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HEALTH EDUCATION

Diabetes Tween Day Camp: A Case Study

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Abstract:

Approximately 1.6 million Americans have type 1 diabetes, and 200,000 of them are under the age of 20. Self-management processes for these youth, such as peer-based support, are essential for quality of life. This pilot study partnered with university students and Lions Club International Foundation to pilot test a new diabetes camp model and evaluations. Data were collected from 10 youth who participated in the diabetes camp held on a college campus. Data revealed they learned about fellow campers, and their experience living with and managing diabetes. This pilot program provides an innovative approach to combining community resources to serve youth with diabetes through a campus camp.

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Approximately 1.6 million Americans have type 1 diabetes (T1D), and 200,000 of them are under the age of 20 (CDC National Diabetes Statistics Report, 2020). Basic needs such as connection and adequate physical activity were unmet during the isolating environment of COVID-19, particularly for young populations (Pavlovic et al., 2021). Changes experienced by adolescents can impact overall development, putting youth at physical and psychological risk (Hager et al., 2017). In addition to the described developmental changes, adolescent youth living with T1D are at risk for elevated glycated hemoglobin (HbA1c), a risk factor for future health problems (Hager et al., 2017). Unfortunately, only 17% of youth with T1D achieve target blood glucose levels (Foster et al., 2021). Self-management processes for youth with T1D, such as coping strategies and peer-based support, are essential for quality of life (Schumann-Green et al., 2012). Self-determination theory (SDT) has been used in several studies to engineer intentional recreation experiences that promote healthy lifestyles (e.g., Hill et al., 2015).

The SDT provides a rationale to assist youth in internalizing healthy behavior through structured camp experiences that target competence, autonomy, and relatedness. Using a theoretical framework for medical specialty camps aids in the transfer of skills related to not only diabetes management, but also in improving their quality of life (Hill et al., 2019). Diabetes camps for youth have been shown to be effective in improving knowledge of T1D as a disease, psychosocial benefits, and fasting glucose and HbA1c. However, the impact of diabetes camp on post-prandial blood glucose levels, which is a better predictor of cardiovascular disease than HbA1c or fasting glucose (Temelkova-Kurktschiev et al., 2000), in youth with T1D is poorly understood. This study partnered with the Lions Club International Foundation (LCIF) to pilot test a new diabetes camp on-campus model, use new evaluation metrics for replication across the country, and determine the effectiveness of a diabetes camp on glycemic variability.

Methods

In August 2021, 10 campers participated in two days of programming from 9 a.m. to 4 p.m. on a mid-Atlantic college campus. Data were collected from 10 adolescent youth ages 10-15 who participated in the two-day medical specialty camp. Grounded in

self-determination theory, programming for camp, included a combination of physical, educational, and art-based activities, such as biking, rock climbing, walking, swimming, tie-dye, and crafts. The three SDT psychological needs—competence, autonomy, and relatedness—were driven by engineering all camp activities with these outcomes in mind.

Competence was used to help teach new activities and skills for diabetes management, such as learning to rock climb or adjust insulin based on physical activity. Autonomy was a focus by providing choices in meals and activities. Campers ate at the college dining hall and were permitted to make their own meal choices. Finally, relatedness was created by campers and counselors being able to talk about daily struggles with diabetes and connecting with support systems. Simply being around other peers with type 1 diabetes happens only once a year at camp. However, the campers were treated as youth first, addressing diabetes as the teachable moments presenting themselves.

One unique camp activity was the "Goal Identification Activity." The campers completed the goal activity by identifying three to five goals they would like to achieve in the next three months. This was initiated through a discussion of personal challenges, parent expectations, and social norms for youth. Once goals were identified, counselors facilitated a discussion to allow campers to hear similar challenges and offer peer suggestions. After a healthy group dialogue on how to accomplish these goals, with input from counselors and peers, all campers wrote a letter to themselves about their goals (some diabetes and some not) and sealed it in a self-addressed envelope. The camp director then mailed these letters to the campers in November 2021 to help them reflect on camp, their peer support, and personal goals.

The camp design was a collaboration between a local university and the Lions Club International Foundation. The measures were developed by an expert review panel within the LCIF, which explored the impact of camp on diabetes management. Eleven Likert-type questions were administered at the day camp's beginning and end. Questions targeted campers' understanding of diabetes management and included such questions as "I understand how to control my diabetes." Six open-ended questions encouraged participants

to share their goals, struggles, and what they expected to learn at camp. Examples of probing pre-test questions shared with campers included: "My biggest success/challenge in managing diabetes this year was..." At post-test, four open-ended questions were asked, such as, "What is one thing you learned at camp?" and "What was your favorite part of camp?"

Data analysis included statistical and thematic content analysis of open-ended and closed question responses. Quantitative data were analyzed using descriptive statistics and the Wilcoxon Signed-Ranks test in SPSS. Qualitative data were thematically analyzed using descriptive and contextual noting and cross-referenced with an additional researcher working on this project. To assess the effectiveness of the camp on glycemic control, parents of campers who routinely wear a continuous glucose monitoring (CGM) system completed a survey assessing glycemic variability the day before and the day of the camp. However, issues arose with the CGM data collection that precluded statistical analysis of the data.

Results

Ten youths completed both the pre-test and post-test versions of the questionnaire in the summer Tween/Teen Diabetes Day Camp. Within this sample, all participants had type 1 diabetes. Three males and seven females participated in the camp. The average age of participants was 11.5 years, with the minimum and maximum ages being 11 and 15, respectively. A Wilcoxon Signed-Ranks Test was conducted to compare diabetes management knowledge before and after camp participation. The results indicated no statistical significance between participants' diabetes knowledge ($z = .000$, $p = 1.00$) from pre-test to post-test, resulting in a small effect size ($r = 0.28$).

Campers participated in camp for a variety of reasons, mostly to engage in fun educational opportunities among others living with T1D. While many campers cited a combination of physical activities, including rock climbing, swimming, and biking, as favorite activities, lunch was noted as an enjoyable activity as well. During their time at camp, participants learned more about diabetes management and specific medications and techniques. Through their participation and engagement with one another, campers learned more about their fellow campers and their experience living with and managing diabetes. All 10 campers indicated they would return if given the

opportunity. The CGM data collection, however, was problematic. While 10 children attended the camp, only two parents filled out both pre- and post-data surveys. This was likely due to time constraints related to filling out the survey.

Discussion and Conclusion

The purpose of this study was to pilot-test a new diabetes camp model and evaluation metrics. Prevalence rates of youth with T1D are increasing, and it is estimated that from 2001 to 2009, T1D prevalence rates increased by 21% in individuals under the age of 20 (Dabelea et al., 2014). Thus, by 2050, it is estimated that approximately 600,000 youth will have T1D (Dabelea et al., 2014). This presents a large economic burden as $16 billion is spent annually on T1D-associated healthcare expenses and lost income (American Diabetes Association, 2018). By examining the impact of a medical specialty camp, this study explores both quantitative measures and qualitative insight on participant experience. Findings suggest the value of peer support for adolescents living with T1D, which can help prevent further health complications. The new LCIF camp measure needs further testing with larger samples. Our results add more substantial support for the continued development of medical specialty camps approach to educate and facilitate autonomous environments for youth living with chronic illnesses (e.g., Waselewski et al., 2020).

Although the current study sample was small, the program design and community collaboration provide an innovative approach to combining community resources to help its members. Youth actively seek autonomy and connection, particularly after prolonged isolation due to COVID-19 mitigation strategies to ensure health. Additionally, this small study provided an opportunity to pilot data collection for future studies utilizing the CGM. Future efforts will aim to directly export the CGM data from the monitor to reduce the burden on research subjects and, thus, increase sample numbers. Finally, investigating how meal composition, which largely impacts glycemic control, changes based on knowledge garnered from camp should be investigated. Collectively, future studies will examine postprandial blood glucose responses in children with T1D as it relates to diabetes knowledge learned at camp, which is a better predictive marker for cardiovascular disease than other measures of blood glucose control.

The data, critical questions used in scripts, and instruments underlying this study are available within the text.

This study was approved by the Institutional Review Board at Old Dominion University.

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