



EXPERIMENTAL STUDY TO ASSESS THE EFFECTIVENESS OF OKRA EXTRACT ON FASTING BLOOD SUGAR LEVEL AND SELECTED SELF-CARE PRACTICES AMONG PATIENTS WITH DIABETES MELLITUS IN SELECTED HOSPITAL CHH. SAMBHAJINAGAR:

A true experimental Study

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Abstract : Diabetes Mellitus is one of the most serious and rapidly growing health problems worldwide. It is a chronic metabolic disease that affects millions of people, and its incidence is increasing at an alarming rate due to changes in lifestyle, diet, and stress. According to the World Health Organization (WHO), about 537 million adults aged between 20 and 79 years were living with diabetes in 2021, and this number is expected to rise to 643 million by 2030 and 783 million by 2045 if preventive measures are not taken. Diabetes Mellitus is a chronic metabolic disorder characterized by persistent hyperglycemia due to defects in insulin secretion, insulin action, or both. Effective management of Type 2 Diabetes Mellitus requires proper glycemic control along with consistent self-care activities such as diet control, exercise, medication adherence, and blood glucose monitoring. Complementary therapies like okra (lady's finger) extract are believed to have hypoglycemic properties and may support conventional treatment. In recent years, there has been growing interest in the use of natural herbs and traditional remedies for the management of diabetes. One such natural plant that has gained attention is Okra (*Abelmoschus esculentus*), also commonly known as Lady's Finger or Bhindi. Okra is a commonly available vegetable in India and is rich in nutrients like vitamins, minerals, and antioxidants. Studies suggest that okra contains soluble fiber, flavonoids, and polyphenols, which help in slowing down glucose absorption and improving insulin sensitivity.

Objective: To assess the effectiveness of okra extract on fasting blood glucose level and selected self care practices among patients with diabetes mellitus.

Methods: A True-experimental research design was used for the the present study to assess the effectiveness of intervention. The study was carried out in a selected hospital located in Chhatrapati Sambhajinagar. A total of 64 patients diagnosed with diabetes mellitus were included in the study and they were selected using simple random sampling technique as experimental group (n=32) and control group (n=32) to ensure fair and unbiased selection. For data collection, a standardized diabetes self management questionnaire, summary of diabetes self care activities was used. And demographic variables (such as age, gender, etc.) was used. This helped in collecting detailed and structured information from the participants. Before conducting the main study, a pilot study was carried out. As part of the intervention, okra extract was given to the participants according to the research study. The effectiveness of okra extract was assessed both before (pre-test) and after (post- test). Pre-test and Post-test scores were compared to evaluate effectiveness.

Results: The study included 64 participants, with 32 in the experimental group and 32 in the control group. Before the intervention, there was no statistically significant difference between the experimental and control groups in fasting blood sugar level (169.80 ± 10.39 mg/dL vs. 168.00 ± 9.90 mg/dL; $p = 0.592$), DSMQ score ($p = 0.736$), or SDSCA score ($p = 0.648$), indicating baseline homogeneity. Following the intervention, the experimental group showed a significant reduction in fasting blood sugar level (155.30

± 10.40 mg/dL) compared with the control group (164.20 ± 10.25 mg/dL) ($t = 7.90$, $p = 0.002$). Similarly, the experimental group demonstrated significantly higher diabetes self-management (DSMQ: 73.56 ± 7.82 vs. 61.47 ± 8.61 ; $t = 5.87$, $p < 0.001$) and self-care practices (SDSCA: 71.92 ± 8.14 vs. 61.35 ± 8.25 ; $t = 5.62$, $p < 0.001$) than the control group. These findings indicate that okra extract was effective in improving glycemic control, diabetes self-management, and self-care practices among patients with diabetes mellitus.

Conclusion: The study concluded that okra extract was effective in significantly reducing fasting blood sugar levels and improving diabetes self-management and selected self-care practices among patients with Diabetes Mellitus. The intervention demonstrated better glycemic control in the experimental group compared to the control group. These findings suggest that okra extract is a safe, economical, and easily available complementary therapy and may be recommended as a supportive nursing intervention alongside routine medical treatment to promote effective diabetes management and improve quality of life.

Keywords: Diabetes Mellitus, Okra Extract, Fasting Blood Sugar level, glycemic control, type 2 Diabetes Mellitus, complementary therapy, nursing intervention.

I. INTRODUCTION

HEALTH IS ONE OF THE MOST VALUABLE ASSETS OF HUMAN LIFE AND IS ESSENTIAL FOR MAINTAINING PHYSICAL, MENTAL, AND SOCIAL WELL-BEING. HOWEVER, RAPID URBANIZATION, UNHEALTHY DIETARY HABITS, SEDENTARY LIFESTYLES, AND INCREASING STRESS HAVE CONTRIBUTED TO A GROWING BURDEN OF NON-COMMUNICABLE DISEASES, PARTICULARLY DIABETES MELLITUS. DIABETES MELLITUS IS A CHRONIC METABOLIC DISORDER CHARACTERIZED BY ELEVATED BLOOD GLUCOSE LEVELS DUE TO IMPAIRED INSULIN SECRETION, INSULIN ACTION, OR BOTH. IF LEFT UNCONTROLLED, IT CAN LEAD TO SERIOUS COMPLICATIONS SUCH AS CARDIOVASCULAR DISEASE, NEPHROPATHY, NEUROPATHY, RETINOPATHY, AND DIABETIC FOOT ULCERS. THEREFORE, MAINTAINING OPTIMAL GLYCEMIC CONTROL THROUGH MEDICATION, HEALTHY LIFESTYLE MODIFICATIONS, AND EFFECTIVE SELF-CARE PRACTICES IS ESSENTIAL FOR PREVENTING COMPLICATIONS AND IMPROVING QUALITY OF LIFE.

DIABETES MELLITUS HAS BECOME A SIGNIFICANT PUBLIC HEALTH CONCERN IN INDIA DUE TO ITS RAPIDLY INCREASING PREVALENCE AND ASSOCIATED COMPLICATIONS. THE DISEASE PLACES A SUBSTANTIAL PHYSICAL, PSYCHOLOGICAL, SOCIAL, AND ECONOMIC BURDEN ON INDIVIDUALS, FAMILIES, AND HEALTHCARE SYSTEMS. ALTHOUGH SEVERAL PHARMACOLOGICAL TREATMENTS ARE AVAILABLE, MAINTAINING LONG-TERM GLYCEMIC CONTROL REMAINS CHALLENGING BECAUSE OF POOR ADHERENCE TO MEDICATION AND INADEQUATE SELF-CARE PRACTICES. THEREFORE, THERE IS A GROWING NEED TO EXPLORE SAFE, AFFORDABLE, AND EASILY ACCESSIBLE COMPLEMENTARY INTERVENTIONS THAT CAN ENHANCE CONVENTIONAL DIABETES MANAGEMENT AND IMPROVE PATIENT OUTCOMES.

EFFECTIVE DIABETES MANAGEMENT DEPENDS NOT ONLY ON PHARMACOLOGICAL TREATMENT BUT ALSO ON REGULAR SELF-CARE PRACTICES, INCLUDING ADHERENCE TO A HEALTHY DIET, PHYSICAL ACTIVITY, BLOOD GLUCOSE MONITORING, MEDICATION COMPLIANCE, AND FOOT CARE. THESE SELF-CARE ACTIVITIES PLAY A VITAL ROLE IN ACHIEVING OPTIMAL GLYCEMIC CONTROL, PREVENTING COMPLICATIONS, AND IMPROVING THE QUALITY OF LIFE OF PATIENTS WITH DIABETES. HOWEVER, MANY PATIENTS FAIL TO FOLLOW RECOMMENDED SELF-CARE PRACTICES BECAUSE OF INADEQUATE KNOWLEDGE, POOR MOTIVATION, AND LIFESTYLE-RELATED BARRIERS, HIGHLIGHTING THE NEED FOR EFFECTIVE EDUCATIONAL AND SUPPORTIVE INTERVENTIONS.

IN RECENT YEARS, HERBAL THERAPIES HAVE GAINED INCREASING ATTENTION AS COMPLEMENTARY INTERVENTIONS BECAUSE OF THEIR NATURAL ORIGIN, AFFORDABILITY, ACCESSIBILITY, AND MINIMAL SIDE EFFECTS. AMONG THESE, OKRA (*ABELMOSCHUSESCULENTUS*) IS RICH IN DIETARY FIBER, ANTIOXIDANTS, VITAMINS, MINERALS, AND BIOACTIVE COMPOUNDS THAT MAY HELP REDUCE BLOOD GLUCOSE LEVELS BY IMPROVING INSULIN SENSITIVITY, DELAYING GLUCOSE ABSORPTION, AND REDUCING OXIDATIVE STRESS. SCIENTIFIC EVIDENCE SUGGESTS THAT OKRA SUPPLEMENTATION MAY IMPROVE GLYCEMIC CONTROL AND SUPPORT DIABETES SELF-MANAGEMENT. IN ADDITION, OKRA IS INEXPENSIVE, READILY AVAILABLE, CULTURALLY ACCEPTABLE, AND CAN EASILY BE INCORPORATED INTO THE DAILY DIET OF DIABETIC PATIENTS.

DESPITE THE GROWING EVIDENCE SUPPORTING THE ANTIDIABETIC POTENTIAL OF OKRA, LIMITED EXPERIMENTAL STUDIES HAVE EVALUATED ITS EFFECTIVENESS ON BOTH FASTING BLOOD SUGAR LEVELS AND SELECTED SELF-CARE PRACTICES AMONG PATIENTS WITH DIABETES MELLITUS. THEREFORE, THE PRESENT STUDY ENTITLED “AN EXPERIMENTAL STUDY TO ASSESS THE EFFECTIVENESS OF OKRA EXTRACT ON FASTING BLOOD SUGAR LEVEL AND SELECTED SELF-CARE PRACTICES AMONG PATIENTS WITH DIABETES MELLITUS IN A SELECTED HOSPITAL OF CHHATRAPATI SAMBHAJINAGAR” WAS UNDERTAKEN TO GENERATE SCIENTIFIC EVIDENCE REGARDING THE EFFECTIVENESS OF OKRA EXTRACT AS A SUPPORTIVE INTERVENTION FOR IMPROVING GLYCEMIC CONTROL AND DIABETES SELF-MANAGEMENT.

Population and Sample

The target population comprised patients with diabetes mellitus. The accessible population included diabetic patients in the selected hospital who met the inclusion criteria and were available during the study period.

Inclusion Criteria

- Patients diagnosed with type 2 diabetes mellitus.
- Age between 30-above 60.
- Fasting blood sugar level more than 126 mg/dl

- Willing to participate in the study.

Exclusion Criteria

- Patient with renal/hepatic disorder.
- Pregnant or lactating women.
- Already consuming herbal supplements.
- Allergic to okra.
- Irritable bowel syndrome.
- Inflammatory bowel syndrome.

Sample Size and Sampling Technique

A total of 64 Diabetic patients were selected using simple random sampling. The participants were divided equally into:

- Experimental Group (n=34)
- Control Group (n=34)

A pilot study was conducted before the main study to assess the feasibility and reliability of the tool. Pilot study participants were excluded from the final sample.

3.2 Data and Sources of Data

Section A: Demographic Variable Proforma

The demographic questionnaire consisted of variables such as:

1. Age
2. Gender
3. Marital status
4. Educational status
5. Occupation
6. Type of family
7. Area of residence
8. Religion
9. Number of family members
10. Monthly family income
11. Pre-existing illness
12. Habit
13. Type of diet
14. Body type
15. Physical activity level
16. Type of diabetes
17. Duration of Diabetes
18. Current treatment
19. Source of information
20. Height
21. Weight

Section B: DSMQ (Diabetes Self-Management Questionnaire)

Diabetes Self-Management Questionnaire (DSMQ) is a validated self-report instrument developed by Schmitt et al. (2013) to assess diabetes self-management behaviors related to glycemic control. It consists of 16 items covering four domains: Glucose Management, Dietary Control, Physical Activity, and Health-Care Use. Each item is rated on a 4-point Likert scale (0–3), with negatively worded items reverse scored. The total score is transformed to a 0–100 scale, where higher scores indicate better diabetes self-management. In the present study, DSMQ scores were interpreted as Poor (0–33), Moderate (34–66), and Good (67–100). The DSMQ is a reliable and valid tool widely used to evaluate diabetes self-management and the effectiveness of interventions aimed at improving glycemic control.

Section C: SDSCA (Summary of Diabetes self-care activities).

Summary of Diabetes Self-Care Activities (SDSCA) is a validated self-report questionnaire developed by Toobert, Hampson, and Glasgow (2000) to assess diabetes self-care behaviors. It measures patients' self-care activities performed during the previous seven days across key domains, including general diet, specific diet, physical activity, blood glucose monitoring, foot care, medication adherence, and smoking (optional). The questionnaire evaluates the frequency of these activities, with higher scores indicating better diabetes self-care practices. In the present study, the total SDSCA score was transformed to a 0–100 scale and interpreted as Poor (0–33), Moderate (34–66), and Good (67–100). The SDSCA is a reliable and widely used instrument for evaluating diabetes self-care practices and the effectiveness of interventions aimed at improving diabetes management.

RESEARCH METHODOLOGY

This section deals with the methodology adopted for the study. Methodology plays a vital role in every research investigation as it helps in obtaining valid and reliable findings. The present study was aimed to assess the effectiveness of okra extract on blood glucose level and self-care activities among patients with Diabetes Mellitus in a selected hospital of Chhatrapati Sambhajnagar.

Research Approach

The present study adopted a quantitative evaluative research approach to assess the effectiveness of okra extract on fasting blood sugar level and selected self-care practices among patients with Diabetes Mellitus in a selected hospital at Chhatrapati Sambhajnagar. This approach enabled objective measurement and statistical evaluation of the intervention and was considered appropriate for obtaining reliable and measurable results.

Research Design

The study employed a True Experimental Research Design. The experimental group received okra extract along with routine care, while the control group received routine care only. Pre-test and post-test assessments of fasting blood sugar level and selected self-care practices were conducted to evaluate the effectiveness of the intervention. This design was appropriate for comparing outcomes between the two groups and determining the effect of okra extract on diabetes management. This design was found appropriate for comparing the outcomes between the experimental and control groups and determining the true effect of Okra extract on fasting blood sugar level and selected self-care practices among diabetic patients.

3.4 Statistical tools and econometric models

This section elaborates the proper statistical/econometric/financial models which are being used to forward the study from data towards inferences. The detail of methodology is given as follows.

3.4.1 Descriptive Statistics

Data were analyzed using descriptive and inferential statistics.

Descriptive statistics included:

- Frequency
- Percentage
- Mean
- Standard Deviation

Inferential statistics included:

- Paired t-test
- Unpaired t-test
- Chi-square test

IV. RESULTS AND DISCUSSION

Demographic variables

The findings revealed that the experimental and control groups were comparable with respect to all selected demographic variables, indicating baseline homogeneity before the intervention. The majority of respondents in both groups were aged 41–50 years, followed by 51–60 years, with most participants being female and married. A large proportion had completed secondary or higher secondary education, were employed in private or government occupations, belonged to joint families, and resided in urban areas. Most respondents were Hindus, had 4–6 family members in their household, and reported a monthly family income of ₹20,001–₹30,000. Chi-square analysis demonstrated that there were no statistically significant differences between the experimental and control groups for age ($\chi^2 = 1.34$, $p = 0.855$), gender ($\chi^2 = 0.27$, $p = 0.60$), marital status ($\chi^2 = 1.03$, $p = 0.79$), educational status ($\chi^2 = 1.22$, $p = 0.75$), occupation ($\chi^2 = 1.07$, $p = 0.58$), type of family ($\chi^2 = 1.29$, $p = 0.419$), area of residence ($\chi^2 = 1.12$, $p = 0.511$),

religion ($\chi^2 = 0.37$, $p = 0.54$), number of family members ($\chi^2 = 0.52$, $p = 0.74$), and monthly family income ($\chi^2 = 1.01$, $p = 0.80$), as all p-values were greater than 0.05. These findings confirm that both groups were demographically homogeneous and comparable prior to the implementation of the intervention.

Table No. 1. Comparison of Demographic profile in Experiment and Control group among the study participants.

Variables		Experiment Group (n=32)	Control Group (n=32)	Total	Chi-square test	p-value
Age-Group	21-30	0	0	0	1.34	p=0.855 #NS
	31-40	7	5	12		
	41-50	15	16	31		
	51-60	09	11	20		
	61 & Above	01	0	01		
Gender	Male	13	15	28	0.27	p=0.60 #NS
	Female	19	17	36		
Marital Status	Single	3	2	05	1.03	p=0.79 #NS
	Married	28	27	55		
	Widow/Widower	1	3	04		
	Separated/Divorced	0	0	0		
Educational status	Illiterate	3	1	04	1.22	p=0.75 #NS
	Primary school	7	10	17		
	Secondary/ Higher secondary	15	14	29		
	Graduate / Postgraduate	07	07	12		
Occupation	Housewife	10	13	23	1.07	p=0.58 #NS
	Private / Government Employee	15	12	27		
	Self-Employed / Business	07	9	16		
Type of Family	Nuclear	12	10	22	1.29	p=0.419 #NS
	Joint	20	22	42		
Area of Residence	Urban	22	21	43	1.12	p=0.511 #NS
	Rural	10	11	21		
	Semi-urban /Slum Area	0	0	0		
Religion	Hindu	26	24	50	0.37	p=0.54 #NS
	Muslim	06	8	14		
	Christian	00	00	00		
	Others	00	00	00		
Number of family members	1-3	6	5	11	0.52	p=0.74 #NS
	4-6	21	20	41		
	More than 6	5	7	12		
Monthly Family Income (₹)	Below 10,000	1	0	01	1.01	p=0.80 #NS
	10,001–20,000	9	12	21		
	20,001–30,000	17	15	32		
	Above 30,000	05	4	9		

Comparison of Pre-Test And Post-Test Blood Sugar Level And Selected Self-Care Practices.

Table No. 2 The Effectiveness of Okra Extract on Fasting Blood Sugar level among the patients of the Diabetes Mellitus in the Experimental and Control group before and after the intervention. (N=64)

	Experimental Group Mean±SD	Control Group Mean±SD	t-test	p-value
Pre-Treatment	169.80±10.39	168.00±9.90	1.26	p=0.592 #NS
Post-Treatment	155.30±10.40	164.20±10.25	7.90	p=0.002 #S

The pre-test comparison showed no statistically significant difference in fasting blood sugar levels between the experimental and control groups ($p > 0.05$), indicating baseline comparability. Post-test results revealed a statistically significant reduction in fasting blood sugar in the experimental group compared with the control group ($t = 7.90$, $p = 0.002$), demonstrating the effectiveness of okra supplementation in improving glycemic control.

Table No. 3 Comparison of Mean DSMQ Score between Experimental and Control Group before and after intervention. (N=64)

DSMQ Assessment	Experimental Group Mean $\pm$ SD	Control Group Mean $\pm$ SD	t-test	p-value
Pre-Test	38.75 $\pm$ 8.60	39.31 $\pm$ 8.24	0.34	0.736 #NS
Post-Test	73.56 $\pm$ 7.82	61.47 $\pm$ 8.61	5.87	<0.001 #S

The pre-test comparison showed no statistically significant difference in DSMQ scores between the experimental and control groups ($t = 0.34$, $p = 0.736$), indicating that both groups were comparable before the intervention. After the intervention, the experimental group showed significantly higher DSMQ scores than the control group ($t = 5.87$, $p < 0.001$), indicating improved diabetes self-management.

Table No. 4 Comparison of Mean SDSCA Score between Experimental and Control Groups before and after intervention.

SDSCA Assessment	Experimental Group Mean $\pm$ SD	Control Group Mean $\pm$ SD	t-test	p-value
Pre-Test	32.84 $\pm$ 7.25	33.46 $\pm$ 7.01	0.46	0.648 #NS
Post-Test	71.92 $\pm$ 8.14	61.35 $\pm$ 8.25	5.62	<0.001 #S

Table No. 4 describes that the pre-test comparison revealed no statistically significant difference in SDSCA scores between the experimental and control groups ($t = 0.46$, $p = 0.648$). Following the intervention, the experimental group achieved significantly higher SDSCA scores than the control group ($t = 5.62$, $p < 0.001$), demonstrating improved diabetes self-care practices.

Association Between Fasting Blood Sugar Level And Self-Care Practices And Selected Socio-Demographic Variables Before The Intervention In The Experimental And Control Group

Table No. 5 presents the association between selected socio-demographic variables and the level of self-management (DSMQ score) among participants in the experimental group. The analysis was performed using the chi-square test to determine whether socio-demographic characteristics had a significant influence on diabetes self-management practices.

Table No. 5: Association between of Demographic profile and ExperimentGroup among the study participants.

Variables		Poor Overall Self-Management (0-33)(n=10)	Moderate Self-Management (34-66)(n=22)	Good Self-Management (67-100)	Total	Chi-square test	p-value
Age-Group	21-30	0	0	0	0	1.82	p=0.611 #NS
	31-40	3	4	0	7		
	41-50	5	10	0	15		
	51-60	2	7	0	9		
	61 & Above	0	1	0	1		
Gender	Male	4	11	0	15	0.18	p=0.67 #NS
	Female	5	12	0	17		
Marital Status	Single	1	1	0	2	0.76	p=0.82 #NS
	Married	7	20	0	27		

Educational status	Widow/Widower separated/divorced	1	2	0	3	3.27	p=0.033 #S
	Illiterate	0	0	0	0		
	Primary school	2	0	0	2		
	Secondary/ Higher secondary	4	6	0	10		
	Graduate / Postgraduate	2	13	0	15		
Occupation	Housewife	1	4	0	5	1.36	p=0.511 #NS
	Private / Government	3	10	0	13		
	Self-Employed / Business	4	8	0	12		
Type of Family	Nuclear	2	5	0	7	0.04	p=0.83 #NS
	Joint	3	8	0	11		
Area of Residence	Urban	6	15	0	21	0.22	p=0.622 #NS
	Rural	3	8	0	11		
	Semi-urban /Slum Area	0	0	00	0		
Religion	Hindu	3	8	0	11	2.39	p=0.034 #S
	Muslim	7	17	0	24		
	Christian	0	0	00	00		
	Others	0	0	00	00		
Number of family members	1-3	2	3	0	5	1.98	p=0.322 #NS
	4-6	5	15	0	20		
	More than 6	2	5	0	7		
Monthly Family Income (₹)	Below 10,000	1	0	0	1	4.88	p=0.042 #S
	10,001–20,000	3	9	0	12		
	20,001–30,000	4	10	0	14		
	Above 30,000	1	4	0	5		

A statistically significant association was found between educational status ($\chi^2 = 3.27$, $p = 0.033$), religion ($\chi^2 = 2.39$, $p = 0.034$), and monthly family income ($\chi^2 = 4.88$, $p = 0.042$) with DSMQ score ($p < 0.05$). No significant association was observed with age, gender, marital status, occupation, type of family, area of residence, or number of family members ($p > 0.05$).

Table No.6 presents the association between selected illness-related variables and the level of diabetes self-management (DSMQ score) among participants in the experimental group. The chi-square test was used to determine whether illness-related characteristics had a significant influence on the self-management practices of the participants.

Table No. 6 Association between of Illness profile and Experimental Group among the study participants.

Particular	Category	Poor Overall Self-Management (0-33) (n=10)	Moderate Self-Management (34-66) (n=22)	Good Self-Management (67-100)	Total	χ^2	p-value
Pre-existing Illness	Hypertension	4	10	0	14	1.34	0.72 #NS
	Kidney	1	0	0	1		
	Thyroid	2	0	0	2		
	Heart	2	0	0	2		
Habits	Smoking	1	1	0	2	1.62	0.65 #NS
	Alcohol	2	4	0	6		
	Tobacco	2	2	0	4		
	None	4	16	0	20		
Diet	Vegetarian	4	10	0	14	0.11	0.74 #NS
	Non-vegetarian	5	13	0	18		
Body Type	Thin	3	9	0	12	2.18	0.34 #NS
	Moderate	4	9	0	13		
	Obese	2	5	0	7		
Physical Activity	Sedentary	5	10	0	15	0.92	0.63 #NS
	Moderate	4	10	0	14		
	Heavy	0	3	0	3		
Type of Diabetes	Type 1	1	2	0	3	0.28	0.87 #NS
	Type 2	8	21	0	29		
Duration	Newly	4	13	0	17	1.98	0.58 #NS
	1–5 years	3	7	0	10		

	6–10 years	2	2	0	4	1.12	0.57 #NS
	>10 years	0	1	0	1		
Treatment	OHA	6	17	0	23	2.31	0.89 #NS
	Insulin	2	4	0	6		
	Others	1	2	0	3		
Health Information Source	Doctor	4	11	0	15	2.31	0.89 #NS
	Nurse	2	5	0	7		
	ASHA	1	2	0	3		
	Family/Friends	1	3	0	4		
	Others	1	2	0	3		

The findings revealed that none of the illness-related variables showed a statistically significant association with the DSMQ score ($p > 0.05$). Variables including pre-existing illness, habits, diet, body type, physical activity, type and duration of diabetes, treatment modality, and source of health information were not significantly associated with the level of diabetes self-management among the study participants.

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