

# Self-Care Practices and Their Predictors Among Type 2 Diabetes Mellitus Patients Attending the General Outpatient Department of a Tertiary Care Hospital, Kolkata, West Bengal, India

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## ABSTRACT

**Introduction:** Self-care practices (SCP) are essential for effective management of type 2 diabetes mellitus (T2DM) and for preventing its complications. However, adherence to these practices remains suboptimal, especially in resource-limited settings. Understanding predictors of good SCP can inform targeted interventions.

**Objective:** To assess the self-care practices and identify their predictors among T2DM patients attending the general outpatient department of a tertiary care hospital in Kolkata.

**Materials and Methods:** A descriptive, cross-sectional study was conducted among 218 diagnosed T2DM patients aged  $\geq 18$  years attending the diabetes clinic of IPGME & R and SSKM Hospital, Kolkata. Participants were selected using consecutive sampling. Data were collected using a pre-tested, pre-designed structured schedule based on the Summary of Diabetes Self-Care Activities (SDSCA) scale. Good self-care practice was defined as scoring above the median across all domains. Data were analyzed using SPSS version 25. Multivariable logistic regression was used to identify predictors of good SCP.

**Results:** The prevalence of good overall self-care practices was 56%. Adherence was highest in medication (94.8%) and lowest in blood glucose monitoring (22.1%). Multivariable logistic regression identified age  $\geq 52$  years (aOR: 3.25; 95% CI: 1.90–5.24), female gender (aOR: 1.80; 95% CI: 1.03–3.12), education above secondary level (aOR: 1.92; 95% CI: 1.05–3.50), urban residence (aOR: 1.85; 95% CI: 1.24–4.73), and controlled CBG ( $< 180$  mg/dL) (aOR: 2.23; 95% CI: 1.12–5.43) as significant predictors of good SCP.

**Conclusion:** Just over half of the T2DM patients exhibited good self-care practices, with notable deficiencies in diet, exercise, and glucose monitoring. Sociodemographic and clinical factors significantly influenced self-care behaviors, underscoring the need for tailored educational and behavioral interventions.

**Keywords:** Type 2 diabetes mellitus, self-care practices, predictors, SDSCA, tertiary care,

## INTRODUCTION

Diabetes has attained epidemic proportions, and the number of cases has quadrupled since 1990 and is currently affecting over

800 million adults. The global prevalence of diabetes is estimated to be 8.5% in the adult population. This prevalence has increased steadily in low and middle-income countries

compared to high-income countries.<sup>[1]</sup> It is estimated that around 77 million Indians are diagnosed with diabetes (type 2), and almost 25 million are prediabetic. More than 50% of the people are unaware of their diabetic status, which inadvertently leads to complications such as retinopathy, nephropathy, neuropathy, etc.<sup>[2]</sup>

For a diabetic person, optimal glycemic control is crucial for keeping the complications at bay, and to achieve this, alongside medications, an array of self-care practices are also recommended. Self-care practices are defined as a set of behaviours practiced by people with diabetes to manage the disease on their own successfully. There are a few essential self-care practices recommended for diabetics that predict a favourable outcome, including healthy eating, being physically active, regular monitoring of blood sugar, medication adherence, and periodic foot examinations. Patients who are compliant with these self-care activities have been found to have better glycemic control, a reduction in the incidence of complications, and an overall better quality of life.<sup>[3]</sup>

Self-care for diabetes is met with a lot of challenges and barriers, including unclear advice from medical practitioners, family cooperation, cost of care, distance from medical centres, and cultural differences between families and the health-care provider. Assessing the self-care practices through questionnaires is expected to help the health providers to know the level of compliance to different aspects of self-care among the treated people and be an eye-opener on the gaps in communication, the barriers in adopting the advices of doctors, and clarifying doubts if any.<sup>[4]</sup>

Thus, with self-care being considered as one of the cornerstones of diabetes management, there is an imminent need to assess these practices along with its predictors among diabetes patients. With this background, this study was conducted among type 2 diabetes patients attending the diabetes OPD of a tertiary care hospital in Kolkata.

## MATERIALS & METHODS

A hospital-based, descriptive, cross-sectional study was conducted from August 5th to 31st, 2024, among patients with type 2 diabetes mellitus attending the diabetes clinic of the Institute of Postgraduate Medical Education & Research (IPGME & R) Hospital. Adult patients ( $\geq 18$  years) attending the clinic, diagnosed with type 2 diabetes for at least a year, and willing to participate in the study were included in this study. In contrast, pregnant women and those with severe physical or mental illness were excluded from the study.

Data collection commenced after approval from the Institutional Ethics Committee was duly obtained and all participants were assured of the anonymity and confidentiality of their information.

Sample size was calculated based on a study conducted in Lucknow by Khan et al,<sup>[5]</sup>

where the prevalence of good self-care practice was reported to be 37%. Considering an absolute precision of 7% and a 10% non-response rate, the minimum sample size of 201 was achieved. Data were collected from 218 participants. Patients attending the clinic, fulfilling the inclusion and exclusion criteria, were enrolled via a consecutive sampling technique till the desired sample size was achieved. The participants were interviewed using a pre-tested, pre-designed schedule which comprised of sociodemographic profile (age, gender, education, occupation, residence, etc.), a disease profile (duration since diagnosis, current treatment regimen, complications related to T2DM, glycaemic control etc.), and the Summary of Diabetes Self-Care Activities (SDSCA)<sup>[6]</sup> questionnaire which was used to assess their self-care practices (SCP). The SDSCA measure is a brief self-report questionnaire of diabetes self-management that includes items assessing the following aspects of the diabetes regimen: general diet, specific diet, exercise, blood-glucose testing, foot care, and smoking. There is a total of 17 questions in this scale, which were translated to Bengali and Hindi and back

translated to English to ensure accuracy. The participants' height, weight were measured (for estimation of Body Mass Index) and their capillary blood glucose levels were also measured. All available medical records were reviewed. Glycemic control was assessed as per the Indian Council of Medical Research (ICMR) guidelines.<sup>[7]</sup>

**Ethical considerations:**

The study commenced after obtaining approval from the Institutional Ethics Committee. (IPGME&R/IEC/2024/0798; dt 05.10.24) After explaining the purpose of the study to the study participants, informed consent was acquired from the study participants. They were also assured of the confidentiality and anonymity of their information

**Operational definitions:**

Healthful eating plan: In the dietary component, restriction of carbohydrates in all meals for all 7 days, eating three cups or more of vegetables and fruits, including seasonal, for all 7 days, no fried food, and no sweet preparations, including tea or coffee with sugar on any day in the previous week, were considered as healthful eating habits.<sup>[8]</sup>

Restriction of carbohydrates: Reducing the intake of quantity of rice/roti per meal.<sup>[9]</sup>

Glycemic control: The glycemic control was categorised as per ICMR (Indian Council of Medical Research) guidelines.<sup>[7]</sup> Study participants were categorised as per any of the three following criteria based on available reports (no older than 3 months preceding the interview date).

Criteria	Ideal	Satisfactory	Unsatisfactory
Fasting plasma glucose (mg/dl)	80-110	111-125	>125
2-hour post-prandial glucose (mg/dl)	120-140	141-180	>180
Glycated hemoglobin (%)	<7	≥7-<8	≥8

Recommended blood glucose level for adults with diabetes mellitus at least 2 hours after meals is lower than 180mg/dl (American Diabetes Association)

**Statistical Analysis**

Data were analysed using IBM SPSS software version 25.0. Descriptive statistics were represented using Median (Inter-quartile range), frequency, and percentages. For the Summary of diabetes self-care activities scale (SDSCA), scores were calculated for each domain, using the number of days per week on a scale of 0-7. Reverse scoring was done for eligible items. Total scores of each domain were obtained by adding the scores of the questions in that domain and scores of all the domains were added to obtain the overall self-care scores. Scores more than or equal to the median of this overall score were categorized as “good self-care practice,” whereas scores lower than the median were categorized as “poor self-care practice”. Pearson’s Chi-square test, followed by binary logistic regression, was performed to identify the predictors of self-care practice.

**RESULT**

In the present study the mean ± SD age of the study participants was 52.40 ± 10.6 years with almost one-third (32.5%) belonging to the age group of 46-55 years. Sixty-one percent of the participants were male and 65% of them practiced Hinduism. Middle school was the highest level of education achieved by 18.8% of the participants and by profession, 23.85% were semi-skilled workers, while 23.85% were homemakers. Majority (91.28%) of them were married, almost 30% belonged to lower middle socio-economic class according to modified B. G. Prasad Scale 2024 and more than half (56%) hailed from a rural area. Regarding duration since diagnosis of type 2 diabetes, it was found that almost 39% of the participants had the disease within the past 1-5 years, whereas 23% had the disease for over 10 years. Oral hypoglycemic agents (OHA) were the prescribed current treatment regime for 62.84% of the participants. Cut-off for random capillary blood glucose (CBG) levels, for optimum control was pre-

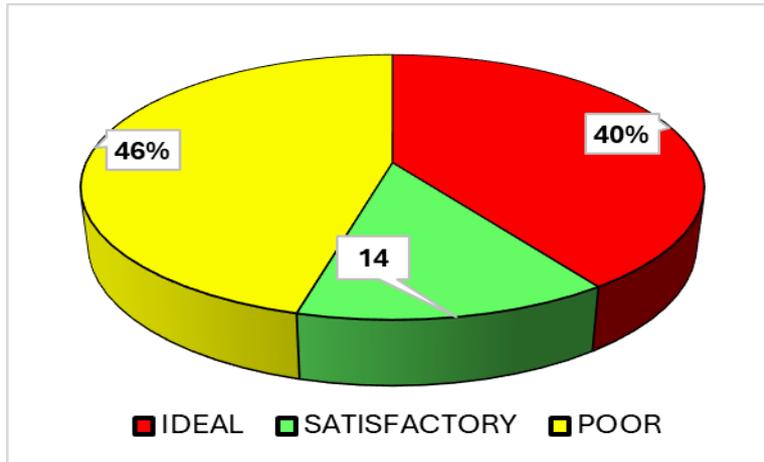
determined at 180mg/dl as per the ADA guidelines and more than half (58.26%) of the participants were found to have CBG levels higher than this value. (Table 1)

**Table 1: Distribution of study participants according to socio-clinical profile (n= 218)**

<b>Variables</b>	<b>Frequency (%)</b>
<b>Age (in completed years)</b>	
25-35	13 (5.96)
36-45	52 (23.85)
46-55	71 (32.57)
56-65	58 (26.61)
>65	24 (11.01)
<b>Gender</b>	
Male	133 (61.00)
Female	85 (39.00)
<b>Religion</b>	
Hinduism	142 (65.00)
Islam	76 (35.00)
<b>Education</b>	
Primary	33 (15.13)
Middle school	41 (18.80)
Secondary	29 (13.30)
Higher secondary	28 (12.84)
Graduate and above	25 (11.46)
Illiterate	32 (14.67)
<b>Occupation</b>	
Professional	8 (3.60)
Semi-professional	2 (0.91)
Skilled	42 (19.20)
Semi-skilled	52 (23.85)
Unskilled	41 (18.8)
Retired	17 (7.79)
Unemployed	4 (1.80)
Homemaker	52 (23.85)
<b>Socio-economic status (as per modified B.G. Prasad Scale, 2025)</b>	
Upper class (I)	35 (16.10)
Upper middle class (II)	33 (15.20)
Middle class (III)	34 (15.40)
Lower middle class (IV)	67 (30.40)
Lower class (V)	49 (22.10)
<b>Marital status</b>	
Married	199 (91.28)
Unmarried	6 (2.75)
Widowed	12 (5.50)
Separated	1 (0.45)
<b>Residence</b>	
Urban	96 (44.00)
Rural	122 (56.00)
<b>Type of family</b>	
Joint	79 (36)
Nuclear	139 (64)
<b>Duration since diagnosis</b>	
1-5 years	85 (38.99)
6-10 years	83 (38.07)
>10 years	50 (22.93)
<b>Current treatment regime</b>	
Oral hypoglycemic agents (OHA)	137 (62.84)
Insulin	36 (16.51)
Both	45 (20.64)
<b>Capillary blood glucose levels (mg/dl)</b>	
<180	91 (41.74)
≥ 180	127 (58.26)

Glycemic control was found to be ideal among 40% of the study participants, whereas, 14% and 46% of them were found

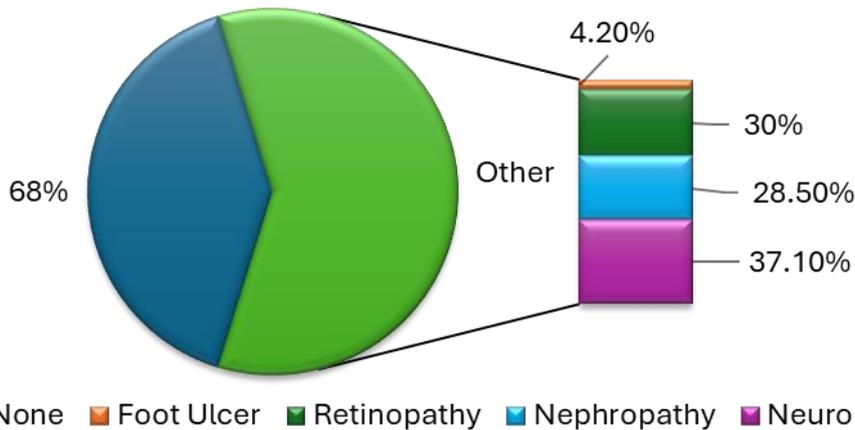
to have satisfactory and poor glycemic control respectively. (Fig 1)



**Fig 1: Distribution of study according to glycemic control (as per ICMR guidelines) (n=218)**

Complications related to diabetes mellitus was diagnosed among 32% of the participants, with neuropathy being the most prevalent, accounting for 37% of reported complications. Retinopathy (30%),

nephropathy (28.50%) and foot ulcers (4.20%) were the other complications present among the study participants. (Fig. 2)



**Fig 2. Distribution of study participants according to complications related to T2DM (n=218)**

About 54% of the study participants were found to have poor SCP with respect to diet. With respect to physical exercise 61% were found to have poor SCP. Regular blood sugar testing was performed by only 43% of the study participants and majority (73.85%)

did not perform footcare. However, more than 72% of the participants were found to be adherent to their medications. Overall SCP was found to be good among 56% of the study participants. (Table 2)

**Table 2: Distribution of study participants according to self-care practice (n=218)**

Self-care practice domains	Good n (%)	Poor n (%)	Median (IQR) score
Diet	100 (45.87)	118(54.13)	20 (10)
Physical activity	85(39.00)	133 (61.00)	5.5 (9)
Blood sugar testing	94 (43.11)	124 (56.88)	1 (2)
Foot care	57 (26.15)	161 (73.85)	18 (9)
Medication adherence	158 (72.48)	60 (27.52)	-
Overall self-care practice	122 (56)	96(44)	52 (19.75)

On binominal logistic regression, age of the study participants, their gender, education, residence and capillary blood glucose levels were found to have a bearing upon their self-care practices. Participants aged 52 years and above (aOR : 3.25, 95% C. I: 1.90-5.24), female study participants (aOR: 1.80, 95% C. I: 1.03-3.12), those educated

above secondary level (aOR: 1.92, 95% C. I: 1.05-3.50), those hailing from urban areas (aOR: 1.85, 95% C. I: 1.24-4.73) and having capillary blood glucose levels of <180 mg/dl (aOR: 2.23, 95% C.I. 1.12-5.43) were more likely to have good self-care practices. (Table 3)

**Table 3. Distribution of study participants according to factors associated with overall self-care practice. (n=218)**

Variables		Self-care practice		aOR (95% C.I.)	p value
		Good n (%)	Poor n (%)		
Age (in completed years)	≥ 52	85 (78.70)	23 (21.30)	3.25 (1.90--5.24)	<0.001
	<52	37 (33.64)	73 (66.36)	1	
Gender	Female	67 (50.38)	66 (49.62)	1.80 (1.03-3.12)	0.037
	Male	55 (64.71)	30 (35.29)	1	
Religion	Muslim	41 (53.95)	35 (46.05)	0.63 (0.39-0.98)	0.042
	Hindu	81 (57.04)	61 (42.96)	1	
Education	Above secondary level	50 (43.47)	65 (56.53)	1.92 (1.05-3.50)	0.032
	Secondary level and below	31 (30.10)	72 (69.90)	1	
Occupation	Unemployed	68 (65.38)	36 (34.62)	0.58 (0.33-1.03)	0.063
	Employed	54 (47.37)	60 (52.63)	1	
Marital status	Unmarried	66 (61.11)	42 (38.89)	1.22 (0.71-2.09)	0.063
	Married	56 (56.57)	43 (43.43)	1	
SES	Lower class	58 (50.00)	58 (50.00)	0.64 (0.37-1.10)	0.46
	Upper class	64 (62.75)	38 (37.25)	1	
Residence	Urban	75 (59.5)	51 (40.5)	1.85 (1.24-4.73)	0.002
	Rural	47 (69.79)	45 (30.21)	1	
Type of family	Nuclear	77 (55.40)	62 (44.60)	0.95 (0.55-1.64)	0.85
	Joint	45 (56.96)	34 (43.04)	1	
Duration since diagnosis	≥ 10 years	38 (48.72)	40 (51.28)	0.62 (0.35-1.10)	0.103
	<10 years	84 (60.00)	56 (40.00)	1	
Current treatment regimen	Insulin	13 (36.11)	23 (63.89)	0.40 (0.18-1.85)	0.37
	Both OHA and insulin	25 (55.56)	20 (44.44)	0.75 (0.39-1.42)	
	Oral hypoglycemic agents	84 (61.31)	53 (38.69)	1	
Capillary blood glucose levels (mg/dl)	<180	72 (40.32)	19 (59.68)	2.23 (1.12-5.43)	<0.001
	≥180	50 (79.12)	74 (20.88)	1	

## DISCUSSION

This study aimed to assess self-care practices (SCP) among patients with type 2 diabetes mellitus (T2DM) and to identify factors influencing these behaviors. The findings reveal that 56% of participants demonstrated good overall SCP, which is indicative of moderate adherence to diabetes self-management practices in the studied population. However, domain-specific gaps were evident, especially in diet, exercise, and foot care.

The prevalence of good SCP in this study aligns with findings by Khan et al. [5], who reported that 64.8% of participants exhibited satisfactory self-care practices in Lucknow. Similarly, Chandrika et al [9]. in Hyderabad found an overall adherence level of 55.7%, nearly matching our observations. These results suggest that despite regional differences, self-care behaviours among T2DM patients in India remain suboptimal and consistent across urban and semi-urban populations.

With regard to individual domains, our study found poor dietary practices in 54% of participants and inadequate physical activity in 61%, similar to findings by Durai et al. [4], where only 35.4% followed dietary recommendations and 27.6% adhered to exercise guidelines. In the Kancheepuram study by Karthik et al. [13], comparable patterns were noted, with 48% of participants showing poor adherence to exercise. These shortcomings can be attributed to cultural food preferences, lack of structured diabetes education, and limited physical infrastructure for exercise in rural and semi-urban areas.

In terms of blood glucose monitoring, only 43% of our participants practiced it regularly. This figure is relatively higher than that reported by Bala et al. [10] during the COVID-19 pandemic in Manipur, where reduced healthcare access and heightened psychological distress further hampered self-care. Conversely, our study's relatively better monitoring rates may reflect post-pandemic normalization of services and better outreach in our setting.

In this study, foot care practices were notably poor, with 73.85% of participants neglecting it, which was comparable to the study by Nguyen et al. [11] in Vietnam, where only 35% engaged in regular foot care. Poor foot care awareness is a persistent global issue in diabetes management, often overshadowed by more emphasized domains such as diet or medication adherence.

Encouragingly, medication adherence was high in our study (72%), consistent with the findings of Toobert et al. [6], who demonstrated that medication adherence is generally higher than lifestyle-based behaviors across populations. This may be due to the tangible and routine nature of medication intake compared to behaviorally intensive tasks such as exercise or dietary change.

From the perspective of glycemic control, 40% of the participants in our study had ideal control, whereas 46% had poor control. Similar glycemic trends were

observed by Chandrika et al. [9] and Khan et al. [5], both of whom reported strong associations between good self-care behaviors and better glycemic outcomes. These reinforce the importance of consistent self-management in preventing complications.

In this study Diabetes-related complications were reported in 32% of participants, with neuropathy (37%) being the most prevalent, followed by retinopathy (30%) and nephropathy (28.5%). These findings reflect the long-term impact of suboptimal glycemic control, consistent with the natural history of diabetes described in Indian Council of Medical Research (ICMR) guidelines [7].

The current study identified several socio-demographic and clinical predictors significantly associated with good self-care practices among type 2 diabetes mellitus (T2DM) patients. On binomial logistic regression analysis, older age ( $\geq 52$  years), female gender, higher education level, urban residence, and optimal glycemic control (CBG  $< 180$  mg/dL) were found to be positively associated with better self-care adherence.

In line with our findings, Shrivastava et al. [3] emphasized the role of age in improving diabetes awareness and self-care behavior, attributing this to increased health consciousness and longer disease duration in older individuals, which facilitates better adaptation to lifestyle modifications and medication adherence. Similarly, Nguyen et al. [11] in Vietnam found that older age was significantly associated with higher self-care scores, particularly in diet and medication adherence domains.

Gender was another significant determinant in our study, with female participants showing better self-care practices than males. This is consistent with the findings of Nguyen et al. [11] and Paudel et al. [12], who reported better self-care among women in multiple domains. However, other Indian studies such as Durai et al. [4] and [5] did not find a significant gender-based difference, suggesting the influence of regional and

cultural factors on gender roles in diabetes management.

Our study also found that participants educated above the secondary level were significantly more likely to follow good self-care practices (aOR: 1.92, 95% CI: 1.05–3.50). This observation is strongly supported by Chandrika et al. [9], who reported that higher educational status positively correlated with adherence to self-care recommendations, particularly in the domains of diet and blood glucose monitoring. Shrivastava et al. [3] also emphasized that education enhances health literacy and promotes proactive engagement in disease management

Participants residing in urban areas were more likely to report good self-care adherence (aOR: 1.85, 95% CI: 1.24–4.73), likely due to better access to health facilities, diabetes education, and support services. This is consistent with findings from Durai et al. [4] and Karthik et al. [13], who found that rural residents had lower adherence to recommended self-care practices, particularly physical activity and blood sugar monitoring.

Better glycemic control (CBG <180 mg/dL) was also significantly associated with improved self-care behaviors, reinforcing the bidirectional relationship between self-management and metabolic outcomes. Khan et al. demonstrated a similar association, where participants who followed appropriate self-care regimens exhibited significantly better glycemic control [5]. Bala et al. also noted during the COVID-19 pandemic that individuals with lower blood glucose levels had better self-care adherence, possibly reflecting increased health vigilance in patients with good metabolic profiles [10].

## CONCLUSION

In this present study, over half of the type 2 diabetes mellitus (T2DM) patients demonstrated good overall self-care practices (SCP), however, significant deficiencies were found in key areas such as diet, physical activity, blood glucose

monitoring, and foot care. Despite high levels of medication adherence, inadequate attention to lifestyle-related domains and routine self-monitoring remains a major concern.

Glycemic control was suboptimal in a considerable proportion of participants, with nearly half exhibiting poor control and about one-third experiencing diabetes-related complications, most commonly neuropathy. The study also identified critical socio-demographic determinants of poor self-care, including older age, female gender, lower education, rural residence, and elevated capillary blood glucose levels.

These findings highlight the urgent need for targeted, culturally sensitive diabetes education programs that address specific gaps in self-care behaviors. Strengthening patient awareness, empowering rural and undereducated populations, and promoting regular follow-up can significantly enhance diabetes self-management and reduce the burden of complications.

## Declaration by Authors

**Ethical Approval:** Approved

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**Conflict of Interest:** The authors declare no conflict of interest.

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