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HEALTH

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

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Abstract

The purpose of this study was to gain an understanding of the experiences of type 1 diabetics in 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 were 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.

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Introduction

Type 1 diabetes is one of the most common chronic endocrine/metabolic conditions affecting adolescents (International Diabetes Federation, 2013). For example, 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 the pre- or early stages of adolescence, but diagnosis trends show more children being diagnosed at ages 0 to 4 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 diabetes 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 increasing weight-bearing activity (Kluding et al., 2017).

Physical activity is not a simple recommendation for type 1 diabetics, though, as many physiological changes 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 that 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 a number of barriers that type 1 diabetic adolescents diabetes face when attempting to access 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). That is, reports suggest that children participate in most of their daily physical activity through physical education classes (Cheung, 2017), and enjoyment of physical education has been 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 feel-

ings 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, 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 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 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 preexisting theoretical preconceptions (Smith & Osborn, 2014). Lastly, IPA includes hermeneutic features by exploring how everyday lived experiences present themselves 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.

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 who matched pre-specified eligibility criteria. For individuals 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 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. All participants were assigned pseudonyms to protect their identity. See Table 1 for more detailed descriptions of the participants' demographic information.

Data Collection

Before the commencement of data collection, all procedures were reviewed and approved by the ethics review committee at [anonymized for review] university. Before data collection began, participants signed a consent form to protect 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

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

best for them to schedule their interviews. The primary source of data for this study was one-to-one telephone interviews. One-to-one interviews were selected to help limit external influences or distractions and enhance comfort for participants to share personal experiences and build rapport with the interviewer. The interviews were semi-structured, with open-ended questions, and participants could speak more on specific topics if they wished. The interview questions followed a pre-established interview guide to support consistency across interviewees. The interview guide was inspired by prior research exploring the physical education experiences of other groups of individuals with disabilities (Haegele & Zhu, 2017). It was modified to be relevant to type 1 diabetics.

Interviews began with an introduction from the interviewer, West, 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 for two years, and she grew up with a 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 this, the researcher stated the purpose of the study and promptly followed with the first interview questions. All responses in each interview were audiotaped. These audio recordings were later transcribed verbatim. Additionally, the interviewer collected reflective interview notes throughout the interview to collect pertinent information and personal thoughts. These reflective field notes included 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 first author analyzed the data via a three-step analysis procedure recommended by Smith and colleagues (2009) for IPA studies. First, the first author immersed herself in the study's original data by reading and rereading the transcriptions and reflective field notes several times. She also relistened to audio recordings of the interviews multiple times to become more familiar with the data. Second, she reduced the 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 identified recurring themes 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 before and during the interview process. The interviewer also stated their relationship to the study and why it was meaningful to them for transparency. 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 knew 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 its (mostly negative) repercussions. 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 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 have been 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.

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, specifically, 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 that their sugars would immediately drop to dangerous levels during the activity. 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 sugar 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 various methods they utilized 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, which were 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 that before strenuous cardiovascular physical activities, such as running, she would make sure to eat something with a little bit of protein beforehand. She spoke about how even a little bit of peanut butter would help her from going low during runs. Sheri also spoke about the 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.

Related, some participants noted that they would reduce their insulin intake in classes before physical education in hopes of preventing their blood sugar from dropping during class.

Lack of Understanding of 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 on 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 that 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 not to 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 about 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 in 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 a lack of appropriate support services and professional training (Ioanna et al., 2005). Findings such as these are why physical education professionals need to receive appropriate training on disabilities/health conditions their students may have and listen to their perspectives, such as those presented in the study, to better understand their experiences (Haegele & Sutherland, 2015).

A significant aspect of type 1 diabetes is that participants wished their physical education teachers had better knowledge of 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 about appropriately dealing with low blood sugar. 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, 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 expect that student always to 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 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 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 led 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, iso-

lated, or 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, it can make the student feel heard and safe and may align the teacher's expectations with the student's 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 regarding type 1 diabetes, especially in physical education, and how these narrow views impacted their experiences. Nearly half of the participants noted the importance of physical education teachers understanding that type 1 diabetic students could do anything other students can do, just with additional support and understanding. Physical education, specifically, has been found to have less experience 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.

Contradicting the view of other participants, one participant emphasized that it's essential not to tell type 1 diabetic students that they can do anything. Dana explained how being told this made her feel lesser than her peers. For example, instances when she was experiencing 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 signify the importance of speaking to students and learning about their experiences and perspectives. Talking to a student with a disability can enhance 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

Several implications for physical education teachers can be derived from our findings. Here, we highlight just a few of those. Still, we believe that physical educators generally would benefit from reviewing our participants' words to better understand how type 1 diabetics experience physical education, and tailor their pedagogical practices to these needs. That is, 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. In contrast, others may monitor their blood sugar via continuous blood glucose monitors, 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 for a hypoglycemic event.

In addition to speaking with their students about their needs and accommodations, another avenue to gain insight into needs could be 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 that 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 could not be recorded. Body language could tell the interviewer significant information about how the individual feels and how comfortable they are (Cingi et al., 2023). Without this information, the interviewer had less insight into the 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.

Conclusion

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 the 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 is 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. Based on these findings, it is clear that teachers and their knowledge and abilities were central to our participants' experiences, 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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