



Health care seeking behaviors among Type 2 diabetes mellitus patients in Bangladesh

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ABSTRACT

Diabetes mellitus is a chronic metabolic disorder with significant social, health, and economic consequences. Globally, Type 2 diabetes affects 463 million people, with a projected increase to 629 million by 2045. This number is estimated to increase to 430 million in the absence of better control or cure. Diabetes health care seeking behavior plays an important role in reducing the incidence of disease, disability and death by improving knowledge. The aim of this study was to assess the health care seeking behaviors among type-2 diabetes mellitus patients in Bangladesh. This was a descriptive cross-sectional study. The study participants were type 2 diabetes patients admitted in Dhaka Medical College Hospital, Dhaka. A total of 112 patients were participated in this study. Convenience sampling technique was used to select the sample. The questionnaire consists of two parts. Part 1 contains questions regarding. Socio-demographic Information questionnaire, Disease related Questionnaires and Health Care Seeking Behaviors Questionnaire were used to describe the patients characteristics and health care seeking behaviors. Data was collected from February to March, 2023. Data was analyzed by using both descriptive and inferential statistics using SPSS version 20. The mean age of the Type 2 DM patients was 51.49 ± 11.63 years old. In the event of illness symptoms nearly half of the patients (49.1 %) visit to a doctor initially, 88.4% patients visit to a doctor after exacerbation of symptoms. In addition, 54% patients consult with general practitioner, 43.8% Type 2 DM patients visit and receive the services from the public health center, 77% patients not regular referring to the doctor, 7.5 % visit the doctor in a follow up basis if needed and 83% patients received information from the physician frequently. Gender, religion, marital status, education, occupation, residence, family type, duration of the disease, current treatment and blood sugar were statistically significantly correlated with health care seeking behaviors ($p < 0.05$). Regular consultation with a health care provider or visiting a healthcare center might help to improve glycemic control in patients with type 2 diabetes in Bangladesh.

INTRODUCTION

Diabetes type-2 is a significant cause of death and disability around the world. Diabetes is a chronic, metabolic disease characterized by elevated levels of blood glucose which leads over time to serious damage to the heart, blood vessels, eyes, kidneys and nerves. This occurs when the body becomes resistant to insulin or doesn't make enough insulin (WHO, 2019).

The prevalence of type 2 disease is increasing throughout the world. Globally, Type 2 diabetes affects 463 million people, with a projected increase to 629 million by 2045 (IDF, 2019). Whereas, in Southeast Asian countries in the next

two decades, from 88 million peoples affected from type-2 diabetes mellitus in 2019 to 153 million by 2045 (IDF, 2019). However, type 2 diabetes mellitus affects approximately 13.1 million people in Bangladesh and is the third leading cause of morbidity and mortality (IDF, 2019).

Diabetes mellitus not only reduces quality of life and life expectancy, but it is also a major cause of several micro vascular and macro vascular complications that lead to blindness, renal failure, myocardial infarction, stroke, and the need to amputate limbs, increasing treatment costs and hospital stays, decreasing quality of life, loss of employment, and a socioeconomic burden (Kanter

and Bornfeldt, 2016). People with diagnosed diabetes incur average medical expenditures of \$16,752 per year, of which about \$9,601 is attributed to diabetes. On average, people with diagnosed diabetes have medical expenditures approximately 2.3 times higher than in the absence of diabetes (ADA, 2022).

A prior study stated that the causes of type 2 diabetes mellitus are genes, extra weight, metabolic syndrome, too much glucose from the liver, bad communication between cells, and broken beta cells (Galicia-Garcia et al., 2020). The nutritional status of a mother during fetal development may also play a role, with one proposed mechanism being that of DNA methylation. The intestinal bacteria *Prevotellacopri* and *Bacteroides vulgatus* have been connected with type 2 diabetes (Cunningham et al., 2021).

Current studies reveal that the development of type 2 diabetes is the result of a combination of many factors that differ from body to body. Some of the most common factors that can lead to diabetes are obesity, an unhealthy diet, alcohol consumption, and an inactive lifestyle. Age, family history, ethnicity, pre-diabetes, high blood pressure, gestational period, low HDL, high triglycerides, depression plays a crucial role too, more often than not (Jain and Ducatman, 2018). Diabetes can also be factor of the social status, the type of illness, access to services and perceived quality of the service (Olawuyi and Adeoye, 2018).

Diabetes health care seeking plays an important role in reducing the incidence of disease, disability and death by improving knowledge (Mengiste et al., 2021). Healthcare seeking behavior (HCSB) is defined as "any action or inaction taken by individuals who perceive themselves to have a health problem or to be ill in order to find an appropriate remedy" (Oberoi et al., 2016). People learn about health, disease, health risks, and health promotion through their health care seeking behavior (Lambert and Loiselle, 2007). People are sought information to the physician in the event of illness, self-medication, doses diet, insulin, comorbidities (Bennadi, 2014).

A previous study showed that, 11.8% a group of type-2 diabetes mellitus patients sought medical treatment within 1 month of the onset of symptoms, while 37% delayed seeking assistance for 1 to 6 months, 17.3% delayed for 6 months to 1 year and 33.9% delayed for more than a year globally (Wei et al., 2017). Whereas in Bangladesh, more than one-third (34.9%) of the participants did not visit their physician or a healthcare center during the previous 3-months. Only 12.4% of participants checked their blood glucose, and 35.8% checked their blood pressure during the last week (Islam et al., 2020).

Based on the above discussion, it has been shown that the majority of type-2 diabetes mellitus patients have not sought diabetes information immediately. However, the majority of the authors conducted research on the health-care seeking behavior of people with type 2 diabetes in various countries, only a few studies were conducted in Bangladesh. In our country, there is a shortage of knowledge regarding the management of type 2 diabetes mellitus. This study serves as a baseline for policy development, diabetes care planning, and future research on the timely and effective use of health care services, and it discovers that positive health care seeking behaviors can improve diabetes control, reducing complications and improving quality of life. So, this study aimed to investigate the status of health care-seeking behaviors and affecting factors in type 2 diabetic patients.

However, the specific objectives are 1. To describe socio-demographics and health related characteristics of type-2 diabetes patients.

2. To identify health care seeking behaviors of type-2 diabetic patients. 3. To investigate the relationship between socio-demographic and health care seeking behaviors of type-2 diabetic patients.

MATERIALS AND METHODS

Study design

A descriptive cross-sectional study was used to describe the health care seeking behaviors among type-2 diabetes mellitus patients in Bangladesh.

Participants

The study participants in this study were all type 2 diabetes mellitus patients admitted in the Dhaka Medical College Hospital in Dhaka (DMCH). DMCH is a tertiary level and 2700 bedded hospital which is the largest public hospital in Bangladesh. This hospital consists of both indoor and outdoor service system hospital and serves as a large number of people from different area of Bangladesh. Therefore, this hospital was an estimated setting for eligible samples of the largest population for this study. In addition, about 4,000 patients seek treatment at the outdoor unit of DMCH each day. A further 1,000 emergency patients also seek treatment on a daily basis (Govt. Plans to Double Capacity of DMCH, 2022).

The Sample size was estimated by G power analysis with significance level of alpha (α) at .05, an expected power of 0.08 ($1-\beta$) and medium effect size at 0.30. The calculated sample size was 84 by G-power analysis and considering 20 % attrition rate the estimated sample size was 112. A convenient sampling was used in this study. The diagnosed type 2 diabetes mellitus patients who were willing to participate and whose age was more than 18 years.

Instruments

Study variables included patient's socio-demographic characteristics clinical characteristics, factors related to health care seeking behavior of type 2 diabetes mellitus patients. The survey comprises two sections with 33 items explained in full below.

i). Socio-demographic characteristics related questionnaire

Socio-demographic questionnaire contained 15 items which are age, sex, marital status, religion, education, profession, residence, income, living status, family member, BMI, disease duration, current treatment, co-morbidity and history of hospitalization.

ii). Disease related health care seeking behavior questionnaire

Disease related health care seeking behaviors questionnaire was developed and permission obtained by Habib Jalilian, Mohammad Zakaria Pezeshki, Leila Torkezadeh, Elnaz Javanshir, Ahmad Moradi, Rahim khodayari-Zarnaq (2020) contained 9 items and variability of the questionnaire was at the cronbach alpha value 0.9 and 0.76 which are first action in the event of illness symptoms, in case of exacerbating of symptoms, the first care provider to consult in case of manifesting the symptoms of the disease, the type of health care center to visit and receive the services, regular referring to the doctor in order to better manage the disease and follow up pattern. The questionnaire was translated into English to Bangla and the back translation technique was used by a bilingual Bangladeshi translator. The English version questionnaire was translated into Bengali version. The discrepancies of the translated questionnaire were by the researcher of NIANER.

Data collection method

Data collection was carried out by the principal investigator. Prior to data collection, the study was approved by the Institutional Review Board of National Institute of Advanced Nursing Education and Research (NIANER) and Bangabandhu Sheikh Mujib Medical University (BSMMU). Permission was also obtained from the Director of Dhaka Medical College Hospital. After getting permission from the concerned authority, permission was taken from the study participant. All patients were ensured that their participation was completely voluntary. The patient's confidentiality and anonymity were maintained strictly through the use of code numbers. It was informed that the patients could be withdrawn at any time without any reason. Patient was informed that the findings of the study would not be submitted to scientific journal for publication and presented to the conferences. Data provided by patients would not be discussed to others. A structured Bengali version questionnaire was used to collect the data from the patients through face to face interview. The patients were explained that it was take approximately 20 minutes to complete the interview session.

Data analysis

All collected data was entered into SPSS program version 20. Before analyzing the data, all data was checked and verified to ensure the accuracy of the data entry. The descriptive statistics such as frequency, percentage, mean and standard deviation was used to describe the demographic and clinical characteristics of type 2 diabetes mellitus patients. The inferential statistics such as chi-square, fisher exact test was used to examine the relationship among socio-demographic and health care seeking behavior pattern.

RESULTS

Socio-demographic and clinical characteristics of the patients

Table 1 shows the socio-demographic and clinical information of the type 2 diabetic mellitus patients. In accordance with the findings, the mean age of the participated patients was 51.49 ± 11.63 years old, with a range of 18 to 75 years old. In terms of gender, nearly half (49.1%) of the patients were male and above half (59%) of them were female. The most of the patients were Muslims (97.3%). In terms of educational attainment, less than half (40.2%) of the patients had held secondary and higher education and

above one third (41.1%), of patients had nonformal education and only signature and few (18.8%) of them had held primary education. Considering the profession, most of the (45.5%) participants were housewife followed by others (28.6 %), service (16 %) and business (9.8%). The average monthly income of the patients was 20973.21 (± 12446.97) and majority of their income was less than 20000 taka. More than half (58.9%) of the patients lived in a rural area.

Most of the patients belong to single family (59.8%) and majority of their family member was less than 5 and above one third (40.2 %) patients had 5-10 family members but least number (4.5 %) of patients had more than 10 family member. The mean BMI of the Diabetes Mellitus patients was 22.65 (SD=4.15432) and majority of them had normal BMI (60.7%) whereas few of them (66.7 %) had overweight (22.3%). In contrast, very few of the patients were underweight (12.5 %). The majority of patients had taken oral antidiabetic tablet (46.4%), injection insulin (37.5%), and behavior change (16.1%). In regard to co morbidities, nearly half (49.1%) of the patients had hypertension followed by others (43.8%), kidney disease (31.3%), very few patients had history of stroke (6.3%) and heart disease (2.6%). Mean blood sugar of the patients was 8.71 (SD=3.69582) indicating type 2 diabetes mellitus patients.

Table 1: Distribution of socio-demographic characteristics of the participants (N=112)

Variable	Categories	n	%	M \pm SD
Age (year)	<40	24	21.4	
	40-60	64	57.1	51.49 \pm 11.63
	>60	24	21.4	
Gender	Male	55	49.1	
	Female	57	50.9	
Religion	Muslim	102	91.1	
	Non-Muslim	10	8.9	
Marital status	Married	109	97.3	
	Unmarried	3	2.7	
Education qualification	Non formal & only signature	46	41.1	
	Primary education	21	18.8	
	Secondary & above	45	40.2	
Profession	Housewife	51	45.5	
	Service	18	16.1	

	Business	11	9.8	
	Others	32	28.6	
Residence	Urban	46	41.1	
	Rural	66	58.9	
Family income	<20000	74	66.1	20973.21±12446.97
	>20000	38	33.9	
Type of family	Single	67	59.8	
	Joint	45	4.2	
Family members	<5	67	59.8	5.4732±3.09012
	5-10	40	35.7	
	>10	5	4.5	
BMI	Underweight	14	12.5	22.6572±4.15432
	Normal	68	60.7	
	Overweight	25	22.3	
	Obese	5	4.5	
Duration of suffering	<1 year	42	37.5	
	1-5 years	39	34.8	1.918±0.80494
	>5 years	31	27.7	
Current treatment	Oral tablet	52	46.4	
	Insulin	42	37.5	
	Behavior change	18	16.1	
Comorbidities	HTN	55	49.1	
	Heart disease	23	2.6	
	Kidney disease	35	31.3	
	Others	49	43.8	
Blood sugar(mmol/L)	Normal	51	45.5	8.7132±3.69582
	Higher	61	54.5	

Health care seeking behaviors

Table 2 shows health care seeking behavior of type 2 diabetic mellitus patients. In term of first action in the event of illness symptoms 49.1 % diabetes patient's visit to a doctor, 47.3 % patients to consult and get tip from family members, friends and other people around them and only 3.6 % patients modify their behavior. Regarding the first action in case of exacerbation of symptoms 88.4 % of the diabetes patients visit to a doctor and only a few (11.6%) patients modified their behaviors.

In case of manifesting the symptoms of the disease more than half (54.5 %) of the diabetes patients first consult to with their family/general practitioner, 39.3 % patients consult primary health care provider and only 6.3 % patients consult to specialist. In term of level of health care center to visit and receive the services 42.0 % patients used to visit specialized hospital, above one third (35.7 %) of the patients used to visit

general hospital and only 22.3 % used to visit primary health care centers. Whereas in term of nature of the hospital about 43.8 % diabetes mellitus patients used to go to the public health centers, 41.1 % private health centers, few percentages (9.8 %) visit to private doctor's office and very low percentage (5.4 %) of diabetes patients visit to traditional therapist. Regarding the better management of the disease 77.4 % of the diabetes mellitus patients reported that they did not use to go to visit doctor whereas only 22.3% patients go to visit doctors.

In response to question about reason of follow up majority (55.4 %) of the diabetes patients mention that they went to follow in case of exacerbating of the symptoms or complication, 24.1 % in the event of symptoms appears and only 20.5 % patients visit to in the event of symptoms appears. In term of frequency of follow up pattern majority (70.5 %) of the patients visit if needed, 25.9 % patients visit once every six months, very low (3.6 %) In respondents of the diabetes mellitus patients

mentioned that from physician application and social network, 16.1 % from the family members and friends and very few (0.9 %) patients get up radio and TV program.

Table 2: Question related to Health Care Seeking Behaviors

Question related HCSB	Options	n	%
The first action in the event of illness symptoms	Refer to a doctor	55	49.1
	Behavior change (diet or exercise)	4	3.6
	Consult and get tip from family members, friends and other people around you	53	47.3
The first action in case of exacerbating of symptoms	Refer to a doctor	99	88.4
	Behavior change	13	11.6
The first care provider to consult in case of manifesting the symptoms of the disease	Primary health care providers	44	39.3
	Family/ general practitioner	61	54.5
	Specialist.	7	6.3
The type of health care center to visit and receive the services	Primary health care centers	25	22.3
	General hospital	40	35.7
	Specialized hospital	47	42.0
The type of health care center to visit and receive the services	Public health centers	49	43.8
	Private health centers	46	41.1
	Private doctors office	11	9.8
	Traditional therapist	6	5.4
Regular referring to the doctor in order to better manage the disease	Yes	25	22.3
	No	87	77.7
How do you see yours doctors (Follow up pattern)?	On a regular basis	23	20.5
	In the event of symptoms	27	24.1
	In the case exacerbation of the symptoms or complication	62	55.4
Follow up pattern (How often do you	Once a week	4	3.6
	Once every six months	29	25.9

visit your doctor)	If needed	79	70.5
The most frequently used information source for disease management	Family members and friends	18	16.1
	Physician applications, social networks	93	83.0
	Radio and TV programs	1	0.9

In table 3 the study found that in regard to health seeking behaviors of type 2 diabetes, the first action in the event of illness symptoms was significantly associated with their current treatment pattern ($p=0.004$). The result shows that 40% of patients currently treating with insulin visit to doctor where as 34.5 % and 25.5% visit to a doctor who currently treating with oral tablet and behavior change respectively.

Type 2 diabetes patients' health care seeking behavior to the first care provider to consult in case of manifesting the symptoms of the illness was also statistically significant with religion, type of family, current treatment and blood sugar. The study found that 71.4 % of Muslim diabetes patients consult with specialist in compared to 28.6 % of non Muslim patients ($p=0.045$) in the case of manifesting the symptoms of the disease. In response to type 2 diabetes mellitus patients who live in joint family (57.1%) consult with specialist whereas 42.9% of diabetes patients who lives in single family which was statistically consistent ($p=0.02$). The study also found that 57.1 % of diabetes patients who currently treating with insulin consult with specialist compared to 28.6 % patients currently treating with tablet and 14.3 % treating with behavior change ($p=0.02$). Similarly, patients who were being at high level of random blood sugar mostly (85.1 %) consult with specialists compared to who were being at normal level of blood sugar when manifesting the symptoms of illness.

The table 4 shows that types of family and current treatment were significantly congruent with the type of health care center to visit and receive the services. It was found that the patients who live in single residing family mostly (73.5 %) visited to public health care center whereas 26.5% patients live in joint family ($p=0.01$). Mostly visit to

private health center 54.3 % and private doctor office (54.5%) to receive the services equally.

Two patients' characteristics 'socio-demographic and health related characteristics' the level of general education and the level of general education and the types of current treatment were found as significantly associated with regular visit to doctor for better management of the disease. The findings revealed that secondary and above level of educated patients (68 %) more visit to the doctor than the primary (26.5%) and non formal (3.6 %) educated patients which are statistically significant ($P=0.005$). Sixty percent of patients who have taken insulin prefer to visit doctor regularly in order to better management of the disease than the patients who taken oral tablet (24 %) and behavior change (16 %) respectively.

With regard to follow up pattern were statistically significant with gender ($p=0.015$) and

occupational status ($p= 0.013$).The findings revealed that hundred percent of the male patients were visit to doctor once a week in a follow up basis whereas female were not. Mostly visit to doctor 53.2 % of male and 46.8 % of female patients were visit to doctor if needed. The study also found that 75 % of others patients were visit to doctor once a week in a follow up basis other than 25 % of service holder patients.

Based on the findings of the study, nearly forty of the patients likely to visit physician to get information more frequently whose disease duration less than one year whereas who suffering from one to five years (38.7 %) and above (21.5%). Likewise, patients who have high blood sugar prefer to go physician to get information more frequently than the normal patients.

Table 3: Relationship among socio-demographic, the first action of illness symptom and first care provider to consult of participants

Variable	Categories	The first action in the event of illness symptoms				The first care provider to consult in case of manifesting the symptoms of the disease			
		Refer to a doctor (%)	Behavior change (%)	Consult & get tip (%)	$X^2(P)$	Primary health care providers (%)	Family/ general practitioner (%)	Specialist (%)	$X^2(P)$
Age	<40	13(23.6)	0(0.0)	11(20.8)	8.5(0.07)	13(29.5)	9(14.8)	2(28.6)	3.8(0.73)
	40-60	36(65.5)	3(75)	25(47.2)		23(52.3)	37(60.7)	4(57.1)	
	>60	6(10.9)	1(25)	17(32)		8(18.2)	15(24.5)	1(14.3)	
Gender	Male	29(52.7)	2(50)	24(45.3)	0.7(0.74)	26(59.1)	28(45.9)	1(45.9)	5.4(0.06)
	Female	26(47.3)	2(50)	29(54.7)		18(40.9)	33(54.1)	6(86.7)	
Religion	Muslim	53(96.4)	3(75)	46(86.8)	4.35(0.10)	43(97.7)	54(88.5)	5(71.4)	6.2(0.045)
	Non Muslim	2(3.6)	1(25)	7(13.2)		1(2.3)	7(11.5)	2(28.6)	
Marital status	Married	53(96.4)	4(100)	52(98.1)	0.43(0.8)	26(93.2)	28(100)	1(100)	4.7(0.09)
	Unmarried	2(3.6)	0(0.0)	1(1.9)		18(6.8)	33(0.0)	6(0.0)	
Education	Nonformal & only signature	21(38.2)	1(25)	24(45.3)	3.4(0.5)	13(29.5)	29(47.5)	4(57.1)	4.2(0.37)
	Primary education	11(20)	2(50)	8(15.1)		10(22.7)	10(16.4)	1(14.3)	
	Sec.& above	23(41.8)	1(25)	21(39.6)		21(47.7)	22(36.1)	2(28.6)	
Profession	Housewife	23(41.8)	2(50)	23(49.1)	6.2(0.5)	16(36.4)	30(49.2)	5(71.4)	10.96(0.08)
	Service	9(16.4)	1(25)	8(15.1)		7(15.9)	10(16.4)	1(14.3)	
	Business	3(5.5)	1(25)	7(13.2)		2(4.5)	9(14.8)	0(0.0)	
	Others	20(36.4)	0(0)	12(22.6)		19(43.2)	12(19.6)	1(14.3)	

Residence	Urban	24(43.6)	2(50)	20(37.7)	0.5(0.8)	18(40.9)	26(42.6)	2(71.4)	0.51(0.77)
	Rural	31(56.4)	2(50)	33(62.3)		26(59.1)	35(57.4)	5(71.4)	
Family income	<20000	39(70.9)	3(75)	32(60.4)	1.5(0.5)	30(68.2)	39(63.9)	5(71.4)	0.3(0.86)
	≥20000	16(29.1)	1(25)	21(36.6)		14(31.8)	22(36.1)	2(28.6)	
Family type	Single	36(65.5)	2(50)	29(54.7)	1.4(0.48)	33(75)	31(50.8)	3(42.9)	7.11(0.02)
	Joint	19(34.5)	2(50)	24(45.3)		11(25)	30(49.2)	4(57.1)	
Family member	<5	37(67.3)	3(75)	27(50.9)	3.5(0.45)	32(72.7)	31(50.8)	4(57.1)	5.8(0.21)
	5-10	16(29.1)	1(25)	23(43.4)		11(25)	26(42.6)	3(42.9)	
	>10	2(3.6)	0(0.0)	3(5.7)		1(2.3)	4(6.6)	0(0.0)	
BMI	Underweight	4(7.3)	0(0.0)	10(18.9)	8.4(0.2)	5(11.4)	9(14.8)	0(0.0)	7.2(0.30)
	Normal	35(63.9)	2(50)	3(58.5)		29(65.9)	36(59)	3(42.9)	
	Overweight	13(23.6)	1(25)	11(20.8)		7(15.9)	15(24.6)	3(42.8)	
	Obese	3(5.5)	1(25)	1(1.9)		3(6.8)	1(1.6)	1(14.3)	
Duration of the disease	<1	26(47.3)	0(0.0)	16(30.2)	6.3(0.2)	21(47.7)	17(27.9)	4(57.1)	6.9(0.14)
	1-5	15(27.3)	2(50)	22(41.5)		15(34.1)	23(37.7)	1(14.3)	
	>5	14(25.4)	2(50)	5(28.3)		8(18.2)	21(34.4)	2(28.6)	
Current treatment	Oral tablet	19(34.5)	1(25)	32(60.4)	15.5(0.004)	17(38.7)	33(54.1)	2(28.6)	11.4(0.02)
	Insulin	22(40)	1(25)	19(35.8)		14(31.8)	24(39.3)	4(57.1)	
	Behavior change	14(25.5)	2(50)	2(3.8)		13(29.5)	4(6.6)	1(14.3)	
Blood Sugar	Normal	27(49.1)	2(50)	22(41.5)	0.6(0.7)	27(61.4)	23(37.7)	1(14.3)	8.7(0.013)
	Higher	28(50.9)	2(50)	31(58.5)		17(38.6)	38(62.3)	6(85.7)	

Table 4: Relationship among socio-demographic, health care center to visit and receive the services and regular referring to the doctor

Variable	Categories	The type of health care center to visit and receive the services				Regular referring to the doctor in order to better manage the disease			
		Public health centers (%)	Private health centers (%)	Private doctors office (%)	Traditional therapist (%)	$\chi^2 (P)$	Yes (%)	No (%)	$\chi^2 (P)$
Age	40	12(24.5)	7(15.2)	3(27.2)	2(33.3)	5.5(0.48)	5(20)	19(21.8)	0.14(0.93)
	40-60	29(59.2)	29(63)	4(36.4)	2(33.3)		14(56)	50(57.5)	
	>60	8(16.3)	10(21.7)	4(36.4)	2(33.4)		6(24)	18(20.7)	
Gender	Male	24(49)	24(52.2)	5(45.5)	2(33.3)	0.8(0.84)	11(44)	44(50.6)	0.33(0.56)
	Female	25(51)	22(47.8)	6(54.5)	4(66.7)		14(56)	43(49.4)	
Religion	Muslim	44(89.8)	43(93.5)	10(90.9)	5(83.3)	0.86(0.86)	24(96)	78(89.7)	0.96(0.32)
	Non Muslim	5(10.2)	3(6.5)	1(9.1)	1(16.7)		1(4.0)	9(1.3)	
Marital Status	Married	47(95.9)	45(97.8)	11(100)	6(100)	0.9(0.83)	23(92)	86(98.9)	3.5(0.06)
	Unmarried	2(4.1)	1(2.2)	0(0.0)	0(0.0)		2(8.0)	1(1.1)	
Education	Non formal & only sig.	15(3.6)	23(50)	4(36.4)	4(66.7)	7.7(0.2)	5(20.0)	41(47.1)	10.46(0.005)
	Primary education	13(26.5)	6(13)	1(9.1)	1(16.7)		3(12.0)	18(2.7)	
	Secd & above	21(42.9)	17(37)	6(54.5)	1(16.7)		17(68.0)	28(32.2)	
Profession	Housewife	20(48)	22(44.8)	5(45.5)	4(66.7)	15.9(0.06)	12(48.0)	39(44.8)	1.3(0.73)
	Service	6(12.2)	10(21.7)	2(18.2)	0(0.0)		4(16.0)	14(16.1)	
	Business	2(4.1)	6(13)	1(9.1)	2(33.3)		19(4.0)	10(11.5)	
	Others	21(42.9)	8(17.4)	3(27.3)	0(0.0)		8(32.0)	24(27.6)	

Residence	Urban	22(44.9)	21(45.7)	2(18.2)	1(16.7)	4.5(0.20)	14(56)	32(36.8)	2.96(0.08)
	Rural	27(55.1)	25(54.3)	9(81.8)	5(83.3)		11(44)	55(36.8)	
Family income	<20000	37(75.5)	29(63)	5(45.5)	3(50)	4.9(0.13)	15(60)	59(67.8)	0.5(000.46)
	≥20000	12(24.5)	17(37)	6(54.5)	3(50)		10(40)	28(32.2)	
Type of family	Single	36(73.5)	21(45.7)	5(45.5)	5(83.3)	9.96(0.01)	15(60)	52(59.8)	0.0(0.98)
	Joint	13(26.5)	25(54.3)	6(54.5)	1(16.7)		1(40)	35(40.2)	
Family member	<5	33(67.3)	23(50)	7(63.6)	4(66.7)	4.29(0.63)	15(60)	52(59.8)	1.0(0.59)
	5-10	14(28.6)	21(45.7)	3(27.3)	2(33.3)		8(32.0)	32(36.8)	
	>10	2(4.1)	2(4.3)	1(9.1)	0(0.0)		2(8.00)	3(3.4)	
BMI	Under weight	7(14.3)	6(13)	0(0.0)	1(16.7)	8.72(0.46)	2(8.0)	12(13.8)	2.9(0.51)
	Normal	3(61.3)	27(58.7)	9(81.8)	2(33.3)		17(68.0)	15(58.6)	
	Over weight	11(22.4)	9(19.6)	2(18.2)	3(50)		6(24.0)	19(21.8)	
	Obese	1(2.0)	4(8.7)	0(0.0)	0(0.0)		0(0.0)	5(5.7)	
Duration of the disease	1	19(38.8)	16(34.8)	4(36.4)	3(50)	2.28(0.89)	8(32)	34(39.1)	0.5(0.78)
	1-5	19(38.8)	15(32.6)	3(27.2)	2(33.3)		9(36)	30(34.5)	
	>5	11(22.4)	15(32.6)	4(36.4)	1(16.7)		8(32)	23(26.4)	
Current treatment	Oral tablet	20(40.8)	27(58.7)	3(27.3)	2(33.3)	14.8(0.02)	6(24.0)	46(52.9)	7.8(0.02)
	Insulin	15(30.6)	17(37)	7(63.6)	3(50)		15(60)	27(31)	
	Behavior change	14(28.6)	2(4.3)	1(9.1)	1(16.7)		4(16)	14(16.1)	
Blood Sugar	Normal	22(44.9)	22(47.8)	4(36.4)	3(50)	0.52(0.91)	12(60)	39(44.8)	0.07(0.8)
	Higher	27(55.1)	24(52.1)	7(63.6)	3(50)		13(52)	48(55.2)	

Table 5: Relationship between among follow up pattern and most frequently used information source for disease management

Variable	Categories	Follow up pattern(How often do you visit your doctor)				The most frequently used information source for disease management			
		Once a week (%)	Once every six months (%)	If needed (%)	$X^2(P)$	Family members and friends (%)	Physician (%)	Electronic database, social networks etc (%)	$X^2(P)$
Age	<40	1(25)	6(2.7)	17(21.5)	0.11(0.99)	2(11.1)	21(22.6)	1(100)	7.25(0.12)
	40-60	2(50)	17(58.6)	45(57)		14(77.8)	50(53.8)	0(0.0)	
	>60	1(25)	6(20.7)	17(21.5)		22(11.1)	15(53.8)	0(0.0)	
Gender	Male	4(100)	9(31)	42(53.2)	8.4(0.015)	12(66.7)	42(45.2)	1(100)	3.83(0.14)
	Female	0(0.0)	20(69.0)	37(46.8)		6(33.3)	51(54.8)	0(0.0)	
Religion	Muslim	4(100)	26(89.7)	72(91.1)	0.46(0.76)	18(94.4)	90(90.3)	1(100)	0.41(0.81)
	NonMuslim	0(0.0)	3(1.3)	7(8.9)		0(5.6)	3(9.7)	0(0.0)	
Marital status	Married	3(75)	28(96.6)	78(98.7)	8.31(0.02)	18(100)	90(96.8)	1(100)	0.63(0.73)
	Unmarried	1(25)	1(3.4)	1(1.3)		0(0.)	3(3.2)	0(0.0)	
Education	Nonformal & only signature	2(50)	11(37.9)	23(41.8)	6.7(0.15)	5(27.8)	41(44.1)	0(0.0)	6.03(0.19)
	Primary education	0(0.0)	2(6.9)	19(24.1)		4(22.2)	16(17.2)	1(100)	
	Secondary & above	2(50)	16(55.2)	27(34.2)		9(50.0)	36(38.7)	0(0.0)	
Profession	Housewife	0(0.0)	21(72.4)	30(38)	16.2(0.013)	5(27.8)	46(49.5)	0(0.0)	11.4(0.07)
	Service	1(25)	2(6.9)	15(19)		7(38.9)	11(11.8)	0(0.0)	
	Business	0(0.0)	1(3.4)	10(12.7)		1(5.6)	10(1.8)	0(0.0)	
	Others	3(75)	5(17.2)	24(30.4)		5(27.7)	26(28.0)	1(100)	
Residence	Urban	2(50)	15(51.7)	29(36.7)	2.11(0.34)	8(44.4)	37(39.8)	1(100)	1.6(0.45)
	Rural	2(50)	14(48.3)	50(63.3)		10(55.6)	56(60.2)	0(0.0)	
Family income	<20000	3(75)	18(62.1)	53(67.1)	0.4(0.38)	8(55.6)	37(67.7)	1(100)	1.46(0.48)
	≥20000	1(25)	11(37.9)	26(32.9)		10(44.4)	56(32.3)	0(0.0)	
Type of family	Single	3(75)	12(41.4)	52(65.8)	0.9(5.56)	11(61.1)	55(59.1)	1(100)	0.70(0.71)
	Joint	1(25)	17(58.6)	27(34.2)		7(38.9)	38(40.9)	0(0.0)	
Family member	<1	2(50)	12(41.4)	53(67.1)	0.6(6.23)	12(66.7)	54(58.1)	1(100)	4.11(0.39)
	1-5	2(50)	15(51.7)	23(29.1)		4(22.2)	36(38.7)	0(0.0)	
	>5	0(0.0)	2(6.9)	3(3.8)		2(11.1)	3(3.2)	0(0.0)	

BMI	Underweight	0(.0)	1(3.4)	67(16.5)	3.2(0.78)	3(16.7)	11(11.8)	0(0.0)	3.44(0.75)
	Normal	4(100)	19(65.5)	45(57)		10(55.6)	57(61.3)	1(100)	
	Overweight	0(0.0)	8(27.6)	17(21.5)		3(16.7)	22(23.7)	0(0.0)	
	Obese	0(0.0)	1(3.5)	4(5.0)		2(11.1)	3(3.2)	0(0.0)	
Duration of the disease	<1	1(25.0)	8(27.6)	33(41.8)	8.5(0.07)	4(22.2)	37(39.8)	1(100)	13.57(0.009)
	1-5	1(25)	12(41.4)	26(32.9)		3(16.7)	36(38.7)	0(0.0)	
	>5	2(50)	9(31)	20(25.3)		11(61.1)	20(21.5)	0(0.0)	
Current treatment	Oral tablet	1(25)	11(37.9)	40(50.6)	8.3(0.08)	5(27.8)	47(50.5)	0(0.0)	10.3(0.03)
	Insulin	3(75)	16(55.2)	23(29.1)		1(61.1)	31(33.3)	0(0.0)	
	Behave change	0(0.0)	2(6.9)	16(20.3)		2(11.1)	15(16.1)	1(100)	
Blood Sugar	Normal	1(25)	16(55.2)	34(43.0)	0.6(0.74)	8(44.4)	42(45.2)	1(100)	1.2(0.54)
	Higher	3(75)	13(44.8)	45(57)		10(55.6)	51(54.8)	0(0.0)	

Table 6: Relationship between socio-demographic and health care seeking behaviors

Variable	The first action in the event of illness symptoms	The first action in case of exacerbating of symptoms	The first care provider to consult in case of manifesting the symptoms of the disease	The type of health care center to visit and receive the services	The type of health care center to visit and receive the services	Regular referring to the doctor in order to better manage the disease	How do you see yours doctors (Follow up pattern)?	Follow up pattern (How often do you visit your doctor)	The most frequently used information source for disease management
	$X^2(P\ value)$	$X^2(P\ value)$	$X^2(P\ value)$	$X^2(P\ value)$	$X^2(P\ value)$	$X^2(P\ value)$	$X^2(P\ value)$	$X^2(P\ value)$	$X^2(P\ value)$
Age	8.47(0.07)	3.31(0.19)	3.77(0.73)	1.26(0.87)	5.49(0.48)	0.14(0.93)	2.44(0.65)	0.11(0.99)	7.25(0.12)
Gender	0.66(0.74)	0.90(0.34)	5.40(0.06)	1.88(0.39)	0.82(0.84)	0.33(0.56)	3.20(0.20)	8.45(0.015)	3.83(0.14)
Religion	4.35(0.11)	3.62(0.057)	6.20(0.045)	1.69(0.42)	0.86(0.83)	0.96(0.32)	0.79(0.67)	0.46(0.79)	0.41(0.81)
Marital status	0.43(0.80)	1.41(0.23)	4.76(0.09)	0.22(0.89)	0.88(0.83)	3.49(0.06)	4.20(0.12)	8.31(0.016)	0.63(0.73)
Education	3.36(0.49)	2.42(0.29)	4.22(0.37)	2.40(0.66)	7.75(0.25)	10.46(0.005)	6.24(0.18)	6.69(0.15)	6.03(0.19)
Profession	6.15(0.40)	3.30(0.34)	10.96(0.08)	8.54(0.20)	15.98(0.06)	1.28(0.73)	6.99(0.32)	16.20(0.013)	11.36(0.07)
Residence	0.52(0.76)	0.99(0.31)	0.51(0.77)	0.27(0.87)	4.55(0.20)	2.96(0.08)	7.05(0.02)	2.11(0.34)	1.58(0.45)
Family income	1.48(0.47)	0.77(0.37)	0.30(0.86)	4.04(0.13)	4.91(0.13)	0.52(0.46)	1.71(0.42)	0.38(0.82)	1.46(0.48)
Type of family	1.46(0.48)	0.21(0.64)	7.11(0.029)	0.89(0.63)	9.96(0.019)	0.00(0.98)	0.20(0.90)	5.67(0.05)	0.70(0.71)
Family	3.47(0.48)	0.69(0.70)	5.77(0.21)	1.40(0.84)	4.29(0.63)	1.02(0.59)	2.72(0.60)	6.23(0.17)	4.11(0.39)

member									
BMI	8.42(0.20)	1.33(0.72)	7.18(0.30)	5.21(0.51)	8.72(0.46)	2.28(0.51)	3.20(0.78)	6.28(0.39)	3.44(0.75)
Duration of the disease	6.32(0.17)	0.12(0.94)	6.89(0.14)	2.58(0.62)	2.28(0.89)	0.49(0.78)	8.47(0.07)	2.86(0.58)	13.5(0.009)
Current treatment	15.4(0.004)	3.99(0.13)	11.40(0.022)	3.74(0.44)	14.82(0.022)	7.83(0.020)	8.35(0.08)	9.56(0.048)	10.29(0.036)
Blood sugar	0.65(0.71)	2.99(0.084)	8.70(0.013)	0.52(0.91)	0.52(0.91)	0.07(0.77)	0.6(0.74)	1.96(0.37)	1.21(0.54)

DISCUSSION

The key findings of this study related to socio-demographic and clinical characteristics of type 2 diabetes mellitus patients. The study has been accomplished admitted over 112 type 2 diabetes mellitus patients from the selected hospital.

Socio demographic characteristics of the patients

The findings of the present study showed that the average age of the participated diabetic patients was 51.49(\pm 11.63) with the range of 18 to 75 years. This finding is almost similar with the previous study in Bangladesh conducted by Ali et al. (2022). The ratio of prevalence of diabetes participated patients similarly the finding it indicated that adult male and female were equally at risk due to poor awareness, ignorance, and cultural practice. The result of this study revealed that more than half of the patients were female. It may be because of the limited setting, sample size and convenient sampling. These findings were quite consistent with the Indian study done by Kohli et al. (2015). The majority of the participants were Muslim because Islam is the official state religion of Bangladesh as per constitution.

In the present study, above half (57.1%) of the patients were middle aged and maximum of them were married which is consistent with the study conducted in Nepal (Thapa et al., 2018). This may be due to deficiency of insulin secretion developing with age and growing insulin resistance. Among the participants 41% were nonformal educated. The findings are consistent with the result revealed by Karimi et al., 2017 conducted in Iran. Low literacy in developing countries like Bangladesh accounts for patients' inadequate understanding of the disease and as a result, their inability to seek health care.

Above half (50.9%) of the patients were housewife because in the present study 45.5% of the diabetes patients were female and above half of participated patients live in rural area which result is similar to Bangladeshi studies (Jennings et al., 2021). This study finding revealed that 61.05 % diabetes patients live in rural area because of the higher

poverty rate or less access to health care. The current study found that considering the income, two third (66.1 %) of the patients were belongs to low income family and above half (59.8) of the patients from the joint family. The finding is congruent with the Nepali previous study (Thapa et al., 2018).

All of the patients had at least one co-morbidities which is similar to the study conducted in Indonesia (Putra and Toonsiri, 2017). The reason for this is a lack of health screenings, sporadic follow-up and a lack of understanding about the complications of diabetes mellitus. Above two third of the participants had normal BMI. This result is nearly similar with the previous study done in Ethiopia by Kassahun et al. (2016). More than half of the patients were higher blood glucose level and rest of the participants taken oral medicine which is similar with the study done by (Kohli et al., 2015).

Health care seeking behaviors

Health care seeking behavior is important as it determines acceptance of health care and improves quality of life. The findings show that nearly half of the patients (49.1 %) visit to doctor in case of first action in the event of illness symptom. The study conducted by Siddique et al. (2017) in Fatikchhari, Chittagong found that one-third diabetes patients visited to registered doctor in initial stage of symptoms appear which is partially relevant to this study result. It can realize that patients' health seeking behaviors are gradually increasing to visit the doctor at the first time of symptoms appear. The present study represents that in case of first action during exacerbating of diabetes mellitus symptoms 88.4 % of patients visit to doctor and only few (11.6 %) patients change their behavior. Dawood et al. (2017) reported that 66.7 % of the participants chose the physician when they experienced any health problem. This can be considering as a positive behavior. This study revealed that above half (54.5 %) of the diabetes patients likely to visit general practitioner to consult in case of manifesting the symptoms of the disease which are congruent with the previous Bangladeshi study (Jennings et al., 2021). This is probably due to low cost,

availability of services and easily expresses the problem with the doctor.

The findings shows that in response to the types of health care center 42% patients used to go specialized hospital and 43.8 % patients prefer to go public hospital to visit and received the services. Rest of the 56.2 % of patients received the service from private hospital or doctor/therapist office. Quiet similar scenario was observed by Abidin et al. (2014) in Malaysian study where 58.2 % the respondents were visiting Government hospital and receive the services. This may be due to cost of private hospital are not affordable who have a lower economic status. In this study, seventy seven percent of patients did not contact the doctor on a regular basis in order to better manage the disease, whereas only twenty two percent of patients did. This result is dissimilar to the study which was done in China by Jin et al. (2017). This study revealed that 73.7% of the respondents presented to the clinics for regular consultation even if they were asymptomatic. To manage their symptoms in the event of an illness, 128 (61.2%) sought advice from someone, and the first person they went to was their doctor (n = 105, 82%). Because of the family and social support, policies, insurance and health system evolution plan, primary health care center obliged to monitor and visit diabetes patients every three months.

The present result revealed that more than half of the diabetes patients made follow up visit with the doctor in the case of exacerbating of the symptoms or arise complication, whereas 20.5 % of patients made regular visit. Similarly, 70.5 % of made their follow up visit when they needed. This finding contrasts with another study in Azarbaijan which the majority of individuals visited the doctor on a frequent basis (Jalilian et al., 2020). Because the key burdens in Bangladesh are socioeconomic conditions, a lack of health care, and a lack of awareness. More than eighty percent of the patients were more likely to visit a doctor to receive diabetes information for illness management. A significant number of patients also sought advice from relatives and friends, social media and radio-television. This result is higher similar with the study by Jalilian et al. (2020). To prevent and control diabetes mellitus it is very important to provide information to the patients

about their diseases through multisectoral approaches. But this result also failed to play their crucial role in informing diabetes patients.

Relationship between socio-demographic and health care seeking behaviors

The findings of this study identified that the diabetes patients who were currently treated with insulin showed significantly better health care seeking behaviors to five actions and cares (Table 6). Such as the first action in the event of illness symptoms, the first care provider to consult in case of manifesting the symptoms of the disease, type of health care center to visit and receive the services, regular referring to the doctor in order to better manage the disease, follow up pattern, the most frequently used information source for disease for disease management.

The patients who were currently treating with insulin they mostly visited to doctors as the first action in the event of illness symptoms. Rather than the patients were treating with tablet and behavior change. This finding is congruent with the study of Jalilian et al. (2020). Similarly a significant number of hyperglycemic patients who currently treating with insulin consult with specialist in case of symptoms manifestation that is supported by the study done in Bangladesh (Siddique, 2017), visit and received care from public hospital that is supported by the study of Jennings et al., (2021). Regular visit the doctor for better management observed in this study is supported with the study in Nepal (Thapa et al., 2018) and frequently received information from physician that is supported by the study of Jalilian et al. (2020). Most probable reason for this findings reported significant better health seeking behavior by the patients currently treating with insulin would be due to the patients who having treating with insulin were in the advance stages of diabetes. So that they showed better health seeking behavior than others.

The study findings also shows that majority of the Muslim patients living in joint family who frequently visited to the specialist in considering the first health care provider in case of symptoms manifestation of the diseases than who live in single family. Similar result also revealed in the

study of Ali et al., (2020). Family support, less waiting time, fair treatment of services also the reason of receiving services from specialist who belong to joint family.

In this study, majority of the hyperglycemic patients prefer to go specialist to consult in case of manifesting the symptoms of the disease. This study is partially similar consistent with the study done in Bangladesh (Siddique, 2017). The current study found that most of the secondary and higher educated patients who was high blood sugar likely to visit doctor in a regular basis to prevent complication which is congruent with the study in Nepal (Thapa et al., 2018). The current study found that most of the secondary and higher educated patients who was high blood sugar likely to visit doctor in a regular basis to prevent complication which is congruent with the study in Nepal (Thapa et al., 2018). Because educated people are informed and attentive of the disease, they are also able to maintain health and lifestyle modifications.

Limitations of the study

The study was conducted with a small number of samples due to shortage of time for data collection. Time limitation for data collection. Setting might be a limitation of this study for generalization. Finally, the result of this study is conducted in a tertiary hospital at Dhaka, it is unclear to what extent the findings can be representative of all over regions in Bangladesh.

CONCLUSION

Health-seeking behavior is complicated, and no single method can explain or establish any pattern. This study shows that broad characteristics like age, gender, marital status, socioeconomic level, and educational achievement are not the only ones that influence health-seeking behavior. Patients have some knowledge about diabetes symptoms and complications, awareness about their management was lacking. Patients need to be made aware of long-term complications of diabetes and precautions that should be taken and that they can be prevented. At the same time, efforts should be made to sensitize them about the importance of taking regular treatment. Public

health care facilities should be utilized for easy and affordable availability of drugs so that burden of disease on patient family can be reduced.

Recommendations

1. It is important to develop well organized diabetes care focused on diabetes education, raising awareness about DM and its severity and self-management to reach good glycaemic control to prevent development of costly complications.
2. Continuing education on diabetes and its complications for primary healthcare providers is crucial and this should be accompanied by a regular assessment. Screening for diabetes is important, but equally crucial is patient education and counseling.
3. It is also crucial role to increase public awareness about the lifestyle modification after affected type 2 diabetes mellitus patients through electronic database, blogs, websites, health portals, mobile applications, social media.

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