



“A Study To Assess The Effectiveness Of A Nurse-Led Program On Diabetes Mellitus Knowledge And Health-Seeking Behaviour Among Elderly In Selected Rural Area Of Rahata Taluka.”

Name of Author: Mr. Rushikesh Bhagwat Dighe, M.Sc (N),

Smt. Sindhutai Eknathrao Vikhe Patil, College of Nursing, Pravara Institute of Health Sciences (DU)
Loni

Email. Rushikeshdighe@gmail.com

Second Author: Dr. (Mrs) Kalpana S. Kale, Professor, M.Sc (N), Ph.D

Smt. Sindhutai Eknathrao Vikhe Patil, College of Nursing, Pravara Institute of Health Sciences (DU)
Loni

Email. Kalpanakale1270 &gmail.com

Third Author : Dr. Rajendra lamkhede, Principal, M.Sc (N), Ph.D

Smt. Sindhutai Eknathrao Vikhe Patil, College of Nursing, Pravara Institute of Health Sciences (DU)
Loni

ABSTRACT

Background: Diabetes mellitus is a major chronic health problem among older adults and requires adequate knowledge and appropriate health-seeking behavior for effective disease management and prevention of complications. Elderly individuals living in rural areas may face difficulties in accessing health information and appropriate healthcare services. Nurse-led educational programs may help improve diabetes-related knowledge and promote appropriate health-seeking behavior.

Aim: The present study aimed to assess the effectiveness of a nurse-led program on diabetes mellitus knowledge and health-seeking behavior among elderly individuals with Type 2 Diabetes Mellitus in a selected rural area of Rahata Taluka, Maharashtra.

Methods: A quantitative quasi-experimental pre-test/post-test control group design was used. A total of 100 elderly individuals aged 60 years and above with Type 2 Diabetes Mellitus were selected from a rural area of Rahata Taluka using purposive sampling. The participants were equally allocated to an experimental group (n=50) and a control group (n=50). Data were collected using a socio-demographic and clinical data form, the Modified Michigan Diabetes Knowledge Test, and a Health-Seeking Behaviour Checklist. The experimental group received a nurse-led programme, while the control group received routine care. Pre-test and post-test assessments were conducted to evaluate diabetes-related knowledge and health-seeking behaviour.

Results: In the pre-test, poor knowledge was observed among 64% of participants in the experimental group and 66% in the control group, while only 6% in each group had good knowledge. Following the intervention, the proportion of participants with good knowledge increased to 80% in the experimental group, whereas it remained 6% in the control group. The mean post-test knowledge score was higher in the experimental group (10.58 ± 2.49) than in the control group (5.60 ± 2.62), with a statistically significant between-group difference

($t=9.74$, $p=.001$). Similarly, the mean post-test health-seeking behaviour score was higher in the experimental group (47.66 ± 8.62) than in the control group (30.72 ± 9.16), with a statistically significant difference ($t=9.52$, $p=.001$). No statistically significant associations were reported between the pre-test levels of knowledge and health-seeking behaviour and the selected socio-demographic variables.

Conclusion: The findings indicate that the nurse-led programme was effective in improving diabetes-related knowledge and health-seeking behaviour among elderly individuals with Type 2 Diabetes Mellitus in the selected rural area. Nurse-led educational interventions may be incorporated into community-based diabetes care to strengthen health education, promote appropriate health-seeking practices, and support diabetes self-management among older adults.

Keywords: Nurse-led programme; Diabetes mellitus; Type 2 Diabetes Mellitus; Knowledge; Health-seeking behaviour; Elderly; Rural area.

Introduction

Diabetes Mellitus (DM) is a complex, chronic metabolic disorder characterized by persistent hyperglycaemia (elevated blood glucose levels) resulting from defects in insulin secretion, insulin action, or a combination of both. In a healthy physiological state, the pancreas produces the hormone insulin, which acts as a key to allow glucose from the bloodstream to enter cells for energy production. When this mechanism fails, glucose remains in the blood, leading to a cascade of metabolic imbalances that affect nearly every organ system in the human body. As a non-communicable disease, diabetes has reached epidemic proportions globally, posing a significant challenge to public health systems and individual quality of life.¹

The classification of Diabetes Mellitus is primarily based on its underlying etiology. Type 1 Diabetes Mellitus (T1DM), formerly known as insulin-dependent or juvenile-onset diabetes, is an autoimmune condition where the body's immune system mistakenly attacks and destroys the insulin-producing beta cells in the Islets of Langerhans within the pancreas. This results in an absolute deficiency of insulin, requiring lifelong exogenous insulin therapy for survival. In contrast, Type 2 Diabetes Mellitus (T2DM) is the most prevalent form, accounting for approximately 90% to 95% of all diagnosed cases. It is characterized by insulin resistance—a condition where the body's cells do not respond effectively to insulin—coupled with a progressive decline in insulin secretion. T2DM is strongly associated with modifiable lifestyle factors, including obesity, sedentary behaviour, and poor dietary habits, as well as non-modifiable factors like genetics and ethnicity.²

Beyond these two primary types, Gestational Diabetes Mellitus (GDM) occurs when glucose intolerance is first recognized during pregnancy, increasing the risk of complications for both mother and child, and often serving as a precursor to T2DM later in life. Other specific types include monogenic diabetes (such as MODY) and secondary diabetes resulting from pancreatic diseases or drug-induced states.³

The clinical significance of diabetes lies in its potential for devastating chronic complications. Prolonged exposure to high glucose levels causes damage to both small and large blood vessels. Microvascular complications include diabetic retinopathy, which is a leading cause of blindness; diabetic nephropathy, the primary cause of end-stage renal disease; and diabetic neuropathy, which leads to nerve damage and, in combination with poor circulation, often results in foot ulcers and lower-limb amputations. Macrovascular complications significantly increase the risk of cardiovascular diseases, such as myocardial infarction (heart attack) and stroke, which are the leading causes of morbidity and mortality among diabetic patients.⁴

This study assesses the effectiveness of nurse-led intervention on self-management, self-efficacy, and blood glucose level among patients with Type 2 diabetes mellitus (DM) were selected from a rural area of Rahata Taluka . In this study, the experimental group received nurse-led intervention on video-assisted teaching regarding nature of the disease condition including, diet, medication, hand and leg exercises, home care management, for 30 mins. Then a demonstration of hand and leg exercise was done followed by return demonstration done by the participants. The participants in the control group did not receive nurse-led intervention; they received only routine care. On the 15th day, when the patients came for the first follow-up, post-test was conducted for both the experimental and control groups. Results There was a statistically considerable difference noted in self-management ($t=29.639$; $p<0.001$), self-efficacy ($t=28.293$; $p<0.001$), FBS ($t=2.415$; $p<0.05$), and PPBS ($t=2.102$; $p<0.05$) in the post-test among patients with Type 2 DM in the

experimental group. **Conclusions** The study concluded that the nurse-led intervention through video-assisted teaching is an effective method to recover self-management and self-efficacy as well as reduce the fasting blood sugar and postprandial blood sugar among patients with Type 2 DM.⁵

Materials and Methods

This study utilizes a quantitative research approach with a quasi-experimental, pre-test and post-test design to evaluate the impact of a nurse-led program (independent variable) on the knowledge and health-seeking behaviours regarding Diabetes Mellitus (dependent variables) among elderly individuals. The target population consists of elderly individuals aged 60 years and above who are clinically diagnosed with Type 2 Diabetes Mellitus. Using a non-probability purposive sampling technique, a total sample size of 100 participants was selected and divided equally into an experimental group (n=50) and a control group (n=50). To be included, participants had to be at least 60 years old, willing to undergo the nurse-led program, and available for the duration of the study period. Conversely, the study excluded individuals presenting with severe acute illness requiring hospitalization at recruitment, those with advanced dementia or severe hearing/communication deficits that would prevent participation, and anyone concurrently enrolled in another structured diabetes education program. Data collection relies on a structured three-section instrumentation framework. Section I captures essential baseline characteristics, focusing on sociodemographic variables (age, sex/gender, marital status, educational background, occupation, socioeconomic status, and family support or caregiver presence) to understand the participants' social context. It also covers critical clinical variables (duration of diabetes, treatment modalities, comorbidities, current medications, smoking and alcohol history, Body Mass Index [BMI], blood pressure, and existing foot complications) to establish a physiological baseline. Section II evaluates disease comprehension using the Modified Michigan Diabetes Knowledge Test, while Section III assesses patient actions via a customized Health-Seeking Behaviour Checklist. Together, these tools provide the structured metrics necessary to measure the program's overall clinical and behavioral outcomes

Distribution of Elderly Participants According to Demographic Characteristics

The demographic characteristics of the participants were broadly comparable between the control and experimental groups. In terms of age, the largest proportion belonged to the 66–70 years category (54% control; 46% experimental), followed by 71–75 years (20%; 16%) and 60–65 years (18%; 30%), while 8% in each group were aged above 76 years. Males constituted a slight majority in both groups (54% control; 52% experimental).

Most participants were married (88% control; 92% experimental), while 12% and 8%, respectively, were widowed. Regarding education, the majority had no formal education (58% control; 64% experimental), followed by primary education (28%; 22%), secondary education (12% in both groups), and higher secondary or above (2% in both groups).

Farming was the predominant occupation (60% control; 56% experimental), followed by labour work (22%; 28%), service/business (14%; 12%), and other occupations (4% in both groups). Regarding monthly family income, most participants belonged to the Rs. 10,001–20,000 category (60% control; 70% experimental). Most participants lived in joint families (78% control; 76%), followed by extended families (12%; 6%) and nuclear families (10%; 18%).

Description of the clinical variables of the control and experimental group elderly selected in rural area.**n=100**

SN	Clinical variable		Control group (n=50)		Experimental group (n=50)	
			F	%	F	%
1	Duration of diabetes	<5 years	5	10%	5	10%
		5–10 years	30	60%	33	66%
		11–15 years	12	24%	8	16%
		>15 years	3	6%	4	8%
2	Current type of treatment	No	8	16%	7	14%
		Oral medicine	34	68%	37	74%
		Insulin	6	12%	5	10%
		Both	2	4%	1	2%
3	Family history of diabetes	Yes	11	22%	9	18%
		No	33	66%	36	72%
		Don't know	6	12%	5	10%
4	Presence of co-morbidities	Yes	12	24%	10	20%
		No	38	76%	40	80%
5	Existing foot complication	Yes	6	12%	8	16%
		No	44	88%	42	84%

The clinical characteristics of the participants were broadly comparable between the control and experimental groups. The majority had a **5–10 year history of diabetes** (60% and 66%, respectively), followed by 11–15 years (24% and 16%). **Oral medication** was the most common treatment modality (68% control; 74% experimental), while smaller proportions were receiving insulin, both oral medication and insulin, or no treatment.

Regarding family history, most participants reported **no family history of diabetes** (66% control; 72% experimental), while 22% and 18%, respectively, reported a positive family history. **Most participants had no co-morbidities** (76% control; 80% experimental). Similarly, the majority had **no existing foot complications** (88% control; 84% experimental), although foot complications were present in 12% of the control group and 16% of the experimental group. Overall, the clinical characteristics showed a broadly similar distribution between the two groups.

Assessment of (pretest & post-test) level of knowledge of control and experimental group study participants**n=100**

Level of existing knowledge	Control Group (n=50)		Experimental group(n=50)	
	pretest	Post test	pretest	Post test
Poor	66%	64%	64%	4%
Average	28%	30%	30%	16%
Good	6%	6%	6%	80%

The pre-test findings showed that in the control group, 66% of participants had poor knowledge, 28% had average knowledge, and 6% had good knowledge. Similarly, in the experimental group, 64% had poor knowledge, 30% had average knowledge, and 6% had good knowledge.

In the post-test, the control group showed minimal change, with 64% of participants having poor knowledge, 30% having average knowledge, and 6% having good knowledge. In contrast, the experimental group demonstrated marked improvement, with 80% of participants achieving good knowledge, 16% having average knowledge, and only 4% having poor knowledge.

Assessment of (pretest) level of health seeking behaviour of control and experimental group study participants

n=100

Level of existing health seeking behaviour	Control Group (n=50)	Experimental group(n=50)
Poor	58%	56%
Moderate	32%	32%
Good	10%	12%

The pre-test findings showed that in the control group, 58% of participants had poor health-seeking behaviour, 32% had moderate health-seeking behaviour, and 10% had good health-seeking behaviour. In the experimental group, 56% of participants had poor health-seeking behaviour, 32% had moderate health-seeking behaviour, and 12% had good health-seeking behaviour.

Effectiveness of nurse-led programme on knowledge and health seeking behaviour among elderly selected in rural area

Mean, SD and 't' value comparison of control and experimental group knowledge scores of the elderly selected in rural area

n=100

	Mean	SD	't' calculated	't' tabulated	'p' value
Control group	5.6	2.62	9.74	1.98	0.001
Experimental group	10.58	2.49			

The findings shows that mean post-test knowledge score was higher in the experimental group (10.58 ± 2.49) than in the control group (5.60 ± 2.62). The difference between the groups was statistically significant ($t = 9.74$, $p = 0.001$), indicating that the nurse-led programme was effective in improving diabetes-related knowledge among the elderly participants in the experimental group.

Comparison of Post-test Health-Seeking Behaviour Scores between the Control and Experimental Groups

n=100

	Mean	SD	't' calculated	't' tabulated	'p' value
Control group	30.72	9.16	9.52	1.98	0.001
Experimental group	47.66	8.62			

The results shows the mean post-test health-seeking behaviour score was higher in the experimental group (47.66 ± 8.62) than in the control group (30.72 ± 9.16). The difference between the groups was statistically

significant ($t = 9.52, p < 0.001$), indicating that the nurse-led programme was effective in improving health-seeking behaviour among the elderly participants in the experimental group.

Association of Level of Knowledge and Health-Seeking Behaviour with Selected Demographic Variables

Association between Pre-test Level of Knowledge and pre test health seeking behaviour with Selected Demographic Variables in the Control Group: The association between the pre-test level of knowledge regarding diabetes mellitus and selected socio-demographic variables among participants in the control group was assessed using the chi-square test. No statistically significant association was reported between knowledge level and age ($\chi^2 = 2.05$), gender ($\chi^2 = 1.48$), marital status ($\chi^2 = 1.98$), educational status ($\chi^2 = 4.48$), occupation ($\chi^2 = 1.36$), monthly family income ($\chi^2 = 1.81$), or type of family ($\chi^2 = 7.29$).

Association between Pre-test Level of Health-Seeking Behaviour and Selected Demographic Variables in the Control Group: The association between the pre-test level of health-seeking behaviour and selected socio-demographic variables among participants in the control group was assessed using the chi-square test. No statistically significant association was reported with age ($\chi^2 = 3.54$), gender ($\chi^2 = 1.15$), marital status ($\chi^2 = 0.76$), educational status ($\chi^2 = 5.50$), occupation ($\chi^2 = 5.46$), monthly family income ($\chi^2 = 9.21$), or type of family ($\chi^2 = 3.00$).

Association between Pre-test Level of Knowledge and Selected Demographic Variables in the Experimental Group

In the experimental group, the association between pre-test knowledge level and selected socio-demographic variables was assessed using the chi-square test. No statistically significant association was reported between knowledge level and age ($\chi^2 = 3.22$), gender ($\chi^2 = 1.30$), marital status ($\chi^2 = 0.89$), educational status ($\chi^2 = 4.56$), occupation ($\chi^2 = 9.55$), monthly family income ($\chi^2 = 10.22$), or type of family ($\chi^2 = 5.57$).

Association between Pre-test Level of Health-Seeking Behaviour and Selected Demographic Variables in the Experimental Group. The association between the pre-test level of health-seeking behaviour and selected socio-demographic variables in the experimental group was assessed using the chi-square test. No statistically significant association was reported with age ($\chi^2 = 2.65$), gender ($\chi^2 = 0.61$), marital status ($\chi^2 = 6.23$), educational status ($\chi^2 = 10.30$), occupation ($\chi^2 = 5.20$), monthly family income ($\chi^2 = 5.58$), or type of family ($\chi^2 = 1.54$).

Overall, no statistically significant association was reported between the pre-test levels of knowledge or health-seeking behaviour and the selected socio-demographic variables in either the control or experimental group.

Discussion

The present study was conducted to assess the effectiveness of a nurse-led programme on diabetes mellitus knowledge and health-seeking behaviour among elderly individuals with type 2 diabetes mellitus in a selected rural area of Rahata Taluka, Maharashtra. The findings demonstrated substantial improvement in both knowledge and health-seeking behaviour among participants who received the nurse-led programme compared with those who received routine care.

Knowledge of Diabetes Mellitus

The pre-test findings indicated that knowledge levels were comparable between the two groups. In the control group, 66% of participants had poor knowledge, 28% had average knowledge, and 6% had good knowledge. Similarly, in the experimental group, 64% had poor knowledge, 30% had average knowledge, and 6% had good knowledge. These findings indicate a considerable need for structured diabetes education among elderly individuals in rural communities.

Following the intervention, the experimental group demonstrated marked improvement in knowledge. The proportion with good knowledge increased from 6% in the pre-test to 80% in the post-test, while those with

poor knowledge decreased from 64% to 4%. In contrast, only minimal change was observed in the control group. The mean post-test knowledge score was higher in the experimental group (10.58 ± 2.49) than in the control group (5.60 ± 2.62), with a reported statistically significant difference ($t = 9.74, p < 0.001$). These findings support the effectiveness of the nurse-led programme in improving diabetes-related knowledge.⁵

The findings are consistent with a quasi-experimental study by a nurse-led diabetes self-management education programme, in which knowledge and self-care behaviour improved significantly following the intervention. In that study, the proportion of participants with low knowledge in the intervention group decreased from 62.7% to 20.6%, while the proportion with high knowledge increased from 11.8% to 54% after the intervention.⁶ Similarly, Subramanian et al. (2020), in a study conducted in Chennai, reported significant improvement in self-management and self-efficacy following a nurse-led intervention consisting of diabetes education, diet, medication, exercise and home-care teaching.⁵

More recent evidence also supports the role of nurse-led education. A 2025 systematic review and meta-analysis of 21 studies found that nurse-led self-management interventions significantly improved self-management behaviour and self-efficacy among individuals with type 2 diabetes mellitus. Another 2025 meta-analysis of eight randomized controlled trials found that nurse-led diabetes self-management education improved self-efficacy and produced improvements in several diabetes-related clinical outcomes, although considerable variation existed between interventions and follow-up periods.⁸

Health-Seeking Behaviour

At baseline, health-seeking behaviour was also broadly comparable between the two groups. In the control group, 58% of participants had poor health-seeking behaviour, 32% had moderate behaviour, and 10% had good behaviour. In the experimental group, 56% had poor, 32% had moderate, and 12% had good health-seeking behaviour. These findings suggest that a considerable proportion of elderly individuals with diabetes required additional support to improve appropriate healthcare-seeking practices.

Following the nurse-led programme, the experimental group showed a higher mean post-test health-seeking behaviour score (47.66 ± 8.62) compared with the control group (30.72 ± 9.16). The reported difference was statistically significant ($t = 9.52, p = 0.001$). This improvement may indicate that structured education and counselling helped participants recognise the importance of timely consultation, treatment adherence, follow-up and appropriate use of healthcare services.⁷

The findings are relevant to evidence from rural India. Flage et al. (2025), studying elderly individuals in three rural villages near Vellore, reported that 93% of elderly participants with acute or chronic illnesses sought treatment; diabetes accounted for 25% of reported chronic illnesses. The study also identified variation in treatment-seeking according to chronic illness, highlighting the importance of continued community engagement with elderly populations.¹²

Similarly, a study of elderly individuals in rural Western Maharashtra reported that health-seeking behaviour is important for facilitating early diagnosis and treatment of morbidity among older adults. A study among elderly people with type 2 diabetes in rural Punjab also reported substantial use of healthcare services and suggested that community-based interventions could further enhance health-seeking practices and diabetes management.^{9,10}

Association with Selected Socio-demographic Variables

The present study found no statistically significant association between pre-test knowledge or health-seeking behaviour and the selected socio-demographic variables in either the control or experimental group. This suggests that the observed baseline levels were not significantly related to the demographic characteristics examined in this sample.

However, findings from other studies indicate that socio-demographic factors may influence health-seeking behaviour in some populations. For example, a study among elderly people in rural and tribal settings in India reported associations between health-seeking behaviour and factors such as income and co-morbidity. Another study of elderly people in rural Maharashtra found differences in health-seeking behaviour according to selected socio-economic characteristics. These differences may reflect variations in population characteristics, healthcare accessibility, measurement tools and local healthcare systems.

Overall Discussion

Overall, the present findings demonstrate that the nurse-led programme was associated with significant improvement in diabetes-related knowledge and health-seeking behaviour among elderly participants in the experimental group. The findings are consistent with previous research demonstrating the value of structured nurse-led diabetes education and self-management support.

The results highlight the potential role of nurses in providing structured diabetes education, counselling, reinforcement of self-care practices and guidance regarding appropriate healthcare utilisation, particularly in rural communities. Incorporating nurse-led educational programmes into community-based diabetes services may therefore provide an opportunity to strengthen diabetes knowledge and promote appropriate health-seeking practices among older adults.

Summary

The present quantitative quasi-experimental study was conducted to assess the effectiveness of a nurse-led programme on diabetes mellitus knowledge and health-seeking behaviour among elderly individuals with Type 2 Diabetes Mellitus in a selected rural area of Rahata Taluka, Maharashtra.

A total of 100 elderly participants aged 60 years and above were included in the study. Fifty participants were assigned to the experimental group and 50 to the control group using purposive sampling. A pre-test and post-test design was adopted. Data were collected using a structured tool consisting of socio-demographic and clinical information, the Modified Michigan Diabetes Knowledge Test, and a Health-Seeking Behaviour Checklist.

At baseline, the majority of participants in both groups had poor knowledge regarding diabetes mellitus. In the control group, 66% had poor knowledge compared with 64% in the experimental group. Similarly, poor health-seeking behaviour was observed among 58% of the control group and 56% of the experimental group.

After implementation of the nurse-led programme, substantial improvement was observed in the experimental group. Good knowledge increased from 6% at pre-test to 80% at post-test, while the proportion with poor knowledge decreased from 64% to 4%.

The mean post-test knowledge score was higher in the experimental group (10.58 ± 2.49) than in the control group (5.60 ± 2.62), with a statistically significant t value of 10.32 and $p = 0.001$.

A significant improvement was also observed in health-seeking behaviour. The experimental group obtained a mean score of 47.66 ± 8.62 , compared with 30.72 ± 9.16 in the control group. The calculated t value was 9.52, with $p = 0.001$ level.

No significant association was found between post-test knowledge or health-seeking behaviour and the selected demographic.

Overall, the findings demonstrate that the nurse-led programme was effective in improving diabetes-related knowledge and health-seeking behaviour among elderly individuals in the selected rural community.

Conclusion

The present study concludes that the nurse-led programme was effective in improving diabetes-related knowledge and health-seeking behaviour among elderly individuals with Type 2 Diabetes Mellitus in a selected rural area of Rahata Taluka. The experimental group demonstrated higher post-test knowledge and health-seeking behaviour scores than the control group, with statistically significant between-group differences.

The findings highlight the important role of nurses in providing accessible, structured and community-oriented diabetes education to elderly individuals in rural communities. Nurse-led programmes may be incorporated into community health services to improve diabetes knowledge, promote appropriate health-seeking practices and support self-management among older adults.

Recommendations

1. Regular nurse-led diabetes education programmes should be conducted for elderly individuals in rural communities.
2. Community health nurses should provide individualized education regarding diabetes self-care, including medication adherence, healthy diet, physical activity, blood glucose monitoring and prevention of complications.
3. Periodic follow-up sessions should be organized to reinforce knowledge and promote sustained health-seeking behaviour.
4. Diabetes education should be integrated into existing community health and geriatric healthcare services.
5. Family members and caregivers should be involved in diabetes education programmes to support medication management, dietary practices and appropriate healthcare utilization among elderly individuals.
6. Simple, culturally appropriate and easy-to-understand health education materials should be developed, particularly for elderly individuals with limited literacy.
7. Nurses should encourage elderly individuals to seek timely professional healthcare and avoid delaying treatment or relying solely on self-medication or traditional remedies.
8. Similar studies should be conducted with larger sample sizes and across multiple rural communities to improve the generalizability of findings.
9. Future researchers may use randomized controlled designs to provide stronger evidence regarding the effectiveness of nurse-led diabetes interventions.
10. Further studies may assess the long-term effects of nurse-led programmes on diabetes self-management, medication adherence, glycaemic control and prevention of diabetes-related complications.
11. Similar interventions may be replicated among other vulnerable populations, including elderly individuals with multiple chronic conditions, to assess their effectiveness in improving diabetes self-management and health-seeking behaviour.
12. Community-based diabetes programmes should include regular screening, follow-up and referral mechanisms to facilitate timely identification and management of diabetes-related complications.

Limitations of the Study

The study has certain limitations. The quasi-experimental design and purposive sampling may limit the generalizability of the findings. The study was conducted in a selected rural area of Rahata Taluka with a relatively small sample of 100 participants; therefore, the findings may not be representative of all elderly individuals with Type 2 Diabetes Mellitus. The outcomes were assessed over a limited follow-up period and were based primarily on knowledge and health-seeking behaviour measures. Long-term effects on glycaemic control, medication adherence, diabetes self-management and diabetes-related complications were not assessed.

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