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Contributing factors to effective self-management in type 2 diabetes mellitus

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ABSTRACT

Background: *Self-management plays a pivotal role in the management of Type 2 Diabetes Mellitus (T2DM). Active patient participation is crucial for achieving optimal glycemic control, preventing complications, and enhancing overall quality of life in the context of long-term, sustainable disease management.*
Objectives: *This study aims to analyze the factors influencing self-management in patients with T2DM, to provide a foundation for developing more effective interventions that support patients in independently managing their condition.*
Methods: *This study employed a literature review method by analyzing articles published within the last five years from the PubMed, ScienceDirect, and ProQuest databases. The search keywords used were "Self-management, Type 2 Diabetes Mellitus, and Factors influencing." Out of 1,168 identified articles, 22 articles were selected based on relevant inclusion criteria, with a primary focus on self-management and its influencing factors in T2DM patients.*
Results: *Self-management in patients with T2DM is influenced by both internal and external factors as well as individual skills. Key contributing factors include family support, cultural values, self-efficacy, emotional regulation, and time management. These elements interact dynamically, demonstrating that patients' ability to manage diabetes is not determined by a single factor but rather by an integration of psychological readiness, supportive environments, and contextual influences. The findings highlight the importance of designing interventions that are holistic, culturally sensitive, and adaptable to patients' daily realities. A holistic intervention approach, grounded in the bio-psycho-social and cultural model, is needed to enhance the effectiveness of self-management.*
Conclusions: *Self-management is a crucial component in the management of T2DM. Ineffective implementation may lead to poor disease control and an increased risk of complications. Therefore, understanding the factors influencing self-management is essential for supporting sustainable and independent diabetes care.*

KEYWORD: *factors influencing; self-management; type 2 diabetes mellitus*

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INTRODUCTION

Type 2 Diabetes Mellitus (T2DM) is a prevalent chronic disease worldwide, characterized by insulin resistance leading to hyperglycemia. The management of this condition relies not only on pharmacological treatment but also on self-management, which involves lifestyle modifications such as dietary regulation, physical activity, and blood glucose monitoring. These actions are undertaken by patients to maintain blood glucose levels within the normal range and prevent serious long-term complications, including cardiovascular disease, neuropathy, and renal failure(1).

Globally, diabetes has reached epidemic proportions, with an estimated 415 million individuals affected in 2015, and projections suggest this figure will rise to 642 million by 2040 (2,3). Indonesia ranks fourth globally in the burden of diabetes, with a prevalence of 8.6% among adults with type 2 diabetes. The prevalence is projected to increase substantially, from 8.4 million cases in 2000 to 21.3 million by 2030 (4,5). These statistics highlight the urgentneed for comprehensive strategies to strengthen self-management and mitigate the risk of complications.

Self-management has been widely recognized as a cornerstone of successful T2DM control, as it encompasses various dimensions that directly impact patients' overall health and quality of life. However, the effectiveness of self-management is significantly influenced by both individual and environmental factors. Studies have shown that successful diabetes self - management is affected by factors such as educational level, social support, self-efficacy, and active involvement in one's health care (6,7). Patients who receive strong social support, possess high self-efficacy, and have adequate awareness of diabetes management tend to achieve better health outcomes and maintain more stable glycemic control, whereas those lacking knowledge and motivation are more likely to experience frequent and severe complications (8,9).

Despite this growing body of evidence, a significant research gap remains. Much of the literature has emphasized clinical and pharmacological aspects of diabetes care, while psychosocial, cultural, and contextual determinants such as health literacy, cultural identity, family support, and time management which have received comparatively less attention (10,11). Moreover, studies exploring how emotional regulation, fear of complications, and environmental barriers shape long-term adherence to self-management behaviors are still limited, particularly in low- and middle-income countries (3,12).

Addressing these gaps is essential to ensure that interventions are not only medically effective but also culturally sensitive and sustainable. This literature review therefore seeks to bridge these gaps by systematically synthesizing evidence on the psychosocial, cultural, and contextual determinants of T2DM self-management. By integrating findings from cross-sectional, qualitative, and

mixed- methods studies, this review aims to provide a comprehensive perspective that can guide the development of contextually relevant, patient-centered, and sustainable intervention strategies.

MATERIALS AND METHODS

The literature analysis was conducted by searching for articles using a combination of keywords across several scientific databases, namely PubMed, ScienceDirect, and ProQuest. The keywords used in the search included *Self-management, Type 2 Diabetes Mellitus, and Factors influencing*. The inclusion criteria for the search encompassed articles published between 2020 and 2025, available through open access or open archives, within the fields of nursing and health professions, available in free full-text format, sourced from scholarly journals, and specifically addressing diabetes-related topics.The exclusion criteria included articles that were not available in open access and those published more than five years prior. Based on the search across the three databases, a total of 1,168 articles were identified, with the following distribution: 151 articles from PubMed, 464 articles from

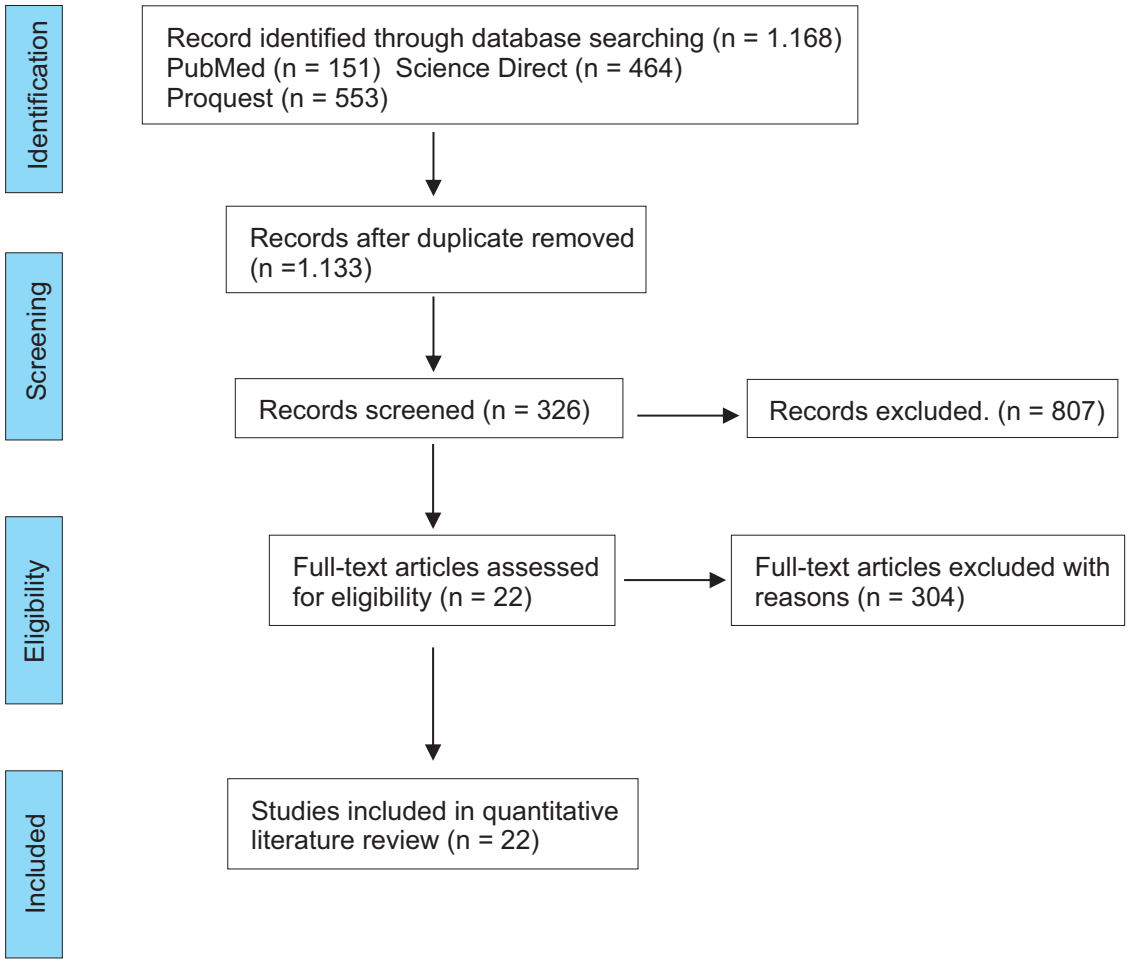

Figure 1. PRISMA Flowchart

ScienceDirect, and 553 articles from Pro-Quest. After removing duplicates, 35 articles were excluded, resulting in 1,133 remaining articles. A screening of titles and abstracts was then conducted, during which 807 articles were excluded due to irrelevance, leaving 326 articles. From these, 22 articles met the final selection criteria, namely those that specifically addressed self-management in patients with Type 2 Diabetes Mellitus and the influencing or supporting factors. A litera-ture review method based on the PRISMA guidelines was applied in this study, as presented in **Figure 1**.

Table 1. Result of the selected article

Author & Year	Title	Design	Aims	Population	Sample	Result
Al Slamah., et al 2020. (13)	Cultural adaptation of self- management of type 2 diabetes in Saudi Arabia (qualitative study)	Qualitative with phenomeno logical and ethnographi c approach	To assess factors that support or hinder the implementation of diabetes self-management programs in Saudi Arabia	Patients with type 2 diabetes and health professionals, including doctors, nurses, dietitians, and health educators	21 participants 12 patients with type 2 diabetes and 9 health professionals	Diabetes self-management was supported by healthcare providers, patient awareness, healthy lifestyles, and technology. Barriers included limited facilities, cultural factors, and low adherence. Solutions proposed included training and structured education.
Almutairi., et al 2024. (14)	Relationship between patient activation and type 2 diabetes Mellitus Self-management and clinical outcomes in Saudi Arabian primary care setting.	cross- sectional	Evaluate the relationship between patient activation and self-management of type 2 diabetes mellitus (T2DM)	T2DM patients aged 18 and above receiving care at primary healthcare centers in Alrass, Saudi Arabia	398 patients aged 18 years and older	Patient activation level positively correlated with self-management behavior and glycemic control, but showed no significant effect on medication adherence or other clinical outcomes. The average activation score was 55.9, and 74.5% of patients had uncontrolled HbA1c levels.

Patel et al., 2021. (11)	Cultural identity conflict informs engagement with self-management Behaviours for south Asian patients living with Type-2 diabetes: a critical interpretative synthesis of qualitative research studies	Critical Interpretativ e Synthesis (CIS).	To understand how cultural identity conflict influences self-management behavior among South Asian patients with type 2 diabetes	South Asian patients living in the UK with type 2 diabetes	536 participants	Cultural identity conflict significantly impacted self-management behavior. Patients who struggled to reconcile their cultural identity with medical advice were less likely to engage in behaviors such as healthy eating, physical activity, and medication adherence.
Chen., et al 2024. (3)	The effect of health quotient and time management skills on self-management behavior and glycemic control among individuals with type 2 diabetes mellitus	Cross- sectional with purposive sampling	Analyze the effects of health quotient (HQ) and time management skills on self-management	Individuals with T2DM from three tertiary hospitals in Chengdu, Sichuan Province, China	215 participants aged ≥18 years	HQ and time management skills influenced self-management behavior and HbA1c control. HQ had a direct (0.156) and indirect (68.8%) effect on self-management, leading to reduced HbA1c levels (−0.394). The mean HQ was 7.47, self-management 72.98%, and HbA1c 8.04 mmol/L, with 34.9% achieving HbA1c <7%.
Klinovszky et al., 2023. (15)	Behind the Curtain: Patients' Perceptions, Treatment Expectations and Behavior in Type 2 Diabetes Mellitus Self- management.	mixed methods	To explore and understand patients' perceptions of treatment and behavior in type 2 diabetes mellitus self-management	T2DM patients undergoing insulin therapy	50 participants	Self-management was influenced by emotional factors, coping strategies, attitudes toward insulin, openness to technology, illness perception, and social support.

Habibi Soola., et al 2022.(16)	Determining the predictors of self-management behaviors in patients with type 2 diabetes: An application of socio-ecological approach.	cross-sectional	Identify predictors of self-management behaviors in T2DM patients referred to the emergency unit in Ardabil in 2020	Patients with type 2 diabetes.	273 patients were referred to the emergency department.	At the individual level, significant factors included gender(p=0.025), education (p=0.002), duration of diabetes (p=0.38), owning a glucometer (p<0.001), empowerment (p<0.001), personal support (p=0.002), and self- efficacy (p=0.047). At the interpersonal level, main healthcare support (p<0.001), social networks (p<0.005), and family/friend support (p<0.001) were crucial. Organizational support (p=0.013), media influence (p<0.001), and situational factors (p<0.001) were also important at the community level.
Hurst., et al 2020.(2)	Impact of diabetes self- management, diabetes management self-efficacy and diabetes knowledge on glycemic control in people with Type 2 Diabetes (T2D): A multi- center study in Thailand.	cross-sectional	To explore the impact of diabetes self-management, self-efficacy, and diabetes knowledge on glycemic control in T2DM patients in Thailand	T2DM patients in Thailand	700 participants	Diabetes management self-efficacy (DMSE) was significantly associated with glycemic control (OR 2.84; adjusted OR 2.67). Self-management (SDSCA) had a positive influence (OR 1.64), while diabetes knowledge (DK) had a negative impact (OR 0.89). After adjustment, only DMSE remained significant, highlighting self-efficacy as a key determinant in glycemic control.

Suglo & Evans, 2020. (10)	Factors influencing self- management in relation to type 2 diabetes in Africa: A qualitative systematic review	Qualitative Systematic Review.	To synthesize qualitative evidence regarding the perspectives and experiences of T2DM patients and identify factors influencing self-management practices	Adults (aged ≥18) living with T2DM in African regions	426 participants	Diabetes self-management in Africa was influenced by cultural, social, economic, emotional, and structural factors. Recommendations included culturally tailored education and improved healthcare systems to support effective self- management.
Peng., et al 2022. (17)	A qualitative exploration of self-management behaviors and influencing factors in patients with type 2 diabetes.	Qualitative study using semi-structured interviews	Identify factors influencing non-adherence to self-management practices, including medication therapy, blood glucose monitoring, and lifestyle changes	Patients with type 2 diabetes	28 interviewed patients	Factors such as excessive optimism, peer influence, irregular blood sugar monitoring, emotional stress, and lack of knowledge regarding diet, exercise, and foot care were found to affect self- management behavior.
Qi., et al 2021.(8)	Self-management behavior and fasting plasma glucose control in patients with type 2 diabetes mellitus over 60 years old: multiple effects of social support on quality of life.	cross-sectional	To assess the quality of life and its influencing factors in older adults with T2DM, specifically examining the relationships between social support, self-management behavior, fasting plasma glucose (FPG) control,	Older adults with type 2 diabetes (aged >60)	571 elderly patients	Older adults had an average quality of life score of −29.25 ± 24.41, with the lowest scores in psychological, activity, and emotional domains. While 65.32% had normal FPG levels, 30.99% had uncontrolled levels. Only 15.94% demonstrated good self- management, whereas 33.62% showed poor behavior-particularly in physical activity (60.8%), glucose monitoring (50.1%),

			and collective impact on quality of life.			and FPG control (40.8%). Low to moderate social support (22.07%) was linked with poorer quality of life (−44.66 ± 26.03).
Zare., et al 2020. (9)	The barriers and facilitators of self-management among adults with type 2 diabetes mellitus: a trans theoretical model (TTM)- based mixed method study in Iran.	Mixed- method with a sequential explanatory approach.	To determine the behavioral status based on the stages of change model and to explore the factors influencing self-management	Adult patients with type 2 diabetes mellitus in Iran.	246 patients with type 2 diabetes mellitus.	Factors influencing self-management in patients with type 2 diabetes include care team support, nutritional knowledge, belief in treatment, and supportive planning during the action stage.
Visagie., et al 2024. (12)	Exploring the thoughts, emotions, and behaviours related to the self-management practices of adults with type 2 diabetes	Qualitative	Explore the thoughts, emotions, and behaviors that contribute to success or challenges in self-management.	Adults aged 35–45 years diagnosed with type 2 diabetes for more than one year in South Africa	17 participants	Successful self-management of type 2 diabetes is influenced by the individual's ability to accept their condition, regulate emotions, restructure negative thoughts, and proactively adopt healthy behaviors.
Lin., et al 2021. (18)	The effect of self-efficacy in self-management on diabetes distress in young people with type 2 diabetes	Cross- sectional descriptive study.	Examine the influence of self-efficacy in self-management on diabetes distress among adolescents and young adults with type 2 diabetes	Adolescents and young adults diagnosed with type 2 diabetes mellitus receiving care at a pediatric outpatient clinic in a medical center in northern Taiwan	60 participants	Self-efficacy in self-management significantly affects diabetes distress in young individuals with type 2 diabetes. Self-efficacy explained 29% of the variance in distress, with disease duration also positively associated. High distress was observed in 31.6% of respondents. Low adherence to medication, exercise, and diet were contributing factors.

						Enhancing self-efficacy is a critical strategy to reduce distress and improve diabetes self- management in the younger population.
He., et al 2023. (19)	Diabetes self-management and its related factors among Chinese young adults with type 2 diabetes mellitus.	cross- sectional study	Explore the status of self-management in young adults with type 2 diabetes mellitus (T2DM) and identify related factors based on the Social Cognitive Theory framework	Young adults in China diagnosed with T2DM for at least three months at two hospitals in Beijing	227 participants.	Factors influencing self-management include self-efficacy, diabetes distress, fasting blood glucose levels, confrontational coping style, diabetes knowledge, disease duration, and participation in diabetes-related social improve self-efficacy, knowledge, and social support can help enhance self-management behaviors.
Yang., et al 2022. (5)	Factors influencing diabetes self-management among adults with type 2 diabetes mellitus in China.	cross- sectional	Analyze the relationship between diabetes knowledge, self-efficacy, fatalism, and social support with self-management.	Adult patients with type 2 diabetes in Wenzhou, China.	108 participants.	Diabetes knowledge and self-efficacy were significant predictors of diabetes self-management.
Kumar & Mohammadn ezhad, (2022). (20)	Perceptions of patients on factors affecting diabetes self-management among type 2 diabetes mellitus (T2DM)	Descriptive qualitative	To explore patients' perceptions of factors affecting diabetes self-management in the Labasa region of Fiji	Patients with type 2 diabetes mellitus in Labasa, Macuata Province, Fiji	30 participants	Factors affecting diabetes self-management in T2DM patients in Labasa include low knowledge, negative perceptions of medical treatment, trust in herbal remedies, limited family support, and barriers such as

	patients in Fiji: A qualitative study					financial burdens, stress, physical limitations, and cultural norms.
Ratnawati., et al 2024. (4)	The Effect of Motivational Interviewing and Family Support on Self- Management in Type 2 Diabetes Mellitus Patients	quasi-experiment al study	Evaluate the effectiveness of motivational interviewing and family support in improving self-management.	Patients with type 2 diabetes mellitus in the working areas of Bulango Selatan and Bulango Timur Health Centers, Bone Bolango Regency, Gorontalo	60 participants	Internal motivation (through motivational interviewing) and social support from family are two key factors influencing the effectiveness of self-management in type 2 diabetes patients
Li., et al 2022. (21)	Impact of fear of hypoglycaemia on self- management in patients with type 2 diabetes mellitus: structural equation modelling	cross- sectional	Examine the impact of fear of hypoglycemia on self-management	Patients with T2DM treated in the endocrinology departments of three hospitals in Jiangsu Province, China	258 participants	Fear of hypoglycemia negatively affects self-management directly and indirectly through distress, self-stigma, and social support. Interventions that reduce FOH and enhance social support may improve patient self-management.
Banasiak., et al 2020. (22)	Facilitating barriers: contextual factors and self-management of type 2 diabetes in urban settings.	Qualitative	Investigate how contextual factors in urban life influence the self-management of	Adults with type 2 diabetes living in urban areas of Toronto and Vancouver, Canada.	29 participants	The self-management of individuals with type 2 diabetes in large cities is influenced by unstable routines, sociocultural factors, and economic conditions.
Omodara., et al 2022. (23)	Exploring the impact of cultural beliefs in the self-management of type 2 diabetes among Black sub-Saharan Africans in the UK	Qualitative	Explore how cultural beliefs, attitudes, and practices influence type 2 diabetes self-management behaviors.	Black Sub-Saharan African adults residing in the UK who have been diagnosed with type 2 diabetes.	36 participants	Self-management is influenced by three main factors: limited knowledge and perceptions about diabetes, the influence of cultural values such as traditional foods and spirituality, and social stigma that leads to denial and shame.

	a qualitative study informed by the PEN-3 cultural model.					
Desse., et al 2024. (24)	Patient-Perceived Challenges to Type 2 Diabetes Self-Management in Sub-Saharan Africa: A Qualitative Exploratory Study.	Exploratory qualitative	explore patient-reported challenges affecting the self-management of type 2 diabetes at a diabetes center in Ethiopia.	Patients with type 2 diabetes receiving care at the Tikur Anbessa Specialized Hospital (TASH), Ethiopia	30 participants	Factors influencing self-management include cultural values and beliefs, family and social support including pressure during social events patients' educational and knowledge levels, economic conditions.
Ansari., et al 2022. (25)	Experiences of diabetes self-management: A focus group study among the middle-aged population of rural Pakistan with type 2 diabetes	Qualitative	To explore self-management experiences among middle-aged individuals with type 2 diabetes.	Individuals aged 40-65 diagnosed with type 2 diabetes and living in rural Pakistan.	20 participants	Family support, education, and culturally sensitive approaches from healthcare providers significantly enhance self-management capabilities and improve patients' quality of life.

RESULTS AND DISCUSSION

RESULTS

Self-management is a critical component in the control of type 2 diabetes mellitus (T2DM), as it encompasses an individual's ability to independently and consistently manage lifestyle, medication, diet, physical activity, and psychosocial conditions. The importance of this aspect is supported by a review of 22 articles listed in Table 1, which originate from various countries including Saudi Arabia, China, Thailand, Africa, Iran, the United Kingdom, and Indonesia. These studies identify a range of factors that influence the effectiveness of self-management. The findings indicate that diabetes management is not solely determined by clinical aspects but is also shaped by external and internal factors, as well as key patient competencies.

External Factors

External factors play a significant role in either supporting

or hindering the success of self-management among patients with type 2 diabetes mellitus (T2DM). Two primary components within this category are family support and cultural values. Both have consistently been shown to influence adhe-rence to medication, diet, physical activity, and long-term glycemic control.

Family Support

Family support has consistently been identified as a key driver of successfull self-management. In a quasi-experimental study conducted by Ratnawati (2024) in Indonesia, interventions based on motivational inter-viewing and family involvement significantly improved self-management scores ($p < 0.05$). Patients who received active support from their families demonstrated enhanced adhe-rence to medication, dietary guidelines, and physical activity routines. Qi (2021) reported that among the elderly T2DM population in China (n = 571), only 15.94% exhibited good self-management behaviors. Those with low levels of social support reported significantly lower quality of life (score −44.66 ± 26.03) compared to those with higher levels of support. Family support was associated with better glu-cose control; 65.32% of patients with good fasting plasma glucose (FPG) control received strong family support, while 22.07% of those with poor FPG control generally reported low social support. Research conducted in Fiji by Kumar and Mohammadnezhad (2022) emphasized the pivotal role of spouses as the most influential source of support more so than children in maintaining patients' adherence to diet and medication regimens. In interviews with 30 T2DM patients, most number of participants highlighted their spouse's role as a primary motivator in establishing healthy routines, including reminders to take medication and monitor blood glucose levels. Habibi Soola (2022) further noted that, within a socio-ecological framework, interpersonal support from family and friends showed a significant correlation with self-management behaviors ($p< 0.001$). Such support encompasses not only emotional and physical assistance but also instrumental support, such as providing healthy meals and transportation to health-care facilities.

Cultural Factors

Local cultural values can act both as facilitators and barriers to effective self - management. In a qualitative study by Omodara (2022) among Sub-Saharan, African communities in the United Kingdom, beliefs in herbal remedies and spiritual healing were found to reduce reliance on conventional medical therapies. This often resulted in delays or discontinuation of prescribed treatments. Patel (2021), in a critical synthesis involving 536 South Asian patients in the UK, found that cultural identity conflicts negatively affected engagement in self-management behaviors. Patients who struggled to reconcile cultural values with medical advice were less likely to maintain healthy eating habits or adhere to recom-

mended physical activity. Similar findings were reported by Desse (2024) in Ethiopia and Banasiak (2020) in Canada. They highlighted how social norms associated with traditional and religious events such as the consumption of high-sugar and high-fat foods frequently led patients to disregard dietary recommendations. This issue is often exacerbated by social pressure to participate in cultural practices, even when these are at odds with treatment adherence.

Internal Factors

Internal factors are critical determinants in the self-management of patients with type 2 diabetes mellitus (T2DM). Two primary components in this category are self-efficacy and emotional regulation, both of which influence patients' motivation, adherence, and engagement in daily self-management behaviors.

Self-Efficacy

Self-efficacy is defined as an individual's belief in their ability to independently manage a chronic condition. A study by Hurst (2020) in Thailand involving 700 T2DM patients found that self-efficacy is a strong predictor of glycemic management success. The study reported an unadjusted odds ratio of 2.84 and an adjusted odds ratio of 2.67 for achieving good blood glucose control (HbA1c < 7%). Furthermore, a study by Yang (2022) involving 108 T2DM patients in China showed that perceived self-efficacy significantly affected self-management behaviors, with a regression coefficient of $\beta = 0.184$ and $p = 0.039$. Although diabetes knowledge contributed more substantially ($\beta = 0.468$; $p < 0.001$), these findings underscore that enhancing self-efficacy through education and training can substantially strengthen patient engagement in sustainable self-management. From a psychological perspective, Lin (2021) studied 60 adoles-cents and young adults in Taiwan and found that self-efficacy accounted for 29% of the variance in diabetes distress ($\Delta R^2 = 0.29$), with a significant negative correlation between self-efficacy and distress ($r = -0.74$, $p < 0.001$).

These results indicate that low self-efficacy not only reduces adherence to treatment and dietary regimens but also to increase the psychological burden on patients. Similarly, He (2023) reported that among young patients in China, self-efficacy, confrontational coping styles, and social support collectively contributed to higher self-management scores. Patients with higher levels of self-efficacy tended to demonstrate better adherence to foot care, blood glucose monitoring, and routine visits to healthcare facilities.

Emotional Regulation

The ability of patients to regulate their emotions is also a critical determinant of successful self-management. A study by Visagie (2024) in South Africa found that patients capable of restructuring negative thoughts and managing stress were more

likely to proactively engage in healthy behaviors. This qualitative study high-lighted the importance of interventions based on cognitive behavioral therapy (CBT) in supporting the emotional aspects of self-management.

Supporting these findings, Klinovszky (2023) identified that negative emotions such as anger, fear, and sadness significantly hindered self-management, especially among patients undergoing insulin therapy. Additionally, maladaptive coping strategies were associated with lower adhe-rence to treatment and limited acceptance of medical technologies. In alignment with these findings, a more focused study by Li (2022) examined the influence of fear of hypo-glycemia (FOH) on self-management among 258 T2DM patients in China. Their structural equation model showed that FOH had a significant direct negative effect on self-management behaviors ($\beta = -0.502$; $p < 0.001$), along with indirect effects through distress (indirect effect = 0.308) and through self-stigma and social support (indirect effect = -0.008). FOH also reduced patients' quality of life and adherence to insulin therapy.

Interestingly, Habibi Soola (2022) identified that social support can act as a crucial mediator that buffers the negative impact of emotional distress on self-management behaviors ($p < 0.001$). A strong social network reinforces psychological resilience and facilitates more rational decision- making by patients.

Key Skill: Time Management

Time management is a vital yet often overlooked skill in the self-management of patients with type 2 diabetes mellitus (T2DM). Patients' ability to plan, schedule, and balance various daily activities such as medication, diet, physical activity, and blood glucose monitoring significantly affects the successful management of this chronic disease. Irregularities in time management may hinder patients' active engagement in their prescribed care regimen, thereby negatively impacting glycemic control. In line with this understanding, Chen (2024) conducted a cross-sectional study involving 215 T2DM patients in China and found that time management skills significantly contri-buted to self-management behaviors. In their structural model, time management skills had a significant direct effect on self-management behaviors -0.617 and served as a mediator in the relationship between health quotient (HQ) and self-management, with a mediation effect proportion of 68.8%.

Statistically, effective self-manage-ment behaviors were significantly asso-ciated with lower HbA1c levels, with a regression coefficient of -0.394, indicating a strong negative relationship between self-management ability and blood glucose levels. Only 34.9% of participants achieved the target HbA1c level of below 7%, whereas the majority of those who failed to control their glucose levels had low scores in both Health Quotient and time management skills. The average HQ score among participants was

7.47 (on a maximum scale), while self-management behavior scores reached only 72.98% of the ideal score.

DISCUSSION

The synthesis of 22 studies, as summarized in Table 1 in the results section, reveals that self-management in patients with type 2 diabetes mellitus is influenced by a complex interplay of internal factors, external conditions, and individual skills. Family support and cultural values, as external factors, play a pivotal role in shaping patients' attitudes and motivation. As demonstrated by Ratnawati (2024) and Kumar & Mohammad-nezhad (2022), family involvement not only enhances adherence to therapy but also fosters a supportive emotional environment. Conversely, certain cultural values, such as the consumption of traditional foods and beliefs in herbal remedies, may act as barriers to effective self-management (11,23,24). Beyond direct emotional support, families also provide instrumental assistance such as meal preparation, financial support for medications, and reminders for follow-up appointments, all of which significantly improve selfcare consistency (8,22). Furthermore, cultural frameworks strongly influence patients' healthseeking behavior and their perceptions of modern versus traditional treat-ments. While cultural alignment can enhance patient motivation, unresolved cultural conflicts, as reported among South Asian and Sub-Saharan African populations, often reduce adherence and create resistance to medical advice (11,23,25). Therefore, culturally tailored interventions are crucial for ensuring that diabetes self-management strategies are not only clinically effective but also contextually acceptable (9).

Self-efficacy, as the most dominant internal factor, has consistently shown a positive correlation with successful self-management outcomes (2,5). However, this self-efficacy is significantly influenced by emotional and social factors. Negative emotions such as fear and distress can undermine confidence and commitment to self-management practices (12,21), whereas social support may buffer or even neutralize these adverse effects (16). Severalstudies emphasize that young adults with type 2 diabetes, in particular, often struggle with sustaining self-efficacy due to lifestyle demands and psychological stressors, highlighting the importance of interventions that combine skill-building with emotional resilience training (18,19). Patients' perceptions of their illness, expectations from treatment, and trust in healthcare professionals are also tightly linked to their self-efficacy levels (15). This suggests that boosting self-efficacy requires a multidimensional approach that not only addresses knowledge gaps but also targets emotional well-being and patient provider relationships.

Time management skills, as highlighted by Chen (2024), are a fundamental prerequisite for effective self-management. This aspect is often overlooked in conventional educational approaches, despite its direct

relevance to medication adherence, physical activity, and blood glucose monitoring routines. Patients with strong time management competencies demonstrate higher rates of dietary adherence, more consistent glucose monitoring, and reduced diabetes distress (3). Conversely, deficits in time prioritization often lead to irregular follow-up attendance and treatment interruptions, particularly among working- age adults (8,22). Effective time management is not only a practical skill but also reflects an individual's capacity to integrate self-care behaviors into daily routines, underscoring its critical role as a mediating factor between knowledge and action.

These findings underscore the importance of holistic and personalized intervention strategies. A biopsychosocial approach, enriched by socio-ecological perspectives, is necessary to integrate family, cultural, psychological, and behavioral dimensions of care (16,25). Importantly, tailoring interventions to account for cultural identities and emotional regulation needs enhances both feasibility and sustainability (11,23). Nurse-led interventions, particularly those emphasizing motivational interviewing, family engagement, and structured time management training, have shown promise in significantly improving self-management outcomes (3,4). Nevertheless, most of the reviewed studies employed cross-sectional designs, which limit causal inference and increase the risk of perception bias. Future research should prioritize longitudinal and interventional designs to explore causal pathways, particularly how emotional regulation and time management mediate the relationship between external supports and self-management outcomes (9,19).

CONCLUSION AND RECOMMENDATION

Self-management in patients with type 2 diabetes mellitus (T2DM) considers a complex and multidimensional process. Its success is largely determined by a combination of internal factors, external influences, and essential behavioral skills. Externally, family support is a critical motivational enhancer and treatment adherence cue. Patients who receive strong family support tend to demonstrate higher compliance with dietary, physical activity, and pharmacological recommendations (4,8). In addition, cultural factors such as beliefs intraditional medicine, customary diets, and spirituality may act either as facilitators or barriers depending on the patient's social context (11,23).

From an internal perspective, self-efficacy emerges as the strongest psychological predictor of successful self-management (2,5). Individuals with high self-efficacy are 2 to 3 times more likely to achieve good glycemic control. Moreover, emotional regulation, particularly in managing fear and stress, significantly contributes to the consistency of self-management behaviors (12,21). Time management is a core skill that enables patients to integrate therapeutic practices into their daily routines. A study by Chen

(2024) found that effective time management significantly reduced HbA1c levels through improved self- management behaviors.

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