Prevalence of Self-care Practices among Type 2 Diabetes Mellitus Patients and its Effect on Glycemic Control: A Cross-sectional Study in Secondary and Tertiary Health-care Centers in Lucknow

Abstract

Background: Globally, prevalence of diabetes is 10.5%, and in 2019, approximately 463 million adults were living with diabetes by 2045; this will increase to 700 million (10.9%). India is a diabetic capital of world, prevalence of diabetes in India is 8.3%. **Aim:** This study aimed to assess self-care practices (SCPs) among type 2 diabetes mellitus (T2DM) patients, its predictors, and effect of SCP on glycemic control. **Materials and Methods:** A cross-sectional hospital-based study was conducted among 300 known T2DM patients in the age group of 18–60 years attending noncommunicable diseases clinic at Secondary and Tertiary Care Hospitals of Lucknow, Uttar Pradesh, selected using two-stage purposive sampling method. Data were collected using a predesigned and pretested semi-structured questionnaire. Data were collected from consenting respondents on the sociodemographic profile (about their residence, gender, marital status, type of family, educational status, family income, employment status, etc.). SCP was assessed using Summary of Diabetes Self-Care Activities. Data were analyzed using SPSS. **Results:** Among 300 patients with a mean age 50 ± 8.9 years, the prevalence of good SCPs was 37%. Out of 189 T2DM patients with poor SCPs, 66.4% had uncontrolled blood sugar level (285.4 ± 67 mg/dL). Out of 73 T2DM patients with poor SCPs, 65.7% had uncontrolled glycated hemoglobin level (8.4% ± 2%), and this was statistically significant. **Conclusion:** The practice of self-care was found to be suboptimal among patients with T2DM in the study.

Keywords: *Hospital based, self-care practices, summary of diabetes self-care activities, type 2 diabetes mellitus*

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Introduction

Globally, the prevalence of diabetes is 10.5%, and approximately 463 million adults are living with diabetes which is expected to increase to 700 million by 2045. The prevalence of diabetes in India is 8.3% and around 77 million diabetic patients are residing in India and around 134 million people will be diabetic by 2045.[1] In Uttar Pradesh, burden of diabetes is also high (10.5%).[2]

The prevalence of diabetic retinopathy, nephropathy, and neuropathy was 34.1%, 26.6%, and 30.9%, respectively, while the prevalence of cardiovascular disease and peripheral vascular disease was 28.0% and 8.3%, respectively, that's why self-care is considered crucial for all people with diabetes for monitoring the disease process, prevention of complications, and glycemic control which improve their quality of life.[3] Self-care is the ability of individuals, families, and communities to promote health, prevent disease, and maintain health and to cope with illness and disability with or without the support of health-care provider.[4]

Diabetes self-care practice (SCP) does not only alone depend on knowledge and awareness about diabetes but also requires skill for SCP along with support of health-care staff, family, peer group, positive mental health, and optimal utilization of available resources. With this background, the said study was planned to assess the prevalence of SCP among type 2 diabetes mellitus (T2DM) patients along with the predictors of SCP and its effect on glycemic control.

Materials and Methods

A hospital-based descriptive cross-sectional study was conducted from December 2021

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to November 2022 among adults (≥18 years) diagnosed with type 2 diabetes attending secondary and tertiary care government hospitals. The study was approved by the institutional review board and IEC No. is V-PGTSC-IIA/P9, December 14, 2021. The study was carried as per the ethics code. All the participants were engaged after informing them about the purpose of the study and taking their consent.

The inclusion criteria were adults aged ≥18 years, diagnosed with T2DM and on treatment ≥1 years. Patients with other types of diabetes, pregnant women, and patient unable to comprehend question and respond were excluded. As per an epidemiological study conducted in north Indian T2DM patients, in which the prevalence of diabetes SCP was estimated to be 50%.[5] Based on this, the minimum required sample size was calculated to be 300 diabetic patients, with 95% confidence interval and 7.5% type 1 error rate. Effect size was assigned a value of 1.6 and nonresponse rate 10%. Purposive sampling method was used to choose the noncommunicable disease clinic in the Lucknow area due to time and financial constraints. Two-stage purposive sampling method was used to select secondary and tertiary care government hospitals. In the first stage, total four hospital/health-care facilities were selected to draw the sample. Two were secondary care government hospitals: Community Health Centre Sarojini Nagar and Chinhat and two were tertiary care government hospitals: Civil hospital and King George's Medical University, Lucknow. In the second stage, for each of the selected health-care facility, first 75 consecutive diabetic patients as per inclusion and exclusion criteria after obtaining consent were included in the study. A total of 300 diabetic patients were interviewed [Figure 1].

Data were collected using a predesigned and pretested semi-structured questionnaire. The information was collected from consenting respondents on the sociodemographic profile (about their residence, gender, marital status, type of family, educational status, family income, employment status, etc.,) clinical characteristics, and SCP was assessed using the summary of diabetes self-care activities (SDSCA). "SDSCA" questionnaire, which included details of the diabetes self-care activities with respect to diet, exercise, blood glucose monitoring, medication adherence, and foot care in the previous week before the interview. The SDSCA was translated into Hindi language keeping in view of the local cultural context of the study population. There are total 17 questions in this scale. The scale is originally designed in English. It was translated into Hindi and back translated to and from Hindi language to ensure appropriateness of the translation. The score is calculated by summation of the mean score for each domain and then classified ≥3= good self-care an <3= poor self-care. The license to use the SDSCA was obtained. The question regarding family support includes involvement during counseling, helps in diabetes SCPs such as in diet, reminding to take medication on time, and regular physical activity. The question was used for knowledge toward diabetes SCP consists of 5-point Likert scale (strongly agree, agree, not sure, disagree, and strongly disagree). The content validity of the questionnaires in terms of its simplicity, clarity, free of ambiguity, and relevance was assessed by seven experts (five PG teachers and two PG students) who rated each question on an ordinal score ranged 1–5, where higher score indicates higher rating of the questions. There were 80.7% simplicity, 86.27% clarity, 85% for free of ambiguity, and 83% for relevance were observed. Cronbach's alpha coefficient of internal consistency among the questions was come out to be 0.84. The data were analysed using statistical package for social sciences (SPSS) version 26 (SPSS Inc., Chicago, IL, USA). Descriptive statistics using frequency, percentages,
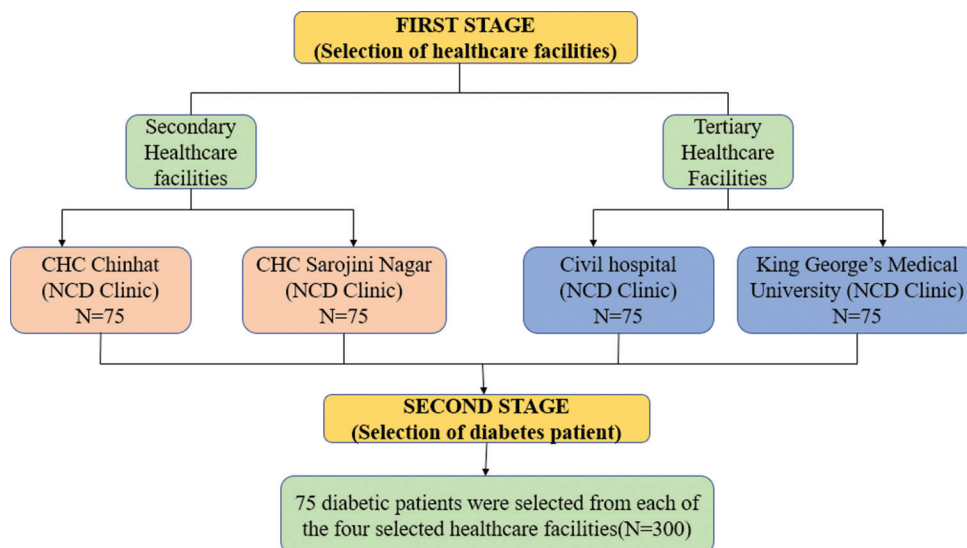

Figure 1: Sampling technique of the study. CHC: Community health center, NCD: Noncommunicable diseases

mean, and standard deviation was used to present the study results. Probability (*P*) was calculated to test statistical significance at the percentage level of significance. Binary logistic regression analysis was used to identify the factors for the outcome variable. *P* < 0.05 was considered statistically significant.

Results

The study was carried out among 300 T2DM patients. Out of which, 51.7% were male (*n* = 155) and 48.3% were female (*n* = 145). The median age of participants was 52 (range: 43.2–58) years. Among the study participants, more than half (63.0%) had poor diabetes SCP.

Out of total study participants, about 37.0% (95% confidence interval [CI] = 31.5, 42.4) of the participants had good SCP, whereas 63.0% (95% CI = 57.5, 68.4) of the participants had poor SCP. About 36.7% (95% CI = 31.2, 42.1) of the study participants had good SCP toward diet. Most of the participants (63.3%, 95% CI = 57.8, 68.7) had poor SCP toward physical activity. About 82.3% (95% CI = 77.9, 86.6) of the study participants had poor SCP toward blood sugar testing. The majority of the participants (75.7%, 95% CI = 70.8, 80.5) had poor SCP toward foot care [Table 1].

Glycemic control (blood sugar level and glycated hemoglobin) among study participants based on diabetes self-care practices

Among study participants with controlled blood sugar level, 46.8% had good SCP, whereas study participants

with uncontrolled blood sugar level 33.6% had good SCP. This difference was statistically significant (*P* = 0.04). Most of the study participants with controlled glycated hemoglobin (HbA1c) (62.5%) had good SCP, whereas with uncontrolled HbA1c, 34.5% had good SCP. This difference was statistically significant (*P* = 0.03) [Table 2].

Sociodemographic characteristics, personal and family history, and diabetes self-care practices of study participants

About 43.7% of the study participants who were of more than 45 years, had good SCPs, 22.3% of those participants who were up to 45 years had good SCPs. This difference was statistically significant (*P* < 0.001). About 42.2% of the study participants residing in urban area had good SCPs, 34.8% of those residing in urban slums had good SCP, whereas 24.6% who were residing in rural area had good SCP and this difference was statistically significant (*P* = 0.03) [Table 3].

Among the study participants who were suffering from any other comorbidities, 44.9% had good SCP, whereas who were not suffering from any other comorbidities, 32.6% had good SCP, and this difference was statistically significant (*P* = 0.03). More than half (56.0%) of the study participants having diabetes distress, in which 31.5% had good SCP, whereas who did not have diabetes distress, 43.9% had good SCP.

Knowledge about type 2 diabetes mellitus among study participants

About one-third (30.7%) of the participants knew about the correct range of normal blood sugar level, whereas more than half (69.3%) of the participants either stated it incorrectly or have no idea of normal range of blood sugar. About 60.0% of the study participants agreed with the statement "a person can maintain his/her blood sugar within normal limit by himself/herself." About 59.7% of the participants disagreed to the statement that, "consumption of jaggery will not increase my blood sugar level" and 36.0% of the participants agreed with this statement, whereas 4.3% of the participants were not sure about this statement. Most of the participants (52.0%) disagreed with the statement, "missing exercise a week will not affect my blood sugar level" about 36.3% of the participants

Table 1: Domain-wise grading of self-care practice of diabetic patients based on the Summary of Diabetes Self-care Activities (*n*=300)

SCP domains	Good		Poor	
	n (%)	95% CI	*n* (%)	95% CI
Diet	110 (36.7)	31.2–42.1	190 (63.3)	57.8–68.7
Physical activity	110 (36.7)	31.2–42.1	190 (63.3)	57.8–68.7
Blood sugar testing	53 (17.7)	13.3–22.0	247 (82.3)	77.9–86.6
Foot care	73 (24.3)	19.4–29.2	227 (75.7)	70.8–80.5
Medication adherence	19 (6.3)	3.5–9.0	281 (93.7)	90.9–96.4
Overall SCP	111 (37.0)	31.5–42.4	189 (63.0)	57.5–68.4

CI: Confidence interval; SCP: Self-care practice

Table 2: Glycemic control (blood sugar level, glycated hmoglobin) among study participants based on diabetes self-care practices

Variables	Total (*n*=300), *n* (%)	SCPs		*P*
		Good (*n*=111, 37%), *n* (%)	Poor (*n*=189, 63%), *n* (%)	
Glycemic control (blood sugar level) (*n*=300)				
Controlled	77 (25.7)	36 (46.8)	41 (53.2)	0.04
Uncontrolled	223 (74.3)	75 (33.6)	148 (66.4)	
Glycemic control (HbA1c) (*n*=118)				
Controlled	16 (13.6)	10 (62.5)	6 (37.5)	0.03
Uncontrolled	102 (86.4)	35 (34.5)	67 (65.7)	

HbA1c: Glycated hemoglobin; SCPs: Self-care practices

Table 3: Sociodemographic characteristics and diabetes self-care practices of study participants (*n*=300)

Variables	Total (*n*=300), *n* (%)	SCPs		*P*
		Good (*n*=111; 37%), *n* (%)	Poor (*n*=189; 63%), *n* (%)	
Age groups (years)				
Up to 45	94 (31.3)	21 (22.3)	73 (77.7)	<0.001
>45	206 (68.7)	90 (43.7)	116 (56.3)	
Gender				
Male	155 (51.7)	61 (39.4)	94 (60.6)	0.38
Female	145 (48.3)	50 (34.5)	95 (65.5)	
Religion				
Hindu	202 (67.3)	69 (34.2)	133 (65.8)	0.14
Muslim	98 (32.7)	42 (42.9)	56 (57.1)	
Category				
SC/ST	60 (20.0)	18 (30)	42 (70)	0.28
OBC	74 (24.7)	32 (43.2)	42 (56.8)	
Other	166 (55.3)	61 (36.7)	105 (63.3)	
Residence				
Rural	69 (23.0)	17 (24.6)	52 (75.4)	0.03
Urban	185 (61.7)	78 (42.2)	107 (57.8)	
Urban slums	46 (15.3)	16 (34.8)	30 (65.2)	
Marital status				
Married	268 (89.3)	95 (35.4)	173 (64.6)	0.24
Unmarried	5 (1.7)	2 (40.0)	3 (60.0)	
Divorced/widowed/separated	27 (9.0)	14 (51.9)	13 (48.1)	
Health insurance/medical reimbursement				
No	264 (88.0)	97 (36.7)	167 (63.3)	0.80
Yes	36 (12.0)	14 (38.9)	22 (61.1)	
Education*				
Illiterate	58 (19.3)	16 (27.6)	42 (72.4)	0.22
Up to high school	135 (45.0)	51 (37.8)	84 (62.2)	
Intermediate and above	107 (35.7)	44 (41.1)	63 (58.9)	
Occupation*				
Skilled manual and above	85 (28.3)	34 (40.0)	51 (60.0)	0.76
Unskilled manual/agriculture	67 (22.3)	23 (34.3)	44 (65.7)	
Unemployed/housewife	148 (49.3)	54 (36.5)	94 (63.5)	
Socioeconomic status**				
Upper	130 (43.3)	55 (42.3)	75 (57.7)	0.17
Middle	56 (18.7)	16 (28.6)	40 (71.4)	
Lower	114 (38)	40 (35.1)	74 (64.9)	
Type of family				
Nuclear	132 (44.0)	55 (41.7)	77 (58.3)	0.13
Joint	168 (56.0)	56 (33.3)	112 (66.7)	

*NFHS 5; **Modified BG Prasad's Socioeconomic Classification, January 2021. *n* (%), compared by Chi-square test/Fisher's exact test in poor SCP and good SCP group, row % are presented. *P*<0.05 statistically significant. SCPs: Self-care practices; NFHS: National family health survey

were not sure about this statement and about 11.7% of the participants agreed with this statement. About 39.0% of the participants disagreed with the statement, "medication is more important than diet and exercise to control my diabetes," and 33.0% of the participants agreed with this statement.

Diabetes management and diabetes self-care practices of the study participants

About 70.5% of the participants who were diagnosed with T2DM within the past 5 years had poor SCP, whereas

about half of the participants (57.1%), whose diagnosis of T2DM was made at least 5 years ago had good SCP and this difference was statistically significant (*P* = 0.01). Among study participants whose spouse/family member involved in counseling, 46.0% had good SCP, whereas participants who did not had spouse or family involved in counseling 66.7% had poor SCP and this difference was statistically significant (*P* = 0.04). About 43.5% who got diet chart had good SCP, whereas 68.5% had poor SCP who did not get any diet chart, and this difference

Table 4: Diabetes management and diabetes self-care practices of the study participants (*n*=300)

Variables	Total (*n*=300), *n* (%)	SCPs		*P*
		Good (*n*=111; 37%), *n* (%)	Poor (*n*=189, 63%), *n* (%)	
Duration since diagnosis of T2DM (years)				
<5	132 (44.0)	39 (29.5)	93 (70.5)	0.01
≥5	168 (56.0)	72 (42.9)	96 (57.1)	
Treatment for T2DM started at the time of diagnosis				
No	10 (3.3)	4 (40.0)	6 (60.0)	0.84
Yes	290 (96.7)	107 (36.9)	183 (63.1)	
Counseling in the past 3 months				
No	235 (78.3)	84 (35.7)	151 (64.3)	0.32
Yes	65 (21.7)	27 (41.5)	38 (58.5)	
Counseling done about*				
Diet				
No	235 (78.3)	84 (35.7)	151 (64.3)	0.39
Yes	65 (21.7)	27 (41.5)	38 (58.5)	
Physical exercise				
No	236 (78.7)	85 (36.0)	151 (64.0)	0.49
Yes	64 (21.3)	26 (40.6)	38 (59.4)	
Daily medication				
No	237 (79.0)	85 (35.9)	152 (64.1)	0.43
Yes	63 (21.0)	26 (41.3)	37 (58.7)	
Weight measurement				
No	243 (81.0)	86 (35.4)	157 (64.6)	0.23
Yes	57 (19.0)	25 (43.9)	32 (56.1)	
Routine blood test at 3 months				
No	238 (79.3)	86 (36.1)	152 (63.9)	0.54
Yes	62 (20.7)	25 (40.3)	37 (59.7)	
Foot care				
No	255 (85.0)	89 (34.9)	166 (65.1)	0.73
Yes	45 (15.0)	22 (48.9)	23 (51.1)	
Hypoglycemia				
No	244 (81.3)	87 (35.7)	157 (64.3)	0.31
Yes	56 (18.7)	24 (42.9)	32 (57.1)	
Spouse/family member involved at the time of recent counseling**				
No	213 (71.0)	71 (33.3)	142 (66.7)	0.04
Yes	87 (29.0)	40 (46.0)	47 (54.0)	
Individual diet chart received				
No	162 (54.0)	51 (31.5)	111 (68.5)	0.03
Yes	138 (46.0)	60 (43.5)	78 (56.5)	
Last follow-up				
Within 1 month	119 (39.7)	41 (34.5)	78 (65.5)	0.50
Within 1 and 3 months	40 (13.3)	13 (32.5)	27 (67.5)	
>3 months	141 (47.0)	57 (40.4)	84 (59.6)	
Having personal glucometer at home				
No	171 (57.0)	55 (32.2)	116 (67.8)	0.04
Yes	129 (43.0)	56 (43.4)	73 (56.6)	
Frequency of checking blood sugar				
Daily	69 (23.0)	35 (50.7)	34 (49.3)	0.02
Weekly	57 (19.0)	21 (36.8)	36 (63.2)	
Monthly	174 (58.0)	55 (31.6)	119 (68.4)	
Type of prescribed medicines for diabetes				
Only pills	233 (77.7)	77 (33.0)	156 (67.0)	0.008
Both pills and insulin	67 (22.3)	34 (50.7)	33 (49.3)	

Contd...

Variables	Total (*n*=300), *n* (%)	SCPs		*P*
		Good (*n*=111; 37%), *n* (%)	Poor (*n*=189, 63%), *n* (%)	
Taking any other medication for illness other than diabetes				
No	185 (61.7)	61 (33.0)	124 (67.0)	0.06
Yes	115 (38.3)	50 (43.5)	65 (56.5)	
Taking medication for T2DM other than prescribed at clinic				
No	259 (86.3)	97 (37.5)	162 (62.5)	0.68
Yes	41 (13.7)	14 (34.1)	27 (65.9)	
Family support in diabetes SCPs				
No	187 (62.3)	26 (13.9)	161 (86.1)	<0.001
Yes	113 (37.7)	85 (75.2)	28 (24.8)	

Table 4: Contd...

*Multiple responses; **Living with patient. *n* (%), compared by the Chi-square test/Fisher's exact test in poor SCP and good SCP group, row % are presented. *P*<0.05 significant. T2DM: Type 2 diabetes mellitus; SCPs: Self-care practices

was statistically significant (*P* = 0.03). About 43.4% of the study participants having glucometer had good SCP, whereas 67.8% who not have glucometer had poor SCP and this was statistically significant (*P* = 0.04). The majority of the participants (50.7%) who frequently checked their blood sugar (daily), had good SCP, whereas most of the participants who checked their blood sugar less often had poor SCP. This difference was statistically significant (*P* = 0.02). About 50.7% of those participants, who were taking both pill and insulin for T2DM or other comorbidities had good SCP, while only 33.0% of those participants who were taking only one pill, had good SCP. This difference was statistically significant (*P* = 0.008) [Table 4]. More than half (75.2%) of the study participants who got family support in diabetes SCP had good SCP, whereas 86.1% who did not have any family support had poor SCP and this difference was statistically significant (*P* < 0.001) .

Predictors of the poor diabetic self-care practices among study participants

Seven variables were identified as significantly (*P* < 0.05) associated with SCPs in univariate analysis and two predictors were found to be statistically significant (*P* < 0.05) in multivariable analysis. The participants who were in the age group of 31–45 years had 2.1 times more odds (adjusted odds ratio OR [AOR] = 2.1, 95% CI = 1.01–4.6) of having poor SCP as compared to participants who were in the age group of 46–60 years. The participants who did not have family support in diabetes SCP had 22.8 times more odds (AOR = 22.8, 95% CI = 11.5–45.2) of having poor SCP as compared to participants who have family support in diabetes SCP [Table 5].

Discussion

More than half (63.0%) of the study participants had poor diabetic SCPs. A study by Burman *et al*. from Kolkata also found poor diabetic SCP (67.5%).[6] However, Goyal and Gupta, and Molalign Takele *et al*., reported 43.5%, 53.3% had poor diabetic SCPs, respectively.[7,8] However, it was higher as compared to a study conducted by Getie *et al*. showed that 44.1% of participants had poor SCPs.[9]

More than half (63.3%) had uncontrolled blood sugar level, whereas 36.7% had controlled blood sugar level. Out of 118 study participants, 56.8 had uncontrolled HbA1c, whereas 43.2% had controlled HbA1c. Alodhayani *et al*., in their study, showed that 77.0% of the participants had HbA1c over 7%.[10] Borgharkar and Das**,** in their study, showed that 76.6% of patients had uncontrolled HbA1c ≥7% and 62.0% of these patients had HbA1c between 7% and 8%.[11] Kumar SP *et al*., in their study, showed that only 28.3% had their HbA1c at or below 7% and 45% above 9%.[12] Abebe *et al*. from Ethiopia show 74.6% of the study participants had poor glycemic control and SCP.[13] These results are in accordance with the results of the present study.

Diabetes SCP was significantly associated with the age of the participants. Good diabetes SCP was seen among the >45 years, as compared to the age group up to 45 years. Study by Goyal and Gupta, from India also showed that an increase in age was associated with good diabetes SCPs.[7] It indicates that patients become more conscious and aware of their health with increase in age.

Patients from urban areas have good diabetes SCPs compared to the rural and urban slum residents. Similar result was found in a study conducted by Vasu *et al*., in India and Molalign Takele *et al*., in Ethiopia.[8,14] It suggests that patients from rural area might face difficulties to access health-care facilities and chance to get counseling on SCPs.

In this study, the duration of diabetes was significantly related to better SCPs, similarly, Rajasekharan *et al*., in Mangalore found better practices among participants with more duration of diabetes.[15] It may be due to patients with shorter duration of disease get less regular counseling and contact with health professionals.

Table 5: Predictors of the poor diabetic self-care practices among study participants (*n*=300)

Variables	*n* (%)	Univariate analysis			Multivariate analysis		
		OR	95% CI	*P*	AOR	95% CI	*P*
Age groups (years)							
Up to 45	94 (31.3)	2.6	1.5–4.7	<0.001	2.2	1.06–4.9	0.03
>45	206 (68.7)				Reference		
Residence							
Rural	69 (23.0)	1.6	0.7–3.6	0.24	2.2	0.7–6.7	0.14
Urban	185 (61.7)	0.7	0.3–1.4	0.36	0.8	0.3–1.8	0.51
Urban slums	46 (15.3)				Reference		
Duration since diagnosis of T2DM (years)							
<5	132 (44.0)	1.7	1.1–2.8	0.01	0.86	0.4–1.6	0.66
≥5	168 (56.0)				Reference		
Currently suffering from any other comorbidities							
No	193 (64.3)	0.5	0.3–0.9	0.03	0.70	0.3–1.3	0.30
Yes	107 (35.7)				Reference		
Diabetes distress							
Yes	168 (56.0)	1.7	1.05–2.7	0.02	1.05	0.5–2.08	0.87
No	132 (44.0)				Reference		
Spouse/family member involved at the time of recent counseling							
No	213 (71.0)	1.7	1.02–2.8	0.04	1.1	0.4–2.9	0.71
Yes	87 (29.0)				Reference		
Individual diet chart received							
No	162 (54.0)	1.6	1.04–2.6	0.03	1.2	0.5–2.7	0.52
Yes	138 (46.0)				Reference		
Having personal glucometer at home							
No	171 (57.0)	1.6	1.0–2.5	0.04	1.1	0.58–2.1	0.71
Yes	129 (43.0)				Reference		
Frequency of checking blood sugar							
Weekly	69 (23.0)	0.6	0.30–1.2	0.20	0.53	0.15–1.8	0.32
Monthly	57 (19.0)	1.1	0.61–1.9	0.73	0.64	0.27–1.5	0.30
Daily	174 (58.0)				Reference		
Type of prescribed medicines for diabetes							
Both pills and insulin	233 (77.7)	0.47	0.27–0.83	0.009	0.68	0.32–1.4	0.34
Only pills	67 (22.3)				Reference		
Family support in diabetes SCPs							
No	187 (62.3)	18.7	10.3–34.0	<0.001	22.8	11.5–45.2	<0.001
Yes	113 (37.7)				Reference		
Knowledge about diabetes							
Poor	146 (48.7)	1.1	0.74–1.8	0.47	1.06	0.56–1.9	0.85
Good	154 (51.3)				Reference		

All the variables those were significant in univariable analysis included in multivariable binary logistic regression analysis. *P*<0.05 significant. Outcome variable (SCPs [No/Yes]). T2DM: Type 2 diabetes mellitus; OR: Odds ratio; CI: Confidence interval; AOR: Adjusted OR; SCPs: Self-care practices

About 36.7% of the participants had adherence to diet. These results were in concordance with the studies conducted by Mohandas *et al*. and AlQahtani *et al*., who showed that 31.0% and 25.5% of the participants had good adherence to diet.[5,16] The results of the present study were contradictory to those of Molalign Takele *et al*., study who showed that 49.8% had good adherence for diet.[8]

In the current study, most of the participants (63.3%) were not adherent to the physical activity, as per SDSCA questionnaires. Only 36.7% of the study participants performed at least 30 min of physical activity in a week.

The studies conducted by Molalign Takele *et al*., Suguna *et al*., and Goyal and Gupta, showed that 50.2%, 44.5%, and 52.3% of the participants were adherent to physical activity, respectively.[7,8,17] Durai *et al*. showed that 45.9% of the diabetics were involved in physical exercise for at least 30 min.[18] Dinesh *et al*. showed that 20.5% of the diabetics were involved in physical exercise for at least 30 min.[19]

About 17.7% of the participants had adherence to blood sugar testing. Similar results were seen in the study conducted by Raithatha *et al*. that 16.0% of the participants

had adherence to blood sugar testing.[20] In contrast to our results, the studies conducted by Vasu *et al.* and Selvaraj *et al.* showed in their study that 71% and 78% of patients had their blood sugar checked at least once in the past 3 months.[14,21]

In the domain of foot care, the present study showed that 24.3% of the study participants were adherent to the foot care. Kumar Gupta *et al.* showed that 84% of the respondents had poor, 16% had satisfactory, and none were following good foot self-care behavior and Verma *et al.* showed that 46.7%, 32.7%, and 20.6% respondents depicted good, satisfactory, and poor practices regarding foot care.[22,23]

When the study subjects were assessed for their knowledge toward T2DM and its SCP, about 41.0% of the study participants had good knowledge about T2DM and SCP. Similar result was reported by Hasnain, in their study that 44.0% of the study participants had good knowledge about T2DM and Mokabel *et al.* from Saudi Arabia.[24,25] It suggests that the patients with good knowledge about T2DM and are more adherent to their medication and SCPs which results in good glycemic control.

In this study, patients with a family or social support were more likely to have good diabetes SCP. Similar result was reported by Molalign Takele *et al.* and Aschalew *et al.* from Ethiopia and Ishak *et al.* from Malaysia.[8,26,27]

In the present study, good SCPs were high among patients who have personal glucometers at home. This finding is also supported by other studies conducted by Molalign Takele *et al.* and Mariye *et al.* from Ethiopia and Dedefo *et al.* from western Ethiopia.[8,28,29] It indicates that having glucometer at home might motivate patients to monitor their blood glucose level regularly and that leads to good SCP.

The limitation of the study is the use of cross-sectional analysis which did not permit observation of the trend of patient adherence toward SCPs and glycemic control status over time. Geriatric patients over 60 years of age were excluded, and the results cannot be generalized to them despite the high risk of nonadherence in older populations. The data were collected using an interviewer-administered method; the responses are prone to social desirability biases.

Conclusion

Our study supports the hypothesis that diabetes SCPs affect blood sugar level of T2DM patients. In this study, diabetes SCPs among T2DM patients were poor and significantly associated with age, rural residency, and family support. More than half of the people living with T2DM had poor diabetes SCP, especially in foot care and blood glucose monitoring. Counseling at every visit about SCP and to monitor blood glucose level from nearest health-care facility and checking that whether they are practicing SCP or not. Focus on young diabetics and diabetic literacy will help to improve areas of self-care among T2DM patients.

Ethical statement

The study was approved by the King George's Medical University ethics committee, Lucknow, Uttar Pradesh (Institutional Review Board and IEC No. was V-PGTSC-IIA/P9, 14/12/ 2021).

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Conflicts of interest

There are no conflicts of interest.

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