School Age Children-A Parent
Education Module

by

Christine Mary Whitmyer, DNPc

A project

Submitted in partial

Fulfillment of the requirements for the degree of

Doctor of Nursing Practice

California State University, Northern Consortium

Doctor of Nursing Practice

April 2018

APPROVED

For the California State University, Northern Consortium

Doctor of Nursing Practice:

We, the undersigned, certify that the project of the following student meets the required standards of scholarship, format, and style of the university and the student's graduate degree program for the awarding of the master's degree.

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ACKNOWLEDGMENTS

Advisor-Dr. Sylvia Miller-for all your continued support

Chair-Dr. Lisa Rauch-For the endless hours spend helping me

Mentor/Committee Member-Dr. Sabrina Chimenti

Committee Member-Katherine Conway

My Family-My husband and children who I could not have ever done this without.

Gillian Williams-My daughter who took me on this journey with her and kept me
on it every when I wanted to jump ship

PREVALENCE AND PREVENTION

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Prevalence and Prevention of Diabetes in School Age Children-A Parent Education

Module

Chapter 1. Introduction

Phenomenon of Interest

There are approximately 18,000 youths diagnosed each year within the United States with Type Two Diabetes Mellitus (T2DM) (Center for Disease Control [CDC], 2014). Treatment of T2DM in children needs to aim attention at the reduction of complications, because the younger one is in developing T2DM the more likely hood of developing severe complications (Temneanu, Trandafir, & Purcarea, 2016). The rising pediatric diabetic population is a concern and one that requires continual monitoring. In 2012, a research study was done to look at the number of diabetic children and it was found that there has been a 21 percent increase in children with the disease from 2001-2009 (Gebel, 2012). The American Academy of Pediatrics in 2013 issued guidelines on how to manage T2DM in children. “The guidelines issued emphasize the use of management modalities that have been shown to affect clinical outcomes in this population” (Temneanu, Trandafir, & Purcarea, 2016, p. 236). The guidelines main recommendation was to integrate lifestyle changes with regards to exercise and diet and if needed medications (Copeland et al., 2013).

“California ranks 24 in overall prevalence with 30.5% of children considered either overweight or obese” (“California Facts,” 2008, p. 1). Being overweight can be a precursor to T2DM as well (Adams, Howell, & Lammon, 2007). According to the CDC,

“being overweight would be a Body Mass Index (BMI) at or above the 85th percentile and below the 95th percentile for children and teens of the same age and sex” (“Defining Childhood,” 2015, para. 1). Obesity, the most important risk factor in developing T2DM in young people, is closely correlated with an increasing number of cases of T2DM” (Temneanu, Trandafir, & Purcarea, 2016, p. 235).

Researchers found the main culprit for the rise in T2DM among children to be obesity (Gebel, 2012). Obesity has been found to be due to children leading a more sedentary lifestyle (Pulgaron & Delamater, 2014). Obese children have approximately 40% lower insulin stimulation glucose metabolism (Pulgaron & Delamater, 2014). Researchers have found that family based interventions have been very successful, such as exercise programs and proper diet guidelines. Training programs have included physical activity education, and dietary intake (Pulgaron & Delamater, 2014). Significant lowering of BMI was seen after the trainings and this was as far out as the one year follow up (Pulgaron & Delamater, 2014).

Problem Statement

According to the CDC Report Card (2014), the rates of new cases of children being diagnosed with (T2DM) continues to rise. “In 2009 more than 20,000 US youths were diagnosed with type 2 diabetes, with an expected 5000 new cases of T2DM are estimated to be diagnosed each year” (CDC Report Card, 2014, p. 5). This data illustrates the importance to have a dedicated focus on increasing educational program for the individuals who have the best ability to reduce this epidemic, parents of elementary school age children. Most literature related to education of parents is related to caring for

the child with an existing diabetes diagnosis. Yet there is a limited amount of literature reflecting measurements of parent's current knowledge of risk factors that contribute to the disease, as well as, what they can do to possibly change these risk factors. The aim is to provide educational modules that may increase knowledge which *could* in-turn change behavior, that *may* prevent children from being at risk for weight inactivity or have a family history of T2DM. This study will measure pre-and post T2DM parental knowledge related to risk factors and prevention strategies, this was done with a researcher developed survey. An additional goal of this project was to assess if parents had made any behavior changes such as, willingness to buy healthier foods, or trying to increase activities for their children, this was done via a qualitative and quantitative questionnaire one month after the workshop. This questionnaire also provides an opportunity for parents to express any barriers they incurred during the study.

Background and Significance

It is vital to make sure that parents of school aged children be made aware that T2DM, is an epidemic among pediatric populations (Adams et al., 2007). This new epidemic is of grave concern for the health of children. It is necessary to look at this disease that once only affected older adults, yet now is being seen in many of our young children. Based on the literature reviews, increased inactivity in children, obesity due to poor diet could be elements for the sudden rise in pediatric T2DM diagnoses (CDC, 2014). If caught early enough, T2DM can be considered reversible (CDC, 2014). Development and implementation of an early educational program, detailing the risk factors for T2DM, is critical for parents and caregivers. This project aligns with Healthy

People 2020. Healthy people 2020 is made up of a group of multidisciplinary participants that work together to produce guidelines for the health of the people. Per healthy people 2020, effective therapy can delay diabetes or its complications ("2020 Topics and Objectives," 2014). In this study, there was no medical research on human beings, being done. With a detailed review of the available literature, an educational program describing the risk factors for diabetes was developed and piloted in an elementary school setting for parents of children in second and third grades.

Purpose

The purpose of this evidence based project was to assess, parental attitudes and knowledge of risk factors related to childhood diabetes. This project was designed to assess parental attitudes and knowledge of risk factors related to childhood diabetes. This was done through a pre-and post-exam survey that was given when the parents attended school based educational modules at their child's school. This project holds a large potential for other school nurses to implement this module and in time see a decrease in T2DM or even the risk factors such as obesity or sedentary lifestyles. The aim was to provide educational modules that may increase knowledge which *could* in-turn change behavior, that *may* prevent children from being at risk for weight inactivity or have a family history of T2DM.

Theoretical Framework

The Health Promotion Model (HPM) designed by Nola Pender, focuses on behaviors that motivate and empower patients to change and engage in health-promoting lifestyles that lead to better health (Edries, Jelsma, & Maart, 2013, p. 2). By utilizing

the HPM model I can help parents to become self-empowered to care for their children. Pender looks at a person's own health beliefs to plan the care that will be provided, because promoting good health care will supersede illness. Health promotion is what Pender looked at first, because ones' behavior can motivate them to succeed or fail in their own self-care. If a person feels they have the power to change their behaviors this could improve their own health and be successful. If they feel that it is out of their control, then they are appearing helpless and it could very well be out of their control. The nurses job then becomes one to help find things to help motivate patients to change their behaviors.

Study Design

The study's tool was a self-designed survey in the form of a questionnaire, it was used to collect data to measure if the material taught in the educational modules did or did not increase health literacy. The questions were developed to assess the parent's knowledge on T2DM risk factors. The researcher made sure that the questions were targeted to gain the data needed to ensure that there were no errors in the survey. Several surveys were looked at but to gain the best information needed for this study a self-design questionnaire was written by the researcher. The same questionnaire was used both pre- and post-exam. The researcher had several other experts in school nursing look at the questions and offer suggestions to help ensure validity of the tool. This tool contained questions with true and false answers, as well as some qualitative questions that were open ended to gather more than just a yes or no answer. The researcher was very careful when designing the study to make sure that the questions that were designed,

help to answer the hypothesis of the study. The study design that was used was two one hour sessions a week a part. PowerPoint and handouts were used to educate parents on the following topics, what is diabetes, what are the risk factors to the disease, what can be done to help ensure the children of these participants become healthier young adults and do not develop type 2 diabetes. There does not appear to be any potential problems involving the subject group that could put them at-risk with regards to physical, legal or violations of normal expectations. One risk that could be possible is psychological stress on the part of the parents, because they are learning a great deal of information and may question themselves if they can all of this for their children. There could also be a risk of social stigma because perhaps their child is obese and they may cause them even more stress that their child has a major risk factor for developing this disease. There is a risk of economic concerns because parents may not have the money needed to purchase healthy foods or put their child in an exercise program or sports to help, and this too can lead to stress. Therefore, stress is a risk factor that must be prepared for to help participants of the study should it develop. For example, have ideas of inexpensive healthy meal plans as well as research local free physical activity programs in the school and incorporate this information into the education module.

Participants (Parents)/Populations

The participants were a convenience sample of parents within a moderate sized elementary school in a metropolitan area. Demographic data from the school indicates that most these participants fell into the lower socioeconomic stratosphere, do not have health insurance, and speak English as a second language. To take on this problem, the

researcher needed to take an innovative approach. Children of today, are the future and we must protect and take care of them starting with their health. Parents from one elementary school were given the opportunity to participate in this program if they had children in the 2nd and 3rd grades. The program was opened to one or both parents or guardians whomever the child currently was being cared by.

Procedures/Project Design

The subjects for this project included parents of children from an elementary school in San Bernardino County, California. For this project, the target population of interest included parents of school age children in the second and third grade, whose primary language was English. During the researcher's time as a school nurse, there has been a noted increase in diabetic children, children currently being tested for diabetes and children needing to be tested. The community is a lower to middle-class population, with both parents working at hourly salaried jobs, made up of primarily Hispanic families. Education in the schools of the children, makes this a unique program because currently there is nothing similar in the research to this type of educational program. These families also have limited means of transportation so providing the education in their child's school setting may make it easier for them to take part in the program. The participants of this group had no potential problems that could put them at risk. The goal of this researcher was to have 15 parents or guardians of the children attend.

There did not appear to be any potential problems involving the subject group that could have put them at-risk with regards to physical, legal or violations of normal expectations. One risk that could be possible is psychological stress on the part of the

parents, because they are learning a great deal of information and may question themselves if they can all of this for their children. There could also be a risk of social stigma because perhaps their child is obese and they may cause them even more stress that their child has a major risk factor for developing this disease. There is a risk of economic concerns because parents may not have the money needed to purchase healthy foods or put their child in an exercise program or sports to help, and this too can lead to stress. Therefore, stress is a risk factor that was prepared for to help participants of the study should it develop. For example, have ideas of inexpensive healthy meal plans as well as research local free physical activity programs in the school and incorporate this information into the education module.

Source

The participants were a convenience sample of parents within a moderate sized elementary school in a metropolitan area. Demographic data from the school indicated that most of these participants fall into the lower socioeconomic stratosphere, do not have health insurance, and speak English as a second language. To take on this problem, the researcher needed to take an innovative approach. Children of today, are the future and we must protect and take care of them starting with their health. Parents from one elementary school were given the opportunity to participate in this program if they have children in the 2nd and 3rd grades. The program was open to one or both parents or guardians whomever the child currently is being cared by.

Criteria for inclusion and exclusion

The initial module of this educational program was offered only to parents whose primary language is English, and they needed to be able to read and write in English. The part of the criteria that required English only participants was due to time constraints, difficulty in translating documents and problems with recruiting, then training and finally being able to pay bi-lingual staff to not have to hire an interpreter for the forms and for the class. All English-speaking participants who signed and completed the consent were welcome to participate.

Capable to provide informed consent

The parents in this study could sign an informed consent, giving their permission to take part in this study and can give their informed consent. Parents need to be able to read and write in English.

CHAPTER 2-Literature Review

Summary of Relevant Research

According to Candela, Gutierrez, Dufek, Putney and Mercer, who performed a study on children and diabetes education, “today, 30-50% of children are being diagnosed with T2DM, and this disorder will overtake type 1 diagnoses within the next 10-20 years” (Candela, Gutierrez, Dufek, Putney, & Mercer, 2012, p. 1). The authors performed a feasibility study to analyze how successful a diabetes education program, not yet examined, could be with children (Candela et al., 2012). Their findings were that education on diabetes risk factors influenced their choices with regards to food choices and exercise.

In an article by Hannon and Arslanian (Hanhon & Arslanian, 2015), research showed an increase in type 2 diabetes in children linked with obesity and the decrease in physical activity of children. According to the authors diabetes type 2 in youth is considered an increasing children’s disorder of the millennium. After their review of several studies on diabetes and children the authors found that “there is a significant need for effective therapeutic options, in addition to increased prevention, to halt the projected fourfold increase in youth T2DM by 2050 and the consequences of heightened diabetes-related morbidity and mortality at younger ages” (Hannon & Arslanian, 2015, p. 113).

Menchaca and Urrutia-Rojas performed a cross sectional study on fifth grade students to review the risk for type 2 diabetes in school children. Measures taken were height and weight, BMI, presences of acanthosis nigricans, physical activity and television watching time. Upon completion of the study which involved over 1076

children it was found that 22.6% of the children were identified as having a risk for developing T2DM (Urrutia-Rojas & Menchaca, 2006). The risk factors that were identified in this study are ones that can be changed with proper education.

An article by Head, Barr and Baker, used a qualitative pilot study made up of five different focus groups of parents, “to identify the norms, values, and perceptions of urban immigrant Mexican American (MA) parents of school children relative to physical activity, healthy eating, and child risk factors for type 2 diabetes” (Head, Barr, & Baker, 2011, p. 51). Focus groups are a way of gathering data through opinions of the participants in each group. Each one of the five focus groups consisted of 14 females and one male participant and a five-level approach were used to analyze findings. This method was selected to help generate accurate findings when using multiple focus groups (Head, Barr, & Baker, 2011). The actual results related that there was an increase in stress associated with the time restraints put on parents by the United States (Head et al., 2011). Parents shared fast-paced lifestyles that caused them to eat at fast food restaurants. Several topics were examined during the study including; cultural adaptation, fast-paced life, parent’s concern regarding how to monitor their child’s activity and eating patterns. One limitation of the study was that participants were interviewed in English, but were fluent in Spanish, resulting in language barriers. Therefore, a limitation of the study was the information translated may not have been accurate. One strength of this study was the information gained could help nurses when they plan interventions for diabetic children (Head et al., 2011). This article also offered good insight into what concerns parents of young children may have in relationship to healthy eating habits and

health risks. Much of this information could be included in educational classes on diabetes prevention.

Kong, Smith, Rome and Sussman (2007) used a cross-sectional approach to determine if there was an association between Acanthosis Nigricans (AN) and T2DM in young children. Prior to the parent and child being seen by one of the researchers, the parent and child were given information sheets to review regarding the study and its goals. Once they were in an exam room doctors asked patients if they wanted to participate. The independent variables for the study were AN, age, BMI, as well as other risk factors such as high blood pressure, ethnicity, and family history. There was only one dependent variable in this study, and it was type 2 diabetes. Over a two-week period, data was collected at various times to ensure a valid sample was obtained. Tests used to analyze the data were Chi-squared and Fisher's exact test and long-binomial regression modeling. One important strength of this study was that patients with AN are likely to have various risk factors for type 2 diabetes, making this an important educational topic to review with parents. Limitations of this study included the fact that health history was self-reported, data was missing such as lipid panel results as well. An interesting factor in the study is that there was a likelihood of patients with AN developing T2DM and should be referred to their doctor (Kong et al., 2007).

A semi-structured set of interviews were performed for a qualitative study done by (Eriksen & Manke, 2011). Flyers were sent home to over 200 families followed by interviews with those that qualified and signed consent. The purpose of the study was to examine and understand the social and cultural foundation that evaluated children's risk

of type 2 diabetes (Eriksen & Manke, 2011). The participants, mothers, and children, used were from an assorted group from Anaheim, California (Eriksen & Manke, 2011). Detailed interviews were performed with 28 adults and 17 children and they were conducted both in Spanish and English to avoid any translation errors. “The research instrument was a loosely structured set of open-ended questions that solicited parents and children’s ideas about the characteristics of a healthy child, what they do to promote health in themselves or their children, the challenges they face in keeping healthy and their experiences with type 2 diabetes” (Eriksen & Manke, 2011, p. 556). Findings showed that parents and children exhibited a fear with regards to food intake. Many shared that it is easier and quicker to grab fast food for dinner, but were unsure what would be healthy options at those types of restaurants, causing children to not have healthy choices for dinner. One limitation noted was that the sample was from an affluent area in California, limiting the findings to that socio-economic group. A strength of this study was that data was gathered from both parents and children so they could get a dual perspective (Eriksen & Manke, 2011).

Katz and partners (2011) conducted a randomized controlled trial (RCT) which showed the need for interventions in schools to change eating habits of children. Five schools from an area in Missouri were selected based on their demographic characteristics, then each school was randomly placed either into an intervention or control group (Katz et al., 2011). The goal of this study was to review how well nutritional education programs were working for both students and parents. Additionally, the study was designed to help evaluate the difference between healthy and less healthy

choices in a mix of food categories. The intervention group was made up of 628 students and 552 students were placed in the control group (Katz et al., 2011). The program took place over several weeks, taught by physical education teachers, informing children how to read and understand the purpose of food labels. Independent variables included gender, grade level, and age. The dependent variables were nutritional knowledge and BMI. The study used ANOVA to analyze differences within their group for the food label pre-and posttests (Katz et al., 2011). Gender, age, and grade level were tested with Post hoc tests. Data was taken from students in grades second and third. In addition, students whose parents did not consent were excluded. The authors reported that students who were in schools where the program was presented showed a higher understanding of why and how to read labels. One major limitation of the study was that “the food label quiz used was developed specifically for the program and not previously validated” (Katz et al., 2011, p. 26). One strength is that overall, the study did show the importance of streamlined, brief intervention in schools (Katz et al., 2011).

Tarini, Herman and Lee conducted a qualitative study on parents who have diabetes, to evaluate their goal to help prevent T2DM in their children. Findings would be evaluated several times in the study from genetic testing, at the beginning, after the false positive result, and after a negative result. (Tarini, Herman, & Lee, 2013). The researchers “calculated mean/median preventive intention scores for each scenario and examined the association between parents’ score change and parent/child characteristics with the use of a 10-point Likert scale” (Tarini et al., 2013 p. 821). “Individuals who participated were from a TRIAD, a multi-center, prospective observational study of

quality of care, costs, and outcomes for diabetes in US-managed care health plan” (Tarini et al., 2013, p. 822). One strength was the result of this study was that once parents saw what the risk of developing T2DM could be for their child, the intent to prevent this became much higher for the parents (Tarini, Herman, & Lee, 2013). Limitations to the study were related to the hypothetical nature of the situation presented. In addition, the researchers looked at intent instead of behavior to prevent the development of T2DM (Tarini, Herman, & Lee, 2013 This study offers the information that parents once aware of the dangers of diabetes showed a need for information to prevent diabetes from occurring.

CHAPTER 3-DNP PROJECT DESIGN

Methodology

After the educational modules had been completed and accurate data collected, the next phase consisted of presenting this information to the school board. The reason for this proposed process was to show validation for teaching parents and caregivers in this method to prevent diabetes. Additionally, an educational website can be put in place to disseminate the findings to show the educational need within the community. These projects findings will inform schools within the scope of my present practice and surrounding districts the importance of educational modules in risk factors of T2DM for parents.

The data collection method for this project was very straightforward. It was designed to gather baseline statistics to accurately assess the programs impact. Data collection was done through a pre-and post-knowledge questionnaire given at the beginning of the education module on diabetes prevention, and at the end of the second educational module. This diabetic education was given to all participants in attendance, administered in person in the classroom. It was important for the interviewer to be present to respond to any questions that might have risen. Additionally, costs of the study were controlled as the need to blanket mail the survey was not needed. The goal of the questions included for the surveys was to replicate, all the data the same on the pre-test and post-test questionnaire. Therefore, the same questionnaire was used both before and after the module. This was to help validate a true assessment of the parents' understanding post-training. The questions were presented in multiple choice format. To

assure accurate data collection and reporting, parents were given a unique identifier that was to be recorded on both the pre-test and post-test. I worked with a statistician assistance on the data and t-test.

Recruitment

In the two grades that were utilized in the study, there were approximately 150 students. This sample of parents were different from other studies participants reviewed because in prior research most of the education was being done for the child and in a health office setting. By providing this opportunity in their child's home school setting, a place that parents are already used to visiting, they were far more likely to attend and participate. The goal was to have 15 parents and or guardians and more than 1 parent from a family could attend if they chose to for the two 1 hour educational modules that were offered on a Monday and one week later the following Monday. This educational module was presented within the multipurpose room at their child or children's school. A form letter was sent home to all parents of the second and third grade elementary students, explaining the program and offering them the opportunity to participate once a signed consent is obtained. Flyers went home with all the children in both grades and provide a brief introduction to what will be reviewed in the class. Also, parents were informed there will be no monetary incentives, but there will be juices and fruits available during the class, which also will be used as educational tools. Parents were informed before signing the consent that this program is completely voluntary and they could remove themselves from it at any time with no penalty to them. There would

be no special procedures such as IND, radioisotopes, electrical equipment etc., used in this study.

Frequency and duration

This educational module was taught in two sessions that were one week apart on Monday of each week. Each session lasted one hour, this hour was composed of PowerPoint presentations, handouts and question and answers.

Location of Study

This study took place within an elementary school building in the San Bernardino County. A multipurpose room within the school was utilized to ensure that media needed will be present, such as overhead projection.

Potential Benefits

The potential benefits of this study were to increase parent's knowledge on what is T2DM and what are its risk factors. In addition, they will gain an understanding as to what are the risk factors associated with this disease, and how can the parents utilize this information to help their children avoid developing these risk factors so that the children can have a healthier lifestyle. There was a better benefit rather than burden for parents to attend this educational module. This study could be a great benefit to the entire United States. Starting one educational module at one school and if successful lead to other schools within the district, then go on to other school districts within the state and then out to other states and their school districts. Healthy children will mean less visits to doctors, health insurance plans may be more accessible for the child because of

better health, and overall success of this project can lead to a major change in the overall health of children.

Potential Risks

There is a great deal of information on diabetes in children, but not a lot of information on what parents know or are doing about the risk factors. With that said, there does not appear to be any potential problems involving the subject group that could put them at-risk with regards to physical, legal or violations of normal expectations. One risk that could be possible is psychological stress on the part of the parents, because they are learning a great deal of information and may question themselves if they can all of this for their children. There could also be a risk of social stigma because perhaps their child is obese and this may cause them even more stress that their child has a major risk factor for developing this disease. There is a risk of economic concerns because parents may not have the money needed to purchase healthy foods or put their child in an exercise program or sports to help, and this too can lead to stress. Therefore, stress is a risk factor that must be prepared for to help participants of the study should it develop. For example, have ideas of inexpensive healthy meal plans as well as research local free physical activity programs in the school and incorporate this information into the education module. A list of local resource programs, that are in the school area, were made available to help any participant deal with any physiological stress that may have occurred from the education.

Precautions Taken to Minimize Risks

Potential for social psycho stress, could be a risk of this training. Educating them on inexpensive healthy meals and inexpensive or free physical activities in the community. Also, it was important to give parents a chance to speak freely and offer support as needed. In addition, a list of local resource programs, that are in the school area, were made available to help any parent deal with any physiological stress that may have occurred from the education.

Confidentiality/Coding/Storage/After Study

All subject's confidentiality was of highest priority to the researcher. No names or information was shared by the researcher of the team. A coding system was used so that each parent will be given a number and letter and that will be the only form of identification, also to protect their privacy. All data will be stored in the researcher's locked office in a locked file cabinet, and only the researcher will have access to this. One year from the day of the study being completed all data will be destroyed, by the researcher via a criss cross shredding machine. This will be done at the one year mark to make sure that all information is collected and synthesized.

Compensation of Subjects

All parents were made aware that there was no monetary compensation for participating in this study but they were provided with food during the class which was another form of compensation.

Instrument/Tool

The study design was a self-designed survey in the form of a questionnaire which was used to collect data to measure if the educational module did or did not increase health literacy. The questions were developed to assess the parent's knowledge on T2DM risk factors. The researcher made sure that the questions were targeted to gain the data needed, to ensure that there be no errors in the survey. I had several other experts in school nursing look at the questions and offer suggestions for face validity. I had looked at several surveys but found it best to get the information needed for this study I had to self-design my questionnaire. It contained questions with true and false answers, as well as some qualitative questions that were open ended to gather more than just a yes or no answer. I was very careful when designing my study to make sure that the questions I designed help to answer my hypothesis.

Evaluation

To analyze the success of the educational module, ("PDSA Cycle," 2016) the data received from the questionnaires, a t-test method was used because it is a test that can look at the difference in two surveys taken (Polit & Beck, 2008). The t-test will help to assess if the means found from two groups are different statistically from each other. This test helped to measure the responses on the questionnaires and determine the average and standard deviation on the pre-and post-test (Polit & Beck, 2008). These finding might then be reviewed to determine if there was a significant growth by the parents.

Chapter Four-ANALYSIS OF DNP PROJECT

Data Analysis

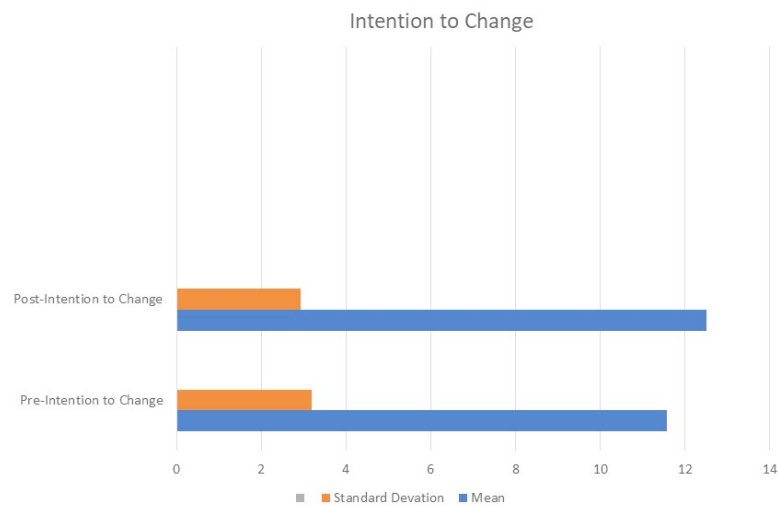
The purpose of this project was to determine if the educational module for parents of school age children could help improve their knowledge on disease and if this would impact changes in their behavior. This diabetes educational module was presented on October 20, 2017 and November 17, 2017. Data was obtained and evaluated from a mixed method pre-and post survey. There were 24 participants in the study made up of 20 females and 4 males.

Paired sample T-tests were used to determine if there was a significant difference between the pretest and post test scores on both the knowledge test and the intention to change test. The knowledge test had a significant difference between the pretest score ($M=14.08, SD=0.93$) and post test score ($M=15.21, SD=0.03$), $t(23)=-5.3, p<.01$ (see Figure 1) and a Cohen's d test showed a significant moderate to large effect (see Table 1). The intention test had a significant difference between the pretest score ($M=11.58, SD=3.19$) and post test score ($M=12.50, SD=2.92$), $t(23)=-3.60, p<.01$ (see Figure 2) and a Cohen's d test showed a moderate to large effect size (see Table 1).

Table 1

Pre-and Post-Descriptive and Inferential Statistics

Variable	<u>Pre-Test</u>		<u>Post-Test</u>		<i>t</i>	<i>p</i>	<i>d</i>
	M	SD	M	SD			
Knowledge	14.08	0.93	15.21	0.03	-5.33	.00	1.08
Intention to Change	11.58	3.19	12.50	2.92	-3.60	.00	0.73

*Figure 1. Intention to Change*

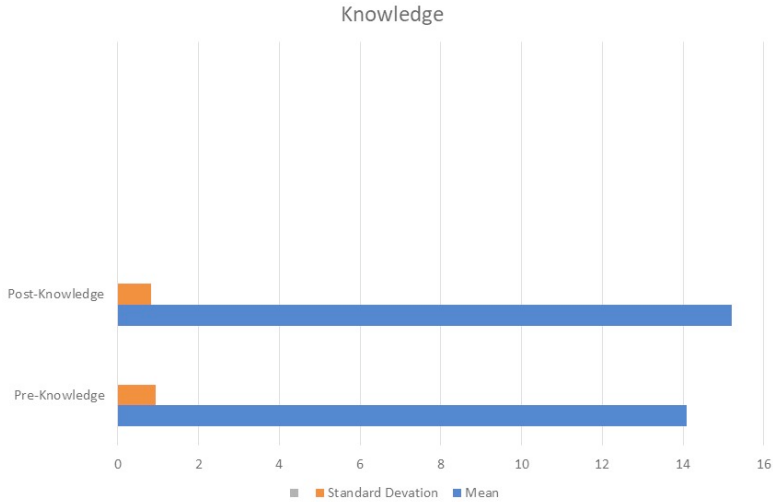


Figure 2. Knowledge

Questions four and five on the pre-posttest (Appendix) provided qualitative data relating to parental perceptions and understandings of T2DM. Qualitative questions revealed additional parental concerns about diabetes and its risk factors. Question four asks parents perspective on how diabetes could affect their child's life. Eighty three percent accurately identified long term health effects, such as depression, hypertension and reduced organ function that can result from diabetes in the post test. In addition, 95.83% identified the lack of exercise and poor diet as risk factors that could lead to a rise in T2DM. This qualitatively demonstrates that they learned from the materials taught during the modules, and this supports the quantitative results.

Question five (Appendix) ask parents to identify ways to keep their child healthy. Prior to the educational modules, parents demonstrated basic knowledge of ways to reduce the chance of developing T2DM, such as "educate my child" and "exercise with my child". Many of the parents wrote about the need for more education for their child on the disease and helping them to make healthier choices with regards to food and encouraging more exercise. In the posttest participants were more specific with their responses. The most frequent response observed at 75% was exercise outside with their friends, such as playing soccer and riding bikes. In addition, 50% noted that fun exercise as a family is beneficial, such as jogging, marching in place during commercials on television or planting a family garden. The post quiz results demonstrate parents gained a better understanding on how to improve diet and exercise which can help to reduce the development of T2DM.

CHAPTER 5

Learning Outcomes from Project**Nursing Implications**

This study supports that parent's benefit from education in risk factors and knowledge about T2DM. These findings from the study show that education in this area does lead to an increase of knowledge and intention to change. The findings from this study show parents can demonstrate an attitude changed based on the educational instruments used in the study. These statistical findings infer that education can increase parental knowledge which can lead to behavioral changes related to food and exercise which eventually, hopefully will show a reduction in risk factors overtime. "Rates of new diagnosed cases are increasing in the United States, 29.1 million people are living with diabetes and about 208,000 are youths younger than age 20 ("Rates of new diagnosed cases," 2017, p. 1)." The children affected by diabetes, are at risk to poor health outcomes as adults and higher health insurance costs overall for the United States. This study may help lower risk factors such as obesity and sedentary life styles. There is currently a lack of literature showing educational modules being used in the school settings to mitigate risk factors for disease. Findings of this study can be successfully implemented in school settings. This DNP project demonstrates that school nurses can be an effective tool in educating parents on T2DM risk factors. School nurses should consider assessing their population for prevalent diseases and providing education. Many school nurses today spend less and less time in the classroom doing health education these afterschool type of programs could help to benefit children at large. Future research could include multi

school comparisons that takes socio-economic and demographic factors into consideration. This may identify how parental education level could affect findings based on what the parents know.

Plan to Publish

Once I complete this study my goal is to submit it to *The Journal of School Nursing*. The reason I choose this journal is that this will be the audience I hope to target to utilize this education module in their own schools. The journal is national and therefore I can disseminate my research to reach a larger target audience.

Limitations to the Study

Limitations to this study included a small sample size and this program was implemented in morning hours and limited working parents from attending. Future research should focus on a replicated study with an enlarged sample size and an assessment of parental availability to attend.

Conclusion

This DNP project comes after 13 years of observing children presenting in the school setting with T2DM. Our roles have changed and funding's are limited, some schools don't even have school nurses, but the nurses that are in the schools are still the front line for health care of the children. As a mother seeing the increase children who have this disease and whose parents don't have the knowledge to help their own children, showed there is a need for change. As a nurse, I realized school nurses could be the ones to help educate the parents and ensure the health of the children.

The purpose of the project was to develop an education module for parents to help increase awareness of risk factors leading to T2DM. This DNP project demonstrated that implementing this parent diabetes education program would benefit the parents help their children lead healthier lives. According to John Auerbach president and CEO of Trust for America's health, there is a current small "decrease in childhood obesity but to continue this progress there needs to be support of school based programs" ("Obesity Rates," 2017, para. 9).

With increase knowledge about healthier choices, children may prevent or prolong the development of T2DM. The promotion of healthier food choices and exercise styles has been proven to benefit children's long term health. Using this module in different school districts to educate parents of risk factors of T2DM could lead to overall improved health for children.

The statistical analyses were significant showing a significant difference between the pre-and posttest, which showed an increased knowledge and an increased intention to change their behaviors for the better health of their child. As school nurses, we need to be the first line to help educate parents and help our children to become healthier. In addition, given the extreme cost of caring for children with T2DM it would be more beneficial to fund educational programs which would be a much lower cost than the lifelong medical expenses of a child with the disease. This program may just be what is needed to lower the increasing number of diabetic children seen every day in the school settings.

Running head: PREVALENCE AND PREVENTION

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APPENDIX-Diabetes Risk Factors Knowledge Quiz

DIABETES RISK FACTORS KNOWLEDGE QUIZ
FOR PARENTS OF SCHOOL AGE CHILDREN

	QUESTIONS:	TRUE	FALSE
1	Diabetes is a disease that can only be inherited genetically?		
2	Diabetes in children is a result of the parent's poor eating habits?		
3	Eating too much sugar and or sweet foods can cause diabetes in children?		
4	Diabetic diets are made up of special foods?		
5	If foods say low if fat your child can have as much as they like?		
6	Children can eat whatever they want because they burn so many calories?		
7	Type 2 diabetes is on the rise in children?		
8	Diabetes is a silent disease that does not show any symptoms?		
9	Is diabetes type 2 a disease that can be reversed?		
10	If left untreated blood sugars will continue to rise in a diabetic?		
11	Medications are more important than diet and exercise to treat diabetes?		

12	Can children become diabetic if there is no family history of diabetes but are overweight?		
13	Living life to the fullest is more important for children than controlling diet and exercise?		
14	Everyone in my family is overweight and we don't have any diabetes, my children are not at risk?		
15	We have little control over what diseases we get if we are genetically predisposed?		

PART II

Please answer yes or no, or true or false, and they write your reason for either answer. If you need more space please feel free to use the back of this survey.

Thank You.

1. Are you planning to make changes in any lifestyle behaviors soon that you believe will lower your child's chance of getting diabetes? Yes or No and Why?
2. Have you recently made changes to your diet and food choices that could help your child from developing diabetes? True or False and Why?

3. If I have a family member with diabetes, diet and prevention measure such as increasing activity and cutting back on sugar won't help my child from preventing diabetes? True or False and why?
4. How could diabetes affect your child's life? Give one or more examples
5. What can you do as the parent of a child do, to reduce the chance they will get type 2 diabetes?