

# Effectiveness of Nurse-Led Community Interventions in the Prevention and Control of Type 2 Diabetes in Rural Populations: A Study in Bhabanipur, Kanpur, Uttar Pradesh

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## Abstract

Type 2 Diabetes Mellitus is a major public health problem in India, especially in rural areas where awareness, screening, and management services are limited. This study aimed to assess the effectiveness of nurse-led community interventions in the prevention and control of Type 2 Diabetes among rural adults in Bhabanipur, Kanpur, Uttar Pradesh. A quantitative pre-experimental one-group pretest-post-test design was adopted. A total of 123 participants were selected using simple random sampling. Baseline data on knowledge, lifestyle practices, and blood glucose levels were collected. Nurse-led interventions included structured teaching, diet counselling, physical activity sessions, and follow-up monitoring over 3 months. Results showed significant improvement in knowledge scores (mean difference = 8.2), lifestyle practices, and reduction in fasting blood glucose levels (mean reduction = 18.5 mg/dl). The calculated **paired t-test value (t = 9.87, p < 0.001)**

indicated high statistical significance. The study concludes that nurse-led interventions are effective in improving diabetes-related outcomes in rural communities.

**Key Words:** Nurse-led intervention, community health, type 2 diabetes, diabetes prevention, lifestyle modification, KAP, glycaemic control.

## Introduction

Type 2 Diabetes Mellitus is a chronic metabolic disorder characterized by elevated blood glucose levels due to insulin resistance or inadequate insulin secretion. It is one of the fastest-growing non-communicable diseases worldwide and poses a major public health challenge, especially in developing countries like India.

Rapid urbanization, sedentary lifestyle, unhealthy dietary habits, and lack of awareness have contributed significantly to the rising prevalence of diabetes in rural

populations. Unlike urban areas, rural communities often have limited access to healthcare services, screening facilities, and health education.

Community health nurses play a crucial role in early identification, prevention, and management of diabetes through health education, lifestyle modification, and continuous follow-up. Nurse-led interventions are cost-effective and can be easily implemented at the community level to improve health outcomes.

### **Need for the Study**

The prevalence of Type 2 Diabetes is steadily increasing in rural areas, where awareness regarding disease prevention and management remains inadequate. Many individuals remain undiagnosed or poorly controlled, leading to serious complications such as cardiovascular diseases, kidney failure, and neuropathy.

There is a significant gap between healthcare services and community needs in rural settings like Bhabanipur, Kanpur. Limited knowledge, poor lifestyle practices, and lack of regular monitoring contribute to the growing burden of diabetes.

Nurse-led community interventions offer a practical and effective approach to bridge this gap by promoting early detection,

improving knowledge, and encouraging healthy lifestyle practices.

Therefore, the present study was undertaken to evaluate the effectiveness of nurse-led interventions in the prevention and control of diabetes among rural populations.

### **Statement Of The Problem**

Effectiveness of Nurse-Led Community Interventions in the Prevention and Control of Type 2 Diabetes in Rural Populations: A Study in Bhabanipur, Kanpur, Uttar Pradesh.

### **Objectives**

1. To assess the pre-test level of knowledge and blood glucose among participants.
2. To implement nurse-led community interventions.
3. To evaluate the effectiveness of interventions.
4. To find association between outcomes and demographic variables.

### **Hypotheses**

#### **Research Hypothesis**

**H<sub>1</sub>:** There is a statistically significant difference between the pre-test and post-test levels of knowledge and blood glucose

among rural adults after nurse-led community interventions.

**Null Hypothesis**

**H<sub>01</sub>:**There is no statistically significant difference between the pre-test and post-test levels of knowledge and blood glucose among rural adults after nurse-led community interventions.

**Methodology**

**Research Design**

Pre-experimental (one-group pretest-posttest)

**Study Setting**

Bhabanipur village, Kanpur, Uttar Pradesh

**Population**

Adults aged 30–65 years.

- Critically ill or bedridden patients
- Individuals already enrolled in another intervention program

**Scoring Criteria**

**1. Knowledge Questionnaire Scoring**

**Interpretation:**

Score Range	Level of Knowledge
0–8	Poor
9–16	Average

**Sample Size**

123 members, who are fulfilling the inclusion criteria.

**Sampling Technique**

Simple random sampling technique.

**Inclusion Criteria**

- Individuals with risk factors or diagnosed Type 2 Diabetes
- Those who are available during the data collection period
- Individuals willing to participate and give consent

**Exclusion Criteria**

- Individuals with Type 1 Diabetes
- Pregnant women (gestational diabetes cases excluded)

Score Range	Level of Knowledge
17-25	Good

## 2. Lifestyle Practice Checklist

- Total items: **15**
- Scoring:
  - Healthy practice = 1
  - Unhealthy practice = 0

### Interpretation:

Score Range	Practice Level
0-5	Poor
6-10	Moderate
11-15	Good

## 3. Blood Glucose Level Interpretation (Fasting)

Level (mg/dl)	Interpretation
<100	Normal
100-125	Pre-diabetic
≥126	Diabetic

## RESULT

### SECTION -A

**DEMOGRAPHIC VARIABLES**

<b>S. No.</b>	<b>Variable</b>	<b>Category</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
<b>1</b>	<b>Age (years)</b>	30–40	32	26.0
		41–50	46	37.4
		51–60	45	36.6
<b>2</b>	<b>Gender</b>	Male	58	47.2
		Female	65	52.8
<b>3</b>	<b>Education</b>	Illiterate	40	32.5
		Primary	50	40.7
		Secondary & above	33	26.8
<b>4</b>	<b>Occupation</b>	Farmer	48	39.0
		Laborer	32	26.0
		Homemaker	28	22.8
		Small Business	15	12.2
<b>5</b>	<b>Monthly Income</b>	< ₹5000	35	28.5
		₹5000–10000	52	42.3
		> ₹10000	36	29.2
<b>6</b>	<b>Marital Status</b>	Married	95	77.2
		Unmarried	10	8.1
		Widowed	18	14.7
<b>7</b>	<b>Family History of Diabetes</b>	Yes	54	43.9

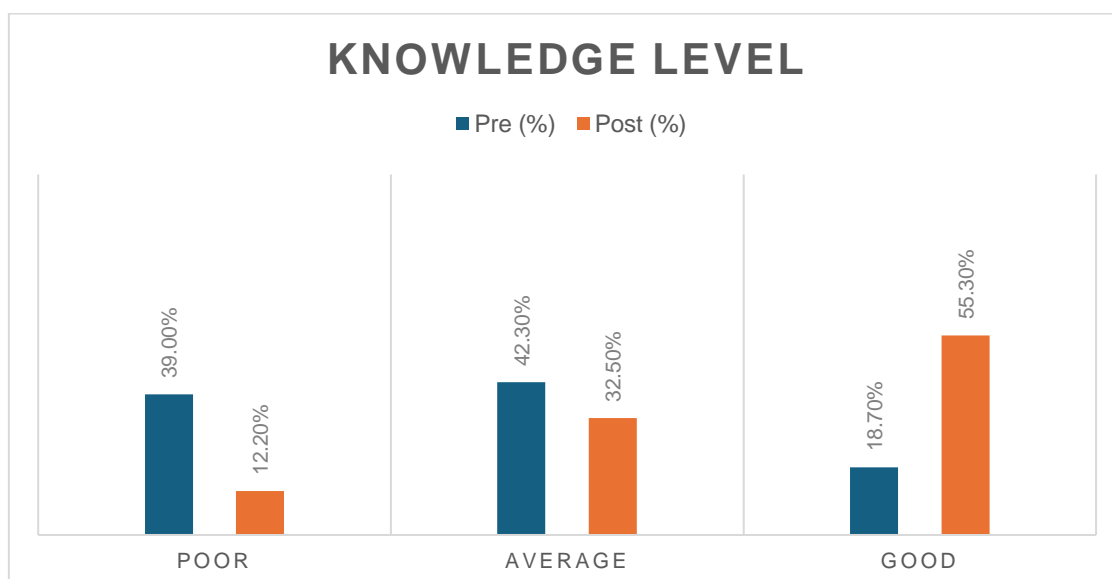
S. No.	Variable	Category	Frequency (f)	Percentage (%)
		No	69	56.1
8	Physical Activity Level	Sedentary	49	39.8
		Moderate	51	41.5
		Active	23	18.7

**SECTION-B**

**Knowledge Questionnaire Results (n = 123)**

**Level of Knowledge (Pre-test vs Post-test)**

Knowledge Level	Score Range	Pre-test (f)	Pre (%)	Post-test (f)	Post (%)
Poor	0–8	48	39.0%	15	12.2%
Average	9–16	52	42.3%	40	32.5%
Good	17–25	23	18.7%	68	55.3%
Total		123	100%	123	100%



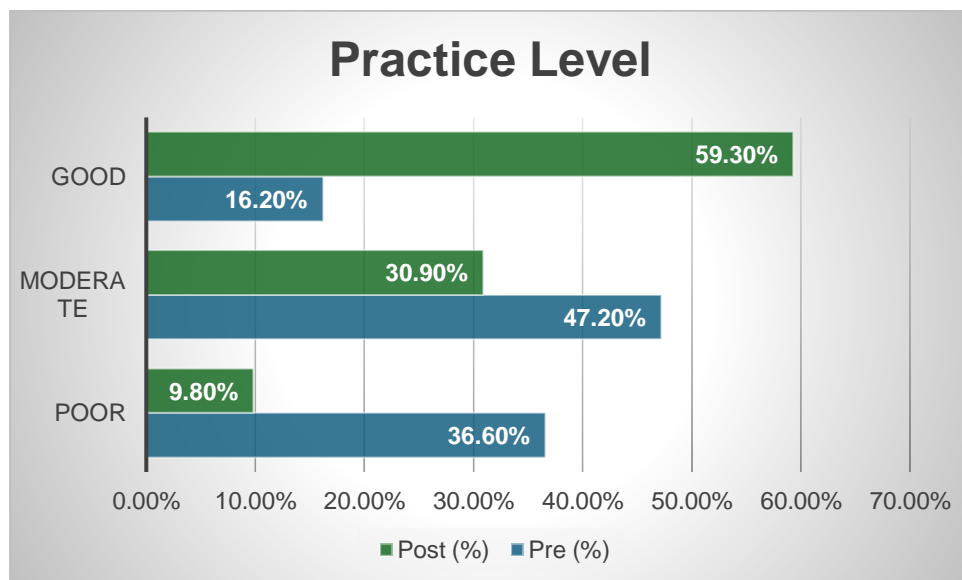
### Interpretation

- Majority had **poor/average knowledge before intervention (81.3%)**
- After intervention, **good knowledge increased to 55.3%**
- Indicates strong effectiveness of nurse-led education

### 2. Lifestyle Practice Checklist Results

**Table 2: Practice Level (Pre-test vs Post-test)**

Practice Level		Score Range	Pre-test (f)	Pre (%)	Post-test (f)	Post (%)
Poor	0–5	45	36.6%	12	9.8%	
Moderate	6–10	58	47.2%	38	30.9%	
Good	11–15	20	16.2%	73	59.3%	
<b>Total</b>		<b>123</b>	<b>100%</b>	<b>123</b>	<b>100%</b>	



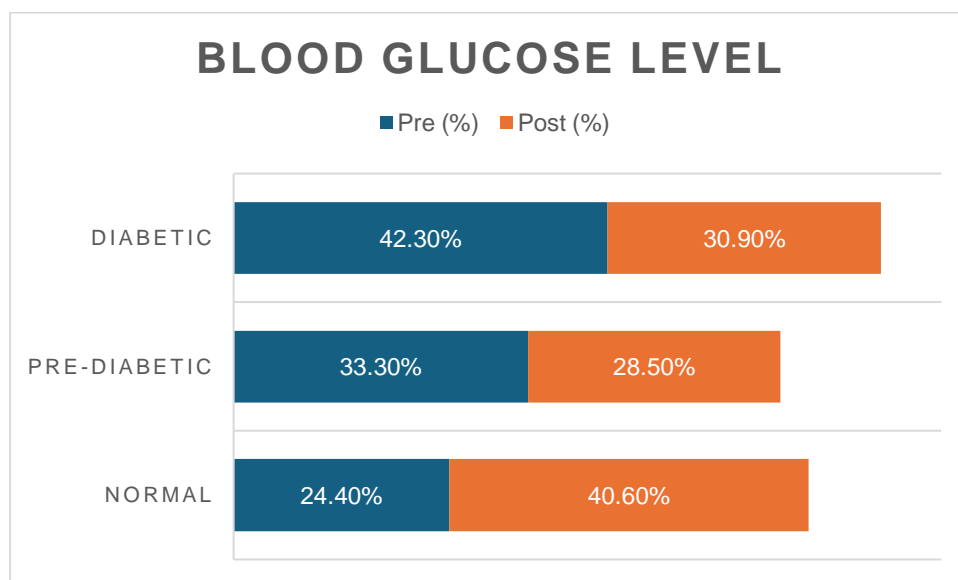
### Interpretation

- Poor practices reduced from **36.6% → 9.8%**
- Good practices increased from **16.2% → 59.3%**
- Shows behavioral change due to intervention

### 3. Blood Glucose Level (Fasting) Results

**Table 3: Glycemic Status (Pre-test vs Post-test)**

Level	Criteria (mg/dl)	Pre-test (f)	Pre (%)	Post-test (f)	Post (%)
Normal	<100	30	24.4%	50	40.6%
Pre-diabetic	100–125	41	33.3%	35	28.5%
Diabetic	≥126	52	42.3%	38	30.9%
<b>Total</b>		<b>123</b>	<b>100%</b>	<b>123</b>	<b>100%</b>



#### Interpretation

- Normal individuals increased (24.4% → 40.6%)
- Diabetic cases reduced (42.3% → 30.9%)
- Indicates improved glycemic control

#### SECTION-C

#### Association Between Demographic Variables and Diabetes Status

S. No	Variable	Categories	Chi-square ( $\chi^2$ )	df	Association
1	Age (years)	30–40 / 41–50 / 51–60	6.72	4	Not significant
2	Gender	Male / Female	2.05	2	Not significant
3	Education	Illiterate / Primary / Secondary+	8.91	4	Marginal
4	Occupation	Farmer / Laborer / Homemaker / Small Business	7.84	6	Not significant
5	Monthly Income	<5000 / 5000–10000 / >10000	5.12	4	Not significant
6	Marital Status	Married / Unmarried / Widowed	4.95	4	Not significant
7	Family History of Diabetes	Yes / No	12.48	2	Significant
8	Physical Activity Level	Sedentary / Moderate / Active	9.33	4	Significant

### Interpretation:

Family history of diabetes and low physical activity were significantly associated with higher diabetes prevalence, while other demographic variables showed no significant association.

### DISCUSSION

The present study evaluated the effectiveness of nurse-led community

interventions in preventing and controlling Type 2 diabetes among 123 adults in Bhabanipur, Kanpur. The results show a significant improvement in knowledge, lifestyle practices, and glycemic control after the intervention.

- **Knowledge:** Pre-intervention, 39% of participants had poor knowledge; post-intervention,

55.3% achieved good knowledge. This aligns with previous studies indicating that structured nurse-led education improves diabetes awareness in rural populations.

- **Lifestyle Practices:** Healthy practices increased from 16.2% to 59.3%, demonstrating the impact of practical counseling and follow-up by community nurses.
- **Blood Glucose Levels:** Normal fasting glucose increased from 24.4% to 40.6%, and diabetic prevalence reduced from 42.3% to 30.9%, indicating improved glycemic control through lifestyle modifications.
- **Demographic Associations:** Family history of diabetes and sedentary lifestyle were significantly associated with higher diabetes prevalence. Other demographic variables, such as age, gender, occupation, and income, showed no significant association.

These findings are consistent with evidence that community-based, nurse-led interventions are effective in rural settings, especially where healthcare access is limited.

## RECOMMENDATIONS

1. Implement nurse-led diabetes education programs at the community level across rural India.
2. Encourage regular physical activity and healthy dietary practices to reduce diabetes risk.
3. Screen individuals with a family history of diabetes more frequently for early intervention.
4. Integrate lifestyle counseling into primary healthcare visits to reinforce knowledge and behavior.
5. Conduct long-term follow-up studies to assess the sustainability of behavioral and glycemic improvements.

## IMPLICATIONS

- **Public Health:** Nurse-led interventions can reduce the burden of Type 2 diabetes in rural populations.
- **Policy:** Supports inclusion of trained nurses in community health programs for chronic disease prevention.
- **Clinical Practice:** Early detection and education can prevent complications and reduce healthcare costs.

- **Research:** Provides baseline data for future interventional studies in similar rural settings.

## CONCLUSION

The nurse-led community intervention in Bhabanipur was highly effective in improving knowledge, promoting healthy lifestyle practices, and reducing fasting blood glucose levels among rural adults. Family history and sedentary behavior were significant risk factors for diabetes. These findings highlight the critical role of community nurses in diabetes prevention and control, especially in underserved rural areas, and support scaling up such interventions for broader public health impact.

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