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Self-Management Education for Improving Self-care Behaviours in People with Diabetes: An Evidence Based Systematic Review

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Abstract
Introduction: *Diabetes mellitus (DM) is a chronic condition requiring effective self-care to prevent complications. However, many patients struggle with self-care due to limited health literacy, inadequate resources, and socio-cultural barriers.* ***Objective:*** *This systematic review examined the effectiveness of Diabetes Self-Management Education (DSME) interventions in improving self-care, glycemic control, and quality of life for individuals with type 2 diabetes.* ***Methods****: Following PRISMA guidelines, a search across multiple databases (2018-2025) identified 12 eligible experimental or quasi-experimental studies. The results consistently demonstrated that DSME significantly improved diabetes outcomes.* ***Result and Discussion:*** *Participants showed enhanced self-efficacy, dietary adherence, self-care behaviors, and glycemic control (HbA1c reductions of 0.6% to 1.1%). Quality of life also improved, with some studies reporting a 7.2-fold increase in the likelihood of better health-related quality of life among DSME participants. Furthermore, innovative and contextually adapted delivery methods, such as SMS, booklets, and culturally specific models like "PASTI SEMBUH," proved highly feasible and acceptable, particularly in resource-limited settings.* ***Conclusion:*** *DSME is a powerful, evidence-based intervention In conclusion, DSME is a powerful, evidence-based intervention that improves clinical outcomes, quality of life, and self-care capacity in individuals with type 2 diabetes. Integrating diverse and contextually relevant DSME methods into national health strategies, especially in low- and middle-income countries, is crucial for wider reach and effectiveness.*

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Introduction

Diabetes mellitus (DM) is a metabolic disease characterized by hyperglycemia due to impaired insulin secretion or work, or both (Kadir & Herawati, 2025). Chronic hyperglycemia can cause damage to vital organs such as the eyes, kidneys, nerves, heart, and blood vessels, leading to serious and life-threatening complications (Istiqomah & Mahyuvi, 2023). Due to its chronic and complex nature, diabetes requires self-care as the main key to successful management (Senee et al., 2022). Effective self-care behaviors have been shown to be closely related to better clinical outcomes, confirming the importance of the individual's active role in managing his or her health independently (Anggraeni et al., 2023). This is due to a lack of awareness, limited resources for trained health workers, lack of health system support, and cultural and social factors that affect patient motivation. As a result, many individuals with diabetes are still unable to carry out optimal self-care.

The prevalence of diabetes, especially type 2, has increased sharply in the last three decades. From 151 million cases in 2000, the number jumped to 537 million in 2021 and around 589 million in 2024. It is estimated that this number will continue to rise to 853 million by 2050. Regionally, Indonesia faces a large burden of diabetes (WHO, 2022). By 2024, around 20.4 million adults (aged 20–79 years) will be living with diabetes, with a prevalence of 11.3%, making Indonesia the fifth country with the highest number of diabetics in the world (International Diabetes Federation, 2020). More than 90% of people with diabetes suffer from type 2 diabetes, which is influenced by socio-economic, demographic, environmental, and genetic factors (Rahmadani & Jihad, 2023). Factors such as urbanization, population aging, lack of physical activity, as well as increasing overweight and obesity demand the importance of self-management and self-care. Patients need to have the skills and commitment to manage lifestyle and medication independently to prevent complications and control the disease optimally.

Effective self-care plays a key role in diabetes management and complication prevention. There are seven essential behaviors that support positive outcomes: healthy eating, physical activity, blood sugar monitoring, medication adherence, problem-solving, stress management, and risk reduction (Debussche et al., 2018). Although correlated with glycemic control and better quality of life, its implementation is often constrained by complex challenges from individual aspects, social relationships, health systems, and the environment, as described in the social ecology model (Puspasari et al., 2023).

Responding to these challenges, the improvement of self-management in people with diabetes has undergone significant development in recent decades through a variety of interventional approaches, both clinically and community based. Various models have been applied, such as group education approaches, individual consultations, the use of digital technology (mobile applications, SMS reminders, telehealth), to family-based interventions and peer support (Margarita et al., 2018). These programs aim to improve patients' understanding of their disease, encourage lifestyle changes, and strengthen decision-making skills related to diabetes management.

Self-management education, particularly through Diabetes Self-Management Education (DSME), not only focuses on delivering information, but also training practical skills, building motivation, and strengthening patients' confidence in self-care (Laia et al., 2024). Through a continuous education process based on individual needs, patients are encouraged to become active managers of their health, starting from monitoring blood sugar levels, regulating diet, physical activity, medication adherence, to preventing

complications (Puspasari et al., 2023). Based on this urgency, this systematic review was prepared with the aim of identifying the effectiveness of various forms of self-management education interventions in improving self-care behavior, glycemic control, and quality of life of people with diabetes. Thus, the results of this review are expected to be the basis for the development of more effective, integrated, and contextual educational intervention strategies in accordance with the needs of patients and the health care system.

Methods

This review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure a high standard of reporting throughout the systematic review process. It involved several key stages, including the structured formulation of relevant keywords, comprehensive data collection from selected electronic databases, and a thorough process of data screening and classification to ensure the final dataset was accurate, relevant, and consistent (Page et al., 2021).

Information Sources

To explore effective complementary therapies for addressing sleep disturbances in individuals with hypertension, a systematic literature search was performed using multiple academic databases, including Google Scholar, Scopus, Web of Science, and Crossref. The search encompassed studies published between 2018 and 2025 to ensure both foundational knowledge and recent advancements were considered.

From this process, a total of 2,496 articles were initially identified in English and other relevant languages. Duplicate entries were removed, and the remaining records were evaluated based on titles and abstracts. Predefined inclusion and exclusion criteria were applied to narrow down the studies relevant to the research objective.

Subsequent screening steps focused on identifying high-quality studies that investigated the use of complementary therapies such as yoga, massage, acupressure, etc. In improving sleep quality among hypertensive individuals suffering from insomnia. Preference was given to studies utilizing experimental or quasi-experimental designs, involving appropriate patient groups, and reporting measurable outcomes such as reduced sleep latency, improved sleep quality, lowered stress, or anxiety, and enhanced overall health status.

The selected articles were then critically reviewed to extract key findings, assess consistency in intervention outcomes, and explore their implications for clinical nursing practices. This systematic review aims to offer evidence-based recommendations for integrating non-pharmacological interventions into holistic care strategies for patients with hypertension and associated sleep disorders.

Search Strategy

The study commenced by constructing a carefully structured list of search terms intended to identify literature related to sleep disorders, kidney failure management, and non-pharmacological interventions. Keyword combinations such as “Sel-care,” AND “Self-management,” OR “Education” AND “DSME,” AND “Diabetes”. This methodical approach to keyword development was implemented to ensure a comprehensive and efficient literature search, enabling the retrieval of relevant, high-quality studies across various academic databases.

Selection Process

This study utilized a structured data collection process focused on identifying relevant literature concerning complementary therapies aimed at improving sleep quality in patients with hypertension who experience insomnia. Data were retrieved using precisely selected keywords, followed by a rigorous multi-step screening process to ensure relevance and methodological soundness. The procedure began with the removal of duplicate records, followed by an initial assessment of titles and abstracts to filter studies according to predefined inclusion and exclusion criteria.

To maintain the specificity of the review, studies that did not directly evaluate the effectiveness of complementary approaches such as yoga, massage therapy, auricular or body acupressure, aromatherapy, mindfulness techniques, or guided relaxation on sleep disturbances, stress reduction, or quality of life in hypertensive individuals were excluded. This step ensured that the review remained focused on interventions with direct relevance to non-pharmacological insomnia management in this population.

Following the initial screening phase, the remaining articles were subjected to further evaluation based on the relevance of their titles, abstracts, and keywords in relation to the study's objectives. A total of 149 articles were excluded at this stage due to lack of relevance. The remaining 172 articles underwent abstract screening, where 147 articles were removed for failing to meet the predefined inclusion criteria. Subsequently, 147 full-text articles were reviewed in depth to assess their methodological quality and relevance. Of these, 47 were excluded because they were study protocols, and another 88 were review articles lacking original empirical data. As a result, 12 studies met all eligibility criteria and were included in the final analysis of this systematic review.

These final studies were subjected to a systematic data extraction and synthesis process to uncover common themes, assess intervention efficacy, and map current trends in the use of complementary therapies for insomnia in patients with hypertension. The findings offer valuable insights into how non-drug-based strategies can support better sleep, enhance psychological well-being, and strengthen holistic care approaches. The selection process, depicted in Figure 1, highlights the comprehensive nature of this review and reinforces the validity and clinical utility of its conclusions.

Result and Discussion

1. Results

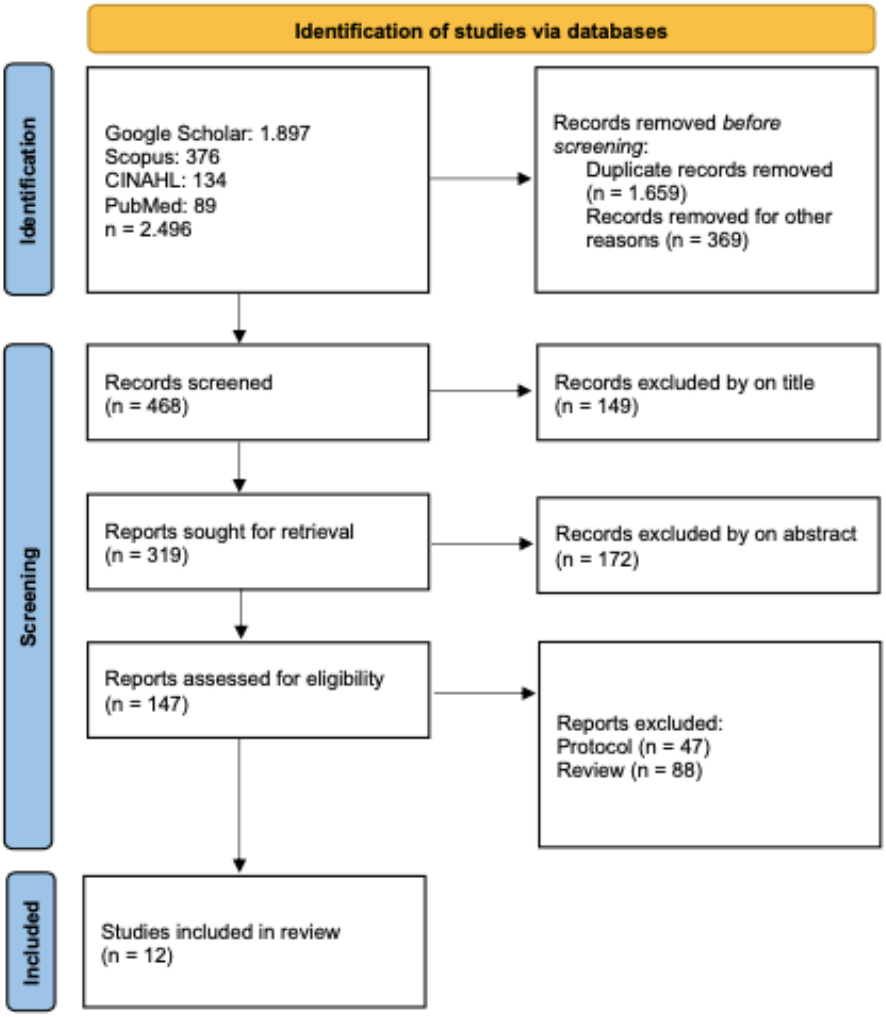

Figure 1 PRISMA Flowchart

Study Selection

The article selection process for this systematic review commenced with a comprehensive search across multiple databases, yielding a total of 2,496 records: 1,897 from Google Scholar, 376 from Scopus, 134 from CINAHL, and 89 from PubMed. In the initial phase, 1,659 duplicate entries and 369 records were removed based on preliminary eligibility criteria, leaving 468 articles for further screening. Subsequently, 149 articles were excluded after title review due to lack of relevance to the study topic. The remaining 172 articles proceeded to abstract screening, during which 147 articles were excluded for not meeting the predefined inclusion criteria. At the eligibility stage, 147 full-text articles were assessed in detail. Among these, 47 were excluded because they were study protocols, and another 88 were review articles that did not contain original research data. Ultimately, 12 studies fulfilled all eligibility requirements and were included in the final systematic review.

Study Characteristics

Table 1
Study Characteristics

No	Author (Year)	Country	Main Objective	Population	Method	Result
1	(Debussche et al., 2018)	Africa	To evaluate the effectiveness of peer-led self-management education in improving glycaemic control in patients with type 2 diabetes in a low-income country	151 participants with type 2 diabetes (HbA1c?8 %)	Randomized control trial	After 12 months, the intervention group showed a significant HbA1c reduction of 1.05%, compared to 0.15% in the control group. BMI decreased by 1.65 kg/m² in the intervention group, with minimal change in the control group. Waist circumference also dropped by 3.34 cm, while it increased in the control group. This peer-led structured education program effectively improved glycaemic control and anthropometric outcomes in patients with type 2 diabetes.
2	(Ridwan et al., 2018)	Indonesia	To assess the feasibility, effectiveness, and efficiency of using SMS to improve diabetes patients' knowledge through the implementation of the Diabetes Self-Management Education (DSME) program on a small scale	6 participants consisting of individuals with diabetes and their family members	Pilot study	The results show that the program is suitable for community use, offering time and effort efficiency without compromising material quality. Statistical analysis (Wilcoxon test) revealed a significant increase in participants' knowledge after the intervention ($p < 0.05$).
3	(Murtaqib et al., 2019)	Indonesia	To determine the effect of diabetes self-management education and support on self-efficacy in patients with type 2 diabetes mellitus	30 participants with type 2 diabetes mellitus	Quasi-experiment	The results showed a significant difference in self-efficacy between the treatment and control groups after the intervention, with a value of 10.495 ($p = 0.001$). This indicates a meaningful impact on the self-efficacy of patients with type 2 diabetes.
4	(Utama et al., 2021)	Indonesia	To evaluated effect of diabetes self-management education (DSME) on improving self-management and quality of life in type 2 DM	55 participants	Randomized control trial	The comparison results showed a significance value of 0.000 ($p < 0.05$) for both self-management and quality of life, indicating that the intervention group experienced significantly greater improvements than the control group. This suggests the intervention was more effective in enhancing self-management and quality of life among participants.
5	(Handayani & Nusdin, 2021)	Indonesia	To analyze the effect of Diabetes Self-Management Education and Support (DSME) on the quality of life in	23 participants	Pre-experiment	Wilcoxon test results showed a significant difference in quality of life before and after the intervention in the treatment group ($p = 0.001$), indicating an improvement after implementing DSME. This concludes that DSME has a

No	Author (Year)	Country	Main Objective	Population	Method	Result
			patients with diabetes mellitus.			significant positive effect on the quality of life of diabetes patients by enhancing their knowledge and self-care skills in managing blood sugar and preventing complications.
6	(Ratnasari et al., 2022)	Indonesia	To determine the effect of Diabetes Self-Management Education and Support on eating habits, body weight, nutritional status, and glycemic control.	60 people with HbA1C levels > 7.5%, and age 30–60 years	Quasi-experiment	This study showed that over six months, there was a significant increase in the consumption of vegetables, fruits, and milk ($p<0.05$), and a significant decrease in the intake of tubers and starches ($p<0.05$). However, rice and side dish consumption did not change significantly ($p>0.05$). Additionally, glycemic control improved significantly ($p<0.05$), but there were no significant changes in body weight or nutritional status ($p>0.05$).
7	(Aminah et al., 2022)	Indonesia	To determine the effect of DSME with media booklet on dietary compliance in patients with type 2 diabetes.	16 participants	Pre-experiment	The results of this study showed that before the intervention, 13 respondents (81.3%) were non-adherent to their diet, while after the intervention, 13 respondents (81.3%) became adherent. The DSME booklet media had a significant effect on dietary compliance among type 2 DM patients at the South Cimahi Public Health Center, with a p-value of 0.006 ($p < 0.05$).
8	(Rahmadani & Jihad, 2023)	Indonesia	To enable patients and their families living with diabetes to recognize diabetes-related problems, effectively control the condition, and carry out proper diabetes management.	Patient with diabetes mellitus type 2	Case study	After two DSME education sessions and a 7-day evaluation, the self-management score increased from 58 (moderate) to 68 (moderate), indicating a 10-point improvement. This shows enhanced self-health management in type 2 DM patients following DSME implementation.
9	(Aulia, 2023)	Indonesia	To determine the effect of diabetes self-management education on self-care behavior and blood sugar levels in patients with type II diabetes mellitus in	30 participants with diabetes mellitus type 2	Quasi-experiment	This study showed that most respondents had good self-care behavior (66.7%) but high blood sugar levels (100%) before the intervention. After receiving Diabetes Self-Management Education (DSME), both self-care and blood sugar levels improved significantly ($p=0.000$ and $p=0.039$).
10	(Probosiwi & Siswidiasari, 2024)	Indonesia	To evaluate the relationship between diabetes self-management education (DSME)	50 patients diagnosed with type 2 diabetes mellitus	Cross-sectional study	The demographic profile revealed that 60% of participants were female, 60% were aged 36–45, and 56% had a normal BMI. While most had good dietary management

No	Author (Year)	Country	Main Objective	Population	Method	Result
			and health-related quality of life (HRQoL) in type 2 diabetes patients			(64%), the majority (84%) had poor physical activity habits. Health-related quality of life (HRQoL) scores was high in physical functioning (64%), vitality (56%), and social functioning (56%). A significant association was found between DSME and HRQoL (p = 0.002; OR = 7.2), indicating that DSME greatly improves the quality of life in patients with type 2 diabetes.
11	(Etlidawati et al., 2024)	Indonesia	To assess the effects of DSME on the self-care of patients with diabetes by using a booklet medium	32 participants with diabetes mellitus	Quasi-experiment	The result showed a significant difference in diabetes self-care between groups (p=0.00). After the DSME intervention, 75% of the intervention group had good self-care behavior compared to 56% in the control group. The intervention group's mean self-care score improved significantly (p=0.01), while the control group showed no meaningful change (p=0.06).
12	(Kadir & Herawati, 2025)	Indonesia	To determine the effectiveness of increasing Diabetes Mellitus patients' knowledge through education using the "PASTI SEMBUH" method.	7 patients with diabetes mellitus	Case study	Based on the interventions given, most patients initially had low knowledge levels (85.7%). After education using the "PASTI SEMBUH" method, knowledge improved to moderate (57.1%) and high (28.6%) levels. The Wilcoxon test showed a significant effect, with a p-value of 0.02 (<0.05), indicating that the educational intervention effectively increased knowledge in Diabetes Mellitus patients.

2. Discussion

The analysis of 12 studies demonstrates that the implementation of Diabetes Self-Management Education (DSME) consistently has a positive impact on various aspects of type 2 diabetes management, including knowledge, dietary adherence, self-care behavior, glycemic control, and patients' quality of life. The study by Debussche et al. (2018) in Africa stands out as the only research conducted in a low-income country outside Indonesia, using a strong randomized controlled trial (RCT) design with a large sample. It reported a significant reduction in HbA1c and improvements in anthropometric parameters. This indicates that peer-led education can be effectively adapted in resource-limited settings. Most studies conducted in Indonesia employed quasi-experimental or pre-experimental designs with small sample sizes, such as those by Ridwan et al. (2018) and Kadir & Herawati (2025). While they showed significant improvements in knowledge and self-care behaviors, the generalizability of the findings is limited due to the small scale and weaker study designs compared to RCTs.

DSME as a Primary Driver for Clinical and Anthropometric Improvements

A crucial point from many studies is DSME's ability to directly improve blood sugar levels, reflected in reduced HbA1c values. The (Debussche et al., 2018), study from Africa, a randomized controlled trial (RCT), showed a substantial HbA1c reduction of 1.05% in the intervention group compared to 0.15% in the control group. This is strong evidence that DSME, particularly when peer-led, can yield significant clinical impact even in low-income countries. In Indonesia, (Ratnasari et al., 2022) and (Aulia, 2023) also reported significant improvements in glycemic control, demonstrating the consistency of DSME's effects across different contexts. These improvements are vital because poor glycemic control is a leading cause of long-term diabetes complications. Beyond blood sugar, DSME also shows potential to improve body measurements related to diabetes risk and complications. (Debussche et al., 2018) found a BMI reduction of 1.65 kg/m² and a waist circumference decrease of 3.34 cm in the intervention group. This indicates that DSME successfully encourages broader lifestyle changes, including diet and physical activity, which affect body composition. Although (Ratnasari et al., 2022), didn't find significant changes in body weight or nutritional status, (Debussche et al., 2018), findings still offer optimism for DSME's potential in promoting better weight management, a major challenge for many type 2 diabetes patients

This is in line with the study by , which stated that diabetes self-management education interventions consistently contribute to the reduction of HbA1c levels, especially when the intervention is delivered over a period longer than three months and through interactive approaches, such as group training or peer support (Margarita et al., 2018). Additionally, other study found that DSME can reduce HbA1c by 0.6% to 1.1%, especially when it includes self-monitoring, meal planning, and physical activity. Emphasized that empowerment-based DSME not only improves glycemic control but also enhances coping skills, motivation, and sustainable healthy behaviors, including weight management and complication prevention (Werfalli et al., 2020).

DSME is an effective strategy for managing type 2 diabetes, with strong evidence showing its ability to reduce HbA1c and support healthy lifestyle changes. Its success across diverse settings, including low-income countries, highlights its adaptability. Peer-led and empowerment-based approaches enhance its impact, making DSME a vital component of diabetes care.

Boosting Self-Efficacy and Strengthening Self-Management Behaviors

(Murtaqib et al., 2019) explicitly demonstrated a significant increase in self-efficacy among DSME participants. Self-efficacy, defined as an individual's belief in their ability to perform a specific behavior or cope with situations, serves as a fundamental basis for long-term behavior change. In the context of diabetes, high self-efficacy is a strong predictor of adherence to medical and dietary recommendations. When patients feel confident in managing their diabetes, they are more likely to take necessary actions. (Aminah et al., 2022) found that most respondents (81.3%) who were previously non-compliant with dietary guidelines became compliant following DSME interventions delivered through booklet media. This provides strong evidence that structured education can directly influence and change dietary behavior. Similarly, (Ratnasari et al., 2022), detailed how DSME affects food choices.

They reported significant increases in the consumption of vegetables, fruits, and dairy products, along with reductions in the intake of starchy foods and tubers. These findings indicate that DSME not only promotes general compliance but also encourages

healthier and more specific food selections. (Rahmadani & Jihad, 2023) and (Rahmadani & Jihad, 2023), in their case study, observed an improvement in patients' self-management scores after participating in DSME sessions, rising from a "moderate" level to a better category. Likewise, (Etlidawati et al., 2024) reported a significant difference in diabetes self-care behaviors between groups, with 75% of the intervention group demonstrating good self-care practices after DSME, compared to only 56% in the control group. This underscores DSME's effectiveness in transforming knowledge into tangible, health-promoting actions. Overall, evidence from various studies confirms that DSME is a strategic approach that enhances individuals' capacity to manage chronic illness independently. DSME not only improves cognitive aspects such as knowledge but also strengthens affective components like self-efficacy and psychomotor skills involved in self-care practices. Therefore, the continuous and contextual implementation of DSME is highly recommended as part of a holistic, patient-centered diabetes management program.

DSME as a Determinant of Enhanced Quality of Life

Various studies have demonstrated that Diabetes Self-Management Education (DSME) is not only effective in improving clinical outcomes such as glycemic control and treatment adherence but also plays a significant role in enhancing the quality of life (QoL) of individuals with diabetes. (Utama et al., 2021) and (Handayani & Nusdin, 2021) explicitly showed that DSME interventions significantly improved patients' quality of life, with both studies reporting p-values below the 0.05 threshold. These findings confirm that the improvements were statistically significant and not due to chance, highlighting DSME's real and measurable impact on patients' well-being. Furthermore, (Probosiwi & Siswidiasari, 2024) reinforced these findings through a cross-sectional study that examined the association between DSME and health-related quality of life (HRQoL). Their results revealed a strong and statistically significant relationship, with a p-value of 0.002 and an odds ratio (OR) of 7.2. This indicates that individuals who participated in DSME were 7.2 times more likely to have better HRQoL compared to those who did not. Such a high OR offers compelling evidence that DSME contributes far beyond disease control, positively influencing vital dimensions such as physical functioning, vitality, and social well-being. The improvements in quality of life brought about by DSME extend beyond the physical domain. They encompass psychological well-being, emotional stability, and social interactions. When patients are well-informed and capable of managing their condition independently, their psychological and physical burdens are reduced, allowing them to live more fulfilling and autonomous lives

Therefore, DSME should be regarded as a comprehensive intervention that addresses both the clinical and holistic needs of diabetes patients. These findings strongly support the integration of DSME into routine healthcare practices, ensuring that diabetes care is not only focused on symptom management but also on enhancing the overall quality of life of patients.

Adaptability of Delivery Methods and Contextual Relevance

The growing body of research highlights the importance of accessible, adaptable, and innovative educational strategies in the implementation of Diabetes Self-Management Education (DSME). (Ridwan et al., 2018), successfully demonstrated the feasibility and effectiveness of using SMS technology to improve patient knowledge. This finding is particularly relevant for regions with limited access to healthcare professionals, as SMS-based interventions offer a low-cost, scalable solution that can reach patients in

remote or underserved areas. The study underscores the potential of leveraging mobile technology to bridge gaps in diabetes education.

Similarly, the effectiveness of print-based educational tools is evident in the studies conducted by (Aminah et al., 2022) and (Etlidawati et al., 2024), where the use of booklets significantly improved patients' understanding and self-care practices. Booklets offer the advantage of being tangible and easy to revisit, allowing patients to reinforce their learning at their own pace. This form of asynchronous learning supports long-term behavior change, especially for individuals who require repeated exposure to health information.

In addition to format innovations, the content and structure of DSME interventions also play a critical role in their success. The "PASTI SEMBUH" method developed by (Kadir & Herawati, 2025), exemplifies how structured, culturally adapted, and targeted educational strategies can significantly enhance patient knowledge. Their results suggest that DSME effectiveness is not solely dependent on the medium used but also on how the content is delivered emphasizing clarity, relevance, and patient engagement.

Taken together, these findings emphasize the importance of diversifying DSME delivery methods to accommodate patient needs and contextual limitations. Whether through digital platforms, printed materials, or structured methods like "PASTI SEMBUH," the overarching goal remains the same: empowering patients with the knowledge and confidence to manage their diabetes effectively. Future DSME initiatives should therefore continue to innovate both in medium and methodology to ensure inclusivity, accessibility, and sustained impact.

Most studies (11 out of 12) originated from Indonesia, highlighting the country's strong initiative in addressing the burden of diabetes through educational interventions. This provides highly relevant and specific evidence for the healthcare system and culture in Indonesia. Nevertheless, the Debussche et al. (2018) study from Africa is also important because it suggests that the fundamental principles of DSME are universal and can be effectively applied in other low- and middle-income countries, although appropriate contextual adaptations are necessary. The diversity of methodologies (RCTs, quasi-experiments, pilot studies, case studies) among the Indonesian studies demonstrates ongoing efforts to evaluate DSME from various perspectives, though there is a need for more large-scale RCTs to strengthen the evidence of causality.

Conclusion

The synthesis of 12 studies affirms that Diabetes Self-Management Education (DSME) is a highly effective and adaptable intervention for managing type 2 diabetes across multiple domains, including glycemic control, self-efficacy, self-care behavior, and quality of life. DSME has demonstrated clinical significance in reducing HbA1c and improving anthropometric outcomes, as evidenced by rigorous trials like Debussche et al. (2018), while also enhancing patient empowerment and adherence to healthy behaviors. It fosters greater self-confidence and better lifestyle decisions, especially when delivered through structured, contextually relevant, and innovative methods—ranging from SMS and booklets to culturally tailored models like "PASTI SEMBUH." The predominance of Indonesian studies highlights local commitment, though broader generalizability would benefit from more large-scale RCTs. Collectively, these findings underscore DSME as an essential, patient-centered approach that should be continuously integrated and expanded within health systems, especially in low- and middle-income settings, to promote sustainable, holistic diabetes care.

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