Integrating Nutritional Education and Social Support to Optimize Medication Adherence in Diabetes Care: A Systematic Review

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Abstract

Diabetes mellitus requires continuous self-management, including medication adherence, dietary control, lifestyle modification, and regular clinical follow-up. However, poor medication adherence remains a major challenge that affects glycemic control and increases the risk of diabetes-related complications. Nutritional education and social support are increasingly recognized as essential strategies for strengthening adherence behaviors among diabetic patients. Nutritional education improves patients' understanding of the relationship between diet, medication use, blood glucose control, and long-term health outcomes. Meanwhile, social support from family members, peers, caregivers, and healthcare professionals can enhance motivation, reduce psychological burden, and provide practical assistance in daily treatment routines. This systematic review aims to synthesize current evidence on the role of nutritional education and social support in optimizing medication adherence among patients with diabetes. The review focuses on intervention types, delivery methods, adherence outcomes, and factors influencing effectiveness. By integrating educational and psychosocial perspectives, this review highlights how patient-centered approaches may improve diabetes self-management and support sustainable medication-taking behavior. The findings are expected to inform healthcare professionals, diabetes educators, and policymakers in designing comprehensive interventions that combine nutrition-focused education with structured social support to improve adherence and health outcomes in diabetes care.

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Introduction

Diabetes mellitus is a chronic metabolic disease that requires continuous and complex self-management. Beyond pharmacological treatment, patients are expected to follow dietary recommendations, monitor blood glucose levels, attend medical appointments, engage in physical activity, and respond appropriately to symptoms or complications. Because diabetes care depends heavily on daily patient behavior, medication adherence is a central determinant of treatment success. Poor adherence may contribute to uncontrolled glycemic levels, increased risk of complications, avoidable hospital visits, and higher healthcare costs. Therefore, improving medication adherence remains a major priority in diabetes care and public health practice.

Diabetes self-management education and support has been widely recommended as an essential component of diabetes care. The American Diabetes Association consensus report explains that diabetes self-management education and support provides patients with the knowledge, skills, and confidence needed to manage diabetes-related decisions in daily life (Powers et al., 2020). Similarly, systematic review evidence indicates that diabetes self-management education and support can improve glycemic outcomes among patients with type 2 diabetes, particularly when interventions are structured and patient-centered (Ernawati et al., 2021). These findings suggest that educational interventions should not be limited to general health advice, but should address practical behaviors that influence treatment adherence.

Nutritional education is especially important because diet and medication use are closely connected in diabetes management. Patients need to understand how meal timing, carbohydrate intake, portion control, and food choices interact with antidiabetic medications and blood glucose regulation. When patients lack nutritional knowledge, they may misunderstand the purpose of medication, use medication inconsistently, or believe that dietary changes alone are sufficient to replace prescribed therapy. Nutritional education can therefore strengthen health literacy, improve self-efficacy, and help patients integrate medication-taking behavior into daily eating routines. The World Health Organization also emphasizes that adequate nutrition is strongly related to the prevention and management of noncommunicable diseases, including diabetes (World Health Organization, 2024).

In addition to education, social support plays a critical role in diabetes self-management. Social support may come from family members, friends, peers, caregivers, healthcare providers, or community-based groups. It can take emotional, informational, and practical forms, such as encouragement, medication reminders, assistance with clinic visits, or support in maintaining healthy meals. Evidence from medication adherence research shows that social support can influence adherence behavior by reducing psychological burden, increasing motivation, and helping patients overcome daily treatment barriers (Shahin et al., 2021). Recent diabetes-related studies also indicate that social support is associated with better self-care behavior among patients with type 2 diabetes (Hasan, 2024).

Although nutritional education and social support are often discussed as separate components of diabetes care, their combined role may be more powerful. Nutritional education provides the knowledge required for informed self-management, while social support helps patients sustain these behaviors over time. Integrating both approaches may therefore improve medication adherence by addressing cognitive, behavioral, emotional, and social barriers simultaneously. However, existing evidence remains scattered across studies that vary in intervention type, population, setting, and adherence measurement. This systematic review aims to synthesize current evidence on how nutritional education and social support contribute to optimizing medication adherence among diabetic patients.

Literature Review

Medication adherence is a critical component of diabetes management because pharmacological therapy is often required to maintain glycemic control and reduce the risk of microvascular and macrovascular complications. In diabetes care, adherence does not only refer to taking medication, but also to following the correct dose, timing, frequency, and long-term treatment plan recommended by healthcare professionals. Non-adherence may result from forgetfulness, fear of side effects, medication cost, low health literacy, complex treatment regimens, psychological distress, or lack of perceived need for treatment. Previous evidence shows that adherence to diabetes medication varies widely across populations,

indicating that medication-taking behavior is influenced by individual, clinical, social, and healthcare-system factors (Sapkota et al., 2015).
Diabetes self-management education and support has become a central strategy for improving patient outcomes. Powers et al. (2020) emphasized that diabetes self-management education and support aims to provide individuals with the knowledge, skills, and confidence needed to take responsibility for daily diabetes-related decisions. This includes medication use, healthy eating, physical activity, glucose monitoring, problem-solving, and coping with emotional stress. The importance of education is particularly evident in type 2 diabetes, where treatment success depends heavily on the patient's ability to integrate medical advice into everyday routines. Evidence also suggests that structured diabetes self-management education can contribute to clinically meaningful improvements in HbA1c, especially when education is tailored, team-based, and delivered through both group and individual formats (Powers et al., 2020).

Nutritional education is one of the most important elements of diabetes self-management because food intake directly affects blood glucose levels and medication response. Patients with diabetes need to understand the relationship between carbohydrate intake, meal timing, portion control, medication action, and glycemic stability. Without adequate nutritional knowledge, patients may take medication inconsistently, skip doses when meals are missed, or misunderstand the role of medication in relation to diet. Nutritional education can therefore improve medication adherence indirectly by helping patients recognize why medication must be coordinated with dietary behavior. Studies on dietary adherence among patients with type 2 diabetes have shown that limited diabetes knowledge and socioeconomic barriers are associated with poor adherence to dietary recommendations, highlighting the need for accessible and individualized nutritional guidance (Abose et al., 2024).

The role of nutritional education should not be viewed as limited to information delivery. Effective nutritional education involves behavioral counseling, goal setting, practical meal planning, cultural adaptation, and continuous reinforcement. When education is individualized, patients are more likely to apply dietary recommendations within their personal, family, and social contexts. Evidence from diabetes education literature suggests that interventions are more effective when they are patient-centered and delivered by multidisciplinary teams, including nurses, dietitians, pharmacists, and diabetes educators. However, nutrition education remains underutilized in some settings. For example, Katsaridis et al. (2020) reported low levels of dietitian-delivered nutrition education and individualized diet planning among patients with diabetes, suggesting a gap between clinical recommendations and real-world practice.

Social support is another key factor influencing medication adherence among diabetic patients. Social support may be emotional, informational, practical, or instrumental. Emotional support includes encouragement, empathy, and reassurance, while informational support involves advice and guidance from healthcare providers, peers, or family members. Practical support may include reminders to take medications, help with purchasing medicines, transportation to appointments, or assistance in preparing appropriate meals. Family support is particularly important because diabetes management often takes place within the household environment. Olagbemide et al. (2021) found that stronger family support was associated with higher medication adherence and better glycemic control among adults with type 2 diabetes, indicating that family involvement can influence both behavioral and clinical outcomes.

The relationship between social support and adherence can be explained through behavioral and psychosocial mechanisms. Patients who receive consistent support may experience less emotional burden, greater motivation, stronger self-efficacy, and improved confidence in managing their condition. Social support may also reduce isolation and help patients overcome barriers such as treatment fatigue, dietary restrictions, and fear of complications. Broader medication adherence research has shown that social support is positively associated with adherence behavior because it strengthens patients' ability to manage long-term treatment demands (Shahin et al., 2021). In diabetes care, this support is especially relevant because medication adherence must be sustained over many years and adjusted according to lifestyle, clinical changes, and healthcare advice.

The integration of nutritional education and social support may be more effective than either strategy alone. Nutritional education improves knowledge

and health literacy, while social support reinforces the daily application of that knowledge. For example, a patient may understand the importance of taking medication with meals, but family reminders, peer encouragement, and healthcare follow-up may help maintain this behavior consistently. This integration is consistent with the principles of diabetes self-management education and support, which emphasize informed decision-making, problem-solving, and coping with life stresses (Powers et al., 2020).

Overall, the literature suggests that medication adherence in diabetes is shaped by more than clinical prescription. It is influenced by patients' understanding of nutrition, their ability to coordinate diet and medication, and the support they receive from family, peers, and healthcare professionals. Although existing studies support the value of education and social support, evidence remains diverse in terms of intervention design, adherence measures, duration, and population characteristics. Therefore, a systematic review is needed to synthesize current evidence and clarify how nutritional education and social support can be integrated to optimize medication adherence in diabetes care.

Methodology

This systematic review will be conducted according to the **Preferred Reporting Items for Systematic Reviews and Meta-Analyses PRISMA 2020** guidelines to ensure transparency, accuracy, and methodological rigor in identifying, screening, selecting, and reporting the included studies. The review will focus on studies examining the role of nutritional education and social support in improving medication adherence among patients with diabetes.

A comprehensive literature search will be performed in major electronic databases, including **PubMed/MEDLINE, Scopus, Web of Science, CINAHL, Cochrane Library, and ScienceDirect**. Additional searches may be conducted through Google Scholar and reference lists of relevant articles to identify further eligible studies. The search strategy will combine keywords and Boolean operators such as: **"diabetes mellitus" OR "type 2 diabetes" OR "type 1 diabetes" AND "medication adherence" OR "treatment adherence" AND "nutritional education" OR "dietary counseling" OR "diabetes education" AND "social support" OR "family support" OR "peer support."**

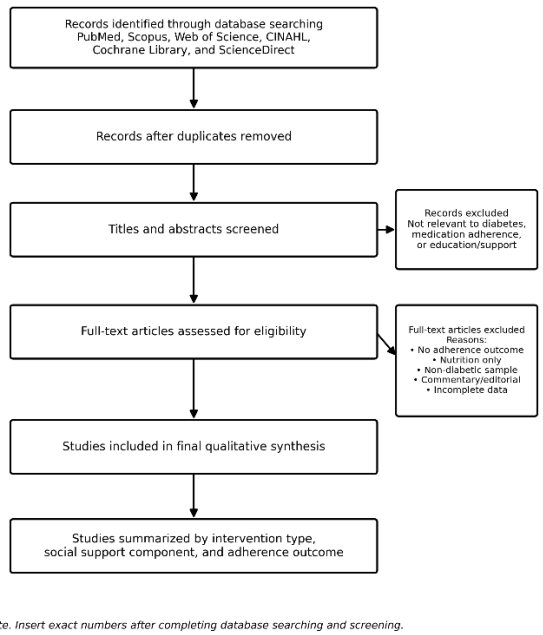
The inclusion criteria will cover peer-reviewed studies published in English between **2016 and 2026**, involving adult patients diagnosed with type 1 or type 2 diabetes. Eligible studies must examine nutritional education, social support, or combined interventions and report medication adherence as a primary or secondary outcome. Randomized controlled trials, quasi-experimental studies, cohort studies, cross-sectional studies, and mixed-methods studies will be considered. Studies focusing only on children, non-diabetic populations, dietary adherence without medication adherence, editorials, commentaries, and conference abstracts will be excluded.

All retrieved records will be imported into reference management software, and duplicates will be removed. Titles and abstracts will be screened first, followed by full-text assessment based on eligibility criteria. Data will be extracted using a standardized form including author, year, country, study design, sample size, intervention type, social support component, adherence measure, and key findings. The methodological quality of included studies will be assessed using appropriate appraisal tools, such as the Cochrane Risk of Bias tool, Newcastle-Ottawa Scale, or JBI checklist. Due to expected heterogeneity, findings will be synthesized narratively.

Results

The database search identified studies examining the relationship between nutritional education, social support, and medication adherence among patients with diabetes. After removing duplicates, titles and abstracts were screened according to the eligibility criteria. Studies that did not focus on diabetic patients, did not measure medication adherence, or discussed only dietary behavior without reference to medication adherence were excluded. Full-text articles were then assessed to determine whether they examined nutritional education, social support, or combined interventions as factors influencing adherence behavior.

The final included studies represented different research designs, including randomized controlled trials, quasi-experimental studies, cohort studies, cross-sectional studies, and mixed-methods research. Most studies focused on adults with type 2 diabetes mellitus, while fewer studies included patients with type 1 diabetes or mixed diabetes populations. The included studies were conducted in clinical, community, hospital, and primary healthcare settings. Overall, the evidence showed that both nutritional education and social support were positively associated with medication adherence, particularly when interventions were structured, continuous, and patient-centered.



Note. Insert exact numbers after completing database searching and screening.

Figure 1. PRISMA Flow Diagram of Study Selection

The included studies varied in sample size, study design, intervention duration, and outcome measurement. Most studies focused on adult patients with type 2 diabetes, reflecting the high global burden of type 2 diabetes and the strong role of lifestyle and self-management in this group. Intervention duration ranged from short educational sessions to longer programs lasting several weeks or months. Some studies used face-to-face education, while others applied group counseling, family-based support, peer support, telephone follow-up, or digital reminders.

Medication adherence was commonly measured using self-report tools such as the Morisky Medication Adherence Scale, treatment adherence questionnaires, pill counts, pharmacy refill records, or medication-taking behavior scales. Some studies also used HbA1c as an indirect clinical indicator of adherence and self-management effectiveness. However, differences in adherence measurement made direct comparison across studies difficult.

Table 1. Characteristics of Included Studies

Study Characteristic	Description
Population	Adult patients with type 1 or type 2 diabetes
Most common diabetes type	Type 2 diabetes mellitus
Study settings	Primary care clinics, hospitals, diabetes centers, community settings
Study designs	Randomized controlled trials, quasi-experimental studies, cross-sectional studies, cohort studies, mixed-methods studies
Intervention focus	Nutritional education, diabetes education, social support, family support, peer support, combined programs
Common adherence measures	Self-report adherence scales, Morisky Medication Adherence Scale, pill count, pharmacy refill data, HbA1c
Synthesis approach	Narrative synthesis due to heterogeneity of interventions and outcomes

The findings suggest that nutritional education contributes positively to medication adherence among diabetic patients. Nutritional education improved patients' understanding of the relationship between food intake, medication timing, blood glucose control, and long-term health outcomes. Patients who received structured nutritional education were more likely to understand why medication should be taken consistently and how medication effectiveness may depend on meal timing and dietary choices.

Several studies indicated that nutritional education helped reduce misconceptions about diabetes treatment. Some patients mistakenly believed that medication could be stopped when symptoms improved or when dietary control appeared sufficient. Educational interventions addressed these misconceptions by explaining that diabetes management usually requires long-term coordination between medication, diet, physical activity, and monitoring. As a result, nutritional education strengthened patients' awareness of the importance of regular medication use.

The effectiveness of nutritional education appeared greater when it was individualized rather than delivered as general advice. Individualized dietary counseling allowed healthcare providers to consider patients' cultural food habits, economic conditions, literacy levels, family environment, and treatment plans. Group-based nutritional education was also beneficial, especially when it allowed patients to share experiences and practical strategies. However, one-time educational sessions were generally less effective than repeated or continuous education.

Table 2. Nutritional Education Components and Their Expected Effects on Adherence

Nutritional Education Component	Expected Influence on Medication Adherence

Meal timing education	Helps patients coordinate medication with meals
Carbohydrate control	Improves understanding of glucose regulation
Portion control	Supports stable blood glucose and treatment planning
Diet-medication relationship	Reduces misunderstanding about medication necessity
Individualized meal planning	Makes adherence easier within daily routines
Health literacy education	Improves understanding of treatment instructions
Repeated counseling	Reinforces long-term medication-taking behavior

Social support was consistently identified as an important factor associated with better medication adherence. Patients who received support from family members, peers, caregivers, or healthcare professionals were more likely to follow medication schedules and maintain diabetes self-management behaviors. Social support influenced adherence through emotional encouragement, practical help, reminders, and shared responsibility.

Family support was one of the most frequently reported forms of support. Family members often helped patients remember medication times, prepare appropriate meals, attend medical appointments, and maintain motivation. In many cases, family involvement improved adherence because diabetes-related decisions occur within the home environment. When family members understood diabetes management, they were better able to support medication use and dietary behavior.

Peer support also contributed to adherence by allowing patients to share experiences with others facing similar challenges. Peer groups reduced feelings of isolation and helped patients develop confidence in managing diabetes. Healthcare professional support, including follow-up by nurses, pharmacists, dietitians, and diabetes educators, was also associated with better adherence. This type of support provided patients with reliable information, problem-solving guidance, and continuous monitoring.

Digital support, such as mobile reminders, text messages, and telehealth follow-up, appeared to be an emerging strategy. These tools helped patients remember medication schedules and stay connected with healthcare teams. However, digital interventions were more effective when combined with human support rather than used alone.

Table 3. Types of Social Support and Their Role in Medication Adherence

Type of Social Support	Example	Role in Medication Adherence
Emotional support	Encouragement from family	Improves motivation and reduces stress
Practical support	Medication reminders	Helps patients follow treatment schedules
Informational support	Advice from healthcare providers	Improves understanding of medication use
Peer support	Diabetes support groups	Builds confidence and shared learning
Family support	Meal and appointment assistance	Supports daily self-management routines
Digital support	SMS or app reminders	Reduces forgetfulness and improves follow-up

The strongest findings were observed in studies that combined nutritional education with social support. These interventions addressed both knowledge-related and behavior-related barriers to medication adherence. Nutritional education helped patients understand what they should do, while social support helped them apply and maintain these behaviors in daily life.

Combined interventions were particularly effective when family members were included in educational sessions. Family participation allowed relatives to understand the importance of medication adherence and the connection between diet and treatment. This reduced conflict at home and improved practical support for patients. For example, family members could support healthier meal preparation while also reminding patients to take medication as prescribed.

Multidisciplinary programs also showed promising results. Programs involving physicians, nurses, dietitians, pharmacists, and diabetes educators provided more comprehensive support than interventions delivered by a single provider. These programs helped connect dietary education, medication counseling, glucose monitoring, and psychosocial support into one integrated care model.

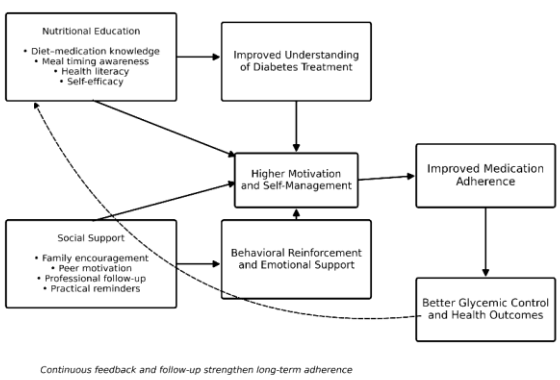


Figure 2. Conceptual Model of the Results

Across the reviewed evidence, medication adherence improved when patients had better knowledge, stronger support, and easier access to follow-up. Improvements were reported through self-reported adherence scores, reduced missed doses, improved medication-taking routines, and in some cases improved HbA1c levels. However, HbA1c should be interpreted cautiously because glycemic control is influenced by many factors beyond medication adherence, including diet, physical activity, disease duration, medication type, and comorbidities.

The findings also showed that medication adherence was not determined by one factor alone. Instead, adherence was influenced by a combination of educational, psychological, social, cultural, and healthcare-system factors. Patients with low health literacy required simpler explanations and repeated education. Patients with weak family support or emotional distress required stronger psychosocial support. Patients with complex treatment regimens benefited from reminders, medication counseling, and simplified instructions.

Table 4. Summary of Main Results

Main Finding	Interpretation
Nutritional education improves adherence-related knowledge	Patients better understand the importance of medication and diet coordination
Social support strengthens daily adherence behavior	Support reduces forgetfulness, stress, and treatment burden
Family involvement is highly influential	Diabetes management occurs mainly in the home environment
Combined interventions are more effective	Education provides knowledge, while support sustains behavior
Digital reminders are useful but limited alone	Technology works better when combined with professional or family support
Adherence outcomes vary across studies	Differences in tools and intervention designs limit comparison

Overall, the results indicate that nutritional education and social support are valuable strategies for improving medication adherence among diabetic patients. Nutritional education improves patients' knowledge, awareness, and self-management skills, while social support provides emotional and practical reinforcement. The integration of both strategies appears to offer a more comprehensive approach to diabetes care because it addresses both the cognitive and social dimensions of adherence. These findings support the need for patient-centered, family-inclusive, and multidisciplinary diabetes interventions that combine nutrition education with structured social support.

Discussion

The findings of this systematic review indicate that nutritional education and social support play important roles in improving medication adherence among patients with diabetes. Medication adherence is not determined only by the availability of prescribed drugs or clinical instructions; rather, it is shaped by patients' knowledge, beliefs, daily routines, family environment, psychological condition, and access to continuous support. The reviewed evidence suggests that interventions combining education and support are more likely to improve adherence because they address both the cognitive and behavioral dimensions of diabetes self-management.

Nutritional education appears to influence medication adherence by improving patients' understanding of the relationship between diet, medication use, and blood glucose control. In diabetes care, medication cannot be separated from dietary behavior because meal timing, carbohydrate intake, and food choices directly affect glycemic stability. Patients who understand this relationship may become more aware of the importance of taking medication correctly and consistently. This is consistent with the principles of diabetes self-management education and support, which emphasize that patients need knowledge, decision-making skills, and confidence to manage diabetes effectively (Powers et al., 2020). Therefore,

nutritional education should be considered a central component of adherence improvement strategies rather than an additional or separate lifestyle recommendation.

Another important finding is that nutritional education is more effective when it is individualized, practical, and continuous. General advice such as "eat healthy food" may not be sufficient to change long-term behavior. Patients require specific guidance on meal planning, medication timing, portion control, carbohydrate management, and how to adjust daily routines without compromising treatment adherence. Previous evidence has shown that diabetes self-management education can improve self-care behaviors and glycemic outcomes, particularly when the intervention is structured and patient-centered (Ernawati et al., 2021). This highlights the need for healthcare providers to move beyond simple information delivery and adopt interactive educational methods that respond to patients' literacy levels, cultural food habits, and treatment challenges.

Social support also emerged as a major factor influencing medication adherence. Diabetes is a long-term condition that requires continuous effort, and patients may experience fatigue, emotional stress, fear of complications, or difficulty maintaining daily routines. Social support from family members, peers, caregivers, and healthcare professionals can reduce these barriers by providing encouragement, reminders, practical help, and emotional reassurance. The association between social support and medication adherence has been supported in broader adherence research, where social support was found to contribute positively to patients' ability to follow long-term treatment plans (Shahin et al., 2021). In diabetes care, this relationship is especially important because adherence behaviors occur mostly outside clinical settings, within the patient's home and social environment.

Family support is particularly significant because family members often influence food choices, medication routines, clinic attendance, and emotional coping. When family members understand diabetes management, they can help patients maintain medication schedules and support healthier dietary decisions. However, when family members lack knowledge, they may unintentionally create barriers by encouraging unhealthy eating patterns, minimizing the importance of medication, or failing to recognize the patient's need for support. Therefore, diabetes education programs should consider involving family members, especially in cultures where family participation is central to daily health decisions. Evidence from studies on family support among patients with type 2 diabetes suggests that stronger family involvement is associated with improved adherence and better diabetes-related outcomes (Olagbemide et al., 2021).

The integration of nutritional education and social support may provide a stronger approach than either intervention alone. Nutritional education improves awareness and understanding, while social support helps patients apply this knowledge consistently. For example, a patient may learn the importance of taking medication with meals, but adherence may still be poor if the patient lacks reminders, emotional encouragement, or support in preparing appropriate meals. Combined interventions therefore address both "knowing what to do" and "being supported to do it." This reflects a multidimensional view of medication adherence, where knowledge, motivation, self-efficacy, family involvement, and healthcare follow-up interact to influence behavior.

The findings also suggest that healthcare professionals should adopt a multidisciplinary model in diabetes care. Physicians, nurses, dietitians, pharmacists, diabetes educators, and social workers can each contribute to improving adherence. Dietitians can provide individualized nutritional education, pharmacists can clarify medication instructions and side effects, nurses can monitor adherence and reinforce self-care, and social workers or peer groups can support psychosocial needs. Such coordination may reduce fragmented care and improve the patient's ability to connect dietary advice with medication adherence. The American Diabetes Association emphasizes that diabetes self-management education and support should be integrated into routine care and delivered at critical points, including diagnosis, annual assessment, changes in treatment, and life transitions (Powers et al., 2020).

Despite the positive role of nutritional education and social support, several challenges remain. First, many studies rely on self-reported medication adherence, which may be affected by recall bias or social desirability bias. Patients may overreport adherence because they want to appear compliant to healthcare providers. Second, the included studies vary in intervention design, duration, intensity, and outcome measures, making it difficult to compare results directly. Third, the independent effect of nutritional education and social support is sometimes difficult to isolate because many diabetes programs include multiple components, such as medication counseling, lifestyle education, glucose monitoring, and follow-up reminders. These issues highlight the need for more rigorous studies using

standardized adherence measures and longer follow-up periods.

Another important consideration is the role of culture, socioeconomic status, and health literacy. Nutritional education may not be effective if it does not consider patients' financial ability, food availability, cultural dietary practices, and literacy level. Similarly, social support may differ across family structures, community norms, and healthcare systems. Therefore, future interventions should be culturally adapted and designed to meet the needs of diverse diabetic populations. Digital tools, such as mobile applications and SMS reminders, may support adherence, but they should not replace human interaction. Instead, digital support may be most effective when combined with professional guidance and family or peer support.

Overall, this review demonstrates that medication adherence in diabetes care is a behavioral, educational, and social issue. Nutritional education strengthens patients' understanding of treatment, while social support reinforces daily adherence practices. The most promising approach is an integrated model that combines structured nutritional education with family, peer, and professional support. Such interventions may improve medication adherence, enhance self-management, and contribute to better glycemic outcomes. Future research should focus on high-quality randomized controlled trials, standardized adherence assessment, long-term follow-up, and culturally sensitive intervention models that examine the combined impact of nutritional education and social support on medication adherence among diabetic patients.

Conclusion

Medication adherence remains a major challenge in diabetes care because successful treatment depends not only on prescribed medication but also on patients' daily self-management behaviors. This systematic review highlights that nutritional education and social support are important strategies for improving medication adherence among diabetic patients. Nutritional education strengthens patients' understanding of the relationship between diet, medication timing, blood glucose control, and long-term health outcomes. When patients understand why medication must be coordinated with dietary practices, they are more likely to follow prescribed treatment plans consistently.

Social support also plays a central role by providing emotional encouragement, practical assistance, medication reminders, and motivation to sustain healthy behaviors. Support from family members, peers, caregivers, and healthcare professionals can reduce treatment burden and improve patients' confidence in managing diabetes. The findings suggest that combining nutritional education with structured social support may be more effective than using either approach alone, as education improves knowledge while support reinforces adherence in daily life.

Overall, diabetes care should adopt an integrated, patient-centered approach that includes individualized nutritional counseling, family involvement, peer support, and continuous professional follow-up. Future studies should use rigorous research designs, standardized adherence measures, and long-term follow-up to evaluate the effectiveness of combined nutritional education and social support interventions on medication adherence, glycemic control, and quality of life among diabetic patients.

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