

An Observational Assessment of the Association between Family History & BMI with Diabetes and Pre-Diabetes

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Abstract

Aim: The aim of the present study was to assess the association between family history with diabetes and pre-diabetes in an urban area of Bihar.

Methods: The present cross-sectional study was conducted in the Department of Community Medicine, Govt. Medical College & Hospital, Purnea (Bihar) for the period of 6 months among 510 respondents of 20-65 year age group in urban area of Bihar. In which 305 male and 205 females were interviewed by using pretested semi structured interview schedule. In the present study, 10 patients were excluded and total 500 patients were included in the study.

Results: The result displayed that association of positive family history and risk of diabetes mellitus. Positive family history was observed more among pre-diabetics 33.34% and diabetics 25% as compared to respondents with normal blood glucose level 20%. The association was found to be statistically significant. The finding (table 3) shows the statistically significant association was observed between family history and BMI. More than 50% respondents who had positive family history of diabetes have high BMI.

Conclusion: Based on our finding, it is possible that advancing age and obesity has increased in pre-diabetes. This highlights the importance of population based survey to monitor blood glucose for effective prevention and control.

Keywords: Capillary blood glucose, Diabetes mellitus, family history, Pre-diabetes, Prevalence

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Introduction

Diabetes is fast becoming the epidemic of the 21st century. [1] Over the past 30 years, the status of diabetes has changed from being considered as a mild disorder of the elderly to one of the major causes of morbidity and mortality affecting the youth and middle-aged people. [2] It is estimated that 20% of global burden of

diabetes is in South East Asian Region (SEAR), which will triple to 228 million by the year 2025 from the current 84 million. [3] World Health Organization (WHO) has projected the maximum increase in diabetes would occur in India. [4] The International Diabetes Federation (IDF) estimates the total number of

diabetic subjects to be around 40.9 million in India and this is further set to rise to 69.9 million by the year 2025. [1] According to the National Urban Diabetes Survey, the prevalence of diabetes and pre-diabetes were 12.1% and 14%, respectively. [5]

Persons with pre-diabetes have a 20-30% risk for growth of diabetes after 5-10 years. [6] In a study in Iran, the incidence of diabetes mellitus was 13.1% in persons with impaired fasting glucose (IGT) during 4 years. [7] Also, impaired fasting glucose or pre-diabetes increased the risk of cardiovascular disease. [8]

According to the World Health Organization (WHO) criteria, the prevalence of known diabetes was 5.6% and 2.7% among urban and rural areas, respectively. [9] India is declared as the diabetic capital of the world with 32.7 million cases and the number is expected to rise. The association between family history of diabetes and risk for the disease has been well documented. [10-12] Recent studies have shown the graded and independent contribution of a positive family history to the increasing risk for diabetes in the U.S. population. [13,14] Family history has been shown to be a risk factor for a majority of chronic diseases of public health significance, including cardiovascular disease, diabetes mellitus etc. [15] Family history of diabetes is not only a risk factor for the disease but is also positively associated with risk awareness and risk-reducing behaviours. It may provide a useful screening tool for detection and prevention of diabetes. [16]

The aim of the present study was to assess the association between family history with diabetes and pre-diabetes in an urban area of Bihar.

Materials and Methods

The present cross-sectional study was conducted in the Department of Community Medicine, Govt. Medical

College & Hospital, Purnea (Bihar) for the period of 6 months among 510 respondents of 20-65 year age group in urban area of Bihar. In which 305 male and 205 females were interviewed by using pretested semi structured interview schedule.

Inclusion criterion:

1. Known cases of diabetes – Person who is on drug treatment for diabetes.
2. Family History of diabetes – Subjects with either or both parents having diabetes were considered to have positive family history.

Exclusion criteria:

Pregnant women and known cases of diabetes respondents were excluded from this study. Known diabetes respondents were included only in screening for prevalence estimation. Pregnant women were excluded due to possible glucose tolerance status in this group due to pregnancy.

Methodology

In the present study, 10 patients were excluded and total 500 patients were included in the study. Visits were made one day prior to inform each respondents remain empty stomach overnight (at least 8hours) and get their blood sugars checked on the following. Consent was taken to all respondents. Information was collected on family history with the help of semi-structured pretested questionnaire. Next day morning between 6am-8am, blood sample was collected for the purpose of estimation of fasting capillary glucose with the help of glucometer. Fasting blood glucose level was also informed to all the respondents along with the education on prevention of diabetes & place of treatment for individuals with higher blood sugar. Chi-square test was applied for see the association. $P < 0.005$ was considered to be statistically significant. Approval for this study was taken from the ethics committee.

Following definitions & criterion were taken into consideration in the study:

Fasting Capillary blood glucose level techniques (According to WHO-2006. people who have 110 mg/dl to 125 mg/dl fasting plasma glucose are pre-diabetic and those higher than 126 mg/dl are diabetic) measured with the help of Glucometer. Family history of was obtained from each

subject and classified into three groups, viz. 1= no family history of diabetes mellitus, 2= one parent affected and 3= both parents and siblings affected. WHO, 2008 criteria was used to assess the BMI. People who have <18 BMI are underweight, 18-24.9 normal weight and 25-30 overweight and >30 are obese.

Results

Table 1: Descriptive characteristics of normoglycemic and pre-diabetic participants

	Normal FBS (n=400)	Pre-diabetes (n=100)	
	Mean±SD	Mean±SD	P value
Age (years)	47.8 ±13.6	54.7 ±13.6	<0.001
Body Mass Index (kg/m ²)	26.1 ±4.4	26.6 ±4.3	0.25
Gender	N%	N%	
Male	180 (45)	52 (52)	0.192
Female	220 (55)	48 (48)	
BMI categories	N%	N%	
Normal weight	160 (40)	35 (35)	0.320
Overweight	160 (40)	45 (45)	
Obese	80 (20)	20 (20)	

There was no statistically significant difference in other variables except for age ($p < 0.001$) between pre-diabetic and normoglycemic subjects. Therefore, pre-diabetic subjects were about 7 years older than normoglycemic subjects.

Table 2: Association between positive family history of diabetes mellitus and respondents fasting blood glucose level

Fasting blood glucose level	Family history of diabetes mellitus		P value
	No Family history	Positive family history	
	N%	N%	
Normal blood glucose Level (n=400)	320 (80)	80 (20)	$p < 0.001$
Pre-Diabetics (n=60)	40 (66.66)	20 (33.34)	
Diabetics (n=40)	30 (75)	10 (25)	

Table 2 displayed that association of positive family history and risk of diabetes mellitus. Positive family history was observed more among pre-diabetics 33.34% and diabetics 25% as compared to respondents with normal blood glucose level 20%. The association was found to be statistically significant.

Table 3: Association of positive family history of diabetes with BMI

BMI (100)	Family history of diabetes mellitus		P value
	No Family history	Positive family history	
	N%	N%	
<18.5	5 (6.66)	4 (16)	$p < 0.002$
18.5-24.9	55 (73.34)	8 (32)	
>25	15 (20)	13 (52)	

The finding (table 3) shows the statistically significant association was observed between family history and BMI.

More than 50% respondents who had positive family history of diabetes have high BMI.

Discussion

Family history is considered an important factor to detect individuals at increased risk developing type 2 diabetes mellitus. In the present study prevalence of pre-diabetes was 12% and diabetes 8%. Positive family history was observed more among pre-diabetics 33.34% and diabetics 25% as compared to respondents with normal blood glucose level 20%. The association was found to be statistically significant. Significant difference was observed on diabetes, pre-diabetes with family history. Positive family history was observed more among pre diabetics (33.34%) and diabetics (25%) as compared to respondents with normal blood glucose level (20%). The association was found to be statistically significant. This is coherent with the findings of other studies. [17-21]

The findings showed that statistically significant association found with positive family history and BMI. More than 50% respondents who had positive family history of diabetes were also observed high BMI (51.6%). This is coherent with the study. [22] In this study, the pre-diabetes was associated to BMI groups in the women. Similarly, Snodgrass et al suggested that fasting glucose was positively associated with BMI only in women. [23]

In the present study, prevalence of diabetes and pre-diabetes increased with the increasing age. Similar findings were reported by the Chandigarh Urban Diabetes Study. [24] Family history was present in 14.06% of diabetes subjects and 12.01% of pre-diabetes subjects and its association with diabetes was significant and not with pre-diabetes. In a study conducted in slums of Mumbai, 18.2% subjects had a family history of diabetes. Studies have shown that the genetic factor plays an important role in the causation of diabetes. [25,26]

Chida et al. in a study reported association of psychosocial factor with the prognosis

of diabetes and as etiological effect was inclusive. [27,28] Another study on working women reported psychosocial work stress as independent predictor of type 2 diabetes among women after a 15-year follow-up. [29] The present study shows no significant association of psychosocial stress with diabetes and pre-diabetes.

In our study prevalence of overweight and obesity was 66.81 (overweight 40% and obese 20%), which was higher than in previous studies [29,30] with prevalence of diabetes and pre-diabetes among these subjects being 23.34% and 12.49%. Subjects with increased BMI showed increase prevalence of diabetes and the association was statistically significant. [31] This was comparable with other studies. [5,24]

Conclusion

Prevalence of diabetes and pre-diabetes was comparable to data from other part of the country and the association of risk factors was also similar to the previous studies. Increasing age, female gender, family history of diabetes, physical inactivity and central obesity emerged as the major risk factors for diabetes in our study. Due to high prevalence of pre-diabetes, it is necessary to link them with non-communicable disease program for life style modification. Based on our finding, it is possible that advancing age and obesity has increased in pre-diabetes. This highlights the importance of population based survey to monitor blood glucose for effective prevention and control.

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