Original Article

https://doi.org/10.3329/cbmj.v14i2.83279

Prevalence of Type 2 Diabetes Mellitus among Hypertensive Patients Attending in A Tertiary Level Hospital in Bangladesh

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Abstract

This cross-sectional, descriptive study was conducted in the Department of Cardiology of Community Based Medical College, Bangladesh (CBMC,B) Hospital, Mymensingh, Bangladesh, between January and June of 2023, among the hypertensive patients to estimate the prevalence of type 2 diabetes mellitus and pre-diabetes (PD). A total of 93 patients with hypertension were purposively selected. Previously diagnosed diabetic patients were excluded from the study. Sociodemographic data were collected by face-to-face interview by using a pre-tested questionnaire. Fasting blood glucose and 2 hours after 75 gm glucose load were estimated by auto analyzer. Age, gender, weight and height and blood pressure were estimated. Body mass index (BMI) was estimated from body weight and height of the patients. Overall, DM was 21.5% and PD was 10.8% (IFG 1.1%, IGT 9.7%) evident in this study. Male showed higher prevalence of type 2 diabetes compare to female. Sex, age, occupation, education, sedentary lifestyle, increase frequency of rice eating showed no statistical significance with DM. All stages of hypertension, middle class economic status, overweight, depressives, family history of diabetes and smoking showed positive association with diabetes. Hypertension and PD showed no significant association.

CBMJ 2025 July: vol. 14 no. 02 P:121-125

Keywords: Hypertension, diabetes mellitus, pre-diabetes, impaired glucose tolerance

Introduction

Coexistence of hypertension and diabetes mellitus have been evident in different studies,[1,2] and both of them may be seen together in metabolic syndrome.[3,4] Prevalence of pre-diabetes was evident 25% among the hypertensive patient in a study.[5] Impaired fasting glucose (IFG) and Impaired glucose tolerance (IGT) individuals are the pre-diabetes patients, who do not manifest any symptoms of impaired glucose metabolism, but are at risk of developing cardiovascular and diabetes mellitus (DM).[6,7] Incidence and Prevalence of DM are increasing rapidly worldwide.[8] To identify DM and pre-diabetes (PD) among the hypertensive patients can help to reduce the cost of treatment and cardiovascular morbidity and mortality by changing life style.[8-10,11] Hence, we proposed this study to observe the prevalence of type 2 diabetes mellitus (DM) and pre-diabetes (PD) among hypertensive patients in tertiary level hospital of Bangladesh.

Methods

This cross - sectional, descriptive study was conducted, between January and June 2023, among hypertensive patients reported to the Department of Cardiology of Community Based Medical College, Bangladesh (CBMCB) Hospital, Mymensingh, Bangladesh. A total of 93 hypertensive patients were selected for this study through purposive sampling procedure. Previously diagnosed cases of diabetes mellitus excluded from the study. Sociodemographic information was collected through face-to-face interview by using a closed type interview schedule.

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Overnight fasting glucose and 2 hour after 75 gram glucose load estimated by a clinical chemistry auto analyzer. Blood pressure of the patient was measured by aneroid type of sphygmomanometer. A modern bathroom scale was used for weight estimation. Weight of study samples were taken with light cloth without shoes. A wall mounted measuring tape was used for height measurement. Sample unit was stand in erect posture on a flat surface with wall mounted measuring tape and height was taken to the nearest centimeter. BMI was calculated by using formula weight in kg/m^2. Obesity was assigned by interpretation of BMI. Following data collection, data input was done. The collected data was assessed for completeness, accuracy, and consistency before analysis. Statistical analysis was carried out using Statistical Package for Social Sciences (SPSS) version 23.0 for windows. Data was expressed as frequency and percentage. Chi-square tests were done to see the association of diabetes with the contributing factors. A p-value <0.05 was considered as statistically significant.

The study was approved by the Ethical Review Committee of Community Based Medical College, Bangladesh (CBMCB), Mymensingh, Bangladesh.

Results

In this study, 41-50 years and 51-60 years age groups were almost same quantity (32.3%, 30.1% respectively) and formed main bulk of study population. Age group of 60 years and above was 25.8%. 30-40 years age group was less (11.8%). Muslim and non-Muslim ratio was 33:17. Male (60.2%) participants were more than female (39.8%). Following the World Health Organization (WHO) criteria, all the hypertensive participants were classified into stage 1, stage 2 and stage 3. Stage 1 hypertensive was highest percent (51.6%).

Agricultural (31.2%) and service holder (31.7%) were almost same percent. 28.0% was housewife and a least percent (9.7%) was the businessman. Literates (53.8%) were more than illiterates (46.2%). Middle class people (69.9%) formed the major portion of the population and this followed by poor (21.5%) and rich (8.6%). Overweight subjects (64.5%) were almost double than normal (33.3%) BMI. Underweight was minimum percent (2.2%). Smoker (66.7%) was double than non-smoker (33.3%). Maximum percent (95.7%) found to be non-sedentary lifestyle and only 4.3% people had sedentary life. 67.7% people eat rice three times a day while 31.2% two times and 1.1% one time (Table-I). Impaired fasting glucose and impaired glucose tolerance were observed in 1.1% and 9.7% respectively, while diabetes mellitus (DM) was detected in 21.5% among the study subjects (Table-II). There is no association between gender of the respondent and diabetes mellitus (P=0.591). Similarly, age was not associated with diabetes (P=0.711). Hypertension was strongly associated with diabetes mellitus (P=0.002). There is no association between occupation and diabetes (P=0.588). No association was evident in between education and diabetes mellitus (P=0.900). A significant association was found in between economic status of the respondents and diabetes mellitus (P=0.030). Overweight or obesity was associated with diabetes mellitus (P=0.042). Sedentary lifestyle was not associated with diabetes mellitus (P=0.156). A significant association was evident in smoking and diabetes (P=0.012). People with family history of diabetes have strong association with diabetes (P=0.000) and an association was evident in between depression and diabetes mellitus (P=0.053). However, no association observed between frequency of rice eating and diabetes (P=0.137) (Table-III).

Table-I: Socio-demographic characteristics of the study subjects (n=93)

Variables		Frequency	Percentage
Age group	30-40	11	11.8
	41-50	30	32.3
	51-60	28	30.1
	60 and above	24	25.8
Gender	Male	56	60.2
	Female	37	39.8
Hypertension	Stage 1	48	51.6
	Stage2	36	38.7
	Stage3	09	9.7
Religion	Non-muslim	32	34.4
	Muslim	61	65.6
occupation	Agriculture	29	31.2
	Business	9	9.7
	Service holder	29	31.7
	Housewife	26	28.0
Education	Illiterate	43	46.2
	Literate	50	53.8
Economic status	Poor	20	21.5
	Middle class	65	69.9
	Rice	08	8.6
Body mass index (BMI)	Normal	31	33.3
	Underweight	02	2.2
	Over weight	60	64.5
Smoking	Smoker	62	66.7
	Non-smoker	31	33.3
Sedentary lifestyle	No	89	95.7
	Yes	04	4.3
Depression	No	57	61.3
	yes	36	38.7
Rice eating habit	3 times a day	63	67.7
	2 times a day	29	31.2
	One time a day	01	1.1
Family history of diabetes	No	88	94.6
	Yes	05	5.4

Table-II: Distribution of impaied fasting glucose, impared glucose tolerance and diabetes mellitus

Variables		Frequency	Percentage
Impaired fasting glucose (IFG)	No	92	98.9
	Yes	01	1.1
Impaired glucose tolerance (IGT)	No	84	90.3
	Yes	9	9.7
Diabetes mellitus (DM)	No	73	78.5
	Yes	20	21.5

Table-III: Association between diabetes mellitus and compounding variables

Diabetes Mellitus	Chi-square value	Df	P value
Gender	0.289	1	0.591
Age	20.666	25	0.711
Hypertension	12.327	2	0.002
Occupation	1.925	3	0.588
Education	0.016	1	0.900
Economic status	7.011	2	0.030
Body mass Index	4.774	2	0.042
Smoking	6.242	1	0.012
Sedentary life style	2.01	1	0.156
Family history of diabetes	19.287	1	0.000
Depression	3.759	1	0.053
Rice eating	3.982	2	0.137
IGT	3.701	2	0.157
IFG	1.601	2	0.449

Discussion

In this study, muslims were more than non-muslims among the sample size of 93. Male subjects (60.2%) were greater than female (39.8%). Professions of agriculture (31.2%) and service holder (31.7%) were almost same. housewife was 28.0% with minimum percent (9.7%) of businessman. Literates (53.8%) were more than illiterates (46.2%) though it was below the national level of literacy (74.5%). among the study subjects' middle class (69.9%) which is more than national level (25%), it is due to increased income generating source. Poor was 21.5% and minimum percent of rich (8.6%). Overweight subjects

were 64.5% which was higher than that of a study done in Kuwait[12] and it was almost double than normal (33.3%) weight. This overweight probably the changes of lifestyle, dietary habit and increased physical inactivity of study subjects. Underweight was very negligible (2.2%) due to health consciousness and economic improvement. More diabetes found among male subject (11.8%) than female (9.7%) which was comparable with the study done in Kuwait.[12] Gender difference was not statistically significant; (P=0.591). Age standard diabetes was not significant in this study (P=0.711) which was not comparable with the study done in Kuwait.[12] Smoker (64.5%) almost double than non-smoker (33.3%). This higher prevalence of smokers possibly habit developed from childhood by seen among peer group and easily availability of cigarettes. Smoking causes microvascular complications of diabetes and even have a role in the development of type 2 diabetes.[13] Prevalence of diabetes was higher noted (29.6%) among the smoker than non-smoker (6.45%); (P=0.012), which co-relates with prospective study of cigarette smoking.[14] Sedentary lifestyle or physical inactivity is a risk factor of pathogenesis of type 2 diabetes.[15] Fortunately, less sedentary lifestyle (4.3%) people was noted in this study; possibly they did household works and was satisfied with what they had. Increase frequency of rice eating habit (i.e., 3 times a day – 67.7%) was noted in this study (P=0.137). It is the traditional habit and principal food of the people in this locality as more rice cultivated in this region, not the real picture of whole country. IFG was less (1.1%) than IGT (9.7%) and IFG was much less than that of the study done in Kuwait (8%).[12] IGT was higher as compared to a Nigerian study (5%).[5] In our study, type 2 diabetes was found in 21.5% hypertensive patients, which was higher than the findings of the study done in Nigeria[5] (14%) and lower than the study done in Kuwait (52.8%).[12] Overall, pre-diabetes was 10.8% which was less than the Nigerian (25%) study.[5] Same percent (7.5%) of diabetes was evident in both stage 1 and stage 2 hypertensive and in stage 3 it was 6.5%, which is comparable to an Indian study (P=0.002).[16] Middle class people showed higher prevalence of diabetes mellitus (19.35%) than rich people (2.15%). This is probably due to the change in lifestyle and food habit, which may be influenced by improvement of economic status of middle class people. This finding did not correlate with the study conducted among the middle class people in Bangladesh.[17] Significant association was evident between poor people and DM (P=0.030). Overweight is a significant risk factor of diabetes and pre-diabetes. A high prevalence of DM (18.3%) among the overweight subjects (P=0.092) comparable to the study done in Bangladesh.[17] People who had family history of diabetes showed higher prevalence of DM than those who had no family history of diabetes (P=0.000), which is also comparable to the study done in Bangladesh.[17] Non-depressive people showed more prevalence (17.2%) of diabetes than depressives (4.3%) (P=0.053), which does not correlate with the study done in the UK.[18]

Conclusion

The prevalence of type 2 diabetes mellitus (DM) among the hypertensive patients was high (21.5%). Prevalence of DM in all stages of hypertension was more or less the same and male predominance was observed. Some risk factors identified were hypertension, obesity, family history of DM, economic status, smoking and depression. However, no association was observed with age, gender, sedentary lifestyle.

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