ORIGINAL ARTICLE

Association of Pre-Diabetes, Diabetes and BMI with family history: A Cross Sectional study in an urban area of Varanasi

Reema Singh¹, Alok Kumar², Sangeeta Kansal³

ABSTRACT

Introduction: Diabetes is undoubtedly one of the most challenging health problems in the 21st century. According to The International Diabetes Federation estimation India will have risen in people living with diabetes up to 87.0 million by 2030 from 50.8 million (2010). According to the World Health Organization criteria, the prevalence of known diabetes was 5.6% and 2.7% among urban and rural areas, respectively in 2009. 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. Hence the study was conducted to assess the association between family history with diabetes and pre-diabetes in an urban area of Varanasi.

Methodology: A Community based cross-sectional study was conducted during July 2012 to December 2012 among 706 respondents of 20-65 year age group in Sunderpur, Varanasi. Out of which 359 male and 347 females were interviewed by using pretested semi structured interview schedule. Consent was taken to all respondents. Pregnant women and known cases of diabetes respondents were excluded from this study. Fasting Capillary blood glucose level measured with the help of Glucometer.

Result: In the present study prevalence of pre-diabetes was 11.8% and diabetes 7.2 %, 0.6% were known diabetic. Out of the total 700 respondents, familial risk was observed only in 10.4%. Out of which 6.7% respondents were having positive family history of one parent and 3.7% were of both parents and siblings. Positive family history was observed more among pre-diabetics 24.4% and diabetics 24% as compared to respondents with normal blood glucose level 15.4%. The association was found to be statistically significant. Significant difference was observed on diabetes, pre-diabetes with family history.

Conclusion & Recommendations: Family history of diabetes mellitus was observed in 10.4% of total screened respondents. Out of which 6.7% were having either parent and 3.7% both parents and siblings. Family history of diabetes is indeed a powerful independent risk factor for the diabetes and pre-diabetes. Our efforts should now be directed toward translating this awareness for use in public health programs.

Keyword: Capillary blood glucose, Diabetes mellitus, family history, Pre-diabetes, Prevalence, Varanasi.

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Introduction

Diabetes is one of the major causes of premature illness and death worldwide. The prevalence of diabetes is rising all over the world.

According to recent estimates, approximately 285 million people worldwide (6.6%) in the 20–79 year age group are with diabetes in 2010 and by 2030, 438 million people (7.8%) of the adult population, is expected to have diabetes⁵. According to The International Diabetes Federation (IDF) estimation India will have risen in people living with diabetes up to 87.0 million by 2030 from 50.8 million (2010), making it the 'Diabetes Capital' of the world (IDA, 2009). This prevalence is increasing not only in urban but also in rural area. According to the World Health Organization (WHO) criteria, the prevalence of known diabetes was 5.6% and 2.7% among urban and rural areas, respectively⁶. 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 documented³,⁴,⁵. Recent studies have shown the graded and independent contribution of a positive family history to the increasing risk for diabetes in the U.S. population⁶,⁷. 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 etc⁸. 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 diabetes⁹. Hence the study was conducted to assess the association between family history with diabetes and pre-diabetes in an urban area of Varanasi.

Methodology

A Community based cross-sectional study was conducted during July 2012 to December 2012 among 706 respondents of 20-65 year age group in urban area of Varanasi. In which 359 male and 347 females were interviewed by using pretested semi structured interview schedule. 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 of the Institute of Medical Sciences, Banaras Hindu University, Varanasi.

**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.

**Operational Definitions used:**

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.

**Inclusion criterion**

**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\(^10\).

**Results**

In the present study overall prevalence of pre- diabetes was 11.9% and diabetes mellitus was 7.2%. Out of which 6.6% were newly diagnosed and 0.6% were known diabetic. It is observed that two fifth (39.3) of the respondents were in the age group of 20-30 years followed by 51-65 years (23.0%). While 20.1% respondents were in age-group of 31 to 40 years and one fifth (20.1%) were in 41-50 (17.6%) years. Out of the total 700 respondents, male (50.6%) and female (49.4%) ratio was equal. More than half (56%) of the
respondents belonged to other backward caste followed by schedule caste (40%). Only 4% respondents belong to general caste. In the present study majority (73.6) of the respondents were married. While about one fifth (18.9%) were unmarried and 7.6% were widow/widower.

**Fig-1**: Distribution of respondents with positive family history of diabetes mellitus

![Distribution of respondents with positive family history of diabetes mellitus](image)

**Fig 1**: Shows that out of the total 700 respondents, familial risk was observed only in 10.4%. Out of which 6.7% respondents were having positive family history of one parent and 3.7% were of both parents and siblings.

**Table 1**: Association between positive family history of diabetes mellitus and respondents fasting blood glucose level

<table>
<thead>
<tr>
<th>Fasting blood glucose level</th>
<th>Family history of diabetes mellitus</th>
<th>Statistical values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Family history</td>
<td>Positive family history</td>
</tr>
<tr>
<td>---------------------------</td>
<td>------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Normal blood glucose level</td>
<td>572</td>
<td>530</td>
</tr>
<tr>
<td>Pre-Diabetics</td>
<td>83</td>
<td>63</td>
</tr>
<tr>
<td>Diabetics</td>
<td>45</td>
<td>34</td>
</tr>
</tbody>
</table>

Table- 1 displayed that association of positive family history and risk of diabetes mellitus. Positive family history was observed more among pre-diabetics 24.4% and
diabetics 24% as compared to respondents with normal blood glucose level 15.4%. The association was found to be statistically significant.

Table 2: Association of positive family history of diabetes with BMI

<table>
<thead>
<tr>
<th>BMI (N-128)</th>
<th>Family History of diabetes</th>
<th>Statistical values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No family history</td>
<td>Positive family history of diabetes mellitus</td>
</tr>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>&lt;18.5</td>
<td>5</td>
<td>5.2</td>
</tr>
<tr>
<td>18.5-24.9</td>
<td>65</td>
<td>67.0</td>
</tr>
<tr>
<td>&gt;25</td>
<td>27</td>
<td>27.8</td>
</tr>
</tbody>
</table>

*N = 83 pre-diabetic and 45 diabetic

The finding (table 2) 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

This was the first community based study in Urban area of Varanasi, assessing the association 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 11.8% and diabetes 7.4 %. Out of the total 700 respondents, familial risk was observed only in 10.4%. Out of which 6.7% respondents were having positive family history of one parent and 3.7% were of both parents and siblings. Positive family history was observed more among pre-diabetics 24.4% and diabetics 24% as compared to respondents with normal blood glucose level 15.4%. 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 (24.4%) and diabetics (24%) as compared to respondents with normal blood glucose level (15.4%). The association was found to be statistically significant. This is coherent with the findings of other studies\textsuperscript{11,12,13,14,15}.

The findings (table 2) show 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\textsuperscript{16}. 

\textsuperscript{11,12,13,14,15,16}
Conclusion and recommendations:

Family history of diabetes mellitus was observed in 10.4% of total screened respondents. Out of which 6.7% were having either parent and 3.7% both parents and siblings. Due to high prevalence of pre-diabetes, it is necessary to link them with non-communicable disease program for life style modification.

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References


