DOI: 10.71317/jgst.2.9(s).2026.567
Journal of Global Social Transformation
Journal homepage: https://rjsaonline.org/index.php/JGST

Impact of Nutritional Education on Diabetes Self-Management Among Low-Income Patients With Type 2 Diabetes: A Quasi-Experimental Study

Sana Hameed[1], Arooba Fatima[2], Muhammad Danish[3]
[1] Nursing Officer, Mukhtar-A-Sheikh Hospital Multan
Email: tahirhameedvrm1733@gmail.com
[2] Nursing Intern, Shahida Islam Teaching Hospital Lodhran
Email: aroobafatima028@gmail.com
[3] Nursing Supervisor, Shahida Islam Teaching Hospital Lodhran
Email: hmdanishaltaf2000@gmil.com

ARTICLE INFO

Submission:
July 08, 2026
Revised:
July 26, 2026
Accepted:
August 26, 2026
Available Online:
September 08, 2026

Keywords:
Type 2 diabetes mellitus; nutritional education; diabetes self-management; self-efficacy; dietary adherence; low-income patients

Corresponding author:
Muhammad Danish
Email:
hmdanishaltaf2000@gmil.com

ABSTRACT

Type 2 diabetes mellitus (T2DM) requires effective dietary management and self-care, while low-income patients may face barriers to appropriate nutritional guidance.To assess the impact of structured nutritional education on diabetes self-management among low-income patients with T2DM.A one-group quasi-experimental pre-test/post-test study was conducted among 29 low-income patients with T2DM at a teaching hospital in Lodhran, Punjab, Pakistan. Participants received structured nutritional education on healthy food choices, portion control, meal planning, and carbohydrate management. Knowledge and self-efficacy were assessed before and after the intervention, while dietary adherence and satisfaction were assessed descriptively.Knowledge scores increased from 15.21 ± 2.16 to 27.83 ± 1.42 ($t = -26.306$, $p < 0.001$), while self-efficacy scores increased from 11.03 ± 2.64 to 23.83 ± 1.51 ($t = -22.647$, $p < 0.001$). Participants reported favorable dietary adherence and satisfaction with the program.Structured nutritional education was associated with significant improvements in knowledge and self-efficacy, with favorable reported dietary adherence and satisfaction. Affordable, patient-centered nutritional education may support diabetes self-management among low-income patients with T2DM.

Introduction

Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder characterized by insulin resistance, impaired insulin secretion, or both. It is a major global health concern and can lead to cardiovascular disease, kidney disease, neuropathy, retinopathy, and premature mortality [1,14]. Effective diabetes management requires continuous self-care, particularly appropriate dietary practices, medication adherence, physical activity, and regular monitoring. However, maintaining effective self-management can be challenging for patients living in low- and middle-income countries (LMICs), where socioeconomic disadvantage, food insecurity, limited healthcare access, and inadequate health education may affect diabetes care [9,10,13].

Nutrition is a fundamental component of diabetes self-management. Appropriate dietary practices, including healthy food selection, portion control, meal planning, carbohydrate management, and balanced food intake, can support better diabetes management [1,4,5]. Nutritional education provides patients with the knowledge and practical skills needed to make appropriate dietary decisions

and incorporate healthy eating behaviors into daily life. Evidence from LMICs suggests that nutrition therapy and diabetes self-management education can improve diabetes-related outcomes and support healthier self-care behaviors [1,9,10].

Recent intervention studies have further demonstrated the value of structured and patient-centered approaches. Food-based interventions, nurse-led education, and digital health programs have shown potential for improving diabetes management and patient engagement [2,3,5,7]. Patient-centered nutrition education has also been associated with improved eating behaviors, indicating that education may help patients translate nutritional knowledge into practical dietary changes [11]. Similarly, health education has been linked with improved adherence to diabetes self-care behaviors [8].

However, knowledge alone may not be sufficient for effective diabetes self-management. Low-income patients may face financial limitations, food insecurity, limited access to healthy foods, and restricted healthcare resources, which can make recommended dietary practices difficult to maintain [13]. Therefore, nutritional education for economically disadvantaged patients should emphasize affordable, accessible, culturally appropriate, and sustainable dietary choices. Interventions should also strengthen patients' confidence and ability to manage their condition in everyday life.

Nutritional Education and Diabetes Self-Management

Nutritional education can strengthen diabetes self-management by improving patients' knowledge, self-efficacy, and dietary behaviors. Patients who understand appropriate food choices and portion sizes may be better prepared to follow recommended nutritional practices [4]. Evidence also suggests that structured diabetes self-management education and nurse-led interventions can support dietary adherence and other self-care behaviors [5,7,8,10].

For low-income patients, however, nutritional recommendations must be realistic and financially feasible. Food insecurity and socioeconomic constraints may limit patients' ability to follow recommended diets consistently [13]. Consequently, effective nutritional education should combine disease-related knowledge with practical guidance that considers patients' financial resources, food availability, health literacy, and individual needs.

Research Gap and Rationale

Although previous research has demonstrated the benefits of nutrition therapy and diabetes self-management education, much of the available evidence has focused on glycemic outcomes or broader diabetes populations [1,9,10]. Limited context-specific evidence is available regarding the effect of structured nutritional education on diabetes-related knowledge, self-efficacy, and dietary adherence among low-income patients with T2DM, particularly in resource-constrained settings.

Therefore, evaluating a practical and patient-centered nutritional education intervention among low-income patients with T2DM is important. Such an intervention may strengthen patients' knowledge, confidence, and ability to follow recommended dietary practices. The findings may help healthcare professionals develop affordable and culturally appropriate educational strategies to support diabetes self-management among economically disadvantaged patients.

Aim and Objectives

Aim

- To assess the impact of nutritional education on diabetes self-management among low-income patients with type 2 diabetes.

Specific Objectives

i. To assess the knowledge and self-efficacy of low-income patients regarding diabetes management and healthy nutritional practices.

ii. To evaluate patients' adherence to recommended nutritional practices following the nutritional education intervention.

iii. To compare pre-intervention and post-intervention knowledge and self-efficacy scores following the nutritional education intervention.

Methods

Study Design

A quasi-experimental, one-group pre-test/post-test design was used to assess the impact of a structured nutritional education intervention on diabetes self-management among low-income patients with type 2 diabetes mellitus (T2DM).

Study Setting and Population

The study was conducted at a teaching hospital in Lodhran, Punjab, Pakistan. The study population comprised adult patients diagnosed with T2DM who met the predefined eligibility criteria.

Sample Size and Sampling

A total sample of 29 participants was determined using a paired-samples t-test, with $\alpha = 0.05$, 90% statistical power, an expected mean change of 0.55, a standard deviation of 1.0, and an assumed pre-post correlation of 0.65. Participants were recruited using **convenience sampling**.

Eligibility Criteria

Participants were included if they were aged ≥18 years, had been diagnosed with T2DM for at least six months, and were residents of Lodhran city. Pregnant or lactating women and patients enrolled in another health education or nutrition program were excluded.

Study Variables

The independent variable was the structured nutritional education intervention. The dependent variables were diabetes-related knowledge, self-efficacy, and adherence to recommended nutritional practices. Patient satisfaction was assessed as an intervention evaluation outcome.

Data Collection Procedure

Data were collected in three phases: pre-test, intervention, and post-test. At baseline, written informed consent was obtained and participants completed a structured questionnaire assessing demographic characteristics, diabetes-related knowledge, self-efficacy, and nutritional practices.

Participants then received structured nutritional education covering healthy food choices, portion control, meal planning, carbohydrate management, and practical strategies for diabetes self-management, with emphasis on affordable and realistic dietary choices.

After the intervention, the questionnaire was administered again to assess knowledge and self-efficacy and to document adherence to recommended nutritional practices. The satisfaction section was completed after the intervention.

Data Collection Tool

Data were collected using a structured questionnaire comprising five sections:

- **Section A:** Demographic Information
- **Section B:** Knowledge about Diabetes and Nutrition
- **Section C:** Self-Efficacy in Diabetes Management
- **Section D:** Adherence to Recommended Nutritional Practices
- **Section E:** Patient Satisfaction with the Nutritional Education Program

Statistical Analysis

Data were analyzed using IBM SPSS Statistics version 27. Frequencies, percentages, means, and standard deviations were calculated for descriptive analysis.

A paired-samples t-test was used to compare pre-intervention and post-intervention knowledge and self-efficacy scores. Adherence and satisfaction were analyzed descriptively because comparable pre-intervention adherence scores were not available for inferential comparison. A p-value < 0.05 was considered statistically significant.

Ethical Considerations

Ethical approval was obtained from the Institutional Review Board (IRB) of the concerned institution. Written informed consent was obtained from all participants before data collection. Confidentiality and anonymity were maintained, participation was voluntary, and participants were informed of their right to withdraw from the study at any stage without consequences.

Results

Demographic Characteristics of Participants

A total of 29 participants were included in the study. The largest proportion were aged 46-55 years (41.4%), followed by those aged 36-45 years (31.0%). Females constituted 55.2% of the sample, while males accounted for 44.8%. More than half (51.7%) had no formal education. Most participants had been diagnosed with diabetes for 6-10 years (55.2%), were married (86.2%), and were unemployed (55.2%). None of the participants (100.0%) reported previous nutrition counseling (Figure 1).

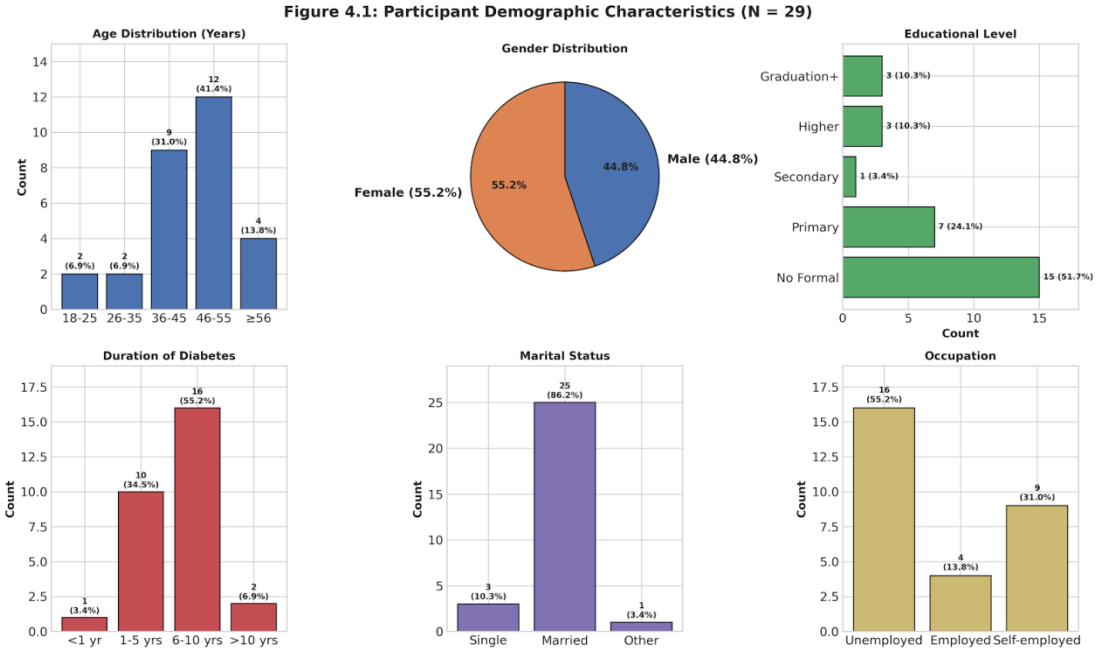

Figure 1: Participant Demographic Characteristics

Displays the baseline demographic breakdown (N = 29), including Age, Gender, Education, Duration of Diabetes, Marital Status, and Occupation.

Pre- and Post-Intervention Knowledge Scores

The mean knowledge score increased from 15.21 ± 2.16 at pre-test to 27.83 ± 1.42 at post-test. A paired-samples t-test demonstrated a statistically significant difference between the two measurements (t = −26.306, p < 0.001), indicating a significant improvement in diabetes- and nutrition-related knowledge following the intervention (Table 1 & Figure 2).

Table 1: Comparison of Pre- and Post-Intervention Knowledge Scores

Variable	Group	N	Mean ± SD	t-value	p-value
Knowledge Score	Pre-test	29	15.21 ± 2.16	−26.306	<0.001
	Post-test	29	27.83 ± 1.42		

Pre- and Post-Intervention Self-Efficacy Scores

The mean self-efficacy score increased from 11.03 ± 2.64 at pre-test to 23.83 ± 1.51 at post-test. The paired-samples t-test showed a statistically significant difference ($t = -22.647$, $p < 0.001$), indicating improved confidence in diabetes self-management and nutritional decision-making following the intervention (Table 2 & Figure 2).

Table 2: Comparison of Pre- and Post-Intervention Self-Efficacy Scores

Variable	Group	N	Mean ± SD	t-value	p-value
Self-Efficacy Score	Pre-test	29	11.03 ± 2.64	−22.647	<0.001
	Post-test	29	23.83 ± 1.51		

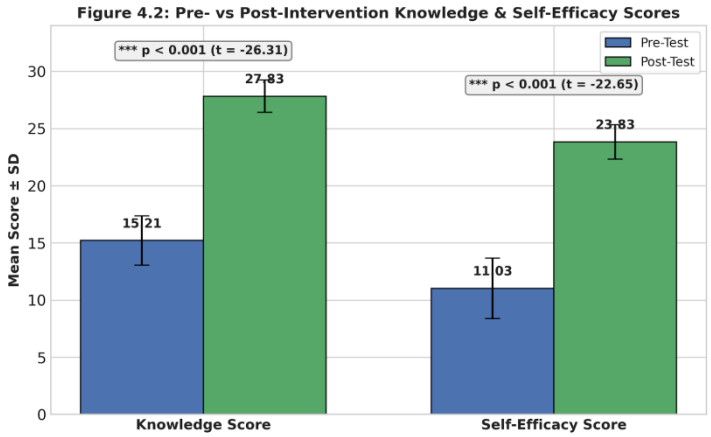

Figure 2: Pre- vs. Post-Intervention Knowledge & Self-Efficacy Scores

Shows significant mean increases in Knowledge (15.21 to 27.83, $p < 0.001$) and Self-Efficacy (11.03 to 23.83, $p < 0.001$) with paired t-test annotations.

Adherence to Recommended Nutritional Practices

Following the nutritional education intervention, participants reported favorable adherence to recommended nutritional practices. For following the recommended meal plan, 51.7% reported “often” and 44.8% reported “always.” Regarding portion control, 51.7% reported always monitoring portion sizes.

For avoiding foods high in sugar and fats, 51.7% reported “often” and 41.4% reported “always.” For including fruits, vegetables, and whole grains, 44.8% reported “often” and 55.2% reported “always.” Regarding carbohydrate intake, 51.7% reported “often” and 44.8% reported “always.”

Furthermore, 65.5% reported always adjusting their diet based on blood sugar information, while 55.2% reported always seeking advice from healthcare providers when needed (Figure 3). Overall, most participants reported following the recommended nutritional practices either “often” or “always,” indicating favorable post-intervention adherence.

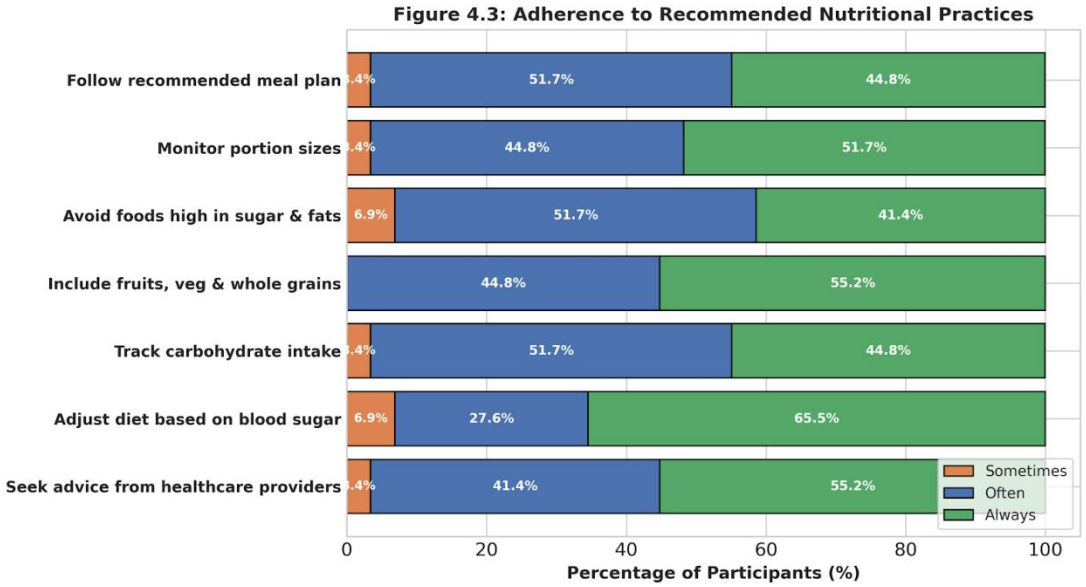

Figure 3: Adherence to Recommended Nutritional Practices

Presents horizontal stacked percentages across seven core nutritional behaviors, illustrating high post-intervention compliance ("Often" and "Always").

Patient Satisfaction with the Nutritional Education Program

Participants reported favorable satisfaction with the nutritional education program. The mean score for clarity of nutrition advice was 3.28 ± 0.70. The program's ability to address personal dietary needs had a mean score of 3.55 ± 0.57, while confidence in managing diabetes after the program had a mean score of 3.55 ± 0.51.

The mean score for the program being practical and realistic was 3.52 ± 0.57, while willingness to recommend the program to other patients had the highest mean score (3.59 ± 0.63) (Figure 4.4). Overall, the satisfaction scores were favorable, with all item means exceeding 3.0, indicating that participants generally perceived the program as clear, relevant, practical, and useful.

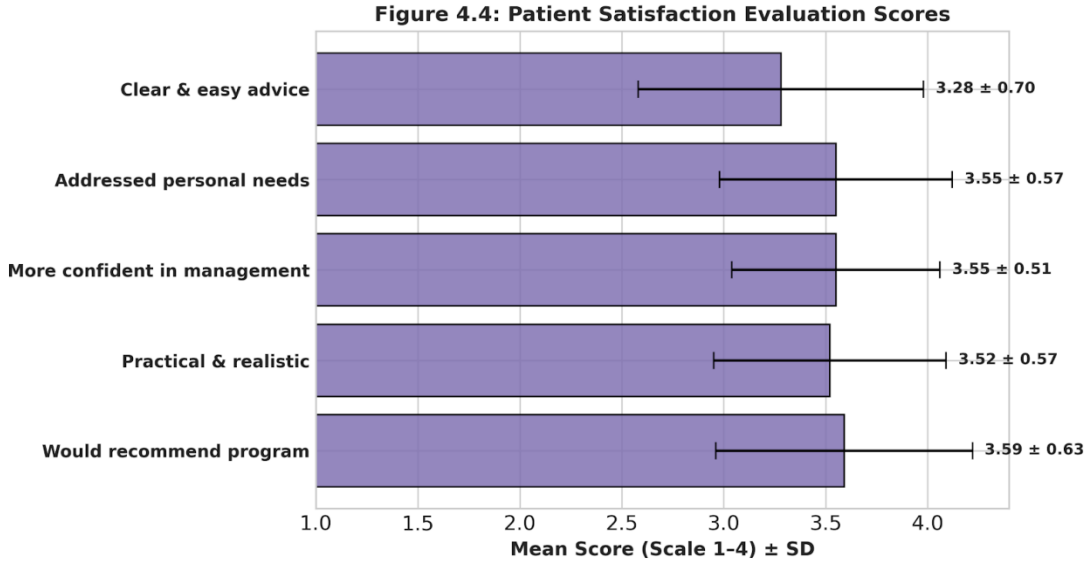

Figure 4: Patient Satisfaction Evaluation Scores

Illustrates mean satisfaction scores with standard error caps across all five evaluation metrics (4-point scale).

Summary of Key Findings

The study demonstrated statistically significant improvements in diabetes-related knowledge and self-efficacy following the nutritional education intervention ($p < 0.001$ for both outcomes). Participants also reported favorable adherence to recommended nutritional practices and positive satisfaction with the program. The highest satisfaction rating was for willingness to recommend the program to other patients with diabetes (3.59 ± 0.63).

Discussion

The present study assessed the impact of structured nutritional education on diabetes-related knowledge, self-efficacy, adherence to recommended nutritional practices, and satisfaction among 29 low-income patients with type 2 diabetes mellitus (T2DM). Most participants were aged 46-55 years, female, had no formal education, and were unemployed. The majority had lived with diabetes for 6-10 years, while none had previously received nutrition counseling. These characteristics indicate a need for accessible, practical, and patient-centered nutritional education for economically disadvantaged patients with T2DM.

A significant improvement was observed in diabetes-related knowledge following the intervention. The mean knowledge score increased from 15.21 ± 2.16 at pre-test to 27.83 ± 1.42 at post-test, with a statistically significant difference ($t = -26.306$, $p < 0.001$). This finding is consistent with previous evidence indicating that structured nutrition and diabetes education can improve patients' diabetes-related knowledge and understanding of healthy dietary practices [1,4,9]. The improvement observed in the present study may be attributed to the practical and focused content of the intervention, which addressed healthy food choices, portion control, meal planning, and carbohydrate management.

Self-efficacy also improved significantly following the intervention. The mean self-efficacy score increased from 11.03 ± 2.64 at pre-test to 23.83 ± 1.51 at post-test ($t = -22.647$, $p < 0.001$). This finding suggests that participants reported greater confidence in managing their dietary practices and diabetes-related self-care after receiving nutritional education. Previous studies have similarly highlighted the importance of diabetes self-management education and health education in strengthening patients' confidence, engagement, and self-care behaviors [6,8,10]. The practical nature of the intervention may have helped participants translate nutritional information into manageable daily practices.

Participants also reported favorable adherence to recommended nutritional practices after the intervention. Most participants reported that they often or always followed the recommended meal plan, monitored portion sizes, avoided foods high in sugar and fats, consumed fruits, vegetables, and whole grains, monitored carbohydrate intake, adjusted their diet based on blood sugar information, and sought advice from healthcare providers when needed. These findings are consistent with evidence suggesting that patient-centered nutrition education can support healthier dietary and self-management behaviors [5,8,11]. However, because adherence data were available only after the intervention, a statistical comparison of pre- and post-intervention adherence was not possible. Therefore, the present findings indicate reported post-intervention adherence rather than a statistically demonstrated improvement in adherence.

Participants also expressed favorable satisfaction with the nutritional education program. The highest mean satisfaction score was observed for willingness to recommend the program to other patients (3.59 ± 0.63), followed by addressing personal dietary needs (3.55 ± 0.57) and increased confidence in diabetes management (3.55 ± 0.51). These findings suggest that participants generally perceived the educational intervention as relevant, practical, understandable, and useful for their daily diabetes management.

The socioeconomic characteristics of the participants are particularly relevant to the interpretation of these findings. More than half of the participants had no formal education and were unemployed, and none had previously received nutrition counseling. Financial constraints and limited access to appropriate dietary guidance may create challenges for adopting healthy eating practices among economically disadvantaged patients [13]. Consequently, nutritional education for low-income populations should focus not only on nutritional recommendations but also on affordability, local food availability, portion control, and realistic meal planning. Such an approach may make dietary recommendations more achievable within participants' socioeconomic circumstances.

Overall, the findings suggest that structured nutritional education was associated with significant improvements in diabetes-related knowledge and self-efficacy, while participants reported favorable adherence to recommended nutritional practices and positive satisfaction with the program. Nevertheless, the findings should be interpreted in light of the study design and outcome measures. The one-group pre-test/post-test design does not include a control group, and therefore the observed changes cannot be attributed exclusively to the intervention. In addition, adherence was assessed only after the intervention, and objective clinical indicators

such as HbA1c and blood glucose were not measured. Future studies should use larger samples, include comparison groups, assess adherence before and after the intervention, and incorporate objective clinical measures with longer follow-up periods.

Conclusion

The study concluded that structured nutritional education was associated with significant improvements in diabetes-related knowledge and self-efficacy among low-income patients with T2DM. Participants also reported favorable adherence to recommended nutritional practices and positive satisfaction with the educational program.

The findings support the importance of structured, patient-centered, affordable, and culturally appropriate nutritional education as a component of diabetes self-management support, particularly for patients with limited educational and financial resources. However, the absence of a control group, the lack of pre-intervention adherence data, and the absence of objective clinical measures such as HbA1c and blood glucose limit the extent to which the findings can be generalized or interpreted as evidence of physiological improvement.

Further research should involve larger samples, controlled study designs, longer follow-up periods, pre- and post-intervention assessment of adherence, and objective clinical indicators to determine whether improvements in knowledge and self-efficacy are sustained and translate into longer-term improvements in diabetes self-management and glycemic outcomes.

References

1. Rossi, A., Nasir, Z., Carrión, A., & Niwagaba, L. B. (2026). Nutrition Interventions Improve Glycemic Control Among People With Type 2 Diabetes in Low-and Middle-Income Countries. A Systematic Review. *Journal of Human Nutrition and Dietetics*, *39*(3), e70269.
2. Nau, C., Wu, J. H., Han, B., Habib, M., Li, X., Padilla, A., ... & Mozaffarian, D. (2026). Effects of a "Food Is Medicine" Intervention on Glucose Control Among Medicaid-Insured Patients With Type 2 Diabetes: A Randomized Controlled Trial. *Circulation*, *154*(7), 624-635.
3. Zheng, C., Dou, X., Xiong, X., Lei, E. Y., Jiang, M., Wu, Y., ... & Chen, J. A. (2026). WeChat-based intervention for glycemic control in patients with type 2 diabetes mellitus: multicenter randomized controlled trial. *JMIR mHealth and uHealth*, *14*, e80738.
4. Khodseewong, S., Somdee, T., Aneknan, P., & Nonsa-ard, R. (2026). Nutritional Knowledge, Attitude, Eating Behavior, and Dietary Intake in Relation to Glycemic Control Among Patients with Type 2 Diabetes in Rural Thailand. *Diabetology*, *7*(7), 139.
5. Sasidharan, S., & Vijayan, D. (2026). Effectiveness of nurse-led diabetes self-management education on medication adherence, dietary practices, and glycemic control among patients with type 2 diabetes mellitus: A narrative review. *Scienxt Journal of Nursing Studies*.
6. Alosta, M. R., Atiyeh, H., Hani, S. B., Hamdan-Mansour, A., Al-yyan, A. A. A., Afaneh, T., ... & Othman, E. H. (2026). Patient Activation and Diabetes Outcomes Among Jordanian Patients With Type 2 Diabetes: Longitudinal Evidence on Adherence and Glycemic Control With Linear Mixed Model Analysis. *Research in Nursing & Health*.
7. Agustin, I., & Erman, I. (2026). Effect of a Nurse-Led Multimodal Intervention on Glycaemic Control among Primary Care Patients with Type 2 Diabetes: A Quasi-Experimental Study. *Jurnal Penelitian Pendidikan IPA*, *12*(7), 577-583.
8. Cantoria, J. J., Alcantara, K. S. Q., Berana, F. Z., Llagas, R. L. S., Pacheco, M., Ramos, L. N., ... & Glinoga, M. G. (2026). The Effects of Health Education on Adherence to Self-Care Behaviors Among Patients with Type 2 Diabetes Mellitus. *Philippine Journal of Nursing*, *96*(1), 76.
9. Guilbert, E., Perry, R., Whitmarsh, A., & Sauchelli, S. (2022). Short-term effectiveness of nutrition therapy to treat type 2 diabetes in low-income and middle-income countries: systematic review and meta-analysis of randomised controlled trials. *BMJ open*, *12*(3), e056108.

10. Chowdhury, H. A., Harrison, C. L., Siddiquea, B. N., Tissera, S., Afroz, A., Ali, L., ... & Billah, B. (2024). The effectiveness of diabetes self-management education intervention on glycaemic control and cardiometabolic risk in adults with type 2 diabetes in low-and middle-income countries: a systematic review and meta-analysis. *PloS one*, *19*(2), e0297328.

11. Gebreyesus, H. A., Abreha, G. F., Beshirie, S. D., Abera, M. A., Weldegerima, A. H., Bezabih, A. M., ... & Nigatu, T. G. (2024). Patient-centered nutrition education improved the eating behavior of persons with uncontrolled type 2 diabetes mellitus in North Ethiopia: a quasi-experimental study. *Frontiers in Nutrition*, *11*, 1352963.Butayeva, J., Ratan, Z. A., Downie, S., & Hosseinzadeh, H. (2023). The impact of health literacy interventions on glycemic control and self-management outcomes among type 2 diabetes mellitus: A systematic review. *Journal of diabetes*, *15*(9), 724-735.

12. Alawode, O., Humble, S., & Herrick, C. J. (2023). Food insecurity, SNAP participation and glycemic control in low-income adults with predominantly type 2 diabetes: a cross-sectional analysis using NHANES 2007-2018 data. *BMJ open diabetes research & care*, *11*(3), e003205.

13. Louie, J. Z., Shiffman, D., Rowland, C. M., Kenyon, N. S., Bernal-Mizrachi, E., McPhaul, M. J., & Garg, R. (2024). Predictors of lack of glycemic control in persons with type 2 diabetes. *Clinical Diabetes and Endocrinology*, *10*(1), 2.

14. Siddiquea, B. N., Magliano, D. J., Chowdhury, H. A., Chowdhury, M. R. K., Afroz, A., Shah, S. S., & Billah, B. (2025). Glycaemic control and its related factors among people with type 2 diabetes in low-and middle-income countries: a systematic review and meta-analysis. *Frontiers in Clinical Diabetes and Healthcare*, *6*, 1695235.