

EDUCATIONAL INTERVENTION AND ITS EFFECT ON HEALTH MANAGEMENT PRACTICES IN ADULTS WITH DIABETES

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ABSTRACT

The present study aimed to assess the effectiveness of an educational intervention on dietary practices, lifestyle behaviors and glycemic control among diabetic patients. A structured educational programme supported by a computer-based software package was implemented among 33 diabetic patients in the experimental group, while 35 patients served as controls. The intervention emphasized dietary modification, physical activity, medical monitoring and risk factor awareness. Results indicated that 12 out of 15 recommended dietary practices were significantly adopted by the experimental group following intervention. Post-intervention, there was a marked increase in the intake of green leafy vegetables, other vegetables, and fruits, along with a reduction in the consumption of cereals, fats and fleshy foods. Significant improvements were also observed in health management behaviors, including daily exercise, periodic blood glucose monitoring, and regular physician visits ($P < 0.01$). Glycemic control improved substantially, as evidenced by a reduction in mean fasting plasma glucose from 172.21 ± 47.49 mg/dl to 127.03 ± 1.15 mg/dl and HbA1c from $9.53 \pm 1.64\%$ to $7.50 \pm 0.99\%$ ($P < 0.01$). The study demonstrates that educational intervention is an effective strategy for improving dietary practices, lifestyle behaviors, and glycemic control among diabetic patients.

Key words: Educational intervention, Dietary practices, Diabetes management, Glycemic control

INTRODUCTION

The prevalence of *Diabetes mellitus* has rapidly increased in India as a result of urbanization, sedentary lifestyles, and a shift to westernized dietary habits. *Diabetes mellitus* has become a major global public health concern. Inadequate self-care behaviors, poor food habits and decreased physical activity have all been found to be major causes of poor glycemic control and the emergence of problems connected to diabetes. Therefore,

consistent lifestyle modification, particularly with regard to nutrition, exercise and medical monitoring as well as pharmaceutical treatment are necessary for effective diabetic control.

The pre-requisite for diabetes care is dietary management since poor food choices have a direct impact on blood glucose levels. Structured nutritional and dietary education dramatically increases dietary adherence and lowers fasting blood glucose and HbA1c levels in people with type 2 diabetes (Eshete *et al.*,

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2023). The significance of patient education in attaining glycemic control is highlighted by systematic reviews and meta-analyses, which further verify that diet-focused educational interventions lead to clinically significant drops in HbA1c (Shiferaw *et al.*, 2021).

Diabetes control is greatly aided by lifestyle choices including regular medical monitoring and physical activity in addition to dietary habits. Research indicates that educational interventions greatly enhance self-care practices, such as regular doctor visits, blood glucose monitoring, and exercise (Majumdar *et al.*, 2025; Kim *et al.*, 2020). Education programs based on behavioral theory have also demonstrated efficacy in improving diabetic patients' self-management abilities and adherence to advised lifestyle behaviors (Ranjbar *et al.*, 2024).

Recent advancements in educational delivery methods, including computer-based, web-based and digital platforms, have further strengthened the impact of diabetes education. Technology-assisted interventions have been shown to improve dietary compliance, increase patient engagement, and enhance glycemic outcomes (Dening *et al.*, 2023). Similarly, social media-based and micro learning educational strategies have demonstrated significant improvements in diabetes knowledge, self-efficacy and self-care behavior related to diet and glucose monitoring (Rahbar *et al.*, 2024).

Long-term and community-based research further demonstrates the lasting benefits of structured educational programs. Evidence from randomized clinical trials and community interventions shows consistent improvements in dietary habits, physical activity levels, and metabolic outcomes among participants who receive structured diet and

exercise education (El-Deyarbi *et al.*, 2024; Ernawati *et al.*, 2021). However, despite the growing body of supporting evidence, these educational interventions remain underutilized in routine diabetes care, especially in healthcare settings with limited resources.

In this context, the present study aimed to examine the effects of a structured educational intervention on dietary habits, lifestyle behaviors, medical monitoring, and glycemic control in individuals with diabetes.

MATERIAL AND METHODS

The study adopted an experimental pre-test and post-test control group design to evaluate the effectiveness of an educational intervention on dietary practices and glycemic control among diabetic patients. The study was conducted at Dia-Care Hospital, Kannur, Kerala and included a total of 68 diabetic patients who were selected based on their willingness to participate and ability to cooperate throughout the study period. The selected subjects were randomly assigned into two groups by drawing lots, comprising a control group with 35 participants and an experimental group with 33 participants. Two participants from the experimental group were excluded from the final analysis due to irregular participation in the intervention sessions. A structured educational intervention was developed in the form of a computer-based software package designed to deliver key health messages related to diabetes management. The intervention focused on dietary modification, physical activity, medical monitoring, and prevention of diabetes-related complications. The educational programme was administered only to the experimental group over a defined intervention period, while the control group continued to receive routine medical care without additional educational

Table 1. Socio-economic profile of the subjects included in educational intervention

Particulars	Control (n=35)		Experimental (n=33)		Total (n=68)	
	Frequ- ency	Per- cent	Frequ- ency	Per- cent	Frequ- ency	Per- cent
Gender						
Male	12	34.3	19	57.6	31	45.6
Female	23	65.7	14	42.4	37	54.4
Age group (yrs)						
<30	2	5.7	3	9.1	5	7.4
31-40	3	8.6	5	15.2	8	11.8
41-50	8	22.9	9	27.3	17	25.0
51-60	15	42.9	12	36.4	27	39.7
>60	7	20.0	4	12.1	11	16.2
Education						
Primary school	14	40.0	3	9.1	17	25.0
Secondary school	12	34.2	17	51.5	29	42.6
Graduation	5	14.3	8	24.2	13	19.1
PG/professional	4	11.4	5	15.2	9	13.2
Occupation						
Service personnel	14	40.0	17	53.6	31	45.6
Business	5	14.3	6	18.2	11	16.2
Agriculture	3	8.6	3	9.1	6	8.8
House wife	13	37.1	7	21.2	20	29.4
Income (Rs/month)						
2500-4500	6	18.2	5	15.2	11	16.7
4501-7000	4	12.1	7	21.2	11	16.7
7001-9500	11	33.3	8	24.2	19	28.8
9501-15000	6	18.2	9	27.3	15	22.7
≥15001	6	18.2	4	12.1	10	15.2

Table 2. Medical monitoring and diabetic management practices of target group at pre and post-intervention periods.

Statement	Control (n=35)			Experimental (n=33)		
	Pre-test %	Post-test %	Z-test	Pre-test %	Post-test %	Z-test
Daily exercise (1/2 hr)	31.4	42.9	0.996 ^{ns}	27.3	66.7	3.489 ^{**}
Practicing yoga	5.7	5.7	0	6.1	12.1	0.861 ^{ns}
Practicing stress alleviation	5.7	8.6	0.465 ^{ns}	6.1	9.1	0.466 ^{ns}
Periodic blood testing	28.6	40.0	1.015 ^{ns}	15.2	90.9	9.470 ^{**}
Visiting physicians regularly	68.6	60.0	0.751 ^{ns}	39.4	93.9	5.764 ^{**}
Use of diabetic foot wear	11.4	11.4	0	3.0	3.0	0
Regular eye check-up	14.3	14.3	0	12.1	12.1	0
Use of Ayurveda/herbal medicine	2.9	11.4	1.412 ^{ns}	0.0	0.0	0
Use of herbal medicine	2.9	2.9	0	0.0	0.0	0
Use of insulin injection	34.3	25.7	0.786 ^{ns}	12.1	12.1	0

input. Baseline data were collected from both groups during the pre-intervention period using structured questionnaires to assess dietary practices, lifestyle behaviors and diabetes management practices. Dietary intake was assessed using the 24-hour dietary recall method. Clinical and biochemical parameters, including fasting plasma glucose and glycated hemoglobin (HbA1c), were obtained from medical records and laboratory reports. Following the completion of the educational intervention, the same data collection procedures were repeated during the post-intervention period. The collected data were coded and analysed using appropriate statistical techniques.

RESULTS AND DISCUSSION

Demographic details

The socio-economic characteristics of diabetic patients selected for the educational intervention study are furnished in table 1.

A total of 68 patients enrolled themselves for educational intervention. They were randomized as the control (n=35) and experimental (n=33) groups. Out of the total of 68 patients 31 (45.6%) were male and 37 (54.4%) were female. The age group of the majority of subjects ranged between 41 to 60 years (64.7%) reflecting same trend on both control and experimental groups. The educational status of the group ranged between primary school to PG/ professional education. Majority of the subjects had education up to secondary level. Totally two-third of the subjects (67.6%), had education up to school level and only one third (32.3%), reported to have higher education. Government servants and professionals like officers, teachers, nurses and retired personnel together constituted 45.6 percent. Second highest group was housewives (29.4%), followed by business men (16.2%)

Table 3. Effect of intervention on blood glucose

Particulars	Pre-test		Post-test	
	Frequency	%	Frequency	%
*FPG level (mg/dl)				
Normal (80-110)	3	9.1	9	27.27
Impaired diabetic (110-125)	1	3.03	6	18.18
Diabetic (>125)	29	87.87	18	54.55
Pooled	33	100	33	100
**HbA1c level				
Good (4.2-5.9 %)	0	0	2	6.06
Fair (6.0-7.5 %)	5	15.15	18	54.55
Poor glycemic (>7.5 %)	28	84.85	13	39.39
Pooled	33	100	33	100

and agriculturists (8.8%). Majority of the subjects (51.5%) reported had a monthly income of 7000 to 15000/- rupees.

Effect of Diabetic intervention on changes in medical monitoring and exercise pattern

Desirable behavioural changes in the management practices of diabetes were also noticed in the case of medical monitoring. There was a significant ($P<0.01$) increase in the periodic blood testing and regular visits to physicians among the patients, who underwent the education programme. An increase in the practice of stress alleviation techniques and yoga, observed during the post-intervention period was not at all of any significant extent. But daily exercise for half an hour by the patients, became more popular after education programme and was adopted by a significantly ($P<0.01$) more number of patients belonging to the experimental group.

Glycemic control: Fasting Plasma Glucose (FPG) and HbA1c levels after intervention.

The HbA1c assay is the standard measurement of chronic glycemia and measures the amount of glucose that binds to haemoglobin over a period of time. The normal recommended HbA1c readings for diabetics should fall within the reference range of 6.5 to 7.0 percent. Glycemic control as measured by HbA1c was divided into two groups according to the ADA: Group 1: controlled if HbA1c $<7\%$ and Group 2: uncontrolled if HbA1c $\geq 7\%$. In the present study, an attempt was made to evaluate the effect of dietary modification and physical activity. The educational intervention could be associated with a better glycemic control among the experimental group. The details are given in table 3 and fig.1.

Most of the diabetic patients in the study had poor glycemic control (84.85%) and a high FPG level (87.87%) during the pre-test period. The post-test results after educational intervention showed tremendous improvement in the blood picture. There was notable reduction in FPG level of the subjects from 87.87 percent (pre-test) to 54.55 percent (post-test). Similarly, HbA1C level also showed

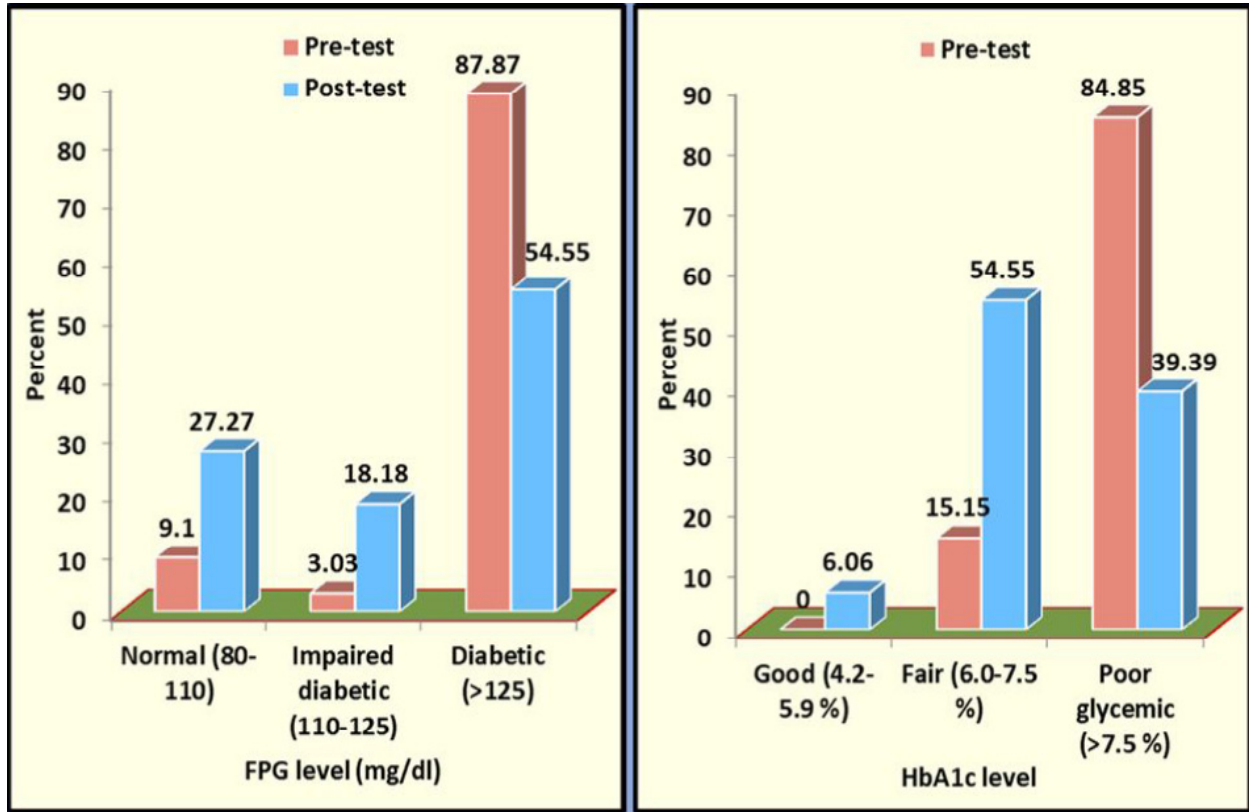


Fig. 1. Effect of intervention on blood glucose

a tell-tale decline between pre (84.85%) and post (39.39%) test period. Thus, the education programme did prove to be effective to bring about remarkable glycemic control among the subjects.

Mean FPG and HbA1c levels of experimental subjects

The Mean FPG and HbA1c levels of experimental subjects who underwent the educational intervention are shown in the table 4. As the table shows, there was a statistically

significant ($P < 0.01$) reduction in the mean values of HbA1c and FPG of experimental subjects due to educational intervention. Significant improvement in the glycemic control by the subjects was an encouraging outcome of the diabetic education. (Rao and Thomas, 2025).

CONCLUSION

The study demonstrates that a structured educational intervention significantly improved dietary practices,

Table: 4. Mean FPG and HbA1c levels of experimental subjects

Particulars	Experimental (n=33)		t-value
	Pre-test	Post-test	
FPG (125mg/dl)	172.21± 47.49	127.03 ± 1.148	5.651**
HbA1c (7%)	9.53± 1.64	7.50 ± 0.999	8.360**

** Significant 0.01 levels

lifestyle behaviors and glycemic control among diabetic patients. Post-intervention, 12 of 15 recommended dietary practices were adopted, with reduced intake of cereals, fats and fleshy foods and increased consumption of vegetables and fruits. Daily exercise increased from 27.3% to 66.7%, periodic blood glucose testing from 15.2% to 90.9%, and regular physician visits from 39.4% to 93.9% ($P<0.01$). Glycemic control improved markedly, with poor HbA1c levels declining from 84.85% to 39.39% and elevated fasting plasma glucose decreasing from 87.87% to 54.55%. Mean fasting plasma glucose reduced from 172.21 ± 47.49 mg/dl to 127.03 ± 1.15 mg/dl, and mean HbA1c from $9.53\pm1.64\%$ to $7.50\pm0.99\%$ ($P<0.01$), confirming the effectiveness of the educational intervention.

REFERENCES

- Dening, J., Mohebbi, M., Abbott, G., George, E. S., Ball, K. and Islam, S. M. S. 2023. A web-based low carbohydrate diet intervention significantly improves glycaemic control in adults with type 2 diabetes: Results of the T2 Diet study randomised controlled trial. *Nutrition & Diabetes*, 13(1), 12. <https://doi.org/10.1038/s41387-023-00240-8>
- El-Deyarbi, M., Ahmed, L. A., King, J., Al Nuaimi, H., Al Juboori, A., Mansour, N. A., Jarab, A. S., Abdel-Qader, D. H. and Aburuz, S. 2024. Effect of structured diet with exercise education on anthropometry and lifestyle modification in patients with type 2 diabetes: A 12-month randomized clinical trial. *Diabetes Research and Clinical Practice*, 213, 111754. <https://doi.org/10.1016/j.diabres.2024.111754>
- Ernawati, U., Wihastuti, T. A. and Utami, Y. W. 2021. Effectiveness of diabetes self-management education (DSME) in type 2 diabetes mellitus (T2DM) patients: Systematic literature review. *Journal of Public Health Research*, 10(2), 2240. <https://doi.org/10.4081/jphr.2021.2240>
- Eshete, A., Lambebo, A. and Mohammed, S. 2023. Effect of nutritional promotion intervention on dietary adherence among type II diabetes patients in North Shoa Zone Amhara Region: A quasi-experimental study. *Journal of Health, Population and Nutrition*, 42, 49. <https://doi.org/10.1186/s41043-023-00393-3>
- Kim, G. H., Park, Y. and Lim, H. S. 2020. The association between diabetes education and glucose control in diabetic patients: Using the 2008 and 2013 Korea National Health and Nutrition Examination Survey. *Clinical Nutrition Research*, 9(2), 81–89. <https://doi.org/10.7762/cnr.2020.9.2.81>
- Majumdar, A., Memon, F., Jatoti, M. and Chandio, F. 2025. Impact of health education on attitude, knowledge, and glycemic control in type II diabetes mellitus patients. *Physical Education, Health and Social Sciences*, 3, 296–315. <https://doi.org/10.63163/jpehss.v3i4.847>
- Rahbar, S., Zarifsanaiey, N. and Mehrabi, M. 2024. The effectiveness of social media-based microlearning in improving knowledge, self-efficacy and self-care behaviors among adult patients with type 2 diabetes: An educational intervention. *BMC Endocrine Disorders*, 24, 99. <https://doi.org/10.1186/s12902-024-01626-0>
- Ranjbar, F., Karimi, M., Zare, E. and Ghahremani, L. 2024. The effect of

- educational intervention based on the behavioral reasoning theory on self-management behaviors in type 2 diabetes patients: A randomized controlled trial. *BMC Public Health*, 24(1), 1761. <https://doi.org/10.1186/s12889-024-19207-0>
- Rao, S. and Thomas, J. 2025. Effectiveness of structured diabetes self-care education on dietary practices and glycemic control: A community-based study. *Journal of Community Health Nursing*, 42(1):15–25.
- Shiferaw, W. S., Akalu, T. Y., Desta, M., Kassie, A. M., Petrucka, P. M. and Aynalem, Y. A. 2021. Effect of educational interventions on knowledge of the disease and glycaemic control in patients with type 2 diabetes mellitus: A systematic review and meta-analysis of randomised controlled trials. *BMJ Open*, 11(12), e049806. <https://doi.org/10.1136/bmjopen-2021-049806>

Celine Mathew, C. 2026. Educational intervention and its effect on health management practices in adults with diabetes. *The Journal of Research ANGRAU*, 54 (2): 44-51