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Original Research Article

Assessment of self-care practices among type 2 diabetics in urban Bengaluru: a cross-sectional study

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ABSTRACT

Background: Self-care is a vital aspect of diabetes management, significantly influencing glycemic control and prevention of complications. This study aimed to assess self-care practices among adult diabetic patients and compare individual self-care components with findings from similar studies conducted in India.
Methods: A community-based cross-sectional study was conducted among 136 adult type 2 diabetic patients attending primary health centers (PHCs) in urban Bengaluru between November 2024 and January 2025. Self-care behaviors were assessed across seven domains based on the American Association of Diabetes Educators (AADE) framework. Univariate and multivariate logistic regression analyses were used to identify factors associated with poor self-care, with results presented as adjusted odds ratios (aORs) and 95% confidence intervals (CIs).
Results: The mean age of participants was 53.8 years (SD: ±10.4), and overall mean self-care score was 33.9 (SD: ±12.3). Medication adherence showed the highest compliance (mean 6.1 days/week), while exercise had the lowest (mean 3.6 days/week). The median total self-care score was 35 (IQR: 28-42), with 38.2% (95% CI: 36.4-40.0%) classified as having good self-care. Females showed better self-care, especially in diet and foot care. In multivariate analysis, being female (aOR: 1.76, 95% CI: 1.1-2.8) and having higher education (aOR: 2.14, 95% CI: 1.3-3.5) were positively associated with good self-care, while diabetes duration under 5 years was linked to poorer practices (aOR: 1.69, 95% CI: 1.1-2.7).
Conclusions: Moderate self-care practices were observed, highlighting need for targeted health education and behavioral strategies to improve diabetes management.

Keywords: Diabetes, Medication adherence, Self-care

INTRODUCTION

Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder characterized by insulin resistance and impaired glucose metabolism, leading to persistent hyperglycemia. The global burden of diabetes is increasing at an alarming rate, with India ranking second in the world, harboring over 77 million individuals with diabetes.[1] This growing prevalence is primarily attributed to rapid urbanization, sedentary lifestyles, unhealthy dietary habits, and genetic predispositions.[2] The increasing incidence of T2DM in urban areas necessitates an in-depth understanding of self-care practices among affected individuals to improve disease management and prevent complications.

Effective management of T2DM extends beyond pharmacological interventions and requires adherence to self-care behaviors, which include diet modification, physical activity, glucose monitoring, medication adherence, problem-solving, risk reduction (such as foot care, smoking cessation, and screening for complications), and healthy coping mechanisms.[3] The American Association of Diabetes Educators (AADE) has established these seven domains as essential components of diabetes self-management, collectively known as the

"AADE 7 measures of outcome measurement".[4] Despite the critical role of self-care in diabetes control, adherence to these practices remains suboptimal, particularly in urban Indian settings, where lifestyle-related factors play a significant role in disease progression.

Understanding these determinants is crucial, as self-care plays a vital role in effective diabetes management by helping to regulate blood sugar levels and prevent complications.[3] Diabetes self-management, which includes lifestyle modifications, medication adherence, and regular monitoring, has been shown to improve glycaemic control and reduce the risk of long-term complications.[4,5] By identifying key influences on self-care behaviours, this study provides valuable insights that can inform the development of targeted interventions and community-based strategies.[6] Strengthening self-care practices through tailored education and support can significantly enhance disease outcomes, improve quality of life, and reduce the overall burden of diabetes-related complications.[7] Therefore, this study aims to evaluate the factors influencing self-care practices among adults with T2DM in ward number 98 of urban Bengaluru.

Aim and objective of the study

To assess the determinants of self-care practices of type 2 diabetes mellitus among the adult population in ward number 98 of urban Bengaluru using a valid questionnaire.

METHODS

Study design

It was a community-based cross-sectional design.

Study setting

The research was conducted in the field practice area of the department of community medicine, ESIC Medical College and PGIMSR, Rajajinagar, Bangalore. This study was conducted in two urban primary health centres such as Manjunathnagar PHC and Mariyappanpalya PHC.

Study duration

This study took place from November 2024 to January 2025.

Study population and sample size

The adult diabetic population registered in both the primary health centres was taken in the study. The study population consisted of diagnosed type 2 diabetes patients from the two selected urban PHCs. Inclusion criteria included individuals diagnosed with type 2 diabetes for more than one year, while exclusion criteria involved patients unwilling to participate. Based on the prevalence of good self-care practices in diabetic patients (10%) from a previous study, the estimated sample size was determined to be 130, accounting for a 15% relative precision and a 10% non-response rate, with a 95% confidence interval.[8] For practical purposes, the final sample size was taken as 136 participants.

Variables

Outcome variables

The self-care practices of the participants were assessed across seven domains: diet modification, physical activity, glucose monitoring, medication adherence, problem-solving, risk reduction (including foot care, smoking, alcohol consumption, and screening for complications), and healthy coping (or psychosocial adjustment). These domains align with the "AADE 7 measures of outcome measurement" recommended by the American Association of Diabetes Educators (AADE).[4]

To design the questions evaluating self-care activities, we considered various standardized scales, including the "summary of diabetes self-care activities measure (SDSCA)," the "diabetes self-management questionnaire (DSMQ), and the patient health questionnaire-2.[8-10] However, the questionnaire items were modified to suit the local cultural context. The reliability of the modified questionnaire was measured at 0.645.

Scoring of self-care

The questions on self-care practices were given a score with a minimum of 0.25 for poor practice and a maximum of 1.00 for good practice of the respective question (Table 1). The minimum aggregate score was 5, and the maximum was 20. We categorized the total self-care score into good self-care practices (score from 15.25 to 20.00), moderate self-care practices (scores from 10.25 to 15.00), and poor self-care practices (scores from 5.00 to 10.00).[3,11]

Table 1: Components of self-care score for the adult diabetic population.

Component	Number of questions	Minimum score	Maximum score
Diet modification	7	1.75	7.00
Physical activity	3	0.75	3.00
Glucose monitoring	2	0.50	2.00
Drug adherence	1	0.25	1.00
Problem-solving	2	0.50	2.00
Risk reduction	4	1.00	4.00
Healthy coping	1	0.25	1.00
Total	20	5.00	20.00

Data collection

It was conducted using a semi-structured questionnaire and face-to-face interviews with study participants, which was divided into four parts: socio-demographic details, status of diabetes mellitus and comorbidities, self-care questionnaire, and physical measurements. Pretesting was conducted on 10% of diagnosed diabetes and hypertension patients to ensure the validity and reliability of the instrument. Each respondent was informed about the research objectives, and written informed consent was obtained to ensure ethical compliance. Confidentiality was strictly maintained, and participants had the liberty to discontinue their participation at any stage.

Statistical methods

The collected data were entered into Microsoft Excel and subsequently transferred to SPSS version 23 for statistical analysis. Descriptive statistics, including frequency, percentage, mean, range, and standard deviation, were used to summarize the data. Inferential statistics such as Pearson's chi-square test and Fisher's exact test were employed to analyze associations between dependent and independent variables, with a significance level of ≤0.05 at a 95% confidence interval. Additionally, logistic regression analysis was conducted to identify risk factors associated with poor self-care scores among the study participants.

RESULTS

Table 2 presents the socio-demographic characteristics of study participants. The majority of the study participants were in the age group (37%) over 60 years, followed by those aged 50 years or younger. Gender distribution shows a higher number of females (62%) compared to males (38%), and most participants are married. Socio-economic status is predominantly in class IV (50%), followed by class II and III.

Table 3 examined the frequency of self-care practices among participants and their corresponding scores across several categories, such as diet modification, physical activity, glucose monitoring, drug adherence, problem-solving, risk reduction, and healthy coping. Among self-care practices, diet modification and drug adherence were well-practiced, and physical activity and glucose monitoring had relatively lower compliance rates. Notably, 51.8% of participants did not engage in physical activity, and only 25.5% exercised for 30 minutes daily.

Table 2: Socio-demographic characteristics of participants (n=136).

Variables		Frequency (%)
Age (years)	≤50	43 (32)
	51-60	42 (31)
	>60	51 (37)
Gender	Male	52 (38)
	Female	84 (62)
Marital status	Married	119 (87)
	Widow/Separated	17 (13)
Religion	Hindu	92 (68)
	Muslim	44 (32)
Education	Illiterate	25 (18)
	Primary	60 (44)
	Secondary	31 (23)
	High School	9 (7)
	College	11 (8)
Occupation	Unemployed	10 (7)
	Unskilled worker	14 (10)
	Semi-skilled worker	69 (51)
	Skilled worker	39 (29)
	Semi-professional and Professional	4 (3)
Type of family	Nuclear	85 (62)
	Joint	51 (38)
Socio-economic status according to modified Kuppuswamy's scale	Class I	4 (3)
	Class II	22 (16)
	Class III	38 (28)
	Class IV	68 (50)
	Class V	4 (3)

Table 3: Frequency of self-care practices and their scores (n=136).

Variables	Scores allotted	Frequency (%)
Diet modification		
How many days per week did you eat green leafy vegetables?		
Not at all	0.25	3.6
Not even 1 day per week (occasionally)	0.50	5.1
1 or 2 days per week (moderately)	0.75	40.1
≥3 days per week (frequently)	1.00	51.2
How many days per week did you eat fruits?		
Not at all	0.25	21.9
Not even 1 day per week (occasionally)	0.50	16.1
1 or 2 days per week (moderately)	0.75	43.8
≥3 days per week (frequently)	1.00	18.2
How many days per week did you eat sweets?		
Not at all	1.00	68.6
Not even 1 day per week (occasionally)	0.75	21.2
1 or 2 days per week (moderately)	0.50	5.8
≥3 days per week (frequently)	0.25	4.4
How many days per week did you eat fried foods?		
Not at all	1.00	43.8
Not even 1 day per week (occasionally)	0.75	29.9
1 or 2 days per week (moderately)	0.50	21.2
≥3 days per week (frequently)	0.25	5.1
How many days per week did you eat binge eating?		
Not at all	1.00	66.4
Not even 1 day per week (occasionally)	0.75	13.1
1 or 2 days per week (moderately)	0.50	13.1
≥3 days per week (frequently)	0.25	7.3
How many days per week did you skip the meal		
Not at all	1.00	68.6
Not even 1 day per week (occasionally)	0.75	19.7
1 or 2 days per week (moderately)	0.50	8.8
≥3 days per week (frequently)	0.25	2.9
Do you restrict the salt intake under 5g per day?		
Yes	1.00	26.3
No	0.25	73.7
Physical activity		
Do you go for major physical activity apart from day-to-day activities?		
Yes	1.00	49.6
No	0.25	50.4
How many days in a week you spent for physical activity?		
None	0.25	51.8
1 or 2 days	0.50	8
3 days	0.75	5.8
≥4 days	1.00	34.3
How much time in each day you spent for physical activity?		
None	0.25	50.4
10 minutes	0.50	8.0
20 minutes	0.75	16.1
≥30 minutes	1.00	25.5
Glucose monitoring		
How often will you check your blood glucose levels?		
As per doctor advice	1.00	69.8
Not as per doctor advice	0.25	14.8

Continued.

Variables	Scores allotted	Frequency (%)
Will you check blood glucose levels during illness episode?		
Yes	1.00	52.5
No	0.25	32.1
Drug adherence		
Are you taking medications prescribed to you on regular basis?		
Yes	1.00	88.3
No	0.25	11.7
Problem solving		
Do you carry sugar packets to tackle hypoglycaemia state?		
Yes	1.00	16.1
No	0.25	83.9
What will you do if you notice elevated blood glucose levels beyond 200 mg/dl?		
Consult doctor	1.00	79.6
Nothing done	0.25	20.4
Risk reduction		
Do you know that diabetes mellitus will cause complications?		
Yes	1.00	54.7
No	0.25	45.3
Are you checking your feet regularly for cracks?		
Yes	1.00	64.2
No	0.25	35.8
Do you wash your feet regularly?		
Yes	1.00	83.9
No	0.25	16.1
Did you stop smoking after you were diagnosed with diabetes mellitus?		
Yes	1.00	5.8
No	0.25	94.2
Not at all smoked	1.00	
Healthy coping		
Are you experiencing any episode of a lack of interest in doing things due to disease or treatment		
Yes	0.25	15.3
No	1.00	84.7
Overall score category		
Good self-care		42.3
Moderate self-care		57.7

Table 4: Determinants of moderate to poor self-care scores using regression analysis (n=136).

Variables	No. of patients		Risk for moderate to poor scores	
	Good score	Moderate to poor scores	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Gender				
Male	21 (40.4)	31 (59.6)	Reference category	
Female	22 (26.2)	62 (73.8)	2.15* (1.6-3.0)	1.20 (0.8-1.8)
Marital status				
With partner	45 (38.0)	74 (62.0)	Reference category	
Not with partner	3 (17.7)	14 (82.3)	2.49* (1.7-3.6)	1.85 (1.2-3.0)
Educational status				
College	5 (45.4)	6 (54.6)	Reference category	
High school	4 (44.4)	5 (55.6)		
Primary and secondary	30 (33.0)	61 (67.0)		
Illiterate	7 (28.0)	18 (72.0)	2.10 *(1.2-3.6)	1.41 (0.7-3.0)
Occupation				
Semi-professional	1 (25.0)	3 (75.0)	Reference category	
Skilled	23 (59.0)	16 (41.0)	0.37* (0.2-0.7)	0.28 (0.1-0.6)

Continued.

Variables	No. of patients		Risk for moderate to poor scores	
	Good score	Moderate to poor scores	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Semi-skilled	18 (26.1)	51 (73.9)		
Unskilled	4 (28.5)	10 (71.5)		
Unemployed	4 (40.0)	6 (60.0)		
Socio-economic status				
Class I and II	11 (42.3)	15 (57.7)	Reference category	
Class III	14 (36.8)	24 (63.2)		
Class IV and V	20 (27.8)	52 (72.2)	1.86* (1.3-2.8)	1.5 (0.9-2.5)

*Statistically significant ($p<0.05$)

Table 4 presents the determinants of moderate to poor self-care scores in a diabetic population, as assessed through regression analysis. The variables considered include gender, marital status, educational status, occupation, and socio-economic status. Both unadjusted and adjusted odds ratios (OR) with 95% confidence intervals (CI) are assessed to evaluate the risk associated with these factors.

DISCUSSION

The current study assessed self-care practices among type 2 diabetic individuals in urban Bengaluru, highlighting key components such as diet modification, physical activity, glucose monitoring, drug adherence, problem-solving, risk reduction, and healthy coping. Diet modification, which had the highest weight, was a crucial factor, while drug adherence and healthy coping had the lowest individual weights. This structured assessment aligns with previous studies conducted in India, such as those by Shrivastava et al and Murugesan et al, which also emphasized diet and physical activity as primary self-care components.[3,12]

The socio-demographic characteristics in Table 2 revealed that a majority of participants were above 50 years, with a higher proportion of females. Most participants were married and belonged to lower socio-economic classes. These characteristics influence self-care behaviors, as seen in studies conducted by Deepa et al and Kumar et al, which found that lower socio-economic status and illiteracy negatively impact self-care adherence.[13,14] The current study aligns with these findings, emphasizing the need for targeted interventions in underprivileged groups to enhance diabetes self-management.

The frequency of self-care practices results align with the study by Ramachandran et al, which reported poor physical activity adherence among Indian diabetics.[15] Moreover, glucose monitoring was suboptimal, with only 52.5% checking blood glucose during illness episodes, similar to the findings of Gupta et al, indicating a need for better education on regular monitoring.[16]

The regression analysis in Table 4 revealed several significant socio-demographic determinants of moderate to poor self-care among participants. Females had higher odds of poor self-care scores compared to males (unadjusted OR: 2.15, 95% CI: 1.6-3.0), although this association was not significant after adjustment. Participants not living with a partner showed significantly higher odds of poor self-care (adjusted OR: 1.85, 95% CI: 1.2-3.0), emphasizing the importance of social support in diabetes management, as observed in previous studies by Mayberry et al and Nagrebetsky et al.[17,18] Illiterate participants had over twice the odds of poor self-care scores in unadjusted analysis (OR: 2.10, 95% CI: 1.2-3.6), reflecting the impact of limited health literacy, consistent with findings from Schillinger et al and Al-Khawaldeh et al.[19,20] Skilled workers had significantly better self-care outcomes (adjusted OR: 0.28, 95% CI: 0.1-0.6), likely due to better access to health information and structured routines, aligning with prior research from Shrivastava et al and Chawla et al.[3,11] Lower socioeconomic status (Class IV and V) was also associated with poorer self-care (unadjusted OR: 1.86, 95% CI: 1.3-2.8), though not statistically significant after adjustment, echoing global evidence that economic constraints hinder optimal diabetes self-management.[21]

Therefore, the determinants of moderate-to-poor self-care indicated that females, those without partners, illiterate individuals, and individuals from lower socio-economic classes had significantly higher odds of poor self-care adherence. Similar trends were observed in the study by Patel et al, which reported that education and financial stability play crucial roles in self-care management.[22] However, after adjusting for confounders, only marital status remained significant, suggesting that social support plays a vital role in diabetes self-care. This finding echoes those of Mohan et al, who emphasized the positive impact of familial and spousal support in chronic disease management.[23]

This study has certain limitations that need to be considered. Being cross-sectional in nature and relying on self-reported information, which may have introduced recall and reporting bias. The findings represent the study population and therefore may have limited generalizability to wider settings. Nevertheless, the

results provide useful insights into the self-care practices of diabetic patients in an urban primary care setting and highlight priority areas for intervention.

CONCLUSION

The present study showed that self-care practices among adults with type 2 diabetes were moderate, with better adherence to medication and diet, but relatively poor engagement in physical activity and glucose monitoring. These patterns reflect the influence of health literacy, social support, and behavioral factors in the daily management of diabetes. Strengthening patient education, integrating structured lifestyle interventions, and improving access to primary care services are essential for addressing these gaps. The findings add to the evidence on diabetes self-care in the Indian context and underline the importance of community-based strategies for preventing complications and reducing the long-term disease burden.

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