

Self-Care Behaviors among Type 2 Diabetes Mellitus Patients in Bangladesh

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ABSTRACT

Background: Diabetes is one of the most common endocrine diseases in the world which is causing many health problem. Self-care behavior of diabetes mellitus is an essential part for controlling the disease which results in a better state of health and improvement of quality of life. The aim of this study was to explore the self-care behaviors among type 2 DM patient in Bangladesh. **Methods:** This descriptive study was conducted among 120 hospitalized type 2 DM patients in Dhaka Medical College Hospital and Kurmitola General Hospital, Dhaka. The study participants were selected conveniently. Data were analyzed using descriptive statistics and inferential statistics such as independent t-test, One way ANOVA and Pearson correlation. **Results:** The mean age of the sample was 54.38 (SD=10.96) years. The total mean score of self - care behavior was 1.53 in a 4 point Likert Scale. It indicates that diabetic patients had a lower level of self-care behaviors. The findings revealed that, age ($p=.000$), gender ($p=.002$), occupation ($p=.008$), consume smoke tobacco ($p=.001$), smokeless tobacco ($p=.032$), physical exercise ($p=.000$), glucometer use ($p=.000$) and other co-morbidities ($p=.016$) were significantly associated with total self-care behaviors. **Conclusion:** The patients with type 2 DM have lower level of self-care and having suffering from large number of co-morbidities and complications. Priority to be given to improve affected patient education and support in diabetes clinics to ensure better self-care practices and avoid early development of complications

Key Word: Diabetes mellitus, Type 2, Self-Care Behavior, Self-Care Practice

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I. Introduction

Self-care behaviors is the prime importance for the patients with type 2 diabetes mellitus (DM). Diabetes self-care behaviors is challenging that has been taken into consideration as powerful strategies to control diabetes¹. Diabetes is one of the greatest worldwide health emergencies of the 21st century² and the seventh leading cause of mortality in the world³. Diabetes is a dangerous disorder in the each develop and developing country including Bangladesh⁴.

The prevalence of DM has increased dramatically in most country around the world⁵. In Bangladesh, 8.4 million, or 10% of the total population of Bangladesh are affected in diabetes mellitus⁶. However, about 425 million people worldwide were suffering from diabetes and it was estimated to increase to 629 million by 2045². Approximately 79% stay in low and middleincome internationally. In contrast of South East Asia, 82 million adults live with diabetes and 0.58 million people death due to diabetes earlier than age 60 years in 2017².

Several risk factors of DM have been identified include raised blood pressure, tobacco use, alcohol consumption, physical inactivity, poor dietary patterns and overweight, genetics, family history of diabetes, past history of gestational diabetes and older age⁷. Type 2 DM is alifelong health condition that can have an effect onthe affected person's circumstance significantly. Patient's functional capacity, physical obstacle, ache and well-known state of health are mostly affected in diabetes sufferers⁸.

The morbidity and mortality rate are high due to diabetes complications⁹. Various macrovascular and microvascular complications introduce a widespread burden, both health and social economic and claims have been made that diabetes is one of the world's most important causes of expenditure, mortality, disability and financial loss^{2,4,10,11}. The complication can be reduced by improving self-care behaviors¹².

Self-care of diabetes is an important element of controlling the disease and improvement of quality of life in type 2 DM patient¹³. A study was conducted in India to estimate the existing self-care behaviors and

factor influencing these behaviors among type 2 DM patients and the result indicate that self-management behavior among patients with diabetes is high with respect to monitoring of sugars¹⁴. Another study done The Health Belief Model and self-care behaviors among type 2 DM patients conducted in Iran, it showed that diabetes patients had moderate level of self-care behavior¹. A study conducted on people with diabetes attending the Nekemte Referral Hospital in West Ethiopia found that 45% the respondents had poor diabetes self-care practice and 54.3% had knowledgeable about diabetes mellitus¹⁵. The findings of Jordanian study indicate that patients with type 2 diabetes mellitus had an inadequate level of self-care behavior¹⁶.

From review of relevant literature, it is evident that studies in self-care behaviors of diabetes patients are generally limited in Bangladesh. Most of the study focused on attitude, practice, and knowledge of type 2 DM. But current study focused on self-care behaviors to reduce the early complication of type 2 diabetes mellitus. The study findings would contribute to develop strategy for improving the self-care behaviors regarding dietary habit, physical exercise, glucose management, how to use glucometer and take insulin. Therefore, it is measure to examine the diabetes self-care behaviors and its relationship with patient characteristics among type 2 diabetes mellitus patients in Bangladesh.

II. Materials And Methods

1. Study Design

A descriptive study design was used to assess self-care behaviors among type 2 diabetes mellitus patients in Bangladesh.

2. Study Participants

The participant of the study was hospitalized of type 2 diabetes mellitus patients at medical unit of Dhaka Medical College Hospital and Kurmitola General Hospital, Dhaka. A convenient sampling technique was used to select participants for data collection. The sample size was estimated by using G*power software (Version 3.1.2), with an accepted minimum level of significant (α) of 0.05, an expected power of 0.80 ($1-\beta$), estimated population effect size 0.30(γ) as the medium effect size. The sample size was 120 with include the 20% attrition rate. Based on returning and completing the questionnaire, 120 patients were considered as eligible subjects who agreed to participate in the study.

Inclusion Criteria:

- i. Diagnosed type 2 DM patients who has been suffering at least 1 year.
- ii. Agree to attend in the study.
- iii. Age more than 20 years.

3. Instruments

A total 41 items of questionnaire was used to measure the variables. The questionnaire consists of following 3 parts

Part-1. Socio-Demographic Characteristics

Socio-Demographic Characteristics of DM patients were assessed using 10 items socio demographic questionnaire (SDQ). The socio-demographic characteristics contained: gender, age, religion, education, marital status, occupation, monthly family income, living area, and smoking status.

Part-2. Clinical Characteristics

Clinical Characteristics questionnaire consist of 11 items including height, weight, exercise, family history of DM, diabetes duration, glucometer, treatment for DM, compliance with treatment, complication, comorbidities, hospitalization.

Part-3. Diabetes Self-Management Questionnaire -Revised (DSMQ - R)

Diabetes Self-Management Questionnaire -Revised (DSMQ-R) developed by Schmitt, (2015) was used to measure the self-care behavior of type 2 DM patients [29]. It consists of 20 items and four section dietary control (DC), glucose management (GM), physical activity (PA) and physician contact. Self-care behaviors rating on a four point Likert scale. Scale ranging from 0= does not apply to me and 3= apply to me very much. High score indicate high level of self-care behaviors.

4. Data Collection

The data collection was carried out by the principal investigator. Prior to data collection ethical approval was taken from the Institutional Review Board (IRB No. Exp. NIA- S-2018- 08) of Bangabandhu Sheikh Mujib Medical University (BSMMU) and National Institute of Advanced Nursing Education and Research (NIANER). Then, Permission was obtained from the Director of Dhaka Medical College Hospital and Kurmitola General Hospital Dhaka through written order issued by the Director of National Institute of Advanced Nursing Education and Research (NIANER), Dhaka, Bangladesh. Informed written and verbal

consent was acquired from each participant who met the inclusion criteria through a written letter. Confidentiality was retained between the investigator and the participant. Data were collected from January 2019 to February 2019. Purpose of the study was to describe by the researcher to the selected patients. Data were collected by face to face interview through questionnaire.

5. Data Analysis

After completion of data collection, data was checked and manage for consistency to minimize error. The collected data were analyzed by using computer software program (SPSS version 23). Descriptive statistics such as frequencies, percentages, means and standard deviations was used to describe the sample characteristics. Inferences statistics such as, two sample t test, ANOVA, and Pearson correlation were used to test the relationship between patients characteristics and self -care behaviors.

III. Results

1. Socio-Demographic and Clinical Characteristics of the Patients (N=120)

In this study the mean age of the participants was 54.38 (± 10.960) years with the age range of 22 to 82 years and majority of them (55%) were in the age group of 40-60 years. In terms of the gender of the participants, (65.8 %) were male and (34.2%) were female. Concerning marital status, (99.2%) were married while (.8%) were unmarried. Majority of the participants (96.7%) were Muslim while only Hindu were (3.3%). Regarding the educational status, uneducated 26.7%, primary and secondary education 57.5%, and college 15.8%. As for occupation, housewife 29.2%, employed 32.5% unemployed 38.3%. Most of their 75% monthly income was less than 25000 taka SD (± 13281.310) and were live in town 55%. Considering tobacco smoking 59.2 % nonsmoker and Smokeless tobacco 56.7% non-user (Table 1).

Table 1. Socio-Demographic Characteristics of Type 2 DM Patients (N=120)

Variables	Categories	n (%)	Mean \pm SD
Age (years) Min=22, Maxi= 82	<40	21 (17.5)	54.38 ± 10.960
	40-60	66 (55.0)	
	>60	33 (27.5)	
Gender	Male	79 (65.8)	
	Female	41 (34.2)	
Marital status	Married	119 (99.2)	
	Unmarried	1 (.8)	

Table 1 continued.

Variables	Categories	n (%)	Mean \pm SD
Religion	Muslim	116 (96.7)	
	Hindu	4 (3.3)	
Education	Analphabet	32 (26.7)	
	Primary and secondary education	69 (57.5)	
	College and University	19 (15.8)	
Occupation	Housewife	35 (29.2)	
	Employed	39 (32.5)	
	Unemployed	46 (38.3)	
Monthly income (Tk.) Mini=7000Tk. Maxi= 70000Tk.	<25000	90 (75.0)	21291.67 ± 13281.31
	25000 – 50000	27 (22.5)	
	>50000	3 (2.5)	
Living area	Village	54 (45.0)	
	Town	66 (55.0)	
Consume smoke Tobacco	Smoker	49 (40.8)	
	Non- Smoker	71 (59.2)	

Consume smokeless Tobacco	User	52 (43.3)
	Non- User	68 (56.7)

The average mean BMI of the DM patients was 23.60 (SD = 4.527) and most of them (54.2%) had normal BMI and 32.5% were overweight. About half of the patients (52.5%) performed physical exercise regularly by walking and had family history of DM 63.3%. The mean duration of suffering from diabetic was 9.65 (± 7.503) years with the range from 1 to 35 years. It was found that, 66.7% patient used to glucometer at home to check there blood sugar taken. Among the DM patients about half of them have been taken oral hypoglycemic agent (47.5%). Majority of the patients had no compliance with treatment (64.2%). Overall (85.8%) of participants reported at least one health effect known to be a complication of diabetes. The most commonly complication were vision impairment (60%), kidney problem (46.7%), DM foot ulcer (15%), poor wound healing (10.8%), hypoglycemia (6.7%) and hyperglycemia (4.2%). Among DM patients hypertension was most commonly self-reported in (65%) of participants, followed by heart disease (39.2%), depression (5.8%), hypercholesterolemia (20%), stroke (13.3%), musculoskeletal pain (16.7%) and other co-morbidities (14.2%). The history of hospitalization due to diabetes had (35%) already been hospitalization for at least 1 time, (48.3%) 2-3 times and (16.7%) had been hospitalized more than 3 times (Table 2)

Table 2. Clinical Characteristics of the Type 2 DM Patients (N=120)

Variables	Categories	n (%)	Mean \pm SD
BMI	Underweight	16 (13.3)	23.60 \pm 4.527
	Normal Body Weight	65 (54.2)	
	Overweigh	39 (32.5)	
Regularly Physical exercise by walking	Yes	63 (52.5)	
	No	57 (47.5)	
Family History of DM	Yes	76 (63.4)	
	No	44 (36.6)	
Duration of suffering from diabetes (year)	1-5	50 (41.7)	9.65 \pm 7.503
	6-10	30 (25.0)	
	>10	40 (33.3)	
Use glucometer at home	Yes	80 (66.7)	
	No	40 (33.3)	
Prescribe treatment for diabetes mellitus	Oral hypoglycemic agent	57 (47.5)	
	Insulin	48 (40.0)	
	Oral hypoglycemic agent + Insulin	15 (12.5)	
Compliance with treatment	Yes	43 (35.8)	
	No	77 (64.2)	
Having complication of DM	DM foot ulcer	18 (15.0)	
	Vision impairment	72 (60.0)	
	Kidney problem	56 (46.7)	
	Poor Wound healing	13 (10.8)	
	Hypoglycemia	8 (6.7)	
	None	17 (14.2)	
Co-morbidities	Hypertension	78 (65.0)	
	Heart disease	47 (39.2)	
	Depression	7 (5.8)	
	Hypercholesterolemia	24 (20.0)	
	Stroke	16 (13.3)	
	Musculoskeletal pain	20 (16.7)	
	Other co-morbidities	17 (14.2)	
Hospitalized due to diabetes	1 time	42(35.0)	2.30 \pm 1.459
	2-3 time	58(48.3)	
	More than 3Time	20(16.7)	

2. Self - Care Behaviors of Type 2 DM Patients

The total mean score of self-care behaviors was 1.53 (SD= .357) in a 4 point Likert Scale which indicate lower level of self -care behaviors among type 2 DM. In terms of subscales of diabetes self- care scale, the highest mean score was 1.79 in dietary control subscale followed by glucose management 1.54, physician contact 1.54, physical activity 1.09 and the mean of additional 2 items related to self - care was 1.35 (Table 3).

Table 3. Distribution of Self - Care Behaviors of Type 2 DM Patients (N=120)

Subscales/Items	Applies to me very much	Applies to me a considerable degree	Applies to me to some degree	Does not apply to me	Mean (SD)
	n (%)	n (%)	n (%)	n (%)	
Dietary Control					
The foods I choose to eat make it easy for me to achieve good blood sugar levels	5 (4.2)	23 (19.2)	52 (43.3)	40 (33.3)	.94 (833)
Occasionally I do not eat lots of sweets or other foods rich in carbohydrates	46 (38.3)	42(35.0)	21(17.5)	11(9.2)	2.03 (965)
I follow the relevant dietary recommendations for people with diabetes (e.g. given to me by my doctor or diabetes specialist)	54 (45.0)	20 (16.7)	24 (20.0)	22(18.3)	1.88 (1175)
Never I have real "food binges" (not triggered by hypoglycemia)	100(83.3)	15(12.5)	4(3.3)	1(.8)	2.78 (537)
I estimate the carbohydrate content of my meals (For achieving better glucose control)	52 (43.3)	22 (18.3)	23 (19.2)	23(19.2)	1.86 (1.176)
I eat with regard to my diabetes.	25(20.8)	25(20.8)	27(22.5)	43(35.8)	1.27 (1.158)
Subtotal (479)			1.79		
Glucose Management					
I check my blood sugar levels (glucose levels) with care and attention	28 (23.3)	24 (20.00)	28 (23.3)	40(33.3)	1.33 (1.169)
I take my diabetes medication (e.g. insulin, tablets) as prescribed/agreed	94 (78.3)	8 (6.7)	12 (10.0)	6 (5.0)	2.58 (.866)
I keep records of my blood sugar values to better manage my diabetes.	14 (11.7)	5 (4.2)	14 (11.7)	87 (72.5)	.55 (1.020)
I check my blood sugar levels (glucose levels) frequently enough for achieving good glucose control	22(18.3)	23(19.2)	26(21.7)	49(40.8)	1.15 (1.150)
I do not forget or skip my diabetes medication (e.g. insulin, tablet)	60(50.0)	22(18.3)	24(20.0)	14(11.7)	2.07 (1.083)
Subtotal					1.54 (.644)

Table 3 Continued.

Subscales/Items	Applies to me very much	Applies to me a considerable degree	Applies to me to some degree	Does not apply to me	Mean (SD)
	n (%)	n (%)	n (%)	n (%)	
Physical Activity					
I am regularly physically active to improve my diabetes/my health.	42 (35.0)	11 (9.2)	11 (9.2)	56 (46.7)	1.33 (1.367)
I do physical activity although it would be good for my diabetes/my health.	37(30.8)	12(10.0)	8(6.7)	63(52.5)	1.19 (1.355)
I am physically active than would be optimal for my diabetes/my health.	17(14.2)	9 (7.5)	24(20.0)	70(58.3)	.78 (1.088)
Subtotal					1.09 (.922)
Physician Contact					
I regularly see the doctor (diabetes specialist) regarding my diabetes.	33 (27.5)	14 (11.7)	26 (21.7)	47 (39.2)	1.28 (1.243)
I tend to see the doctor (diabetes specialist) regarding my diabetes.	42(35.0)	18(15.0)	8(6.7)	52(42.3)	1.42 (1.351)
Regarding my diabetes , I should not see my doctor (diabetes specialist) more often	52(43.3)	20(16.7)	6(5.0)	42(35.0)	1.68 (1.341)
I check/ discuss my diabetes treatment with the doctor (diabetes specialist) regularly.	43 (35.8)	32 (26.7)	23 (19.2)	22 (18.3)	1.80 (1.120)
Subtotal					1.54 (.554)
Additional item related to self-care					
I could not improve my diabetes self-care considerably.	34 (28.3)	34 (28.3)	22 (18.3)	30 (25.0)	1.60 (1.148)
My diabetes self- care is Good	16(13.3)	25(20.8)	35(29.2)	43(35.8)	1.11 (1.052)
Subtotal					1.35(.577)
Total					1.53(.357)

3. The Relationship between Patient’s Characteristics and Self-Care Behaviors of Type 2 Diabetes Mellitus

This table shows that, the age of patients has significantly negative correlation with self -care behavior (r = −.353, p=.000) and the female patients have significantly higher self- care than male (t= −3.11, p = .002). Occupationally, patients being housewives have significantly higher self-care behaviors than other (F= 5.05, p = .008). It was found that the self-care behaviors were significantly higher among non-smoker than smoker (t= −3.54, p =.001) and smokeless tobacco non- user (t= − 2.17, p= .032) than smokeless tobacco user. Patients

who do physical exercise by walking their self-care was high ($t=4.08, p=.000$). Patients who use glucometer at home their self-care behavior significantly higher than who did not use glucometer at home ($t=-4.93, p=.000$). The result also shows that self-care behaviors was higher who don't have other co-morbidities ($t=-2.44, p=.016$).

Table 4. The Relationship between Patient Characteristics and Self-Care Behaviors (N=120)

Variables	Category	M±SD	t/F/r	(P)
Age			-.353	(.000)
Gender	Male	1.46±.341	-3.11	(.002)
	Female	1.66±.353		
Education	Uneducated	1.41±.317	2.58	(.080)
	Primary and Secondary educated	1.56±.345		
	College and University	1.60±.432		
Occupation	Housewife	1.66±.302	5.05	(.008)
	Employed	1.54±.419		
	Unemployed	1.41±.306		
Monthly Income(Tk.)			.086	(.351)
Consume smoke tobacco	Smoker	1.39±.343	-3.54	(.001)
	Nonsmoker	1.62±.340		
Consume smokeless tobacco	User	1.45±.315	-2.17	(.032)
	Nonuser	1.59±.377		
BMI			.045	(.624)
Physical Exercise	Yes	1.65±.321	4.08	(.000)
	No	1.39±.351		
Family History of DM	Yes	1.54±.381	.086	(.932)
	No	1.53±.319		
Duration of suffering from DM			.114	(.214)
Use glucometer at home	Yes	1.63±.307	4.93	(.000)
	No	1.32±.364		
Compliance with treatment	Yes	1.55±.408	.536	(.594)
	No	1.51±.327		
Other comorbidities	Yes	1.33±.359	-2.44	(.016)
	No	1.56±.349		

IV. Discussion

The study aim was to investigate the relationship between patient's characteristics and self-care behaviors of type 2 diabetes mellitus.

1. Relationship between Patients Characteristic's and Self-Care Behavior of Type 2 Diabetes mellitus

The findings of the present study showed that the total 120 participants had a lower level of self-care behaviors. The total mean score of self-care behaviors was 1.53. However study from elsewhere have also reported contrasting findings. These differences in findings could be due to low educational background, low income, poor adherence to medication and poor knowledge about self-care behaviors. These findings are consistent with the study which reported that most of the subject had low level of self-care behaviors^{16,17,18}. They mention that characteristics of the patients, number of potential barrier to self-care (social, economic, cultural, medical and other), different educational level as well as the dominant female gender among the subject are the reason for low level of self-care behaviors. This findings are inconsistent with the results reported by^{1,19,20}, which reported moderate level of self-care ability. The reason for this moderate level people eating healthy diet, consuming white bread rather than brown bread, don't consume nuts as well as snack meal and do not drink one cup of low fat milk.

Based on this study, there was a significant association between self-care and some patient's characteristics including age, gender, occupation, tobacco smoking, smokeless tobacco, exercise, glucometer use and other comorbidities. The most frequently performed self-care behavior was exercise followed by glucometer use.

The current study showed that Age of diabetic participants was significantly associated with self-care behavior. Participant in age group <40 years were more likely perform self-care as compared to those above the age. This could be due to ability to meet their self-care need, eat healthy diet and exercise, using internet and social interaction. This is similar with a study done in West Ethiopia conducted by^{15,17}. Their study indicate that respondent in age group 35-44 were more likely perform self-care as compared to those above the age of sixty five years.

Female gender was significantly associated with desired self-care than male. Although the previous studies^{18,21,22,23} are available to support this result. A qualitative study found that, female patients who had type 2 diabetes mellitus were more readily to disclose their disease to their families and friends whereas men were avoid to tell, they incorporate management of diabetes into their daily lives²⁶. Female patients restricted their

diet more than men in glycemic control. Previous study reported that male had significantly higher self-care behavior than female¹⁷. In contrast three studies did not notice significant difference among both genders in practicing self-care behavior^{24,25}.

The current study revealed that, occupation was significant association self-care behaviors. Participants who were being housewives they were more likely to perform self-care than other occupation^{15, 27}. Their findings, housewives were nearly 4 times more likely to perform self-care than government employee.

The findings of this study shown that, smoking was significantly associated with self-care behavior. Patient who are non-smoker their self-care is good. These study result is consistent with previous study reported by¹⁷. The findings of this study is dissimilar to result of the study conducted by¹⁹. They found that there is a non-significant effect of smoking on their self-care activities.

In this study, Exercise was significantly association with self-care behavior. Previous study supported this findings¹⁷. This study also revealed that participants who had glucometer at home were more likely to have good self-care behavior. However the result differed from another study which found that respondent who had glucometer were 2.5 times poor self-care behavior than those who did not²⁸.

V. Conclusion

In summary, the findings from the current study revealed that self-care behavior of the patients was lower. In Bangladesh, majority of the patients were low income and they face many challenges to their daily lifestyle and hospital visit in order to follow prescribe medication as well as self-care. Also there were a higher number of patients with type 2 diabetes mellitus who have cardiovascular diseases, vision impairment and kidney disease and its affect self-care activities. The result suggest that an educational program should be designed and implemented to increase people's information about self-care behavior in order to reduce complication. The finding also suggest regular health checkup including foot and dental checkup, together with yearly eye examination, blood pressure and lipid monitoring and advice for smoking cessation.

However, there were several limitations to the study. The generalizability of the study results is compromised by the use of self-administered questionnaire of socio-demographic and clinical data, small sample size, convenient sampling technique. The study period might be short and sample contains more male than female.

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