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# Using Diabetes Self-Management Education to Enhance Adolescent Transition

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Walden University  
College of Health Sciences

This is to certify that the doctoral study by  
Jessica Adkins  
has been found to be complete and satisfactory in all respects,  
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2018

Abstract

Using Diabetes Self-Management Education to Enhance Adolescent Transition

by

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MS, University of South Alabama, 2006

BS, Armstrong Atlantic State University, 2003

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

May 2018

## Abstract

Type 1 diabetes is a long-term diagnosis, the prognosis of which is directly related to the patient's ability to self-manage the disorder. Adolescents are not currently taught how to manage diabetes; instead, parents and educators expect self-management to be more of a learned behavior from their parents. The purpose of this project was to create a quality improvement plan which the regional pediatric diabetes center study site could implement to improve adolescent glycemic control. Orem's self-care theory was used as theoretical framework for the design and evaluation of the project. The practice-focused question for this doctoral project was: Can a quality improvement plan focused on diabetes self-management education support better control of the glycemic ranges of Type 1 diabetes in adolescents during the transition of self-management from parent to child? The design of the project included creation of curriculum for classes as well as streamlining blood glucose reporting within the center. The quality improvement plan outcomes provided an improvement on hemoglobin A1c of 0.3% for those utilizing the reporting systems and an improvement of 0.4% for those who had attended the education classes. Of the 11 patients who routinely sent in blood glucose over the 4-month time period, 10 met the goal of checking glucose as directed. These outcomes indicate the potential need for more concise direction within nursing practice to provide individual ages within the pediatric population with specific education plans to improve health outcomes. Improving the glycemic control of adolescents living with diabetes allows for a better transition into adulthood with a decreased risk of long-term complications, significantly contributing to positive social change.

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## Dedication

This project is dedicated to all my diabetes patients I care for daily. My passion for diabetes management comes from my desire to give you and your families the tools needed to improve every aspect of your life and empower you to thrive as you grow into adults. The strength and courage it takes to live life to its fullest while managing diabetes is that of superheroes, and each one of you have your own special superpowers! Keep showing the world what you can become and how diabetes doesn't define who you are!

## Acknowledgments

The process of completing a doctoral program, especially the doctoral project, is not an easy process to navigate. Without many influential and patient people in my life, I would not have made it through. I must start off saying thank you to Dr. Mattie Burton, as she helped guide me through the process of putting my mind onto paper and into action. Through this, my confidence became stronger and my goals clearer. I also must thank all the members of the clinic, including my preceptor. This project implementation required so much team work, and I am grateful for everyone stepping up. Lastly, but most important, I would like to thank my husband (Brian) and all my boys (Lewis, Mica, Elliot, and the newest addition Axel). This doctorate program has taken a lot out of all of us, and this wife/mama is so blessed to have had each of you supporting me every step of the way.

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## Section 1: Nature of the Project

### **Introduction**

Within the practice of pediatric endocrinology, the transition of self-management from parents to adolescents living with Type 1 diabetes (T1D) is a challenging task. The challenges of living with T1D are best addressed by a multidisciplinary team who encourage patients to become educated and learn a certain level of self-management of the disorder to achieve better glycemic control (Chatterjee & Davies, 2015). The support system integration in education is a part of diabetes self-management education (DSME), which is not being addressed appropriately in pediatric clinics and populations (Chilton & Pires-Yfantouda, 2015). Children, especially those diagnosed at an early age, are not given the education needed for self-care, and once these children are beginning the transition from childhood to adolescence to adulthood, they are not individually supported to transition from their parents care (Dashiff, Riley, Abdullatif, & Moreland, 2011).

There is a lack of direction for healthcare providers to aid children's transition into adolescence with successful glycemic control. Within the pediatric population, the American Diabetes Association (ADA; 2016) has given some guidelines to help parents begin to transfer the self-management of children's diabetes onto the children themselves in preparation for adult care; however, the guidelines are considered generic at this point and only express that providers and patient's families should begin the transition in early to midadolescent years. This gap in practice is often evidenced by a decrease in glycemic control. Within the adolescent population, only 17% actually achieve the ADA

recommendation of maintaining hemoglobin A1c (HgbA1c) < 7.5% (Channon et al., 2007). The importance of this target maintenance is to prevent complications of diabetes acutely and, even more impactful, elimination of chronic conditions later in life. Within the southeast region of Georgia, the adolescent T1D population is currently underserved in regards to self-management education. In this doctoral project, I addressed the developmental educational and management needs of children living with T1D to allow for improved planning within the nursing practice.

### **Problem Statement**

The Pediatric Diabetes Center (PDC) reaches 36 rural counties and is the only center within a 3-hour radius for children with T1D. Within the center, there are two certified diabetes educators (CDEs) and a part-time dietician. The center is relatively new, in that it just received the American Association of Diabetes Educators (AADE) certification in 2014. The PDC is held within a larger pediatric endocrinology practice, managing over 400 children with diabetes. All 400 of these children will transition into adolescents while a part of the practice. Understanding how to reach these patients with the best evidence-based practice will enable the PDC to improve glycemic control through DSME.

Within the PDC, there are currently programs in place for new onset education for parents and children, pump classes, and continuous glucose monitor training. The current problem with the PDC's education programs is that none of these programs address specifically the needs of the adolescent individual striving towards independence and self-management of diabetes. The implementation of a quality improvement plan

focusing on DSME in adolescents will lead to improvement in glycemic control as well as a more successful transition to adolescent self-care. The education that nurses present to patients is essential for the individual's self-care and prevention of secondary disease states (Sousa & Zauszniewski, 2005). Without the right program structure in place, the nurses cannot properly educate the adolescent T1D population on their self-management needs. As a result, there is a lack of adequate glycemic control in the current adolescent population. T1D, being a chronic disease, is included in this research finding; however developmentally appropriate education remains the gap-in-practice. Within the nursing practice, quality improvement projects will allow for improved presentation of information to patients and their families resulting in improved disease control.

### **Purpose**

There are many aspects of DSME that are not specifically addressed within the pediatric diabetes population. Currently, there is a gap-in-practice identifying proper adolescent self-management education geared toward glycemic control during the transition of self-care from parents to child. The purpose of this project was to address the need for better glycemic control in the adolescent population, during their transition of care from parents to child, through an age-specific DSME program. The practice-focused question to help address the concern was as follows: Can utilization of a quality improvement plan focused on DSME support better control of the glycemic ranges of T1D adolescents during the transition of self-management from parent to child? Educating adolescents with a specific curriculum will allow for better understanding and

glycemic control, as a result of the program taking into consideration the current development and independent stage of the child.

Patients are encouraged to become educated and learn a certain level of self-management of their condition to achieve better glycemic success (Chatterjee & Davies, 2015). Babler and Strickland (2015) and Cooper et al. (2013) investigated the production of tools to aid adolescent in self-management of T1D. They found that the transition to self-management was difficult, and identification of the needs of patients aids nurses and providers in the care of diabetes. Identifying the tools to produce a better transition will yield better self-management of the adolescent and better glycemic control (Babler & Strickland, 2015).

### **Nature of the Doctoral Project**

In order to build a quality improvement plan focusing on DSME in adolescents, I needed access to ADA and AADE resources. The ADA (2014) promotes their *Standards of Care* by annually providing up-to-date diabetes management recommendations for the care of all individuals living with diabetes. Within this publication, there is a children and adolescent section where the focus is on outcomes in glycemic control (ADA, 2014). The AADE also addresses self-care behaviors focusing on self-management diabetes characteristics that are important for managing diabetes through life (AADE, 2009). My use of both the AADE and ADA publications addressed the medical and educational needs to help create specific adolescent education within the PDC clinic.

In order to evaluate the current need, I conducted a retrospective chart review to understand the current education provided as well as the past history of glycemic control

in this population within the clinic. As a method of evaluating the implementation of the quality improvement(QI) plan within the clinic, it was necessary to conduct glycemic testing using a HgbA1c testing and patient self-care, such as blood glucose (BG) testing and reporting. I compared the collected data with the retrospective data collected prior to implementation. All data needed for this project were a part of the patients' charts from routine diabetes follow-up exams. Additional blood draws were not needed.

My analysis of these data prior to and after implementation of the QI plan demonstrated the benefits of the specified adolescent transition self-management education program initiated. The anticipated findings gave evidence of potential designs yielding answers to the current gap-in-practice for adolescent self-management. The purpose of this project was to use these identified gaps to create a QI plan to address and expectedly improve glycemic control and self-care behaviors of the adolescent population.

### **Significance**

Addressing the need for a QI plan to aid in the adolescent transition to self-management of diabetes will positively impact the local and regional population's diabetes management. The medical health benefits of the plan will be seen throughout the PDC, the endocrinology clinic, the local hospital organizations, and insurance companies. The largest impact for the community will be the reduction of complications as a result of better glycemic control. Obtaining glycemic control early in the child's life of living with diabetes has been shown to reduce macro- and microcomplications related to diabetes (Lawes, Franklin, & Farmer, 2014). On a community level, the positive

effects of the improvement plan can benefit the overall well-being of the adolescent patients. The enhanced overall self-care improvements will also benefit the adolescents' social system including their family members, peers, school, and local community systems, through improved society interactions and improved self-care.

This project will impact nursing practice by introducing new education systems to support the recommendation of self-management in the adolescent population. These education systems will lead to patients maturing into adulthood with better self-care, disease management, and less complications. The QI plan will allow nurses to continue to meet the goals of continually striving to care for the whole patient, rather than just the disease. The healthcare system as a whole will also potentially benefit from the project reaching practice areas such as medical and psychological aspects. The medical practice will be able to gauge glycemic control expectations based on the developmental needs of the adolescent during their transition. The psychological practices can benefit from learning the effects of using specific developmental disease-orientated teaching to reach the individual at their current age and stage within the pediatric subspecialty. Improvements to care as a result of this project will also allow for less overall medical expenses as a result of improved glycemic control and improved out of office communication with diabetes providers.

The long-term goal of the QI plan for adolescent self-management is to create a successful, healthy, independent adolescent ready to transition into adulthood with improved diabetes self-care tasks. The patient's ability to check BGs at recommended times of day have been shown to have a direct positive link to better glycemic control



(Helgeson, Honcharuk, Becker, Escobar, & Siminerio, 2011). If a child living with diabetes does not maintain control within the standards of ADA guidelines, the chances of better control in adulthood are greatly reduced (Lawes et al., 2014). These effects will negatively affect their ability to maintain their health and overall self-care and could also lead to increased complications. Individuals living with diabetes must learn to self-evaluate in order to gauge where in their diabetes management they actually are (Sousa & Zauszniewski, 2005). This self-evaluation is an important trait that must be used through all aspects of the patient's life, both socially and medically.

### **Summary**

This section included a discussion of the project problem, purpose, nature of the doctoral project, and the significance of the project to patients and the healthcare system as a whole. Children with diabetes achieving better glycemic control using the implementation of a QI plan to address the DSME during the transition to adolescence of diabetes care has the potential to have a wide-spread positive impact. Currently, there is minimal guidance on a patient-centered education focus on diabetes self-management during the adolescent years. By implementing an improvement plan within the PDC, patients living within 36 counties can be reached. Creating a successful, self-managing adolescent living with diabetes will allow for them to better transition into adulthood as well. The participants benefiting from the QI plan will potentially experience improved glycemic control, which will decrease risk of complications as a result of diabetes. However, the long-term benefits will be just as great through the patients' improved self-care that will improve their control and ability to function within daily life. The nursing

profession, as well as other medical practices, will potentially benefit from the plan as a result of further guidance on the specific developmental care of patients this age within the pediatric specialty.

In the following section, I will discuss application theories and models used for the project implementation and evaluation. I will also provide information regarding the background, context of the QI plan to address the glycemic control of adolescents living with T1D. The roles of the Doctorate of Nursing Practice (DNP) student and project team will also be discussed, as well as the implementation of the plan.

## Section 2: Background and Context

### **Introduction**

DSME remains the standard for the best management of T1D. However, in the adolescent population, the education received to allow for proper management lacks impactful results. To address this practice problem, I developed the following practice-focused question to guide this project: Can utilization of a QI plan focused on DSME support better control of the glycemic ranges of T1D, during the transition of self-management from parent to child? I identified gaps in the current practices by allowing for changes in the practice used currently for discussing glycemic control in the adolescent population. The purpose of this project was to identify these gaps and then create a QI plan to address and potentially improve glycemic control of the adolescent population.

When discussing self-management in the diabetes setting, application of implementation and practical theories and models need to be considered. Orem's self-care theory and the logic model were relevant for this QI plan. Using this theory and model, I implemented improved glycemic control measures through education and monitoring of the target population. Using the findings of this plan, A broader application of the findings of this project may be influential to the nursing profession as a whole. Allowing the findings of this project to other age specific chronic conditions in the pediatric population, could improve transition of children into independent disease management.

### **Concepts, Models, and Theories**

A QI plan to address better glycemic control through self-management education geared towards the adolescent population comes with complex developmental and implementation needs. It is important to consider the developmental aspects of the child as well as current environmental practices within the PDC that need addressing. The actual improvement project will be an ever-changing practice based on the results from the first implementation. Using Orem's self-care theory, I wrote essential tasks for the management of diabetes within an adolescent into a program plan, and then evaluated this plan using the logic model.

Orem's self-care is a conceptual theory that allows for the developmental considerations of the change from dependent care of the parents to the self-care of the child (Sousa & Zauszniewski, 2005). Orem's self-care theory describes the phenomena within self-mediated tasks that an individual accomplishes in order to preserve their life, health, and wellness (Sousa & Zauszniewski, 2005). This theory is one of three middle-range theories grouped into Orem's broad-range theory of nursing (Sousa & Zauszniewski, 2005). Orem wrote that individuals can care for themselves and should be responsible enough to take on self-care tasks (Sousa & Zauszniewski, 2005). All care needs are acquired within the social contexts of the environment (Denyes, Orem, & SozWiss, 2001). The education that nurses give to patients is essential for the individual to be able to care for and prevent certain disease states (Sousa & Zauszniewski, 2005).

I based this project on the idea that the application of Orem's theory in the adolescent T1D population will ease their transition into adulthood. I believed the

application of Orem's theory in this population would result in compliant and controlled diabetes early in life, which will yield success in health and wellness. In their study, Sousa and Zauszniewski (2005) discussed the importance of self-evaluation within self-management. They found the validation of increased self-care leading to positive self-management of an adolescent's diabetes can be measured quantitatively through HGBA1C. These findings resulted in the conclusion that people with diabetes must learn to self-evaluate in order to gauge where in their diabetes management they actually are functioning.

The logic model is an effective tool for evaluating a QI plan, such as the adolescent DSME program (Hodges & Video, 2011). The logic model is a guide for implementation and evaluation that has been used across many different professional fields (Hayes, Parchman, & Howard, 2011). The model is a visual representation of the link between expected resources, activities, and short- and long-term evaluations (Hayes et al., 2011). Within the adolescent program setup, it was important to consider the stakeholders' input and outcome responses for evaluation. Through evaluation, the stakeholders allowed for the program's development to meet the needs of the target population while allowing results to be concluded and applied for improvement of practice (see Hodges & Video, 2011).

### **Definitions**

I provided the following definitions to allow for an improved understanding of the terminologies throughout this project:

*Adolescent:* For the purposes of this project, adolescents were the ages between 12–18 years.

*Self-management:* For the purposes of this project, this term was used to describe the ADA (2016) recommendation of personal everyday management of the processes required for an individual to control their diabetes. Within the pediatric population, this applies to the parent as well as the child.

### **Relevance to Nursing Practice**

The education presented to adolescents living with T1D can affect their ability to transition into adulthood with an increased quality of life and reduced chances of secondary complications (CITE). Babler and Strickland (2015) conducted a large-scale study on adolescent transitioning to the self-management of their diabetes. The purpose of their study was to investigate the implementation of self-management education systems to encourage a smoother and more successful self-management of pediatric diabetes. Phase 4 of their study, named “Moving the Journey Towards Independence,” focused on how to normalize the process of transition the adolescent into self-management. Through qualitative interviewing, the researchers found a prominent theme from the adolescents, which was their feeling of “taking on the burden of care” (Babler & Strickland, 2015, p. 657). This finding displayed a negative view on their transition, showing a desperate need for better social and educational structure to achieve a successful transition. As a result, their main recommendation from the study was to create a process that provides these children with individual and group counseling as well as education sessions. They recommended that the focus of these sessions be on creating

positive support for the transition and understanding of diabetes, while giving structure of slow independence in all aspects within adolescents' lives. This positive impact is including, but not limited to, home life, school life, and sports (Babler & Strickland, 2015).

Hilliard, Powell, and Anderson (2016) discussed evidence-based behavior intervention, using a psychological approach to the management behavior aimed at improving self-management diabetes in adolescents. They proposed that a psychologist, being trained to understand the development of children within various aspects of their lives, is an essential part of the multidisciplinary team within pediatric diabetes (Hilliard et al., 2016). Using theories of behavioral interventions, the authors proposed multiple behavior modifications to help promote a more positive self-management transition. Technology interventions and health care delivery system interventions were two of their recommendations. With these two interventions, the multidisciplinary team would be able to reach the adolescent through allowance of self-reporting and adherence with technology as well as within routine follow-up visits (Hilliard et al., 2016). These recommendations support the view of the child as capable and successful component of self-care, yielding a positive view on requirement of self-management diabetes and glycemic control.

Many of the studies I reviewed did not address or utilize a nursing theory to aid in the data collection and analysis leaving room for further research to improve validity. Also, a large gap in current literature is the retrospective reporting. If the adults were able to look back and give opinions about their transition and experience in relation to

parental roles, the result may yield the ability to produce more guidance to support the education provided within DSME.

Most of the current literature illustrated the importance of social support from parents, caregivers, and significant others. In separate systematic reviews, Babler and Strickland (2015) and Cooper et al. (2013) investigated the production of tools to aid adolescents in self-management of their T1D. Both pairs of researchers found the transition to self-management was difficult and that the identification of the needs of these patients will aid the nurses and providers in their care. However, they did not address how to change this outcome as a result of the limitations of the findings. Though the adolescent population can give opinions about what is occurring within their daily lives, their responses lack answers as to how to fix their concerns. The probable reason being that the adolescents are in the middle of experiencing the research question at hand. The authors pointed to the decrease in self-management, but did not address how to get the teenagers to acquire the education to yield better control. In this doctoral project, I addressed this gap in literature by implementing a solution to the problem of lack of transition in adolescents.

Nurses who work with children within the pediatric diabetes population are in need of further guidance in caring for each developmental age group. The care and education of patients and families must conform to the current age and abilities of the child patients at that point in time. Using this project, nurses will have a model for adolescent DSME that will allow for an overall improvement of care for this age group as



well as set the foundation for additional chronic illness education plans within the adolescent population.

### **Local Background and Context**

The problem of lack of glycemic control in the adolescent population as a result of lack of self-management education is relevant to the PDC in southeast Georgia because of the target population and demographics of care. The PDC reaches 36 counties and manages all T1D children in this region from birth to 18 years of age. Once these children reach 18 years of age, the transition to adult care begins. The adult diabetes care is vast and reaches these outlying counties through not just endocrinology clinics but also family practice clinics. The adults within rural areas in Georgia tend to stay within communities of care. As a result, the individuals do not always travel to bigger cities to seek specialist care; therefore, it is imperative that the children who are diagnosed with T1D understand why it is important and how to manage diabetes before the adult transition happens.

The organization the PCD is located within is a community hospital serving the same region and the center. The pediatric hospital services are inpatient, outpatient, and private practice. Because of some internal administration personal connections with pediatric diabetes, the vision to grow the pediatric diabetes services is great. The strategic vision within the PDC is to grow the center to be a leader in diagnosis, management, and research in the southeast (referring to the lower eastern states from Tennessee, to Mississippi, to Florida, and every state in between).

In the state of Georgia, House Bill O.C.G.A. § 20-2-779 lays out the requirement

that all public schools must have two diabetes trained personnel within each school. The state determined this requirement based on the importance of continual management of diabetes to continue appropriate glycemic control (Georgia Department of Education, 2012). This ruling moved the emphasis of pediatric diabetes control into the same realm as Type 2 diabetes adult education within the state (CITE). So often, Type 2 diabetes has been the only diabetes the communities have been introduced to (CITE). This new law has increased the public's knowledge and understanding of diabetes care in all school staff, including teachers and ancillary staff. This has resulted in more support for the school nurses. This increased knowledge is applicable to the doctoral project because although the adults, and possibly even caregivers, are becoming more knowledgeable about diabetes, the adolescents are still being left out of the increased understanding of their own disease state and requirements.

### **Role of the DNP Student**

Pediatric diabetes management falls under the subspecialty umbrella of pediatric endocrinology. I, for the past 7 years have been working as a pediatric nurse practitioner in pediatric endocrinology. My passion, since becoming a part of my current clinic, has been T1D. I work with the inpatient and outpatient sides of my current organization to help diagnose, manage, and treat all children with T1D under the age of 18. Within my doctoral practicum experience, I have become more involved with the education aspects of the management. Working alongside the pediatric endocrinologist and CDEs in the PDC, I have learned of and desired to address the adolescent need for emphasis in reeducation.

T1D in children, can be such a powerful condition to manage. When the children first come to me, whether in clinic or inpatient, and they are given a diagnosis, they are usually very sick, symptomatic, and in shock of the diagnosis. However, through intensive insulin therapy and diabetes education, within a month, the very sick, very scared patient and their families, come back to see me in clinic with a whole new outlook on their diagnosis. I have been able to see first-hand how impactful education can be for these families. Teaching the child and families how to live a long healthy life with a disease that used to come with so many complications is rewarding. I enjoy the opportunity to be able to discuss the history of diabetes, and how a person living with diabetes now is no longer destined to have complications.

One of the hard concerns about my connection with a pediatric specialty is the concept that not all parents do what is expected. I feel my biggest bias, is assuming that a parent will help in the process of educating the adolescent child. So often within pediatric care, there are parents who are not involved. To help address this concern, the QI implementation of education, will be given to parent and child, with reinforcement on the child's ability to self-report and manage. The parents will be used as tools for accountability, but not as the first line of education or blood glucose reporting.

### **Role of the Project Team**

Team members within the organization worked together to design and implement the QI plan to include new DSME class structures, a glucose reporting system, and parental support. Having a level of expertise, while also addressing barriers as obstacles

to overcome tends to yield the best results of change (Estabrook, 2003). Hyrakas and Harvey (2010) discussed that in order to see success, healthcare today is in need of leaders who understand more expertly the process of change and how to integrate it with the differences within it system.

The participation of the team members was as follows:

- Nurse practitioner/team leader/project leader: Collaborates with the multidisciplinary team as an expert resource and ensure that all aspects of project are implemented.
- Physician: Works alongside the team leader as an expert resource, contributor, and conducts patient medical care.
- CDEs (three): pediatric educators who will help create curriculum, manage Health Information Technology (HIT) reporting system, and conduct classes.
- Staff nurse: Works with parents and other team members to communicate concerns or new plan.
- Registered dietician: Works as an expert in nutrition, helps create the nutrition portion of DSME.
- Business and clinical managers: Work with team members to facilitate creating staff and schedules to support new program recommendations.

The project team had multiple strategic meetings to collaborate in making decision to help create the QI plan. Each member of the team was responsible for delegated portions of the plan, where they are designated the expert. The team leader

provided the team with information and data need to make informed decisions as the QI plan comes together.

### **Summary**

Within Section 2, models and theories applicable to the development of the QI plan were discussed. Through theoretical application, addressing the concern of T1D adolescent transition into self-management occurred as a QI plan to the existing education currently offered in the PDC. Also, discussion regarding relevance to nursing practice was mentioned. Literature currently acknowledges the gap in the education from parent to adult Type 1, leaving the adolescent susceptible to losing glycemic control. This doctoral project seeks to improve the education the adolescents receive to set them on the path of success and proper glycemic control, into adulthood. In the following section, I will discuss the practice-focused question. Sources of evidence, operational data, and analysis are discussed in relation to the application and evaluation of the quality improvement plan proposed.

### Section 3: Collection and Analysis of Evidence

#### **Introduction**

Implementing a QI plan addressing DSME within the adolescent T1D population will allow for the introduction of new evidence-based practice improving glycemic control as well as the successful developmental transition of adolescent independence. The identified problem of declining glycemic control in the adolescent ages within pediatric diabetes is impactful because without this direct education, the adolescents grow into adults and could potentially live their lives without the proper knowledge to control their diabetes. The southeast PDC reaches a large area of rural communities and is a leading, accredited PDC in Georgia. The findings of this project study on addressing the self-management skills given to adolescents will have a large impact on the area long term, by potentially reducing chronic secondary complications as a result of poor glycemic control. In this doctoral project, I sought to address the data-supported drop in glycemic control during the adolescent period. Using retroactive HGBA1C values compared to the postimplementation values, I was able to evaluate the QI project for effectiveness. The proposed improvement to self-management education will potentially positively impact the diabetes community as a whole by giving direction to evidence based practice (EBP) education guidelines.

#### **Practice-Focused Question**

In this project study, I investigated the practice-focused question of: Can utilization of a QI plan focused on DSME support better control of the glycemic ranges of T1D adolescents, during the transition of self-management from parent to child? The

results of my project allowed more directed education to be provided to the targeted population of adolescents with T1D. Research supported a need for adolescent education to help improve glycemic control; however, the gap-in-practice existed in regards to curriculum and education set up. Self-management education is the gold standard for long term success in diabetes control (CITE). With new onset patients, intensive education is provided to the patients and families. but as the children grow up, they are not then reeducated to learn what their parents were taught (Chilton & Pires-Yfantouda, 2015). Instead, they just receive secondary education through their parents teaching them, or by watching the example of what their parents do (CITE). The examples and education given in these situations may or may not be complete and directional for improved control (Dashiff et al., 2011).

The purpose of the doctoral project was to develop and implement a QI plan addressing the DSME for adolescent T1D children. The education program consists of education sessions, blood glucose reporting systems, and group participation, all designed to give the adolescents the information and accountability needed to succeed in their transition to self-care of their diabetes. The parents are a part of the process but are not the primary recipients of the education; instead, the parents are facilitators, along with the educators, to walk the teenagers through their self-management.

### **Sources of Evidence**

Using the ADA and AADE as resources, in this project, I was able to create a QI program focusing on DSME for adolescents. Within the realm of diabetes, the ADA *Standards of Care* are the evidence-based guidelines for all individuals living with the

diagnosis (CITE). This publication consists of a subsection addressing child and adolescent management for improved practice, focusing on outcomes. The AADE (2009) self-care behaviors are seven identifiers for improved diabetes control: healthy eating, being active, monitoring, taking medication, problem solving, reducing risks, and healthy coping. Both AADE and ADA resources encompass the medical and educational needs of the adolescent education provided by the PDC.

The education classes were divided up into separate parent and adolescent sessions. The adolescents were given DSME directed towards how to manage their diabetes as well as self-care tasks needed for successful glycemic control. The parent classes reviewed DSME and provided ideas for accountability directed towards creating independence within their T1D adolescent. Each class, taught by a CDE, was given a pre- and posttest to evaluate direct knowledge acquisition; however, the larger scale evaluations were in the short- and long-term outcomes found in chart review.

The QI plan also included the introduction of a new BG reporting system, which was introduced in the education sessions for both the adolescent and their parents' classes. The goal of this system was to use technology to aid in the reporting of BGs for the adolescents. The parents were able to view and continue to encourage the reporting, but the adolescent themselves had to input and submit the information in the system. This self-care action was verified, by the upload of the meter and log downloads, by the medical assistants, when the patients comes into the office for their appointments.

Through a retrospective chart review, the current education within the clinic was evaluated, along with the collective past history of the adolescents within the PLC. The



implementation and evaluation of the QI plan was completed through evaluating both glycemic control and patient self-care behaviors. I compared the HgbA1c levels, BG recordings, and BG reporting to the same data collected prior to implementation. All data were collected just prior to implementation of the education plan and will be again 1 month, 6 months, and 1 year after the program is implemented.

Within the chart review, I also gathered data on BG checking and reporting. One of the PDC's AADE goals for each patient is checking BGs at least four times a day. These data were documented as preimplementation status. To acquire BG stabilization in between visits, patients were requested to send in BG reports for insulin dose adjustments. These data were also documented for preimplementation status. All information needed for this project was already a part of the patient's chart from routine diabetes follow-up exams and was not acquired merely as a need for the QI plan.

### **Archival and Operational Data**

For the doctoral project, the data collection occurred through retrospective chart review. The project team pull the HgbA1c results for all adolescents in the clinic from ages 13 to 18 years of age. HGBA1C is the recommended data point used to judge glycemic control (ADA, 2012). The data gives a percent of glucose attached to red blood cells for a retroactive 3-month timeline (CITE). Using this data, the blood glucose control of the adolescents can be judged without having to consider outliers such as illness or a few days of altered blood glucose (Lawes et al., 2014).

The clinic has a policy that all children with diabetes receive an A1C at every visit along with a blood glucose. The medical assistant and/or nurses acquire the tests

prior to putting the children in the room. The HGBA1C is a point of care test (POCT) and is resulted within 6 minutes of the capillary blood draw. Though the POCT is Clinical Laboratory Improvement Amendments exempt, the organization runs monthly control test, alongside the manufacturers recommended weekly controls. These tests give the results validity within 0.1% of the hospital lab results. To collect the data, permission was provided to the project team from the practice manager and business director. Once this permission was obtained, a retrospective chart review was conducted. To do so, the organization's electronic medical record (EMR) was accessed with the help of the clinic's CDEs. The chart review also provided information for evaluation of the patients' self-care measures. The evaluation of each patient's ability to check BGs at a minimum of four times daily was recorded before participation in the program as well as at the 2 week, 6, and 12 month timeframes after entrance into the program.

### **Analysis and Synthesis**

The information needed for analysis of the QI plan was all acquired from data that already existed within the PLC's routine information acquired at each visit. All of the information for visits was input into the organization's EMR named EPIC. Within the EPIC system, reports can be requested to batch data collection points. The CDEs submitted a request for a batch of HGBA1Cs for all children ages 13–18 years of age within the clinic. These data were already stored in each patient's chart but was also organized into a data sheet to include the A1C result along with the patients age. The EPIC data sheet allowed the project team a view of all A1Cs in this population, without seeing patients' names. From this data sheet, the CDEs then requested an elimination of

all patients' data who had been diagnosed with diabetes within the past year. This was important for the project because new onset diabetic's have an elevated A1C as a result of not previously receiving care for the unknown condition (CITE). These data would have created a falsely elevated A1C average compared to when the data are removed.

I created a timeline to allow for implementation of the adolescent DSME improvement plan. In the timeline, I took into consideration the time required in creating curriculum and staff education. Using the evaluation of the previously discussed logic model, implementation of individual activities began as staggered time units. The initial aspects of the plan implemented were the blood glucose reporting structure. I worked with the other members to narrow down the desired system and set an implementation date. Once this process began, I then focused on a staff minieducation session to update staff and team members on the needs and developmental processes of the target population. From this information, the CDEs worked closely with myself to begin developing the curriculum for the classes. Upon review of the completed education sessions and followup process, I then began the process of creating the parental support education to correspond to the patient education information. The total time from the onset of plan development to implementation was 4 months. To evaluate the program, I created a plan to review parental and patient output data within 4 weeks of class participation and then 6 and 12 months out. All individual activities were evaluated by team members during and at the conclusion of the plan.

The short-term outcomes were measured 4 weeks after implementation of the QI plan using the logic model. The model for this project included a formative evaluation

throughout the project timeline and upon completion (see Figure 1). This was a preliminary plan that will be continually reviewed and revised as needed by the project team.

Formative Evaluation		Process Evaluation	Outcome Evaluation		
Input	Activities	Output	Short term	Intermediate	Long Term
Mission, Goals, & Objectives	Retroactive chart review to focused on A1c data and BG check frequency	Target population of type 1 diabetes patients 13-18yr	Checking BGs 4x's a day for 2 weeks	Checking BGs with all food intake	Lifestyle habit change
Pediatric Diabetes Center	Educate CDEs on Orem's self-care theory in relation to adolescent needs	RNs, CMAs, and front desk staff	Stabilization of A1c	Decrease in A1c	A1c < 7.5
Quality Improvement Plan	Develop an education curriculum for patients to include multiple class options	Patient Education Materials	Adolescents attend all scheduled classes	Adolescents send in all BGs are requested times	BG reporting independently
Age specific DSME	Implement a new HIT reporting system structure for adolescents	Glucose Reporting System	Adolescents send in BGs through the new HIT system once a week	Adolescent Improved understanding of diabetes requirements	Adolescent independently Self-managing diabetes
HIT reporting system	Develop a curriculum for parent support class	Evaluation at 6 months post education clinic attendance	Parents verbalize adolescent changes in home	Parents demonstrate accountability	
Parental support	Develop process evaluation for participation				

*Figure 1.* Framework for the quality improvement plan for adolescent DSME program logic model.

## Summary

In this section, I addressed the problem, purpose and goals, and evidence that allowed me to review the QI plan for evaluation. Analysis of glycemic control with the pediatric diabetes center was conducted through a retrospective chart review. Within the chart review, the date of onset of diabetes, patient's age, and HgbA1c were noted. The date of onset allowed for the removal of data that falsely skewed the average A1C of the adolescents aged 13 to 18 years in the PDC. The patient's ability to check BGs and report the data to the PDC also provided information regarding the results of the program. Evaluation of the effectiveness of the implemented improvement plan occurred by comparing the participants' A1C and self-care habits after completion of the program with their already analyzed retrospective data. In the following Section 4, I will address the findings and recommendations of the QI plan. I will also discuss the strengths and limitations of the project as they apply to the adolescent T1D participants and their families.

## Section 4: Findings and Recommendations

### **Introduction**

Within the large service area of the PDC, there is a gap-in-practice addressing the self-management of T1D in patients transitioning to adolescence. DSME is standard, proper control to achieve a lack of complications in the self-care of T1D (Babler & Strickland, 2015). Currently, in the adolescent population at the PCD, the education received to allow for proper management lacks impactful results. To address this practice problem, I developed the following practice-focused question to guide this project: Can utilization of a QI plan focused on DSME support better control of the glycemic ranges of T1D adolescents, during the transition of self-management from parent to child? A QI design plan was created to identify and address the specific gaps and potentially improve the glycemic control of the adolescent population.

To investigate the need within the PDC, I completed a retrospective chart review to collect the preimplementation HGBA1C data from all adolescents in the clinic aged 13 to 18 years old. The only exclusion criteria were that the child had been diagnosed with T1D for more than a year. These data were collected as routine clinic visit data, resulting in the data being available within the patient's chart and able to be compiled through the EMR database. The information was given as patient's age and current A1C at the time before implementation. These data were then used to compare to the postimplementation results for outcome evaluation. Because this project was a QI plan, there were multiple stages of implementation: BG technology reporting system, educational classes, and group sessions (both educational and social).

I completed the evaluation data for the short-term outcomes and will complete the long-term outcomes will be evaluated by the PDC in the future as that data becomes available. The following outcomes were and will be used to measure effectiveness of the QI process: checking BGs with all food intake, decrease in A1C, adolescents sending in all BGs at the requested times, adolescents' improved understanding of diabetes requirements, and parents demonstrating accountability. For the first stages of the plan and for the means of publishing the current data within this project, the BG reporting system and education classes were implemented and analyzed for short-term outcomes. The continuation of the QI project logic model will be ongoing by the PDC after the reporting of this project paper. The PDC will evaluate the intermediate and long-term outcomes of the BG reporting system, educational classes already in place, and continue the programs by adding group classes for the adolescents to attend.

### **Findings and Implications**

My retroactive chart review of all adolescents 13–18 years of age with T1D and diagnosed for more than a year in the PDC revealed a collective HGBA1C of 8.6%. This information was consistent with Channon et al.'s (2007) findings of only 17% of all adolescents maintaining a HGBA1C < 7.5%. The patients within the PDC were placed into the adolescent DSME program in phases corresponding to their visits at each phase.

The project team used the first phase of the implementation to begin the process of transferring all adolescents who met the criteria into the use of the blood glucose technology system for reporting all data, in between office visits. The patients were then evaluated for their ability to check their BG the recommended number of times per day



(as directed by the care team) as well as their HGBA1C a month after the personal use initiation of the new system. Up to the time of the submission of this project, 11 patients had begun to use the glucose reporting system. Of these 11 patients, 10 of them are meeting their required glucose checks daily, with an average reduction in A1C of 0.3%. These findings indicate the patients' ability to manage their glycemic control is directing related to their ability to log on and follow their glucose data. This concept is supported by the findings of Quinn, Minor, Lender, Okafor, and Gruber-Baldini (2008) on T1D patients' use of improved glucometer technology. Their study found that over a 12-month period, a group of closely monitored T1D patients demonstrated significantly improved A1C while using a computer-integrated or memory-storage glucometer.

Four months into the introduction of the BG reporting phase, the patients began to be entered into the second phase, the individualized education classes. These classes were assigned to the patients by the provider at the patient's routine office follow-up. Up to the time of submission of this paper, 12 patients had successfully completed their first individual education class and had a 1-month follow-up. This process is a bit slower in evaluating because patients only generally come into clinic once every 3 months, unless they are having health problems that need to be addressed. Of these 12 patients, eight of them met their required checks daily, with an average reduction in A1C of 0.4%.

Thus far, the QI implementation plan has yielded the expected improvements as a result of pairing education with accountability. The patients have been receptive to the information and have been responding with positive independent habits even while at home with parents. The parents have discussed an ease with the technology reporting

system in communicating with both their child and the office. The continuation of the QI plan is expected to exponentially raise the amount of participants as well as the continuation of improvement on the A1C reduction, as a direct result of close follow-up with these children.

While conceptualizing this QI plan, the project team did not anticipate some of the limitations or outcomes from the implementation thus far. One of the major factors of initiation, which was unanticipated, was the concept of the slow introduction to the adolescent DSME. The PDC has over 150 adolescents who met the criteria for admittance into the program; however, the majority of these patients only visit the center once every 3 months. As a result, the program was slow to start. The team was prepared for a faster and more voluminous start; therefore, the current analysis and findings are not to the point of desired significance. This must be kept in mind when considering the current data, with the understanding that the continuation of the program may yield different, though not anticipated, results.

Another interesting and positive outcome of this implementation was the adolescents' response to being scheduled for an adolescent education class. The team expected parental response to be positive and receptive, with a little push back from the adolescents themselves. However, much to the team's surprise, the patients, when provided with an appropriate description of what to expect in the adolescent-developmentally appropriate education session, were positive and as encouraged as the parents. This response demonstrated even further the need for adolescent-directed

DSME. The patients themselves want additional information to succeed, and as a whole, the pediatric diabetes healthcare team needs to have a plan to meet this need.

The adolescent DSME transition QI plan is filling in the gap-in-practice at PDC within education for adolescent diabetes management. Reaching the individual children and their families allows for a successful transition from parent to child and improving the possibility of glycemic control later in life. This improved glycemic control yields less complications as the child grows into an adult (Lawes et al., 2014). Within the community, the individual must have the appropriate self-care evaluations in order to function successfully in society (Sousa & Zauszniewski, 2005). Through the results of the QI plan, the pediatric diabetes education can become age-specific to allow the adolescents to become successful in their self-care tasks and continue their role in society while maintaining their quality of life and wellness. Considering the concept of managing adolescents as a subgroup within pediatrics can be useful in other areas of the management of chronic illnesses as well. Giving support to the parents by taking the burden of education of life saving self-care can yield similar results within other sectors of the healthcare spectrum.

### **Recommendations**

As a result of the time constraints of this QI project, my recommendations based on the findings revolve around completion of the adolescent transition program. The findings from the short-term outcomes demonstrate the investment benefits of continuing with all aspects of the program recommendations. For the continuation of the individual adolescent and parent classes, the use of the created adolescent-directed teaching

curriculum will yield standardization for all educators presenting information to parents and children. In regards to the BG reporting systems, based on the slow entrance into the new process, I recommend investigating better forms of publicity within the patient population of the office. Sending group e-mails, the creation of flyers, and routine clinic provider emphasis could improve the patient initiation of the improved change.

Group classes are another extension of QI project that will be continued past the findings of this project. The creation of group class curriculum should extend the information presented in the individual education classes. The adolescents have appeared significantly interested in the information provided in class, and this interest needs to be continually captured. Having the audience of the classes be adolescent only will continue this result. I recommend either holding a corresponding parent class or having the parents drop the children off at the class and return at the commencement for a recap of information given.

### **Contribution of the Doctoral Project Team**

The project team worked together through two group meetings and then individually with the myself, designing and implementing the QI project. The technology portion of the project was implemented by the CDE team. The lead diabetes educator was in charge of the dissemination of information to patients and parents in the form of detailed instructions using both written and graphic prompts. The nurse practitioner and the lead diabetes educator, using information from the dietician, worked together to create the curriculum necessary for implementing the standardized group class. The business managers and other office staff worked with the rest of the project team to create

a schedule and EMR documentation tools to allow for the patients to be enrolled in both the BG reporting system and the education classes.

Beyond this project, the nurse practitioner and lead diabetes educator will continue to develop curriculum for the group class as well as evaluate the current reporting system structure to ensure it continues to be patient and parent friendly for the recording and submission of data. These two lead team members also plan on working with other team members to create a full adolescent transition program training day. This training day will allow for gaps to be filled with knowledge of the material and processes of the program, which may have been missed as a result of the time constraints within the project implementation stages.

### **Strength and Limitations of Project**

This doctoral project has many strengths and limitations. One of the main strengths of the project revolved around the concept that the pediatric-specific knowledge base of the diabetes team was able to be paired with current ADA *Standards of Care* to create a process to not only address the pediatric T1D community but an even smaller subgroup of the age-specific population. Age-specific health promotion is a recognized gap in healthcare communication and is a part of the American Association of Colleges of Nursing essentials (AACN, 2006). Another strength of the program is the flexibility to address other pediatric chronic care education using the structure of this project. Though the information will change, by using the logic care model with the underlying adolescent specific self-care theoretical concepts, a health team could create a program to create empowerment and self-care skills within this patient population.

One of the main limitations of this project were the time constraints. The best outcomes of this full implementation will be long-term outcomes, which will not be evaluated until at least 12 months from implementation. The postproject plans for continuation and extension should eliminate this limitation and can be reported in a follow-up publication. The other limitation, like so many education programs, revolves around patient compliance and participation. As Quinn et al. (2008) discussed, there is a direct link between the use of BG technology and improved glycemic control. However, the patient must choose to participate, and therefore, the findings only encompass the group of patients that chose to attend a class or submit data in between visits.

## Section 5: Dissemination Plan

DNP graduates are expected to be disseminators of information (CITE).

Dissemination of scholarly work applies acquired knowledge to the current clinical field to improve healthcare practice (AACN, 2006). This project will yield improved care of the adolescent T1D population, which will improve overall care of the diabetes population in years to come. I will report the results of this project to the PDC organizational leaders, fellow-scholars, and nationally to key stakeholders.

Through the use of a power-point presentation and education session, I will present a report of the educational improvement program and its effect on the age-specific T1D population to the lead pediatric organizational providers and directors. The presentation will then be offered as a resident/nurse “lunch and learn” session within the inpatient setting. The benefit of this presentation will be to involve those caring for these children when they come to the hospital and create an extension of continuity of education.

Publication of the abstract for this doctoral project within a disease specific population journal, such as *Diabetes Educator*, would also be a possible avenue of dissemination to the healthcare professionals currently working with children living with diabetes. The goal of this publication would be to encourage QI plans to current education programs directed at parents and gear the adolescent trainings towards encouraging improved control.

A larger scale of dissemination would be through an educational session presentation at a national conference. Through already accepted invitations, I will

present this project at both the AADE 18 Conference as well as the Pediatric Endocrine Nurses Society 2018 conference. These presentations will be interactive in nature, and I will provide a brief view of the curriculum along with the technology application selections. The goal of these sessions will be to continue to report, on a more global level, the importance of age-specific disease management education.

### **Analysis of Self**

Through my DNP academic journey and the creation and implementation of this doctoral project, I have had the ability to grow within my many academic and professional roles. As a pediatric nurse practitioner, I have acquired information, especially within pediatric diabetes management, that has helped me to grow as a leading expert in my field. I have developed the ability to link my practice and management of pediatric diabetes with the scholarly skills I learned in my doctoral program. Through vast amounts of research, I have enhanced my evidence-centered approach to education and treatment for all pediatric age groups, despite my project focus on just one of them.

Working on this project was not an individual process; it was a team effort requiring much collaboration. Working with the various members of the team and staff at the PDC site over the past few years has molded me into an improved manager. Leading team members while developing a project can lead to difficulties, and when being confronted with these challenges, I acquired the skills to use the strengths of those around me to overcome obstacles.

One of the best lessons I had to learn, in a hard way honestly, was that I had to lean on others to help me move through the project. No matter how much I wanted to do



things on my own, that was not the most effective way to progress forward. This became clear when a personal surprise blessing came along about halfway through my doctoral program. Without the continuing support of those surrounding me in the professional realm, the project vision had the potential to be lost. For this lesson in my journey, I will be forever grateful.

I also learned to be grateful for change. This is not an easy lesson to admit because I am a person who tends to be comfortable within current processes and with current people. During the time of this project, my project team members changed as a result of position moves. This was a scary time because the introduction of new people comes with new information to disseminate and the potential of criticism (even if constructive). Both did come, and both were absolutely beneficial to the completion of this project.

I am excited to say my age-specific diabetes education journey is not completed, rather just beginning. I have found how passionate I am to work with others in the diabetes management realm to provide education to patients where they are in life. Not only can I do that as a practitioner but as a scholar of diabetes and pediatrics together. Within my current practice, I plan to continue to work with team members and branch out our education to not only the adolescents, but to the younger children, teaching them and their parents collectively yet separately. I am setting a goal to establish a standard of care for all pediatric diabetes education, as a view of branches of information from one central curriculum concept. The adolescents are just the beginning.

### **Summary**

The purpose of this project was to use identified gaps in practice to create a QI plan to address and expectedly improve glycemic control and self-care behaviors of the adolescent T1D population. The program I developed consisted of educational classes and the introduction of a technology-based application for BG reporting. The initial short-term outcomes yielded evidence that the plan will improve the glycemic control of the adolescents who attend the classes as well as report BGs as directed in between clinic visits. My recommendations for continuation past this project include using the adolescent curriculum and creating a group adolescent class for further education in a peer setting. The long-term benefits of this education program can be seen through improved glycemic control, which will yield a decrease in secondary complications and allow for improved self-care and participation within society.

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