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The impact of glucose monitoring devices on relationships with food and eating behaviour for people with type 2 diabetes mellitus: A review of the literature

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ABSTRACT

Background: There is limited understanding of the impact of glucose monitoring technologies on relationships with food and eating behaviours for those with type 2 diabetes mellitus (T2DM).

Aims: With previous reviews focused on T2DM treatment burden and self-management, this review aims to enhance understanding of the impact of flash or continuous glucose monitoring (FGM/CGM) on users' eating behaviours and relationships with food as this can inform important recommendations for CGM use amongst those with T2DM.

Method: A systematic search was conducted across four databases: Scopus, Medline, CINAHL and PubMed, from October–November 2024, following PRISMA guidelines. Studies were quality appraised and qualitative data was synthesized using thematic synthesis.

Findings: Thirteen studies met inclusion criteria and their findings were included in the synthesis. The review revealed that F/CGM enhanced participants' nutritional awareness, supported personalised dietary experimentation, and fostered intentional eating behaviours. However, data overload and emotional burden were also reported, with some users experiencing restrictive or distressing impacts on their relationship with food. These insights inform practical recommendations for CGM implementation with those with T2DM.

Conclusion: Further research should aim to identify factors that contribute to successful adaptation to CGM and explore the long-term effects of CGM use on food relationships.

1. Introduction

Diabetes Mellitus (DM) is widely recognised as one of the most demanding chronic illnesses, requiring continuous monitoring and complex decision-making related to its management (Shrivastava et al. [1]). The prevalence of Type 2 Diabetes Mellitus (T2DM) is predicted to increase globally (Khan et al. [2]), a trend that is consequential, given the associated risks of cardiovascular and microvascular complications, as well as increased mortality (Sanal et al. [3]; Ali et al. [4]).

The risk of developing T2DM can be reduced with nutritional and lifestyle interventions (Salas-Salvadó et al., [5]). For people living with T2DM, typical strategies to manage DM and regulate blood glucose (BG) levels include making changes to lifestyle, including diet and levels of exercise (Salas-Salvadó et al., [5]). Strategies for achieving glycaemic control often involve rigorous dietary self-management, demanding

organisational skills for monitoring food intake and portion sizes (Salvia & Quatromoni, [6]). Management of T2DM is often lifelong and can be burdensome for individuals (Espinoza et al., [7]; Bitterfield & Reed, [8]).

Diabetes technology is continuously developing to support individuals with managing DM. Advances in health technology, such as BG monitoring devices, have reduced the burden of self-management of diabetes (Alcántara-Aragón, [9]; Grant & Golden, [10]). To ensure individuals attain glycaemic control, it is recommended that people track their BG levels through self-monitoring (Heinemann et al., [11]).

Eating behaviour provides an essential role in the prevention and management T2DM. Eating is a global activity, involving both internal and external aspects of an individual, and is necessary for human survival and health (Sobal & Bisogni, [12]). For people with T2DM, dietary restrictions can aid in the prevention of DM complications, as well as

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improve metabolic control (Salas-Salvadó et al., [5]). Therefore, people living with DM are consistently advised to follow a healthy diet and implement life-long dietary modifications, including changes to food choices and meal patterns (Yannakoulia, [13]; Ajala et al., [14]). With human food choice directly influenced by perceptions, beliefs and responses to food-related cues (Mela, [15]), nutrition is closely related to lifestyle, and relationships with food are shaped by the broader social, cultural, and economic environment. Eating behaviour is a complex process between physiological factors and the surrounding food environment (Stover et al., [16]), where both emotions and behaviour influence individuals' eating behaviours. As well as the process of eating and the food and the nutrients consumed, eating behaviour encompasses food preferences, decision-making and patterns of consumption (Yannakoulia, [13]).

2. Purpose of this review

Previous reviews have focused on synthesising literature related to self-management of T2DM and treatment burden (e.g., Wu et al., [17]; Lin et al., [18]; Van Rhoon et al., [19]). However, to date, no systematic review has sought to understand the impact of glucose monitoring technologies on the relationships with food and eating behaviours of those with T2DM. With strategies recommended for achieving glycaemic control often involving rigorous dietary self-management, monitoring food intake and portion sizes, alongside glucose level monitoring, the impact of the introduction of glucose monitoring technology on eating behaviour and relationships to food is important to explore. As eating behaviour is influenced by a complex interplay between physiological, psychological, social, cultural, and economic factors, better understanding of the impact of such technology on this may support the development of practical recommendations for CGM implementation and inform the development of future CGM technologies.

3. Author positioning statement

SM completed this research in partial fulfilment of a doctorate in clinical psychology. JH and TW, both clinical psychologists, supervise research at the intersection of diabetes and disordered eating. Following previous work, they developed particular interest in the impact of diabetes self-management and assistive technology on eating behaviour and relationships to food.

4. Method

The PRISMA protocol for conducting systematic literature reviews informed this review to ensure methodological rigour (Page et al., [20]). Initial consultations with researchers and clinicians in the field of diabetes and eating behaviours informed a pilot search strategy. Following Siddaway et al.'s [21] guidance, the topic was divided into key concepts to generate search terms. A pilot search, conducted in October 2024 using Cumulative Index to Nursing and Allied Health Literature (CINAHL), informed the gathering of commonly used key terms from relevant articles. Variations such as synonyms, plurals, alternate spellings, classification terms, and acronyms were also considered alongside other researchers. If necessary, search terms were truncated to gain variations of words (e.g., perce* = perception, perceived, perceptions), and terms were combined using Boolean operators 'AND'/'OR'.

The final search terms (Table 1) were used to retrieve relevant empirical literature. Systematic searches were conducted, using four bibliographic databases: Scopus, Medline, CINAHL and PubMed, from October to November 2024. These databases were selected as they specialise in disciplines related to health sciences. An additional search using Google Scholar yielded no further articles. Table 2 provides a summary of the inclusion and exclusion criteria employed to ensure that articles included were relevant and able to assist in answering how CGM impacts user's eating behaviour and food relationships. Fig. 1 displays a

Table 1

Search terms.

Concept 1: Terms relating to experiences		Concept 2: Terms relating to glucose monitoring		Concept 3: Terms relating to Type 2 Diabetes
Experience* OR "qualitative" OR "narrative" OR "impact" OR "psychosocial" OR "attitude" OR "opinion" OR "perce*" OR "belie*" OR "feel*" OR OR "know*" OR "understand**"	AND	Glucose monitor* OR "glucose sensor" OR "lingo" OR "biosensor" OR "Freestyle Libre" OR "Abbott" OR "Dexcom" OR "G6" OR "Medtronic" OR "Guardian connect" OR "Guardian sensor" OR "Eversense" OR "Senseonics" "FGM" OR "CGM" OR "FSL" OR "continuous glucose monitor" OR "real-time continuous glucose monitoring" OR "flash glucose monitoring"	AND	"Type 2 diabetes" OR "T2DM" OR "non-insulin dependent"

Table 2

Inclusion and exclusion criteria.

Inclusion criteria	Exclusion criteria
Studies written in English language Peer reviewed journals using qualitative or mixed-method experimental designs	Websites and commentaries, case studies, reviews and conceptual or theoretical articles.
Experiences of glucose monitoring technologies e.g. Flash glucose monitoring, real time continuous glucose monitoring, retrospective continuous glucose monitoring or pumps, glucose monitoring apps	Conceptual, theory, efficacy, or acceptability of flash or continuous glucose monitoring and not relating to experiences.
Experiences of people with Type 2 Diabetes	Experiences of other clinical populations e.g. Type 1 diabetes, Gestational diabetes
Qualitative research (interviews, semi structured interviews, focus group discussion). Mixed-methods research (i.e. questionnaires of qualitative nature with open-ended questions).	Quantitative studies without qualitative component. Studies only investigating improvements in glycaemic control.
Adult (18 or older) or older adult population	Adolescents represent a distinct developmental group with unique clinical, social, and emotional needs. Their experiences with flash and continuous glucose monitoring and food relationships are shaped by parental involvement, unique school environments, and peer contexts, differing substantially from adults. Self-monitoring of blood glucose that does not refer to flash or continuous glucose monitoring.

flow chart of search results and the PRISMA screening process (Page et al., [20]).

The review applied the thematic synthesis approach introduced by Siddaway et al. [21] to construct meaning from the data. This followed a process of familiarisation with the articles, systematically coding both the results and discussion data for each study, and constructing patterns of meaning that specifically addressed the research question. Codes were assimilated and re-configured upon further review of the articles, eventually producing five themes that described the impact of CGM on user's eating behaviour and food relationships.

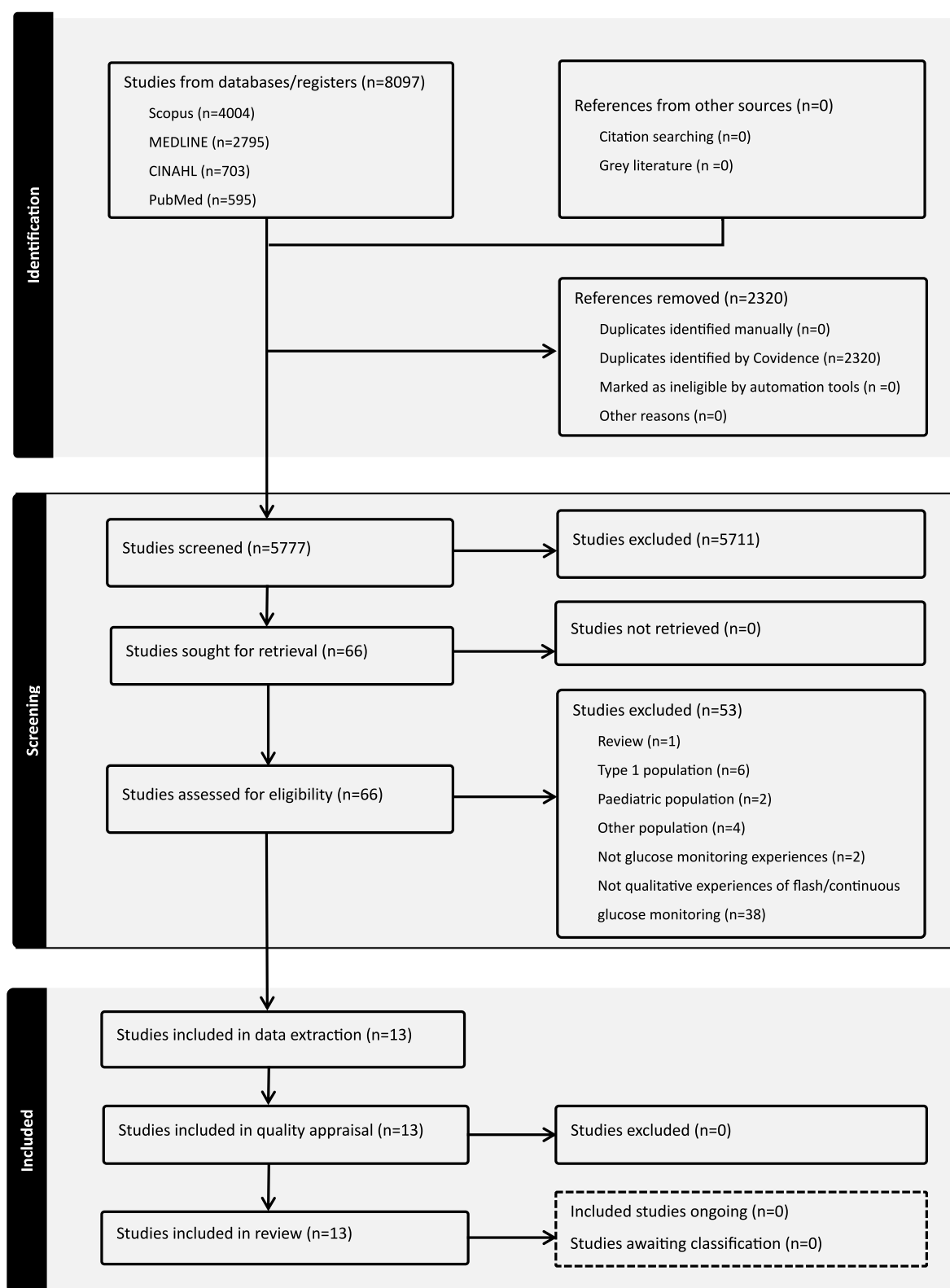


Fig. 1. Prisma flow diagram.

5. Results

5.1. Study selection

The initial search identified 8097 papers; 2320 duplicates were removed upon import into Covidence for management. Title and

abstract screening against the inclusion criteria excluded a further 5,711, with 66 articles remaining for full-text screening. Overall, 13 studies met the criteria for inclusion in the review. The reference lists of selected articles were reviewed for studies that met the inclusion criteria but no additional studies were identified.

Eleven studies used qualitative designs, one employed mixed

Table 3
Data extraction.

Author(s) and year	Participant Characteristics	Study Design	Glucose Monitoring Technology
Bults et al. [22]	n = 25, mean age: 63 (SD 7.6, range 47-77). Female (52%), Male (48%) Ethnicity: Not reported. More than half (14/25, 56%) of co-researchers had been diagnosed with T2DM $\geq$ 10 years ago.	Semi-structured interviews and focus groups.	Four mobile health apps for control and self-management of T2DM. Clear.bio and FreeStyle Libre (FSL), mySugr, MiGuide & Selfcare
Chiu et al. [23]	n = 20, range 53-72. Male (65%), Female (35%). Ethnicity: Taiwanese.	Semi-structured interviews on day of continuous glucose monitor (CGM) removal and at 3 months after CGM-based counselling.	CGM (iPro 2)
Clark et al. [24]	n = 34, mean age = 58.9. Male (59%), Female (41%). Graduated college (39%). Ethnicity: Non-Hispanic white (91%).	In-depth, semi-structured interviews were conducted with adults with T2DM who had used CGM for 3–6 months.	Dexcom G6
Eer et al. [25]	n = 8. Mean age = 56 (35-75). Male (62.5%). Female (37.5%). Ethnicity: Indigenous Australians.	Feasibility study, nested within a 6-month, non-blinded, randomised controlled trial (RCT) pilot study comparing effectiveness of FGM to self-monitoring of blood glucose.	Flash glucose monitor (FGM) (Abbott Freestyle Libre 1)
Fritschi et al. [26]	n = 8. Mean age = 68 $\pm$ 5.2. Female (100%). Ethnicity: Black African American.	Semi-structured interviews and small-scale acceptability trial.	CGM and Fitbit devices
Griauzde et al. [27]	RCT Participants: n = 1584. Mean age = 63.3. Female (46.71%). Male (53.26%). Ethnicity: Not reported. Enhanced Care-High Risk qualitative arm participants: n = 61, with n = 21 participating in semi-structured interviews.	RCT 1. 12-month randomised Quality-Improvement program. 2. Semi-structured interviews and thematic analysis of Enhanced Care-High Risk arm.	CGM
Johnston et al. [28]	Interview participants: n = 10. Demographic information not reported. Survey participants: n = 84. Male (64%). Female (36%). Mean age = 60. College graduates (64%). Ethnicity: Caucasian (93%). N = 10 participants completed the interview.	Mixed-methods study. 1. Semi-structured interviews. 2. Cross-sectional survey	FSL CGM (80%), Dexcom CGM (20%).
Litchman et al. [29]	n = 26. Males (38%). Females (62%). Mean age = 45.8 $\pm$ 9.5 years. High school education or less (57.7%) Ethnicity: Hispanic adults.	Semi-structured interviews.	CGM
Ni et al. [30]	n = 28. Median age = 56 (48-60). Male (25%). Female (75%). Ethnicity: Hispanic (57%), Non-Hispanic white (21%), Non-Hispanic Black (18%), Non-Hispanic Asian (3.6%).	Semi-structured interviews.	FSL and FSL 2 CGM
Sergel-Stringer et al. [31]	n = 12. Median = 55. Range (37-64). Male (33%). Female (67%). Ethnicity: New Zealand European (83%), Māori (17%).	Qualitative study nested within RCT. Semi-structured interviews.	Dexcom G6, real-time-CGM
Shin et al. [32]	n = 28. Mean age = 51.4. Range: Not reported. Male (39.3%). Female (60.7%). Ethnicity: Not reported.	Semi-structured interviews.	CGM
Vallis et al. [33]	n = 13. Mean age: Not reported. Range: 84.6% between 25 and 65, 15.4% > 65. Male (15.4%). Female (84.6%). Ethnicity: Not reported.	Semi-structured interviews.	FSL, FSL 2 FGM or Dexcom CGM
van Leersum et al. [34]	n = 25. Male (48%). Female (52%). Age: 30-70+ across 3 steps. Ethnicity: Not reported. Nationality: Dutch.	1. Semi-structured interviews 2. Focus groups to discuss self-management tasks, roles, and challenges. 3. App testing phase, including: Pre-use interviews, eHealth app trial period (4 apps), post-use focus groups.	Four eHealth apps using glucose monitoring.

Abbreviations: T2DM: Type 2 Diabetes Mellitus; FSL: FreeStyle Libre; CGM: Continuous glucose monitor; FGM: Flash glucose monitor; RCT: Randomised controlled trial.

methods, and one was a randomised controlled trial (RCT) with a qualitative arm. Only the qualitative results reported by the studies were included in this systematic literature review. Table 3 presents a summary of each articles' key findings and characteristics.

5.2. Study aims

The 13 articles broadly examined experiences of people with T2DM who were using CGM. Two studies explored the experiences of people using e-health apps that measured glucose (Bults et al., [22]; van Leersum et al., [34]). Five studies explicitly explored changes in attitudes and behaviours at the end of a trial involving glucose monitoring (Clark et al., [24]; Sergel-Stringer et al., [31]; Vallis et al., [33]) and follow-up (Bults et al., [22]; Chiu et al., [23]). Four studies further explored the feasibility and acceptability of CGM (Chiu et al., [23]; Eer et al., [25]; Fritshi et al., [26]; Litchman et al., [29]). Three studies explored the impact of combining CGM with additional approaches, such as T2DM self-management education and support (Fritshi et al., [26]), an online peer support community (Litchman et al., [29]) and personalised low-carbohydrate nutrition counselling (Griauzde et al., [27]). One study further explored the impact of CGM and nutrition counselling on changes to HbA1c from baseline and at 12 months (Griauzde et al., [27]).

5.3. Assessment of study quality

Studies included in the review were quality assessed using three method-specific quality appraisal tools. The eight qualitative studies were evaluated using the Critical Appraisal Skills Programme (CASP) tool. The three mixed methods studies were assessed using the Mixed Methods Appraisal Tool (MMAT; Hong et al., [35]). Both RCTs were appraised using the CASP Checklist for RCTs. No articles were assessed as being poor quality such that their findings should be excluded from the synthesis. However, a notable finding was the absence of researcher reflexivity across all articles. Specifically, authors did not discuss their positionality, the contexts from which they approached the research, or how their experiences and perspectives may have influenced the study process or interpretation. This gap is an important consideration, as it may shape how findings are developed and reported, also influencing the ability to embed reflexivity throughout the review process.

5.4. Synthesis of findings

Through thematic synthesis (Siddaway et al., [21]), five themes that described the impact of CGM on user's eating behaviour and food relationships were constructed from the reviewed articles: Navigating the nutritional landscape; Eating by experiment; Intentional eating; Data overload; and CGM burden.

5.5. Navigating the Nutritional Landscape

In all 13 articles, participants described how CGM supported their ability to navigate their nutritional needs more effectively than with self-monitoring of blood glucose via finger prick. Overall, CGM enhanced awareness of BG level fluctuations, with comparisons to baseline rates also fostering motivation to make dietary changes. In particular, the visualisation of bodily information supported participants to better understand the association between nutrition and BG levels (Bults et al., [22]; Chiu et al., [23]; Clark et al., [24]; Fritshi et al., [26]; Griauzde et al., [27]; Johnston et al., [28]; Ni et al., [30]; Sergel-Stringer et al., [31]; Shin et al., [32]; Vallis et al., [33]; van Leersum et al., [34]). Participants described how their ability to visualise data supported their understanding of their unique bodily patterns (Bults et al., [22]; van Leersum et al., [34]) and asymptomatic periods out of range (Ni et al., [30]). The visualisation feature also supported participants to develop an understanding of their windows of food

sensitivity, which previously went unrecognised (Fritshi et al., [26]). The ability to retrospectively review visual data over periods of time supported further clarity and pattern recognition, increasing users' awareness of the distance between actual and goal levels of BG and motivating healthier eating across seven articles (Chiu et al., [23]; Clark et al., [24]; Fritshi et al., [26]; Sergel-Stringer et al., [31]; Shin et al., [32]; Vallis et al., [33]; van Leersum et al., [34]).

The positive reinforcement of continuous, instantaneous feedback on the association between BG and eating behaviours increased users' sense of agency in managing their condition, encouraging attitudinal shifts (Chiu et al., [23]), and reinforcing adaptive dietary changes (Vallis et al., [33]). Immediate, detailed feedback from CGM also promoted greater engagement with T2DM management, with participants increasing their monitoring of BG levels (Clark et al., [24]; Fritshi et al., [26]; Vallis et al., [33]). Furthermore, alarms and visual negative feedback alerted participants to areas where they could consider making changes to their diet (Fritshi et al., [26]; Johnston et al., [28]; Vallis et al., [33]; Ni et al., [30]). Altogether, the CGM supported participants' insight regarding how their bodies interacted with food, enabling users to develop a baseline understanding of their nutritional needs and increasing coherence around their food relationships.

5.6. Eating by experiment

The influence of CGM directly informing dietary intake was reported across all 13 articles. Participants described using the continuous data from the CGM to experiment with different foods in real-time, observing the impact on their BG levels and then using this information to inform whether they should keep or cut foods. This led to surprising discoveries, such as the impact of fruit on BG (Shin et al., [32]).

CGM was influential in directing users' relationships with foods, acting as an adjudicator in food decision-making (Clark et al., [24]; Griauzde et al., [27]; Shin et al., [32]). Participants appreciated the personalised approach to decision-making afforded by the data, which could aid recognition of deviations in BG that were outside of their usual fluctuations (Griauzde et al., [27]; Litchman et al., [29]), and they appreciated being alerted as to when to refrain from certain foods (Fritshi et al., [26]; van Leersum et al., [34]).

Participants also described developing a greater appreciation and curiosity for foods that flattened their BG trend lines (Clark et al., [24]; Eer et al., [25]; Johnston et al., [28]; Litchman et al., [29]; Shin et al., [32]; van Leersum et al., [34]; Chiu et al., [23]). Exemplifying this, participants' relationship with snacking shifted incrementally across three studies (Chiu et al., [23]; Clark et al., [24]; Fritshi et al., [26]). Participants reduced their food intake and developed a preference for snacks that were more fibrous and protein-rich, as opposed to sugary (Clark et al., [24]). Participants also used healthy snacks to help manage their overall portion sizes (Clark et al., [24]), illustrating a trend towards grazing eating behaviours and reduced portion sizes; such changes to food relationships were described across seven studies (Chiu et al., [23]; Clark et al., [24]; Eer et al., [25]; Griauzde et al., [27]; Litchman et al., [29]; Ni et al., [30]; Shin et al., [32]). Participants specifically described decisions to reduce the amount of carbohydrates in their food portions (Griauzde et al., [27]) and choosing to reduce portion sizes, even when they were not necessarily changing dietary choices (Shin et al., [32]). Overall, CGM appeared to increase participants' discernment, introducing a quantifiable, scientifically informed approach to food relationships.

5.7. Intentional Eating

Across 12 articles, CGM supported the development of accountability and attentiveness to dietary intake, empowering users' relationships with food. The CGM was reported to be both intuitive and convenient (Sergel-Stringer et al., [31]; Shin et al., [32]) which, as hypothesised by Sergel-Stringer et al. [31], may be associated with widespread increases

in frequency of BG measurement (Chiu et al., [23]; Eer et al., [25]; Griauzde et al., [27]; Johnston et al., [28]; Sergel-Stringer et al., [31]). Participants described feeling more able to effectively plan meals (Chiu et al., [23]; Litchman et al., [29]), which encouraged more active engagement with their dietary needs (Clark et al., [24]; Fritshi et al., [26]; Griauzde et al., [27]; Shin et al., [32]; Litchman et al., [29]).

Across seven studies (Chiu et al., [23]; Clark et al., [24]; Eer et al., [25]; Griauzde et al., [27]; Ni et al., [30]; Shin et al., [32]; Vallis et al., [33]), participants described how CGM enhanced their confidence with food. Participants' enhanced familiarity with their BG levels may have encouraged more relaxed (Chiu et al., [23]; Clark et al., [24]; Vallis et al., [33]), flexible (Griauzde et al., [27]; Ni et al., [30]) and self-reliant eating styles (Eer et al., [25]). Overall, CGM encouraged participants to conscientiously interact with food, supporting a sense of self-assurance and organisation in their eating behaviours.

5.8. Data overload

Seven studies introduced narratives suggesting that CGM could potentially impact user's relationship with food and eating in ways that may be restrictive, burdensome, or potentially risky (Chiu et al., [23]; Clark et al., [24]; Eer et al., [25]; Griauzde et al., [27]; Litchman et al., [29]; Ni et al., [30]; van Leersum et al., [34]). Griauzde et al. [27] recognised that, although CGM can empower and motivate participants, it could also increase diabetes-related distress. Participants reported a dependence on CGM to know what to eat, when, and how much to eat, potentially forming rigid rules for eating behaviours (Clark et al., [24]). Participants also described how the CGM could draw too much attention to diet, experiencing it as being overly restrictive (Griauzde et al., [27]). The increasing dependence on data meant that participants sometimes felt encouraged to skip meals to maintain time in range (Chiu et al., [23]), impacting on intuitive eating habits (Litchman et al., [29]).

Participants could find the CGM data confusing: "I was completely lost when the scores of my previous meal showed" (Bults et al., [22], p.7). van Leersum et al. [34] reflected on how outputs from the CGM could cause confusion if users were unsure about how to interpret the data, which could risk negatively impacting user's food relationships. They suggest that false-positive healthy messages from the CGM could inadvertently reinforce risky eating dynamics, and over-acting on information. Particularly in the absence of support and knowledge, over-dependence on CGM could encourage food practices that are too restrictive and critical, damaging food relationships.

5.9. CGM burden

Participants across five studies reflected on the cognitive and emotional cost of trying to maintain high levels of glycaemic control with CGM (Chiu et al., [23]; Eer et al., [25]; Griauzde et al., [27]; Ni et al., [32]; van Leersum et al., [34]). Participants described how the burden of recording nutritional information had increased routine management behaviours (Chiu et al., [23]). Participants frequently described how the CGM could impact on their emotional wellbeing, with users experiencing frustration (Ni et al., [30]) and overwhelm (van Leersum et al., [34]). Closely connected to these experiences, participants described a sense of demoralisation after receiving CGM feedback, particularly if they felt they had already made significant efforts to improve their glycaemic control: "Honestly sometimes it's useful and sometimes it's annoying and aggravating. I'm trying to change my diet all the time, as much as possible" (Ni et al., [30], p.6). Overall, the re-conceptualisation of food as data introduced complications for participants' food relationships, sometimes introducing additional dietary restriction, complexity, and ambiguity, impacting on their confidence and their emotional experience with food.

6. Discussion

T2DM is a chronic metabolic disorder whereby management recommendations are often centred around diet, lifestyle, and medication. Recent advances in health technologies mean that CGM can be available to patients with T2DM, but research into their experiences of using this technology is limited. This rigorously conducted systematic literature review was the first to examine the impact of CGM on food relationships and eating behaviours in the T2DM population. Thematic synthesis developed five themes conceptualising shared experiences in enhancing food clarity and motivation (*Theme 1: Navigating the Nutritional Landscape*), scientifically informed eating behaviours (*Theme 2: Eating by Experiment*), assertive food approaches (*Theme 3: Intentional Eating*) and insight regarding the potential costs of increasing reliance on CGM (*Theme 4: Data Overload and Theme 5: CGM burden*).

CGM users valued how visualisation of glycaemic control supported their understanding of nutrition. This enabled better understanding of their unique bodily patterns of functioning, including windows of food sensitivity and asymptomatic periods out of target range. Within the contemporary healthcare context, professionals are increasingly reliant on data visualisation tools to effectively identify patterns, outliers and reach data-driven decisions (Sarker, [36]). These approaches have been found to produce more successful data analysis and decision-making within healthcare (Wang et al., [37]). This literature review suggests that CGM users were able to make sense of visual data in a way that was intuitive and enhanced their understanding of their nutritional needs.

The mechanism of continuous feedback from CGM also supported participants in their ability to enact behavioural change in their diets. These findings align with the wider literature for continuous feedback supporting behavioural change in dietary healthcare contexts. The 12-week MyPlanetDiet RCT found that personalisation of dietary feedback and nutritional needs were more efficacious and sustainable for dietary change in comparison to generic advice (Davies et al., [38]). Furthermore, Schembre et al.'s [39] systematic review of RCT and within-subjects, single-arm interventions explored the content of feedback in diet and physical activity interventions. They found that when device feedback was continuously available, personalised, and actionable, it produced significant behavioural change outcomes as users were able to see the direct impact of their food choices and adjust behaviour accordingly.

The literature suggests that the process of logging food choices, clarifying personalised diet goals and applying insights into meal planning contributes to participants' sense of accountability and confidence with food (Wallace et al., [40]). Similar was found in the general population by Wallace et al. [40], and Natale et al.'s [41] systematic review of patient experiences with CGM and sensor-augmented insulin pump therapy, across T1DM and T2DM, found that CGM was particularly effective in motivating management through supporting ownership and enhancing awareness of glycaemic control. Patients also developed confidence in managing DM through developing operational skills, customising settings and increasing trust in the technology, suggesting that increased self-management accountability via CGM is universal across T1DM and T2DM.

This review identified that some participants experienced restrictive food relationships and cognitive and emotional burden when attempting to maintain precise glycaemic control. In the REPLACE RCT of 224 adults with T2DM from 26 European diabetes centres, patients under 65 years of age saw a greater reduction in HbA1c in the intervention group (flash glucose monitoring) whereas patients over 65 saw a greater reduction in HbA1c in the control group (self-monitoring BG via finger prick) (Haak et al., [42]). This may indicate that the burden of glucose monitoring technologies may be experienced more acutely by older populations, and that further research may be needed to better understand how to adapt technologies and improve support across the lifespan. This is particularly pertinent as DM is a recognised risk factor for cognitive impairment, with the combined prevalence of mild cognitive

impairment in T2DM being estimated to be as high as 45% within a systematic review and meta-analysis of observational studies (You et al., [43]).

7. Limitations

Despite this literature review employing a highly systematic, comprehensive search strategy and robust methodology, synthesising qualitative results to ensure a focused exploration of lived experiences, all included studies failed to report on researcher reflexivity, a fundamental element of rigor in qualitative research. The inability to assess potential researcher bias in theme interpretation is a limitation of this thematic synthesis due to the quality of reporting of the primary research. Some variability was also noted between studies regarding how food relationships were defined and operationalised by researchers, although the literature review was able to account for this variability using clear, predefined inclusion criteria.

Only peer-reviewed studies written in English were included in this review, which may reduce the representation of food relationships from a global perspective. Four of the studies included were from countries where English is not the predominant language (i.e., Netherlands: Bults et al., [22]; van Leersum et al., [34]; South Korea: Shin et al., [32]; Taiwan: Chiu et al., [23]). However, all included studies were located in the global north, with the synthesis likely to have been influenced by western, educated, industrialised, rich, and democratic (WEIRD) socio-cultural and healthcare contexts. WEIRD contexts influence how T2DM is diagnosed and managed, as well as the predominant discourses surrounding the condition. Consequently, the findings may not reflect the experiences of people living with T2DM from the global majority, where factors such as food availability and dietary differences, cultural meanings of eating, healthcare access, and family involvement in care may differ substantially.

Finally, five of the studies did not report ethnicity, limiting assessment and understanding of the diversity of the dataset. However, the remaining eight studies broadly reflected a wide range of ethnicities, age ranges, and education levels, improving heterogeneity of the overall sample when considering all studies combined.

8. Implications and recommendations

Access to CGM for the T2DM population is not currently routine in the UK healthcare context (Ajjan et al., [44]). However, this review identified that adults with T2DM found that CGM improved their understanding of the relationship between food and their glycaemic control, increasing their sense of accountability and attentiveness to foods, thereby enhancing their motivation for dietary behavioural change with increased confidence in dietary decision-making. With CGM introducing possibilities for participants to remarkably re-shape their relationships with food and T2DM management, these clinically relevant findings mean that access to CGM should be improved for the T2DM population.

The review found that some participants experienced CGM as time-consuming, frustrating, confusing, and technologically demanding, increasing the burden of daily T2DM management behaviours. Thus, healthcare professionals should collaboratively develop goals with patients utilising CGM data, whilst modelling compassionate approaches to T2DM management. Patients being introduced to CGM should be fully informed about the demands of its use, including the potential burden of managing continuous data, alarm fatigue, and how to engage in realistic, and sustainable data interpretation routines. Healthcare professionals should also use standardised measures of diabetes distress to review areas of challenge within clinical appointments.

Future research should aim to clarify factors that support adaptive adjustment to CGM use. For example, exploration of the benefits of pairing CGM with psychosocial interventions, such as compassionate nutrition training, in comparison to CGM alone, to effectively address the needs of the T2DM population.

9. Conclusion

Overall, the reviewed literature indicates that CGM supports people with T2DM to make better sense of their glycaemic control, shedding light on complex bodily processes. CGM supported their ability and motivation to engage with their dietary needs, introducing possibilities to experiment with food choices, and increasing T2DM-management confidence. However, the process of re-appraising food through the lens of data can increase burden of T2DM management. These findings suggest that increased access to CGM could better support the needs of the T2DM population and clinical outcomes, although there is a need for compassionate support from clinicians to mitigate against increased burden and data overwhelm.

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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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