

Assessment of self-care activities: A study among type 2 diabetic patients in a rural area of West Bengal

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ABSTRACT

Background: Diabetes care is complex. Diabetes self-care activities are behaviors undertaken by people to successfully manage diabetes on their own. In populous and developing country like India where resources are limited, and treatment costs are on the rise, emphasizing on the self-care management may lead to improved outcomes in treatment and expenditure. **Objectives:** To assess self-care activities and associated factors among type 2 diabetic patients. **Materials and Methods:** A clinic-based cross-sectional study was conducted in Primary Health Centre in Singur among 195 patients (males 45 [23.1%], females 150 [76.9%]) who were interviewed with the help of a pretested schedule. Descriptive statistics, univariate logistic regression, and multivariable logistic regression were used to analyze the data. **Results:** Among the six domains of self-care activities, drug intake compliance was as high as 72.3% while correct diet intake and foot care were as low as 35.4% and 37.4%, respectively. Overall satisfactory self-care activities were among only 25.6% diabetic patients while adequate advice related to self-care activities was given to 38.5% patients. Longer duration (odds ratio [OR] - 3.1, confidence interval [CI] - 1.7-7.4), adequate advised (OR - 2.9, CI - 1.3-6.9), no diabetes distress (OR - 2.9, CI - 1.2-7.4), and glycemic control (OR - 4.0, CI - 1.8-9.3) were significant predictors of satisfactory self-care activities. Final model can predict the 34.5% of variance of self-care activities. Final model can predict 74.4% of the outcome accurately. **Conclusion:** Both self-care advises and activities should be an integral part of the control of the disease through high-quality health education and promotion programs guided by health personnel at all levels.

KEY WORDS: Multivariable Logistic Regression; Self-care Activities; Type-2 Diabetes


INTRODUCTION

Diabetes, with a global burden of 415 million people leads to around 5 million deaths every year. Around 80% of the world's diabetic population lives in developing countries. India, with a diabetic population of around 69.2 million ranks second in the list of countries affected by diabetes right behind China^[1] In National Family Health Survey 4 around

5.3% of males and 3.2% of females in rural West Bengal were reported as having very high blood sugar (>160 mg/dl).^[2] Whereas in rural Hugli district 5.8% of males and 5.3% of females fall into the category.^[3]

Diabetes is a chronic illness that requires continuous medical care for life and education and support for patient self-management to prevent acute complications and risk of long-term complications such as nephropathy, retinopathy, and neuropathy.^[4]

Diabetes self-care activities are behaviors undertaken by people with or at risk of diabetes to successfully manage the disease on their own.^[5] Self-care management of diabetes is complex. It needs a multi-faceted approach which requires the patient to follow certain guidelines such as healthy eating,

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being physically active, regular monitoring of blood sugars, taking regular medications, good problem-solving skills, healthy coping skills and risk-reduction behaviors to achieve an optimum glycemic control, and prevent complications in future.^[6-11]

In a populous and developing country like India where resources are limited, and treatment costs are on the rise, emphasizing on the self-care management of diabetes may lead to improved outcomes in treatment and expenditure especially when drug compliance is poor due to lack of awareness regarding the disease and its complications.^[12,13]

As self-care activities for diabetes demand enormous efforts not only from the patient himself but also from his family as well, there is a necessity for evaluating different domains of self-care activities and its associated factors.

With this background, this study was conducted to evaluate self-care activities along with associated factors among patients attending Primary Health Centre in Rural West Bengal.

MATERIALS AND METHODS

This study was a cross-sectional clinic based observational study conducted from 1st April to 15th July 2016. Rural Health Unit and Training Centre, Singur is the rural field practice area of All India Institute of Hygiene and Public Health (AIIPH), Kolkata which serves 61 villages with 2 Union Primary Health Centre (UPHC). All the patients with diagnosed type 2 diabetes mellitus who came to the one of the two centers during the study period were approached and whoever gave written informed consent was considered in the study.

Data were collected by interviewing each respondent with the help of structured pre-designed pre-tested schedule which had five parts; sociodemographic characteristics, disease profile, advice given about self-care activities for diabetes management, and self-care activities.

For disease profile participants were asked about the duration of disease, family history of diabetes, out of pocket expenditure for diabetes management and present history of hypertension.

Eight questions were asked to report advice given to study participants regarding self-care activities (diet, exercise, smoking, drug intake, blood monitoring, and foot care). Each question had two responses as Yes/No. Each 'Yes' response was given score 1 and 'No' scored as 0. Individuals were classified as adequately advised and inadequately advised after taking cut off value of 6 (median score).

Details about self-care activities were collected using the Summary Diabetes Self-Care Activities questionnaire developed by Toobert *et al.*^[14] after making minor changes

with due consultation with experts of AIIPH to suit the Indian context for foods commonly consumed and as daily monitoring of blood sugar was uncommon, the questionnaire referred to venous blood glucose testing. Face and content validity of the instrument was ascertained by expert committee of AIIPH.

Individuals with average score of parameters (i, ii) ≥ 5 and average score of parameters (iii, iv) ≥ 1 were classified as satisfactory dietary practice, with ≥ 5 for parameter v were classified as satisfactory exercise practice, with yes response to parameter (vi, vii, and viii) were classified as satisfactory drug intake, blood monitoring, and foot care activities, respectively, while with no response to parameter (ix) was classified as satisfactory smoking practice.

10 questions were asked to assess the diabetic distress adopted from diabetes distress scale. Responses were scored on a 3-point Likert scale from not a problem to serious problem. Individuals with a mean overall score of ≥ 1 were classified as having diabetes distress.

Clinical examination for height, weight was done after following standard operating procedures.

Individuals with PPBS < 180 (mg/dl) were classified as having optimum glycemic control.^[15] Individuals with body mass index (BMI) (≥ 25 kg/m²) were reported as overweight/obese.^[16]

Statistical Analysis

All analyses were conducted with the SPSS software version 16.0. Descriptive statistics (mean \pm standard deviation [SD] and median for the continuous variables and frequency in percentage for the categorical variables) were used to assess the demographic and disease-related characteristics of the participants. Univariate and multivariable logistic regression was used to determine the factors related with satisfactory self-care activities (domain-wise and overall). Force entry was used, and multicollinearity was checked before putting independent variables into the final model by variation inflation factor after taking the cutoff value of 10. Results were considered significant at conventional $P < 0.05$ level.

RESULTS

The mean \pm SD age of the participants was 52.44 (10.13) years. 76 (39%) belonged to age group 40-49 years, and 150 (76.9%) were females. 86 (44.1%) belonged to other backward caste, and 168 (86.2%) were Hindus. 157 (80.5%) were married at the time of survey. 102 (52.3%) belonged to nuclear families. 109 (55.9%) participants were home-makers, and 104 (53.3%) were educated up to the primary.

Mean±SD and median per capita income were 1508.8 (989) INR and 1250 INR and 91 (46.7%) of them belonged to socioeconomic Class IV (modified B. G. Prasad scale May 2016). 104 (53.3%) were hypertensives, and 82 (42.1%) had a family history of diabetes. Mean±SD duration of diabetes among participants was 6 (5.3) years and median was 4 years. 101 (51.8%) participants had some out of pocket expenditure on diabetes management. 81 (41.5%) had optimum glycemetic control. 98 (50.3%) participants were overweight/obese (BMI ≥ 25 kg/m²).

164 (84.10%) were non-smokers while 69 (35.4%) had satisfactory diet practice. Overall satisfactory self-care practice was found among 50 (25.6%) of the participants (Figure 1).

76 (39%) of the study participants followed the healthful eating plan for more than 4 days in past week. 71 (36.4%) among study participants ate at least five servings of fruits and vegetables for more than 4 days in past week. 49 (25.1%) of them ate sweets more than once in past week (Table 1).

129 (66.2%) have been advised to take less spicy and fatty food while only 89 (45.6%) for more than five servings of fruits and vegetables. All most all, i.e. 99% have been advised to avoid sweets and to take drugs as prescribes. Only 31 (15.9%) have been advised for proper foot care (Table 2).

Those with above primary education (2.3)*, with diabetes duration ≥ 4 years (2.7), were adequately advised (3.8), had out of pocket expenditure (3.2), had no diabetic distress (2.2), and had glycemetic control (3.5) had higher odds of satisfactory overall self-care activities while who were overweight/obese had 50% less chance of satisfactory overall self-care activities (Table 3).

After adjusting all the independent variables with each other, longer duration (odds ratio [OR] - 3.1, confidence interval

* = Value in parenthesis in Odds Ratio

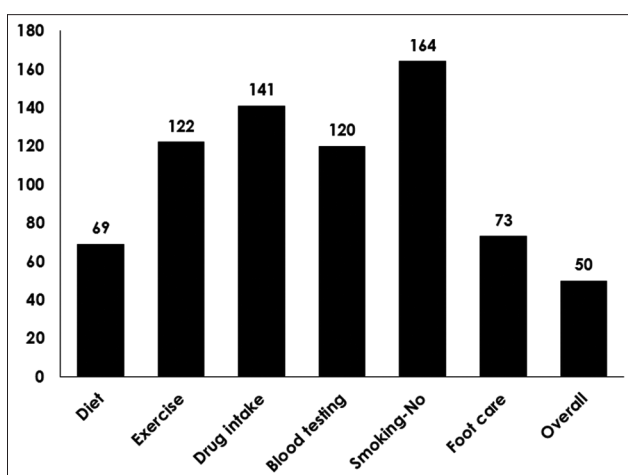


Figure 1: Bar diagram showing the satisfactory self-care activities among study participants (n=195)

[CI] - 1.7-7.4), adequate advised (OR - 2.9, CI - 1.3-6.9), no diabetes distress (OR - 2.9, CI - 1.2-7.4), and glycemetic

Table 1: Self-care activities among study participants (n=195)

Parameter	n (%)
How many of the past 7 days have you followed the healthful eating plan?	119 (61.0)
0-4 days	76 (39.0)
5-7 days	
On how many of the past 7 days did you eat five or more servings of fruits and vegetables?	124 (63.6)
0-4 days	71 (36.4)
5-7 days	
On how many of the past 7 days did you eat high-fat foods such as red meat or full-fat dairy products?	135 (69.2)
0-1 days	60 (30.8)
>1 days	
On how many of the past 7 days did you eat sweets?	146 (74.9)
0-1 days	49 (25.1)
>1 days	
On how many of the past 7 days did you participate in at least 30 min of physical activity? (total minutes of continuous activity, including walking)	73 (37.4)
0-4 days	122 (62.6)
5-7 days	
Have you tested your blood sugar in past 3 months?	120 (61.5)
Yes	
Do you take your prescribed medications daily?	141 (72.3)
Yes	
Do you dry between your toes after washing daily?	73 (37.4)
Yes	
Have you smoked a cigarette even one puff during the past 7 days?	164 (84.1)
No	

Table 2: Advice related to self-care activities given to study participants (n=195)

Parameter	Yes n (%)	No n (%)
Have you been advised to take less oily and spicy food?	129 (66.2)	66 (33.8)
Have you been advised to more than five servings of fruits and vegetables per day?	89 (45.6)	106 (54.4)
Have you been advised to avoid sweets?	193 (99.0)	2 (1.0)
Have you been advised to brisk walk daily for at least 30 min?	161 (82.6)	34 (17.4)
Have you been advised to test your blood sugar level at least once in 3 months?	145 (74.4)	50 (25.6)
Have you been advised to take your medications daily as prescribed?	193 (99.0)	2 (1.0)
Have you been advised to quit smoking?	154 (79.0)	41 (21.0)
Have you been advised how to take care of your foot?	31 (15.9)	164 (84.1)

Table 3: Factors associated with satisfactory self-care activities among study participants ($n=195$): Univariate logistic regression

Domain variable	Diet OR (95% CI)	Exercise OR (95% CI)	Blood testing OR (95% CI)	Drug intake OR (95% CI)	Smoking OR (95% CI)	Foot care OR (95% CI)	overall OR (95% CI)
Age (<60 years)	2.2 (1.1-4.4)	1.8 (0.9-3.3)	1.3 (0.7-2.5)	1.6 (0.8-3.1)	1.3 (0.5-2.9)	0.6 (0.3-1.2)	1.6 (0.5-2.4)
Sex (male)	0.9 (0.4-1.8)	2.2 (1.1-4.6)	1.5 (0.7-3.1)	0.9 (0.4-1.9)	0.01 (0.0-0.04)	0.5 (0.3-1.1)	0.7 (0.3-1.5)
Hindu	5.2 (1.5-17.8)	1.6 (0.7-3.8)	0.7 (0.3-1.8)	3.4 (1.5-7.9)	2.6 (1.1-6.7)	1.5 (0.6-3.6)	3.1 (0.9-10.8)
Education (Above primary)	1.4 (0.8-2.5)	1.9 (1.1-3.4)	3.3 (1.8-6.0)	1.3 (0.7-2.4)	0.2 (0.1-0.6)	1.1 (0.6-1.9)	2.3 (1.2-4.5)
Joint family	0.6 (0.3-1.1)	0.9 (0.5-1.6)	1.4 (0.8-2.5)	0.6 (0.3-1.2)	0.5 (0.2-1.1)	1.9 (1.1-3.4)	1.6 (0.8-2.9)
Currently married (Yes)	2.4 (1.1-5.3)	2.2 (1.1-4.5)	1.4 (0.7-2.8)	1.7 (0.8-3.6)	0.1 (0.01-0.8)	1.03 (0.5-2.1)	1.4 (0.6-3.2)
Higher SES	4.1 (2.1-7.8)	1.6 (0.7-3.8)	1.1 (0.6-2.0)	1.3 (0.7-2.4)	0.6 (0.3-1.3)	0.8 (0.5-1.5)	1.5 (0.8-2.9)
Duration of diabetes (a 4 years)	3.3 (1.7-6.2)	2.8 (1.6-5.2)	0.9 (0.5-1.6)	2.1 (1.1-4.1)	1.1 (0.5-2.5)	1.5 (0.8-2.6)	2.7 (1.4-5.5)
Family history (Yes)	1.9 (1.1-3.4)	1.5 (0.8-2.8)	1.1 (0.6-1.9)	3.5 (1.7-7.1)	2.3 (1.1-5.6)	1.6 (0.9-2.9)	1.4 (0.7-2.6)
Adequately advised	5.9 (3.1-11.2)	3.3 (1.7-6.3)	1.1 (0.6-2.0)	2.1 (1.1-4.1)	1.3 (0.6-2.8)	2.0 (1.1-3.7)	3.8 (2.0-7.5)
Hypertensive	1.9 (1.1-3.5)	2.7 (1.5-4.8)	0.6 (0.4-1.2)	1.1 (0.6-2.0)	1.3 (0.6-2.7)	†	1.3 (0.7-2.5)
Out of pocket expenditure (Yes)	6.8 (8.4-13.6)	2.6 (1.4-4.7)	0.9 (0.5-1.6)	4.6 (2.3-9.2)	1.4 (0.6-3.0)	†	3.2 (1.5-6.4)
Diabetic distress (No)	3.7 (1.8-7.4)	1.4 (0.8-2.5)	1.8 (1.02-3.4)	4.3 (2.2-8.2)	1.5 (0.7-3.4)	0.9 (0.5-1.7)	2.2 (1.1-4.5)
Glycemic control (Yes)	1.2 (0.7-2.2)	1.1 (0.6-2.0)	3.2 (1.7-5.9)	1.3 (0.6-2.5)	0.7 (0.3-1.5)	2.4 (1.3-4.3)	3.5 (1.8-6.8)
Overweight/obese	1.3 (0.7-2.4)	0.5 (0.3-0.9)	0.6 (0.3-1.1)	1 (0.5-1.9)	1.1 (0.5-2.4)	0.6 (0.3-0.99)	0.5 (0.2-0.9)

†: Not applicable as per the conceptual framework of researcher in the respective models, OR: Odds ratio, CI: Confidence interval

Table 4: Factors associated with satisfactory self-care activities among study participants ($n=195$): Multivariable logistic regression

Domain variable	Diet OR (95% CI)	Exercise OR (95% CI)	Blood testing OR (95% CI)	Drug intake OR (95% CI)	Smoking OR (95% CI)	Foot care OR (95% CI)	Overall OR (95% CI)
Age (<60 years)	1.8 (0.7-4.8)						
Sex (male)		2.2 (0.9-5.1)			0.01 (0.0-0.06)		
Religion (Hindu)	3.7 (0.9-15.3)			2.5 (0.9-6.6)	1.2 (0.3-4.7)		
Education (Above primary)		††	2.9 (1.5-5.6)		1.6 (0.4-7.0)		1.7 (0.8-3.7)
Joint family						2.0 (1.1-3.7)	
Currently married (Yes)	0.6 (0.2-1.9)	2.0 (0.8-4.4)			0.6 (0.06-7.1)		
Higher SES	3.1 (1.4-6.9)						
Duration of diabetes (≥ 4 years)	4.8 (2.1-10.1)	2.3 (1.1-4.5)		2.8 (1.2-6.5)			3.1 (1.3-7.4)
Family history (Yes)	0.8 (0.4-1.8)			2.2 (0.9-5.0)	1.9 (0.6-5.9)		
Adequately advised	1.6 (0.7-3.5)	1.7 (0.7-3.8)		1.1 (0.5-2.7)		2.7 (1.4-5.2)	2.9 (1.3-6.9)
Hypertensive	1.2 (0.5-2.6)	2.1 (1.1-4.4)					
Out of pocket expenditure (Yes)	3.8 (1.6-8.8)	1.5 (0.8-3.1)		2.1 (0.8-4.8)			1.7 (0.7-3.9)
Diabetic distress (No)	3.6 (1.5-8.7)		1.9 (0.9-3.8)	4.3 (2.0-9.5)			2.9 (1.2-7.1)
Glycemic control (Yes)			2.8 (1.5-5.4)			2.2 (1.1-4.1)	4.0 (1.8-9.3)
Overweight/obese		0.5 (0.3-0.9)				0.6 (0.3-1.2)	0.5 (0.2-1.2)
R2	0.433	0.244	0.187	0.309	0.6	0.153	0.345

††: Not considered into final model due to interaction, OR: Odds ratio, CI: Confidence interval, SES: Socio-economic status

control (OR - 4.0, CI - 1.8-9.3) were significant predictors of satisfactory self-care activities. Final model can predict the 34.5% of the variance of self-care activities. Final model can predict 74.4% of the outcome accurately. All the models were fit to explain the dependent variables as shown by the nonsignificant Hosmer–Lemeshow statistics (Table 4).

DISCUSSION

This cross-sectional study found 25.6% of study participants had satisfactory self-care activities. 35.4% had satisfactory diet, 62.6% had satisfactory exercise, 72.3% followed proper drug regimen, 61.5% had satisfactory blood sugar

monitoring, 84.1% were non-smokers, and 37.4% had satisfactory foot care activities. Longer duration (OR - 3.1, CI - 1.7-7.4), adequately advised (OR - 2.9, CI - 1.3-6.9), no diabetes distress (OR - 2.9, CI - 1.2-7.4), and glycemic control (OR - 4.0, CI - 1.8-9.3) were significant predictors of satisfactory self-care activities.

We have found 72% of diabetics with satisfactory drug intake which is lower than 79.8% as found in a study^[17] in South India and 88.1% as found in a study^[18] in Gujarat. This major difference may be attributed to the urban setting of the other studies. Our finding is more than that found in studies done in tertiary care centers^[19,20] as more non-compliant diabetic are referred to such centers for complications.

In our study, satisfactory diet practice was found in only 35.4% of study participants, which is less when compared with other studies (41%,^[19] 45.9%^[20]) conducted in South India which may be attributed to the inclusion of sweets in local dietary practice in our setting.

61.5% had satisfactory blood sugar monitoring which is lower in comparison to 70%,^[17] 76.6%^[20] as the patients in the latter studies belonged to the urban community having better resources for blood monitoring.

37.4% of our participants had satisfactory foot care which is in concurrence with a study conducted by Sekhar *et al.*^[19] even when the study settings are different. This may be explained by the similar cultural and spiritual customs. As seen in our study, only 15.2% of study participants were advised for foot care whereas 37.4% practiced satisfactory foot care. This may be explained by the practice of cleaning of foot as a part of local culture.

In our study, satisfactory exercise practice was found in 62.6% of study participants, which is much more when compared with other studies (19.5%,^[17] 37%,^[19] and 43.4%^[20]) which may be due to fact that they were done in urban setting where usual lifestyle is sedentary.

25.6% of the patients were having satisfactory overall self-care activities whereas in a study conducted in Jhansi^[21] 10% of patients had satisfactory practice which may be due to low literacy status of the study participants and most of them were not currently married in latter.

Optimum glycemic control which was present among 46% of our study participants as found in other studies (40%,^[18] 51%,^[19] and 49.4%^[22]) which are again pointing toward a uniform pattern of diabetes and its related self-care activities.

This study found that individuals with longer duration of diabetes had 3.1 times higher odds of having satisfactory self-care activities. Patients with longer duration are usually

have more knowledge and have prepared themselves mentally for diabetes management and thus better self-care activities. Those who were adequately advised about the self-management of diabetes had 2.9 higher odds of satisfactory self-care activities which may be attributed to the knowledge gained by them through the advice.

The strength of our study is that we have evaluated multiple aspects of self-care among diabetics which has not been much explored yet in our country, that too in a rural setting. This study has certain limitations. First, our sample size was small. Second, in this study, not all the known self-care activities such as self-efficacy, good problem-solving skills, healthy coping skills, and risk-reduction behaviors were investigated in this study.^[9,20,23] Third, since it was a clinic-based study, generalization may not be possible. Finally, all the self-care activities in our study were self-reported.

CONCLUSION

Self-care activities are essential for good quality of life and prevention of complications. As this study found that satisfactory self-care activities were found in those diabetic patients who were adequately advised about self-management, those who were mentally prepared due to longer duration of the disease and also those who were not found to be distressed. Therefore, it is inferred that every diabetic patient who is newly diagnosed should be advised for self-management of diabetes and counseled sincerely to prepare the patients mentally to follow the self-care routine to control diabetes lifelong. More efforts should be put to educate the patients through existing facilities in both government and private health-care sectors. Future research regarding self-care activities should be conducted with the help of community-based studies to increase the generalizability.

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