



The impact of flash glucose monitoring on adults with type 1 Diabetes' eating habits and relationship with food

T. Wallace^a, J. Heath^{a,b,*}, C. Koebbel^c

^a Doctoral Programme in Clinical Psychology, University of Hertfordshire, Hatfield, Hertfordshire AL10 9AB, UK

^b Bedford Hospital Adult Diabetes Service, Bedfordshire Hospitals NHS Foundation Trust, Bedford Hospital South Wing, Kempston Road, Bedford MK42 9DJ, UK

^c Luton and Bedfordshire Eating Disorders Service, East London NHS Foundation Trust, Mountbatten House, 56 High Street South, Dunstable, Bedfordshire LU6 3HD, UK

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ABSTRACT

Aim: To gain a better understanding of how the FreeStyle Libre (FSL) flash glucose monitor influences the eating habits and relationship with food of adults with type 1 diabetes (T1D).

Methods: Reflexive thematic analysis was conducted on fifteen semi-structured interviews conducted with adults with T1D, exploring their experiences of at least one year of FSL use.

Results: Four themes were constructed from the qualitative data: (1) Personal Food Story (what food represented before and after diabetes diagnosis), (2) New Opportunities (the FSL offered novel discoveries and increased self-confidence regarding food choices), (3) Body as a Machine (participants viewed their bodies as a collection of complex processes requiring continuous maintenance), and (4) re-evaluating Diabetes (participants expressed a shift in their expectations of themselves and their diabetes management). Although the FSL offered participants more freedom and flexibility with their eating, this was constrained by feeling forever under scrutiny from the data.

Conclusions: Findings suggest the FSL influences users' eating habits, including when, why, what and how much they eat. Participants described both the positive and negative impact of these changes on their emotional wellbeing and relationship with diabetes, arguing for a need to address patients' relationship with food in routine clinic care.

1. Introduction

The FreeStyle Libre (FSL) flash glucose monitor (FSL; Abbott Diabetes Care) became available via NHS prescription in 2017 for people living with type 1 diabetes (T1D) who meet clinical criteria. The device offers an alternative to testing blood glucose levels using the finger-prick method; the user scans the device using a hand-held reader or their smartphone to get a digital reading of their interstitial blood glucose level, without having to draw blood. Impressively, the FSL has been associated with reduced HbA1c, increased awareness of hypoglycaemic episodes, and increased frequency of blood glucose checking [8,11,24]. FSL use has also been positively associated with measures of quality of life and treatment satisfaction in adults with T1D [16,23]. However, the impact of the FSL on eating habits and the individual's relationship to food has received little attention in the literature.

Considering the fundamental nature of eating, and the interruptions to this process that T1D causes, people living with T1D must adjust how

they eat to survive. Investigating the impact of changing food intake is important; changes in diabetes management methods have previously been shown to cause changes in food beliefs and behaviours, such as patient perceptions of 'good' and 'bad' foods, or patients choosing to eat high fat meals to avoid carbohydrates and the need to inject insulin [17]. Furthermore, the required focus on food consumption in diabetes management has been suggested to contribute to the development of disordered eating [21,29], with research suggesting that adolescents and women with T1D are at greater risk of developing disordered eating behaviours than adolescents and women without diabetes (Nielson, Emborg & Mølbak, 2002; [28]).

Whilst the benefits of advancements in diabetes technologies are clear to see, interventions aimed at stabilising blood glucose within optimum levels have been identified as encouraging perfectionist tendencies [12], a risk factor associated with disordered eating and eating disorders. Management strategies based upon target setting, such as reducing HbA1c and keeping track of numbers, can prioritise data

* Corresponding author at: Doctoral Programme in Clinical Psychology, University of Hertfordshire, Hatfield, Hertfordshire AL10 9AB, UK.

E-mail address: j.heath@herts.ac.uk (J. Heath).

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collection over connection with one's body. Collecting data on the body is a growing phenomenon in non-clinical populations, with a plethora of diet apps aimed at encouraging the user to voluntarily record daily food consumption in order to increase self-awareness of health-related behaviours, and subsequently motivate behavioural change [6].

Indeed, the initiation of self-tracking using a device or app has been associated with novel eating habits [7,15,18], some of which appear to be helpful through promoting self-reflection on food intake and gaps in nutrition [13]. However, increased self-awareness seems to prompt some individuals to adopt rigid approaches to food intake, including disordered eating behaviours [19,25]. Considering the volume of data collected and presented by the FSL, the interpretation of such data is an important factor for diabetes multidisciplinary teams (MDTs) to hold in mind when assessing patient suitability for the device.

To the author's knowledge, there has not yet been a qualitative exploration of the impact of FSL use on T1D adults' relationship with food. Such research could be helpful in identifying T1D populations at particular risk of disordered eating or diabetes distress associated with food and eating. To address this gap, reflexive thematic analysis was conducted on semi-structured interviews with adults living with T1D to explore their experiences of the FSL regarding its impact on their eating habits and relationship with food.

2. Methods

2.1. Sample

The study was conducted at North Bedfordshire Adult Diabetes Service, an NHS funded hospital-based diabetes centre in Bedford, UK. Ethical approval was granted by the University of Hertfordshire's Health, Science, Engineering & Technology Ethics Committee (ref: LMS/PGT/NHS/02963) and the NHS Health and Social Care Research Ethics Committee B (HSC REC B) (REC ref: 21/NI/0118). Eligible participants were English-speaking, over 19 years old, had T1D, and had been prescribed the FSL for at least 12 months.

The service's patient database was used to generate a list of 245 potential participants who met eligibility criteria. As recruitment occurred in September 2021 during the Covid-19 pandemic, recruitment was via email advertisement and dissemination of study information via contact with the diabetes team.

Within two weeks, 30 patients expressed an interest in participation, all of whom were offered a phone call with the researcher to ask questions about the study: no patients requested this. Following initial contact, 14 patients did not respond to emails from the researcher and, out of the remaining 16 who consented to individual interview, the researcher selected as diverse a sample as possible of 15 patients, meeting the study recruitment aim, with interviews conducted between October and November 2021. The sample comprised ten females and five males aged between 24 and 66, who identified themselves as White British (N = 12), White Irish (N = 1), White European (N = 1) and Black Caribbean (N = 1).

2.2. Interviews

Participants provided informed consent to participate verbally prior to interview. Due to social distancing guidelines, interviews were conducted remotely via Microsoft Teams (n = 4), Zoom (n = 7), or telephone (n = 4) according to participant preference [14]. Interviews averaged 60 min in duration. One investigator (TW) conducted all interviews, which were recorded and transcribed, then stored securely.

Due to the lack of prior qualitative research in this area, a semi-structured interview schedule was developed by the research team based on both their clinical experience in the area and a literature review conducted on experiences of health-tracking technologies in relation to relationship with food and eating in non-clinical populations. The interview guide was shared with three experts by experience recruited

from the service to ensure clarity and to reflect on the experience of being asked such questions. The interview schedule covered four main sections: general experiences and frequency of use of the FSL in comparison to finger-prick testing; eating habits prior to and since using the FSL; any changes in eating habits over time and following T1D diagnosis; and experiences, use, and interpretation of the FSL data.

2.3. Analysis

Reflexive thematic analysis [3–5] was used to analyse the data, facilitated by qualitative software, NVivo 12 (QSR International, 2018). The process of analysis followed Braun and Clarke's six-phases of reflexive thematic analysis.

A single coder (TW) coded all transcripts, with initial codes shared with experts by experience to facilitate reflection on how researcher biases might influence interpretation of the data. The codes evolved with shifts in insight and multiple layers of reflection. Codes were grouped to develop themes in an active process of construction requiring analytic and interpretative work by the researcher. Themes were reviewed by the research team regarding their coherence, boundaries, and ability to represent a useful interpretation of the data set as a whole.

3. Results

Four themes were constructed during reflexive thematic analysis: 1) Personal Food Story; 2) New Opportunities; 3) Body as a Machine; and 4) re-evaluating Diabetes. These themes, and associated subthemes, are illustrated in Table 1. Each are outlined below alongside representative quotes.

3.1. Personal food Story

Prior to life with diabetes, participants described experiences and beliefs that predominantly alluded to food representing social connection and indulgence. Following diagnosis, a sense of deprivation and unfairness was prominent. The nature of the deprivation could vary, e.g., for some individuals, strict food regimes were implemented by parents; for others, such choices had to be made by themselves. Nevertheless, diabetes brought with it a lack of freedom and novel judgements about food, and an individual responsibility to make 'good choices' based on professional advice. Participants' food journey thus far provided a context in which the FSL would be introduced.

3.1.1. Eating Identity

Participants constructed an idea of who they were in relation to food, drawing on the role that food played in their upbringing and relationships with family members. Some participants categorised themselves as

Table 1
Themes and Subthemes.

Theme	Subtheme
Personal Food Story	Eating Identity
	Deprived of Freedoms
New Opportunities	Food Rules
	Novel Insights
	"I can eat this"
Body as a Machine	Becoming the Professional
	Peer Support
	Food as Functional
	Seeking Permission from the Data
Re-evaluating Diabetes	"I'm just a number"
	Rigid Routines
	"Information overload"
	"Got to be better"
	"It's not an exact science"
	Visibility
Managing Body Weight	

a certain type of eater or body type, highlighting societal expectations about food and its relationship with body shape.

I've always been a large person so always been dieting and told to diet (Aisling).

Participants shared memories from their youth that typically centred social connection via food, e.g., family traditions, joyful rebellion with siblings, or punctuating special moments.

when I was much younger we would walk into town we'd go into Simons we'd all get a cake and we'd all sit on one of the benches outside in the thoroughfare, and we'd all have cake. (Sharon).

3.1.2. Deprived of Freedoms

Participants recalled memories of post-diagnosis diet changes, including the need for precision and eating schedules. This often involved eating the same thing at the same time every day to match food to their insulin profile, or exclusion of certain foods. Food restrictions experienced during childhood were associated with feelings of deprivation and unfairness, with some saying goodbye to some of their most loved foods.

I was actually in hospital they obviously had volunteers visiting the hospital and um they were giving all the children crême eggs and they gave my brother crême eggs and not me I can remember that like it was yesterday. Cos I couldn't understand it. I couldn't understand it. (Katie).

I couldn't have like sugarpuffs or, which was I remember that being my favourite and I was never allowed to have it [laughs] I laugh now but it was probably quite sad at the time. (Hayley).

3.1.3. Food rules

Certain 'truths' about food, health, and eating were implied, with many participants describing food choices suggestive of a dichotomous view of 'good' and 'bad' foods. Generally, food that was high in carbohydrate or sugar was associated with cheating or feelings of guilt.

My diet is quite basic and straight forward and consistent things but I have been guilty of treats I suppose you would call them. You know having a Kipling's apple pie with custard for afters or something like that. (Harrison).

For some, eating outside of the home appeared to be historically or currently experienced as a risky or difficult to manage activity. This was referenced in relation to parental rules and attitudes towards appropriate foods, which seemingly had a long-term impact on participants' eating habits.

I still sort of don't go round my friend's house for tea and things, I just think that I was restricted on certain things that I could eat and couldn't eat. (Becky).

3.2. New Opportunities

The FSL was a vehicle for new opportunities and discoveries resulting in increased self-efficacy. Through an increased sense of confidence to manage various situations, with the reassuring presence of the FSL data, participants were able to explore broader food choices.

3.2.1. Novel Insights

Various discoveries were made possible by the FSL. There was a sense that participants were able to access a higher level of understanding of their blood glucose levels and bodily processes. New insights into food content changed where, what and how much participants chose to eat.

I've evaluated foods really easily. So if you ate this kind of bread on one day, see what effect it has. Different kind of bread on another day, see what effect it has. And you can do that so easily (Lottie).

3.2.2. "I can eat this"

Participants described their increased self-efficacy in managing what would be challenging foods because of the FSL. This allowed experimentation with food; instead of certain foods being too dangerous to eat, participants appeared less fearful of complex foods as the visual representation on the graphs offered the perception of control.

it's given me the confidence and the ability to be able to just take it in my own hands and deal with it being able to see those graphs and change things and whatnot, I just feel... more confident and empowered with my diabetes rather than feeling like it controls me (Sarah).

This flexibility contradicted previous experiences of post-diagnosis deprivation discussed in the previous theme. Some participants spoke about revisiting childhood favourites that had not been eaten since diagnosis, however expectations of past favourites were not always met. Participants also described flexibility regarding timings, with the trend arrows enabling eating on occasions where they previously would not, e.g., spontaneous social meals.

3.2.3. Becoming the professional

Equipped with data and increased understanding, participants shifted from 'patient' to 'professional' in their diabetes management role. Their new role included analysing data to identify trends and understand high/low glucose events. There was an increased sense of ownership of diabetes management, shifting from handing over snippets of information and awaiting instructions, to initiating and evaluating changes oneself.

I think "Okay, what's, what's caused that, why has that happened?" And I need to backtrack and think "Was it something I ate, did I forget to take fast-acting insulin, did I forget to take my long-acting insulin, my basal dose" (Mickey).

Through FSL use, several participants also discovered that their body responded in an idiosyncratic way to food or insulin, feeling reassured by the presence of data to evidence this. The necessity for this data to help patients feel empowered to influence their care not only highlights the common power differential between patient and professional, but also the need to share information with patients and acknowledge their own medical knowledge.

when I go to an appointment I am far more confident. Because the graphs can't be argued with, I can't make up a graph. (Katie).

3.2.4. Peer support

Participants described sharing their new expertise with family or friends with diabetes, including experimental methods facilitated by the FSL, and how peers trusted such advice.

I've got a friend who was diagnosed not that long ago he was saying to me "Oh I don't eat roast potatoes anymore because they completely screw up my control" And I said to him "Look, I'm not telling you to do this, but this is what I do and it works for me." He then went away and did it and he came back and he said, "Flippin' heck it works a treat." (Greg).

The data also enabled celebration of successes with peers who would share a 'a good day'. A noteworthy point is that participants were more likely to share good days with peers than difficult days.

3.3. Body as a Machine

Participants related to their bodies as machines requiring maintenance, with continuous FSL data offering a window into their inner

workings. Although no participants specifically used this metaphor, their experiences painted a picture of a meticulous, sometimes reluctant, engineer trying to maintain a complex system with inputs and corresponding outputs. Participants alluded to food as fuel, with the system's requirement overriding natural urges. There was a sense that data represented the individual and was therefore open to judgements.

3.3.1. Food as Functional

The notion that food is fuel was apparent; some participants described only eating if it was required, emphasising the fundamental nature of food as a resource for survival. In this way, eating was akin to medicating, as opposed to a pleasurable or social process, which perhaps increased the pressure to consume the appropriate type and dosage.

I don't tend to eat when I'm hungry. I eat when I, because food is a means to an end if you see what I mean I don't unfortunately, I don't think "Oh I really fancy this", I will think "I'm really hungry, maybe I fancy this but I don't eat it because.." my blood sugar trend or you know it's just not right, the time's not right (Katie).

3.3.2. Seeking permission from the data

Participants described using data to determine whether they were allowed to eat in the moment, which contradicted the sense of freedom described in the 'Novel Insights' theme. If blood glucose levels were considered too high, the hunger urge would often be ignored, suggesting that data was prioritised over natural instincts, desires, and social processes. One participant described involuntarily visualising the FSL graph when making food choices, and avoiding foods that caused a spike on the graph. Notably, participants described feelings of deprivation due to restricted foods in their youth or post-diagnosis, and were echoing this following the introduction of FSL.

because I know it has a bigger impact I probably eat less, whereas before my husband would go, "Oh do you do you fancy Chinese tonight?" I'd go, "Oh yeh that sounds great." Whereas now I'm a bit like, "Mmm no." (Madonna).

3.3.3. "I'm just a number"

Feeling judged solely by blood glucose level or HbA1c was commonly articulated. The FSL data was sometimes seen to represent who participants were, regardless of efforts or strengths elsewhere. There was also a frustration that participants' complicated and messy human experiences could be reduced to a number. The inescapable role of numbers felt somewhat cold and mechanical, disregarding emotional experiences and focusing purely on output.

I think what's difficult is the Libre doesn't always show the true extent of what you're experiencing, so the Libre may look brilliant in terms of your levels but actually you getting to that point might be quite stressful. But I think they sometimes look at it like, "Oh the Libre's fine so that's great." They don't sometimes dive deeper into it (Bluebell).

3.3.4. Rigid routines

Several participants created routines, involving precise timings or meal plans, to consistently keep their blood glucose levels in range, as though following a manual for optimal functioning.

and the times, as I said to you, fairly regimented with our eating habits in certain respects and timings certainly. You know we have breakfast pretty much the same time every day. I have my lunch and evening meal within, generally within sort of like...minutes of each other throughout the week. (Hank).

3.3.5. "Information Overload"

Participants found adjustment to the data overwhelming at times. Due to ease of scanning, many initially found it hard to resist scanning,

and responding to the information became an arduous task, perhaps pulling focus to small details and away from the bigger picture.

I found myself getting obsessed by it I mean, I get annoyed because I've done something I shouldn't have done, but I can see some people would be possibly trying to adjust their whole life just to keep the line flat in the middle of the range that they're supposed to be in. (Peter).

3.4. Re-evaluating diabetes

Overall, the FSL seemingly resulted in participants repositioning themselves in relation to the concept of good control and diabetes in general. As a result of viewing their body as a complex data-producing system, participants expressed an expectation that well-controlled blood glucose levels should be achievable with exact science, correct calculations, and consistency; falling short of the goal was due to individual failures. At other times, there was the impression that perfect control was an unreachable goal and their best efforts were good enough. Improved control facilitated by the FSL also introduced further dilemmas described below.

3.4.1. "Got to be better"

The notion that failure to achieve perfect control is only through one's own fault was highlighted via the negative self-talk participants experienced in relation to their diabetes control and food choices.

I call it chatter, it chatters away at you all the time and sometimes it's not very nice chatter. It's saying, "You've got to do this, you've got to do that, sort it out, why can't you just do that, it's so easy not to eat most things, blah blah blah." And you have all this going on whilst you're calm, doing everything that you've got to do in your day (Lottie).

Unsurprisingly, when the FSL graph showed unexpected results, frustrations arose. Similarly, data was sometimes received as criticism, exacerbated by the colour coded zones, which had a significant impact on mood.

if it's in the green, I scan it, it's like a sense of relief. It's a really strange thing to say, but I'm like, "Oh yes, that's a relief." Because I was expecting the worse but actually I'm in range But when I'm in amber, my mood, for that split second is not the same. It changes. So it's like, "Oh." (Bluebell).

3.4.2. "It's not an exact science"

Conversely, participants also acknowledged the many challenges associated with pursuing optimum control. They reflected on their emotional state before reviewing data and made a commitment to not punish themselves if things were not going to plan. Self-compassion was expressed through recognition of uncontrollable external factors and focusing on efforts rather than outcome.

I always used to beat myself up about it before having the Libre because I'd think "Maybe I made a mistake, maybe I didn't do that injection or the right amount of units or maybe the carbohydrate content was higher than I bargained for." But it's kind of shown me that actually sometimes it's not an exact science, so there's so much other things that can influence those numbers and those graphs. (Dove).

3.4.3. Visibility

Wearing the FSL on the body influenced how participants viewed themselves or were viewed by others. Audible FSL alarms meant that they had to explain diabetes more often and led to novel prompts from others to manage levels by medicating or eating something. When eating in public, the FSL gave participants the option to hide diabetes due to the reduced amount of necessary equipment. This meant participants felt less self-conscious, although it was unclear whether this made the process less laborious, or whether it made participants more likely to eat in

public, or eat what they wanted in public.

you don't draw attention to yourself, you don't have loads of pens flying over the table and needles (Bluebell).

3.4.4. Managing body weight

Some participants felt stuck in cycle of eating and insulin use that led to better control, facilitated by the FSL, but also impacted their ability to pursue their desired body weight. Two competing priorities were implied: one that wants to pursue good control, and one that desperately wants to avoid feeling fat.

I view insulin as fat juice. Because it does, it makes you fat. Um since being on the pump and I've got better control, um I've put on weight So there's always in the back of your mind "If I get really good control I'm going to live for longer but I'm actually going to be fatter too." So it's um, it's a continual emotional, psychological battle (Lottie).

4. Discussion

This research explored the impact of flash glucose monitoring on eating habits and relationship with food for adults with T1D. It is important that such experiences are understood so that targeted support can be provided when necessary by diabetes services.

It was clear that FSL use increased participants' self-awareness of food consumption, as mirrored in health-tracking technology literature (Hahn et al., 2021b; [18]). The notion that increased self-awareness can lead to both greater positive engagement but can also prompt greater emotional load was present among participants. The resultant and sometimes overwhelming process of evaluating foods using the graphs prompted changes in what, why, when, and how much participants were eating. This adjustment of food intake following FSL use has previously been identified in the literature [1,10,30].

Several participant accounts highlighted a restrained and ambivalent relationship with food. It seemed the FSL reinforced the perception of food as a mathematical problem and encouraged a regimented, sterile approach to eating. Eradicating problematic foods or not responding to hunger cues is concerning as it mirrors the practice of ignoring signals from the body seen in disordered eating. Similarly, data was often not discussed as value-free facts but instead carried strong emotional and evaluative connotations. Therefore, participants were not engaging in self-reflection but self-criticism, which preceded worry and guilt, and reduced motivation. Research has shown that predictors of insulin restriction among adults with T1D and eating disorder symptomology included momentary increases in anxiety, guilt, or shame before eating or when breaking a dietary rule, e.g., 'no desserts' [20]. It is therefore apparent that viewing food as a moral transgression, rather than necessary nourishment, can have a direct impact on vital diabetes management tasks.

5. Clinical implications

Currently, standardised questionnaires are often used as a springboard for initiating dialogue or to monitor the efficacy of interventions and, within diabetes services, the Problem Areas in Diabetes (PAID) Scale [26] is frequently used. When considering the results of this study, it is clear that participants' experiences speak to three questions asked by the PAID Scale: Q4) Uncomfortable social situations related to your diabetes care (e.g., people telling you what to eat); Q5) Feelings of deprivation regarding food and meals; and Q11) Feeling constantly concerned about food and eating. However, despite the PAID capturing various experiences, the following areas of concern were not captured: weight gain worries, irritation at having to eat when not hungry, feeling overwhelmed or disheartened by the data, obsessively checking the data, and worries about sharing data with clinicians. This has important implications for practice as users who are intentionally or

unintentionally prioritising the appearance of the data over their own wellbeing may not be identified in clinic, allowing continuation of increasingly unhealthy cycles of increased stress, guilt, and restriction. The current study identified the contrasting positive and problematic impact of FSL use, and users may attempt to tolerate the problematic aspects in order to access the benefits of the FSL data. Using standardised questionnaires to initiate conversation around eating habits and their impact on patients' mood, social life and expectations of themselves in relation to diabetes would be helpful in giving patients permission to disclose concerns or seek support, particularly in the context of a supportive relationship with clinicians that acknowledges and appreciates the complexity of living with diabetes.

Type-specific measures of diabetes distress may be helpful in scaffolding discussion with patients about their perception of food and emotional responses to eating, e.g., the Type 1 Diabetes Distress Scale (T1-DDS) [9]. Where there are concerns about disordered eating, a brief questionnaire can be used as a first step screening tool by appropriately trained staff, e.g., the modified SCOFF adapted for diabetes (mSCOFF) [31]. Further screening tools may be beneficial to elicit individual psychological barriers to insulin use, e.g., the Insulin Treatment Appraisal Scale (ITAS) [27]. Particularly where barriers are apparent, increased education regarding the function of insulin and its association with weight gain could help to reduce shame and negative body image perceptions.

Staff training should also consider language used in staff-patient consultations. Clinicians should avoid categorising food as 'good' or 'bad', which can be interpreted as the FSL user being a 'good' or 'bad' person, opting instead for 'everyday' and 'sometimes' foods to avoid the associated moral judgement. Similarly, although awareness of HbA1c is important, drawing attention to efforts and small achievements, and enquiring about user wellbeing holds equal importance to increase resilience and reduce feelings of guilt and shame when reviewing FSL data.

This research has also clearly illustrated the merit of peer support for people living with T1D when using the FSL, and the value of user perspectives of the FSL for those considering the use of this technology. Such support could include common emotional responses to the data and advice to not overcorrect in response to the data; such information could reduce feelings of shame or isolation for new users and could be shared online (e.g., through video testimonials or blogs by organisations like Diabetes UK and Digibete).

Lastly, Abbott (FSL developers) are urged to consider wellbeing-focused modifications, e.g., a notification if the user has scanned more than 20 times a day to highlight potential obsessive scanning. If time in target is lower than expected, the FSL could also offer a compassionate self-reflective message or question, e.g., enquiring about relevant external factors or challenges overcome that day. What is of utmost importance is that further development of the FSL device should not be without the involvement of experts by experience.

6. Limitations

Recruitment of a self-selecting opportunity sample meant that the sample may have included participants who felt confident to share their eating habits and diabetes management, rather than those who felt ashamed of their eating difficulties and experienced the FSL very differently. Participants had also lived with diabetes for significantly varied durations, therefore, for some, their point of comparison for the FSL was historic, rigid self-management practices spanning previous decades that likely impacted their relationship with food. Recruitment from one diabetes service in the UK means that patient experiences from alternative adult diabetes services or clinical teams are not represented.

7. Future research

The current study's qualitative approach to investigating the

relationship between diabetes, disordered eating and FSL use should be repeated with similar sample sizes across multiple centres with the following samples to further our understanding of this novel area: recruitment of young women with T1D who are more at risk of disordered eating (Nielson, Emborg & Mølbak, 2002; [28]); recruitment of patients from racially minoritized backgrounds, based on previous research highlighting differences in diabetes technology use amongst racially minoritized groups [2]; and adolescents with T1D who may have unique experiences of using the FSL to facilitate novel decisions about food without the support of parents.

8. Conclusions

This qualitative exploration has contributed an in-depth understanding of the impact of the FSL on users' relationship with food and eating. This is an important endeavour, not only as diet and lifestyle factors are vital components of lifelong diabetes self-management, but also to encourage consideration of a healthy relationship with food and quality of life among FSL users. This study highlights the vital need for psychologists to be an integrated and essential part of diabetes services, to support diabetes specialist clinicians in tailoring diabetes care to the individual psychosocial needs of patients, including the assessment of eating disturbances and body dissatisfaction. As the advancement of diabetes technologies continues, better understanding of the impact of technology use on eating habits and attitudes, and resultant insulin use, will facilitate earlier intervention for disordered eating, leading to improved long-term diabetes outcomes.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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