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"Assessment of Self-care practices in Type-II Diabetes Mellitus patient in Urban adult population"

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Abstract

Introduction:
Self-care practices refer to the set of behaviors, individuals with diabetes engage in to manage their condition effectively. Simple lifestyle modifications, such as exercise, dietary control, regular glucose monitoring, medication adherence, foot care, and avoidance of harmful habits, are essential in preventing or delaying the onset of complications associated with Type II diabetes.

Objectives:

1. To assess self-care practices among patients with Type II diabetes mellitus.
2. To analyze the correlation between self-care practices and various socio-demographic variables.

Material and Methods:
A community-based cross-sectional study was conducted among 251 patients with Type II diabetes in urban wards of Bhopal. Participants were selected using a multi-stage random

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sampling technique. Data were collected using a pre-tested, semi-structured Summary of Diabetes Self-Care Activities (SDSCA) questionnaire.

Results and Conclusion:
The study found that only 51 (20.3%) participants practiced adequate dietary control, 128 (51%) engaged in sufficient physical activity to maintain glycemic control, 203 (80.9%) adhered to prescribed medications, and 198 (78.9%) monitored their blood glucose at least once in the past three months. Foot care adherence was alarmingly low, with only 15 (6%) participants practicing proper foot care. The findings suggest a need for targeted interventions to improve self-care practices, particularly in areas such as diet and foot care, to reduce diabetes-related complications.

Keywords: Self-care practices, SDSCA, Type II diabetes mellitus

Introduction:
Diabetes mellitus is a chronic metabolic disease characterized by elevated blood glucose levels. *Type 2 diabetes* results from a progressive decline in β-cell insulin secretion, often against the backdrop of insulin resistance.(Schlosser J et al., 2020)[1]

Self-care practices refer to the set of behaviors individuals with diabetes adopt to manage their condition independently. These practices are closely linked to better glycemic control, reducing the risk of complications in individuals with type II diabetes. (Karthik RC et al., 2020)[2]

Medical Nutrition Therapy (MNT) has been shown to reduce HbA1c levels by 1-3%.[3] The quantity, frequency, and content of meals play a critical role in determining glycemic control. Additionally, structured exercise interventions lasting at least eight weeks have been found to lower HbA1c by an average of 0.66% in people with type II diabetes. Medication adherence is also crucial for maintaining euglycemia and reducing HbA1c.(Schlosser J et al., 2020)[1]

A study by Goitom Molalign Takele et al. (2021)[4] reported that 46.7% of participants had good self-care practices. Similarly, in Guateng, South Africa, a study by Chipo Mutyambizi et al. (2020)[5] found that self-care practices among diabetic patients at two tertiary hospitals were suboptimal. In India, the prevalence of self-care practices among diabetic patients was found to be 45% in a study conducted by (Karthik RC et al., 2020).[2]

The present study aims to investigate self-care practices among adults with type II diabetes mellitus (T2DM) in an urban setting. Understanding current behaviors and identifying factors that influence self-care practices in this population is crucial for developing targeted interventions. Ultimately, enhancing self-care practices can lead to better glycemic control, reduce complications, and improve overall health outcomes for urban T2DM patients.

OBJECTIVES

1. To assess self-care practices among patients with Type II diabetes mellitus.

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2. To analyze the correlation between self-care practices and various socio-demographic variables.

MATERIALS AND METHODS

This community-based, cross-sectional study was conducted over a one-year period (2023-2024) in the urban community of Bhopal district. The study included 251 participants who had been diagnosed with type II diabetes mellitus (DM) for more than one year. Diabetes was defined by the following criteria: fasting plasma glucose (FPG) ≥126 mg/dL, HbA1c ≥6.5%, or post-prandial plasma glucose >200 mg/dL. Participants were selected using a multi-stage sampling method.

Initially, 17 wards of Bhopal, serving as the Primary Sampling Units (PSUs), were randomly selected using the lottery method. From these wards, a list of Anganwadi centers was obtained, and 2-3 centers (Secondary Sampling Units, SSUs) were chosen using a random number table. A list of diabetic patients was then sourced from these SSUs, and participants were randomly selected from this list through the lottery method.

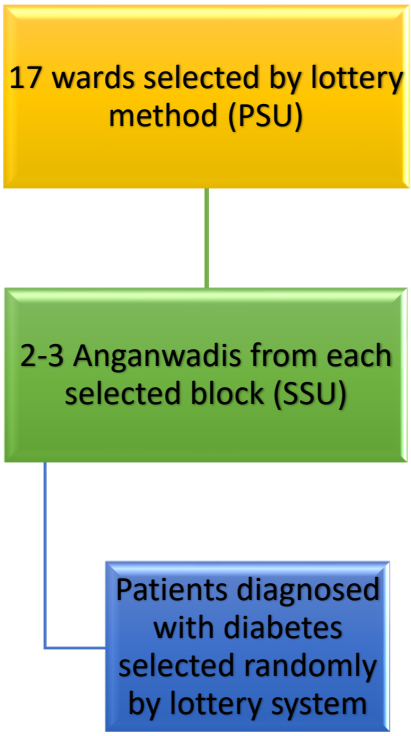

Figure 1: Multi-stage random sampling process for participant selection.

The sample size was calculated using Cochran's formula, assuming a 45% prevalence of self-care practices, with a 95% confidence level and 15% relative precision. This resulted in a sample size of 239, which was rounded to 251.

Data collection was carried out using a pre-tested, semi-structured questionnaire based on the Summary of Diabetes Self-Care Activities (SDSCA) scale(Mallicka et al, 2023).[6] The SDSCA is a concise tool for assessing diabetes self-management behaviors.

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Operational definitions used in study:

1. **Dietary Control**- It had 4 components which include no. of days diet restriction followed in the last 7 days and similarly for a month, frequency of consuming fat-rich foods and consumption of 2 serving of fruits and vegetables/day in last 7 days. **Adequate diet practice was considered if the cumulative score was more than 75% of the total**.(Selvaraj K et al, 2016)[7]
2. **Physical Activity**- Had 2 components- (i) work related activity was considered as exercise behaviour during work (ii) any specific exercise other than work-related activities for **at least 30min for a minimum of 5 days with a gap of not 2 continuous days was considered good exercise behaviour**.
3. **Sugar Monitoring**- Testing of venous blood glucose **at least once in the previous 3 months was considered good monitoring behaviour**.
4. **Medication adherence**- Taking all prescribed medication including injection insulin on time **for all 7 days in the previous 7 days was considered good adherence**.(Keerthi Chandrika et al., 2020)[8]
5. **Foot care**- It had 2 components- (i) foot care done (ii) inspection of the footwear before wearing them in the last 7 days. It was considered **adequate** if the **cumulative score was greater or equal to 10.**

Statistical analysis was done using software Jamovi 2.3.28 version.

Results:

The mean age of participants in this study was 52.8 years (±11.9). The majority of the 251 participants were female (63.7%), and 216 (86%) were married. A significant proportion, 165 participants (65.7%), lived in joint families, while the remainder were part of nuclear families. Education levels revealed that 211 participants (84%) had completed high school or attained a lower level of education.

Regarding health status, 155 participants (61.7%) had co-morbidities, with hypertension being the most common (44.6%) in addition to diabetes. Additionally, 91 participants (36.2%) had developed diabetes-related complications such as neuropathy, nephropathy, or retinopathy. Lastly, 59 participants (23.5%) reported a history of tobacco or alcohol use.

Table 1: Self-care practices domains distribution in Type-II diabetic patients

Self-care practice domain (N=251)	**Adequate**	**Inadequate**	**χ^2-value**	**p**
Diet control	51	200	88.5	<0.001*
Physical Activity	128	123	0.09	0.75
Medicine Adherence	203	48	95.7	<0.001*
Glucose Monitoring	198	53	83.8	<0.001*
Foot care	15	236	195	<0.001*

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*p-value<0.05 was considered significant

Table 1 reveals that in this study, 51 participants (20.3%) demonstrated adequate dietary control, while 128 (51%) engaged in sufficient physical activity to maintain their glycemic control. A majority of 203 participants (80.9%) adhered to their prescribed medications, and 198 (78.9%) monitored their blood glucose levels at least once in the past three months. However, only 15 participants (6%) practiced adequate foot care.

The components of self-care practices were compared using the χ^2 goodness of fit test. Statistically significant p-values were observed for dietary control, medication adherence, glucose monitoring, and foot care, indicating a significant difference between the groups in these domains of self-care practices.

Table 2: Binary logistic regression between various socio-demographic profile and self-care practices.

Variable	Self-care domains (odds ratio, 95% CI, p-value)				
	Diet Control	**Physical activity**	**Medicine Adherence**	**Glucose Monitoring**	**Foot Care**
Gender: Male – Female	1.47 (0.65 to 3.31), 0.34	1.61 (0.87 to 3.0), 0.13	0.41 (0.17 to 0.98),**0.046***	0.73 (0.34 to 1.54), 0.41	0.03 (0.003 to 4.22), 0.81
Duration of disease	1.08 (1.02 to 1.15),**0.012***	0.95 (0.89 to 1.0),**0.05***	0.90 (0.83 to 0.98),**0.019***	1.02 (0.96 to 1.08), 0.5	0.98 (0.89 to 1.09), 0.84
Type of family Nuclear-Joint	1.62 (0.81 to 3.24), 0.17	0.48 (0.27 to 0.85),**0.01***	0.45 (0.2 to 1.0), 0.055	1.07 (0.54 to 2.12), 0.83	1.62 (0.54 to 4.87), 0.39
Education Qualification	1.22 (0.46 to 3.24), 0.67	0.92 (0.42 to 2.02), 0.83	2.91 (0.77 to 11), 0.12	0.37 (0.15 to 0.89),**0.027***	1.19 (0.28 to 5.02), 0.8
Marital Status	1.15 (0.43 to 3.02), 0.77	0.69 (0.3 to 1.58), 0.38	1.22 (0.43 to 3.5), 0.71	1.70 (0.69 to 4.1), 0.24	1.22 (0.43 to 3.5), 0.14
Socio-economic Status	0.7 (0.34 to 1.45), 0.34	1.27 (0.72 to 2.22), 0.41	1.18 (0.58 to 2.4), 0.65	1.10 (0.55 to 2.22), 0.77	0.39 (0.11 to 1.38), 0.65
Religion Hindu-Muslim	1.56 (0.76 to 3.15), 0.21	1.01 (0.58 to 1.75), 0.98	1.02 (0.49 to 2.09), 0.968	0.73 (0.37 to 1.45), 0.37	1.53 (0.47 to 4.95), 0.47

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Variable	Self-care domains (odds ratio, 95% CI, p-value)				
	Diet Control	**Physical activity**	**Medicine Adherence**	**Glucose Monitoring**	**Foot Care**
Complications Present – Absent	0.85 (0.41 to 1.76), 0.66	0.53 (0.30 to 0.95),**0.32***	0.45 (0.21 to0.99),**0.046***	1.86 (0.91 to 3.82), 0.09	1.47 (0.43 to 5.03), 0.54
Comorbidities Present – Absent	3.82 (1.7 to 8.58),**0.001***	0.75 (0.43 to 1.29), 0.29	0.96 (0.48 to 1.94), 0.91	1.87 (0.92to 3.78), 0.08	1.27 (0.40 to 3.97), 0.68
Addiction Present-Absent	0.093 (0.18 to 1.14), 0.37	1.25 (0.64 to 2.46), 0.51	1.54 (0.65 to 3.62), 0.33	1.48 (0.68 to 3.23), 0.32	1.24 (0.31 to 4.89), 0.75
Significant Variables	Duration of disease, Co-morbidities	Duration of disease, Type of family, Complication	Gender, Duration of disease, Complication	Education Qualification	None

*p-value<0.05 was considered significant

Table 2 presents the results of binary logistic regression analysis, examining the association between various socio-demographic factors and self-care practices. The analysis shows a significant association between dietary control and both the duration of disease (Odds Ratio (OR) = 1.08, 95% Confidence Interval (CI) = 1.02–1.15) and the presence of comorbidities (OR = 3.82, 95% CI = 1.7–8.58).

Similarly, physical activity was significantly associated with the duration of disease (OR = 0.95, 95% CI = 0.89–1.00), education level (high school or lower) (OR = 0.48, 95% CI = 0.27–0.85), and the presence of complications (OR = 0.53, 95% CI = 0.30–0.95).

Medication adherence was found to be significantly associated with gender (OR = 0.41, 95% CI = 0.17–0.98), duration of disease (OR = 0.90, 95% CI = 0.83–0.98), and the presence of complications (OR = 0.45, 95% CI = 0.21–0.99). Glucose monitoring was significantly associated with educational level (OR = 0.37, 95% CI = 0.15–0.89), while foot care showed no significant association with any socio-demographic variables.

Discussion:

The present study determines and correlates the association between self-care practices and

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socio-demographic variables among participants with type II diabetes. Understanding these patterns is crucial for developing targeted interventions to improve diabetes management.

In the current study, 20% of the participants followed an adequate diet. Similar findings were observed in a study by Hemavathi Dapasana et al., where 12.6% of participants demonstrated dietary adherence (H. Dapasana et al., 2017).[9] This relatively low adherence to dietary recommendations highlights the need for enhanced dietary education and counseling, especially considering the significant role diet plays in glycemic control.

Regarding physical activity, 51% of participants reported engaging in sufficient exercise, which aligns with the 42.3% reported by (Mohan V. et al., 2011).[10] However, a higher adherence (82.1%) was found in a study by (Wajid Syed et al., 2022). [11]These variations may stem from differences in socio-cultural factors, access to facilities, or participant awareness regarding the importance of physical activity in diabetes management.

A high percentage (80.9%) of participants adhered to their prescribed anti-diabetic medications, which is consistent with the findings of (Jwalant Joshi et al.,2022)[12] where 89.3% of participants were adherent . This level of medication adherence could be attributed to increased awareness of the importance of consistent medication use in managing diabetes and fear from complications related to Diabetes.

In terms of glucose monitoring, 78.9% of participants practiced regular monitoring, similar to the findings by Recharla C. Karthik et al. (75.2%) and Rajasekharan et al. (76.6%).(R. Karthik et al., 2020; Kulkarni V et al., 2015)[2,13] Regular glucose monitoring is a critical component of self-care, enabling timely adjustments in treatment. However, improving access to monitoring devices, particularly in resource-limited settings, remains essential.

Foot care practices were alarmingly low, with only 6% of participants performing adequate foot care, comparable to the studies by Jwalant Joshi et al. (9%) and ArulMozHi et al. (20%) (Jwalant Joshi et al.,2022; S.A et al., 2014).[12,14] Poor foot care adherence is concerning, as it can lead to complications such as ulcers and infections. This finding underscores the need for enhanced education on foot care and the incorporation of routine screenings in diabetic care protocols.

The duration of the disease appeared to positively influence adherence to self-care practices, as observed in this study. Longer disease duration likely leads to greater disease awareness, as patients have had more time to internalize self-care behaviors. This finding suggests that ongoing patient education, particularly early in the disease course, is essential for fostering long-term adherence to self-care practices.

Conclusion:

The study concluded that the duration of disease, presence of complications, and co-morbidities were significantly associated with key self-care practices, including diet control, physical activity, and medication adherence. Participants with a longer disease duration and those with complications or co-morbid conditions were more likely to adhere to these essential aspects of diabetes management. Educational qualifications showed a significant

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association with glucose monitoring, suggesting that higher levels of education may contribute to better self-management in this area.

However, foot care practices were alarmingly low among the participants, with no significant association observed between foot care and any socio-demographic variables. This finding highlights a critical gap in self-care behavior that could lead to severe complications if not addressed. Interventions aimed at improving foot care education and awareness, particularly among those with lower education and longer disease duration, are urgently needed.

Overall, the study highlights the need for tailored educational programs to improve adherence to all aspects of diabetes self-care.

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