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Experiences of College Students Who Are Newly Diagnosed With Type 1 Diabetes Mellitus

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ABSTRACT

Purpose: To gain insight and understanding of emerging adult experiences after a diagnosed with type 1 diabetes mellitus (T1DM) and prior to or during college life experiences.
Design and Methods: A qualitative research design using a focus group was conducted with 12 college students recently diagnosed with T1DM during emerging adulthood. The focus group took place during a College Diabetes Network retreat. Using Braun and Clarke's six phase process, two researchers independently conducted a thematic analysis from the transcribed, verbatim audiotaped narratives.
Results: The 12 participants attended colleges in 11 different states. The mean age was 21 years (SD = 6.3) and the majority were female ($n = 7$). Qualitative analysis revealed four themes: 1) diabetes affects all aspects of life and complicates college living; 2) college environment affects diabetes management; 3) diabetes diagnosis facilitates growth and maturity; and 4) strategies used for diabetes management in college.
Conclusion: T1DM is complex to manage in the college environment. However, these emerging adults newly diagnosed with T1DM highlight strategies for diabetes management while in college and the pivotal role of pediatric providers play in the successful management of T1DM.
Practice Implications: Diabetes education for emerging adults in college requires an adaptive focus that supports the developmental needs of this population. Nurses should focus on teaching healthy, modifiable behaviors of sleep, physical activity, and nutrition to improve glycemic control as well as adapting to the college life choices.
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Emerging adults newly diagnosed with type 1 diabetes (T1DM) and in college are experiencing multiple transitions simultaneously. Transitions, often conceptualized as developmental, health-illness and situational, add complexity to adapting to these changes (Meleis, 2010). Critical transitions for youth with T1DM are the developmental transition of emerging adulthood and the situational transition of college (Hanna, 2012). Adding to these transitions, some emerging adults are also experiencing a health-illness transition with a relatively new diagnosis of T1DM. Thus, emerging adults in college with a new diagnosis of T1DM must simultaneously adjust to developmental changes, college campus life and the life changing T1DM diagnosis. In addition, emerging adulthood is a time period for increasing independence (Arnett, 2007) and the need to take on responsibility for diabetes management (Anderson & Wolpert, 2004); this is in contrast to those diagnosed as children and adolescents when parental involvement in diabetes management is essential (Anderson, 2012). Although transitions have the potential to impact health and well-being (Meleis, 2010), little is known about the experience of youth who are in the developmental transitional period of emerging adulthood and the situational transition to college as well as having the added complexity of the health-illness transition of a relatively new diagnosis of T1DM. A greater understanding of the experience of emerging adults who are college students with a relatively new diagnosis of T1DM will help the nursing profession conduct future research of salient factors that predict health outcomes. Thus, the purpose of this exploratory study was to gain a deeper understanding among emerging adults experiences after being diagnosed with T1DM just prior to or during college.

Background

For those with T1DM, emerging adulthood is a critical transitional period for development and adaptation (Hanna, 2012). Although little is known to guide clinical care for emerging adults with diabetes (Garvey et al., 2014; Peters et al., 2011), this challenging transitional period has long been associated with poor glycemic control (Kapellen et al., 2018; Majumder, Cogen, & Monahan, 2017; Wysocki, Hough, Ward, & Green, 1992). This includes those in early emerging adulthood involved in intensive insulin treatment (Insabella, Grey, Knafl, &

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Tamborlane, 2007; Los, Ulrich, & Guttmann-Bauman, 2016; Miller et al., 2015). Emerging adulthood transition has also been associated with poor diabetes management which was less than optimal among those recently graduated from high school (Hanna, Weaver, Stump, Fortenberry, & Dimeglio, 2014) and a stressor for those preparing for transitioning to self-management (Ersig, Tsalikian, Coffey, & Williams, 2016). Diabetes management has been reported to be challenging for students in college (Garvey et al., 2014) due to a lack of diabetes care routines (Balfe, 2009; Majumder, Cogen, & Monahan, 2017). Diabetes care and control can be disrupted by college life which may include irregular classroom schedules, changes in dietary, physical activity, and sleep behaviors, and new or different support systems for those with T1DM (Jones, Sinclair, Holt, & Barnard, 2013; Palladino et al., 2013; Ramchandani et al., 2000; Roberts, 2015; Saylor & Calamaro, 2016; Schmid et al., 2011; Wdowik, Kendall, & Harris, 1997; Wilson, 2010).

The transition in health-illness status of a relatively new diagnosis of T1DM would add complexity to the challenges of adapting to the transitions of emerging adulthood and college. In addition, emerging adults with T1DM have been described to use various adaptive strategies for developmental, situational and diabetes care transitions (Rasmussen, Ward, Jenkins, King, & Dunning, 2011). Rasmussen et al. (2011) found that adults (18–38 years old) in Australia used previous experience, sought out information, and connected with other people with T1DM as strategies to manage T1DM during a transition. There is a paucity of published research on how emerging adults adapt to the new T1DM diagnosis. Therefore, it is imperative to understand the experience of emerging adults with a relatively new T1DM diagnosis who are assimilating to college life. Describing challenges of diabetes and college life faced by emerging adults diagnosed after 17 years of age with T1DM may provide a better understanding of the hurdles faced that limit health and how they adapt.

Methods

This exploratory, qualitative study used a focus group to gain a deeper understanding among emerging adults experiences after being diagnosed with T1DM just prior to or during college. This study received approval from the University of Delaware's Institutional Review Board. Informed consent was obtained prior to participation.

Sampling and Setting

The study sample participants were recruited from a planned weekend retreat sponsored by the College Diabetes Network (CDN). Inclusion criteria were: diagnosed with T1DM at age 17 or older, ≥ 18 years old at time of consent, and currently in college or recently graduated from an undergraduate program. Recruiting a sample who meet the narrowed criteria was challenging and the (CDN) diabetes-related retreat provided a national and diverse sample. A total of 12 participants with an age range of 18–26 were approached and all consented to participate in the focus group.

Enrollment

Between February and March 2017, CDN staff contacted, via email, potential participants to elicit interest in study participation. On the first retreat day, the non- CDN primary investigator met with interested potential participants, explaining the study, reviewing the informed consent and clarifying that study participation would not alter their relationship with CDN. The following day, informed consent from interested participants was obtained.

Focus Group/Data Collection

Participation in the focus group was voluntary and occurred after the sponsored CDN weekend retreat located in Boston, MA. Participants were informed that they could choose not to answer any questions, leave the room, and stop their participation at any time. Researchers were sensitive to the time constraints of those who attended the retreat, hence there was one focus group. The primary author moderated the hour-long focus group and used two digital audio recorders. A predetermined set of semi-structured questions with probes regarding living on college campus with T1DM were used for the focus group and the topics were as follows: (a) college experience, (b) changing college plans, (c) managing daily activities (sleep, social events, physical activity, etc.), (d) sharing diagnosis, and (e) involvement in diabetes care. Participants received a $15 electronic gift card after completing the focus group and survey.

Analysis

Quantitative, descriptive statistical analysis was completed on the demographic data using version 22 of the Statistical Package for Social Sciences (IBM Corp. Released, 2013). The qualitative data, focus group interview, were transcribed verbatim and reviewed for errors using original digital recorders prior to analysis. Verbatim transcripts were coded, line-by-line to create initial codes using a constructive analytical approach (Broido & Manning, 2002; Creswell, 2014). Qualitative data were analyzed using Braun and Clarke's six phase process for thematic analysis (Braun & Clarke, 2006). The first two authors independently read the verbatim transcript in its entirety to gain and note general impressions. The codes emerged into seven initial themes. Researchers reviewed the initial themes in relation to the coded extracts and the entire transcript, which resulted in an increase in subthemes, but after rereading and discussing, the authors collapsed seven themes to four themes. Using an iterative process, researchers continued analysis of defining and naming themes. The researchers completed the final phase of thematic analysis and selected participant examples that related back to the purpose of the study (Braun & Clarke, 2006). Fictitious initials were assigned to the quotes to ensure anonymity.

Qualitative Data Rigor and Trustworthiness

To increase data credibility, a member check was conducted with participants; this is advocated to increase accuracy and authenticity in qualitative findings (Creswell, 2014; Fossey, Harvey, McDermott, & Davidson, 2002; Kornbluh, 2015). As per the consent, participants were contacted via email and asked to review final themes and examples of participants' quotes and then respond with corrections, comments, or agreement within two weeks. Among the 12 participants, the response rate was 42%, which is common with member checks (Thomas, 2017). Among those who responded, all agreed with emerged themes, thus increasing representation of the participants with T1DM and data credibility (Thomas, 2017).

Transferability was achieved by using a sample of individuals who were diagnosed between 17 and 25 years of age (Creswell, 2014). The sample was obtained using College Diabetes Network and the study protocol included a detailed research process description that increased the data transferability. The themes emerged from an iterative process and constant reference to the original transcripts. To increase the dependability of the data, the third author conducted an audit and examined the research process. Thus confirmability was achieved as the results and interpretations supported the focus group transcripts (Creswell, 2014).

Results

Participants

The participants ($n = 12$) ages ranged from 19 to 26 years with a mean of 21 years ± 0.63 (see Table 1). Researchers enrolled the sample from all areas of the Unites States as follows: AL, CA, FL, GA, IN, MA, OH,

Table 1
Frequencies of emerging young adults newly diagnosed with type 1 diabetes mellitus (T1DM[a].

Demographic Variable	N (%)	Mean (SD	Range
Age		21 (0.63)	19–26
Duration of T1DM (years)		1.91 (1.21)	<1 year–5 years
Hemoglobin A1c		6.79 (0.20)	5.2–7.8
Continuous glucose monitoring % used		91.25% (17.69)	50%–100%
Gender			
Male	5 (42)		
Female	7 (58)		
Year in college			
Freshman	3 (25)		
Sophomore	3 (25)		
Junior	3 (25)		
Graduate school	3 (25)		
Insulin administration			
Injections	4 (33.3)		
Pump therapy	8 (66.7)		
Continuous glucose monitoring			
No	4 (33.3)		
Yes	8 (66.7)		

[a] Age when diagnosed with type 1 diabetes mellitus: 17–25 years' old.

RI, VA, WA, and WI. Undergraduate college students lived on campus. The average hemoglobin A1C level was 6.79% ± 0.20. Hemoglobin A1C, a measure of blood glucose variability over the past three months, provides an indication of diabetes control (Aron, 2014). A hemoglobin A1C less than or equal to 7% has been shown to decrease the likelihood of diabetes complications (Aron, 2014). In the study, the average time since their hemoglobin A1C measurement was 2.56 + 1.69 months and ranged from two weeks to six months. Only two participants had a family history of T1DM, a father and maternal grandfather.

Emerged Themes

Qualitative analysis of the focus group data resulted in four major themes with one theme having subthemes, describing different aspects of that major theme (see Fig. 1). The major four themes were as follows: (a) diabetes affects all aspects of life and complicates college living; (b) college environment affects diabetes management; (c) diabetes diagnosis facilitates growth and maturity; and (d) strategies used for diabetes management (with five associated subthemes).

Diabetes Affects All Aspects of Life and Complicates College Living

A T1DM diagnosis may impact emerging adults' college choice to be closer to home, which resonated for those diagnosed just prior to college. M. H. said, "…from my parent's perspective … at least a consideration of maybe you should stick around." Even attending the college of your choice, the complexity of diabetes and college life existed as C.E. illustrates:

> "Living with diabetes in college is more than a full time job… it [T1DM] takes what parts of college are already anxiety inducing and already challenging and just adds a really thick extra layer to everything. There's really nothing that diabetes doesn't impact as far as like day to day, eating, studying, sleeping, exercising."

Others described college life with T1DM as "[diabetes] impacts my ability to get all the school work I need to get done finished" (M. B.).

An important consideration is that T1DM affects social interactions and choices in the college environment. All students want to be a part of the social events offered with campus living as this is important aspect of college. D. E. stated, "Even without alcohol partying is dangerous. I can live without alcohol, but got to be like everybody else." Those with

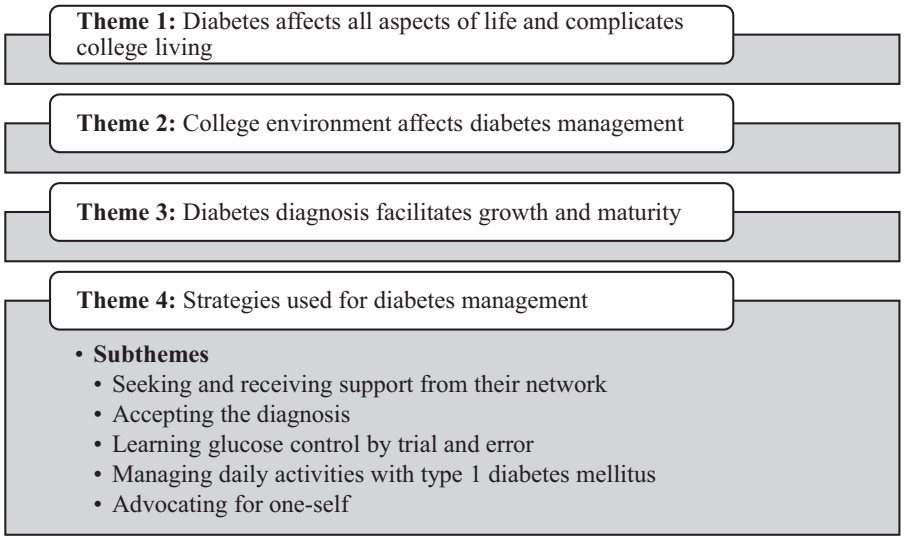

Fig. 1. Focus group themes/subthemes of emerging young adults newly diagnosed with type 1 diabetes who are in college.

T1DM have varied blood glucose levels due to their diet, exercise, sleep, stress, and so forth. this impacts roommates and even making new friends. Some participants would search for a roommate with a similar routine, especially sleeping. For example, S·K noted that,

> "sometimes you wake up in the middle of the night because you're low …you're trying to be quiet…or your pump is beeping … and then they're [roommate] like, 'are you okay?' So, it definitely affects your sleep, and it could affect your roommate's sleep, and that can be frustrating."

The complexity was seen as these young people were challenged by boundaries in their interaction with others, exemplified in intrusive comments and feelings of entitlement from those without T1DM. R. C. recalled an interaction in a grocery store close to campus while taking about Stevia. "Oh, I really like it a lot better than Splenda. This old woman turns around and said my son is a doctor and he said you really shouldn't eat artificial sugars. I said well when you have diabetes that's your only option….She said oh I have pre diabetes so I totally understand. I said I'm sure you do." Also D. E. noted, "I feel like people feel they are entitled to pressure us into not engaging in certain behaviors or not eating certain things that we want to eat." Other students have experienced curious people crossing personal boundaries. J. L. noted, "I will never forget when I was in class and [students] looking over my shoulder to see my blood sugar [results]." Also, M. H. noted that "Every time I'd fall asleep like take a nap in the middle of the day, my roommate would wake me up to make sure I was ok, which was really nice but it sucked to be woke up from a nap."

College Environment Affects Diabetes Management

This theme related aspects of the college environment that included dining halls, nutrition, class scheduling, and the general layout of the campus pertained to walking between classes, meetings, meals, and events. One participant described feelings of hypoglycemia and not feeling well in between two of her classes. She had to walk very briskly to her next class and was not permitted to eat in class. Building on this theme, M. G., stated, "If your class schedule works out [with] a long lunch break so I can't make it to the dining hall and back to my class in time to get food and eat it. I can't go to class and there are so many complications."

Dining options are essential for those with T1DM as it directly affects diabetes management and varies by university. C. R. noted positive aspects of the dining environment in the following comment: "friendliness to different kinds of diets, including vegetarian, vegan, etc. So, I found eating …. really easy." Conversely, others had a different experience; one noted having only one main dining hall with limited choices. M. H. said,

> "So for me being on shots I would go in, get some food, pre-bolus [insulin to cover meal], …. end up eating more food and getting another shot and it happened every meal. … I like giving six or seven shots a day … and using a lot of supplies. So, it caused me to not pre-bolus [give myself an another insulin shot before meals] anymore, which is sacrificing a little bit of your health, but to give one more shot."

Diabetes Diagnosis Facilitates Growth and Maturity

While maturity occurs naturally at different paces, the emotional growth of some emerging adults diagnosed with T1DM was hastened or altered. "I feel like I've had to develop after becoming diagnosed [T1DM]" (M. H.). As D. E. noted, "I feel like it's [T1DM] forced me to be a lot more responsible not just about my health, but also within my relationships with other people."

Notably, participants looked at life differently as some felt more responsible and others lived by the Carpe Diem philosophy. M. G. stated,

> "….being diagnosed kind of just taught me not to sweat the small stuff in life and enjoy it because I realized nothing was going to be bigger than my health, I guess you could say. So I realized I need to have fun and live in the moment."

Another participant felt a strong responsibility towards the diabetes community by educating those without T1DM. "… if I'm the only person they'll ever meet with T1DM … I can't let them leave this interaction not knowing what it is [they understand] or not putting a face to it *[T1DM]" (J. D.)*.

Regardless of one's age when diagnosed with T1DM, the views of their world may change in the process of adaptation. Some developed an increased compassion for other college students and faculty. However, some participants changed their outlook on life. C. R. said that,

> "when you get this huge burden thrown on your shoulders [T1DM diagnosis] it kind of allows you to develop some more compassion for other people. You kind of look at other people through this lens of everybody has something that they're carrying."

Strategies Used for Diabetes Management in College

The fourth theme had five subthemes: (a) seeking and receiving support from their network; (b) accepting the diagnosis; (c) learning glucose control by trial and error; (d) managing daily activities with T1DM; and (e) advocating for one-self.

Seeking and Receiving Support From Their Network. The concept of support, as articulated in the focus group, has multiple aspects including social (friends/peers) and university (e.g. professors and disability services) networks. In the following quote one will understand that professors and university/college services were part of the network. R. C. noted, "The support you get from not only professors but from resources [disability support and student health] on campus are also really helpful." A professor may have more influence than he/she realizes on a student with a disability, facilitating students seeking support. J. D. said,

> "… you can just tell them [professors] directly…I think that conversation the majority of the time is just awkward… I had professors like I'm handing the letter and they're like, 'Oh, I'll lose that, so just keep it. Just let me know what you need.' They deal with so many people [with] so many different disabilities that they just don't even know what to do and how to help you." Thus, "I think that's where the office of disability is a better approach".

Friends and roommates also provided support, often as tangible aid. For example, a simple, but important aspect is the need to always have diabetes supplies for T1DM management and potential emergencies. This can be more difficult for males with T1DM because they do not carry a purse like a female or a bulky backpack. One participant (C. E.) who needed to carry pens noted, "So you find a girl, hey, I need you to keep this lifesaving stuff for me and you have to stay by me all night." Many participants felt that "the more people that knew the safer that you are." M. B. noted that "I remember for my 21st if I didn't have some of my fraternity brothers I would be dead."

Accepting the T1DM Diagnosis. After accepting the T1DM diagnosis, emerging adults may begin to develop strategies for daily management of T1DM, which implies understanding the seriousness. M. B. noted that "I think you're … walking that line of this is a serious condition [diabetes] but then …I can do all of the things you can do. … I think they [people without T1DM] assume it's not as bad as it could be but then again we also have these challenges that we have to face." Also, there was acceptance of everything affecting blood glucose when diagnosed with T1DM. One participant reported,

> "…you have to be really cognizant of everything that you do, everything that you eat you realize how important all of your daily activities are on your overall health. So once you make that connection that everything you eat has an effect on everything else that you do and feel" (D. E.).

Learning Glucose Control by Trial and Error. Glucose management was individualized as well as was the college experience, leading to trial and error. As M. H. noted, "A lot of it is learning from your mistakes and just learning as you go to have a better management plan for yourself." Altered cognition related to hypoglycemia was also individualized. Each emerging adult with T1DM must learn how different blood glucose levels affect them and make adjustments as necessary. D.F said, "… the lowest I got was 41 [blood glucose level] …I couldn't function to even check my blood sugar." While another participant reported a blood sugar of "thirty something" (C. E.) and was able to check their blood glucose.

Much of the focus group conversation focused on nutrition and physical activity as important to insulin adjustment and subsequent diabetes control. For example, playing a sport may affect blood glucose control immediately and even have lasting effects into the next day. M. H. noted that

> "First semester freshman year we had late practices [club ultimate Frisbee], so I would go to bed and every night after practice [and] I would wake up low [blood glucose] in the middle of the night. That affects the next day in your classes and your homework."

The participants understood the positive benefits of nutrition and physical activity after many trial and error episodes. J. D. noted,

> "exercising regularly is worth all of the pain and awful because your numbers are so good when you do it when it's regular and routine. So it's worth it and you feel so much better. …we [people with T1DM] forget very quickly what the old normal felt like. I think we forget that sometimes and trying to figure out how to exercise our way back into having such good stability I think is worth the risk. The reward is worth it."

Managing Daily Activities With T1DM. The inter-relationship of nutrition, physical activity, sleep and diabetes control was noted by M. G.:

> "it [sleep] affects your blood sugar sometimes indirectly. …when I don't sleep enough I just feel more tired during the day obviously. …when you're tired you naturally want to eat more. I think it [sleep] definitely helps your body recover and it helps even next day like you have more energy, yeah, to make healthier choices for your body that help your blood sugar."

Many voiced that sleep should be the number one health behavior priority. A participant noted, "All of the adversity of the day and everything that you put your body through like you can only recover when you sleep" (S. K.). The culture of college sleep behaviors was also noted in relationship to one's diabetes. C.P. stated that "There's just immense pressure that you have to stay up late and like it's cool to stay up late. If you go to bed early you're looked down upon…So I think just realizing sleep is way more important and sleep has to be a big priority for you especially with diabetes." Beyond T1DM, "It helps lower your stress levels, it helps you grow, it helps regulate and you can consolidate memories while you sleep" (D. E.).

The challenge of using a gym and managing blood sugar levels, insulin absorption and physical activity was noted by some. J. L. said, "… I still have no idea how lifting weights will affect blood sugar every day. Every day is different." Initially, some have a fear of exercise resulting in hypoglycemia. M. B. noted that, "…for the first three or four months, I wouldn't exercise at all. Then … I would ask friends to go with me [to the gym] and test obsessively [blood glucose level] wait and take glucose tabs just in case [hypoglycemia]." The challenge was profoundly noted by one participant who described exercise and blood sugar as "an ongoing war" (C. E).

Advocating for One-self. Participants described interactions with roommates and holding them accountable since they were living together and may need to save their life. "One day I told my roommates I have T1DM, kind of gave them diabetes 101. I showed them where my glucagon was and I could pass out" (C. E.). However, J. L. was more theatrical and reported,

> "I walked into my room one day and I sat down on the floor and I said, okay, if I were seizing right now what would you do. I waited for him to look through my drawers, find my glucagon and come over and show me that he knew how to do it. I think it's important enough that they [roommates] know that it was worth kind of like testing [college exam]."

Even though not all students enjoy drinking alcohol regardless of T1DM, but socializing with peers at various campus events are important for this age group and a large part of the college experience. However, those with T1DM must advocate for themselves and teach others about the effects of drinking, eating, and dancing at parties. M. G. noted,

> "…like peer pressure and managing our health and everything it's [diabetes] forced me to be even more assertive than I already was and especially when it comes to say being ill. … If there is partying or events if I say like, 'No, listen I can't come. This makes my immune system more compromised than yours and I need to recover.' Then once again people will back off way better than they would if you don't have this diagnosis."

Campus officials may not understand the importance of courses schedules and their location on campus. Time between classes or distance to the dining hall may not allow for a lunch break causing hypoglycemia even with snacks. M.H. noted,

> "… if your class schedule works out in a way that you don't have a lunch break... I can't go to class and there are so many [diabetes] complications. Yeah, that's where I think you have to advocate for yourself and say I need a lunch break. If you're like, 'Well I eat breakfast at 9:00 and lunch at 4:00,' that's not very healthful for your body and you eat dinner and your body [blood glucose] just gets really messed up."

Discussion

Diabetes and the transition to college life is a challenge for these young people. This is consistent with Hanna's premise that young people with T1DM need to adjust to the transitional events such college (Hanna, 2012) This sample of emerging adults with T1DM portrays diabetes affecting everything and making college life more complex. Indeed, for anyone with T1DM, management is known to be demanding, requiring, throughout the day, multiple checks of glucose levels, and adjustments of multiple insulin doses integrated with regular meals and the amount of exercise (Balfe, 2009; Majumder et al., 2017; Saylor & Calamaro, 2016). Some of the college students in this sample perceived these requirements as overwhelming. For example, class schedules could interfere with the above management when a class time coincides with when one usually checks glucose levels or eats a meal. This is consistent with Balfe who noted that college life interferes with diabetes management routines (Balfe, 2009; Garvey et al., 2014). The college environment also contributes to management of diabetes, for the good and the bad. Several college students in the sample noted how dining halls

at college lend themselves, because of limited nutritional information to positively or negatively impacting healthy eating for someone with diabetes.

Similar to the Rasmussen et al.'s (2011) findings, these college students with T1DM were resourceful in developing several strategies for diabetes management. Different from Rasmussen's results, participants in our study used a "trial and error" approach to diabetes management. Comparable to Garvey et al. (2014) many of these college students worked on integrating nutrition, exercise and sleep into college life, but found it challenging. College students mentioned that acceptance and understanding of their diagnosis was a strategy to assist them in diabetes management. Other researchers found similar results indicating that accepting a chronic condition diagnosis is essential for its management (Babler & Strickland, 2016; Mofrad, 2014; Polonsky, Fisher, & Guzman, 2010). Alcohol is an aspect of college life that participants discussed. Those who identified as undergraduate students in the focus group commented on the importance of still socializing yet not drinking alcohol. This finding is consistent with a study of emerging adults with T1DM where only a small portion (ranging from 22% - 44%) were consistent drinkers of alcohol during the first year after high school (Hanna, Stupiansky, Weaver, Slaven, & Stump, 2014).

College students with diabetes note that having a support network was critical to their success while away from home, whether caregivers or interested professors. It is well known that support facilitates diabetes management for youth with T1DM (Carcone, Ellis, Weisz, & Naar-King, 2011; Malik & Koot, 2011; Palmer et al., 2011). Integral to support is advocating for oneself. College students discussed particular situations in which that they had to educate their peers regarding what T1DM is and when to identify and seek help during a diabetes emergency.

Although diabetes diagnosis and management is challenging, these college students in this focus group perceived that they matured quickly and the process of managing their own care taught them responsibility as emerging adults. Hanna et al. (2013) reported that emerging adults with T1DM are more responsible post high school. However, receiving a new diagnosis of T1DM as an emerging adult requires support from peers, the medical community, the academic community, and at times, presents as challenging to manage in college.

Limitations

There are limitations to this study that warrant discussion. At the time of the study, the focus group involved CDN members who attended a weekend diabetes-related retreat. Given this was a self-selected, motivated group, findings may differ than a typical population of college students with T1DM. Participants may have a high level of motivation, which was evidenced by their mean, self-reported hemoglobin A1c was 6.79% (SD = 0.2). According to the T1D Exchange Clinical Registry (2015), only 14% of emerging adults 18–25 years of age meet the recommended hemoglobin A1c level less than or equal to 7%. It is unknown if the presented emerged themes encompass all the issues since researchers did not have the opportunity for data redundancy as they were restricted to one larger focus group. The strengths of this study include the recruitment from a nationwide population decreasing a potential geographically biased focus group. In addition, this age group being was diagnosed with T1DM as an emerging adult and not as a child are more difficult to locate for enrollment. The sample was representative of 11 different states with almost equal number of males and females.

Practice Implications

All transitions, whether developmental, health-illness and/or situational, are more complicated when faced with a chronic health condition. While nursing care is a key component of patient-centered care to foster proper diabetes management, the emerging adult has unique needs for successful management adaptation. Diabetes education for emerging adults transitioning in college requires an adaptive focus that supports the developmental needs of this population. Nurses should focus on teaching healthy, modifiable behaviors of sleep, physical activity, and nutrition to improve glycemic control as well as adapting to the college life choices.

Nurses should collaboratively work with the student develop a plan to target healthy behaviors. Identifying support services and resources on college campuses including contacting Disabled Student Services to learn more about health-related accommodations in college, referral to student health services, and locating local provider particularly when distant from usual source of care can offer tools for student success in transitions. In addition, education regarding the effects of sleep behavior, nutrition, and physical activity on diabetes management may be more effective if designed with consideration for the emerging adults' transition from home to college and vice versa. This initial and continued follow though of education may prevent hyper- and hypoglycemic events that may leads to long-term microvascular and macrovascular complications.

Implications for Future Research

Emerging adults in college are an understudied population with unique educational and clinical needs. As this population has the highest hemoglobin A1C levels compared to other age groups, more research is needed focusing on college specific diabetes management. Much of the current research studies are qualitative and are composed of small samples, thus larger sample size and interventional studies are necessary. Results from this study and other research maybe used to develop and test a college transition program. Future research combining the emerging adults with T1DM, healthcare professionals, and university services including student health, mental health, disability support services, and admissions may improve health outcomes among this population.

Conclusion

T1DM presents challenges for the newly diagnosed emerging adult, especially in the college environment. For the emerging adult, diabetes pervades every decision and every event in his/her daily life including nutrition, physical activity, sleep, support systems, academics, and psychosocial social aspects. It is vital for healthcare professionals to understand the uniqueness of this population who is experiencing multiple simultaneous transitions when caring and educating for them. In addition, healthcare providers and students with T1DM need to collaborate with college campus administration and faculty as they play a supportive role in fostering healthy diabetes management.

CRediT authorship contribution statement

Jennifer Saylor: Investigation, Conceptualization, Methodology, Formal analysis, Writing - review editing. **Kathleen M. Hanna:** Investigation, Conceptualization, Methodology, Writing - review & editing. **Christina J. Calamaro:** Investigation, Methodology, Formal analysis, Writing - review editing.

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