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Original Article

Associated Risk Factors among the Type 2 Diabetes Patients Attended at Chattogram Diabetic General Hospital

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Background: *Diabetes Mellitus (DM) is a metabolic illness characterized by hyperglycemia due to inadequate insulin synthesis by pancreatic beta (β) cell or insulin resistance. Awareness of associated risk factors of Type 2 Diabetes Mellitus (T2DM) can decrease complications as well as mortality. The present study was done to describe the associated risk factors among the T2DM patients attended at a tertiary care hospital.*

Materials and methods: *A descriptive study was conducted at Chattogram Diabetic General Hospital from December 2021 to June 2022.A total of 400 diabetic respondents, aged 45-90 years, were recorded. Data regarding associated risk factors were collected by using a pretested, semi-structured questionnaire. Statistical analysis was done using SPSS (Statistical Package for Social Science) version 20.*

Results: *Results demonstrate that, 45-55 years age group was more affected (62.3%) and positive family history also shown more occurrence of T2DM in female (55.8%). Majority of the female participants without physical activity (43.3%) were diagnosed T2DM and also observed that the female who intake more carbohydrate (40.5%) and being overweight were identified as T2DM.*

Conclusions: *By modifying lifestyle (Less carbohydrate intake, weight reduction and more physical activity) the occurrence of T2DM might be reduced.*

Key words: Attitude; Awareness; Diabetes; Risk factor.

INTRODUCTION

Diabetes mellitus is a metabolic and one of the most common Non-Communicable Diseases (NCDs). It is characterized by hyperglycemia which is caused by inadequate insulin synthesis or a lack of insulin response.[1] Diabetes mellitus etiologies are a complicated mixer of genetics, environmental influences, and lifestyle decisions.[2]

It was one of the top ten causes of death for adults and resulted in four million fatalities globally in 2016. Diabetes-related medical costs were projected to be USD 727 billion in 2017.[3] The anticipated prevalence of diabetes worldwide in 2019 was 9.3% (463 million people) and it is expected to increase to 10.2% (578 million) by 2030 and 10.9% (700 million) by 2045.[4] Diabetes was always thought to be a disease of the wealthy, but it has now become a major public health issue in low- and middle-income countries, affecting South Asians in particular.[5]

The majority of diabetic patients in Bangladesh are T2DM and the risk of developing T2DM is determined by both modifiable (Obesity, sedentary lifestyle, diet, smoking, physical and emotional stress) and non-modifiable (Family history of diabetes, age, race/ethnicity) factors related to rapid urban growth and changing

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lifestyle (i.e. obesity, sedentary lifestyle, diet, smoking, physical and emotional stress).[2,5,6] The rising prevalence of T2DM suggests that previous preventative measures, such as increasing physical activity and promoting a healthy diet, have not resulted in population-level gains. The essential approaches for managing the condition are early detection of modifiable factors and systematic treatment monitoring.[7]

In Bangladesh, several epidemiological studies have been conducted on T2DM in adults which mainly focused on treatment compliance and complications.[1,2,6,8,9,10,11] For that reason clinical significance of T2DM is poorly understood in our country perspective. Considering this fact, the main goal was to describe the distribution of associated risk factors (Modifiable and Non-modifiable) for type 2 diabetes among the patients of Chattogram Diabetic General Hospital.

MATERIALS AND METHODS

This is a descriptive type of study took place in Chattogram Diabetic General Hospital, Chattogram. The study population comprised of diagnosed patients with T2DM attended indoor and Outdoor Patient Departments. The study was carried out from December 2021 to June 2022 and data collection was started from the 1st week of January 2022 to 30th January 2022. A convenient type of sampling method was used and data collected by face-to face interview by using a self-administered structured questionnaire after taking written informed consent from the participants. From the participant's prescription book, information regarding their height, weight and blood glucose was recorded.

Ethical approval for this study was received from Ethical Review Committee of CVASU (CVASU/Dir (R&E) EC/2021/2073(6) Date: 22/9/2021). After ethical permission, an application was submitted to Chattogram Diabetic General Hospital for collection of data and permission was given by Chattogram Diabetic General Hospital (S.L. No. 13).Patients consents were also taken before filling out the questionnaire.

A total of 400 diabetic patients, both male and female of 45 to 90 years age range were selected. All the patients were diagnosed with T2DM. Pregnant or lactating women up to 12 weeks post-partumwere excluded to avoid gestational diabetes cases. The sample was determined according to the formula described by Hoque.[12]

Total 400 patients, both male and female were selected from outdoor and indoor of the Chattogram Diabetic General Hospital for the study.

According to American Diabetes Association (2022) Pre-prandial capillary plasma glucose 80–130 mg/dL (4.4–7.2 mmol/L) and Peak postprandial capillary plasma glucose <180 mg/dL (10.0 mmol/L) was considered as controlled blood glucose.[13]

Body mass index was calculated using weight in kg divided by height in meter^2. According to WHO, BMI of adult: Underweight (BMI< 18.5) Normal (BMI 18.5-24.9) Overweight (BMI 25-29.9) and Obese (BMI ≥30) .

Data were examined and confirmed for consistency and the elimination of mistakes after data collection.Data was collected by both qualitative and quantitative method. All quantitative data were compared by unpaired-test, and all qualitative data were compared by Chi-square test, using a statistical software (SPSS).

The Statistical Packages for Social Sciences (SPSS) version 20.00 was used for data entry and analysis. Descriptive statistics were computed after categorizing the continuous variables (Presented as frequencies). Non Modifiable risk factor (Age categorized as 45-55 years, 56-65 years, 66-75 years and 76 or above). Family history (Positive and negative) and Modifiable risk factors like food habit (Carbohydrate, Protein and Fat which is categorized as less intake and more intake)

RESULTS

Among 400 participants, highest number of participants were present in the 45-55 years age group which was 62.3% (Table I).

Table I Age-wise distribution of study participants (n=400)

Age (Years)□	Range□	Mean ± SD
□	45 – 88□	54.76 ± 8.806
Age Group□	Frequency□	Percentage (%)
45 -55□	249□	62.3□
56 – 65□	102□	25.5□
66 – 75□	40□	10.0□
76 and above□	9□	2.3□

In this study, the male and female mean age was 55.9 years and 53.63 years respectively (Table II).

Table II Gender-wise distribution of study participants (n=400)

Gender□ □	Frequency□ □	Percentage (%)□ □	Mean age□ (Years)	±SD
Male□	199□	49.7□	55.9□	±9.20
Female□	201□	50.3□	53.63□	±8.25

Most male participants were businessmen (24.3%) and female participants were housewives (43%). Less than half of the male participants (42.5%) reported positive family history of T2DM where as in case of female participants itwas more than half (55.8%). The majority of male (31.5%) and female (43.8%) participants were found doing less physical activity. Carbohydrates intake was higher in most of the participants (76.3%) (Table III).

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Table III Distribution of study participants according to risk factors (Occupation, Family history, Physical activity, Food habit) (n=400)

Occupation	Total (400)	Male (199)	Female (201)
Businessmen	100 (25.1%)	97(24.3%)	3(0.8%)
Service holder	60 (15.1%)	51 (12.8%)	9 (2.3%)
Farmer	11 (2.8%)	11 (2.8%)	0
Housewife	172 (43.0%)	0	172 (43.0%)
Others	57 (14.3%)	40 (10.0%)	17 (4.3%)
Family history			
Yes	197 (49.2%)	86 (42.8%)	111 (55.8%)
No	203 (50.8%)	115 (57.2%)	88 (44.2%)
Physical activity (Walking etc.)			
Yes	101 (25.3%)	73 (18.3%)	28 (7.0%)
No	299 (74.8%)	126 (31.5%)	173 (43.3%)
Food habit			
Carbohydrate			
More intake	305 (76.3%)	143 (35.75%)	162 (40.5%)
Less intake	95 (23.8%)	56 (14%)	39 (9.75%)
Protein			
More intake	217 (54.3%)	107 (26.75%)	110 (27.5%)
Less intake	183 (45.8%)	92 (23%)	91 (22.75%)
Fat			
More intake	170 (42.5%)	82 (20.5%)	88 (22%)
Less intake	230 (57.5%)	117 (29.25%)	113 (28.25%)

Most of the participants were overweight (45%) where as 37.5% were normal weight and 17.5% were obese found in Table IV.

Table IV BMI (Body Mass Index)-wise distribution of study participants (n=400)

BMI (kg/m^2)	Number	Percentage (%)
Normal weight	150	37.50
Over weight	180	45
Obese	70	17.5

The male mean BMI was 25.62 kg/m^2 and the female mean BMI was 27.59kg/m^2 (Table V).

Table V Gender-wise BMI (body mass index) distribution of study participants (n=400)

Gender	Number	Mean BMI (kg/m^2)	±SD
Male	199	25.62	±2.83
Female	201	27.59	±4.21

DISCUSSION

The goal of the current study was to describe the associated risk factors of T2DM which will reduce the disease progression and thus reduce the disease related complications.

Total 400 patients were included in this study, among them mean age (54.76 years) and age range (45-88) were similar with the result of Koopman who found type 2 diabetes mellitus was diagnosed at 52.0 years.[14] Participants of 55-59 years had a higher chance to develop type 2 DM compared to 35-39 years found by Chowdhury.[9]

In this study, male and female mean age of diabetes was 55.9 years and 53.63 years respectively where females were younger than male, which coincide with Meisinger and Hussain.[15,16]

In this study most of the male participants were businessmen and females were housewives. Other research in India has revealed similar results.[17] This link between diabetes and occupation could be due to a combination of employee inactivity, housewife stress and work-related stress.[18]

The current study found compliance of positive family history with T2DM and it is common in females (55.8%). A study of siblings found that having a parent with diabetes predicts the likelihood of developing diabetes strongly and independently.[19]

It has been reported that, people who had less physical activity and sedentary lifestyle (Such as sitting, watching TV and less working, etc.) are more likely to develop T2DM.[20] In the present study 31.5% male and 43.3% femalehad less physical activity. Doing physical exercise (Such as walking, aerobic exercise, strength training, flexibility exercises and so on) utilize and maintained blood glucose level, improve insulin sensitivity which prevent T2DM.

Importantly, this study found that, people who take more carbohydrate were diabetic by using the 'Healthy Eating Plate' of Harvard T.H. Chan School of Public Health as a guide. Similarly, a study done by Bifound a strong association with higher sugar-sweetened beverage consumption and T2DM.[21] The Nurses' Health Study (NHS) found that diet quality is crucial in the development of diabetes, regardless of BMI or a number of other risk factors. Higher dietary glycemic load and trans-fat intake are linked to an increased risk of diabetes.[22]

Our study has revealed that, almost half of the participants (45%) were overweight which is coincide with Wang.[23]

LIMITATIONS

There are some limitations present in this study which is considered when the results are analyzed. Convenience sampling was used to choose the participants. Further more, the sample size was relatively small. Therefore, the current study's findings might not fully reflect normative views and the investigation was carried out on a minimal scale because of time and resource constraints.

CONCLUSION

Less physical activity, more carbohydrate intake and being overweight are the modifiable factors that contribute to occur T2DM. Besides this some Non modifiable factors like positive family history, age (45-55 years) also contributes for occurring T2DM. Considering both factors it might be helpful for the reduction of T2DM occurrence, disease progression and complications.

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RECOMMENDATIONS

This study will help to identify modifiable and non-modifiable risk factors of type 2 diabetes mellitus. Modifiable risk factors like obesity, less physical activity, high carbohydrate intake. By changing it (Weight reduction, changing lifestyle, doing physical activity, taking protein and fibers instead of more carbohydrate) educating people and by creating awareness type 2 diabetes mellitus can be prevented.

Non-modifiable risk factors like positive family history cannot be changed. But early diagnosis and properly controlled type 2 diabetes mellitus by maintaining healthy lifestyle and regular medical check-ups can prevent early complications, which causes many sufferings and may cause death.

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DISCLOSURE

All the authors declared no competing interest.

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