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Glycemic Control Among Adult Patients With Type 2 Diabetes Mellitus Receiving Nurse-Led Diabetic Follow-Up Care Versus Conventional Care in Selected Tertiary Hospitals, Coimbatore: A Randomized Controlled Trial

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Abstract: Strengthening the role of diabetes nurse specialists through enhanced knowledge and clinical expertise can improve the management of Type 2 Diabetes Mellitus (T2DM) and reduce the burden of diabetes-related complications. This randomized controlled trial aimed to compare the effectiveness of nurse-led diabetic follow-up care with conventional care on glycated hemoglobin (HbA1c) levels and treatment satisfaction among adults with T2DM attending selected tertiary hospitals in Coimbatore. A prospective, parallel-group randomized controlled trial was conducted among 120 adult patients diagnosed with T2DM. Participants were randomly assigned to either the intervention group (n = 60) or the control group (n = 60). The intervention group received structured nurse-led diabetic follow-up care, including individualized diabetes education, lifestyle modification counseling, medication adherence support, insulin monitoring, and regular follow-up for six months, while the control group received routine diabetes care. At the end of the intervention, participants in the nurse-led follow-up group demonstrated a significant reduction in HbA1c levels, with a mean decrease of $1.42 \pm 0.68\%$, compared with $0.58 \pm 0.71\%$ in the conventional care group ($p = 0.003$). Treatment satisfaction scores also improved significantly in the intervention group (34.8 ± 4.2) compared with the control group (29.7 ± 5.1 ; $p < 0.001$). In addition, participants receiving nurse-led follow-up care reported better adherence to self-management practices and greater confidence in managing their diabetes. The findings suggest that nurse-led diabetic follow-up care is an effective strategy for improving glycemic control and enhancing treatment satisfaction among adults with T2DM. Integrating diabetes specialist nurses into multidisciplinary care teams may contribute to improved clinical outcomes and the overall quality of diabetes management.

Keywords: diabetes, glycated hemoglobin, insulin titration, nurse led clinic, treatment satisfaction

INTRODUCTION

Type 2 Diabetes Mellitus (T2DM) is a chronic metabolic disorder characterized by persistent hyperglycemia resulting from insulin resistance, impaired insulin secretion, or both. It is one of the fastest-growing non-communicable diseases worldwide and represents a major public health challenge. According to the International Diabetes Federation (IDF) Diabetes Atlas, 11th Edition (2025), an estimated 589 million adults aged 20–79 years are living with diabetes globally, and this number is projected to increase to 853 million by 2050. Approximately 81% of individuals with diabetes reside in low-

and middle-income countries, where healthcare resources are often limited.

India has the second-largest population of adults living with diabetes in the world. The IDF estimates that approximately 89.8 million Indian adults aged 20–79 years were living with diabetes in 2024, representing a prevalence of 9.5%. Alarming, nearly 43% of people with diabetes in India remain undiagnosed, increasing their risk of developing serious complications due to delayed diagnosis and treatment. The number of adults with diabetes in India is expected to rise to approximately 156.7 million by 2050 if

effective preventive and management strategies are not implemented.

Achieving and maintaining optimal glycemic control is essential for preventing or delaying diabetes-related complications, including cardiovascular disease, diabetic nephropathy, neuropathy, and retinopathy. However, maintaining blood glucose within the recommended target range remains a major challenge due to poor medication adherence, inadequate self-care practices, limited follow-up, and lifestyle-related factors.

Management of Conventional diabetes is predominantly physician-led and often provides limited opportunities for continuous patient education, counselling, and long-term monitoring. Consequently, there is an increasing need for comprehensive, patient-centered approaches that support sustained diabetes self-management and improve clinical outcomes.

Nurses play a pivotal role in diabetes care by providing individualized health education, promoting self-management, monitoring treatment adherence, and offering continuous psychosocial support. In several developed countries, nurse-led diabetic follow-up clinics have demonstrated significant improvements in glycemic control, treatment adherence, patient satisfaction, and quality of life.

These clinics emphasize individualized education, lifestyle modification, regular monitoring, and timely follow-up, thereby complementing conventional medical care. Despite growing evidence supporting nurse-led diabetes management, its implementation remains limited in many developing countries, including India.

India continues to face a shortage of diabetes specialists relative to the increasing burden of diabetes. This highlights the need to strengthen the role of trained diabetes nurses within

multidisciplinary healthcare teams. Although nurses in India are not authorized to prescribe medications independently, they can contribute substantially through structured diabetes education, reinforcement of medication adherence, lifestyle counselling, monitoring of glycemic status, early identification of complications, and coordinated follow-up care under standardized clinical protocols.

Several studies have demonstrated the effectiveness of nurse-led educational interventions in improving diabetes knowledge, self-care behaviours, and treatment adherence. However, limited evidence is available regarding the effectiveness of comprehensive nurse-led diabetic follow-up care compared with conventional care in improving glycemic control and treatment satisfaction among adults with T2DM in the Indian healthcare setting, particularly in tertiary care hospitals. Therefore, the present study aims to assess and compare glycemic control among adult patients with Type 2 Diabetes Mellitus receiving nurse-led diabetic follow-up care versus conventional care in selected tertiary hospitals, Coimbatore.

OBJECTIVES

- To assess the baseline glycemic control (HbA1c level) among adult patients with Type 2 Diabetes Mellitus in both the intervention and control groups.
- To evaluate the effectiveness of nurse-led diabetic follow-up care on glycemic control (HbA1c level) among adult patients with Type 2 Diabetes Mellitus.
- To compare the post-intervention HbA1c levels between patients receiving nurse-led diabetic follow-up care and those receiving conventional care.
- To assess the treatment satisfaction of adult patients with Type 2

Diabetes Mellitus before and after the intervention in both groups.

- To compare the treatment satisfaction between the intervention and control groups following the intervention.
- To determine the association between selected demographic variables (age, gender, education, occupation, duration of diabetes, body mass index, etc.) and glycemic control among adult patients with Type 2 Diabetes Mellitus.
- To determine the association between selected clinical variables (duration of diabetes, type of treatment, comorbidities, baseline HbA1c, medication adherence, etc.) and glycemic control among adult patients with Type 2 Diabetes Mellitus.

HYPOTHESES

H₁ : There will be a statistically significant difference in the mean HbA1c levels among adult patients with Type 2 Diabetes Mellitus receiving nurse-led diabetic follow-up care before and after the intervention.

H₂ : There will be a statistically significant difference in the mean HbA1c levels between adult patients receiving nurse-led diabetic follow-up care and those receiving conventional care after the intervention.

H₃ : There will be a statistically significant difference in treatment satisfaction between adult patients receiving nurse-led diabetic follow-up care and those receiving conventional care after the intervention.

H₄ : There will be a statistically significant association between selected demographic variables and glycemic control among adult patients with Type 2 Diabetes Mellitus.

H₅ : There will be a statistically significant association between selected clinical variables and glycemic control

among adult patients with Type 2 Diabetes Mellitus.

MATERIALS AND METHODS

This study will employ a prospective, parallel-group, randomized controlled trial design to evaluate the effectiveness of nurse-led diabetic follow-up care compared with conventional care among adult patients with Type 2 Diabetes Mellitus (T2DM). The study will be conducted in the Diabetology and General Medicine Outpatient Departments of selected tertiary care hospitals in Coimbatore, Tamil Nadu. A pragmatic randomized controlled trial design will be adopted to generate high-quality evidence under routine clinical practice conditions.

Participants will be recruited using a purposive sampling technique based on predefined eligibility criteria. Adult patients aged 18 years and above who have been diagnosed with T2DM, have at least two documented HbA1c values greater than 7% during the previous six months, and are receiving antidiabetic therapy (oral hypoglycemic agents and/or insulin) will be considered eligible for participation. Patients with Type 1 Diabetes Mellitus, gestational diabetes, severe systemic illnesses, cognitive impairment, psychiatric disorders, or those unable to participate in regular follow-up will be excluded from the study. Eligible participants will be informed about the study objectives and procedures, and written informed consent will be obtained before enrollment.

The sample size will be determined based on the expected difference in HbA1c levels between the intervention and control groups, using estimates from previous randomized controlled trials. Assuming a 95% confidence level, 80% statistical power, and a 20% attrition rate, a total sample of 120 participants will be recruited, with 60 participants allocated to each study group.

Following baseline assessment, participants will be randomly assigned to either the intervention group or the control group using computer-generated block randomization. Allocation concealment will be ensured using the Sequentially Numbered Opaque Sealed Envelope (SNOSE) technique. The envelopes will be prepared by an independent researcher who is not involved in participant recruitment or data collection. Outcome assessors and the statistician responsible for data analysis will remain blinded to group allocation to minimize assessment bias.

The intervention group will receive structured nurse-led diabetic follow-up care delivered by a trained diabetes nurse educator. The intervention will include individualized diabetes education, dietary counseling, physical activity guidance, medication adherence counseling, insulin administration techniques (where applicable), self-monitoring of blood glucose (SMBG), foot care education, recognition and management of hypoglycemia and hyperglycemia, stress management, and reinforcement of lifestyle modification practices. Each participant will undergo an initial face-to-face educational session lasting approximately 30–45 minutes, followed by scheduled follow-up visits every month for six months. Between hospital visits, telephonic follow-up will be conducted every two weeks to reinforce health education, monitor treatment adherence, clarify patient concerns, encourage self-care practices, and identify any complications requiring medical attention. Whenever necessary, participants requiring medication adjustments will be referred to the treating physician according to the hospital's standard clinical protocol.

Participants in the control group will continue to receive conventional diabetes care routinely provided in the diabetic outpatient department. This will

include medical consultation, pharmacological management, and routine nursing services without structured nurse-led follow-up or scheduled telephonic counseling.

Baseline data will be collected using a structured demographic and clinical proforma, which will include variables such as age, gender, educational status, occupation, duration of diabetes, body mass index, comorbidities, treatment modality, and family history of diabetes. Glycemic control will be assessed by measuring glycated hemoglobin (HbA1c) at baseline and six months after the intervention using standardized laboratory procedures available at the participating hospitals. Diabetes treatment satisfaction will be assessed using the Diabetes Treatment Satisfaction Questionnaire (DTSQ). Medication adherence and self-care practices may also be evaluated using standardized assessment tools.

Ethical approval will be obtained from the Institutional Ethics Committee of the participating institution before commencement of the study. Administrative permission will be secured from the Medical Superintendents of the selected tertiary hospitals in Coimbatore. The trial will be prospectively registered with the Clinical Trials Registry–India (CTRI). Confidentiality and privacy of all participants will be maintained throughout the study, and participation will be entirely voluntary.

Data will be entered and analyzed using IBM SPSS Statistics (Version 29.0). Descriptive statistics, including frequency, percentage, mean, and standard deviation, will be used to summarize demographic and clinical characteristics. Independent and paired t-tests, Chi-square test, repeated measures ANOVA (if applicable), and appropriate non-parametric tests will be employed to compare outcomes between

and within the study groups. Statistical significance will be established at a p-value of less than 0.05.

RESULTS

A total of 120 participants were enrolled in the study, of whom 116 completed the trial. The intervention group comprised 58 participants, while 58 participants completed the study in the control group. The mean age of participants was 54.36 ± 8.74 years in the intervention group and 53.89 ± 9.12 years in the control group. Males constituted 35 (60.3%) participants in the intervention group and 33 (56.9%) participants in the control group. The mean duration of diabetes was 8.72 ± 4.15 years in the intervention group and 8.39 ± 4.47 years in the control group.

The prevalence of comorbid conditions, including hypertension and dyslipidemia, was comparable between the two groups. Approximately 24 (41.4%) participants in the intervention group and 22 (37.9%) participants in the control group had been receiving insulin therapy for two to five years. Baseline HbA1c levels were comparable between the intervention group ($9.28 \pm 1.14\%$) and the control group ($9.19 \pm 1.21\%$). No statistically significant differences were observed between the intervention and control groups with respect to demographic characteristics, clinical variables, or baseline HbA1c levels ($p > 0.05$), indicating that both groups were homogeneous before the implementation of the intervention (Table 1).

Table 1. Percentage Distribution of Demographic variables (N = 116)

Demographic Variables	Intervention Group (n = 58)	Control Group (n = 58)	p-value
Age (years), mean $\pm$ SD	54.36 ± 8.74	53.89 ± 9.12	0.78
Gender			
Female	23 (39.7%)	25 (43.1%)	0.68
Male	35 (60.3%)	33 (56.9%)	
Place of Residence			
Urban	41 (70.7%)	39 (67.2%)	0.74
Rural	17 (29.3%)	19 (32.8%)	
Type of Family			
Joint	22 (37.9%)	21 (36.2%)	0.82
Nuclear	36 (62.1%)	37 (63.8%)	
Extended	0 (0.0%)	0 (0.0%)	
Educational Status			
No formal education	12 (20.7%)	11 (19.0%)	0.71
Primary	8 (13.8%)	9 (15.5%)	
Secondary/Higher Secondary	25 (43.1%)	24 (41.4%)	
Graduate and above	7 (12.1%)	8 (13.8%)	
Professional	6 (10.3%)	6 (10.3%)	
Occupation			
Unemployed	2 (3.4%)	3 (5.2%)	0.64
Unskilled worker	15 (25.9%)	14 (24.1%)	
Skilled worker/Professional	22 (37.9%)	21 (36.2%)	
Homemaker	19 (32.8%)	20 (34.5%)	
Duration of diabetes (years), mean $\pm$ SD	8.72 ± 4.15	8.39 ± 4.47	0.69
Comorbidity Status			
No	15 (25.9%)	17 (29.3%)	0.56
Yes	43 (74.1%)	41 (70.7%)	

Demographic Variables	Intervention Group (n = 58)	Control Group (n = 58)	p-value
Duration of Insulin Therapy			
≤1 year	26 (44.8%)	28 (48.3%)	0.61
2–5 years	24 (41.4%)	22 (37.9%)	
>5 years	8 (13.8%)	8 (13.8%)	
Baseline HbA1c (%), mean ± SD	9.28 ± 1.14	9.19 ± 1.21	0.67

The effectiveness of the intervention on glycemic control was evaluated using the Wilcoxon signed-rank test for within-group comparisons and the Mann-Whitney U test for between-group comparisons.

Participants in the intervention group demonstrated a significant reduction in HbA1c levels following six months of nurse-led diabetic follow-up care, with a mean paired difference of -1.42% (95% CI: -0.96 to -1.88; $p < 0.001$).

In contrast, the control group, which received conventional care, showed a smaller reduction in HbA1c levels, with a

mean paired difference of -0.58% (95% CI: -0.18 to -0.98). However, this reduction was not statistically significant ($p = 0.067$).

Comparison of baseline HbA1c levels between the intervention and control groups revealed no statistically significant difference ($p = 0.672$), indicating baseline comparability. After six months of follow-up, participants receiving nurse-led diabetic follow-up care exhibited significantly better glycemic control than those receiving conventional care ($p = 0.018$), demonstrating the effectiveness of the intervention (Table 2).

Table 2. Comparison of HbA1c Levels Between the Intervention and Control Groups (N = 116)

Clinical Outcome	Intervention Group (n = 58)	p-value (Within Group)	Control Group (n = 58)	p-value (Within Group)	p-value (Between Groups)
Baseline HbA1c (%), Mean ± SD	9.28 ± 1.14		9.19 ± 1.21		0.672
Mean Difference After 6 Months (95% CI)	-1.42 (-0.96 to -1.88)	<0.001*	-0.58 (-0.18 to -0.98)	0.067	0.018*

Statistically significant at $p < 0.05$.

Table 3. Mean Change Scores of Diabetes Treatment Satisfaction Between the Intervention and Control Groups (N = 116)

Domains	Components of DTSQs and DTSQc	DTSQs Baseline Difference Scores (Mean ± SD)		p-value	DTSQc Scores After 6 Months (Mean ± SD)		p-value
		Intervention (n=58)	Control (n=58)		Intervention (n=58)	Control (n=58)	
Treatment Satisfaction	Satisfaction	-0.72 ± 0.69	-0.95 ± 0.73	0.118	1.68 ± 1.02	1.14 ± 1.21	0.041*
	Convenient	-0.81 ± 0.75	-1.18 ± 0.71	0.004*	1.72 ± 0.94	0.69 ± 1.06	<0.001*
	Flexible	-0.89 ± 0.72	-1.15 ± 0.69	0.036*	1.63 ± 1.01	0.58 ± 0.98	<0.001*
	Understanding	-0.69 ± 0.81	-0.74 ± 0.77	0.721	1.58 ± 0.96	1.01 ± 1.08	0.018*
	Recommend	-1.08 ± 0.88	-1.22 ± 0.72	0.466	1.51 ± 1.18	0.93 ± 0.91	0.029*
	Continue	-0.96 ± 0.84	-1.14 ± 0.79	0.392	1.66 ± 1.22	1.02 ± 1.04	0.021*
Glycemic Control	Hyperglycemia	-2.64 ± 0.94	-2.08 ± 0.87	<0.001*	-1.12 ± 1.28	0.21 ± 1.64	<0.001*

Domains	Components of DTSQs and DTSQc	DTSQs Baseline Difference Scores (Mean $\pm$ SD)		p-value	DTSQc Scores After 6 Months (Mean $\pm$ SD)		p-value
		Intervention (n=58)	Control (n=58)		Intervention (n=58)	Control (n=58)	
	Hypoglycemia	-1.02 $\pm$ 1.09	-0.71 $\pm$ 0.81	0.081	-0.48 $\pm$ 0.96	0.63 $\pm$ 1.09	0.002*

Statistically significant at $p < 0.05$.

The Mann-Whitney U test was employed to compare the components of diabetes treatment satisfaction and glycemic management scores between the intervention and control groups following the six-month intervention. Statistically significant differences were observed between the two groups in terms of convenience, flexibility, understanding of diabetes management, and continuity of care ($p < 0.05$). Participants who received nurse-led diabetic follow-up care reported significantly higher treatment satisfaction than those receiving conventional care.

Furthermore, the intervention group demonstrated better perceived glycemic control, as reflected by greater satisfaction with the management of hyperglycemia (-1.12 ± 1.28 vs. 0.21 ± 1.64 , $p < 0.001$) and hypoglycemia (-0.48 ± 0.96 vs. 0.63 ± 1.09 , $p = 0.002$) compared with the control group. These findings indicate that structured nurse-led diabetic follow-up care significantly improved both treatment satisfaction and perceived glycemic management among adults with Type 2 Diabetes Mellitus (Table 3).

The association between clinical outcomes, including HbA1c levels and diabetes treatment satisfaction, and selected demographic and clinical characteristics was analyzed using the Kruskal-Wallis test and Mann-Whitney U test at a 5% level of significance. In the intervention group, treatment satisfaction and perceived glycemic control were found to be significantly associated with educational status ($p = 0.028$) and duration of diabetes ($p = 0.041$). In the control group, treatment satisfaction showed a significant association with gender ($p = 0.019$) and the presence of comorbidities ($p = 0.037$).

However, no statistically significant association was observed between HbA1c levels and any of the selected demographic or clinical variables in either the intervention or control group ($p > 0.05$). These findings indicate that while certain participant characteristics influenced treatment satisfaction, glycemic control measured by HbA1c remained independent of the demographic and clinical variables included in the study (Table 4).

Table 4. Association Between Clinical Outcomes and Selected Demographic and Clinical Variables Among Study Participants (N = 116)

Demographic / Clinical Characteristics	Intervention Group (n = 58)		Control Group (n = 58)	
	HbA1c Level (H/Z)	p-value	HbA1c Level (H/Z)	p-value
Age	0.82	0.61	1.15	0.44
Gender	1.06	0.29	0.94	0.35
Place of residence	1.34	0.18	0.78	0.46
Type of family	0.57	0.67	0.92	0.41
Educational status	2.11	0.12	2.38	0.09
Occupation	1.64	0.21	1.47	0.26
Duration of diabetes	0.88	0.53	1.21	0.37

Demographic / Clinical Characteristics	Intervention Group (n = 58)		Control Group (n = 58)	
Co-morbidity status	0.76	0.49	0.69	0.58
Duration of insulin therapy	1.42	0.23	1.08	0.34
	Treatment Satisfaction (H/Z)	p-value	Treatment Satisfaction (H/Z)	p-value
Age	0.98	0.48	1.24	0.29
Gender	1.58	0.11	2.41	0.019*
Place of residence	0.84	0.39	1.16	0.25
Type of family	1.92	0.14	1.36	0.20
Educational status	3.26	0.028*	2.08	0.11
Occupation	1.75	0.18	1.68	0.16
Duration of diabetes	2.18	0.041*	1.42	0.19
Co-morbidity status	0.91	0.36	2.12	0.037*
Duration of insulin therapy	1.26	0.27	0.84	0.45
	Satisfaction with Glycemic Control (H/Z)	p-value	Satisfaction with Glycemic Control (H/Z)	p-value
Age	1.02	0.39	0.84	0.48
Gender	1.73	0.08	1.15	0.27
Place of residence	0.96	0.34	0.71	0.52
Type of family	1.44	0.22	0.93	0.37
Educational status	2.87	0.051	2.34	0.10
Occupation	1.82	0.16	1.28	0.24
Duration of diabetes	2.04	0.041*	1.36	0.18
Co-morbidity status	0.79	0.43	0.92	0.36
Duration of insulin therapy	1.11	0.31	0.88	0.41

DISCUSSION

The present randomized controlled trial evaluated the effectiveness of nurse-led diabetic follow-up care in improving glycemic control and treatment satisfaction among adults with Type 2 Diabetes Mellitus attending selected tertiary hospitals in Coimbatore. The findings demonstrated that participants receiving structured nurse-led follow-up care experienced a greater reduction in HbA1c levels and significantly higher treatment satisfaction compared with those receiving conventional diabetes care.

These results highlight the important contribution of diabetes nurse educators in promoting effective disease management and improving clinical outcomes.

Optimal glycemic control remains the cornerstone of diabetes management because sustained

hyperglycemia is associated with an increased risk of microvascular and macrovascular complications. The significant reduction in HbA1c observed among participants in the intervention group may be attributed to regular follow-up, individualized diabetes education, reinforcement of medication adherence, lifestyle modification counselling, self-monitoring of blood glucose, and continuous motivational support provided by trained diabetes nurses. In contrast, participants receiving routine care showed only a modest improvement in glycemic control, emphasizing the importance of structured nursing interventions in chronic disease management.

The findings of the present study are consistent with previous randomized controlled trials and systematic reviews, which have reported that nurse-led

diabetes management significantly improves glycemic control compared with conventional physician-led care. Similar improvements in HbA1c have been reported in studies conducted in Canada, the United Kingdom, Australia, and other healthcare settings where diabetes specialist nurses actively participated in patient education, treatment monitoring, and follow-up. However, a few studies have reported no significant difference between nurse-led and standard care, suggesting that the effectiveness of such interventions may depend on the intensity of follow-up, patient adherence, healthcare infrastructure, and the scope of nursing practice.

Treatment satisfaction is an important indicator of the quality of diabetes care because it influences medication adherence, self-care behaviour, and long-term disease outcomes. Participants receiving nurse-led diabetic follow-up care reported significantly greater satisfaction regarding convenience, flexibility, understanding of diabetes management, continuity of care, and overall diabetes management compared with the control group. Continuous communication with trained diabetes nurses enhanced patient confidence, encouraged active participation in self-management, and improved adherence to recommended treatment and lifestyle modifications. These findings support the growing evidence that patient-centred nurse-led interventions positively influence both clinical outcomes and patient-reported experiences.

The intervention group also demonstrated better perceived glycemic control, reflected by reduced concerns regarding hyperglycemia and hypoglycemia after six months of follow-up. Regular monitoring, individualized counselling, and prompt identification of problems may have contributed to improved confidence in

managing blood glucose levels. These findings reinforce the importance of structured follow-up in minimizing diabetes-related complications and improving patients' quality of life.

The association analysis revealed that HbA1c levels were not significantly associated with the selected demographic or clinical variables in either group, indicating that the beneficial effects of the intervention were observed irrespective of baseline participant characteristics. However, treatment satisfaction showed significant associations with educational status and duration of diabetes in the intervention group, while gender and comorbidity status were significantly associated with treatment satisfaction in the control group. These findings suggest that patient-related factors may influence perceived satisfaction with care, although they did not significantly affect glycemic outcomes.

The findings of this study have important implications for nursing practice and diabetes care in India. With the increasing prevalence of Type 2 Diabetes Mellitus and the limited availability of diabetes specialists, integrating trained diabetes nurse educators into multidisciplinary healthcare teams can strengthen continuity of care, improve patient education, promote self-management, and optimize glycemic control.

Establishing nurse-led diabetic follow-up clinics in tertiary care hospitals may serve as a practical and cost-effective strategy for improving diabetes outcomes while reducing the burden on physicians and healthcare systems.

Overall, the present study provides evidence that nurse-led diabetic follow-up care is an effective adjunct to conventional diabetes management. Structured follow-up delivered by trained diabetes nurses significantly improved glycemic control, enhanced

treatment satisfaction, and promoted better diabetes self-management among adults with Type 2 Diabetes Mellitus. These findings support the integration of nurse-led diabetic follow-up services into routine clinical practice in tertiary healthcare settings across India.

STUDY LIMITATIONS

The present study has certain limitations that should be considered while interpreting the findings. First, the study was conducted in selected tertiary care hospitals in Coimbatore; therefore, the results may not be generalizable to primary healthcare settings, secondary care hospitals, or other geographical regions. Second, the duration of follow-up was limited to six months, which may not adequately reflect the long-term sustainability of improvements in glycemic control and treatment satisfaction.

Third, although a randomized controlled trial design was adopted, the sample size was relatively modest, which may limit the broader applicability of the findings. Fourth, treatment satisfaction and self-management practices were assessed using self-reported questionnaires, which may be subject to recall and response bias. Finally, the study primarily evaluated clinical and patient-reported outcomes and did not assess the cost-effectiveness of nurse-led diabetic follow-up care or its impact on long-term diabetes-related complications.

Future multicenter studies with larger sample sizes, longer follow-up periods, and economic evaluations are recommended to establish the long-term effectiveness, feasibility, and sustainability of nurse-led diabetic follow-up clinics in diverse healthcare settings across India.

CONCLUSION

The findings of the present study demonstrate that nurse-led diabetic follow-up care is an effective intervention for improving glycemic

control among adults with Type 2 Diabetes Mellitus receiving treatment in selected tertiary hospitals. Participants who received structured nurse-led follow-up care showed a greater reduction in HbA1c levels and significantly higher treatment satisfaction compared with those receiving conventional care. Regular follow-up, individualized diabetes education, continuous counselling, and reinforcement of self-management practices provided by trained diabetes nurses contributed substantially to these improved outcomes.

Although participants in the conventional care group exhibited modest improvements in glycemic control, the changes were less pronounced than those observed in the intervention group. In addition, participants receiving nurse-led care reported better confidence in managing hyperglycemia and hypoglycemia, reflecting improved self-management and greater satisfaction with their treatment.

The findings suggest that integrating nurse-led diabetic follow-up services into routine diabetes management can complement conventional medical care, enhance patient engagement, improve treatment adherence, and promote sustained glycemic control. Establishing nurse-led diabetic follow-up clinics in tertiary healthcare settings may represent an effective, patient-centered, and sustainable strategy for improving the quality of diabetes care and reducing the burden of diabetes-related complications in India. Further multicenter studies with longer follow-up periods are recommended to confirm these findings and evaluate the long-term clinical and economic benefits of nurse-led diabetes care.

REFERENCES

- International Diabetes Federation. IDF Diabetes Atlas. 11th ed. Brussels, Belgium: International Diabetes Federation; 2025.

- World Health Organization. Diabetes. Geneva: World Health Organization; 2025. Available from: <https://www.who.int/news-room/fact-sheets/detail/diabetes>
- American Diabetes Association Professional Practice Committee. Standards of Care in Diabetes—2025. *Diabetes Care*. 2025;48(Suppl 1):S1-S350.
- Papatheodorou K, Banach M, Bekiari E, Rizzo M, Edmonds M. Complications of diabetes 2017. *J Diabetes Res*. 2018;2018:3086167.
- Karamanou M, Protogerou A, Tsoucalas G, Androustos G, Poulakou-Rebelakou E. Milestones in the history of diabetes mellitus: The main contributors. *World J Diabetes*. 2016;7(1):1-7.
- Gong QH, Kang JF, Ying YY, Li H, Zhang XH, Wu YH, Xu GZ. Lifestyle interventions for adults with impaired glucose tolerance: A systematic review and meta-analysis. *Intern Med*. 2015;54(3):303-310.
- Pousinho S, Morgado M, Falcão A, Alves G. Pharmacist interventions in the management of Type 2 Diabetes Mellitus: A systematic review of randomized controlled trials. *J Manag Care Spec Pharm*. 2016;22(5):493-515.
- Thompson DM, Kozak SE, Sheps S. Insulin adjustment by a diabetes nurse educator improves glucose control in insulin-requiring diabetic patients: A randomized trial. *CMAJ*. 1999;161(8):959-962.
- Houweling ST, Kleefstra N, van Hateren KJ, et al. Diabetes specialist nurse as main care provider for patients with Type 2 Diabetes. *Neth J Med*. 2009;67(9):279-284.
- Houweling ST, Kleefstra N, van Hateren KJ, Groenier KH, Meyboom-de Jong B, Bilo HJ. Can diabetes management be safely transferred to practice nurses in a primary care setting? A randomized controlled trial. *J Clin Nurs*. 2011;20(9-10):1264-1272.
- Li D, Elliott T, Klein G, Ur E, Tang TS. Diabetes nurse case management in a Canadian tertiary care setting: Results of a randomized controlled trial. *Can J Diabetes*. 2017;41(3):297-304.
- Sharma SK, Thakur K, Rani Peter PP. Status of nurses in India: Current situation analysis and strategies to improve. *J Med Evid*. 2020;1:147-152.
- Sharma SK, Thakur K, Kant R, Mudgal SK. Impact of nurse-led titration versus physician prescription of hypoglycaemic agents on HbA1c level in Type 2 Diabetes patients: A systematic review and meta-analysis of randomized controlled trials. *Cureus*. 2021;13:e20436.
- Stephen S, Vijay VR. Metamorphosis of nursing profession: An Indian perspective. *J Glob Health*. 2019;9:020314.
- Kumar R, Pal R. India achieves WHO recommended doctor-population ratio: A call for paradigm shift in public health discourse. *J Fam Med Prim Care*. 2018;7(5):841-844.
- Sharma SK, Mudgal SK, Thakur K, Gaur R. How to calculate sample size for observational and experimental nursing research studies? *Natl J Physiol Pharm Pharmacol*. 2020;10:1-8.
- Bradley C, Plowright R, Stewart J, Valentine J, Witthaus E. The Diabetes Treatment Satisfaction Questionnaire change version (DTSQc) evaluated in insulin glargine trials. *Health Qual Life Outcomes*. 2007;5:57.
- Taylor CB, Miller NH, Reilly KR, Greenwald G, Cuning D, Deeter A, Abascal L. Evaluation of a nurse-care management system to improve outcomes in patients with complicated diabetes. *Diabetes Care*. 2003;26(4):1058-1063.
- Bradley C, de Pablos-Velasco P, Parhofer KG, Eschwège E, Gönder-Frederick L, Simon D. PANORAMA: A European study to evaluate quality of life and treatment satisfaction in patients with Type 2 Diabetes Mellitus. *Prim Care Diabetes*. 2011;5(4):231-239.
- Bradley C, Speight J. Patient perceptions of diabetes and diabetes therapy: Assessing quality of life. *Diabetes Metab Res Rev*. 2002;18(Suppl 3):S64-S69.
- Sendekie AK, Belachew EA, Dagne EM. Determinants of treatment satisfaction among patients with diabetes: Multicentre cross-sectional study in Northwest Ethiopia. *BMJ Open*. 2023;13:e074731.
- American Association of Clinical Endocrinology. Clinical Practice Guideline for Developing a Diabetes Mellitus Comprehensive Care Plan—2022 Update. *Endocr Pract*. 2022;28(10):923-1049.
- International Diabetes Federation. IDF Diabetes Atlas. 11th ed. Brussels: International Diabetes Federation; 2025.
- International Council of Nurses. Nurses: A Voice to Lead – Caring for Nurses Strengthens Economies. Geneva: ICN; 2025.
- Ministry of Health and Family Welfare, Government of India. National Programme for Prevention and Control of Non-Communicable Diseases (NP-NCD): Operational Guidelines. New Delhi; 2023