Research Article
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Is Bangladesh's people aware of "diabetes mellitus: the disease of prosperity" health care management?

Abstract

Introduction: Diabetes mellitus is an increasing threat to the world, which is also considered a "disease of prosperity". The manifest of demographic changes, cultural transition, modernization, and population aging, etc. make it a "developing countries problem". The incidence of type 2 diabetes mellitus is increasing so rapidly and it is estimated by 2030 this number will almost double. Around 387 million people have diabetes which is equal to 8.3% people. It is projected that there will be a 42% increase in the number of individuals with diabetes, from 51 to 72 million in the developed countries and a 170% increase, from 84 to 228 million, in the developing countries. Diabetes mellitus is a chronic disease once thought to be uncommon in Bangladesh, but now it has emerged as an important public health problem. About 3.6 million people are affected throughout the country. In Bangladesh around 4% of adults aged 25 years or more have type 2 diabetes mellitus, and 80 lakh people in Bangladesh suffer from diabetes. It causes 6.4 percent of total deaths in the country. Awareness of diabetes is not up to the mark due to health education about diabetes, announcement, and an overall lack of awareness of the disease and its effectiveness makes it more complicated to manage.

Objectives: This study aimed to assess the knowledge and awareness status on health care management of type 2 diabetes mellitus in Bangladesh.

Methods: This is a cross-sectional study followed by descriptive methods and mixed methods in design among Dhaka and Manikgonj districts.

Results: Findings reveal that a very significant relationship exists between compliances and complications. Compliances are influenced by various factors like sex, education, occupation, treatment facilities, etc. But who follow the proper compliances face fewer complications? Also, in addition to anti-diabetic medication and another method of compliance to an herbal method which was familiar to diabetic patients. Most compliance the respondents preferred are diet, exercise, weight control over the medication.

Conclusion: Overall, a positive outcome was that the patients of type 2 diabetics who maintained proper compliance faced fewer complications than those who didn't follow them properly.

Keywords: Type 2 diabetes mellitus, awareness, health care management, disease of prosperity

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Introduction

According to the American Diabetes Association, approximately 18.3% (8.6 million) of Americans age 60 and older have diabetes.[1] The number of complications in diabetes mellitus increased proportionally with the length of the disease, while the number of complications was lower in cases with better patient compliance. According to the American Diabetes Association[2], around 18.2 million people, or 6.3% of the population had diabetes and diabetes was the sixth leading cause of death in the U.S.A. The prevalence of diabetes in adults globally was estimated to be 4.0% in 1995 and is projected to rise to 5.4% by the year 2025. The prevalence of diabetes is higher in developed countries 6% in 1995, 6.2% in 2000, and 7.6% in 2025. The developing world has a lower estimated prevalence; 3.3% in 1995, 3.5% in 2000, and 4.9% in 2025. It is projected that there will be a 42% increase in the number of individuals with diabetes, from 51 to 72 million in the developed countries and 170% increase, from 84 to 228 million, in the developing countries. Most of the people with diabetes in developing countries are projected to be younger, aged 45 to 64 years, while those in developed countries will be aged 65 years. Diabetes will be increasing concentrated in urban areas, with the greater burden among women. The direct and indirect cost of diabetes management in the U.S.A estimated at $132 billion. Once one gets diabetes, he has no way of turning back.

Diabetes patients had two times more days of inpatient treatment, 1.3 times more outpatient visits, and 9.7 times more medications than those who don't have diabetes.[3] The study found that annual per-capita expenditure on medical care was 6.1 times higher for diabetic patients than non-diabetic ones (USD 635 vs USD 104 respectively). The National Diabetes Information Clearinghouse[4] estimates that diabetes costs $132 billion in the United States alone every year. In Bangladesh around 4% adults aged 25 years or more had type 2 diabetes mellitus, about 3.6 million people are affected, and 6.4 percent of total deaths throughout the country.[5] In Bangladesh, over 8 million people suffer from diabetes. Still, now people in the country are not aware of the impact and effect of diabetic Mellitus. Unplanned urbanization in the cities where people have very limited scope for physical activities and the changing lifestyle play double burden of the disease. Even in rural areas, people practicing less physical exercise and they take rickshaw vans or other rides to go to marketplaces, which earlier they

walked all the 3–5-kilometer path. In addition, people are habituated to having fast food, soft drinks, etc. that have high levels of sugar and fat. Stressing on massive health awareness and regulations for changing people's lifestyles. People are not aware of diabetic Mellitus (DM) and so on the management DM, which causes the increasing number of diabetic patients.

Objective

General objective

This study aimed to assess the awareness status on health care management of type 2 diabetes mellitus in Bangladesh.

Specific objectives:

I. To assess the knowledge and awareness status of diabetes management

II. To assess the compliances and management of diabetes mellitus

III. To assess the association of patients' compliance with disease complexity

Material and methods

This study utilized a mixed study design both qualitative and quantitative methods to adhere to the comprehensive approaches. The proposed study was conducted in two settings urban and rural areas to compare the situation comprehensively. For urban settings BIRDEM (Bangladesh Institute of Research and Rehabilitation for Diabetes, Endocrine and Metabolic Disorders) and some of its sister institutions. The sample size was chosen by purposive type of sampling. Participants were recruited using a stratified purposive sampling technique. For that, we conducted 25 semi-structured in-depth interviews with patients and 8 informal discussions with physicians. For the current quantitative analyses, data were collected from urban and rural settings. Data from urban areas were collected from BIRDEM and their sister institution and rural parts data were collected from Shibaloya in Manikgong by randomly selected participants from the nearest diagnosis laboratory. Study populations will be selected randomly in such a way so that each district contains most of the representation using the following formula for the quantitative method.

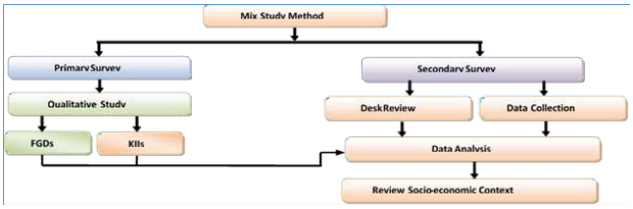
$n = Z2pq/ d2$

$= (1.96)2(0.5)(0.5)/ (0.05)2$

= 384.16 = 384 or approximately 400 and a total 800 (2 areas x 400 sample). A multi-stage procedure for sample size selection will applied and the approximate sample was made double to avoid precession error. Therefore, the total sample was 800.

(Where, n = required sample size, Z = confidence limit set at 1.96 which corresponds to 95%, p = the estimated prevalence of relation between the maternal socioeconomic, status and the outcome of the newborn q = 1-p = 1- 0.5 = 0.5, d = degree of accuracy desired, usually set at 5% (0.05))

For the quantitative part, a pre-coded structured questionnaire was applied to collect information. Primary respondents were the diabetic's patients both male and female who have suffered from at least for the last six months. During the preliminary phase of qualitative part for the study, data were collected through the following Informal Discussion. For qualitative analysis here used thematic analysis. For quantitative analysis, all completed questionnaires were checked for inconsistency and errors by the supervisor before sending for computerization. The researcher prepared a coding manual and data were cleaning and analyzed using the SPSS 17.0. All data were entered and stored on password-protected computer of the researcher. Only the primary investigators had access to this information.



To ensure the anonymity of the participants, codes were used to identify participants and groups in all stages of this research. Participants' names and other personal information were never linked to their responses. Ethical clearance for this study was granted from both the American International University of Bangladesh and from BIRDEM administration. A consent (oral or written) from the participants will be ensured to get the information from them.

Results

In this chapter finding of the study are presented in different tables and described briefly.

Table 1 shows the distribution of the respondents according to their place of residence which was the same 50% in each area. The ratio of females was little bit higher than the males which was not purposively but randomly according to criteria and availability of the respondents. The percentage of female was 56% whereas the male ratio was 44% between both areas. Among the respondents, the majority was found from the age group of 47-61 years, which was 376 (47%), and the lowest ratio was aged below 31 years 48 (6%). Also, the age category for 62+ years was second lowest among both areas (11%).

Table 1 Participants according to their place of residence

Particulars	# of the respondents	%
Area		
Urban	400	50
Rural	400	50
Sex		
Male	350	44
Female	450	56
Age		
>31	48	6
32-46	289	36
47-61	376	47
62+	87	11
Total	800	100

Here the Table 2 represent the ratio of occupational variety considering the sex among the respondents. About 79% of females who have diabetes was engaged in household chores as a housewife. Second major number of females were service holders (14%) and very few were work as a teachers, maid, industry laborer's, sewing, etc. Among the male participants' the majority were service holders (47%) and the nearest occupation were business (27%).

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Table 2 Occupational category according to sex

	Female. N (%)	Male. N (%)	Total. N (%)
Sewing	9 (2%)	0	9 (1.1%)
Industry labor	4 (0.9%)	4 (1.1%)	8 (1%)
Day labor	0	9 (2.6%)	9 (1.1%)
Services	63 (14%)	166 (47%)	229 (28.6%)
Business	4 (0.9%)	96 (27%)	100 (12.5%)
Unemployed	4 (0.9%)	9 (2.6%)	13 (1.6%)
HH works	354 (79%)	4 (1.1%)	358 (44.8%)
Teacher	9 (2%)	35 (10%)	44 (2.2%)
Retire	43 (10%)	53 (15%)	96 (8.2%)
Servant	4 (0.9%)	0	4 (0.5%)
Total. F(%)	450 (56.3%)	350 (43.7%)	800 (100%)

According to Table 3, the data showed that the ratio of respondents who took treatment after knowing diabetes was almost nearer in both urban (93%) and rural (91%) areas. On the other hand, some people taking treatment but did not know whether they have diabetes or not. In urban areas (3%) and rural areas (1%) they took some initiatives like, weight loss, exercise, less food consumption, herbal medicine, etc. due to family history of diabetes mainly. Very few respondents from both areas we found were not responsive about the fact and ignored it (urban 4% and rural 7%). In addition, few respondents from both areas found that they accepted the fact but simply ignore it and didn't comply with any methods of treatment for diabetics.

Table 3 Area-wise awareness of respondents who took treatment after being informed having diabetes

Area	Knowledge about having diabetes	Taken treatment		
		Yes N (%)	No N (%)	Total N (%)
Urban	Know about having diabetes	370 (92.5)	17 (4.3)	387 (96.8)
	Don't know about having diabetes	13 (3.2)	0 (0)	13 (3.2)
Rural	Know about having diabetes	358 (91.1)	26 (6.7)	386 (95.8)
	Don't know about having diabetes	5 (1.2)	9 (3.0)	14 (4.2)

From the qualitative information, it was found that most people were aware about diabetics but did not practice management and did not take any measurement to control it. The main symptom of diabetes is having more urination, and the main cause was parents having diabetes. Besides that, they did not know any other causes and symptom. For that less knowledge, they were less aware of diabetes and its management. And if there exists any family history of diabetes especially among parents no other one. And for that, while they faced another sign, they simply ignored it. Overall, as early as they informed about diabetics, they took treatment. But here also one-fifth of the people said that they were less likely to take compliance, especially the female's one. Because some of them felt shy at first while they heard about it. As their perception,

"I did not know about my diabetes. When I first hear that and my child asked me to follow the compliances, I felt shy. What people will say? In our society females are so neglected that they were taught from their girlhood not to be ill. Always be fit to serve for the family. The female body is not a human body it is a machine. "

Here the Table 4 showed that after knowing about having diabetes vast majority from both areas took medicine regularly (urban 74%, rural 86%). The second majority of their emphasis on controlling diet is from both urban (46%) and rural (36%) areas. The next group of respondents took regular exercise for diabetes management (rural 28% and urban 34%). From the qualitative part, we found that, after knowing of having diabetes very first they tried to take medicine to consult with physicians. Some of them took medicine that was guided by the dispensary man. Additionally, they informed that they followed some diet and take initiative to lose control means eating very less food or skip the regular meals. Especially the female respondents tending to skip meals for one time in a day. They are less likely to take meal at night. In addition, among the males they initially take two tome breads (Roti), and at lunch they take a regular meal.

Table 4 Very first attempt of diabetes management after informed

Particulars	Urban area		Rural area	
	N	%	N	%
After knowing diabetes taking a diet regularly	258	46.2	192	35.6
After knowing diabetes take regular exercise	192	34.4	150	27.8
After knowing diabetes taken medicine regularly	414	74.2	462	85.6
After knowing diabetes taken initiation to control weight	42	7.5	90	16.7
After knowing diabetes taken insulin to control diabetics	24	4.3	6	1.1
After knowing diabetes no method was taken at all.	24	4.3	30	5

Here the Table 5 shows that the frequency of taken other methods except medication to control diabetes which were higher among the respondents. The data showed that except for medication the most popular methods were diet, exercise, weight control, intake of fruit, etc. In addition, in the rural area among the male, the tendency of regular exercise was lower (27%) than in the urban area (49%). Conversely, among the female in both areas' intake, more vegetables and fruit exercise were same. In both areas, respondents give less priority on weight control. Overall, all the respondents from urban areas prioritize on intake of less fatty food first where in rural they prioritize on intake of fruits and vegetables. From the qualitative part, it was found that all the respondents meant to intake less fat food- ***to skip the "SUGAR"***. They firstly avoided sugar but that was only for the tea but not for other food like desserts.

Table 5 Other method taken except medicine to control diabetes

Area	Sex	Intake less fat food	Regular exercise	Weigh-loses/ control	Take fruit and vegetable more
Urban	Female	220 (49%)	150 (33%)	142 (32%)	202 (45%)
	Male	182 (52%)	172 (49%)	113 (32%)	142 (41%)
Rural	Female	180 (40%)	120 (27%)	78 (17%)	198 (44%)
	Male	114 (32%)	94 (27%)	90 (26%)	126 (36%)

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After knowing of having diabetes most people take initiatives in their way. But the study found that they at least take one single initiative. Some were found to take more than one initiative for diabetes management. Here the Table 6 shows that the respondents in both areas took at a time one or more methods to control diabetes except medication. Female from urban areas (15%) like to take one measurement than the male (7%). Which was found opposite in the rural areas. For a second time, females from both urban (35%) and rural (38%) areas are more likely to take multiple method except medication than the male. Here the multiple method indicates, diet with less fat, fruit and vegetable intake, regular exercise and weight control, etc. From the qualitative part, it was found that mostly they preferred physical exercise like walking with regular diet like; intake low fatty food (here fatty food means Sugar), bread (roti) for two-time meals, fruits and vegetable intake increased. Thus, also the weight would be controlled otherwise preferred for weight control. Only 34 of the total respondents responded for following single measure to control like either diet or exercise or weight control etc. where regular exercise and diet became priorities.

Table 6 At least taken one or more initiative to control diabetes except medicine

Area	Sex	Taken single initiative	Taken multiple initiatives
Urban	Female	66 (15%)	159 (35%)
	Male	24 (7%)	151 (43%)
Rural	Female	54 (12%)	171 (38%)
	Male	60 (17%)	115 (33%)

Here Table 7 showed that except other controlling methods for diabetes, they preferred oral medication, as they have no time to taken exercise or have a balanced diet. Among the respondents, almost 357 (45%) taken insulin to control diabetes. A total of 518 respondents (65%) taken oral medicine. A total 89% taken herbal medicine like; dry seeds or blackberry seeds.

Table 7 Frequency of taken different type of medication for controlling diabetes

Treatment	Taken oral medicine	Taken Insulin (Injection)	Taken herbal treatment
Yes	518 (65%)	357 (45%)	714 (89%)
No	272 (34%)	425 (53%)	86 (11%)
Can't remember/ don't know	10 (1%)	18 (2%)	0 (0%)

According to the Table 8, the frequency of blood tests to measured diabetics was high among the respondents in cases of taken measured in every month at least one time (67%). Here we can see that the frequency of taken measurements once in each month was higher 20% among the total respondents. That represents their awareness of compliance about diabetics. Because they tried to on track of controlling diabetes by measuring it regularly. The second majority of the respondents 30% checked four times in a year or after 3-4 months each. The third majority of the people 20% answered once every week for updating the blood glucose to take necessary compliances thereby.

Table 8 Frequency of use of test to measure diabetes

Type of Frequency	Urban area N (%)	Rural area N (%)	Total N (%)
Once in everyday	56 (14)	22 (6)	56 (7)
Once in every week	102 (26)	78 (20)	162 (20)
Once in every month	50 (13)	94 (24)	534 (67)
Once in every year	28 (7)	60 (15)	78 (10)
Twice in a week	48 (12)	10 (3)	18 (2)
Four-time yearly around	88 (22)	22 (6)	240 (30)
Never tested	24 (6)	76 (19)	18 (2)
Couldn't memorized/don't know	4 (1)	38 (10)	42 (5)

Discussion

However, the risk of developing type 2 diabetes increases with age, obesity, and lack of physical activity. Type 2 diabetes is more common in individuals with a family history of the disease and in members of certain socio-demographic & racial/ethnic groups. It occurs more frequently in women with prior GDM and in individuals with hypertension or dyslipidemia.[6] The number of complications in diabetes mellitus increased proportionally with the length of the disease, while the number of complications was lower in cases with better patient compliance.[1] According to Journal of Diabetics UK (2010) and ADA (2015) regular exercise may have a win-win situation for patients. Blood fat can be reduced by stopping smoking, healthy and balanced diet, weight control, avoiding alcohol, and physical activities. Which also help to reduce the risk of blood pressure and other complications.

The incidence rate of Type 2 diabetes in most of the European studies that used similar criteria for classification of glucose tolerance ranges from 7.6 to 10.8/1000 PY.[7–11] In the Ely study in UK the crude incidence rate was 7.5,[12] similar to a recent report in the Australia (7.0/1000 PY)[13] which are due to inappropriate dieter, exercise and weight controlling. Diabetes is often believed to be caused by eating excess sweets (particularly sugar), brought on by stress and worry, or a form of punishment for immoral behavior. Many Native American tribes (e.g., Ojibwa, Cree, Dakota, Navajo, Kiowa, Ute), for example, believe that diabetes is a new disease introduced by the "white man." Typically, diabetes is believed to result from a state of imbalance caused by consuming too much sugar, consuming too much food in general, drinking alcohol, or behaving immorally. Because one should strive to follow the right path, a diagnosis of diabetes may indicate a failure to live properly and a lack of spiritual strength. As a result, a person may feel shamed by a diagnosis of diabetes and reluctant to tell family or friends.[14] A common problem with health education content is that health professionals provide too much detail regarding pathophysiology and too little regarding the daily management of illnesses.[15] It is important to assess patient beliefs and current practices concerning a condition and to use that information as a foundation on which to build health education programs. If the health program is broadly implemented, important information from community members can be gleaned in focus groups before initiation

of the program to address those areas of greatest concern for the target group. Cultural information can be well incorporated here as it relates to the area of health education. For example, if the intervention is nutrition counseling, inclusion of common foods, methods of preparation, and typical units of food measurement is necessary.[16] Successful intercultural patient education programs elicit and build on patients' health beliefs, preferred learning styles, lifestyle preferences and practices, and community context. They also consider teaching modalities, program content, and ensuring the appropriateness of written materials.[17,18]

Conclusion

This study investigated the perceived differences in emergency department and urgent care services among college students residing in rural and urban communities. Findings in this study supported health disparities that exist in rural and urban areas. Rural college residents had less confidence in the ability of their hometown ED and UCCs to provide quality care compared to urban residents. The lack of confidence in medical care treatment among rural residents implied lesser use of these services in their hometowns. Thus, travel time, cost, and convenience are additional burdens for those who choose to seek quality medical care services outside their medically underserved communities. Regardless of geographically location, access to quality health care should be available to all people in urban and rural communities. The need to reduce health disparities in rural communities and improve health for all cannot be overlooked. Also need a healthy lifestyle from childhood to adulthood for all the people to keep well. Compliance's rate was sufficiently high to bring positive changes among the patients who followed the measure of compliances for controlling diabetics than those who didn't. Universal availability of maintaining various compliances for controlling diabetics has the potential to improve patient's status on it.

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Conflicts of interest

The author declared that there is no conflict of interest of this research. This is solely research conducted and reported by the author Umme Salma Mukta.

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