

2015

# The effect of group therapy on Diabetes specific knowledge

Marci A. Hankins  
hankins.marci@gmail.com

Follow this and additional works at: <http://mds.marshall.edu/etd>



Part of the [Health Psychology Commons](#), and the [School Psychology Commons](#)

---

## Recommended Citation

Hankins, Marci A., "The effect of group therapy on Diabetes specific knowledge" (2015). *Theses, Dissertations and Capstones*. Paper 947.

THE EFFECT OF GROUP THERAPY ON DIABETES SPECIFIC KNOWLEDGE

A Thesis submitted to  
the Graduate College of  
Marshall University

In partial fulfillment of  
the requirements for the degree of  
Education Specialist

in

School Psychology

by

Marci A. Hankins

Approved by  
Dr. Teresa Clark, Committee Chairperson  
Dr. Lanai Jennings  
Dr. Conrae Lucas-Adkins  
Dr. Stephen O'Keefe

Marshall University  
July 2015

## TABLE OF CONTENTS

List of Tables and Figures.....	iii
Abstract.....	iv
Chapter 1: Literature Review.....	5
Diabetes Care.....	6
Effects of Diabetes in School.....	9
Patient Knowledge.....	10
Intervention with Pre-Adolescent Children.....	10
Positive Effect of Groups.....	11
Conclusion.....	12
Hypotheses.....	13
Chapter 2: Method.....	14
Participants.....	14
Instrument.....	14
Procedure.....	15
Chapter 3: Results.....	17
Chapter 4: Discussion.....	20
Limitations.....	23
Future Studies.....	24
Appendix A: Diabetes Knowledge Questionnaire-24.....	26
Appendix B: Weekly Curriculum.....	27
Appendix C: Letter from Institutional Research Board.....	30
References.....	31

## LIST OF TABLES AND FIGURES

Table 1.....	17
Figure 1.....	18
Table 2.....	19

## ABSTRACT

Type 1 Diabetes is a chronic illness that must be managed 24 hours a day with insulin administration and frequent blood glucose testing to maintain control. Because children spend a significant amount of their day at school, children with Type 1 Diabetes need additional support within the school setting. However, there are few studies investigating the school setting for support for children with Type 1 Diabetes. The current school-based study evaluated the effectiveness of a psychoeducational group therapy intervention on Diabetes Specific Knowledge. One child with Type 1 Diabetes and four peers without diabetes participated in the group therapy treatment. Diabetes Specific Knowledge was assessed three times over a six week period using the Diabetes Knowledge Questionnaire- 24. The results showed an overall slight increase in Diabetes Specific Knowledge.

## **CHAPTER 1**

### **LITERATURE REVIEW**

The prevalence of Type 1 Diabetes in the United States has been found to be between 0.26% and 0.34% per 1,000 people depending on the age of diagnosis (Menke et al., 2013). From 2002 to 2005, about 15,600 children and adolescents were diagnosed with Type 1 Diabetes annually (Centers for Disease Control and Prevention, 2011). Wodrich and Cunningham (2008) report Type 1 Diabetes comes in second as the most common chronic childhood illness following Asthma. If Type 1 Diabetes is not properly managed, this can result in many complications ranging from symptoms such as excessive thirst, fatigue and irritability (Cox et al., 2005), to more severe and chronic complications negatively affecting microvascular systems of the body (The Diabetes Control and Complications Trial Research Group, 2014). Because of the potential negative side effects associated with poor management of this disease, knowledge about this condition is important to protect children with Type 1 Diabetes while they are at school. Understanding Type 1 Diabetes is important to help students maintain appropriate control of their diabetes while away from their parents as well as to positively affect their quality of life.

Type 1 Diabetes is a chronic illness that needs to be managed 24 hours a day, seven days a week; therefore, support within the school setting for children and adolescents is vital. Since youth spend a majority of the day in school, the school setting is an excellent location to provide intervention. The purpose of this study is to evaluate the effectiveness of a psychoeducational group therapy intervention on Diabetes Specific Knowledge in students with and without Type 1 Diabetes.

## **Diabetes Care**

Type 1 Diabetes, also known as insulin-dependent diabetes mellitus and juvenile-onset diabetes, is a chronic disorder that results when the beta cells within the pancreas, the only cells that create insulin, are destroyed (Centers for Disease Control and Prevention, 2011). These cells are the only source of insulin production, which is significant because without these cells insulin is not produced. Insulin is the primary catalyst that allows the absorption of glucose into the blood cells; without the insulin cells cannot obtain necessary nutrition in order to survive (Wilcox, 2005). For people with Type 1 Diabetes to survive, insulin must be administered via injections, or by use of an insulin pump (Centers for Disease Control and Prevention, 2011). It is important for individuals with diabetes to closely regulate their blood glucose to keep it within normal healthy limits which range from 90 mg/dl to 150 mg/dl depending on the individual's age and the time of day, before meals or overnight, (Silverstein et al., 2005), otherwise, this can lead to many different health complications.

Type 1 Diabetes is controlled by monitoring blood glucose and administering insulin as needed (Delamater et al., 1984, Centers for Disease Control and Prevention, 2011). It is suggested for a child or adolescent with Type 1 Diabetes to test his or her blood glucose four or more times daily to achieve and maintain good glycemic control, identify patterns of lows and highs, and to help with insulin adjustments (Silverstein et al., 2005). It has been found that more frequent testing showed better glycemic control (Anderson et al., 1997). Heightened control and lower glycemic levels positively reduce other long-term health problems associated with a Type 1 Diabetes diagnosis (Silverstein et al., 2005).

Uncontrolled diabetes or poor blood glucose regulation, resulting in hyperglycemia or hypoglycemia, can lead to a number of complications. Hyperglycemia or high blood glucose,

glucose greater than 150 mg/dl (Cox et al., 2005), may result in symptoms such as excessive thirst, frequent urination, fatigue, inability to focus, and irritability. Cox and colleagues (2005) found an increase in cognitive dysfunction in adults with Type 1 and Type 2 Diabetes with hyperglycemia with a blood glucose reading of greater than 270 mg/dl. Overall, those with hyperglycemia exceeding a blood glucose level of 270 mg/dl were more likely to have slower performance on tasks such as word retrieval, slower mental subtraction and increased subtraction errors compared with those whose blood glucose was below 270 mg/dl. Other symptoms of hyperglycemia include increased urination, extreme thirst and hunger, reduction in weight, blurred vision, dry mouth, and confusion to name a few (Wilson et al., 2009). Hyperglycemia can cause diabetic ketoacidosis (DKA), which can lead to loss of consciousness, followed by coma and eventually death (Delamater, Warren-Boulton, Bubb, & Fisher, 1984). DKA results from a deficiency of sufficient amounts of insulin to effectively break down sugar or, a total lack of insulin in the body. This can lead to buildup of chemicals, called ketones, to process fat for energy due to the insulin deficiency (Wilson, Posey & Schneider, 2009).

In contrast to hyperglycemia, hypoglycemia is the cells' deficiency of sugar, also called low blood sugar, and can present common symptoms that may include sweating, hunger, problems concentrating, tremors, headache, and behavioral changes depending on the severity (Delamater et al., 1984, Silverstein et al., 2005). A glucose reading of 60 mg/dl and below can also result in unconsciousness and convulsions or seizures if left untreated (Delamater et al., 1984). Severe hypoglycemia associated with coma and convulsions may require administration of glucagon when the person is unable to orally ingest sugar (Silverstein et al., 2005). An individual with hypoglycemia may seem disoriented, shaky and pale. In addition, fluctuation in mood, reduction in mental processing, motor speed and ability to pay attention are all factors that

can affect a child in the learning environment. The time required to recover from hypoglycemia may take up to 30 minutes before the symptoms subside, negatively affecting a student's ability to learn including the student's ability to focus and attend during class (Wilson et al., 2009).

Many factors can affect the ability of the person with diabetes to properly regulate blood sugar. In addition, an individual's insulin sensitivity, the cells sensitivity to insulin, which in turn affects the amount of insulin needed to maintain blood sugar, may fluctuate on a daily basis. Stress can have a negative impact on blood sugar, usually resulting in more frequent hyperglycemia. Also, stress can indirectly impede compliance with self-management of diabetes as the individual may be more occupied with external stressors of life instead of stress of diabetes care (Delamater et al., 1984). In addition, a person with diabetes who becomes sick with illness or fever, may require an increase to the amount of insulin required for glycemic control. Growth spurts and hormonal changes, such as during menarche in females, affect the amount of insulin needed to maintain adequate blood sugar levels (Delamater et al., 1984). An increase in physical exercise can additionally impact the amount of food and insulin required to maintain adequate blood glucose levels, usually resulting in hypoglycemia (Delamater et al., 1984). However, if someone with Type 1 Diabetes has hyperglycemia, exercise can have the opposite effect; it can increase the blood sugar level instead. This should be noted, as students are usually more active during physical education class and recesses. Either of the extremes during school hours can affect the behavior and ability to learn of children with Type 1 Diabetes if their body is not at homeostasis with normal blood sugars.

If a Type 1 Diabetes regimen is neglected, a student may suffer from many different medical complications. According to Silverstein and colleagues (2005), there was a decrease in microvascular complications when improved compliance of diabetes care was observed.

Microvascular complications include negative effects in the eyes, kidneys and the peripheral nervous system (Diabetes Control and Complications Trial Research Group, 2014).

Hypertension, or high blood pressure, cardiovascular disease, cerebrovascular disease and peripheral vascular disease are also common chronic complications with uncontrolled diabetes (Silverstein et al., 2005).

Uncontrolled Type 1 Diabetes can significantly affect a student's health and academic functioning. However, many factors can influence the regulation of blood glucose, which makes it even more important to increase the knowledge about this chronic condition for those who have Type 1 Diabetes.

### **Effects of Diabetes in School**

Given the complexity of glucose control and other issues related to the care of diabetes, students often struggle to effectively self-manage without support (Shroff -Pendley et al., 2002). Some students with diabetes may neglect their diabetes care during school to avoid negative attention and run their blood sugars higher intentionally to avoid "low" episodes (Delamater et al., 1984). These episodes may make students feel inferior to others in class (Delamater et al., 1984). Research shows that children with diabetes who had episodes with blood glucose levels of 60 mg/dl or lower resulted in diminished cognitive abilities which could negatively impact the child in the school setting, not only socially, but with class work as well (Ryan et al., 1990). Thus, the fear of hypoglycemia may cause students and parents to over treat initial symptoms which then result in poorer control because of higher blood sugars (Marrero et al., 1997). Not only does diabetes affect the students' cognitive abilities, it also impacts the behavior of the student with diabetes.

Some behavioral changes associated with uncontrolled diabetes may be attributed to other non-medical reasons in the classroom. For example, as fluctuation in blood glucose can affect one's ability to focus, this can be mistaken for Attention Deficit Hyperactivity Disorder (ADHD) or a Specific Learning Disability (SLD) (Wodrich & Cunningham, 2008). In addition, symptoms such as irritability and fatigue associated with hyperglycemia (Cox et al., 2005) in someone who has diabetes can be seen as a behavior problem in a non-diabetic. Even when teachers were given information about possible behavioral changes due to uncontrolled diabetes in class, 40% incorrectly attributed the problems to nonmedical causes (Wodrich & Cunningham, 2008).

### **Patient Knowledge**

Knowledge of diabetes is an important first step to understanding how to manage diabetes. School nurses thought adolescents with diabetes need to increase their own knowledge about diabetes (Nabors et al., 2005). In addition, the nurses felt that students need to increase their communication about their disease, though many diabetics prefer to keep their disability private (Nabors et al., 2005). Persons with a chronic illness such as Type 1 Diabetes must understand their disease and how to manage it to be able to actively make decisions about their care (Coates & Boore, 1995). Additionally, a deficiency in knowledge about diabetes is one reason self-management is insufficient (Coates & Boore, 1995).

### **Intervention with Pre-Adolescent Children**

Learning how to self-manage diabetes prior to age 14 may help in adherence of diabetes regimen and improve overall control which can positively affect quality of life (Nabors, Lehmkuhl, Christos & Andreone, 2003). Knowledge of diabetes in children ages seven through eleven years-old is not associated with metabolic control; however for older adolescents (i.e.,

ages 12-17), understanding of diabetes-related information was significantly associated with the adolescents' metabolic control (La Grece, Follansbee, & Skyler, 1990).

Even though knowledge at a younger age may not be associated with metabolic control, other factors should be considered. Teachers in primary schools perceived that younger children with Type 1 Diabetes did not understand the seriousness of the condition, which may lead to mismanaging their disease. However, because of their immaturity, teachers perceived that these children do not feel the same peer pressure as adolescents do about feeling different for having a disability (Boden et al., 2011). Also, even though younger children may be less capable in self-management, mothers perceived that younger children have a less negative view of diabetes compared with adolescents (Schmidt 2007). Therefore, intervening at a younger age may be the prime time before peer pressure becomes an issue and a less negative view of diabetes develops in adolescence.

### **Positive Effect of Groups**

Group therapy has been shown produce positive experiences for participants in many studies for children and adolescents with and without diabetes (Warren-Boulton et al., 1981; Kichler et al., 2013; Greco, Pendley, McDonell, & Reeves, 2001; Shroff Pendley et al., 2002). Within a group medical setting, Warren-Boulton et al. (1981) examined adolescents with diabetes who talked about different components of self-management, as well as issues related to psychosocial problems. They observed improvements in self-confidence, peer relationships, and in diabetes treatment adherence. In another clinical study, Kichler et al. (2013) evaluated the impact of group therapy wherein adolescents participated in activities that included sharing diabetes-related experiences, increasing knowledge of diabetes and carbohydrate counting, as

well as role playing both school and social situations. They found an increase in quality of life, decrease in HbA1c and a reduction in hospitalization over a six-month post-intervention period.

Many groups include only children and adolescents with diabetes, which may lead to the taboo of diabetes around other non-diabetic peers. A pilot study at a medical clinic used a group setting of adolescents with Type 1 Diabetes and their best friends and found a significant increase from pre-intervention to post-intervention in knowledge about diabetes over a four week period (Greco et al., 2001). Additionally, the study showed an increase in the peers' ability to provide support for the adolescents with Type 1 Diabetes (Greco et al., 2001). There may be a positive effect on management of diabetes if peers accompany adolescents with Type 1 Diabetes during meals and physical activity (Shroff Pendley et al., 2002).

## **Conclusion**

Many studies have assessed adolescents with diabetes who increasingly rely upon peers as they begin to spend more time independent of their parents; however, few studies have looked at younger children ages five through twelve years old (Nabors, Lehmkuhl, Christos & Andreone, 2003; La Grece, Follansbee, & Skyler, 1990). This study aims to evaluate the knowledge effect on younger children before adolescence and improve their knowledge base of Type 1 Diabetes before they reach adolescence.

Group interventions in the medical setting have been implemented as well, but this study was conducted in the school, as children spend many hours during the weekdays in school and need support there as well (Delamater et al., 1984, Greco et al., 2001, & Kichler et al., 2013). One study did include school-based situations within the group context, but was still conducted within the medical setting (Kichler et al., 2013). Medical professionals have noted probable positive effects on the child's diabetes management with support from many different systems

that are a part of the child's life (Shroff Pendley et al., 2002). One main system involved in any child's life is the school; therefore it seems reasonable to evaluate knowledge within the school setting.

The first step to evaluate support for children with Type 1 Diabetes in the school setting is to explore the improvement of knowledge as a result of participation in the psychoeducational group focused on Diabetes Specific Knowledge. Therefore, this current study seeks to measure knowledge of diabetes in the person with Type 1 Diabetes and non-diabetic peers by using the medium of group intervention.

### **Hypotheses**

When provided a psychoeducational group intervention, the investigator hypothesizes that (1) all students will show an increase in Diabetes Specific Knowledge; moreover, that (2) the child with Type 1 Diabetes will have a larger increase in Diabetes Specific Knowledge when compared to her peers who are non-diabetic.

## **CHAPTER 2**

### **METHOD**

#### **Participants**

The sample for this study included five first grade students from a rural elementary school classroom within the Mid-Atlantic region. One child, a seven-year-old female participant, had been recently diagnosed with Type 1 Diabetes (< 6 months). The remaining four children were six- and seven-year olds. They did not have Type 1 Diabetes. Three children were males and two females, while four were White (non-Hispanic) children and the fifth child was Black/African American.

The participants were selected by consulting with the classroom teacher. The teacher was asked to choose a heterogeneous group of students who would benefit from the group intervention. The researcher specifically requested some students be included based on social skill deficits, whereas others be included based on their social adeptness. One student selected by the teacher did not participate due to chronic absences. The student with Type 1 Diabetes was selected by speaking with the school nurse to identify a child with Type 1 Diabetes in the schools where the author worked.

Because of the low incidence of children and adolescents with Type 1 Diabetes, only one student with diabetes was available to participate from the target school. Each member of the group assented and parental permission was obtained.

#### **Instrument**

The Diabetes Knowledge Questionnaire-24 (DKQ-24) was developed by Garcia, Villagomez, Brown, Kouzekannani, and Hanis (2001) and derived from the original 60-item questionnaire, which was established by Villagomez et al. (1989). The 60-item instrument was

originally in both Spanish and English using the recommendations from the National Standards for Diabetes Patient Education Programs. The DKQ-24 is a True/False self-report scale of knowledge related to diabetes with *Yes, No, or I Don't Know* options. Individuals are asked to report their knowledge of diabetes. Examples include the following and all items are available within Appendix A: Eating too much sugar and other sweet foods is the cause of diabetes, Kidneys produce insulin, or shaking and sweating are signs of high blood sugar.

The study of DKQ-24 reports content validity with a review by a panel of registered nurses. In addition, construct validity was found using factor analysis and experimental design. The study reports internal consistency. The DKQ-24 achieved a coefficient of 0.78 compared with the DKQ 60-item assessment, which achieved an internal consistency coefficient of 0.83. From pre- to post-test, there was no statistical significance in the control group [ $t(188)$ ,  $P=0.06$ ]. The experimental group significantly increased their diabetes knowledge scores from pre- to post-test at the three month follow up ( $[t(220)=8.49, P<0.001]$ ). The scores on the DKQ-24 were calculated by percentage correct to indicate the increase in diabetes-specific knowledge.

## **Procedure**

The students participated in six, 30-45 minute weekly sessions during the psychoeducational group intervention. Participants were pulled from class at a time which minimized the interruption of the core academic instruction. The group met in a small room within the same school. Meetings during the intervention were focused on providing the students with age-appropriate information about Type 1 Diabetes including: blood sugar readings; what insulin is and where it comes from; and social-emotional impact of diabetes, to name a few. The author and co-leader (another graduate student) asked the students questions

regarding the diabetes related topic for the day. Please refer to Appendix B for more information.

The investigator administered the DKQ-24 at baseline, after three weeks of intervention, and as a post-intervention follow-up after six weeks of session completion. Administration occurred in a group format. The author or co-leader read the questions aloud and instructed the students to choose the best answer. Some students required more age-appropriate terms, as the DKQ-24 is written for adults. Additionally, some students needed more guidance. In this case, the author would read each item as well as the three response options- *Yes*, *No* or *I Don't Know* and tell the student to choose his or her best answer. Two student's answers were removed due to the fact that they answered all *Yes* resulting in an inconsistent response pattern.

The DKQ-24 was divided into four global areas or domains based upon types of information regarding Type 1 Diabetes: Treatment of Diabetes and Related Effects, Long-Term Complications of Diabetes, Causes of Diabetes, and Hyperglycemia/Hypoglycemia. A total of 48 points were possible on the DKQ-24 as each correct answer was scaled at 2 points. An answer of *I Don't Know* was scaled at 1 point. An incorrect answer was 0 points.

## CHAPTER 3

### RESULTS

The results of the first hypothesis that diabetes -specific knowledge will increase with psychoeducational group intervention are reported in Table 1.

The overall mean from pre-test to post-test increased by 1.66 points suggesting an overall increase in Diabetes Specific Knowledge as measured by the DKQ-24 (Shown in Figure 1). Students' scores in the global area of Treatment of Diabetes and Related Effects domain improved by an average of 0.67 points. The Long Term Complications area's mean score increased by 0.67 points. Causes of Diabetes decreased by 0.67 points. Hyperglycemia/Hypoglycemia increased by 0.33.

Table 1  
Means of all participants pre-, mid-, and post-test for overall knowledge and global areas

Assessed Area	Pre-test Mean	Mid-test Mean	Post-test Mean
DKQ-24 overall	21.67	21.33	23.33
Treatment of Diabetes and Related Effects	7	6.67	7.67
Long-Term Complications	5	5.67	5.67
Causes of Diabetes	5.67	4.33	5
Hyperglycemia/Hypoglycemia	4.67	4.67	5

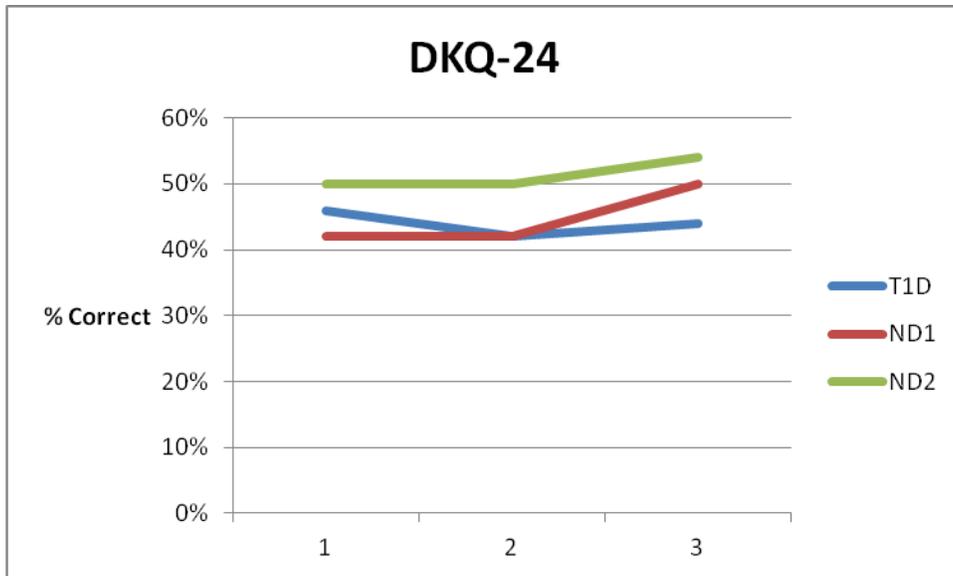


Figure 1: Participant Scores (by percentage correct) on DKQ-24.

Results from the second hypothesis, that the child with Type 1 Diabetes will have a larger increase in Diabetes Specific Knowledge when compared to her peers who are non-diabetic are shown in Table 2.

The overall score of the student with Type 1 Diabetes decreased by 2% pre- to post-test compared to the 6% increase of the non-Diabetic peers. The global area of Treatment of Diabetes and Related Effects decreased by 2% for the student with diabetes compared with a 2% increase of her peers. Long-Term Complications remained the same in the student with diabetes compared with a 10% increase in her peers. The Causes of Diabetes domain decreased by 20% for the student with Type 1 Diabetes compared with her peers whose score maintained at 60%. Hyperglycemia/Hypoglycemia decreased by 20% for the student with diabetes compared with her peers whose score increased by 15% which is contrary to what research has shown.

Table 2  
 Type 1 Diabetic compared with Non-Diabetic peers results.

Assessed Area	T1D pre-test	T1D post-test	ND pre-test	ND post-test
DKQ-24 overall	46%	44%	45%	51%
Treatment of Diabetes and Related Effects	46%	44%	39%	41%
Long-Term Complications	60%	60%	45%	55%
Causes of Diabetes	50%	30%	60%	60%
Hyperglycemia/Hypoglycemia	60%	40%	40%	55%

## CHAPTER 4

### DISCUSSION

Type 1 Diabetes prevalence rates are between 0.26% and 0.34% per 1,000 people depending on the age of diagnosis (Menke et al., 2013). Though Type 1 Diabetes is the second most common chronic childhood illness (Wodrich & Cunningham, 2008), it has a low incidence rate which can lead to the misunderstanding of the effects of diabetes. In addition to the lack of understanding about diabetes, there has been a lack of studies in the school setting where children spend a large amount of time daily. Many studies have been conducted in the medical setting (Warren-Boulton et al., 1981; Kichler et al., 2013), however, children spend a significant portion of their day in school. Because of the lack of studies within schools and misunderstanding of the effects of diabetes, this study seeks to evaluate the effect of a psychoeducational group intervention within the school setting on Diabetes Specific Knowledge.

The results of this study show children participating in the psychoeducational group intervention increased their overall Diabetes Specific Knowledge 1.66 points as measured by the DKQ-24 from pre- to post-test. Additionally, increases were evident in three of the four global areas including Treatment of Diabetes and Related Effects (.67), Long-Term Complications (.67) and Hyperglycemia/Hypoglycemia (.33).

Although there was an increase in overall knowledge the non-diabetic peers' scores increased more than in the student with Type 1 Diabetes. There was a 2% decrease in the overall score for the student with Type 1 Diabetes as compared to a 6% increase in her non-diabetic peers. The child with Type 1 Diabetes maintained her pre-test score at the post-test only in the area of Long-Term Complications; otherwise, the student's scores revealed post-test declines in all other domains. One possible explanation for her unexpected performance was her recent

diagnosis. Because she was recently diagnosed, her parents provide assumed caregiving responsibility and did not involve her in the care of her diabetes. Being newly diagnosed, she may not have had much exposure to Diabetes Specific Knowledge other than the 30-45 minute weekly session during the psychoeducational intervention. In addition, her parents may have a better understanding of this information as they are her caregivers until she becomes old enough to being self-managing her diabetes.

These scores can reflect some amount of the lack of knowledge which may translate to a lack of support for students with Type 1 Diabetes in school. Improvements in any area would be beneficial for students with Type 1 Diabetes to increase safety while at school. For younger students, knowledge of diabetes by teachers and staff may be more crucial. It may be beneficial to extend the study to more than six sessions to see more growth in Diabetes Specific Knowledge.

Teachers have an important role to play in helping children with diabetes self-manage. They can help in facilitating necessary self-care such as blood sugar testing in the classroom to improve compliance with diabetes regimen. By developing a supportive environment for the child to monitor his/her diabetes, this can improve compliance and help in awareness of other non-diabetic students. Eighty-nine percent of nurses surveyed from middle and high schools and 95% of nurses from elementary schools agreed that teachers need to improve their knowledge of diabetes in order to be more supportive for students with diabetes (Nabors, Troillett, Nash & Masiulis, 2005).

Education of teachers and school staff about diabetes was one of the four topics indicated by school nurses in all three levels (elementary, middle and high schools) which need improvement to provide more support for students with Type 1 Diabetes (Nabors et al., 2005).

Recently, management of diabetes has intensified from two injections a day to multiple injections or use of an insulin pump which puts more responsibility on the school and other childcare settings as children spend many hours in school or at childcare centers (American Diabetes Association, 2004). Therefore, knowledge of how to administer insulin and recognize both hyperglycemia and hypoglycemia are critical for the safety of a child with Type 1 Diabetes. Additionally, the lack of participation by schools in medical situations has been perceived to lead to larger scale and much more serious ramifications for the children with diabetes than many faculty and staff may understand (Boden et al., 2011). Knowledge of diabetes is especially important for younger and recently diagnosed students to provide a safe environment at school.

Problems related to diabetes may occur often within the school setting thus the school psychologist can be a key member to incorporate and advocate for medical behaviors, such as more frequent blood glucose testing and insulin administration, into a school plan (Delamater et al., 1984). School psychologists can help in implementing a behavior program to reward students with Type 1 Diabetes to reinforce appropriate self-management techniques in the classroom with the teacher (Delamater et al., 1984).

Additionally, a school psychologist can help in clarifying in-class behaviors that may be caused by hypoglycemia or hyperglycemia versus ADHD or SLD in a child without diabetes. School psychologists can also consult with teachers to develop accommodations in the classroom for students with diabetes and offer information to parents about Section 504 plans or Other Health Impairment category for Special Education (Wodrich & Cunningham, 2008).

Not only can school psychologists help with medical behaviors on an individual level, but they have training to consult with other school staff members and in counseling services. School psychologists are trained and have skills to be able to facilitate effective group counseling

sessions for a wide range of students, in particular for issues that may impact students' abilities to learn in school (Pérusse, Goodnough, & Lee, 2009). School psychologists have training in many areas to be able to lead a group. These areas include understanding of cognitive abilities, psychosocial aspects, racial and ethnic perspectives (Pérusse, Goodnough, & Lee, 2009). Therefore, school psychologists should be utilized as a member of a team to help in supporting students with Type 1 Diabetes in the school setting.

### **Limitations**

Results of the study should be interpreted with caution due to the fact that data were collected only three times: pre-intervention, after three weeks of the intervention, and post-intervention, after six weeks of the intervention. This leaves room for error, as maturation was not controlled for in the research design. This would have been more effective if the participants were assessed three weeks prior to the psychoeducational group intervention beginning to account for maturation of the participants. In addition, history was not controlled for by assessing the participants three weeks post- psychoeducational group intervention. Having these data would be beneficial to evaluate whether the results showed an overall increase in knowledge due to the intervention, or if the knowledge continued to increase, it may be an increase in knowledge due to another factor such as possible learning disabilities or other cognitive impairment.

In addition, the DKQ-24 was developed for adults, but this study used it with first grade students. This should be taken into account, as some of the language used may be confusing for the students.

As Type 1 Diabetes has a low prevalence rate, at 0.26% and 0.34% depending on the age of diagnosis (Menke et. al, 2013), the age of the child with diabetes was a convenience sample as

she attended a school in which the author worked. The DKQ-24 was originally developed for adults, thus using an older group of participants who would understand more of the questions asked may result in a more effective psychoeducational group intervention.

### **Future studies**

This current study focused on the improvement of Diabetes Specific Knowledge, but this can be seen as a bridge to improve Type 1 Diabetes awareness which may translate to support within the school setting for children and adolescents with Type 1 Diabetes. Developing a pilot study to evaluate what would make this psychoeducational intervention more effective at improving Diabetes Specific Knowledge should be the first step.

It would be beneficial to conduct a pilot study with the DKQ-24 to understand what language may be preventing the students from reporting accurately their increase in knowledge. Also, having three options for answers may have been confusing for the students. Having only two answer choices to choose from may be clearer. Perhaps, using visuals, such as smile and frown face, or thumbs up and thumbs down may be clearer for students to identify especially for the younger population used in the current study. A pilot study would also guide the areas and language that students had more difficulty with in adjusting to the curriculum of the psychoeducational intervention. Further studies should look at the effect of knowledge on metabolic control in the school setting and school support for those children with Type 1 Diabetes.

This study evaluating Diabetes Specific Knowledge does not evaluate the interpersonal skills developed through the group therapy medium. There is evidence from this study that social skills including taking turns, raising hands and asking other questions did improve, but there was no measure to compare pre- to post-intervention of these areas, only anecdotal

evidence that the author noticed. This view on the group would show perspective taking that may improve empathy in non-diabetic peers.

It may be effective to conduct a similar group in coordination with the school nurse, to focus on the medical part of diabetes, as the school psychologist focuses on the interpersonal skills of the students. In particular, Malik and Koot (2012) found empathy to be a critical factor for adolescents with Type 1 Diabetes, group interventions with both medical and interpersonal focus may help in the increase of support of children and adolescents with Type 1 Diabetes.

**Appendix A**  
**Patient's Diabetes Knowledge Questionnaire**

	Questions	Yes	No	Don't Know
1	Eating too much sugar and other sweet foods is a cause of diabetes.			
2	The usual cause of diabetes is lack of effective insulin in the body.			
3	Diabetes is caused by failure of the kidneys to keep sugar out of the urine.			
4	Kidneys produce insulin.			
5	In untreated diabetes, the amount of sugar in the blood usually increases.			
6	If I am diabetic, my children have a higher chance of being diabetic.			
7	Diabetes can be cured.			
8	A fasting blood sugar level of 210 is too high.			
9	The best way to check my diabetes is by testing my urine.			
10	Regular exercise will increase the need for insulin or other diabetic medication.			
11	There are two main types of diabetes: Type 1 (insulin-dependent) and Type 2 (non-insulin dependent).			
12	An insulin reaction is caused by too much food.			
13	Medication is more important than diet and exercise to control my diabetes.			
14	Diabetes often causes poor circulation.			
15	Cuts and abrasions on diabetes heal more slowly.			
16	Diabetics should take extra care when cutting their toenails.			
17	A person with diabetes should cleanse a cut with iodine and alcohol.			
18	The way I prepare my food is as important as the foods I eat.			
19	Diabetes can damage my kidneys.			
20	Diabetes can cause loss of feeling in my hands, fingers and feet.			
21	Shaking and sweating are signs of high blood sugar.			
22	Frequent urination and thirst are signs of low blood sugar.			
23	Tight elastic hose or socks are not bad for diabetics.			
24	A diabetic diet consists mostly of special foods.			

Source: Starr County

This product was adapted from the DKQ "Diabetes Knowledge Questionnaire," - Garcia and Associates for the diabetes self management project at Gateway Health Center, Inc. with support from the Robert Wood Johnson Foundation® in Princeton, NJ.

## Appendix B

### Weekly Curriculum

From Chase, H.P. (2008). *A First Book for Understanding Diabetes: Companion to the 11<sup>th</sup> Edition of "Understanding Diabetes"*. Munster, IN: Hilton Publishing Company. Questions were presented about the topic of chapters used for that day and discussion from the group followed.

#### Week 1- DKQ-24 administration

##### Chapter 2- What is Diabetes?

This chapter defines Type 1 Diabetes (insulin-dependent) and Type 2 Diabetes (Non-insulin dependent). It explains some of the common symptoms of Type 1 Diabetes, how insulin works to break down sugar, a brief overview of ketones and the “honeymoon” period. A visual of the body to explain the pancreas is included.

##### Chapter 10- Feelings and Diabetes

This chapter covers emotions that the newly diagnosed child with diabetes and his/her family may feel about the recent diagnosis. It suggests working toward a positive feeling towards diabetes to make diabetes a part of life.

#### Week 2

##### Chapter 6- Low Blood Sugar (Hypoglycemia or Insulin Reaction)

This chapter explains what hypoglycemia is, the main causes of low blood sugar. In addition, it covers many different signs and symptoms of mild, moderate, and severe low blood sugar. It provides a list of steps to take depending on the severity of low blood sugar and a chart to follow.

### Chapter 7- Blood Sugar (Glucose) Testing

This chapter covers the gambit of blood sugar levels from very high levels to low, as well as what blood sugar levels are for Non-diabetic children. It explains when to test, goals for blood sugars based on age of the child and steps to follow to test blood sugar.

### Week 3

### Chapter 20- Outpatient Management, Education, Support Groups, and Standards of Care

This chapter covers what to do after diagnosis including follow-up doctor visits to prevent and monitor long-term complications of diabetes. In addition, it provides suggestions such as support groups and how to handle special events such as field trips and parties.

### Week 4- DKQ-24 Administration

### Chapter 14- Diabetes and Blood Sugar Control

This chapter reviews blood sugar control, what “good” control looks like and relates blood sugar levels to HbA1c values. It provides visual graphics to explain the information. Four main areas that influence blood sugar control are explained: Insulin/Oral Meds, Good Dietary Habits, Stress/Motivations, and Exercise.

### Week 5

### Chapter 1- The Importance of Education in Diabetes

This chapter explains what the family and child with diabetes will learn right after diagnosis of Type 1 Diabetes. It reviews all the important components of managing diabetes- blood sugar,

testing blood sugar, drawing up insulin, ketone testing, plan for school, food education, feelings/emotions

Week 6

Chapter 26- Use of Insulin Pumps in Diabetes Management

This chapter explains what an insulin pump is, how it works and what one needs to do to begin insulin pump therapy. It explains that the pump may provide more flexibility with diabetes treatment, but there are also negatives that go with the use of pumps compared to shots.

Week 7- DKQ-24 Administration only

## Appendix C



Office of Research Integrity  
Institutional Review Board

April 23, 2015

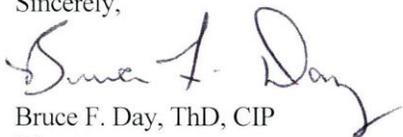
Teresa P. Clark  
Assistant Professor  
Marshall University College of Education and Professional Development  
School Psychology Program  
100 Angus E. Peyton Drive Room GC 109  
South Charleston, WV 25303

Dear Ms. Clark:

This letter is in response to the submitted thesis abstract for student **Marci Hankins** to examine extant data gathered from a psychoeducational intervention for increasing knowledge of Type 1 Diabetes, its causes and treatment given in Kanawha County Schools 2 years ago. After assessing the abstract it has been deemed not to be human subject research and therefore exempt from oversight of the Marshall University Institutional Review Board (IRB). The Code of Federal Regulations (45CFR46) has set forth the criteria utilized in making this determination. Since the information in this study does not involve human subjects as defined in the above referenced instruction it is not considered human subject research. If there are any changes to the abstract you provided then you would need to resubmit that information to the Office of Research Integrity for review and a determination.

I appreciate your willingness to submit the abstract for determination. Please feel free to contact the Office of Research Integrity if you have any questions regarding future protocols that may require IRB review.

Sincerely,



Bruce F. Day, ThD, CIP  
Director

**WE ARE... MARSHALL™**

401 11th Street, Suite 1300 • Huntington, West Virginia 25701 • Tel 304/696-7320 for IRB #1 or 304/696-4303 for IRB #2 • [www.marshall.edu/ori](http://www.marshall.edu/ori)  
A State University of West Virginia • An Affirmative Action/Equal Opportunity Employer

## References

- American Diabetes Association. (2004). Insulin administration (position statement). *Diabetes Care*, 27(Suppl. 1), S106–S109.
- Anderson, B., Ho, J., Brackett, J., Finkelstein, D., & Laffel, L. (1997) Parental involvement in diabetes management tasks: Relationships to blood glucose monitoring adherence and metabolic control in young adolescents with Insulin-Dependent Diabetes Mellitus. *Journal of Pediatrics*, 130(2), 257–265.
- Boden, S., Lloyd, C. E., Gosden, C., Macdougall, C., Brown, N., & Matyka, K. (2011). The concerns of school staff in caring for children with diabetes in primary school. *Pediatric Diabetes*, 2012: 13, e6-e13. doi: 10.3109/01460862.2013.782079
- Centers for Disease Control and Prevention. (2011). National diabetes fact sheet: National estimates and general information on diabetes and prediabetes in the United States. Retrieved from [http://www.cdc.gov//diabetes/pubs/pdf/ndfs\\_2011.pdf](http://www.cdc.gov//diabetes/pubs/pdf/ndfs_2011.pdf)
- Chase, H.P. (2008). *A first book for understanding diabetes: Companion to the 11<sup>th</sup> edition of "Understanding Diabetes"*. Munster, IN: Hilton Publishing Company.
- Coates, V. E., & Boore, J. R. P. (1995) Knowledge and diabetes self-management. *Patient Education and Counseling*, 29, 99-108.
- Cox, D. J., Kovatchev, B. P., Gonder-Frederick, L. A., Summers, K. H., McCall, A., Grimm, K. J., & Clarke, W. L. (2005). Relationships between hyperglycemia and cognitive performance among adults with Type 1 and Type 2 Diabetes. *Diabetes Care*, 28, 71-77.
- Delamater, A. M., Warren-Boulton, E., Bubb, J., & Fisher, E. B, Jr. (1984) Diabetes management in the school setting: The role of the school psychologist. *School Psychology Review*, 13(2), 192-203.
- Diabetes Control and Complications Trial Research Group. (2014). The effect of intensive treatment of diabetes on the development and progression of long-term complications in Insulin-Dependent Diabetes Mellitus: The diabetes control and complications trial research group. *Diabetes Care*, 37, 9-16. doi:10.2337/dc13-2112
- Garcia, A. A., Villagomez, E. T., Brown, S. A., Kouzekannani, K., & Hanis, C. L. (2001). The Starr County diabetes education study. *Diabetes Care*, 24(1), 16-21.

- Greco, P., Pendley, J., McDonell, K., and Reeves, G. (2001). A peer group intervention for adolescents with Type 1 Diabetes and their best friends. *Journal of Pediatric Psychology, 26*(8), 485-490.
- Jacobson, A. M., Hauser, S. T., Wertlieb, D., Wolfsdorf, J., Orelans, J., & Vieyra, M. (1986). Psychological adjustment of children with recently diagnosed Diabetes Mellitus. *Diabetes Care, 9*, 323-329.
- Jameson, P. (2006). Helping students with diabetes thrive in school. "On the Cutting Edge". *Newsletter of the American Dietetic Association's Diabetes Care and Education Practice Group, 26-29*.
- Kichler, J. C., Kaugars, A. S., Marik, P., Nabors, L., & Alemzadeh, R. (2013). Effectiveness of groups for adolescents With Type 1 Diabetes Mellitus and their parents. *Families, Systems, & Health, 1-14*. doi:10.1037/a0033039
- La Greca, A. M., Follansbee, D. J., & Skyler, J. S. (1990). Developmental and behavioral aspects of diabetes management in children and adolescents. *Children's Health Care, 19*(19), 132-139.
- Lange, K., Sassmann, H., von Schutz, W., Kordonouri, O., & Danne, T. (2007). Prerequisites for age-appropriate education in Type 1 Diabetes: A model programme for Paediatric Diabetes Education in Germany. *Pediatric Diabetes, 8* (Suppl.6): 63-71.
- Lehmkuhl, H., & Nabors, L. (2008). Children with diabetes: Satisfaction with school support, illness perceptions and hba1c levels. *Journal of Developmental and Physical Disabilities, 20*(2), 101-114. doi: 10.1007/s10882-007-9082-4
- Malik, J. A., & Koot, H. M. (2012). Assessing diabetes support in adolescents: Factor structure of the modified diabetes social support questionnaire (dssq- friends). *Diabetic Medicine, 29*, e232-e240. doi: 10.1111/j.1464-5491.2012.03677.x
- Marrero, D. G., Guare, J. C., Vandagriff, J. L., & Fineberg, N. S. (1997). Fear of hypoglycemia in the parents of children and adolescents with diabetes: Maladaptive or healthy response?. *The Diabetes Educator, 23*(3), 281-286.
- Menke, A., Orchard, T. J., Imperatore, G., McKeever Bullard, K., Mayer-Davis, E., & Cowie, C. C. (2013). The prevalence of Type 1 Diabetes in the United States. *Epidemiology, 24*(5), 773-774.
- Nabors, L., Lehmkuhl, H., Christos, N., & Andreone, T. (2003). Children with diabetes: Perceptions of supports for self-management at school. *Journal of School Health, 73*(6), 216-221.

- Nabors, L., Troillett, A., Nash, T., Masiulis, B. (2005). School nurse perceptions of barriers and supports for children with diabetes. *Journal of School Health*, 75(4), 119-124.
- Nathan, D. M. (1993). Long term complications of Diabetes Mellitus. *The New England Journal of Medicine*. 328(23), 1676-1685.
- National Diabetes Advisory Board (1984). National standards for diabetes patient education programs. *Diabetes Care* 7:XXXI-XXXV
- Pérusse, R., Goodnough, G. E., Lee, V. V. (2009). Group counseling in schools. *Psychology in the Schools*. 46(3). 225-231. doi: 10.1002/pits.20369
- Ryan, C. M., Atchison, J., Puczynski, S., Puczynski, M., Arslanian, S., & Becker, D. (1990). Mild hypoglycemia associated with deterioration of mental efficiency in children with Insulin-Dependent Diabetes Mellitus. *Journal of Pediatrics*. 117(1), 32-38
- Shroff Pendley, J., Kasmien, L. J., Miller, D. L., Donze, J., Swenson, C., & Reeves, G. (2002). Peer and family support in children and adolescents with Type 1 Diabetes. *Journal of Pediatric Psychology*, 27(5), 429-438.
- Silverstein, J. et al. (2005). Care of children and adolescents with Type 1 Diabetes. *Diabetes Care*, 78(1).
- Schmidt, C, MCN. (2007), Self-care in children with Type 1 Diabetes: A survey of mothers. *The American Journal of Maternal Child Nursing*, 32(4), 223-229.
- Scibilia, J., Finegold, D., Dorman, J., Becker, D., & Drash, A. (1986). Why do children with diabetes die? *European Journal of Endocrinology*, 279, 326-333
- Warren-Boulton, E., Anderson, B. J., Schwartz, N. L., & Drexler, A. J. (1981). A group approach to the management of diabetes in adolescents and young adults. *Diabetes Care*. 4,620-623.
- Wilcox, G. (2005). Insulin and insulin resistance. *The Clinical Biochemist Reviews*. 26(2),19-39.
- Wilson, S. A. B., Posey, W. M., & Schneider, E. M. (2009). Type 1 Diabetes in children. *Pediatric School Psychology*. 37 (6), 6-9.
- Wodrich, D. L., & Cunningham, M. (2008). School-based tertiary and targeted interventions for students with chronic medical conditions: Examples from Type 1 Diabetes Mellitus and Epilepsy. *Psychology in the Schools*. 45(1), 52-62. doi: 10.1111/j.1399-5448.2010.00654.x

Villagomez, E (1989). *Health beliefs, knowledge, and metabolic control in diabetic Mexican American adults*. MS thesis. Houston, TX, The University of Texas Health Science Center.