Knowledge, Attitude and Practices of Diabetes Mellitus among Patients Visiting Out-Patient Department at A Rural Health Centre of Bangladesh

Sumon Rahman Chowdhury[1*] Shahryar Ahmad[2] Mohammad Mahmudul Hassan[3]
Farzana Mostafa[4] Tasnuva Tanzil[5]

Abstract

Background : Diabetes Mellitus (DM) is a disorder in which the body does not produce enough or respond normally to inculin causing blood sugar levels to be abnormally high. To assess the knowledge, attitude and practices regarding diabetes mellitus and their associated factors among diabetic patients visiting outpatient department of a primary care setting at a rural health center.

Materials and methods: A questionnaire based cross-sectional survey was carried out in the Outpatient Department of a primary level hospital in a poor resource country from February to November 2021. A total of 384 patients aged ≥30 years of either gender with known diabetes mellitus type 2 were included in the study using systematic random sampling technique and interviewed using a pre-tested structuredquestionnaire. Data were analyzed on Statistical Package for Social Sciences (SPSS) version 21 and inferential analysis was performed using chi-square test. The study duration spanned over 9 months.

Results: The study results showed that 257 (66.9%) of the participants had adequate knowledge, 165 (43.0%) had adequate attitude while only 105 (27.3%) had adequate practices related to diabetes mellitus. Moreover, adequateness of attitude was statistically significantly associated with age (p=0.001) and education (p=0.016) while that of practices was also statistically significantly associated with age (p=0.001) and education (p<0.001) of the patients.

Conclusion: Diabetes related attitude and practices of the patients studied were far from satisfactory. Moreover, participants' age and educational status appeared to influence both their attitude and their practices. Further evaluation of study findings using more rigorous designs is recommended.

Key words: Attitude; Diabetes Mellitus; Knowledge; Outpatients.

1. Senior Medical Officer of Diabetes, Endocrinology and Metabolism Chittagong Diabetic General Hospital, Chattogram.
2. Assistant Professor of Endocrinology Chittagong Medical College, Chattogram.
3. Professor of Veterinary Epidemiology, Faculty of Veterinary Medicine Chittagong Veterinary and Animal Sciences University, Chattogram.
4. MPH Student North South University, Dhaka.
5. Junior Consultant of Anaesthesiology Boalkhali Health Complex, Chattogram.

***Correspondence:** **Dr. Sumon Rahman Chowdhury**
Cell : 01670 39 30 31
E-mail: sumonrahman79@yahoo.com

Submitted on : 26.10.2021
Accepted on : 15.12.2021

Introduction

Diabetes Mellitus (DM) is considered a serious public health problem globally as its incidence is increasing mainly in low- and middle-income countries, particularly of type 2 diabetes mellitus. It is a chronic disease characterized by hyperglycemia either due to inadequate production of insulin or defects in insulin secretion or both leading to instabilities of carbohydrate, fat and protein metabolism.[1] It is common worldwide with a number of complications such as diabetic retinopathy, nephropathy and neuropathy that have placed communities all over the world under a great amount of financial stress.[1] As estimated by International Diabetes Federation (IDF) the people living with diabetes mellitus globally in the year 2019 was 463 million (Age 20-79 years) and the figure is projected to rise to 700 million by 2045.[2] Also, International Diabetes Federation estimated the global health expenditure on DM to be around 760 billion in 2019.[3] IDF estimates that nearly half of all people existing with DM are undiagnosed.[2] Proportion of people living with diabetes mellitus type 2 is on the rise globally but this phenomenon is particularly more marked in low-and-middle income countries (Poor resource areas) where 79% of adults with diabetes mellitus are currently living.[4] The disease is largely preventable with a mixture of lifestyle changes and long-term health care management.[5] According to a systematic review, the recent prevalence of diabetes mellitus type 2 in Bangladesh, a poor resource country was 14% up from 5% in 2001.[6] Bangladesh is currently ranked 10th in terms of diabetes mellitus cases globally.[3,6] As per recent International DM Federation (IDF) estimates, 8.4 million adult cases of diabetes mellitus are currently present in Bangladesh and in absence of appropriate interventional strategies, this figure may reach 15 million by 2045.[3] Moreover, Bangladesh is also projected to

have the 10th highest number ofpatients with diabetes mellitus.[7] A recent country-based survey of Bangladesh had shown the prevalence of type 2 diabetes mellitus as 12.8% (95%CI 11.2-14.3) (Men: 12.8%, women: 12.7%) and prediabetes as 14.0% (95% CI 12.6-15.4) (Men: 12.1%, women: 16.5%).[6]

Significant variance regarding diabetes mellitus has been found across countries due to diversities in biology, culture, lifestyle, environment, and socioeconomic status due to predisposition, development, and clinical presentation.[5] A study conducted in Myanmar found prevalence of diabetes mellitus greater in urban (12.1%) than in rural areas (7.1%).[8] In studies conducted in our neighboring country Pakistan, it was found that the urban and rural population variation is also present in these studies.[9-11]

Demographic determinants and poor knowledge for health can be attributed to the epidemiological shift of diabetes mellitus in lower middle income countries.[12] The most substantial method of controlling diabetes mellitus is suggested to be the spread of awareness to motivate people to adopt a healthy lifestyle. Energetic efforts are therefore required to heighten the awareness for early diagnosis, a mechanism for control of the risk factors and disease management of diabetes mellitus as evident from the studies conducted on diabetes mellitus related knowledge, attitude and practices.[13,14] A study from Kuwait reported poor knowledge about the risk factors of diabetes mellitus among the population studied.[15] A study from South Africa reported poor diabetes related management practices among diabetic patients studied.[16] Another study from South Africa reported poor knowledge, negative attitude and poor practices related to diabetes mellitus among adult patients with type 2 diabetes.[17] An earlier study from Bangladesh reported that only 33.5% of the population were able to report any valid causes of diabetes, with approximately 55% being aware of any symptoms of diabetes and approximately 27% able to report ways to prevent the disease. Only 37.5% of respondents were aware of the specific complications of diabetes.[18] Moreover, it also showed that the knowledge of risk factors, management and care of diabetes mellitus was low in the general population of Bangladesh.[18]

Though diabetes mellitus related knowledge, attitude and practices of the patients and its effect on diabetes mellitus management have been evaluated previously, local evidence in poor resource country such as Bangladesh and particularly from rural setting is limited. In the given context, this study was conducted to assess the knowledge, attitude and practices regarding diabetes mellitus and their associated factors among diabetic patients visiting outpatient department of a primary care setting at a diagnostic center in rural area as appropriate knowledge, positive attitude and good practices regarding diabetes mellitus can arguably play a role in its better management.

Materials and methods

A questionnaire based cross-sectional survey was carried out in the Outpatient Department of the hospital in a rural area of the province of Kumira, Sitakunda in a poor resource country, Bangladesh from February to September 2021. Ethical approval for the study was taken from Chittagong Diabetic and General Hospital.

Taking the percentage frequency of the outcome factor to be 50% for a liberal estimate, with 95% confidence level and 5% precision, the minimum required sample size was calculated to be 384 participants. Patients aged ≥30 years of either gender with known diabetes mellitus type 2 were included in the study while patients who did not have diabetes mellitus or who refused to give verbal informed consent was excluded from the study. Systematic random sampling technique was used to include the patients in the study. A pre-tested structured questionnaire was used for participant interviewed by the principal investigator that had been checked both for face validity and reliability. First the face validity was checked by asking the participants how relevant the questionnaire appeared to the study objective; and then the reliability was checked by calculating Cronbach's alpha that was found to be 0.751, showing an acceptable level of internal consistency. It contained questions assessing demographic profile as well as knowledge, attitude and practices of the patients regarding diabetes mellitus type 2. At the completion of data collection, all the responses of outpatients were coded by giving the value of 1 to a correct response and a value of 0 to an

incorrect response. By summing up the scores of dental outpatients, separate indices were generated to assess the adequacy of their knowledge, attitude and practices. Anyone with a score of 70% or above was considered to have adequate knowledge, attitude or practices regarding diabetes mellitus.

Data were analyzed on Statistical Package for Social Sciences (SPSS) version 22. Descriptive analyses were performed by generating frequencies and percentages for categorical variables and means and standard deviations for continuous variables. Inferential analysis was performed using chi- square test whereas the significance level was set at 0.05.

Results

A total of 384 diabetic patients who completed the questionnaire were included in the study. Mean age of the patients was 44.3 ± 1.5 years, 196 (51.0%) were male, 217 (56.5%) were local language (Chittagonian) speaking, 367 (95.6%) were Muslims, 136 (35.4%) were illiterate (Unable to read and write) while 103 (26.8%) had only primary education and 122 (31.8%) had self-business while 165 (43.0%) of them were unemployed. The study results further showed that 257 (66.9%) of the participants had adequate knowledge, 165 (43.0%) had adequate attitude while only 105 (27.3%) had adequate practices related to DM mellitus (Table I).

When we explored the association between demographic factors, e.g, age, gender, education and occupation with adequateness of knowledge wedid not find any significant association. Moreover, it was seen that adequate attitude was statistically significantly associated with age (p=0.01) and education (p=0.016) of the patients where patients in the youngest age group, i.e. 28-50 years, were more likely to have adequate attitude than those in the older age groups, i.e 51-70 years or 71 years or above, (51.2% vs. 35.3% and 21.7% respectively) while patients who had matriculationwere more likely to have adequate attitude than those who were illiterate, studied in Madrasa, had primary, intermediate, graduate or post-graduate education (54.3% vs.52.9%, 40.0%, 32.1%,32.4%, 36.4% and 33.3% respectively). Furthermore, adequateness of practices was alsostatistically significantly associated with age (p=0.001) and education (p=0.001) of the patients where patients in the youngest age group, i.e 28-50 years, were more likely to have adequate attitude than those in the older age groups, i.e 51-70 years or 71 years or above, (35.1% vs. 18.6% and 17.4% respectively) while patients who were graduate were more likely to have adequate attitude than those who were illiterate, studied in Madrasa (Religious schools), had primary to secondary school, intermediate (High school) or post-graduate education (52.3% vs. 23.5%, 26.7%, 18.4%, 23.9%, 44.1% and 10.7% respectively) (Table II).

Table I Participants' knowledge, attitude and practice assessment

Variabes (n=384)	Count (%)
Adequate Knowledge	
Yes	257(66.9)
No	127(33.1)
Adequate Attitude	
Yes	165(43.0)
No	219(57.0)
Adequate Practice	
Yes	105(27.3)
No	279(72.7)

Table II Bivariate analysis of associations between participants' demographic characteristics and their knowledge, attitude and practices

Variables 4 n=38	Knowledge		Attitude		Practices	
	Adequate n=257	Inadequate n=127	Adequate n=165	Inadequate n=219	Adequate n=105	Inadequate n=279
	Count (%)	Count (%)	Count (%)	Count (%)	Count (%)	Count (%)
Gender						
Male	129(65.8)	67(34.2)	78(39.8)	118(60.2)	46(23.5)	150(76.5)
Female	128(68.1)	60(31.9)	87(46.3)	101(53.7)	59(31.4)	129(68.6)
p	**0.637**		**0.2**		**0.082**	
Age						
28-50 yrs	135 (65.9)	70(34.1)	105(51.2)	100(48.8)	72(35.1)	133(64.9)
51-70 yrs	105 (67.3)	51(32.7)	55(35.3)	101(64.7)	29(18.6)	127(81.4)
>71 yrs	17(73.9)	6(26.1)	5(21.7)	18(78.3)	4(17.4)	19(82.6)
p	**0.732**		**0.001**		**0.001**	
Language						
Bengali	22(62.9)	13(37.1)	16(45.7)	19(54.3)	8(22.9)	27(77.1)
Chittagonian	137(63.1)	80(36.9)	100(46.1)	117(53.9)	57(26.3)	160(73.7)
Noakhaliya	37(77.1)	11(22.9)	21(43.8)	27(56.2)	12(25.0)	36(75.0)
Comilla	20(74.1)	7(25.9)	7(25.9)	20(74.1)	5(18.5)	22(81.5)
Chakma	8(57.1)	6(42.9)	3(21.4)	11(78.6)	7(50.0)	7(50.0)
Others	33(76.7)	10(23.3)	18(41.9)	25(58.1)	16(37.2)	27(62.8)
p	**0.22**		**0.232**		**0.193**	
Religion						
Muslim	245(66.7)	122(33.3)	158(43.1)	209(56.9)	104(28.3)	263(71.7)
Hindu	7(77.8)	2(22.2)	6(66.7)	3(33.3)	Nil	9(100.0)
Christian	Nil	1(100.0)	Nil	1(100.0)	1(100.0)	Nil
Other	5(71.4)	2(28.6)	1(14.3)	6(85.7)	Nil	7(100.0)
p	**0.463**		**0.16**		**0.081**	

Education						
Illiterate	90(66.2)	46(33.8)	72(52.9)	64(47.1)	32(23.5)	104(76.5)
Studied in Madrasa	8(53.3)	7(46.7)	6(40.0)	9(60.0)	4(26.7)	11(73.3)
Primary	70(67.9)	33(32.1)	33(32.1)	70(67.9)	19(18.4)	84(81.6)
Matriculate	29(63.1)	17(36.9)	25(54.3)	21(45.7)	11(23.9)	35(76.1)
Intermediate	30(88.2)	4(11.8)	11(32.4)	23(67.6)	15(44.1)	19(55.9)
Graduate	26(59.1)	18(40.9)	16(36.4)	28(63.6)	23(52.3)	21(47.7)
Postgraduate	4(66.7)	2(33.3)	2(33.3)	4(66.7)	1(10.7)	5(89.3)
p	**0.131**		**0.016**		**<0.001**	
Occupation						
Government Employee	49(68.1)	23(31.9)	27(37.5)	45(62.5)	27(37.5)	45(62.5)
Private Sector Employee	18(72.0)	7(38.0)	9(36.0)	16(64.0)	9(36.0)	16(64.0)
Self-Business	77(63.1)	45(36.9)	59(48.4)	63(51.6)	26(21.3)	96(78.7)
Unemployed	113(68.5)	52(31.5)	70(42.4)	95(57.6)	43(26.1)	122(73.9)
p	**0.726**		**0.417**		**0.07**	

Discussion

Present study highlights deficiency in patients' knowledge showing that around 65% of the participants had adequate knowledge, while less than half (43%) had adequate attitude and only 27.3% had adequate practices related to diabetes mellitus. The rates of awareness of diabetes mellitus was comparable to that seen in some other studies done in the country.[18, 19]

The study results showed that education of participants was significantly associated with both their attitude and practices related to diabetes mellitus, but not with their knowledge. Literature revealed that level of education is directly linked with the knowledge about diabetes mellitus among respondents. With an increase in their awareness, it is hoped that the attitude and practices of individuals will be naturally influenced in a positive way.

Studies have also shown that family history of diabetes mellitus is related with knowledge regarding the disease, as one learns about the disease and how to take care of family members. Those who take care of family members are aware of the disease, but unfortunately this was not the case in our study since the patients had limited access to health care professionals especially in rural areas. This also highlights the roleof healthcare personnel, inparticular family physicians and professionals in health education, who need to educate the general community about diabetes mellitus and other chronic diseases especially in poor resource areas.

As seen in our study, earlier research done in Bangladesh has also shown that adequate awareness is not present in the masses regarding diabetes mellitus, proper medications use, modifications in life style, changes in the dietary plans, misconceptions about insulin and other related complications of diabetes mellitus probably due to lack of educational programs.[18,20-21] Moreover, research shows that taking medications on time is the only common practice done for management of diabetes mellitus.[22] As compared to urban areas, rural areas lack adequate knowledge due to insufficient health education, so it is recommended that there should be public awareness programs about diabetes mellitus among the masses targeting diabetic and non-diabetic patients in such rural settings since Bangladesh is a poor resource country where diabetes can escalate to make it the ninth highest in the world in the near future.[7]

Findings from our study and previous similar work shows that diabetic patients are poorly educated in general and more so in under privileged population such as rural settings, so providing them and their family members with awareness opportunities could prove to be more effective in bringing about the desired lifestyle changes and reducing the increasing burden of diabetes outcome.[18]

Limitations

It is acknowledged that this study has two important limitations. As the majorityof our respondents did not have any formal education, translation bias may have been introduced by the interviewer to a certain extent. Moreover, interview-based assessment of participants' practices instead of observing them due to time constraint was another limitation of the study.

Conclusion

Though a majority of participants had adequate knowledge, only a minority of them had the will or adequate attitude and practices regarding diabetes mellitus. Moreover, participantsage and educational status appeared to influence both their attitude and their practices. Further evaluation of study findings using more rigorous interventional studies is recommended.

Recommendations

In light of the study findings, it is imperative that masses, specially is rural areas in such poor resource countries are given diabetes mellitus related awareness on priority basis to reduce the burden of disease. For this purpose, all available

outreach techniques such as awareness campaigns on print and electronic media, seminars, free educational camps and one to one educational method should be used.

Acknowledgment
We would like to thank the Department of Diabetes, Endocrinology and Metabolism at Chittagong Diabetic General Hospital for giving us the permission to conduct the research in the rural health centre. Moreover, this research did not receive any specific grant from funding agencies in the public, commercial or not-for-profit sectors.

Contribution of authors
SRC - Conception, design, acquisiation of data & manuscript writing & final approval.
SA-Acquisation of data, data analysis, interpreitation of data & final approval.
MMH - Design, critical revision & final approval.
FM-Data analysis, critical revision & final approval.
TT-Acquisation data, drafting & final approval.

Disclosure
All the authors declared no competing interests.

References
1. World Health Organization. Classification of Diabetes Mellitus 2019.
https://apps.who.int/iris/bitstream/handle/10665/325182/%209789241515702-eng.pdf?sequence=1& isAllowed=y [Accessed 14th June 2019].

2. Cho N, Shaw JE, Karuranga S, Huang Y, da Rocha Fernandes JD, Ohlrogge AW. et al. IDF Diabetes Atlas: Global estimates of diabetes prevalence for 2017 and projections for 2045. Diabetes Res Clin Pract. 2018;1:138:271-281.

3. International Diabetes Federation. IDF Diabetes Atlas 9th edition 2019.
http://www.idf.org/diabetesatlas [Accessed 14th June 2019].

4. Bommer C, Sagalova V, Heesemann E, Goehler MJ, Atun R, Bärnighausen T et al. Global economic burden of diabetes in adults: projections from 2015 to 2030. Diabetes Care. 2018; 1; 41 (5): 963-997.

5. Hills AP, Misra A, Gill JM, Byrne NM, Soares MJ, Ramachandran A et al. Public health and health systems: Implications for the prevention and management of type 2 diabetes in South Asia. Lancet Diabetes Endocrinol. 2018; 1; 6 (12): 992- 1002.

6. Islam RM, Khan MN, Oldroyd JC, Ranad J, Chowdhury EK et al. Prevalence of diabetes and prediabetes among Bangladeshi adults and associated factors: Evidence from the Demographic and Health Survey, 2017-18. medRxiv. 2021.01.26.21250519.

7. International Diabetes Federation. Diabetes in Bangladesh. 2015.
http://www.idf.org/membership/mena/Bangladesh [Accessed 14th June 2019].

8. Aung WP, Htet AS, Bjertness E, Stigum H, Chongsuvivatwong V et al. Urban-rural differences in the prevalence of diabetes mellitus among 25-74-year-old adults of the Yangon Region, Myanmar: two cross-sectional studies. BMJ Open. 2018;30;(3):e020406.

9. Meo SA, Zia I, Bukhari IA, Arain SA. Type 2 diabetes mellitus in Pakistan: Current prevalence and future forecast. J Pak Med Assoc. 2016; 66 (12): 1637- 1642.

10. International Diabetes Federation. Diabetes in Pakistan 2015.
http://www.idf.org/membership/mena/Pakistan [Accessed 14th June 2019].

11. Aamir AH, Haq UZ, Mahar SA, Qureshi FM, Ahmad I, Jawa A et al. DiabetesPrevalence Survey of Pakistan (DPS-PAK): Prevalence of type 2 diabetes mellitus and prediabetes using HbA1c: A population-based survey from Pakistan. BMJ Open. 2019; 1; 9 (2): 1- 9.

12. Demaio AR, Otgontuya D, Courten DM, Bygbjerg IC, Enkhtuya P, Oyunbileg J et al. Exploring knowledge, attitudes and practices related to diabetes in Mongolia: A national population- based survey. BMC Public Health. 2013; 13 (1): 236.

13. Zaman JM, Patel A, Jan S, Hillis GS, Raju PK, Neal B, et al. Socio-economic distribution of cardiovascular risk factors and knowledge in rural India. Int J Epidemiol. 2012; 16; 41 (5): 1302-1314.

14. Maskari AF, Sadig EM, Kaabi AJM, Afandi B, Nagelkerke N, Yeatts KB. Knowledge, attitude and practices of diabetic patients in the United Arab Emirates. PLoS One. 2013; 14; 8 (1): 1-8.

15. Carballo M, Mohammad A, Maclean EC, Khatoon N, Waheedi M, Abraham S. Knowledge, attitudes, behaviours and practices towardsdiabetes mellitus in Kuwait. East Mediterr Health J. 2018;1:24(11).

16. Shilubane H, Netshikweta L, Ralineba T. Beliefs and practices of diabetic patients in Vhembe district of Limpopo Province. Afr J Prim Health Care Fam Med. 2016;8(2):1-6.

17. Roux ML, Walsh C, Reid M, Raubenheimer J. Diabetes-related Knowledge, Attitude and Practices (KAP) of adult patients with type 2 diabetes mellitus in the Free State province, South Africa. South Afr J Clin Nutr. 2019;32(4):83-90.

18. Fottrell E, Ahmed N, Shaha SK, Jennings H, Kuddus A. Diabetes knowledge and care practices among adults in rural Bangladesh: A cross-sectional survey. BMJ Glob Health. 2018; 3(4): e000891.

19. Feng L, Naheed A, Silva DHA, Jehan I, Raqib R, Islam MT et al. Regional Variation in Comorbid Prediabetes and Diabetes and Associated Factors among Hypertensive Individuals in Rural Bangladesh, Pakistan, and Sri Lanka. J Obes. 2019; 2019: 1- 11.

20. MakkiAwouda FO, Elmukashfi TA, Al-Tom SAH. Effects of Health Education of Diabetic Patient's Knowledge at Diabetic Health Centers, Khartoum State, Sudan: 2007-2010. Global J Health Sci.2014;6(2):221-226.

21. Hussain A, Ali I. Diabetes mellitus in Pakistan: A major public health concern. Arch Prama Pract. 2016; 7 (1): 30- 32. Azar ST, Malha LP, Zantout MS, Naja M, Younes F, Sawaya MT. Management and Control of Patients with Type 2 Diabetes Mellitus in Lebanon Results from the International Diabetes Management Practices Study (IDMPS). J Med Liban.2013; 103(886):1-5.