Family behaviours that impact on the self-management activities of adults living with Type 2 Diabetes: a systematic review and meta-synthesis

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Abstract

Background: Research suggests that adults with type 2 diabetes perceive family members to have an important impact on their self-management. However, it is unclear which family behaviours are perceived to influence self-management practices.

Aims: To identify family behaviours that adults with type 2 diabetes' perceive as impacting on their diabetes self-management.

Methods: This meta-synthesis identified and synthesised qualitative studies from the databases EMBASE, Medline and CINALH published between 2000 to October-2016. Studies were eligible if they reported direct quotes from adults with type 2 diabetes describing the influence of families on their self-management. This meta-synthesis adheres to the PRISMA statement.

Results: From 2606 studies screened, 40 were included. This meta-synthesis identified that adults with type 2 diabetes perceive family behaviours to be either: 1) '*facilitators to diabetes self-management'*, 2) '*barriers to diabetes self-management' or* 3) *'equivocal' behaviours with the potential to both support and/or impede diabetes self-management'*. Seven sub-themes were identified within these themes, including: four facilitator sub-themes ('positive care partnerships'; 'family watchfulness'; 'families as extrinsic motivator' and 'independence from family'); two barrier sub-themes ('obstructive behaviours' and 'limited capacity for family support'); and one equivocal behaviours subtheme ('regular reminders and/or nagging').

Conclusion: While most family behaviours are unambiguously perceived by adults with type 2 diabetes to act as facilitators or barriers to self-management, some behaviours were perceived as being neither clear facilitators nor barriers, which were termed 'equivocal' behaviours. If the concept of 'equivocal behaviours' is confirmed, it may be possible to get the adult living with type 2 diabetes to reframe these behaviours so that they are perceived as enabling their diabetes self-management.

Introduction

Effective self-management is crucial to adults living with type 2 diabetes. Self-management helps maintain wellbeing and reduces the risk of secondary complications, such as diabetic retinopathy, cardiovascular diseases, peripheral arterial disease, and amputation (1). Adherence to a diabetes self-management plan has been associated with health literacy, motivation, self-efficacy, mental health, and environmental factors such as social support and socio-economic status (2, 3). A number of adults with type 2 diabetes report already receiving diabetes-related support by family members (4, 5), and many diabetes education interventions have involved families to actively support adults living with type 2 diabetes with their self-management plan (6, 7).

Lorig's model for chronic disease self-management (8) and the WHO framework for Innovative Care for Chronic Conditions (9) both identify that families and other social networks are valuable in promoting positive health outcomes. Yet, neither conceptual model/framework provides a clear explanation or theoretical basis for how families can provide effective support. Commonly cited theoretical models in previous family-interventions in diabetes are the Social Cognitive (10) and Family Systems Theory (11) models. However, both of these models focus on parent-child interactions or educator-student interactions rather than adult-family interactions (12, 13).

In a joint statement, both the American Diabetes Association and the European Association for the Study of Diabetes have called for diabetes self-management interventions to focus on family behaviours that reflect person-centred experiences (14). In previous intervention studies aimed at improving self-management of type 2 diabetes, the involvement of family members has had inconsistent effects (12, 15), primarily due to a failure to: adopt appropriate family behavioural change theoretical or conceptual frameworks (12); acknowledge the complexities of family dynamics (12); and/or implement a person-centred intervention (12, 14, 15).

Nonetheless, many qualitative and quantitative observational studies have reported that families can be influential to diabetes self-management (16-22), and some have measured an association between family behaviours and diabetes self-management (23-27). An examination of this evidence is required to provide greater insights to optimise families' involvement in diabetes self-management (12, 15). Qualitative research offers special potential for understanding perceptions

underpinning behaviours associated with self-management, especially with regard to complex social phenomena such as family relationships (28). A qualitative approach also allows for the voice of adults living with type 2 diabetes to be prioritised, which is necessary to targeting family behaviours they identify as relevant to their diabetes.

Identification of these family behaviours as perceived by adults living with type 2 diabetes, and how they impact self-management is an important first step to designing better person-centred self-management interventions involving family members.

Aim

To identify family behaviours that impact on adults living with type 2 diabetes self-management practices.

Methods

Design: Systematic review and meta-synthesis. Meta-syntheses allows for analysis of qualitative data across studies to generate greater meaning through a systematic and rigorous approach (29). Meta-synthesis is increasingly used in psychosocial and behavioural research to heighten the contributions of many studies into more formalised evidence (30). This meta-synthesis adopted a person-centred approach to ensure that the perceptions of adults with type 2 diabetes rather than families or health professionals, were privileged. Only raw data ('quotes') from included qualitative studies were considered, rather than the authors' interpretations, so as to prioritise the 'voice' of adults with diabetes (31). This systematic review and meta-synthesis is reported in accordance with the PRISMA Statement (32).

Study eligibility

Studies were eligible for inclusion if they were published in the English peer review literature between 2000 and October 2016, and reported empirical qualitative data citing raw quote(s) from adults living with type 2 diabetes. The quotes needed to describe perceptions and/or experiences of their families' behaviours and contributions to their diabetes self-management. The year 2000 was decided as a cut-off date to account for changes in lifestyle, culture, health care over time. 'Family' was defined as whomever participants described as family (12, 33). 'Family behaviours'

were defined as any action exhibited by family members that the person with diabetes identified as impacting on their diabetes self-management practices. Participant experiences that referred to 'friends', 'co-workers', or 'neighbours' were excluded.

Search strategy

The databases CINAHL, Medline, and Embase were searched for studies using the terms: diabet* (title-only), famil* (keyword), and self-management and its synonyms, which included self-care, secondary prevention, and health promotion (keyword). The search strategy was planned and conducted in consultation with a university health librarian.

Study selection

Ten percent of titles and abstracts were screened against inclusion criteria by two reviewers (JV and TL), with full-text obtained when necessary to deciding on its eligibility. Following 96.8% agreement, further screening was conducted by one reviewer alone (JV).

Data extraction

The aims, data collection methods, and sample characteristics of each study, along with the raw data ('quotes'), were extracted and imported into the software Nvivo™ for management and analysis (34).

Quality assessment:

The Critical Appraisal Skills Programme (CASP) was applied by one reviewer (JV) to assess the credibility and rigour of the pool of included studies (35). The quality assessment played no role in the synthesis.

Synthesis

The qualitative data was analysed using Thomas and Harden's (36) three-stage thematic synthesis approach (36). During the first stage ('coding text'), any quotations describing perceptions of family behaviours relating to diabetes self-management were identified. The second stage ('developing descriptive themes') was to assign the relevant data identified from stage 1 (participant quotations) into a descriptive category (a node) (36). The nodes were labelled according to the characteristics of the family behaviours relating to diabetes self-management. The

final stage involved the nodes being categorised inductively into broader categories ('generation of analytical themes')(36).

Family behaviours were classified as 'enabling', 'reinforcing', and/or 'predisposing' behaviours to provide additional depth on how these interactions function to impact diabetes self-management (37, 38). Predisposing behaviours were defined as family behaviours that motivated or hindered an individual's capacity for behaviour change (37, 38). Reinforcing behaviours were defined as the negative or positive feedback adults with type 2 diabetes experienced as consequence to their specific behaviour(s) (37, 38). Enabling behaviours included the presence or absence of a particular resource that led to specific behaviours (37, 38). Classification of identified family behaviours into the three domains was determined by two independent reviewers (JV and JLP).

Findings

Description of studies

The initial search identified 1639 articles, of which 40 studies met the final inclusion criteria (Figure 1). More than half the studies were conducted in high income countries (n=25) (Table 1) (39). Half (n=22) of the studies focused on culturally and linguistically diverse or disadvantaged populations.

Collectively, studies included 829 adult participants with diabetes, with a median of 23 (interquartile range of: 13, 30) participants per study. Participants were mostly women (63.5%), and had a mean age of 58.6 (± 5.8) years. Ten studies specifically investigated the experience of adults with type 2 diabetes regarding the influence of family members on their diabetes management (16-22, 40-42). Some studies that were not aimed at investigating family members also provided substantial contributions to the development of the themes (43-46). These studies focused on the broader experience of adults with diabetes, while a few studies examined single self-management activities, such as diet (47), exercise (46), or smoking cessation (48) (Supplementary Table 1).

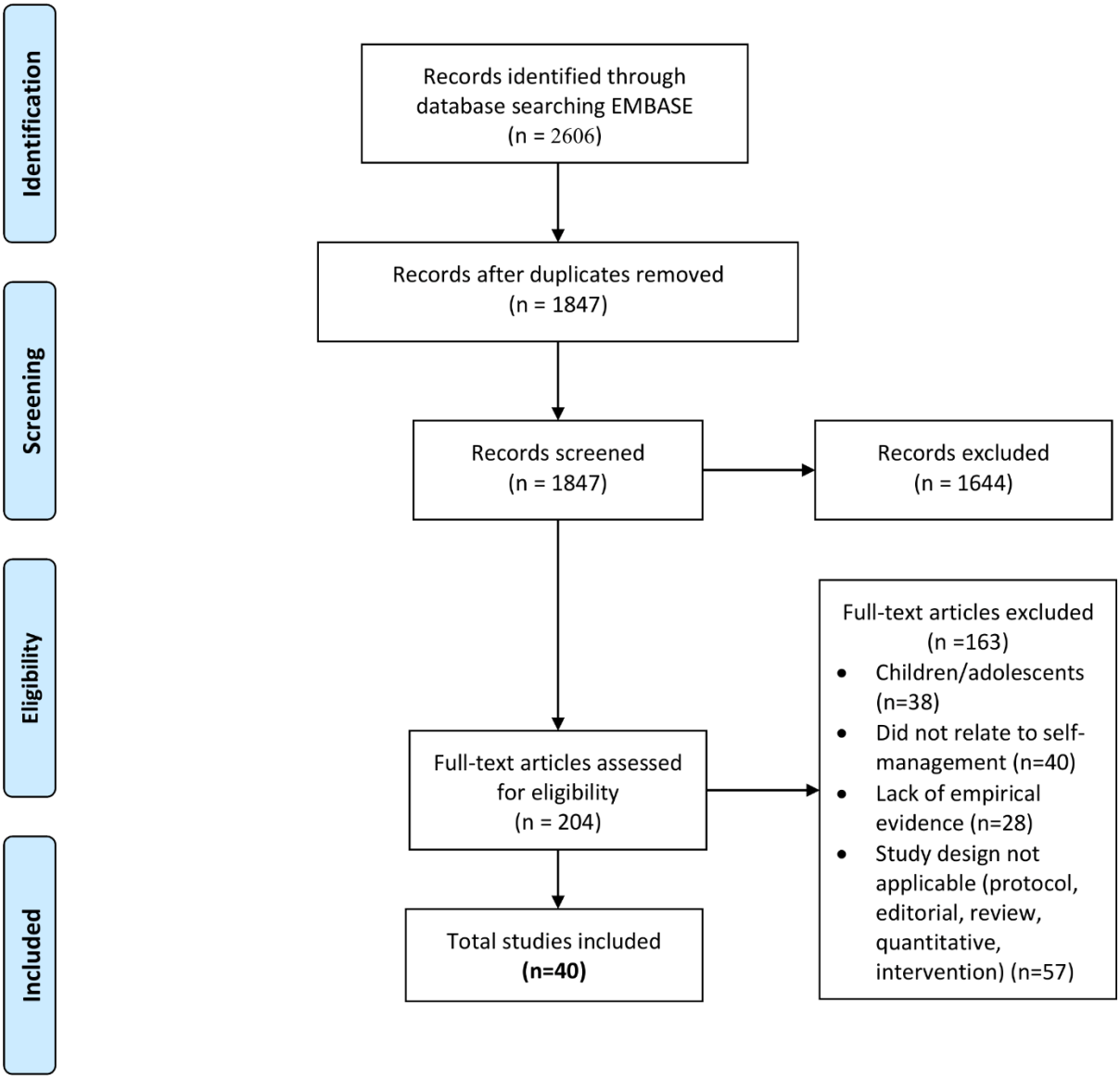

Figure 1 PRISMA flow chart

Table 1 Summary of included studies

Author, year, and country	Population focus	Sample	Gender (% men) and age	Data collection
Benavides-Vaello et al. 2016[46]	Mexican-Americans	N=12	0% men	Semi-structured interviews

America			52.8 range 47-60 years	
Joo et al. 2016[48] America	Migrant elderly Koreans	N=23	52.2% men 68.5±2.5 years	Focus group interviews, and semi-structured interviews
Mayberry et al. 2016[17] America	Low socio economic population	N= 15	26.7% men 58.7±8.1 years	Structured focus group interviews
Seawell et al. 2016[49] USA	Black Americans	N=10	100% men Age unreported	Semi-structured focus group interviews
Shirazian et al. 2016 [50] America	N/A	N=23	60.8% men 64±NA years	Semi-structured focus group interviews
Carolan et al. 2015[51] Australia	Adults of socially and economically disadvantaged backgrounds	N= 22	45% men Age range: 40 to >70 years	Semi-structured focus group interviews
Chau et al. 2015[47] Hong Kong	N/A	N=42	92.9% men 60.3±11.3 years	Focus groups and individual semi-structured interviews

Choi et al. 2015[18] America	Korean migrants	N=33	50% men 68.1±7.9 years	Semi-structured interviews
Juárez-Ramírez et al. 2015 [52] Mexico	Social and economically marginalised peoples	N=25	17.4% men 56.6±10.8 years	Semi-structured interviews
Laranjo et al. 2015[53]	N/A	N=16	43.7% men 64.0±NA years	Focus groups
Majeed-Ariss et al. 2015 [54] England	British Pakistani women	N= 15	0% men Age range: 31-76 years	Semi-structured interviews
Jowsey et al. 2014[55] Australia	N/A	N=27	54% men Age ranged: 34-85 years	Semi-structured interviews
Oftedal et al. 2014[19] Norway	N/A	N=19	63% men 52.3±NA years	Semi- structured focus group interviews.
Thompson et al. 2014[44] USA	N/A	N=8	62.5% men 34-78 years	Used participant-generated photographs to elicit responses to a semi-structured interview
Hu et al. 2013[20] America	Hispanic immigrants	N=36	25% men 50±10.77 years	Free flowing focus groups

Li et al. 2013[56] Singapore	Elderly women	N=10	0% men 60-69 years	Semi-structured interviews
Nam et al. 2013[57] America	Korean immigrants	N=23	60.9% men 58.5±7.3 years	Semi-structured focus group interviews
Park et al. 2013[43] Korea	Women only study	N=10	0% men 51.8±NA years	Semi-structured interviews
Samuel-Hodge et al. 2013[21] USA	African Americans	N=35	19% men 64.0±2.5 years	Focus groups
Belue et al. 2012[42] Senegal	N/A	N=54	35% men 51.8±3.4 years	Semi-structured interviews
Gunn et al. 2012[58] England	Type 1 and 2 diabetes hospitalized due to diabetes related crisis	N=45	57% men Age range 30 to >60 years	Semi-structured interviews
Lundberg et al. 2012[59] Thailand	N/A	N=30	36.6% men 52.3 (28-79) years	Semi-structured interviews
Mathew et al. 2012[60] Canada	N/A	N=35	48.6% men 55±NA years	Structured focus group interviews or individual telephone interviews
Mayberry et al. 2012[41] America	N/A	N=61	31% men 57.1±8.6 years	Semi-structured interviews

Muchiri et al. 2012[61] South Africa	Rural low income population	N=31	10% men 55.7 (41-65) years	Semi-structured focus group interviews
Ramal et al. 2012[62] America	Low socioeconomic Hispanics	N=27	22.2% men Age unreported	Semi-structured focus group interviews
Chun et al. 2011[63] American	Chinese migrants	N=20	40% men 62± 9.2 years	Semi-structured interviews
Guell et al. 2011[22] Germany	Turkish migrants	N=7	Age and gender unreported	Semi-structured flexible interviews
Madden et al. 2011[64] America	Medically uninsured patients with diabetes	N=26	34.6% men 50.6±NA years	Semi-structured interviews
Beverly et al. 2010[45] America	Americans	N= 30	70.0% men 66.7±8.40 years	Semi-structured focus groups
Weiler et al. 2009[16] America	Latinos	N=10	40% men 56.5 (46-65) years	Semi-structured interviews
Abdoli et al. 2008[65] Iran	N/A	N=11	36% men Age unreported	In-depth unstructured interviews
Finucane et al. 2008[66] America	Filipino Americans	N=17	20% men 50.7±N/A	Semi-structured focus groups and interviews
Wellard et al. 2008[67] Australia	Adults living in regional areas	N=4	25% men 55-65 years	Semi-structured interviews

Kokanovic et al. 2006[68] Australia	Culturally and linguistically diverse migrants	N=16	Age and gender unreported	Free flowing interviews
Lohri-Posey et al. 2006[69] America	Rural	N= 13	46% men 49±NA years	Unstructured interviews
Rafique et al. 2006[39] Pakistan	N/A	N= 27	40.7% men 44.4 (18-70) years	Semi-structured interviews
Vincent et al. 2006[70] USA	Latino, Hispanic, Chicano or Mexican population	N= 20	25% men 53.0 (27-73) years	Semi-structured focus groups interviews
Huang et al. 2005[71] America	Elderly adults	N=28	43% men 74 years (65 to 88)	Semi-structured interviews
Carter-Edwards et al. 2004[40] America	African American women	N=12	0% men 49.3±NA years	Semi-structured interviews

Quality assessment

The quality of the studies was variable. Most studies clearly described their research aims, design and methodology. However, only a few described their study setting (18-22, 40, 41, 43, 45, 52, 61, 63-65, 68, 69), or reported whether data saturation was reached (18-21, 40, 41, 43, 45, 52, 53, 61, 63-65, 68, 69). The sampling approach in three studies was unclear (16, 48, 72). Several studies did not report ethical/institutional approval (41, 70), and many failed to report study limitations (40, 60, 68, 70, 73).

Synthesis

A variety of family behaviours were identified and categorised as: i) 'facilitators', ii) 'barriers' or iii) 'equivocal' behaviours to optimal diabetes self-management. Sub-themes relating to family behaviours that participants perceived as facilitating diabetes self-management included: 'positive care partnerships', 'family watchfulness', 'independence from family', and 'family as an extrinsic motivator'. Sub-themes relating to family behaviours perceived to be barriers to self-management included: 'obstructive behaviours' and 'capacity for family support or engagement'. Sub-themes relating to family behaviours perceived to be equivocal (i.e. with potential to be either barriers or facilitators) included 'being reminded to self-manage'. Each of these themes described a variety of specific behaviours, as described below. Additional exemplar quotes are summarised in Supplementary Table 2.

1. Family behaviours facilitating self-management adherence

Within this theme, there were four sub-themes, as described below.

1.1. Positive care partnerships

Positive care partnerships described behaviours that positively contributed to self-management and included a range of shared activities, such as: doing health-related activities or tasks together, (i.e. visiting a clinician, exercising and/or cooking together).

> *My wife for instance always makes sure that whatever I eat is or has the minimal amount of sugar in it. We also walk together. There is a forest near us and we often go walking with the dog. (Man, Age n/a) (68, pg. 221);*

This sub-theme also involved providing informational and financial support, and providing support for 'Instrumental Activities for Daily Living' such as cooking, driving, and doing the grocery shopping (74). Financial support was identified more commonly in studies with culturally and linguistically diverse or low-income participants.

> *My husband does most of the grocery shopping, so he reads all the food labels for me and he will stand there in the aisles and read them – bless his heart – he is great like that. And he is*

> *into computers, so he will read stuff and he goes to the doctor and stuff with me whenever he can) (Woman, Age 56) (42, pg. 1242)*

Having shared health goals, such as partnering with another family member also living with diabetes was viewed as a helpful relationship. Shared health goals were beneficial particularly when both family members provided support to each other for adopting healthier lifestyles, blood glucose monitoring, or adhering to medication regimens.

> *…if I feel down, then I've got someone to speak to and [we] remind each other that we've got to take our insulin and you know, if you forget… the other one's there to remind you (Gender n/a, Age n/a) (59, pg. 595)*

1.2 Family vigilance

Participants valued family members' help in identifying acute and chronic changes in their clinical status, especially if participants were hypoglycaemic and required immediate attention. Participants also acknowledged the important role that family members play in recognising and helping them address more discrete declines in their overall health.

> *My sister saw [the effects]. She rushed off to the church's kitchen and got some orange juice for me (Type 2 diabetes).(Woman, Age, 53) (42, pg. 1242)*

1.3 Family as an extrinsic motivator

Participants also described how certain extrinsic motivators relating to family influenced their self-management practices. The desire to participate and be part of future family events was a powerful extrinsic motivator, as it encouraged participants to maintain their health through the self-management of their diabetes.

> *We have a little girl who's now three and so I want to be around as she's growing up, you know. So that's a motivating factor (Gender n/a, Age 53) (56, pg. 272)*

Participants with diabetes who had family members also with diabetes sometimes learned from them either through learning from their mistakes or through observing positive behaviours, attitudes, and skills that reduced their diabetes risk factors.

> *Like my dad had it... we've been through all that, we used to cook separate for him, we used to make separate, and I knew like what it does to you and how you can control it because we had it in the house before. (Woman, Age n/a) (55, pg. 4)*

1.4. Developing independence from families

Participants also described the need to become independent from their family as a pathway for improving their self-management capabilities. This was particularly pronounced for participants who did not want to rely on or burden family members for their self-management, or felt pressured by family obligations. Being independent was especially important in situations where a family's behaviour was perceived to be a barrier to optimal self-management practices. Some participants who had established their independence from their families prioritised their own health as a way of optimising their self-management practices.

> *I'm afraid of diabetes complications. If I don't take care of myself, I will be dependent on my family and others. So, I have to take care of myself and do it. (Gender n/a, Age n/a) (66, pg. 450)*

2 Barriers to diabetes self-management

2.1. Obstructive behaviours

Many participants perceived obstructive family behaviours as a major barrier to managing their diabetes effectively. Obstructive family behaviours included: sabotaging their diabetes-related diet; and/or unhealthy family habits or routines that hindered participant's ability to adhere to their diabetes self-management plan.

> *She [wife] could do better.... Well, just a lot of junk foods that we really don't need (Man, Age n/a) (45, pg. 158)*

Participants also described the difficulty of managing their diabetes whilst juggling other family duties; and/or being required to prepare a separate non-diabetes meal for the rest of the family.

> *I constantly have to consider their dietary wishes versus my restrictions, and it overwhelms me to the degree that I simply can't manage sticking to the required diet. Therefore, I have to increase my insulin doses (Gender n/a, Age n/a) (19, pg. 45)*

2.2 Limited capacity for family support or engagement

Participants described a lack of family engagement, or capacity for support, which included the lack of emotional, physical and financial support from family members. The absence of support from family members included: families being too busy and unable to exercise together with the participant; or unable to prepare healthier meals and/or not being able to afford healthier food options.

> *I get mental support from my family but not too much financial support. Right now, I am eating French fries because that is all I can afford. (Female, Age 64) (43, pg. 340)*

This lack of engagement was sometimes due to families not being sufficiently motivated and/or not understanding the importance of supporting the person with their diabetes self-management. The net results were that participants perceived a lack of empathy and understanding from their family members regarding the daily challenges of living with diabetes.

> *[…]When I am not feeling well, nobody [in my family] wants to hear it. […] I really want to have someone who understands diabetes and me (Woman, Age 59) (58, pg. 218)*

3. Family behaviours that were equivocally-perceived as positive or negative influences to self-management adherence

This meta-synthesis identified behaviours that appeared to be 'equivocally-perceived', in that their influence to be a facilitator or barrier to diabetes self-management depended on the perception of the participant living with diabetes. In particular, reminders from family members were viewed as having the capacity to be either helpful or unhelpful. These reminders related to a range of activities of diabetes self-management activities, including: attending appointments with health professionals, taking medications, exercising and maintaining a healthy diet. Where reminders were perceived as facilitators, they were welcomed and appreciated by many participants.

> *Without my daughter's support, I cannot do anything. She made a clinic appointment. Every day, she reminds me to take medications and do mild exercise. (Woman, Age 66) (49, pg. 282)*

Others, however, perceived self-management reminders to be unhelpful, and considered them to be a form of 'nagging'.

> *I know personally that nagging demotivates me and makes me completely introverted. (Gender n/a, Age n/a) (19, pg. 46)*

For some participants, persistent nagging escalated into covert or even overt threats.

> *No, my family is on top of me, don't eat that, don't eat that. If you go on, we will leave you... (Woman, Age n/a). (61, pg. 8)*

Family behaviours as reinforcers, enablers and predisposing factors

Collectively, the family behaviours described within the above sub-themes could be considered to be enabling, reinforcing and/or predisposing to diabetes self-management activities (Table 2).

Table 2 Identified family behaviours classified as either reinforcing, enabling, or predisposing behaviours

Facilitators:		
Reinforcing behaviours	**Enabling behaviours**	**Predisposing behaviours**
Desire to participate to self-manage for future family events	Doing health-related tasks or activities together	Learning from other family member's diabetes experience
Shared health needs or goals	Symptom identification	Independence from family pressures or barriers
Being a role model/Having a role model	Financial support	Not wanting to rely on or burden the family
	Support for 'Instrumental Activities For Daily Living'	
	Informational support	
Equivocally perceived		
Reinforcing behaviours	**Enabling behaviours**	**Predisposing behaviours**

Nagging/providing threats for not self-managing	Regular reminders – adherence prompts	
Barriers		
Reinforcing behaviours	**Enabling behaviours**	**Predisposing behaviours**
Sabotaging diabetes-related diet	Juggling self-management activities with family pressures and commitments	Limited financial support
Lack of family understanding or motivation to understand		Unhealthy family routines
		Limited capacity to provide family support

Discussion

This meta-synthesis provides insights into the variety and types of family behaviours that impact positively or negatively on diabetes self-management and, for the first time, identifies that there may be 'equivocal' family behaviours that individuals with diabetes may perceive as either a barrier or facilitator to optimal diabetes management. For instance, while some perceived regular reminders as helpful and welcomed this input, others perceived these as 'nagging', demotivating and reinforcing of non-adherence. If correct, this interpretation gives rise to a window of opportunity for interventions aimed at helping adults with diabetes to reframe how they perceive equivocal behaviours so that they become facilitators rather than barriers to self-management.

The large variety of family behaviours related to diabetes may be attributable to the number of activities required by people with diabetes to effectively self-manage [5]. It is possible that there are family behaviours that are specific to the individual activities of diabetes self-management (e.g. diet (75), physical activity (26, 75), medication (75), and smoking status (23)). Further understanding family behaviours related to specific activities of diabetes self-management (i.e.

family behaviours most relevant to medication adherence) may improve the effectiveness of interventions to utilise family behaviours to support improvements in diabetes-related outcomes.

While the behaviours identified as facilitating diabetes self-management were diverse, they included roles that either depended on the active engagement of the family member or an engaged interaction between participants and their family member, such as 'doing diabetes-related tasks or activities things together'. Two of the discovered sub-themes related to family relationships rather than behaviours per se: 'independence from family' and 'family as an extrinsic motivator'. The review also highlighted the constraints placed on family support by financial disadvantage, which warrants further research.

Classifying the identified family behaviours as enabling, reinforcing and predisposing provided greater insight into the impact of behaviours. Enabling family behaviours helped identify a setting that supports diabetes self-management, and included: 'doing things diabetes related tasks or activities together', 'symptom identification' and 'regular reminders' (37). Whereas, reinforcing behaviours are characterised by the social consequence of an action were evident in actions such as 'nagging', or having 'shared health-related goals', or 'being a healthy role model'. Predisposing behaviours were defined by factors relating to existing self-efficacy, values, beliefs, or attainment of knowledge, and included 'unhealthy family routines', 'learning from other family member's diabetes experience', and 'independence from family pressures or barriers'. These classifications help unpack the complexity of these behaviours, by examining the nature of these family behaviours in their influence to diabetes self-management. Identifying the most important and changeable reinforcing, predisposing and enabling family behaviours impacting on diabetes self-management practices may help in identifying the most meaningful family behaviours to be targeted in self-management interventions (37).

Study implications:

The findings from this meta-synthesis are aligned with a number of theoretical frameworks that may be useful for the development of future interventions. The Integrated Behaviour Model (IBM) suggests that targeting behaviour change is most successful when the individual has high levels of 'intention' and 'motivation' (76, 77). Family behaviours that adults with diabetes have limited

control over may be less amendable to change (76). As removing barriers or creating new facilitators enacted by family members may require the active intention and motivation of the family member to change rather than the individual with diabetes (i.e. expecting family members to adopt a healthier diet, or expecting family members to exercise with them), these behaviours may be under limited control by the person with diabetes.

In previous intervention studies, the Health Belief Model and Self-Regulatory Model have been used to improve adherence to self-management in diabetes populations (78, 79). Models such as the Health Belief Model or the Self-Regulatory Model, if applied to the findings of this meta-synthesis, could offer potential strategies for adults living with type 2 diabetes to negotiate family behaviours that benefit their self-management. For example, the behaviours derived from this meta-synthesis, such as 'providing regular reminders' or 'family partnerships', closely align with the Health Belief Model constructs, 'perceived facilitators' and 'cues to action' (79). An intervention using these constructs may engage with these behaviours by improving how the person with diabetes collaborates and negotiates with how family members can establish regular reminders (or prompts) that is both tailored and helpful to the adult's diabetes self-management.

Another interesting finding from this meta-synthesis was the behaviour of 'developing independence from families'. Adults with diabetes who demonstrate this behaviour may have greater capacity to self-manage in the face of barriers, particularly those enacted by their family members. Future studies could learn from the strategies employed by these individuals to mitigate the influence of family behaviours perceived as barriers.

Limitations

As previously stated, this meta-synthesis only analysed the quotes made available by the authors, and did not include author-derived themes or discussions on their data. The omission of author-derived themes limited the amount of usable data for the analysis, but was consistent with the focus of this review on exploring the voice of adults with diabetes. The exclusion of family members and health professionals also meant the review could not benefit from their perspectives, which may differ from that of adults with diabetes. The meta-synthesis, instead, was intended to provide insights into how the perceptions of adults with diabetes may facilitate person-centred

interventions aimed at improving self-management, including scenarios where families are unwilling to be involved.

In addition, this meta-synthesis could not examine the influence of socio-demographics (e.g. gender, family roles) on perceptions of family influence, due to inconsistencies between studies in reporting on these variables. By virtue of the focus on family influences, the review also left out non-familial social relationships, such as those with friends and co-workers.

It is important to reiterate that many of these studies varied by country, ethnicity, and social disadvantage. This meta-synthesis could not examine the effect of culture on family behaviours, despite their likely influence. For example, in some cultures, rejection of food is socially unacceptable even among family members, particularly when certain foods (that may be high in sugars or carbohydrates) are well ingrained within the culture (47, 67, 71); this may make it especially difficult for people to adhere to a diabetes-related diet.

Conclusion and future directions

A diverse range of family behaviours are perceived as positively or negatively influencing self-management across many domains of diabetes self-management (e.g. diet, physical activity, involvement in health). Considering how to most effectively harness positive family behaviours, and to minimise the impact of negative family behaviours is important for clinicians and researchers alike. Our results inform future interventions aimed at identifying and testing approaches that optimise family behaviours that are perceived to facilitate diabetes self-management, as well as trying to address behaviours that are perceived as barriers.

The identification that some family behaviours may be perceived as ‘equivocal’ warrants further exploration. If the concept of equivocal behaviours is confirmed, it may be possible to reframe these family behaviours so that they are perceived as being supportive to diabetes self-management. Reframing equivocal behaviours as positive, may deliver a two-tiered benefit by transforming a barrier to a facilitator.

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