

Identifying Factors Which Enhance the Self-Management of Type 2 Diabetes: A Systematic Review with Thematic Analysis

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Abstract

Background: Individuals with type 2 diabetes play a pivotal role in their health. Enhancing the self-management of diabetes can improve blood glucose control, and quality of life, and reduce diabetes-related complications. We have identified factors influencing the self-management of type 2 diabetes to inform strategies that may be applied in the long-term management of blood glucose control.

Methods: We conducted a systematic literature review of recent studies published between January 2010 to December 2020 to identify the available evidence on effective self-management strategies for type 2 diabetes. The databases used for the searchers were Scopus, PubMed, Science Direct, CINAHL, and Google Scholar. We assessed English language publications only. The screening of titles was duplicated by two researchers. We then conducted a thematic analysis of the key findings from eligible publications to identify reoccurring messages that may augment or abate self-management strategies.

Results: We identified 49 relevant publications involving 90,857 participants. Four key themes were identified from these publications: Individual drive, social capital, Knowledge base, and Insufficient health care. High motivation and self-efficacy enabled greater self-management. The importance of family, friends, and the health care professional was salient, as were the negative effects of stigma and labelling. Enablers to good self-management were the level of support provided and its affordability. Finally, the accessibility and adequacy of the health care services emerged as fundamental to permit diabetes self-management.

Conclusions: Self-management of type 2 diabetes is an essential strategy given its global presence and impact, and the current resource constraints in health care. Individuals with type 2 diabetes should be empowered and supported to self-manage. This includes awareness raising on their role in self-health, engaging broader support networks, and the pivotal role of health care professionals to inform and support. Further research is needed into the capacity assessment of healthcare systems in diabetes medicine, targeted low-cost resources for self-management, and the financial requirements that enable self-management advice to be enacted.

Keywords: Type 2 diabetes, self-management, patient journey

1. Introduction

With the increased prevalence of global pandemics, demands on health services have risen disproportionately to health care expenditure (McKibbin & Fernando, 2020; Soley-Bori et al., 2021). Furthermore, the usual access to healthcare services for the management of existing non-communicable disease pandemics has decreased since the emergence of COVID-19 (Moynihan et al., 2021), indicating a growing backlog of cases, as well as a greater likelihood of disease complications and comorbidities. Potential methods to offset the cost of health care are urgently needed, especially for those global regions where health resourcing and expenditure are already inadequate.

Type 2 diabetes is characterised by elevated blood glucose concentrations over an extended period, and remains a global pandemic of considerable economic (Seuring et al., 2015) and social (PwC, 2021) cost. The global prediction for type 2 diabetes prevalence is predicted to rise to 700 million by 2045, of which the majority of those affected will be in (LMICs) Low- and Middle-income Countries (Saeedi et al., 2019). While appropriate blood glucose control may be achieved through lifestyle and pharmacological management, (Davies et al., 2018) the consequences of poor diabetes management and elevated blood glucose concentrations include limb amputations, retinopathy, nephropathy, increased cardiovascular disease risk, and premature mortality (Mann & Truswell, 2017).

One possible cost-effective method to achieving appropriate blood glucose control is to augment diabetes self-management. Greater self-management is associated with improved blood glucose control (Ferguson et al., 2015) and patient well-being or quality of life (Hailu et al., 2019; Isaksson et al., 2015). Strategic methods to support and enhance diabetes self-management are therefore warranted. Given the importance and potential for supporting diabetes self-management, we have undertaken a systematic review to identify, and then describe factors affecting self-management amongst adults with type 2 diabetes. The systematic review was conducted to identify and describe the factors that affect self-management amongst adults with type 2 diabetes and find strategic methods to support and enhance diabetes self-management and present existing messages on what is still needed.

2. Methods

2.1 Study Design

We followed the Cochrane guidelines (Higgins et al., 2020) for conducting systematic reviews, and PRISMA reporting standards for systematic reviews and meta-analyses (Page et al., 2021).

2.2 Study Eligibility

This systematic review and thematic analyses were undertaken to address the research question “what are the individual barriers to the self-management of type 2 diabetes?”. Addressing this research question carefully will inform strategies that may be applied in the long-term management of blood glucose control and identify key areas for health care practitioners to focus upon in discussion with patients to enhance self-management strategies. A broad range of study designs were considered potentially relevant to this research focus. Eligible articles included study participants that were adults with type 2 diabetes. Studies that solely considered the effectiveness of self-management of type 2 diabetes on health outcomes such as blood glucose control without reflection on what promoted or inhibited self-management, were not considered relevant. Studies including purposeful recruitment of only those with type 2 diabetes and other comorbidities (such as coronary heart disease or end stage renal disease) were excluded, to reduce confounding in our results due to factors specific to the management of other non-communicable diseases.

2.3 Literature Search

We identified recent studies with an online search of formal databases, and sourced articles published between January 2010 and December 2020 with additional bibliographic searches. These recent studies were considered to inform an analysis reflective of current type 2 diabetes management. Databases utilised were Scopus, PubMed, Science Direct, CINAHL, and Google Scholar. Key search terms were (“diabetes type 2” OR “type 2 diabetes mellitus” OR T2DM) AND (“self-management” OR “self-care”) AND (factors OR determinant). We assessed English language publications only.

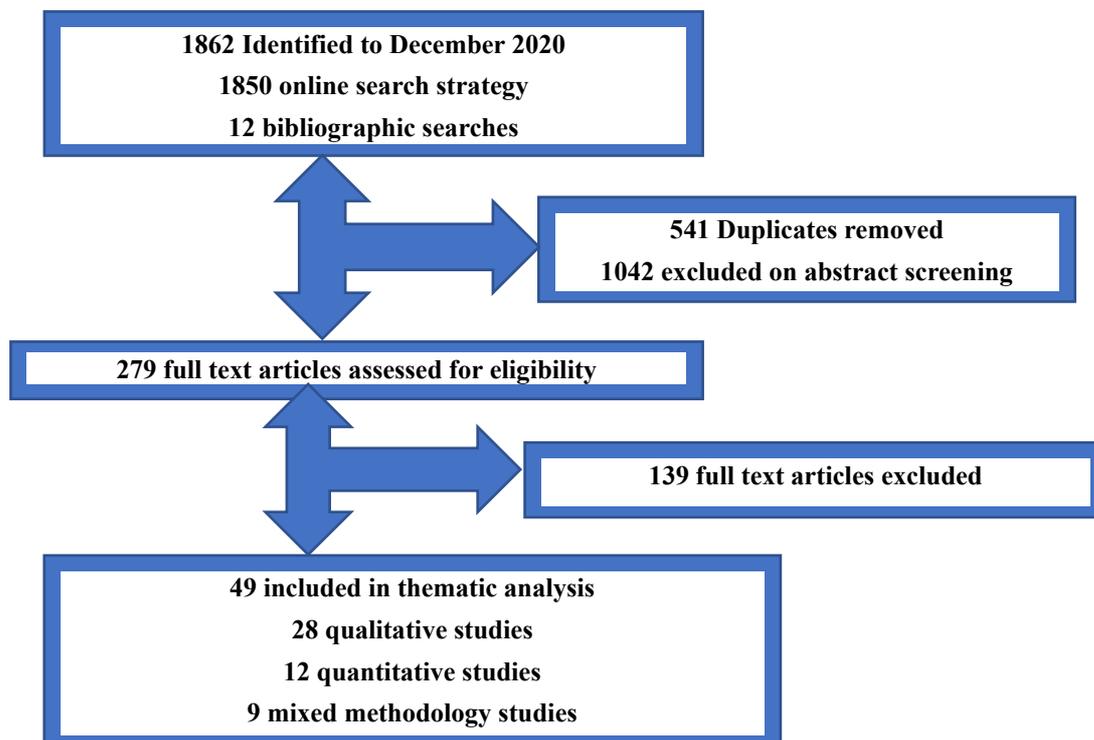


Figure 1. Flowchart illustrating the identification of eligible studies

2.4 Screening and Data Extraction

The online search was screened by two independent reviewers and augmented by bibliographic searches to review reference lists to identify additional potentially eligible publications. Disagreements in screening were resolved through discussion with consensus. A data extraction table based on PRISMA protocols (Moher et al., 2015) was used to collate relevant descriptive data for each identified study, as well as the key findings. This extraction table was filled out by one researcher and looked over for accuracy by a second. Quality assessment of eligible publications was undertaken utilising Critical Appraisal Skills Programme (CASP) tools. We report on eligible studies with a CASP score of eight (out of ten) or higher, as per previous reviews (Long et al., 2020).

2.5 Thematic Analyses

Once all eligible papers were identified, we considered their findings with thematic analysis, adapting grounded theory methods (Corbin & Strauss, 2014). An initial coding scheme was developed upon the first review of the findings from each publication, and then refined as the analysis progressed. Second-cycle coding of unweighted codes entailed reorganising, categorising, and refining the system to scan across publications for patterns and themes. To increase the credibility of the results, debriefing occurred with a researcher experienced in working with participants with type 2 diabetes to help address potential researcher bias and ensure the analysis was reflective of the sourced data. The identified themes are presented as key mediators to successful self-management of type 2 diabetes.

3. Results

The process of identifying eligible studies is shown in **Figure 1**. Of the 49 eligible studies identified, twelve articles were published between 2010 to 2015 while thirty-seven were published between 2016 to 2020. A total of 90,857 participants were included in eligible studies. Sixteen studies of 10 to 84,179 participants came from North America, eleven studies of 20 to 1,691 participants came from Asia, nine studies of 10 to 246 participants came from Europe and the UK, five studies of 54 to 220 came from Africa, six studies of 15 to 60 participants came from Australia and Aotearoa/New Zealand, one study of 150 came from the Pacific Region, and one study of 273 participants was multinational. Studies applied a range of sampling and analytical techniques with 28 qualitative analyses, 12 quantitative analyses, and 9 applied mixed methodologies. Each eligible publication described factors

that affected diabetes self-management practice. A further description of each study is found in the supplementary Table 1.

Table 1. Summary of themes that emerged from eligible studies relating to type 2 diabetes self-management

Theme	Sub-theme	Studies
<i>Individual drive</i>		47
	Drive to understand self-management	26
	Motivation to manage diabetes	8
	High self-efficacy	8
	Engaging in self-care behaviour	5
<i>Social capital</i>		34
	Relationships with health professionals	10
	Family and friends support	10
	Community support	11
	Stigma and labelling	3
<i>Knowledge base</i>		16
	Quality of training received	10
	Affordability of training	6
<i>Insufficient health care</i>		13
	Access to health services	6
	Adequate HCPs and resources	4
	Existing policies and treatment guidelines	3

A summary of the themes identified within the thematic analyses of findings from eligible studies is also shown in **Table 1**. Under the theme of Individual drive, the primary sub-theme was a drive to understand self-management of blood glucose control. Patients were supported in doing so by high levels of health literacy and self-efficacy. The patient drive was also reinforced by regular support (Dao-Tran et al., 2018; Ojewale et al., 2019; Schiøtz et al., 2012). The importance of this theme was underscored by the negative findings where insufficient knowledge led to poor diabetes management (Alzubaidi et al., 2017; Bezo et al., 2020; Pamungkas et al., 2020). In the context of aiding patient self-management, clear, simple, and effective communication was identified as essential for the effective delivery of diabetes knowledge and care (Alzubaidi et al., 2017; Dao-Tran et al., 2018; Rosal et al., 2011). Information delivered must take into account the level of understanding and education for an individual patient (Pamungkas et al., 2020), and build from their existing knowledge base (Alzubaidi et al., 2017; Bezo et al., 2020; Pamungkas et al., 2020). This need for clear health information, was particularly relevant amongst studies with low socioeconomic status participants (BeLue et al., 2013; De Man et al., 2019; Rendle et al., 2013; Yin et al., 2019).

Social capital describes the support required by individuals with diabetes to practice self-management daily. Four sub-themes emerged, including relationships with health professionals (Ojo et al., 2018; Ross et al., 2019), family and friends (Carolan et al., 2015; Dao-Tran et al., 2018; Isaksson et al., 2015; Schiøtz et al., 2012), community (De Man et al., 2019; Ji et al., 2020), and stigma and labelling due to having type 2 diabetes (Al-Dwaikat et al., 2020; Zheng et al., 2019). A major challenge uncovered in this review was the inconsistent and low level of sufficient information being offered by health professionals to their diabetes patients (Nam et al., 2011; Weller et al., 2017), which damaged trusting relationships. Family and friends offered support through activities such as accompanying patients to clinics, providing companionship during physical activity, enabling appropriate food choices, assisting with mobility, promoting positive feelings, and willingness to participate in creating a supportive environment for daily activities (Isaksson et al., 2015; Lee et al., 2019). The community play a broader role in creating environments supportive of these actions (BeLue et al., 2013; Dao et al., 2019; Keene et al., 2018; King et al., 2010). Fewer studies found that stigma and labelling were negative emotional reactions from having diabetes (Janes et al., 2013) which led to reduced social capital and support (Al-Dwaikat et al., 2020; Maneze et al., 2019;

Zheng et al., 2019).

Critical to successful diabetes self-management efforts was the quality and affordability of the training received. These factors influenced adherence to good self-management practices (Alzubaidi et al., 2017; Bezo et al., 2020), as did approaches that were linguistically and culturally appropriate (Alzubaidi et al., 2017; Krebs et al., 2010), or tailored according to the needs of the individual. Conversely, medical information provided and communicated to patients involving the use of medical jargon, and medical terms without comprehensive explanations, caused patients to perceive less and understand little, creating confusion due to inconsistent information (Kindarara et al., 2017; Macido, 2019; Siminerio et al., 2013). As a result, patients followed “their own way” of managing their diabetes with limited engagement and communication with health professionals (Bezo et al., 2020; Despina & Wakefield, 2020; Jiang et al., 2019; Maneze et al., 2019; Ross et al., 2019; Siminerio et al., 2013; Weller et al., 2017). Financial constraints were also identified as a theme, with adults managing diabetes with limited financial resources described this experience as a game of balance and negotiation, whereby purchasing healthy foods and quality medications would be abandoned due to more pressing concerns and other priorities in their life (Masupe et al., 2018).

The final theme identified was Insufficient health care. Three sub-themes emerged: access to health clinical settings, the need for adequate Health professionals and resources, and inadequate guidelines for diabetes management. There were a wide range of difficulties in accessing diabetes services including more current recommendations (Bech et al., 2019; Christensen et al., 2020; Fritz, 2017; Graves et al., 2019; Rendle et al., 2013), health education (Gunggu et al., 2016; Wu et al., 2019) and technologies (Alzubaidi et al., 2017; Despina & Wakefield, 2020) particularly in rural (Graves et al., 2019) or resource-constrained health care settings (Adu et al., 2019). It was also found that patients experienced dissatisfaction due to lengthy waiting times and the time wasted while at facilities (Aweko et al., 2018; Christensen et al., 2020; De Man et al., 2019; Elliott et al., 2013). This review identified the need for patient-centred care and information (Christensen et al., 2020; Ji et al., 2020). Patients perceived that Health professionals have a greater role to empower individuals, and continuing to support effective behaviour change (Bech et al., 2019; Gunggu et al., 2016). Findings from this review also highlight that Health professionals should be equipped with the latest knowledge on diabetes treatment guidelines and health transition to the management of diabetes (Bech et al., 2019; Macido, 2019). Finally, studies determined that more public health programs are required to provide professional guidance, to health care teachers, aiding the patient to develop appropriate skills in health practices (Gunggu et al., 2016; Macido, 2019). It was also recognised that adapting a standard care model for diabetes care and management, and the reorganisation of healthcare services to monitor the progress of diabetes amongst those already diagnosed, supported patients to achieve better health results (Janes et al., 2013; Milo, 2017; Pandit et al., 2014; Weller et al., 2017).

4. Discussion

We have conducted a systematic review of the recent literature to enable comment on strategies to aid self-management of blood glucose control in type 2 diabetes. We have relied on a broad range of study types, conducted over a diverse geographical area with participants accessing health care services in LMICs and high-income countries. We then sought to identify common themes expressed by participants in relation to the self-management of their type 2 diabetes, so to better identify barriers and enablers to optimising self-care that can inform strategies that may be applied in the long-term management of appropriate blood glucose control. This is a particularly pertinent approach in resource constrained health care settings.

The dominant theme identified was the importance of the participant’s own individual drive to understand and manage their blood glucose control. This drive was linked to higher individual self-efficacy in general, and health literacy while being strengthened through family and community support. Greater awareness by health professionals of the role family and community support in enhancing self-management strategies may lead to low-cost initiatives for greater blood glucose control such as promoting community walking groups. Patient motivation for self-management was threatened by the quality and inconsistency of information delivered by health professionals. This study identified that from the patient perspective, their needs are not being met or fully understood within current health care systems. While the term ‘self-management’ implies individual responsibility, findings from our analyses clearly indicate issues with accessing appropriate diabetes services and the role of supportive health professionals in establishing and maintaining self-management. The need was identified for up-to-date health information about diabetes self-management accessible by a range of health care professionals to provide consistent, helpful, and appropriate messaging. Given the resource cost of developing such evidence-based messaging, and the need for its continual update, an efficient way forward may be the adaptation of guidelines for health professionals recently developed by a known body (Powers et al., 2021) to become linguistically and culturally appropriate to a range of settings. However, such a move requires appropriate input, support and buy-in from health care systems to recognise the importance of the patient in diabetes self-management.

To the best of our knowledge, this is the first systematic review to consider this topic, however, our findings draw heavily from a rich field of qualitative considerations of diabetes self-management (Adu et al., 2019; Alzubaidi et al., 2017; Aweko et al., 2018; Christensen et al., 2020; Despins & Wakefield, 2020; Elliott et al., 2013). Recent complementary publications support our findings and include a narrative review of meta-analyses on trends in diabetes self-management conducted by Hermanns et al. (2020). This work identified an evolution of self-management approaches over time working towards empowerment and strengthening self-efficacy, rather than compliance with instructions delivered by health professionals. By considering only recent publications, (2010-2020) we sought to focus and comment upon current care modules. Hermanns et al.(2020) also identified the growing use of medical technology in diabetes self-management, as was the focus of another recent review by Greenwood et al. (2017). Use of medical technology such as continuous glucose monitoring did not emerge from our analysis as having a salient contribution to any theme, perhaps due to our broad sampling from LMICs and high-income countries. Reliance on medical technology in diabetes self-management comes with its risks, as technology first becomes available in high-income countries before being accessed in LMICs then low-income countries, if at all. A strong reliance on medical technology going forward in diabetes self-management, therefore, has the likely potential of increasing health inequities between and within populations. The current review identified the need to improve the quality and consistency of health messages delivered by health professionals across different health care settings, this finding may prove more equitable (Ward, 2018) and effective (Stenov et al., 2018) for all than reliance on medical technology.

This review has a number of strengths. Our thematic analyses of review results identified barriers to informing appropriate strategies that may strengthen diabetes self-management. This is particularly relevant for health care systems operating within resource-constrained environments. We have systematically identified a broad range of recent literature sources, to then analyse for salient themes relevant across a range of health care settings. We have done so to aid understanding and advance self-management and treatment method, that will be a part of strategic planning for diabetes programs going forward. This topic is relevant and will remain relevant for the duration of the type 2 diabetes pandemic.

Most of the studies identified were from the patient perspective, other valuable contexts to improve type 2 diabetes self-management would be that of health professionals and health system capacity. Future research should focus on the delivery of self-management strategies from recently published guidelines (Powers et al., 2021) and their uptake within patient populations, as well as their appropriate adaption and translation to a diverse range of settings. A range of health professional perceptions are also needed, to better understand their barriers and enablers to empower patients with diabetes to self-manage their blood glucose control for improved health and wellbeing. Further research is also needed into the barriers to health care access and acting on information and self-management strategies provided by health professionals. Capacity assessment of health care systems in diabetes medicine is needed. Consideration of resource demands of different health care tools that may aid diabetes self-management would also be beneficial. The current work has primarily identified patient needs; however, the broader context of health professionals and health system capacity is still needed.

5. Limitations

This review is not without limitations. We could not consider publications in languages other than English. Relevant findings to our topic that would inform this research could be available in other languages, however, we did not access them. Although our decision to only include studies with a quality assessment score of eight or higher out of ten had precedence, it was based on limited capacity to review and analyse findings from a greater number of publications. We cannot be certain that lower-quality articles do not also contain rich data to inform this work.

6. Conclusions

Type 2 diabetes is a global pandemic. Poorly controlled blood glucose management in type 2 diabetes is associated with further serious complications such as limb amputation, retinopathy, nephropathy, increased cardiovascular disease risk, and premature mortality. Our findings indicate that in enhancing diabetes self-management strategies, it is essential to consider the influencing factors that affect the individual's participation in self-management practices. Our analyses identified that individual drive, the social capital on the social support received by the individuals with diabetes, the knowledge of diabetes aetiology and the insufficient health care services were key variables contributing to blood glucose control. Further research is needed into the capacity assessment of healthcare systems in diabetes medicine, targeted low-cost resources for self-management, and the financial requirements that enable self-management advice to be enacted. Perhaps most importantly, low-cost options to improve blood glucose control in a range of settings including low-resourced settings are urgently needed.

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Data Availability Statement

The data is available in full of the referenced source documents of this systematic review.

Competing Interests Statement

The authors declare no conflicts of interest.

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Table 1. Data Extraction Sheets

First Author/Yr.	Setting	Study Design	Sampling/ Participant	Analysis Approach	Findings
1 Barriers to Effective Diabetes Mellitus Self- Management practice ... (Rian Adi Pamungkas, 2020)	West Indonesia	Sulawesi, In-depth interviews and focus group discussions	n=28	Qualitative analysis	thematic Individual factors Low pt. perception Lack of social engagement Inadequate knowledge Lack of motivation
2 Experiences of diabetes self-management (Mary Carolan, 2015)	Local health services in Australia	In-depth interviews and focus group discussions	n= 22	Qualitative analysis	thematic Individual factors Pts' experience on the disease Access to resources and services DM affects the family Family support Health Literacy Diabetes knowledge
3 Diabetes Self-Management and Education of People Living with Diabetes ... (James Elliott, 2013)	Diabetes clinic Muscat Oman	in Semi-structured interview.	n = 16	Qualitative analysis	thematic Individual factors Challenges in how to recognize the disease Low self-monitoring Lacks diabetes education Pts perception on how to promote SMB activities Structural factors Access to HC Services and consultations
4 Factors influencing self- management behaviors among patients ... (Benjamin H, 2020)	Solomon Islands	Self-report questionnaires	n =150	Cross-sectional design analysis	study quantitative Individual factors Pts low level of SMB resulting in low skills in problem-solving Less communication with HCP Lack of knowledge leads to low SM practices
5 A Qualitative Exploration of Facilitators and Barriers for Diabetes ... (Christensen, Nina Ingemann, 2020)	Danes Denmark	Three workshops	n=28	Qualitative content analysis	interactive Structural factors -Lack of access to health services -Lack of available health programs for DSM Individual factors -feeling powerless or helpless - person-cantered approach -setting clear and achievable goals -Practical knowledge of SM education
6 Patient's perspective on self-management: ... (Astrid N., 2019)	Dutch primary care. Netherland	Semi-structured face-to- face interview	n=10	Qualitative analysis	thematic Individual factors -Lack disease-related behaviour Structural factors - health professionals could not explain how to deal with T2DM in daily life

7	Making sense of blood glucose data and self-management in individuals ... (Laurel A. Despines, 2020)	Mid-west region the USA.	One-on-one semi-structured interview	n =16	Mix method designs	study	<p>Individual factors</p> <ul style="list-style-type: none"> - Blood glucose data, - Building mental models - Making self-management decisions - personal experience, <p>Structural factors</p> <ul style="list-style-type: none"> - Periodical refresher information on DM - Sources of knowledge were classes, health information technology, and their social network
8	Factors influencing self-management in patients with type 2 diabetes in general practice: a qualitative study (Julie Dao, 2019)	South Western Australia Sydney	Survey via mailed	n = 88	Qualitative analysis	thematic	<p>Individual factors</p> <p>(e-health literacy, motivation, time constraints);</p> <p>Organisational factors</p> <p>(affordability, multidisciplinary care)</p> <p>Community levels-</p> <p>(culture, self-management resources).</p> <p>Structural</p> <p>provider and patient views and experiences primary HC scarce in disadvantaged settings</p>
9	The social organization of self-management support of persons with diabetes ... (M. L. Schiøtz, 2011).	General Hospital in Denmark	Self-administered questionnaires	n =2572	Quantitative analysis		<p>Interpersonal factors</p> <p>Family and social support assist good health behaviours, PA, Food, etc</p>
10	Factors associated with self-management among Vietnamese adults with type 2 diabetes ... (Tiet-Hanh D, 2018)	Diabetes outpatient clinic South, Vietnam.	Self-report questionnaires.	n = 198.	A cross-sectional study designs	quantitative analysis	<p>Individual factors</p> <ul style="list-style-type: none"> -Belief in treatment effectiveness, -Low diabetes knowledge -Self-efficacy. <p>Interpersonal factors</p> <p>Family and friends support,</p> <p>Structural factors</p> <p>Healthcare professional support</p>
11	Relationship of Family Support Towards Self-Management and Quality ... (Ahmad Yamin, 2018)	Bandung Puskesmas.	Self-administered questionnaires	n =92	Quantitative analysis		<p>Individual factors</p> <p>low social support</p> <p>DM self-management behaviour</p>
12	Time to question diabetes self-management support ... (H. Alzubaidi, 2016)	Metropolitan healthcare Melbourne, Australia	Face-to-face structured and semi-focus groups	n = 60	Qualitative analysis	thematic	<p>Individual factors</p> <p>Pts. prefer face-to-face information</p> <p>No support was offered</p> <p>knowledge gaps and skills</p> <p>tailored self-management support</p> <p>telephone- or internet-based interventions</p>

13	Health-Illness Transition Experiences with Type 2 Diabetes Self-management ... (Désiré M, 2017)	California State University, Sacramento On Sub-Saharan African immigrant	Face-to-face semi-structured interview	n =10	Qualitative analysis.	content	Individual factors Participants' health-illness transition experiences knowledge of SMB mastery of new skills Culturally tailored interventions
14	Understanding Daily Experiences with Type 2 Diabetes Self-Management (BeLue R, 2013)	Clinic Patients in M'Bour, Senegal Dakar	Semi-structured designed questionnaires	n =54	Qualitative analysis		Individual factors Strengthening pts. Efficacy Different ethnic backgrounds, different perceptions, experiences, and social support financial challenges related to accessing medical care and adhering to the prescribed diabetic diet due to cost constraints and availability. Family as supportive, community, and social structures. Culture shapes health behaviour's
15	Socioeconomic status moderates the association ... (Tao Yin, 2019)	General Health China	Semi-structured questionnaires and quantitative studies	n =1691	Quantitative analysis		Individual factors Demographic, health status, health knowledge, and SES affect SMB
16	Self-Management Behaviors, Glycemic Control ... (Meihua Ji, 2020)	Suburban area of Beijing, China.	Self-report survey questionnaires	n= 207	Cross-sectional study design Quantitative analysis		Individual factors greater self-efficacy and social support Social support is needed for promoting lifestyle changes and better SMB
17	Diabetes self-management and glycemic control: The role ... (Agnan L., 2019)	University of Michigan School of Public Health, Ann Arbor.	self-report measures from pts health supporter	n = 326	Quantitative analysis		Individual factors positive diabetes-related attitudes lower diabetes-related distress greater self-efficacy Interpersonal factors family and friends play an important role
18	Diabetes empowerment and need for self-management support among (Ulf Isa, 2015)	Rural municipality in northern Sweden	Self-administered questionnaire	n = 159	Quantitative analysis		Structural factors Diabetes empowerment support healthcare professionals Interpersonal factors family and relatives in rural areas
19	Patient and Provider Dilemmas of Type 2 Diabetes Self-Management. (Juliet A, 2018).	5 communities in Stockholm	Semi-structured interview guides	n =28	Qualitative analysis	thematic	Structural factors patients and providers experience daily Provider perceptions that pt's do not understand the disease Individual Factors Pts struggle to adapt to the new regime of managing

							DM How to utilization SM advice Interpersonal Factors Engagement of close family in SM
20	Diabetes self-management in three different incomes.... (Jeroen D. M., 2019)	3 settings Iganga, Mayuge, and Uganda. Township Cape town South Africa	Semi-structured In-depth interviews FGDs and observations	Each setting conducted their data collection		Qualitative content analysis.	Structural factors SM influence people's lifestyle. patient-provider interaction, -improving health service delivery Sociocultural factors - encouraging community initiatives Modification of the physical environment - accessibility to healthy food - the socio-cultural environment (i.e. norms, values, attitudes, and social support)
21	Redefining diabetes and the concept of self-management from a patient's perspective ... (T. K. Masupe 2018)	Cape Town, South Africa	Semi-structured and In-depth interviews (FGDs' and 1 to 1 interview	n = 48		Qualitative thematic analysis	Individual Factors inadequate knowledge, fear; cultural practices; cost of healthy food, alcohol abuse, unhealthy cooking methods Patient centered definition Health-seeking behaviour Structural factors Lack of awareness about T2DM Health education needs and health care provider experiences
22	Randomized Trial of a Literacy-Sensitive, Culturally Tailored Diabetes Self-Management (Milagros 2011)	5 Community health centers. Massachusett. Puerto Rico Caribbean Latinos	Orally administered questionnaires	n =252		RCT linear mixed model	Sociocultural factors Literacy-sensitive, culturally tailored interventions SMB among low-income people Individual Factors Knowledge self-efficacy
23	Diabetes Self-Management Education (DSME) - Effect on Knowledge, Self-Care Behaviour ... (Hailu, F. B., 2019)	Jimma University Medical Centre Ethiopia	Interview-administered questionnaires	n=128		Quantitative comparative analysis	Structural factors Improve intervention on DSM Individual Factors Knowledge increased self-care behavior and self-efficacy
24	Self-Efficacy, Problem Solving, and Social-Environmental ... (King, D. K Glasgow, 2010)	5 Kaiser Permanente Colorado primary care clinics Denver Metropolitan	Structured questionnaires to	n=463		Quantitative analysis	Individual Factors Enhancing self-efficacy Problem-solving Sociocultural factors social-environmental support demographical features

25	Some say no, some say yes": Receiving inconsistent or insufficient information from healthcare ... (Della Maneze, 2019)	Outpatient diabetes centers in South Western Sydney	Semi-structured questions.	n=18	Qualitative thematic analysis	Structural factors inconsistent and insufficient information confusion and mistrusts
26	That wasn't a place to worry about diabetes": Housing access ... (Danya E. K., 2018)	US city, New Haven, Connecticut US	Semi-structured oral interview via posted flyers	n=40	Qualitative thematic analysis	Finance and psychological influence socioeconomically disparities prioritization diabetes self-management Housing access
27	Who can provide diabetes self-management support in ... (Siminerio, L, 2013)	University of Pittsburgh	Self-administered questions	n=141	RCT mix method analysis	Structural factors Patient-centered self-management approaches collaboration between HCP, caregiver, community, and patients. empowerment, goal setting. Patient-centered self-management approaches
28	Facilitators, barriers and expectations in the self-management ... (Laranjo. Lili, 2015)	Portuguese Association Diabetes outpatient clinic	Qualitative data was obtained using video-recorded 3 focus groups	n= 16	Qualitative thematic analysis	knowledge action gap tailored guidance lifestyle behaviour change Family and social ties
29	Quality of primary care physicians' communication of diabetes self-management ... (Ojo, OS, 2018)	Ace Medicare Clinics Limited, Ota, Ogun State South West Nigeria.	Self-administered questionnaire	n=105	Quantitative descriptive analysis	Structural factors HCP lack adequate knowledge lack of resources and staffing Training of primary care physicians
30	Challenges to diabetes self-management for adults with type 2 diabetes in ... (Robin Whittemore, 2019)	Seguro Popular Mexico City	Semi-structured interviews	n=20	Qualitative descriptive analysis	Sociocultural factors Cultural beliefs, personal control, and low health literacy challenges to lifestyle modification perceived quality of care Structural factors Accessible of HCS lack of resources, patient engagement Interpersonal factors lack of family support competing demands mental health issues.

31	A survey on patients' characteristics and perceptions of family support ... (Lucia Y. Ojewale, 2019)	Ibadan, Oyo State, South-West Nigeria	Descriptive cross-sectional designed close-ended questionnaire	n=197	Quantitative analysis.	Interpersonal factors good family support good self-management activities comprised diet adherence, exercise, glucose monitoring, medication
32	Assessing the effectiveness of a goal-setting session as part of a ... (MáireO' D, 2018)	West of Ireland and in Leicester in England.	3 months after Pre and Post self-reported questionnaires	n=279	Qualitative content analysis	Structural factors Goal setting is feasible and effective and leads to behavior change. leads to confidence and self-efficacy
33	The Mediating Role of Self-Efficacy in Shaping Self-Management Behaviors ... (Xinjun Jiang, 2019)	4 hospitals in China: Yanhua Jimenli Wuyishan Leping	Cross-sectional study designed questionnaire and instruments used	n=320	Cross-sectional study design and quantitative analysis	Individual Factors Self-efficacy plays an important role mediation of knowledge DSM behaviors.
34	A Nurse-Led Inpatient Diabetes Self-Management Education and ... (Antony. M, 2019)	Inpatients at the Community Hospital West Coast USA	One-to-one non-structured single group pre-test-post-test design	n=10	Quantitative descriptive analysis	DSMES improves knowledge and diabetes self-management skills,
35	Discovering successful strategies for diabetic self-management: ... (Susan C Weller, 2016)	University-affiliated Family Medicine Clinics in Galveston, Texas	1. Semi-structured interviews with open-ended questions 2. medical records after interviews	n=56	Qualitative comparative content analysis	Structural factors Good control in monitoring DM Need good motivation.
36	A Qualitative Exploration of Fijian Perceptions of Diabetes: Identifying Opportunities for Prevention and Management; (Catherine Dearie, 2019)	Fijians living in Greater Sydney, Australia	One-on-one qualitative interviews A snowball method	n = 15	Qualitative analysis thematic	Culturally lifestyle interventions family networks, church groups, and community support structures as a motivators for health action
37	Identification of Family Factors That Affect Self-Management. (Peng Yue, 2018)	Xicheng district of Beijing China	Semi-structured interviews with audio- recording	n= 20	Qualitative descriptive analysis	Tailored intervention family responsibility, experience, activities, and resources. family financial burden
38	Sociodemographic Factors Associated with Engagement in Diabetes Self- ... (Eric Adjei B, 2018)	United States	Hosp data analyzed data random-digit-dial telephone survey	n= 84 179	Quantitative and content analysis Mix method	improve DSME Patient-centered approach culturally sensitive and considering language barriers Telemedicine and other technology used to deliver DSME

								improve access and provide education for low-income through technology use
39	Patient Knowledge, Perceived Self-Efficacy, and Self-Management ... (Razel B, 2019)	South California community	California	Semi-structured interviews	n=100.	Cross-sectional study design and Quantitative analysis		Continuous DM education
40	Preferring to manage by myself; ... (Laura Kristine B 2019)	Danish Denmark		Semi-structured interview with open-ended questions	n=14	Qualitative thematic analysis		healthcare allocates resources to accommodate needs and support patient-centered care health professionals use terms from textbooks
41	Self-Management as a Mediator of the Relationship between Social ... (Tariq Al-D., 2019)	Midsized southern city United States.		Cross-sectional designed interview	n=102	Quantitative analysis		Lack of Social Support lower income presence of diabetes-related complications lack of financial depression
42	Understanding barriers to glycaemic control from the patient's perspective ... (Ron Janes, 2013)	Wairoa Medical Centre, Wairoa, New Zealand		Audiotaped in semi-structured, face-to-face interviews.	n=15	Qualitative analysis	thematic	literature related to context, family, finances, work, negative emotional reactions, fear of new events (diagnosis, starting pills/insulin); guilt about getting diabetes and not controlling it shame about having diabetes, unscientific beliefs and personal beliefs poor understanding of diabetes poor clinician-patient relationships. Patient-centered approach workforce shortages
43	Factors Influencing Diabetes Self-Management Among Medically. (Jimmy R,2017)	Federally Health Centre. America	Qualified North	Open-ended questions, audiotaped. Eight focus groups	n=120	Descriptive analysis	qualitative	Lack of motivation Financial constraints role of family support peer or friend support/network Low-income guidance from healthcare providers. Translating medical information.

44	Predictors of Diabetes Self-Management among ... (Azylina Gunggu, 2016)	4 diabetes clinics in Sarawak, Malaysia.	Face-to-face interview using a questionnaire ..	n=400	Quantitative analysis.	Health care personnel must empower and convince patients Of spousal support for emotional and physical support adherence to the follow-up. Strong family support builds patients' confidence level, lifestyle changes emotional and physical support adherence to the follow-up.
45	Self-management Experience of Middle-aged (Fei-L. W.2019)	Metabolic outpatient clinics in Taiwan	Semi-structured Questions discussions 2 FGD	for n=23	Qualitative thematic analysis	Patient-centred diabetes education and culture are sensitive. develop patient-centered, culture-sensitive clinical skills.
46	Access to Diabetes Self-Management Education (Barbara A. G 2019)	Alabama, US	Descriptive structured questionnaires	Semi- A GIS was used to provide distance data	Quantitative analysis.	Timely access to DSME geographical healthcare service access lack of income or financial resources cultural and spiritual beliefs, language, education, self-reliance, and concern about confidentiality. accessibility to health resources, and availability of primary care providers. health-seeking behaviours, health service utilization
47	Effects of an Outpatient Diabetes Self-Management Education on Patients (Fan Z., 2019)	Cardiovascular Xiangya Hospital, Central South University,	2-session education Follow up Post education single-blinded randomized	n=60	Quantitative analysis	Diabetes education The mental health of patients psychological distress
48	Persistent barriers and strategic practices ... (K A S Rendle, 2013)	Safety-net clinics in Southern California.	Semi-structured qualitative interviews	n =20	Qualitative thematic analysis	low-income patients tailoring to incorporate the everyday socioeconomic environment clear, open communication with patients. Patient-centered communication
49	Challenges to developing diabetes self-management skills in a low-.... (H. Ann Fritz, 2014)	An urban area in central North Carolina	1. semi-structured interview 2 photo-elicitation 3. record daily activities in a logbook	n = 20	Mix method study Content analysis	negotiating care systems on patient characteristics for prioritizing areas challenges in skill development

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