IMPLEMENTING SCREENING FOR DIABETES DISTRESS IN ADOLESCENTS WITH TYPE 1 DIABETES

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Abstract

Background: Diabetes distress refers to the emotional burden of living with diabetes. It affects 30% of adolescents with type 1 diabetes and diminishes their ability to care for themselves. Diabetes distress is associated with above-target glycemic control, less frequent self-care behaviors, and high levels of psychological distress. Routine screening for diabetes distress in pediatric endocrinology clinics is needed to foster improved diabetes outcomes. Unfortunately, many pediatric endocrinology clinics do not meet the recommendations of the American Diabetes Association (ADA) to screen for diabetes distress routinely.

Purpose: To implement screening for diabetes distress for adolescents with type 1 diabetes in a pediatric endocrinology clinic.

Methods: The setting was a pediatric endocrinology clinic in the southeastern US. Upon arrival, adolescent patients with type 1 diabetes scanned a QR code using their cell phone or tablet. The code linked to a REDCap screening with the Problem Areas in Diabetes (PAID) screening tool for diabetes distress.

Results: Fifty-six patients were identified for screening over the 10-week cycle. Of these, 53 (90%) completed the screening. Low diabetes distress (scores between 20-29) was 15%. Moderate diabetes distress (scores between 30-39) was 5.6%. Severe diabetes distress (scores of > 40) was 22.6%. Scores < 20 were not considered reflective of diabetes distress; 56.8% of scores were less than 20. Questions relating to anxiety about diabetes, fear of diabetes complications, and feeling overwhelmed with diabetes care were the most severely ranked symptoms. The screening proved to be both efficient in implementing and identifying diabetes distress in the selected patient population.

Recommendations: Diabetes distress screening tools are feasible to implement in pediatric endocrinology clinics for adolescents with type 1 diabetes. These findings confirm that diabetes distress is a prevalent problem affecting diabetic adolescents in the practice. The next steps include referring patients with moderate to severe diabetes distress scores to behavioral health counseling to help reduce the burden of diabetes distress.

Key Words: type 1 diabetes, distress, adolescent, PAID, screening, A1C.

Background and Significance

Over one-third of adolescents with type 1 diabetes experience diabetes distress—the negative emotional impact of living with and managing diabetes (Hagger et al., 2018; Kenny et al., 2021). People living with type 1 diabetes require multiple daily insulin injections or insulin pumps, frequent blood glucose checks, and extensive knowledge of nutrition (Kenny et al., 2021). For adolescents, these stressors can be overwhelming in addition to normal social and family stressors. Type 1 diabetes also presents a financial burden and constant threat of chronic health complications if not well controlled. Together, these stressors can develop into diabetes distress in adolescents.

Diabetes distress can negatively affect adolescents' ability to care for themselves and function in a multitude of situations. Adolescents with chronic levels of diabetes distress have above-target glycemic control, less frequent self-care behaviors, and high levels of psychological distress (Iturralde et al., 2018). Other studies have shown that patients experiencing high levels of diabetes distress are likely to have higher hemoglobin A1c levels (Sturt et al., 2015). Unfortunately, adolescents who have poor glycemic control and self-care behaviors are also at a higher risk for diabetes-related complications that persist later in life. Some of these complications include macrovascular complications, including atherosclerosis and thrombosis in the heart, peripheral arteries, and brain, and microvascular complications, including retinopathy, neuropathy, and nephropathy (DiMeglio et al., 2018). Hyperglycemia is the biggest risk factor for these complications, with cardiac disease being the leading cause of morbidity and mortality in patients with type 1 diabetes (DiMeglio et al., 2018). Despite significant medical advances in the treatment, less than one-quarter of adolescents achieve clinically recommended levels of glycemic control. Therefore, diabetes distress must be identified to prevent lifelong

complications (Iturralde et al., 2019; DiMeglio et al., 2018). The ADA guidelines for type 1 diabetes recommend implementing screening for diabetes distress after the age of eight with the use of diabetes-specific validated tools (ElSayed et al., 2022).

Adolescents with type 1 diabetes are commonly screened for depression; however, there are key differences between depression and diabetes distress. Treatment for depression alone does not necessarily resolve diabetes distress (Hagger et al., 2016). Diabetes distress includes concerns about hyperglycemia, hypoglycemia, dietary distress, and medical self-efficacy (Hagger et al., 2016). Depression screenings do not account for these aspects and could lead to a missed opportunity for intervention for adolescents with diabetes distress (Hagger et al., 2016). There is strong evidence that, when identified, adolescents with diabetes distress respond well to therapy, including psychotherapy, cognitive behavior therapy, motivational interviewing, and solution-focused therapy (Hendriechx et al., 2021; Gonzalez, 2020). Adolescents with diabetes distress show a moderate response to psychological treatment**,** and tailored treatment for specific diabetes distress issues could result in a significant decrease in A1c and tighter glycemic control (Sturt et al., 2018). Implementing such interventions in clinical practice could help to address prevalent problems in adolescents with diabetes. Currently, there is a gap in clinical practice for screening and assessing for diabetes distress in the adolescent population despite multiple screening tools being available.

Purpose

This project aims to implement screening for diabetes distress for adolescents with type 1 diabetes in a pediatric endocrinology clinic. In the literature review, I will address the prevalence of diabetes distress as well as those at greater risk of developing diabetes distress; discuss the impact of diabetes distress on diabetes outcomes such as hemoglobin A1c levels and

blood glucose control; discuss screening tools for diabetes distress and the rationale for selecting the PAID questionnaire; and review the similarities and differences between diabetes distress and depression.

Review of Literature

A search strategy was performed using CINAHL, PUB Med, and Google Scholar. Search terms included combinations of "Type 1 diabetes," "diabetes distress," "Adolescents AND diabetes distress," and "Type 1 diabetes AND Adolesc*." The search was limited to studies published in English between 2015 and 2022. Articles were included if they were full-text and peer-reviewed.

Diabetes distress is experienced at high rates among adolescents living with type 1 diabetes, with nearly one-third of adolescents experiencing high levels of diabetes distress (Hagger et al., 2018), proving that it is a significant problem for adolescents with type 1 diabetes. Gender, age, hypoglycemia, duration of disease, and social group are specific variables that put adolescents at an increased risk of developing diabetes distress.

Gender has been identified as a risk factor for diabetes distress. When compared to males, female adolescents have higher rates of diabetes distress (Sturt et al., 2015). Female gender, as a variable of diabetes distress, also showed that overall, diabetes distress was significantly more pronounced in adolescent girls than in adolescent boys (Lašaitė et al., 2016). The reason for higher levels of diabetes distress in females is unclear, thus presenting an opportunity for additional research.

Patient age is a variable that multiple studies have identified as a factor for diabetes distress. A systematic review evaluated aspects of diabetes distress, including age, self-care behaviors, health beliefs, and self-efficacy, and found that patients between the age of 14-18

were more distressed when compared to those over 18 years old; had more negatively impacted self-care behaviors caused by diabetes distress; and had less family support causing higher levels of diabetes distress (Haggar et al., 2016). A separate study that examined diabetes distress in emerging adults and adolescents found that diabetes distress scores were higher in emerging adults (Lašaitė et al., 2016). Adolescents and younger patients' increased risk for diabetes distress correlates strongly with a longer duration of diabetes (Sturt et al., 2015). Diabetes distress was found to be higher in females during adolescence, and emerging adults with type 1 diabetes tend to have worse glycemic control and more recurrent episodes of hypoglycemia and diabetic ketoacidosis (DKA) than all other age groups (Wentzell et al., 2022). Due to the high prevalence of diabetic adolescents, clinicians should regularly screen for diabetes distress.

Other variables that were commonly identified in research to increase diabetes distress include hypoglycemia, duration of disease, and social group. In one study, adolescents with the lowest levels of diabetes distress showed the lowest levels of family conflict and the highest levels of self-care and coping (Iturralde et al., 2018). Also, more frequent episodes of severe hypoglycemia easily influence diabetes distress. There were no differences in diabetes distress in patients using continuous glucose monitoring or insulin pump therapy, as well as no correlation between patients using an insulin pump versus multiple daily injections (Sturt et al., 2015). Patients at high risk for diabetes distress should be evaluated regularly and receive intervention when necessary. However, most endocrinology clinics do not screen for diabetes distress. It is often under-recognized, which has the potential to lead to negative outcomes for patients.

The two most common tools that have been established to measure diabetes control include hemoglobin A1c and blood glucose logs or measurements. Adolescents experiencing high levels of diabetes distress are likely to have higher hemoglobin A1c levels (Sturt et al.,

2015). Hemoglobin A1c measures a patient's average blood sugar over a ninety-day period and is widely used as an indicator of diabetes control (All about your A1C, 2022). Higher hemoglobin A1c levels put patients at higher risk for diabetes-related complications. Along with increased hemoglobin A1c, emotional distress, peer conflict, and decreased engagement in self-care also lead to higher levels of diabetes distress (Haggar et al., 2018). Self-care is particularly distressing due to frequent injections, blood glucose monitoring, and focus on dietary aspects. When a clinician can recognize diabetes distress and recommend treatment, a reduction in diabetes distress can lead to improved hemoglobin A1c levels. In a study evaluating diabetes distress over time, adolescents with low diabetes distress had the lowest baseline hemoglobin A1c (Iturralde et al., 2019).

Despite multiple screening tools being available, there is a gap in clinical practice for screening for diabetes distress in the adolescent population. The ADA created a 7 A's model to help practitioners routinely assess for diabetes distress. A well-validated diabetes distress screening tool, such as the PAID 20 questionnaire, provides a standardized method for providers to implement the 7A's model. The 7 A's include Aware, Ask, Assess, Advise, Assist, and Arrange (Hendriechx et al., 2021).

The PAID questionnaire is a 20-question best-validated tool that evaluates various factors that can cause diabetes distress (Lee et al., 2015). It is recommended for use as it has strong positive evidence for content validity and hypothesis testing. The PAID questionnaire is also effective due to its ease of implementation and use, which is important to avoid disrupting workflow on busy clinic days. The PAID questionnaire is brief, easy to score, and provides important information on emotional adjustments to a wide range of diabetes situations (Welch et al., 1997). Implementing the PAID questionnaire in pediatric endocrinology clinics for

adolescent patients can provide valuable insight into patients' emotions toward their diabetes care, thus improving diabetic outcomes. The ADA recommends that "diabetes distress should be routinely monitored using patient-appropriate validated measures," which include the PAID questionnaire (Young-Hyman et al., 2016).

The PAID questionnaire focuses on diabetes-related concerns, which can help differentiate diabetes distress from depression. Thus, evaluations have concluded that when diabetes distress was added to evaluations, depressive symptoms were no longer associated with hemoglobin A1c (Hagger et al., 2018).

It is important that clinicians recognize the difference between diabetes distress and depression. Although the symptoms are similar, diabetes distress shows a positive response to certain therapies that may not apply to those diagnosed with depression. Diabetes self-management education (DSME) interventions have significantly reduced diabetes distress (Sturt et al., 2018). There is strong evidence that, when identified, adolescents with diabetes distress respond well to therapy.-Diabetes-tailored interventions show a significant decrease in hemoglobin A1c (Sturt et al., 2018). This evidence is further supported by a study by Schmidt et al. (2018), which found that hemoglobin A1c declined in response to diabetes-tailored interventions.

Although diabetes distress and depression are similar, there are key differences that are important for clinicians to identify. Diabetes distress includes concerns about hyperglycemia, hypoglycemia, dietary distress, and medical self-efficacy (Hagger et al., 2016). Depression screenings do not account for these aspects and could lead to a missed opportunity for intervention. Hagger et al. (2018) compared diabetes distress and depressive symptoms using a combination of the Patient Health Questionnaire for Adolescents (PHQA-8) for depression and

the PAID-Teen (T) for diabetes distress. Forty-one percent of adolescents in the study had both moderate to severe depression *and* high diabetes distress based on the PHQA-8 questionnaire and the PAID-T, while 21% had only moderate to severe depressive symptoms and 36% had only high diabetes distress symptoms (Hagger et al., 2018). The overlap between diabetes distress and depression makes it difficult to distinguish between the two sets of symptoms. Additionally, Itturalde et al. (2019) found that patients with stable high diabetes distress also reported the highest levels of anxiety and depression.

Summary

Diabetes is a complicated disease that puts a significant emotional burden on those living with it. Diabetes distress can lead to feelings of hopelessness, anger, guilt, and fear and can be made worse by interactions with friends and family and overwhelming demands of diabetes care (Hagger 2016). These negative emotions have the potential to lead to deterioration in health and long-term health consequences. Diabetes distress is a common problem, as frequent as 22.8%, identifying high levels in adolescents with type 1 diabetes (Lašaitė et al., 2016). Diabetes distress can have a significant impact on the long-term health of people living with type 1 diabetes. Each increase in diabetes distress was shown to cause a 0.5 standard deviation increase in hemoglobin A1c or a decrease in self-management (Sturt et al., 2015). There are numerous variables that can impact levels of diabetes distress experienced by adolescents. The most frequent variables for increased diabetes distress include younger age, female sex, severe hypoglycemia, and longer duration (Sturt et al., 2015). Additionally, higher levels of family conflict and coping mechanisms are also risk factors for higher levels of diabetes distress (Iturralde et al., 2019). Diabetes distress and depression have similar symptoms, which makes well-designed screening tools important for clinical implementation. Using the PAID questionnaire can assess diabetes

distress early and guide intervention to decrease levels of distress. The PAID questionnaire presents strong positive evidence for content validity and moderate evidence for reliability, and it also has the strongest evidence (Lee et al., 2015).

Theory

Kurt Lewin's change theory will be used to guide my DNP project. In this theory, Lewin theorized a three-stage model of change known as unfreezing-change-refreezing, which requires that previous knowledge be rejected and replaced (Petiprin, 2020). The unfreezing stage is when problem awareness is made, and the need for change is identified. The change stage is when new ideas or alternatives are presented and implemented. The refreezing stage occurs after the new system has been implemented, and the goal is to make the new system a habit or standard of care (Wojciechowski et al., 2016).

Adolescents with Type 1 diabetes frequently struggle with noncompliance, poor compliance, or not accepting of having diabetes. Diabetes distress strongly predicts poor diabetes management but is rarely assessed during pediatric endocrinology visits. Unfreezing, the first stage of Lewin's Change Theory, will apply to changing the way providers see struggles with diabetes management (Petiprin, 2020). Implementing the PAID questionnaire will enable providers to recognize adolescents' struggles with diabetes distress.

The second stage of Lewin's Change Theory is Change (Petiprin, 2020). Once providers implement the PAID questionnaire and begin to see the frequency and severity of diabetes distress in the adolescent patient, providers will be able to address diabetes distress and improve measurable outcomes such as hemoglobin A1c and time in range. By identifying the PAID questionnaire, providers will become more productive in managing adolescents with type 1 diabetes.

The final stage of Lewin's Change Theory is the Refreezing stage (Petiprin, 2020). The goal will be to make the PAID questionnaire part of office visits, which usually occur once every three months for adolescents with type 1 diabetes. The PAID questionnaire will become a standard of care in the pediatric endocrine clinic due to its usefulness in identifying diabetes distress, eventually leading to improved patient outcomes. It is also important to note that the change theory has three major outcomes: driving forces, restraining forces, and equilibrium (Petiprin, 2020). The driving force that will lead to a new direction is the need for improved diabetes management in adolescents with type 1 diabetes to prevent diabetes-related complications. The restraining forces that can hinder change are the provider's willingness to accept diabetes distress as a problem and the feasibility of the PAID questionnaire. The hope is to find an equilibrium that will improve diabetes management due to the identification of diabetes distress by the PAID questionnaire. Future considerations and plans would include the addition of diabetes-specific counseling for patients with moderate to high diabetes distress.

Methods

Untreated diabetes distress can affect adolescents' ability to care for themselves properly, thus leading to above-target glycemic control, less frequent self-care behaviors, and high levels of psychological distress (Iturralde et al., 2018). Implementing diabetes distress screenings in pediatric endocrinology clinics for adolescent patients can provide valuable insight into patients' emotions towards their diabetes care, thus improving diabetes outcomes. Therefore, this project aims to implement the PAID questionnaire for adolescents with type 1 diabetes to identify diabetes distress in a pediatric endocrinology clinic.

Design

This is an evidence-based practice (EBP) project. The pediatric endocrinology where this project takes place has a large population of adolescent patients with type 1 diabetes. To date, no tool has been implemented to evaluate diabetes distress. Once the screening tool is implemented, the clinic can identify patients who would benefit from behavioral health intervention or closer follow-up with their provider. The future goal will be to identify type 1 adolescents with diabetes distress and provide additional resources. The clinic will improve outcomes related to type 1 diabetes management, such as decreasing hemoglobin A1c levels.

Translational Framework

This project uses the Johns Hopkins EBP (JHEBP) model as a translational framework. The Johns Hopkins EBP has three steps: practice question, evidence, and translation (Dang et al., 2022). Developing the practice question is essential in the JHEBP model; "This is the place to establish your 'burning platform' for practice change" (Champlain Valley Physicians Hospital, 2022). According to JHEBP, "In the first phase, the team develops a practice question by identifying the patient population, interventions, and outcomes (PICO)" (Dang et al., 2022). In this first step, I found that my clinic was not using tools to assess diabetes distress. The practice question was, "In adolescents with diabetes, does screening and treatment for diabetes distress lead to improved diabetes health outcomes?" The patient population was identified as adolescents between 12 and 20 years of age living with type 1 diabetes. Anecdotally, diabetes distress was identified as a significant problem in our clinic, specifically with adolescents; however, the clinic did not have any way of screening or identifying patients with diabetes distress for further assessment and evaluation. More evidence was needed to determine whether diabetes distress

screening would help consistently identify diabetes distress in our patient population and improve diabetes health outcomes.

The second phase of JHEBP is evidence. The evidence phase consists of five steps, which include internal and external evidence search, appraising evidence, summarizing, synthesizing the strength of evidence, and developing recommendations for change (Dang et al., 2022). To ensure that I collect high-level evidence, I performed a literature search using scholarly databases such as CINAHL and PUBMED. Selection criteria also included peer-reviewed articles to ensure the highest quality evidence was selected. Synthesis of this evidence revealed that diabetes distress is a significant problem for people with type 1 diabetes. The synthesis also identified screening tools that show strong evidence for identifying diabetes distress. The literature also revealed that screening and treatment improve diabetes health outcomes. Through high-quality evidence, I have found that implementing a screening tool to assess for diabetes distress is both a good fit that meets the practice goals and a feasible project. Overall, the evidence supported the implementation of routine screening in adolescent populations, which aligns with the ADA's recommendations for implementing screening for diabetes distress (ElSayed et al., 2022).

The translation phase consists of multiple steps, which include determining fit and feasibility, creating an action plan, securing support and resources, implementing the plan, evaluating outcomes, reporting to stakeholders, identifying additional steps, and disseminating the findings (Dang et al., 2022). I developed an action plan for project implementation and secured support from management and physicians within the clinic. Implementing that action plan consists of the four P’s: Purpose, Picture, Plan, and Participation (Upstate Medical University, 2023b). The implementation plan must address each of these to ensure its success. In the final stage of the translation phase, I analyzed the project results to identify its strengths and

weaknesses and determine if changes need to be made to ensure it achieves the goal. The translation phase ends with discussing the findings and presenting them to the stakeholders in my clinic.

Population

Adolescent patients with type 1 diabetes between the ages of 12 and 20 who attended routine diabetes care appointments at a pediatric endocrinology clinic were the population for this project.

Setting

This project occurred at a pediatric endocrinology clinic in the southeastern United States. This is an outpatient clinic with five providers and one diabetes educator. It is part of a not-for-profit healthcare system and attends to approximately 50 pediatric patients daily. The clinic is open Monday through Friday for eight hours per day.

Project Implementation

This project implemented screening for diabetes distress. The PAID 20 questionnaire was administered through REDCap. REDCap is a secure method for building and managing online surveys and data. At check-in, patients were provided a QR code to scan with a cell phone or tablet to access the REDCap web interface. Once patients accessed the REDCap page, they were provided an information page that described the screening. Scores were set to be automatically calculated within REDCap and then emailed to the patient's provider after completing the questionnaire. After submitting the screening questions, patients were provided with informational websites about diabetes distress from the Centers for Disease Control (CDC) and the Association of Diabetes Care and Education Specialists.

The project stakeholders were the clinic manager, four physicians, one nurse practitioner, and one certified diabetes educator working in a pediatric endocrinology clinic. The stakeholders held meetings and agreed that diabetes distress is a significant issue for the patient population and that consistent screening could improve patient outcomes.

Instruments

The PAID questionnaire is a 20-item measure of diabetes distress using a Likert scale. The Likert scale has an item response range of 0 for not a problem to 4 for a serious problem. The total score is computed by summing responses ranging from 0 to 100. Scores of 0-19 indicate no significant diabetes distress, 20-29 indicate low diabetes distress, 30-39 indicate moderate diabetes distress, and scores of 40 or higher are considered severe diabetes distress. The PAID questionnaire has concurrent and divergent validity, evidenced by strong correlations to dysfunctional coping styles, quality of life, and depressive symptoms (Fisher et al., 2019). The PAID questionnaire revealed adequate internal consistency with Cronbach α values greater than 0.90 (Jannoo et al., 2019). The project also found a comparative fit index value of 0.923. Satisfactory criterion validity was also found due to the positive significant association between A1C and diabetes duration. The PAID questionnaire has demonstrated sensitivity to change, making it suitable as an outcome measure (Reddy et al., 2013). The PAID questionnaire has also reported an internal reliability of $\alpha = 0.90$ and a test-retest reliability of $r = 0.83$ (Reddy et al., 2013). The PAID questionnaire is one of the screening tools recommended by the ADA for diabetes distress (ElSayed et al., 2022).

IRB Approval

This project was submitted to UNCG IRB and was designated on 06/2023 as Not Human Subjects Research. The project was submitted to Cone Health IRB on 06/2023 and approved on 08/2023. See Appendix A.

Steps Implemented

Beginning in September 2021, this process was discussed extensively with all stakeholders. The pediatric endocrine clinic concluded that there was likely a high occurrence of diabetes distress in adolescent patients with type 1 diabetes but lacked a tool to assess for the distress. The DNP student presented stakeholders with the PAID questionnaire, evidence of validity, and the clinic's implementation plan. Stakeholders discussed the project over two weeks and agreed on implementation. See Appendix A.

The DNP student met with nursing staff and front office staff to discuss collection distribution and collection of PAID questionnaires. Emphasis was placed on avoiding disruption of clinic flow. All staff present agreed with the plan for implementing and distributing the PAID questionnaire.

After approval from the nursing and front office staff, primary stakeholders met again to discuss the start date and implementation. Dates and the John’s Hopkins EBP model were unanimously agreed upon before submission to UNCG and Cone Health IRB.

Implementation of the screening process began at the end of August 2023. One provider began implementing the PAID questionnaire for patients who met the criteria. After two weeks of implementation, results were reviewed with each stakeholder, and adjustments were made when necessary. The implementation process ended at the beginning of November 2023. Final data has been presented to stakeholders.

Data Collection

Providers reviewed patients one week before the appointment and selected patients meeting the population criteria (i.e., adolescents 12- 20 years old with type 1 diabetes). Providers initially made a list of patients and provided the list to the front office and nursing staff to provide the questionnaire. After one week of project implementation, the data collection process was modified to improve implementation. This modification included placing a flag by names identified by the provider to be screened. The front office and nursing staff found using the flags in the electronic health care record to be easier and more consistent. The front office staff provided selected patients with a handout that briefly explained the project and gave a QR code. The QR code was scanned using either a patient's cell phone or tablet, and patients were taken to the PAID questionnaire through a secure REDCap web interface. Patients completed the questionnaire between check-in or before the end of the visit. The provider discussed the PAID questionnaire with the patient during the visit. Information about diabetes distress from the Centers for Disease Control was provided through the REDCap website after patients completed the questionnaire.

Data Analysis

Data collection utilized REDCap, provided by the clinic's parent organization, and was analyzed using Microsoft Excel. I performed descriptive statistics, including the range and mean of the total scores for the PAID questionnaire responses. Categories of severity were calculated to analyze the distribution of scores across categories of no significant diabetes distress (0-19), low diabetes distress (20-29), moderate diabetes distress (30-39), and severe diabetes distress (>40). A bar graph was created to display the average severity of each of the 20 diabetes distress

symptoms, ranging from lowest to highest severity. See Appendix B. There were some missing rows of data. These were deleted and not included in the results.

Results

Fifty-six patients were identified for screening over the 10-week project cycle. Of these, 53 (90%) completed the screening. Barriers to completing the screening included not having access to a cell phone or tablet during the visit and not having Wi-Fi connectivity. Among those who initiated the screening, there were no incomplete submissions during the 10-week cycle. Initially, we used a paper chart to flag patients to receive the PAID 20 screening. After two weeks, the process was modified to utilize the electronic health record (EHR) to flag patients the morning before their clinic visits by adding “screening” by the patient's name.

Total screening scores ranged from zero to 78.75. The mean score was 23.28, with a standard deviation of 21.96. The percentage of screening responses that met the criteria for low diabetes distress (scores between 20-29) was 15%. Moderate diabetes distress (scores between 30-39) was 5.6%. Severe diabetes distress (scores of > 40) was 22.6%. Scores < 20 were not considered reflective of diabetes distress; 56.8% of scores were less than 20. See Appendix C. Additionally, the average scores for the 20 individual items were analyzed to identify the symptoms that were found to be most distressing. A bar chart has been used to display the score results for each symptom. See Appendix B.

Implementation of this project was feasible. However, there are a few considerations to note. First, to prevent duplicate data, the flag was left by the patient's name in the EHR for the 10-week cycle. During the project implementation, no patients were seen twice for clinic visits during the 10-week cycle. If used longer, this process must be modified to prevent duplicate screening. The front staff could click on the flag, which displayed the date the flag was placed.

During the project, patients reported the questionnaire was simple and did not require much time. A possible barrier for this project is that other EHR users could inadvertently remove the flag, which skews the screening completion percentage. However, inadvertent flag removal did not occur during this project. This project proved feasible and did not increase time for patient care or disrupt the rooming process. The front office stakeholders felt that using the handout with the QR code allowed them to pass out the screening tools without negatively impacting the process of checking patients in. Patients were familiar with using a QR code and felt the screening was simple to complete and concise. Many also commented that they liked completing it using the QR code instead of a paper screening. All screening were completed at check-in or after the provider finished the visit to ensure clinic flow was not disrupted.

Discussion

The results of this project were consistent with previous studies discussed in the literature review. This project found that 43.2% of patients who completed the screening tool had significant levels of diabetes distress. Low diabetes distress was present in 15% of patients, moderate diabetes distress in 5.6% of patients, and severe diabetes distress in 22.6% of patients. Over half (56.8%) did not have significant diabetes distress based on the PAID questionnaire. A study published using another screening tool, the Diabetes Distress Scale (DDS), showed that 39% of adolescents had minimal diabetes distress, 36% had moderate diabetes distress, and 25% had severe diabetes distress (Hedge et al., 2023). Published results of another study concluded that 18% of studied adolescents experienced moderate diabetes distress, while 18% experienced severe diabetes distress using the PAID-T scale (Hagger et al., 2017). The slight difference in scores can be attributed to the use of different screening tools. These results support that diabetes distress is a significant problem in adolescents living with type one diabetes. Implementing a

screening tool for diabetes distress can help providers identify patients needing additional resources such as mental health counseling or increased appointment frequency. The ADA notes that a combination of mental health care with counselors should be part of diabetes treatment and also encourages incorporating physical activity, which can benefit mental and physical health (Young-Hyman et al., 2016).

For stakeholders at the clinic, the implementation of the screening tool for diabetes distress presented the opportunity to identify the specific needs of patients living with type 1 diabetes. Higher levels of diabetes distress have been shown to correlate with higher hemoglobin A1c levels. Adolescents reporting high diabetes distress had significantly higher hemoglobin A1c levels than those with low or no distress (Powers et al., 2016). Consistently using screening tools to identify diabetes distress can improve hemoglobin A1c levels by allowing providers to identify areas causing distress and implement interventions.

In addition to identifying diabetes distress, implementing the screening tool allowed the clinic to examine factors contributing to diabetes distress independently. In some patients, the total diabetes distress scores were not elevated, but the screening tool showed areas such as social interactions or concerns about complications from diabetes distress that were elevated in the majority of patients. Implementing this screening tool will help providers not only address diabetes distress but also address aspects that are most impactful for the adolescent population. Being able to pinpoint questions that elicit high scores will also help behavioral health clinicians tailor their care and improve diabetes distress outcomes in the future.

This project has progressed through the stages of the Johns Hopkins EBP, and implementing screening tools for diabetes distress will be the best practice for this clinic. The screening tool implementation will be extended to all providers at the practice location and will

be used during visits with adolescent type 1 diabetic patients. This project was also beneficial because it was associated with minimal cost, used existing organizational resources (i.e. REDCap), and required no additional purchase of resources besides the single flyer with a QR code. The estimated cost for the project was less than $10 for the ten-week screening period, so the implementation across the clinic comes with little financial burden. The time required for implementation, completion, and review of the screening was minimal and did not disrupt clinic flow. Working with the EPIC EHR to automate the flagging of patients selected for screenings could further reduce the time burden.

Conducting this project has allowed me to gain valuable insight into the use of screening tools. The questions from the PAID screening tool were well-worded and could be completed quickly. This helped ensure the project had excellent patient response rates and questionnaire completion. However, there is an opportunity to modify the questions to be more applicable to adolescent concerns and development. A screening tool with questions related to adolescents' social lives, interactions with peers, and conflicts with parents would help make the questions more relevant for this population. Since the PAID screening was developed for adults, some items may not be as relevant to adolescent-specific concerns, such as body image and parental conflict (Hagger et al., 2016).

Conclusion

This project successfully implemented a screening for diabetes distress for adolescent patients with type 1 diabetes. The project proved to be easily implemented without causing disruption to the clinic workflow. Using REDCap helped to automate the screening distribution and scoring. Ultimately, this project provides support for the implementation of routine screening for diabetes distress and provides evidence that adolescents with type 1 diabetes are experiencing

diabetes distress at significant rates. In total, 43% of patients screened positive for diabetes distress, with over half of the positive screens scoring in the severe level of distress. This project also identifies the need for collaboration with behavioral health clinicians to provide tailored approaches to help manage diabetes distress. The next step in this project is to expand the screening to all providers in the pediatric endocrinology clinic. Once the screening is implemented throughout the clinic, a process to provide focused interventions will be developed in conjunction with behavioral health clinicians and diabetes educators.

Limitations

The PAID questionnaire presents limitations to its use in the adolescent population because it lacks questions that apply to the struggles of this age group. A systematic review found a significant correlation with hemoglobin A1c when PAID-T and Diabetes Satisfaction Questionnaires (DSQ) questionnaires were used to assess diabetes distress in the adolescent population (Hagger et al., 2016). There are several other diabetes distress scales or questionnaires, but they have not been extensively researched. Kenny et al. (2021) found that the PAID-11 questionnaire was the most psychometrically sound tool for measuring diabetes distress, but I could only find one study that used this questionnaire. While using questionnaires with more questions tailored to the adolescent population would be ideal, the limited data available makes the PAID questionnaire the best choice now. An area that would be helpful for my clinical application would be implementing diabetes interventions and therapy to help reduce diabetes distress. Diabetes self-management education (DSME) showed reductions in diabetes distress in people with type 1 diabetes and is recommended for routine use (Sturt et al., 2015). As this project progresses, it would be beneficial to not only identify diabetes distress using the PAID questionnaire but also to implement DSME therapy. Lastly, the topic of the financial

impact on diabetes distress and the healthcare industry has proven to be an opportunity for further evaluation as there is little information presented in the articles I reviewed. The addition of these topics provides the opportunity to enhance my project.

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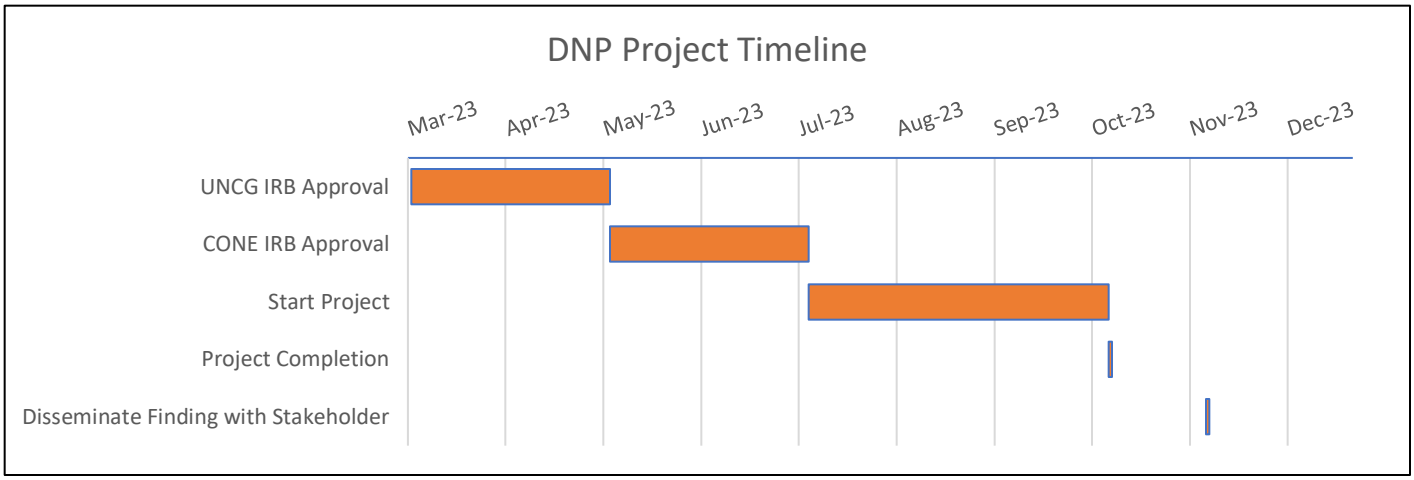
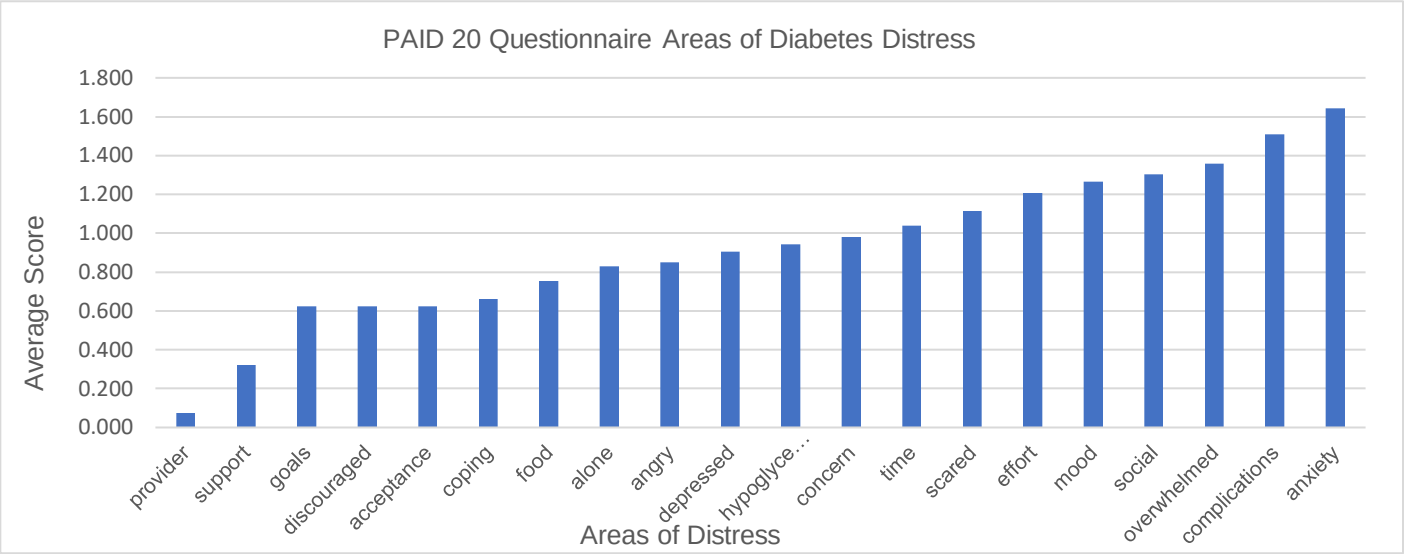
Appendix A

DNP Project Timeline



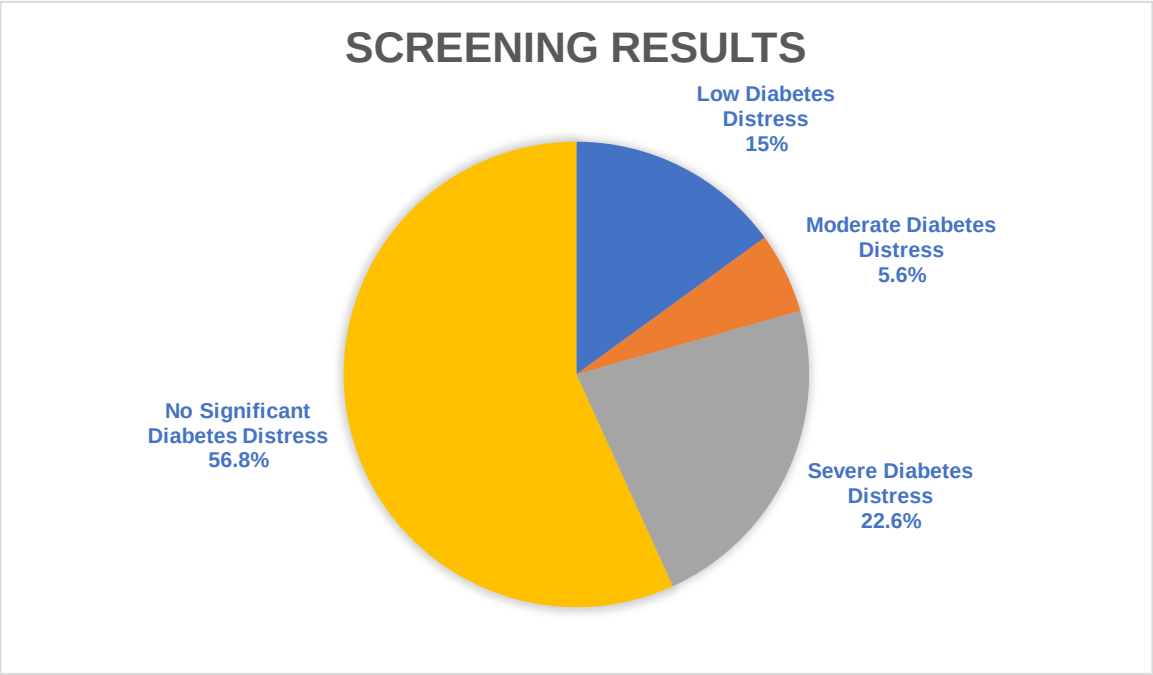
Appendix B

PAID Questionnaire Areas of Diabetes Distress



Note. This figure illustrates the average scores for each area on the PAID Questionnaire in order of increasing severity.

Appendix C


SCREENING RESULTS
Low Diabetes Distress 15%
Moderate Diabetes Distress 5.6%
Severe Diabetes Distress 22.6%
No Significant Diabetes Distress 56.8%