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A Reflection of Experiences of Adults with Type 1 Diabetes in Integrated Physical Education Classes

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A REFLECTION OF EXPERIENCES OF ADULTS WITH TYPE 1 DIABETES IN INTEGRATED PHYSICAL EDUCATION CLASSES

by

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ABSTRACT

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Abstract

The purpose of this study was to gain an understanding of the experiences of type 1 diabetics in integrated physical education classes. In this study, we interviewed young type 1 diabetic adults and asked them to reflect on their school-based physical education experiences. An interpretative phenomenological analysis (IPA) approach was adopted to guide data collection, analysis, and interpretation for this retrospective study. Eight participants (ages 19 to 32) were enrolled in this study, and semi-structured interviews focused on their physical education experiences acted as the primary data. Transcribed interview data were analyzed using an IPA approach. Three interrelated themes emerged from the analysis process, (a) the (mostly negative) impact of physical activity in schools, (b) lack of education and understanding regarding type 1 diabetes, and (c) frustrations from dealing with misconstrued expectations based on inaccurate beliefs. Themes depicted several barriers that type 1 diabetics face when accessing physical activity in physical education and their frustrations with the lack of education surrounding type 1 diabetes.

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CHAPTER I: INTRODUCTION

Background

Type 1 diabetes is one of the most common chronic endocrine/metabolic conditions affecting adolescents, with diagnosis rates increasing annually (International Diabetes Federation, 2013), but only accounts for approximately 0.55%, or 1.3 million people, of the United States population (Bullard et al., 2018). More recently, new cases of type 1 diabetes skyrocketed during the "COVID years", with a 14% higher diagnosis rate in 2020 and 27% higher rate in 2021 (Watson, 2023). Type 1 diabetes was typically diagnosed in children in pre or early stages of adolescence, but diagnosis trends indicate more children than ever are being diagnosed between ages 0 to 4 (Dahlquist et al., 2011). As of 2009, type 1 diabetes is classified as a disability under The Americans with Disabilities Act (ADA), according to the American Diabetes Association (2009). The American Diabetes Association stated that amendments and regulations that classify type 1 diabetes as a disability developed due to the condition substantially limiting the function of the endocrine system.

Diabetics, in general, face serious health implications, both short- and long-term, including microvascular and macrovascular diseases (Daneman, 2006). However, the risk of heart disease is more significant for type 1 diabetics when compared to type 2 diabetics (Schofield et al., 2019). A contributing factor to this finding is that prolonged episodes of hyperglycemia can negatively impact heart function (Schnell et al., 2013). Other health risks associated with type 1 diabetes includes kidney failure, peripheral neuropathy, and the development of psychiatric conditions, including anxiety and depression (Jacobson et al., 2013). Additionally, there are several physiological changes that are directly associated with type 1 diabetes, such as the deterioration of connective tissues (Larkin et al., 2014), reduction of

cognitive and motor functioning (Lobnig et al., 2006), impaired visual perceptual skills (Gaudieri et al., 2008) and multiple implications to the musculoskeletal system (Kılıçöz et al., 2022).

Regular physical activity may significantly improve the health of type 1 diabetics (Wu et al., 2019). Physical activity is vital in maintaining good heart health and reducing the risks associated with cardiovascular disease (Colberg et al., 2015). Specifically, in younger type 1 diabetics, engagement in physical activity can improve glycemic control, target lipid profiles, and body composition (Quirk et al., 2015). Physical activity in type 1 diabetics may also aid in achieving fitness and glycemic goals (Riddell et al., 2017). However, despite physical activity providing several health benefits, many type 1 diabetics have been found to participate less frequently in physical activity when compared to their nondiabetic counterparts (Colberg et al., 2015). In addition, other risks associated with type 1 diabetes (e.g., kidney failure) may also be mitigated with regular physical activity (Jacobson et al., 2013; Kim, 2018; Kluding et al., 2016; Stump, 2011). In fact, exercise recommendations for diabetics experiencing neuropathy have changed in recent years due to the recognition of the benefits of exercise in this population (Kluding et al., 2017). While the previous focus has been on preventing injury in individuals with neuropathy, recent studies have shown benefits from continuing or even increasing weight-bearing activity (Kluding et al., 2017).

Despite the aforementioned health benefits, type 1 diabetes often affects an individual's ability to participate in everyday activities, such as exercising (Colberg et al., 2015). For example, many type 1 diabetics found it difficult to maintain euglycemia (normal blood sugar levels) both during and after exercising (Colberg et al., 2015). Furthermore, early and late hypoglycemia (low blood sugar) and hyperglycemia (high blood sugar) were shown to be common side effects of exercising for many type 1 diabetics, making participating in physical

activity potentially risky for them (Colberg et al., 2015). While there are many reasons why type 1 diabetics may not participate in frequent physical activity, one of the most significant barriers reported was fear of hypoglycemia (Colberg et al., 2015). Therefore, although physical activity is recommended for adolescents with type 1 diabetes, these individuals may face many unique barriers to engaging in physical activity (Tully et al., 2016), which may in turn have a negative impact on many type 1 diabetics' health and activity rates (Riddell et al., 2017). For example, in a study of 18 type 1 diabetic adults, nearly all reported not achieving enough physical activity (McCarthy et al., 2016). Because of this inactivity, there are a number of additional health concerns that can develop. Of note, nearly 60% of the type 1 diabetic population was reported as overweight or obese (Riddell et al., 2017). Additionally, approximately 40% of the type 1 diabetic community was reported as having hypertension, whereas 60% of the type 1 diabetic population reported having dyslipidemia (Bohn et al., 2015).

For many children, physical education classes provide important opportunities to be physically active (Meyer et al., 2011). In fact, most children participate in physical activity through physical education classes (Cheung, 2017). For example, a study examining the impact of state physical education requirements on student physical education exercise time found that these requirements helped students not only exercise more often and in longer durations throughout the week, but also that physical education helped students exercise more vigorously (Cawley et al., 2007). Physical education classes can also help increase the likelihood of youth engaging in strength-building activities (Cawley et al., 2007). Overall enjoyment of physical education has been shown to play a significant role in establishing a physically active lifestyle (Barr-Anderson et al., 2008).

Unfortunately, individuals with physical, medical, and/or sensory differences may not perceive activities associated with physical education as enjoyable. For example, many individuals with disabilities have reported negative experiences and associated feelings toward physical education due to participation barriers or removal due to perceptions about their disability (Fitzgerald, 2005; Haegele & Sutherland, 2015; Haegele & Zhu, 2017). These findings (Healy et al., 2013; Nicoll & Campbell, 2012) often center on and listen to the experiences and perspectives of students with disabilities regarding physical education classes, providing valuable acknowledgment of their individualized experiences. For example, students shared their experiences with curriculum content, interactions with peers in the classroom, and attitudes toward teachers' instructional methods (Haegele & Sutherland, 2015). Gaining an understanding of these views may help to identify modifications required to enable access to full participation for every student, consequently allowing teachers to act accordingly by providing these students with accommodations to make education more meaningful (Roulstone et al., 2011). In addition, the construction and implementation of activities that allow for the participation of all students in the classroom, regardless of physical, medical, and/or sensory differences, provides opportunity for all students to participate meaningfully and competently, which contributes to positive experiences in physical education (Goodwin & Watkinson, 2000).

While research in this area of inquiry has grown in recent years, it tends to prioritize the voices of people experiencing only some disabilities (e.g., visual impairments, autism, physical disabilities). Thus far, to our knowledge, only one research study exists that explored the experiences of type 1 diabetics in physical education. Due to the abundant benefits type 1 diabetic students can attain from physical activity, and physical education, it is imperative to ensure these students can fully participate safely and are given the proper accommodations

necessary in order to do so. As such, this research study sought to understand the experiences of type 1 diabetics in physical education classes by asking type 1 diabetic adults to reflect on their prior experiences.

Research Question

- What meaning do adults with type 1 diabetes ascribe to their prior experiences in physical education?

Definitions

Continuous Glucose Monitors (CGM). Medical devices that "measure interstitial fluid glucose levels to provide semi-continuous information about glucose levels, which identifies fluctuations that would not have been identified with conventional self-monitoring" (Langendama et al., 2012, p. 1).

Endocrine System. A system in the human body that consists of glands that release hormones (chemical messengers) into the bloodstream to be transported to various organs and tissues throughout the body. For instance, the pancreas secretes insulin, which allows the body to regulate levels of sugar in the blood (Jacobson et al., 2022).

Hyperglycemia. High blood sugar levels which are most often caused by a lack of insulin or insulin resistance (Cleveland Clinic, 2023).

Hypoglycemia. Low blood sugar levels which are most often caused by excess insulin (Cleveland Clinic, 2023).

Insulin. Insulin is a hormone the body makes to keep blood glucose levels within the normal range. It is made by beta cells in the pancreas. Insulin's main job is to move glucose from the bloodstream into the body's cells to make energy (Diabetes and Insulin, 2004).

Insulin Pump (Continuous Subcutaneous Insulin Infusion [CSII]). Medical devices that *"*approximate physiologic insulin delivery through a continuous basal insulin infusion and incremental, or bolus, insulin administration at meals" (Strowig, 1993, p. 1).

Physical Education. An academic subject that provides students with a planned, sequential, K-12 standards-based program of curricula and instruction designed to develop motor skills, knowledge and behaviors for active living, physical fitness, sportsmanship, self-efficacy, and emotional intelligence (SHAPE America, 2023)

Type 1 Diabetes. A condition "when an individuals' pancreas doesn't make insulin or makes very little insulin. Insulin helps blood sugar enter the cells in the body for use as energy. Without insulin, blood sugar can't get into cells and builds up in the bloodstream. High blood sugar is damaging to the body and causes many of the symptoms and complications of diabetes" (Centers for Disease Control and Prevention [CDC], 2022).

Limitations:

- Interviews were conducted via telephone call formatted interviews, and therefore body language and facial expressions will be unable to be recorded.
- This study was retrospective, and the recorded experiences of this specific population may not represent current experiences.

Delimitations:

- The specific population of young adult, type 1 diabetics was selected for this study. This could result in findings not representing all students with disabilities.
- In order to participate in this study, the individual must have had type 1 diabetes while participating in physical education. Therefore, this specification limits the study to only type 1 diabetics diagnosed before high school.

Significance of Study

Ensuring that physical education experiences are meaningful for all students, including students with physical, medical, and/or sensory differences, has become an increasingly prominent research topic, as seen in studies such as Spencer-Cavaliere and Watkinson (2010) and Fitzgerald and Stride (2012). Recently, researchers have begun to take the approach of listening to students' experiences in physical education to evaluate the inclusiveness of the class. For example, Byrnes and Rickards (2011) asserted that educational professionals could utilize the experiences of students with disabilities to evaluate system-wide processes and procedures, evaluate the level of appropriateness in implemented educational interventions, as well as allow for the opportunity for teachers to improve their practice and professional qualities. By evaluating processes, procedures, and interventions, physical education professionals can improve their current instructional methods by considering past students' frustrations and limitations to enhance the experience for type 1 diabetics. In addition, evaluating teaching strategies could allow education professionals to be more confident and familiar with effective teaching methods.

Currently, however, there is very little empirical work exploring the experiences that type 1 diabetic students encounter in physical education. This may pose barriers for physical education teachers to evaluate their teaching processes and procedures in order to ensure their classroom is inclusive to type 1 diabetic students. The purpose of this study was to gain an understanding of the experiences of people with type 1 diabetes in physical education classes. The completion of this study will provide insights into the experiences of type 1 diabetics in physical education and identify the potential participation barriers these students may face.

CHAPTER II: LITERATURE REVIEW

The purpose of this chapter is to present a review of the significant literature that pertains to the research in the areas of physical activity in type 1 diabetics and the experiences that type 1 diabetics have reported in physical education.

Diabetes

Diabetes is an umbrella term that encompasses type 2 diabetes, type 1 diabetes, and gestational diabetes (Centers for Disease Control and Prevention, 2022). In general, diabetes is a condition in which the body has difficulty regulating the amount of glucose in the bloodstream (high blood sugar) (Wu et al., 2018). Type 2 diabetes is the most common of the three types. For type 2 diabetics, the pancreas still produces insulin, but the body is inefficient in using the insulin produced (Wu et al., 2018). This literature review, however, focuses on type 1 diabetes, an autoimmune disease in which insulin-producing cells in the pancreas are destroyed by what scientists believe to be the body's immune system (Atkinson et al., 2014).

Type 1 diabetes is also (not always correctly) known as juvenile diabetes because the average age of onset in children is 13 to 14 years yet type 1 diabetes can occur at any age (Dahlquist et al., 2011). While a definitive cause for type 1 diabetes has not been identified, there is evidence that the autoimmune response may be triggered by a virus (Hyöty, 2016). There also appears to be at least some degree of a genetic factor associated with the etiology of type 1 diabetes (Steck & Rewers, 2011). Currently, no cure exists for this disease; type 1 diabetics must inject insulin or wear an insulin pump to receive this life-sustaining hormone (Katsarou et al., 2017).

Physical Activity Among Type 1 Diabetics

Being physically active can confer many health benefits to type 1 diabetics such as improved cardiovascular variables, enhanced mental health, and better bone health (Colberg et al., 2015). Specifically, in younger type 1 diabetics, engagement in physical activity can improve glycemic control, target lipid profiles, and body composition (Quirk et al., 2015). Physical activity in type 1 diabetics may also aid in achieving fitness and glycemic goals (Riddell et al., 2017). However, despite physical activity providing several health benefits, many type 1 diabetics participate less frequently in physical activity when compared to their nondiabetic counterparts (Colberg et al., 2015). In addition, type 1 diabetics reported that the most significant barrier to participation in physical activity was fear of hypoglycemia (Brazeau et al., 2008), as well as a lack of knowledge on how to avoid a hypoglycemic episode during physical activity (Colberg et al., 2015).

Physical activity can be very complex for type 1 diabetics (Chetty et al., 2019). Physical activity can quickly alter blood glucose levels, making exercising a potentially high-risk activity for type 1 diabetics (Riddell et al., 2017). The significance of the impact that exercise has on an individual's blood sugar depends on the type, intensity, and duration of the activity (Colberg et al., 2015). Differences in exercise intensity can also impact one's ability to maintain euglycemia, as higher-intensity exercises have been shown to release a more significant amount of counterregulatory hormones, such as epinephrine and glucagon, which may result in immediate and lasting elevations in blood glucose levels (Fahey et al., 2006). The duration of a workout can also impact glycemic levels, as more extended periods of physical activity tend to result in greater blood glucose use and the risk of hypoglycemia (Colberg et al., 2015; Koivisto et al., 1992; Turner et al., 2014). An activity as short as a 10-second sprint has been shown to affect

individuals' blood glucose levels (Fahey et al., 2006). Additionally, food eaten before, during, or after a workout, the frequency of a workout, or the nature of the activity may also significantly impact the glucose levels of a type 1 diabetic during and after a workout (Colberg et al., 2015). The risk of a hypoglycemic or hyperglycemic episode is not just during exercise, but can be carried over throughout the day or even overnight (Colberg et al., 2015).

Unfortunately, factors such as fear of hypoglycemia, inability to maintain glycemic control, and inadequate knowledge regarding exercise management, create many barriers to being physically active for type 1 diabetics (Riddell et al., 2017). These barriers could be the reason that most type 1 diabetics have been found to be less active than the general population, with a large portion of the type 1 diabetic community not reaching the minimum amount of moderate to vigorous physical activity per week (Riddell et al., 2017). These unfortunate barriers may be hindering the ability of type 1 diabetics to reap the benefits that physical activity may bestow on their health.

Physical Education for Type 1 Diabetics

Physical education can provide a significant opportunity for youth to engage in physical activity (Meyer et al., 2011). School physical education is the primary program for educating and training youth in America to be physically active (Simonsmorton et al., 1994). Physical activity levels show an increase through physical education, with the use of an effective curriculum and trained staff (Kohl, 2013). This increase could be due to national regulations requiring students to be physically active for at least 50% of their time spent in physical education (Simonsmorton et al., 1994). The Centers for Disease Control and Prevention (CDC) stated that physical education could provide youth with the knowledge and confidence to build a lifetime of physical activity (Physical Education, 2022).

While several studies have shown the significance of closely monitoring blood sugars while partaking in physical activity, very little research was found representative of recorded experiences of type 1 diabetics in physical education (Vahedi et al., 2018). As previously indicated, physical education can include a significant amount of physical activity, which may cause the class to be deemed as a potentially high-risk activity for type 1 diabetic students. The risk associated with physical activity for type 1 diabetics emphasizes the significance of attempting to understand the experiences of type 1 diabetics in physical education to ensure safe participation opportunities and necessary accommodations. It is essential that stakeholders in physical education, such as teachers or parents, ensure that children with type 1 have equal and safe participation opportunities just like every other child (MacMillan, 2014)

To date, a limited number of studies have focused on type 1 diabetics in physical education. Quirk et al. (2015) conducted a qualitative study examining the perceived participation influences on physical activity engagement in kids with type 1 diabetes, noting that the influence of social support was the first and most common of the five categorized themes. Findings also suggested that type 1 diabetic children believed that their parents and peers had a heavy influence on their physical activity levels (Quirk et al., 2015). Parental support was categorized as emotional support for physical activity and included things like driving the child to the physical activity opportunity, to advocating for their child's participation (Quirk et al., 2015). Quirk and colleagues (2015) also noted the importance of the child's motivation to be active, as well as interests, enjoyment, and satisfaction as being intrinsic motivators for children to be physically active.

Finally, as previously mentioned, schoolteachers were noted as playing a significant role in facilitating physical activity for students with type 1 diabetes (Quirk et al., 2015). Despite

these possible positive motivators, Davis et al., (2023) found that type 1 diabetics have less frequent physical activity participation in the school environment when compared to their nondiabetic peers. Like Quirk and colleagues (2015), MacMillan et al. (2014) conducted a qualitative study that included interviews with type 1 diabetics regarding having type 1 diabetes in physical education. Results from this study discussed four major findings: the knowledge of type 1 diabetes and how it related to physical activity, the influencers and influential figures for physical education and physical activity participation in type 1 diabetes, the teaching practice and ideas to accommodate diabetic youth, and current diabetes support and training for teachers and perceived needs (MacMillan et al., 2014). The indications from this study further stipulated the significant need for improved support from schools and teachers when establishing physical activity opportunities during physical education experiences for type 1 diabetics (MacMillan et al., 2014). Results showed a lack of knowledge regarding type 1 diabetes in teachers. In fact, many participants of the study indicated that they felt like they could use their diagnosis to sit out of physical education classes and that teachers supported the lack of participation out of fear of dealing with type 1 diabetic students (MacMillan et al., 2014).

Additionally, results from this study illustrated the necessity of proper training and guidance regarding diabetes management of students by the teachers (MacMillan et al., 2014). This study also suggested that support for type 1 diabetic students may be improved by having teachers and parents/guardians communicate more regarding the child's specific needs (MacMillan et al., 2014). The role of a parent/guardian should not be undervalued, especially with a child with a disability, as they are often primarily responsible for managing their child’s health condition at younger ages (Koch, 2020). In fact, studies have shown that parent and teacher interactions may lead to positive future interactions for the child (Koch, 2020).

Though in existing studies, we learned that type 1 diabetics could potentially be at risk when participating in physical activity. But, to date, there is very limited research that has spoken to the actual integrated physical education experiences of type 1 diabetics. With limited research, we are missing key information assuring that type 1 diabetic students can safely participate in physical education classrooms. Ensuring safe and meaningful participation opportunities are being provided in physical education classrooms for youth with type 1 diabetics could be imperative in combating the harsh effects of the disease due to the significant role physical education classes play in providing physical activity opportunities for youths.

Summary

There is a significant lack of research investigating physical education experiences for type 1 diabetics. Physical activity is essential in aiding in health management for type 1 diabetics. However, it is often considered a high-risk activity due to the chances of a hypoglycemic or hyperglycemic episode. Regardless of the potential risk, students with type 1 diabetes must be provided equal opportunities to participate in meaningful physical activity during physical education classes. Thus, this thesis provided a unique understanding of adults' experiences reflecting on their time spent in physical education while having type 1 diabetes.

CHAPTER III: METHODOLOGY

The primary purpose of Chapter III, Methodology, is to outline the procedures utilized during the data collection and analysis process. The following sections detail the study's research approach, participants, procedures, data collection, data treatment and analysis, and quality assessment.

Research Approach

This study aimed to investigate and amplify the voices of type 1 diabetic adults reflecting about their experiences in integrated physical education classes. The study was designed to interview young type 1 diabetic adults and request them to reflect on their school-based physical education experiences. The retrospective method used in this study was purposefully selected, as it allowed individuals time to process emotions related to their past experiences and speak to their entire experiences related to physical education throughout their time in school (Haegele & Zhu, 2017).

An interpretative phenomenological analysis (IPA) approach was used to guide data collection, analysis, and interpretation for this retrospective study. IPA is used to examine a participant's personal experience, analyze an individual's perception or account of an experience, and investigate in great detail how the participants make sense of their personal and social world (Smith & Osborn, 2007). IPA being used to analyze the interview responses helped the researcher better understand each participant's unique lived and personal experiences. Additionally, rather than a theory-driven approach, IPA is a collaborative approach, meaning it explores meanings through interpretative work between the researcher and the participant (Smith & Fieldsend, 2021). For this study, the researcher examined the meaning of experiences of type 1 diabetic adults during their physical education classes.

IPA utilizes three primary theoretical underpinnings to understand personal lived experiences (Smith & Osborn, 2014). These three underpinnings include idiographic, phenomenological, and hermeneutic features (Smith & Osborn, 2014). IPA is idiographic due to its technique of interpreting an individual's detailed experiences rather than making general claims based on the responses (Smith & Osborn, 2014). Phenomenology stems from a philosophical approach that interprets lived experiences rather than utilizing pre-existing theoretical preconceptions (Smith & Osborn, 2014). Lastly, IPA includes hermeneutic features by exploring how everyday lived experience presents itself in individuals (Tuffour, 2017). All three theoretical underpinnings of IPA helped the researcher better analyze and understand the lived experiences of individuals.

Participants

Eight participants were recruited primarily through personal contact recruitment using a criterion sampling technique, where the researcher contacted acquaintances that match pre-specified eligibility criteria to participate in this study. For an individual to be considered eligible for this study, participants must have been diagnosed with type 1 diabetes by a medical professional and participated in a physical education class after their diagnosis. Participants must have been at least eighteen years of age and no older than thirty-five. This specific age group was carefully chosen based on the likelihood of the participants being able to remember their experiences in physical education more vividly and to ensure that no significant policy changes have occurred since they were in school. Participants must have attended an in-person public or private school that required physical education classes for their students.

Before interviews began, the researcher obtained permission through the IRB to conduct the study. After gaining permission and carefully selecting eligible participants who met all of

the listed criteria, each participant provided informed consent. The participants were required to sign a predeveloped consent form to protect both the participant and the researcher. After providing consent, the participants were asked to select a time and date from a list of predetermined dates that works best for their schedules, to schedule their interviews. If there were no times on the predetermined list, an option was available for participants to work with the researcher to find a time that works best for them both. The data collection process began after obtaining consent forms from all participants enrolled in the study and scheduling their interviews.

A total of eight participants took part in this study. Of these eight participants, six of them identified as females and two identified as males. Participants' ages ranged from 19 to 32 years old. Seven participants identified as White and one participant identified as White/Hispanic and Puerto Rican/ Eastern European. To protect their identity, all participants were assigned pseudonyms. See Table 1 for more detailed descriptions of the participants' demographic information.

Table 1. Participants' demographic information.

Name	Gender	Race/Ethnicity	Age (years)	Age Diagnosed	School Location
Aimee	Female	Caucasian	19	11	Rural
April	Female	Caucasian	32	13	Suburban
Dana	Female	Caucasian	26	3	Rural
Jack	Male	Caucasian/ Hispanic, Puerto Rican/ Eastern European	29	6	Urban
Melissa	Female	Caucasian	21	8	Suburban
Sheri	Female	Caucasian	26	6	Urban
Tim	Male	Caucasian	27	4	Urban
Trina	Female	Caucasian	22	11	Urban

Data Collection

To collect data from the participants, semi-structured telephone interviews were conducted. One-to-one telephone call interviews were specifically selected for this study to enhance an eligible individual's ability to participate, as the individual would not have to consider travel time or costs (Irvine, 2010). Phone interviews also allowed for a multitude of benefits both for the interviewee and interviewer, such as the ability to perform the interview even if individuals were ill or in the case of inclement weather (Irvine, 2010). Video interviews are more demanding, as participants are required to have internet access to participate (Gray et al., 2020). Phone interviews allowed participants to feel more comfortable, as they iso not need to worry about their appearance or surroundings (Irvine, 2010). One-to-one interviews were

selected to help limit external influences or distractions, as well as to enhance comfort for participants to share personal experiences and build rapport with the interviewer. The interviews were semi-structured, meaning many questions the participants were asked were open-ended, and participants were able to speak more on specific topics if they wished. The interview questions followed a pre-established interview guide with the same questions for each interviewee, however the order and magnitude of questions may have changed based on each conversation.

Interviews started with an introduction from the interviewer. The introduction included a brief personal statement regarding why the study was created, the interviewer's relationship to the study, and the motivation behind the data collection. After the researcher stated the purpose of the study, the beginning of the interview questions promptly followed. All responses in each interview were audiotaped for the researcher's ability to reference back to responses from the participants for interpretation. These audio recordings were later transcribed to allow the researcher the ability to analyze the answers of each participant further. Additionally, the interviewer collected reflective interview notes throughout the interview to collect pertinent information and personal thoughts. These reflective field notes obtained information that stood out to the interviewer. Important responses, key points, unique experiences, and common themes were highlighted for reflection on during analysis.

Data Treatment and Analysis

Once all interviews concluded, audio files were transcribed verbatim utilizing Otter [Mobile Application]. Otter is a voice-to-text transcription software that can be downloaded on mobile devices to transcribe recordings for free (Rebelo, 2023). After all of the interviews were transcribed, the researcher analyzed the data via analysis procedures recommended by Smith and

colleagues (2009) for IPA studies. Smith and colleagues (2009) noted that objective thematic development is to discover findings in the form of the participants' embodied experiences. To do so, a three-step analytical process was utilized. First, the first author immersed herself in the study's original data by reading and rereading the transcriptions and reflective field notes several times. The researcher also relistened to audio recordings of the interviews multiple times to become more familiar with the data. Second, she reduced documents (transcriptions of the interviews and reflective notes) associated with each case into emergent themes at the case level (Smith et al., 2009). The primary objective of this step in the analysis was to produce concise statements that "reflect not only the participant's original words and thoughts but also the analysts' interpretation" (Smith et al., 2009, p.92). After the researcher found emergent themes at the case level, the final step was to search for patterns and connections across participants (Haegele & Zhu, 2017). Emergent themes were then identified through continuous comparison across cases. The author in this study did so by identifying recurring themes that were present across each study, which were then summarized and presented as the study's results.

Quality Assessment

To analyze the quality of interpretative phenomenological analysis, Smith and colleagues (2009) recommend the four principles of IPA; sensitivity to context, commitment and rigor, transparency and coherence, and impact and importance. Therefore, these four principles were utilized when assessing the quality of this study. Regarding sensitivity to context in this study, the interviewer communicated any biases or personal views to the participants. The interviewer also stated their relationship to the study and why it was meaningful to them. To address commitment and rigor, the interviewer remained focused throughout the interview, giving the study participant their full attention. The transparency and coherence of the study was

demonstrated by ensuring the participant had knowledge of everything happening throughout the study. Procedures and information were given to each participant regarding the entire study's recruitment process, interviews, transcription, and analysis procedures. Lastly, the impact and importance of the study was determined by whether the study's findings communicated the content of interest, importance, or usefulness (Yardley, 2000).

CHAPTER IV: MANUSCRIPT

A REFLECTION OF EXPERIENCES OF ADULTS WITH TYPE 1 DIABETES IN INTEGRATED PHYSICAL EDUCATION CLASSES

Abstract

The purpose of this study was to gain an understanding of the experiences of type 1 diabetics in integrated physical education classes. In this study, we interviewed young type 1 diabetic adults and asked them to reflect on their school-based physical education experiences. An interpretative phenomenological analysis (IPA) approach was adopted to guide data collection, analysis, and interpretation for this retrospective study. Eight participants (ages 19 to 32) were enrolled in this study, and semi-structured interviews focused on their physical education experiences acted as the primary data. Transcribed interview data were analyzed using an IPA approach. Three interrelated themes emerged from the analysis process, (a) the (mostly negative) impact of physical activity in schools, (b) lack of education and understanding regarding type 1 diabetes, and (c) frustrations dealing with misconstrued expectations based on inaccurate beliefs. Themes depicted several barriers that type 1 diabetics face when accessing physical activity in physical education and their frustrations with the lack of education surrounding type 1 diabetes.

A Reflection of Experiences of Adults with Type 1 Diabetes in Integrated Physical Education Classes: A Qualitative Inquiry

Type 1 diabetes is one of the most common chronic endocrine/metabolic conditions affecting adolescents (International Diabetes Federation, 2013). Most recently, new cases of type 1 diabetes have increased considerably during the "COVID years", with diagnosis rates increasing by 14% in 2020 and 27% in 2021 (Watson, 2023). Type 1 diabetes is typically diagnosed in children in pre or early stages of adolescence, but diagnosis trends show more children being diagnosed at ages 0 to 4 more than ever (Dahlquist et al., 2011). As of 2009, type 1 diabetes was classified as a disability under The Americans with Disabilities Act (ADA), according to the American Diabetes Association (2009). The American Diabetes Association stated that amendments and regulations that classify type 1 diabetes as a disability developed due to the condition substantially limiting the function of the endocrine system.

Diabetics, in general, face serious health implications, both short- and long-term, including microvascular and macrovascular diseases (Daneman, 2006). However, the risk of heart disease is more significant for type 1 diabetics when compared to type 2 diabetics (Schofield et al., 2019). A contributing factor to this finding is that prolonged episodes of hyperglycemia can negatively impact heart function (Schnell et al., 2013). Other health risks associated with type 1 diabetics include kidney failure, peripheral neuropathy, and the development of psychiatric conditions, including anxiety and depression (Jacobson et al., 2013).

Regular physical activity may significantly improve the health of type 1 diabetics (Wu et al., 2019). Physical activity is vital in maintaining good heart health and reducing the risks associated with cardiovascular disease (Colberg et al., 2015). Specifically, in younger type 1 diabetics, engagement in physical activity can improve glycemic control, target lipid profiles,

and body composition (Quirk et al., 2015). Physical activity in type 1 diabetics may also aid in achieving fitness and glycemic goals (Riddell et al., 2017). In addition, other risks associated with type 1 diabetes (e.g., kidney failure) may also be mitigated with regular physical activity (Jacobson et al., 2013; Kim, 2018; Kluding et al., 2016; Stump, 2011). In fact, exercise recommendations for diabetics experiencing neuropathy have changed in recent years due to the recognition of the benefits of exercise in this population (Kluding et al., 2017). While the previous focus was on preventing injury in individuals with neuropathy, recent studies have shown benefits from continuing or even increasing weight-bearing activity (Kluding et al., 2017).

Physical activity is not a simple recommendation for type 1 diabetics, though, as there are a number of physiological changes that may influence one's ability to engage. For example, physiological changes that are directly associated with type 1 diabetes include the deterioration of connective tissues (Larkin et al., 2014), reduction of cognitive and motor functioning (Lobnig et al., 2006), impaired visual perceptual skills (Gaudieri et al., 2008), and multiple implications to the musculoskeletal system (Kılıçöz et al., 2022). As such, it is imperative to ensure type 1 diabetics have access to safe physical activity opportunities in order to prevent or slow the progression of these negative physiological effects.

Despite the aforementioned health benefits, type 1 diabetes often affects an individual's ability to participate in everyday activities, such as exercising (Colberg et al., 2015). Supporting this, Wilkie and colleagues (2017) reported that type 1 diabetic children were less physically active than their non-diabetic peers. These findings could be a result of the fact that adolescents with type 1 diabetes face many unique barriers to physical activity (Tully et al., 2016), which may have a negative impact on many type 1 diabetics' health and activity rates (Riddell et al.,

2017). For example, many type 1 diabetics found it difficult to maintain euglycemia (normal blood sugar levels) both during and after exercising (Colberg et al., 2015). Early and late hypoglycemia and hyperglycemia were shown to be common results of exercising for many type 1 diabetics, making participating in physical activity potentially risky (Colberg et al., 2015).

For many children, physical education classes provide important opportunities for youth to be physically active (Meyer et al., 2011). In fact, children participate in most of their daily physical activity through physical education classes (Cheung, 2017), and enjoyment of physical education was shown to play a significant role in establishing a physically active lifestyle (Barr-Anderson et al., 2008). Unfortunately, many children with disabilities have reported negative experiences and associated feelings toward physical education because of experiencing participation barriers or removal due to instructors' perceptions about their disability (Fitzgerald, 2005; Haegele & Sutherland, 2015; Haegele & Zhu, 2017). Findings such as these tend to appear in studies that center on and listen to the experiences and perspectives of students with disabilities regarding physical education classes (Healy et al., 2013). Allowing students with disabilities the opportunity for their voices to be heard constitutes a valuable acknowledgment of their individualized experiences (Nicoll & Campbell, 2012).

While research in this area of inquiry has grown in recent years, it tended to prioritize the voices of people experiencing only some disabilities (e.g., visual impairments, autism, physical disabilities). Thus far, no research exists, to our knowledge, that explores the experiences of type 1 diabetics in physical education. Due to the abundant benefits type 1 diabetic students can attain from physical activity, and therefore physical education, it is imperative to ensure these students can fully participate safely and are given the proper accommodations, if necessary, in order to do

so. Thus, the purpose of this study was to gain an understanding of the experiences of people with type 1 diabetes in integrated physical education classes.

Methods

Research Approach

In this study, we interviewed young type 1 diabetic adults and asked them to reflect on their school-based physical education experiences. The retrospective method used in this study was purposefully selected, as it allowed individuals time to process emotions related to their past experiences and speak to their entire experiences related to physical education throughout their time in school (Haegele & Zhu, 2017).

An interpretative phenomenological analysis (IPA) approach was adopted to guide data collection, analysis, and interpretation for this retrospective study. IPA is used to examine a participant's personal experience, analyze an individual's perception or account of an experience, and investigate in great detail how the study's participants make sense of their personal and social world (Smith & Osborn, 2007). IPA utilizes three primary theoretical underpinnings, ideography, phenomenology, and hermeneutics, to work to understand personal lived experiences (Smith & Osborn, 2014). IPA is idiographic due to its technique of interpreting an individual’s detailed experiences rather than making general claims based on the responses (Smith & Osborn, 2014). Phenomenology stems from a philosophical approach that interprets lived experiences rather than utilizing pre-existing theoretical preconceptions (Smith & Osborn, 2014). Lastly, IPA includes hermeneutic features by exploring how everyday lived experience presents itself in individuals (Tuffour, 2017). All three theoretical underpinnings of IPA help researchers better analyze and understand the lived experiences of individuals. For this study, the researcher examined the meaning of experiences of type 1 diabetic adults during their physical

education classes. Using IPA to analyze the interview responses allowed us to better understand each participant's unique lived and personal experiences.

Participants

Eight participants were recruited to participate in this study. Participants were recruited primarily through personal contact recruitment using a criterion sampling technique, where the researcher contacted acquaintances that matched pre-specified eligibility criteria. For an individual to be considered eligible for this study, they were diagnosed with type 1 diabetes by a medical professional and participated in a physical education class after their diagnosis. Participants were at least 18 years of age and no older than 35 at the time of the interview. Participants attended an in-person public or private school that required physical education classes for their students. Of these eight participants, six of them identified as females and two of them identified as males. Participants' ages ranged from 19 to 32 years old. Seven participants identified as White and one participant identified as White/Hispanic and Puerto Rican/ Eastern European. All participants were assigned pseudonyms to protect their identity. See Table 1 for more detailed descriptions of the participants' demographic information.

Data Collection

Before data collection began, participants signed a consent form to protect both the participant and the researcher. After providing consent, the participants were asked to select a time and date from a list of predetermined dates that worked best for them to schedule their interviews. After obtaining consent and scheduling interviews for all the participants enrolled in the study, the data collection process began.

To collect data from the participants, one-to-one telephone interviews were conducted. One-to-one interviews were selected to help limit external influences or distractions, as well as to

enhance comfort for participants to share personal experiences and build rapport with the interviewer. The interviews were semi-structured, where questions were open-ended, and participants could speak more on specific topics if they wished to do so. The interview questions followed a pre-established interview guide to support consistency across interviewees.

Interviews began with an introduction from the interviewer, where the interviewer described why the study was created, the interviewer's relationship to the study, and the motivation behind the data collection. Within this statement, the interviewer disclosed that she, herself, was a type 1 diabetic of two years and she grew up with sibling who was a type 1 diabetic, which informed her interest in doing the project, as well as her previous research work with type 1 diabetes. Following, the researcher stated the purpose of the study, and promptly followed with the first of the interview questions. All responses in each interview were audiotaped. These audio recordings were later transcribed to allow the researcher to analyze the conversations with each participant. Additionally, the interviewer collected reflective interview notes throughout the interview to collect pertinent information and personal thoughts. These reflective field notes obtained information that highlighted significant experiences the participants shared that pertained to the research question.

Data Analysis and Trustworthiness

Once all interviews concluded, audio files were transcribed verbatim utilizing Otter [Mobile Application]. After all the interviews were transcribed, the researcher analyzed the data via analysis procedures recommended by Smith and colleagues (2009) for IPA studies. Smith and colleagues (2009) noted that thematic development is used to discover findings in the form of the participants' embodied experiences. To do so, a three-step analytical process was utilized. First, the first author immersed herself in the study's original data by reading and rereading the

transcriptions and reflective field notes several times. The researcher also relistened to audio recordings of the interviews multiple times to become more familiar with the data. Second, she reduced down documents (transcriptions of the interviews and reflective notes) associated with each case into emergent themes at the case level (Smith et al., 2009). The primary objective of this step in the analysis was to produce concise statements that "reflect not only the participant's original words and thoughts but also the analysts' interpretation" (Smith et al., 2009, p.92). After the researcher found emergent themes at the case level, the final step was to search for patterns and connections across participants. Emergent themes were then identified through continuous comparison across cases. The first author in this study did so by identifying recurring themes that were present across each study, which were then summarized and presented as the study's results.

To analyze the quality and trustworthiness of interpretative phenomenological analysis, Smith and colleagues (2009) recommended the four principles of IPA; sensitivity to context, commitment and rigor, transparency and coherence, and impact and importance. Therefore, these four principles were utilized when assessing the quality of this study. Regarding sensitivity to context in this study, the interviewer communicated any biases or personal views to the participants. The interviewer also stated their relationship to the study and why it was meaningful to them. To address commitment and rigor, the interviewer remained focused throughout the interview, giving the study participant her full attention. The transparency and coherence of the study was demonstrated by ensuring the participant had knowledge of everything happening throughout the study. Procedures and information were given to each participant regarding the entire study's recruitment process, interviews, transcription, and analysis procedures.

Findings and Discussion

Three interrelated themes emerged from the analysis process, (a) the (mostly negative) impact of physical activity in schools, (b) lack of education and understanding regarding type 1 diabetes, and (c) frustrations from dealing with misconstrued expectations based on inaccurate beliefs. The first theme, the (mostly negative) impact of physical activity in schools discussed the participants' experiences with physical activity in physical education classes, and the (mostly negative) repercussions associated with it. The second theme, lack of education and understanding regarding type 1 diabetes, discussed the overall impact physical education teachers' lack of knowledge regarding the disease had on the experiences of type 1 diabetic students. Lastly, the third theme, frustrations from dealing with misconstrued expectations based on inaccurate beliefs, uncovered several ways that physical education teachers placed insufficient or unrealistic expectations on their type 1 diabetic students and how these expectations heavily affected their students.

The (Mostly Negative) Impact of Physical Activity in Schools

When discussing physical activity with participants, nearly all of them described that engaging in physical activity can impact blood sugars. For some participants, physical activity made their mood increase, helped keep them in shape, and was enjoyable. For example, Tim noted that "physical education was always fun for me when my numbers were cooperating. It helped me get ready for sports after school and stay in shape". Despite these reported benefits, our participants, like Type 1 diabetics in general (Wilkie et al., 2017), noted not always having ample opportunities for physical activity. One potential reason why physical activity opportunities were rare for participants might be because of the numerous negative experiences type 1 diabetics have expressed associated with physical activity, specifically in physical

education. For example, participants expressed several instances of hypoglycemic (low blood sugar) episodes when participating in physical activity in physical education. When experiencing hypoglycemic episodes, participants reported that they were required to sit out of class until their blood sugar rose, not always receiving an excused break. Aimee, for example, expressed that:

> Some of my physical education teachers threatened me with point deductions when I was experiencing a diabetic-related issue and needed to step out. Some were more like, 'yeah, if you step out, I don't care what is happening, it's going to affect your grade.' However, others were much more understanding and let me sit out to correct my blood sugars.

Collectively, many participants noted having more negative experiences in physical education than positive. When describing these negative instances, the participants emphasized how drastically some elements of activities and the environment affected their blood sugars in physical education. For example, many participants mentioned how high temperatures or working out outside in the sun often affected their blood sugars negatively. Aimee mentioned,

> I definitely saw my blood sugars change negatively if we were doing weight training or a lot of cardio like in the weight room, but especially when we went outside the track, and it was super-hot. My blood sugars always were affected.

In addition, participants reported that rigorous cardiovascular activities, such as running, would drastically affect their blood sugars. Highlighting this, half of the study's participants mentioned how difficult the PACER test was for them to complete due to blood sugar related concerns. For example, Dana reported that:

> The PACER test always affected my sugars. It was always running for me. That's always what made me go low more often. Like I said before, the occasional rebound would happen, but out of any PE activity running would likely be the one to affect me.

Tim also mentioned how particular physical education activities, specifically weightlifting and cardiovascular workouts, would often alter his blood sugars. Some participants noted their sugars would immediately drop to dangerous levels during the activity. In fact, the American Diabetes Association states that physical activity may lower a type 1 diabetic's blood glucose levels' for more than 24 hours after the fact, as physical activity increases the body's sensitivity to insulin (American Diabetes Association, 2023). However other participants referred to their struggles with experiencing low blood sugars at the end of class and having it affect their next class. Trina stated,

> Most of my lows were right at the end of physical education, so it was like oh, whatever class is over. But then it would delay me getting to my next class on time or my performance in the following class.

This is important to note, as hypoglycemia is an immediate medical emergency, and can lead to dizziness, impaired vision, shakiness, seizures, or even a coma if left untreated (Hirsch, 2000).

Participants discussed a variety of methods they utilized to attempt to reduce the risks associated with participating in physical activity in physical education. Some participants stated that they felt safest when taking care of themselves during a hypoglycemic episode, as they felt as though others around them, including their physical education teachers, were unsure of how to handle the situation. For example, Melissa noted that she would give her physical education teacher a bag of candy at the beginning of the year in case of an emergency related to physical activity in physical education. Additionally, Sheri shared that her mother would give out fanny packs to her teachers at the beginning of the year full of candy and juice boxes in case of an emergency. Some participants stated that their parents would meet with the school to schedule

physical education after lunch, as they would have just eaten and would be less likely to experience a hypoglycemic episode. For example, Sheri reported that:

> During my 504 planning meetings, my parents would always request that I have physical education right after lunch. Doing this always helped ensure my blood sugars are good because I would have just eaten a high volume of carbohydrates and would bolus slightly less, knowing I would be exercising right after.

Similarly, Trina mentioned how before strenuous cardiovascular physical activities, such as running, she would make sure to eat something with a little bit of protein in it beforehand. She spoke upon how even a little bit of peanut butter would help her from going low during runs. Sheri also spoke about her methods she utilized to control her blood sugars in physical education and said:

> I had a plan set in place where I would receive the curriculum plans for physical education a week in advance. Because I knew the activities in advance, I would either have like extra protein at lunch or cut back on my amount of insulin intake for what I was eating depending on how strenuous activity would be.

Relatedly, some participants noted that they would reduce their amount of insulin intake in classes before physical education, in hopes to not have their blood sugar drop during class.

Lack of Understanding Type 1 Diabetes in Physical Education

The most common finding in this study was about the lack of knowledge and education that physical educators have about type 1 diabetes, and the impact that this had for our participants' experiences. Every participant in the study mentioned their struggles and frustrations associated with their physical education teachers and educators in general not understanding their disease. This included physical educators who were also health educators,

who still did not have a sound understanding of their disease, and were, for some, unable to distinguish between type 1 and type 2 diabetes. For example, April voiced her frustration with the misconception from physical education teachers and how she wished physical education teachers especially would learn the difference between type 1 and type 2 diabetes, and that there was a lot more to be aware of than just fainting from low blood sugars. Because of these misunderstandings, some participants stated their physical education teachers would often lecture them on diet and how their disease is preventable, which is inaccurate and caused frustration among the participants. For example, Dana recalled that:

> I felt like a lot of their knowledge all came from type 2 diabetes, which especially sucked in like the physical education department because, you know, type 2 can be manageable with diet and exercise which is something that they were being literally paid to teach and so, I felt like they all very often thought I was exaggerating.

The participants were vocal about how dangerous it was for type 1 diabetic students to not have a physical education teacher know what type 1 diabetes was and the dangers associated with physical activity for them. For example, Dana also emphasized that she felt as though her health was not taken seriously in physical education due to the misconceptions of her disease when she stated:

> I had a very consistent feeling that my PE teachers were under the impression that I was taking advantage of my diabetes and that I just didn't want to participate in gym class, and I just felt like my health was not taken seriously. I felt like they really, especially as I became a preteen/ teenager, felt like they really just thought I was trying to get out of gym, which was ridiculous because I played sports all the time.

This lack of understanding from physical education teachers regarding type 1 diabetes is, unfortunately, not surprising, given other research that has demonstrated that teachers do not have enough training on working with students with disabilities in general (Martin, 2017). Many physical education teachers have reported doubting the ability to provide opportunities for students with disabilities/additional health support needs due to lack of appropriate support services and professional training (Ioanna et al., 2005). Findings such as these is why it is essential for physical education professionals to receive appropriate training on disabilities/health conditions their students may have and listen to their perspectives, such as those presented in study, to better understand their experiences (Haegele & Sutherland, 2015).

A significant aspect of type 1 diabetes that participants wished their physical education teachers had better knowledge low blood sugars. Some participants expressed that their physical education teachers did not understand the severity of the low blood sugar and would discredit the student during the medical emergency. Sheri stated,

> My PE teachers did not understand the importance of a low blood sugar, or really even a high blood sugar. The only time I felt they understood is when I was able to tell them, 'hey, my blood sugar is high, I can't participate'. They'd be like, okay. But, if I were low, then it was like adding an extra layer of complication, because I have to stop to treat myself or like to sit out for, you know, X amount of time before I could resume. Or if I was already engaged in the activity and I'd have to like, step away, or just stop completely for the remainder of the class depending on where my blood sugar levels were at. That they just didn't get it.

The influence of inaccurate knowledge or stereotypes that the participants' physical educators had regarding type 1 diabetes was viewed as highly impactful, especially socially and mentally.

Aimee reported feeling isolated due to the lack of knowledge surrounding appropriately dealing low blood sugars. She noted:

> Some of my physical education teachers were checking in with me every 15 minutes, and that's like three or four times in a class period and I'm just like, I don't want you checking in on me that much. It made me feel isolated. But then there's times where I'd have low blood sugar, when they need to check in on me, and never did. It was extremely frustrating.

Additionally, two participants, April and Melissa, for example, expressed that they kept their diagnoses from their physical education teachers, because their lack of understanding affected their social lives and mental health. Melissa stated:

> I feel like my biggest thing was the social aspect of it. I knew a lot of my PE teachers would kind of make an announcement to the class about my diagnosis without my permission. At that point, I did not let everyone know about my diagnosis. I was almost embarrassed of it growing up, because there's such a negative outlook towards diabetes and people don't know the full extent.

These findings indicated an immediate concern, as hiding their disability could have health implications and dangers. When physical education teachers are not made aware of a student's disability, they will then expect that student to always be able to do the activities other students are participating in, which can be especially dangerous (Moola et al., 2011). Physical education teachers especially should be aware of their students with type 1 diabetes due to the increased likelihood of concerning blood sugar changes when participating in physical activity (Colberg et al., 2016).

Frustrations from Dealing with Misconstrued Expectations Based on Inaccurate Beliefs

Related, but distinct from the prior theme, our participants discussed and described the significance that misconstrued expectations of others had on their experiences within physical education. For example, the participants emphasized how frustrating it was when a physical education teacher acted as though they knew everything regarding the disease, when in reality, their understanding was often influenced by false information and personal beliefs. Melissa spoke about her frustrations with this aspect, specifically addressing the assumption that all type 1 diabetics were the same, when she said:

> My big thing is all type 1 diabetics are different. So, it's kind of like, let me tell you how I function so you know how I handle things and we can go from there. It's not something where the teacher needs to tell me, 'Oh, you have to do this or this'. I've noticed that a lot growing up. They all like to input their personal beliefs and opinions on how you should handle a situation and like, I've been handling it a certain way for so long, that I should not have been made to feel like I needed to change it just because they think we're all the same.

Dana also emphasized how frustrating it was when a physical education teacher's false assumptions lead to dangerous expectations. This participant emphasized the importance of leaving personal beliefs and potentially hurtful stereotypes behind when working with type 1 diabetics. If not, she stated the child may feel unheard, isolated, or even unsafe in the classroom. To remediate issues like this, Dana emphasized that if a physical education teacher speaks to their student with type 1 diabetes and attempts to better understand them, can make the student feel heard and safe, and may align the teacher's expectations with the students' abilities. She stated:

> No matter what, a student that feels seen and validated is going to perform better in their classes regardless of what that class entails. If a child feels welcome and at least there is an attempt being made to understand that child, that kid is going to want to be present and want to put their best of their abilities into what they're doing. If they're physically or mentally unable to do what is being requested of them, then they're at least going to be more enthusiastic about seeking an alternate activity fulfilling the requirements in a different way if they're being worked with instead of worked against. On top of just everything else, no matter what an educator thinks, the child knows more about their body than the educator ever will.

Like Dana, others expressed their frustrations with the closed mindedness of physical education teachers when it comes to type 1 diabetes, especially in physical education, and how these narrow views impacted their experiences. Nearly half of the participants noted the importance for physical education teachers to understand that type 1 diabetic students could do anything that other students are able to do, just with additional support and understanding. Physical education, specifically, has been found have less experiences for children with disabilities to “feel capable” and “surpass limitations” (Bredahl, 2013). Expressing her frustration, Trina said:

> Never tell a student that they can't do something, because then you put the words that you can't do it. It gives them this negative connotation and not all kids, especially early on in diagnosis, will believe that they can still do everything. So, when you have that one person who says “oh, you can't go exercise” or “oh, you can't have snacks”, it gives that negative connotation that can stick with a child forever.

Contracting the view of other participants, one participant emphasized that it's essential to not tell type 1 diabetic students that they can do anything. Dana went into detail of how being

told this made her feel lesser than her peers. For example, instances when she was experiencing a low blood sugar, or another type 1 diabetes related inconvenience, and she was physically unable to do an activity being asked of her. She noted:

> When you grew up with diabetes, you have a bunch of adults telling you that you can do everything that everyone else can do and that it doesn't have to hold you back and that like there's nothing that diabetes can take away from you and you're still a normal kid and all this and blah, blah, blah, and you can do anything you want. That's not true, and adults need to stop telling children with diabetes that, because diabetes is a disability and there's plenty of stuff that I can't do. There's plenty of stuff that I couldn't do as a child. So, I grew up thinking every time my diabetes kept me from doing something that there was something wrong with me, because I'm supposed to be able to do everything everyone else can do and all that but couldn't."

It is differences such as these two perspectives that signifies the importance of speaking to students and learning their experiences and perspectives. Talking to a student with a disability can enhances disability awareness and sensitivity to students with disability's preferences (Seymour et al., 2009). Every student with type 1 diabetes is different and will require different accommodations and experience different struggles.

Implications for Physical Education Teachers

There are a number of implications for physical education teachers that can be derived from our findings. Through listening to the perspectives of our participants, we've learned the importance that type 1 diabetics place on communication, and opportunities for students to speak with teachers to discuss accommodations. For example, some participants discussed the need to test their blood sugars before, midway through, and after physical education whereas others may

monitor their blood sugar via continuous blood glucose monitors, which are often read through cell phones. Knowing this information as a physical education teacher is essential, as the child must be permitted to engage in activities needed to monitor and support their blood glucose (e.g., checking phones, sitting out) when needed, without repercussions. Additional procedures such as carrying glucose tablets or juice in physical education may be good suggestions in the case of a hypoglycemic event.

In addition to speaking with their students about their needs and accommodations, another avenue to gain insight into needs could be through learning more about 504 plans and how they can help type 1 diabetic students. Not all type 1 diabetic students are made aware that they have the right to have a 504 plan, so by learning more about them, physical education teachers may be able to both familiarize themselves with these plans that protect the students and educate their students on how they may obtain a 504 plan. It is also important for physical education teachers to attend these 504 plan meetings. These meetings represent another opportunity for physical education teachers to learn a lot about how to best accommodate type 1 diabetic students and how to keep them safe in the classroom. Taking all of these strategies into consideration may decrease the likelihood type 1 diabetics will have negative experiences in physical education.

Limitations

There were two main limitations to this study. First, since the study was conducted via telephone call formatted interviews, body language and facial expressions were unable to be recorded. Body language could tell the interviewer significant information about how the individual is feeling and how comfortable they were (Cingi et al., 2023). Without this information, the interviewer had less insight into nonverbal behavior of the interviewee. Second,

this study was retrospective, meaning that the recorded experiences of this specific population may not represent current experiences. The participants may also not have been able to remember every detail of their experiences, as they could have occurred several years ago.

Conclusions

The purpose of this study was to gain an understanding of the experiences of type 1 diabetics in integrated physical education classes. Utilizing a retrospective, IPA approach, three interrelated themes were constructed. The first theme, physical activity with type 1 diabetes in physical education, discussed how blood sugars of a type 1 diabetic may be altered by physical activity. The second theme, lack of education and understanding regarding type 1 diabetes in physical education, discussed the massive array of barriers that type 1 diabetics face when their physical education teachers do not understand or attempt to accommodate their students with type one diabetes. This was found to be the most prominent issue that participants in the study encountered as participants discussed how drastically a lack of understanding of type 1 diabetes can affect type 1 students in physical education. The last theme found in this study frustrations with dealing with misconstrued expectations based on inaccurate beliefs. This theme uncovered several ways that physical education teachers are placing insufficient or unrealistic expectations on their type 1 diabetic students and how these expectations heavily affect their students. It is clear, based on these findings, that teachers and their knowledge and abilities were central to the experiences of our participants, further emphasizing the importance of active communication between teachers and students, as well as professional development and training that has type 1 diabetes content in mind.

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Table 1. *Participants' demographic information.*

Name	Gender	Race/Ethnicity	Age (years)	Age Diagnosed	School Location
Aimee	Female	Caucasian	19	11	Rural
April	Female	Caucasian	32	13	Suburban
Dana	Female	Caucasian	26	3	Rural
Jack	Male	Caucasian/ Hispanic, Puerto Rican/ Eastern European	29	6	Urban
Melissa	Female	Caucasian	21	8	Suburban
Sheri	Female	Caucasian	26	6	Urban
Tim	Male	Caucasian	27	4	Urban
Trina	Female	Caucasian	22	11	Urban

CHAPTER V: SUMMARY

To date, a limited number of studies have focused on type 1 diabetics in physical education. Quirk et al. (2015) conducted a qualitative study examining the perceived participation influences on physical activity engagement in type 1 diabetic youth and noted that the influence of social support was the first and most common of the five categorized themes. Findings also suggested that type 1 diabetic children believed that their parents and peers had a heavy influence on their physical activity levels (Quirk et al., 2015). Parental support was categorized as emotional support for physical activity and included things like driving the child to the physical activity opportunity, to advocating for their child's participation (Quirk et al., 2015). Quick and colleagues (2015) also noted the importance of the child's motivation to be active, as well as interests, enjoyment, and satisfaction as being intrinsic motivators for children to be physically active. Finally, schoolteachers were noted as playing a significant role in facilitating physical activity for students with type 1 diabetes (Quirk et al., 2015).

To extend this line of inquiry, we explored the retrospective experiences of eight adult type 1 diabetics who reflected about their experiences in schools. Of these eight participants, six of them identified as females and two of them identified as males. Data was collected via semi-structured interviews, and interview questions followed a pre-established interview guide as a checklist with the same questions for each interviewee, however the order and magnitude of questions may have changed based on each conversation. During the data analysis process, three emergent themes were constructed.

The first theme, the (mostly negative) impact of physical activity in schools, depicted participants' feelings towards physical activity in physical education and the barriers they encountered. While some participants encountered more barriers to physical activity compared to

others, many participants spoke about how their blood sugars were often altered due to physical activity in physical education. Vigorous cardiovascular activities, such as running, were reported as the most popular physical activity that altered blood sugars. Additionally, participants expressed that the temperature of the gym or outside temperature often affected their blood sugars. While some participants were able to quietly sit out and do the proper corrections needed to get their blood sugars back in range, other participants expressed their frustrations with physical education teachers penalizing them for taking this necessary break.

The second theme, lack of understanding type 1 diabetes in physical education, discusses the participants' frustrations with the lack of education surrounding type 1 diabetes. Frustrations with lack of education surrounding type 1 diabetes was mentioned by every participant in the study. Many participants expressed their frustrations around the misconceptions between type 1 and type 2 diabetes, stating that their physical education teachers often lectured them on diet and exercise. Other participants described how their physical education teachers would accuse them of over exaggerating when experiencing a high or low blood sugar due to not understanding the severity of their disease. These misunderstandings and inaccurate beliefs regarding type 1 diabetes led to many misconstrued expectations placed upon the participants.

The third theme, frustrations from dealing with others misconstrued expectations based on inaccurate beliefs, discussed how physical education teachers' untrue stereotypes of type 1 diabetics or inaccurate understandings of the disease lead to misconstrued expectations for the participants. Many participants spoke about how every type one diabetic is different and how physical education teachers must understand this and not treat all of their type 1 diabetic students the same. For example, some participants expressed how frustrating it can be for physical education teachers to tell them they can do anything that other students can do, because

sometimes there really are times where blood sugars prevent them from performing certain activities at a specific time. Other participants, however, felt as though their disability does not prevent them from doing things that other students can do and did not want to be treated any differently. Participants then expressed that this is why it is essential for physical education teachers to speak to their students with type 1 diabetes individually to better understand how to best accommodate them in their classrooms.

Limitations

There were two main limitations to this study. First, since the study was conducted via telephone call formatted interviews, body language and facial expressions will be unable to be recorded. Body language may be able to tell the interviewer significant information about how the individual is feeling and how comfortable they are (Cingi et al., 2023). Without this information, the interviewer had less insight into nonverbal behavior of the interviewee. Second, this study is retrospective, meaning that the recorded experiences of this specific population may not represent current experiences. The participants also may have not been able to remember every detail of their experiences, as they could have been several years ago. **Conclusion**

The purpose of this study is to gain an understanding of the experiences of type 1 diabetics in physical education. Utilizing a retrospective, IPA approach, three interrelated themes were constructed. The first theme, physical activity with type 1 diabetes in physical education, discussed how blood sugars of a type 1 diabetic may be altered by physical activity. The second theme, lack of education and understanding regarding type 1 diabetes in physical education, discussed the massive array of barriers that type 1 diabetics face when their physical education teachers do not understand or attempt to accommodate their students with type one diabetes. This was found to be the most prominent issue that participants in the study encountered as

participants discussed how drastically a lack of understanding of type 1 diabetes can affect type 1 students in physical education. The last theme found in this study facing others misconstrued expectations. This theme uncovered several ways that physical education teachers are placing insufficient or unrealistic expectations on their type 1 diabetic students and how these expectations heavily affect their students. It is clear, based on these findings, that teachers and their knowledge and abilities were central to the experiences of our participants, further emphasizing the importance of active communication between teachers and students, as well as professional development and training that has type 1 diabetes content in mind.

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Appendix A

Participant Interview Guide

Demographic Information

1. Age

2. Age Diagnosed

3. Gender

4. Race/Ethnicity

5. Can you please describe your K-12 physical education placement?

a. Was it self-contained (e.g., adapted physical education classes)?

b. Was it inclusive (e.g., general physical education classes)?

c. Combination?

6. Can you tell me about the place that you went to school?

a. Urban

b. Rural

c. Suburban

7. Approximately how many students were in your graduating class?

a. Less than 100 students

b. Between 100 and 250 students

c. Between 250 and 400 students

d. More than 400 students

Interview Questions

8. Can you describe what your experiences in K-12 physical education were like?

a. Were you able to fully participate in each activity?

b. Was your participation in physical education meaningful?

9. How do you feel that your diagnosis of Type 1 Diabetes affected your ability to participate in physical education?

a. Did you often have to sit out of activities? If so, why?

10. Describe any experiences of any barriers to physical education/physical activity directly related to your diagnosis?

a. Fear of hypoglycemic episodes?

b. Lack of support from a physical education teacher?

c. Lack of knowledge from the physical education teacher?

11. Can you discuss experiencing any Hypoglycemic episodes in physical education?

a. How often?

b. Did they prevent you from participating?

c. Did you feel safe during them?

d. What would you do if one occurred?

e. [Why do you think this?] [How do you feel about this?]

12. Were there specific strategies utilized to prevent hypoglycemic episodes in physical education?

a. What strategies did you utilize?

b. What strategies did your teacher utilize?

13. Can you describe your experiences with your physical education teachers?

a. Did they understand your disability? [Why do you think this?]

b. Did your physical education teachers understand how you experienced physical education? How do you know?

c. How did this make you feel at the time?

d. Do you believe that having Type 1 Diabetes influenced your relationship with your physical education teacher?

Why do you think this?

14. How equipped do you feel your physical education teachers were in regards to being educated enough on your disability to provide you with safe and meaningful physical activity opportunities?

a. Did you feel safe participating in all activities? [Why do you think this?]
b. Do you feel as though your teacher knew what to do in case of a hypoglycemic episode?[Why do you think this?]
c. Do you feel as though your physical education teachers knew how their activities could potentially affect your blood sugars?[Why do you think this?]

15. Were there activities or environments in physical education that affected your blood sugar more than others? If yes, please describe these activities/environments. If not, what factors do you believe influenced these stable blood sugars?

a. Did more rigorous workouts affect your blood sugar more?
b. Did doing physical education outside affect your blood sugars more?
c. Did weight lifting or cardiovascular activities play a role in your blood sugars?

16. Do you feel as though the physical education curriculum was safe for type 1 diabetics and took into account the potential risks that physical activity may accumulate?

a. Do you feel as though your teacher often ensured you could participate in everything safely? [Why do you think this?] [How do you feel about this?]

b. Do you feel as though the curriculum could've been changed to accommodate your needs better? [Why do you think this?] [How do you feel about this?]

17. If you could have changed anything about your physical education experience, what would it be? Why?

18. How have your physical education experiences impacted your physical activity levels today?

a. Prepared you?
b. Educated you?
c. Discouraged you?

19. If every PE teacher in the world read this paper, what would you tell them?

20. Anything else you would like to share?

Appendix B

OFFICE OF THE VICE PRESIDENT FOR RESEARCH

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4111 Monarch Way, Suite 203
Norfolk, Virginia 23508
Mailing Address
Office of Research
1 Old Dominion University
Norfolk, Virginia 23529
Phone(757) 683-3460
Fax(757) 683-5902

DATE:	August 21, 2023
TO:	Justin Haegele
FROM:	Old Dominion University Education Human Subjects Review Committee
PROJECT TITLE:	[2088701-1] A Reflection of Experiences of Adults with Type 1 Diabetes in Integrated Physical Education Classes
REFERENCE #:	
SUBMISSION TYPE:	New Project
ACTION:	DETERMINATION OF EXEMPT STATUS
DECISION DATE:	
REVIEW CATEGORY:	Exemption category #2

Thank you for your submission of New Project materials for this project. The Old Dominion University Education Human Subjects Review Committee has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will retain a copy of this correspondence within our records.

If you have any questions, please contact John Baaki at (757) 683-5491 or jbaaki@odu.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Old Dominion University Education Human Subjects Review Committee's records.

Appendix C

Informed Consent Form

INFORMED CONSENT
OLD DOMINION UNIVERSITY

PROJECT TITLE: A Reflection of Experiences of Adults with Type 1 Diabetes in Integrated Physical Education Classes

INTRODUCTION

The purposes of this form are to give you information that may affect your decision whether to say YES or NO to participation in this research, and to record the consent of those who say YES. This project, A Reflection of Experiences of Adults with Type 1 Diabetes in Integrated Physical Education Classes, will ask you to complete a short demographic questionnaire, and complete a 60-90 minute interview where we ask for you to reflect about your experiences related to physical education.

RESEARCHERS

Justin A. Haegele, PhD, Associate Professor, Old Dominion University (PI) Kalleigh West, Masters Student, Old Dominion University

DESCRIPTION OF RESEARCH STUDY

This study will examine the reflections of adults with type 1 diabetes about their experiences in integrated physical education classes.

If you decide to participate, you'll be asked to respond to a brief questionnaire, as well as to complete a one-to-one individual interview via telephone or zoom with a research team member. Only the audio recording and transcript will be recorded if you elect to participate in the video call. The researcher may contact you for a follow-up interview or to get clarification on the transcript of your responses. The total time of participation will be between 60-90 minutes and will be scheduled around your availability.

INCLUSION CRITERIA

Participants will include those who (a) are between 18-35 years of age, (b) self-identify as having type 1 diabetes, (c) have experience with physical education after receiving their diabetes diagnosis, and (d) are willing to complete an interview for 60-90 minutes.

RISKS AND BENEFITS

RISKS: There are no expected or predicted potential risks associated with participation in this study. And, as with any research, there is some possibility that you may be subject to risks that have not yet been identified. However, it is important to note that while participants have the option to skip or not answer questions.

BENEFITS: There are no direct benefits to participants as a result of participation in this study.

COSTS AND PAYMENTS

Participation in this research is completely voluntary. Additionally, there are no costs associated with participation in this research.

NEW INFORMATION

If the researchers find new information during this study that would reasonably change your decision about participating, then they will give it to you.

CONFIDENTIALITY

The researchers will take reasonable steps to keep information private. First, participants have the option to provide only a pseudonym if they prefer to further ensure confidentiality. However, all participants' information will be kept on a password-protected external hard drive that is only accessible by the research team. The results of this study may be used in reports, presentations, and publications; but the researcher will not identify you and only use the selected pseudonym to report findings. Of course, your records may be subpoenaed by court order or inspected by government bodies with oversight authority.

WITHDRAWAL PRIVILEGE

It is OK for you to say NO. Even if you say YES now, you are free to say NO later by opting out of data collection or deciding not to answer specific questions. Your decision will not affect your relationship with Old Dominion University, or otherwise cause a loss of benefits to which you might otherwise be entitled.

COMPENSATION FOR ILLNESS AND INJURY

If you say YES, then your consent in this document does not waive any of your legal rights. However, in the event of harm arising from this study, neither Old Dominion University nor the researchers are able to give you any money, insurance coverage, free medical care, or any other compensation for such injury. In the event that you suffer injury as a result of participation in any research project, you may contact Dr. Justin A. Haegele, at jhaegele@odu.edu or 757 683 5338, Dr. John Baaki, the current chair for the DCOE Human Subjects Committee, at jbaaki@odu.edu or 757-683-5493.

VOLUNTARY CONSENT

The purpose of this form is to inform you about the study prior to participation. By agreeing to complete and submit this screening survey, you are consenting to participate in this study. This means, you are saying that you have read this form or have had it read to you, that you are satisfied that you understand this form, the research study, and its risks and benefits. The researchers should have answered any questions you may have had about the research, however if you have additional questions prior to completing this study, please reach out to Justin Haegele at jhaegele@odu.edu. If you have any questions later on, then the researchers should be able to answer them:

Justin A. Haegele: 757-683-5338

If at any time you feel pressured to participate, or if you have any questions about your rights or this form, then you should call Dr. John Baaki, the current chair for the DCOE Human Subjects Committee, at jbaaki@odu.edu or 757 683 5491.

I have read and fully understand the contents of the document labeled "INFORMED CONSENT OLD DOMINION UNIVERSITY: A Reflection of Experiences of Adults with Type 1 Diabetes in Integrated Physical Education Classes". I voluntarily agree to the terms and conditions listed above.

Name: _____

Signature: _____

Date Signed: _____

Kalleigh West

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570-872-0120
kwest008@odu.edu
www.linkedin.com/in/kalleigh-west-ctrs-3bb48b253

Education:

Old Dominion University, Norfolk, Virginia

- **Master of Science Degree:** Adapted Physical Education and Health
  Anticipated Graduation Date: December 2023
  GR GPA: 3.9
- **Bachelor of Science Degree:** Park, Recreation, and Tourism Studies
  Concentration: Therapeutic Recreation
  Minor: Psychology
  Graduation Date: May 2022
  UG GPA: 3.77

Related Work Experience:

Hampton VA Hospital, Spinal Cord Unit

Recreational Therapist Intern, Full Time…Hampton, Virginia… January - May 2022

- Conducted assessments, planned interventions based on the resident's assessment, implemented interventions, evaluated resident's progress, and documented all activities and progress of residents.
- Conducted one-on-one and group interventions
- Co-lead community outings for residents
- Created unique, new recreational activities for the residents

Personal Care Therapist

Personal Aide, Part-Time... Chesapeake, Virginia…December 2020- Present

- Implemented individualized recreational activities and conducted community outings with client
- Administered structured communication drills to improve social skills and capabilities
- Provided client with basic human needs such as food and vitamins and assisted with hygienic practices
- Provided client with proper oral medicine, injections, and wound care in the morning and nighttime

Human Movement Sciences (HMS) Graduate Assistantship

Graduate Assistant to Dr. J. Haegele, Part-Time… Old Dominion University… August 2022- Present

- Aid in the development of Camp Webber, a camp for youth with visual impairments/blind in Alaska
- Assist Dr. Haegele in research studies
- Attend doctorate level research discussion meetings
- Create research findings posts for the Human Movement Sciences department

Certifications/Awards:

- **Certified Therapeutic Recreation Specialist.** NCTRC…Certified February 2023
- **Class A Special Olympics Volunteer.** Chesapeake, Virginia... Certified September 2021
- **CWSE5691: Child Abuse and Neglect: Recognizing, Reporting and Responding for Educators.** Norfolk, Virginia... Certified March 2021
- **Dyslexia Awareness Certificate.** Virginia Department of Education… Awarded January 2023
- **Gene Hayes Award for the Southeast Recreational Therapy Symposium**. SRTS… Awarded April 2022
- **Maggi Curry-Williams Quiet Influence Award Finalist**… May 2022
- **Old Dominion University's Kaufman Award Finalist**… May 2022
- **Protective Behaviors Certificate.** Chesapeake, Virginia... Certified September 2021
- **Safe Space Certification**. Old Dominion University...Certified June 2020
- **SEES Experience Guaranteed: Internship Grant.** Old Dominion University… Awarded January 2022
- **Southeast Recreational Therapy Symposium Scholarship.** Myrtle Beach, SC… Awarded March 2022