

Risk Assessment of Type 2 Diabetes among Family Members of Persons with and Without Diabetes Mellitus in an Urban Community

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ABSTRACT

Background: Diabetes mellitus is a major life style disease. The pervasiveness of this disease is no longer limited to wealthy, among whom it was once associated as a lifestyle disease. People from poorer section of society are now also at the risk of getting diabetes mellitus as the wealthy counterparts. However, the situation is worse for poor, as they do not have access to quality healthcare and awareness as that of well to do people.

Aim: To assess the risk of getting diabetes among the persons with family history of diabetes within an urban slum of Mumbai using IDRS score.

Materials and Methods: This cross sectional study was carried out in the urban slums of Banganga area in South Mumbai. Door to door survey was conducted to identify 50 families with history of diabetes. Fifty families without the history of diabetes were identified as controls. Structured questionnaire was used for all participants to information related to demographic data, anthropometric measurements and personal life style. Chi square test and Odds ratio analysis was carried out on the gathered data.

Results: It was found that, gender, lifestyle, body weight and familial histories are some of the major factors, which influence the propensity of acquiring diabetes. The IDRS score was higher for people with familial history of diabetes. IDRS score was also higher for people with sedentary lifestyle and higher body mass index.

Conclusion: The gathered data revealed that the group of people with familial history of diabetes is at advanced risk of diabetes than the group of people with no familial history of diabetes.

Keywords: Diabetes mellitus, IDRS, family history, prevalence, risk factor

INTRODUCTION

Diabetes mellitus is a major lifestyle disease. As per World Health Organisation (WHO) projections, diabetes will be the 7th leading cause of worldwide death by 2030.

^[1] Over 19% of world's diabetics populations are residents of India. ^[2] The prevalence of diabetes has increased in urban areas as urbanization has led to

unhealthy lifestyle changes, which adversely affect the metabolic properties of human body. High prevalence of diabetes in the 1st degree relatives as well as vertical transmission of the disease through more than two generations is also a major factor in its prevalence in India. ^[3] The fast food culture which has overwhelmed Indian cities and towns is another major driver of

diabetes epidemic. The unhealthy ‘Junk’ foods consumed by many Indians, affect the body mass of people and successively affect the blood sugar level. [4] The onset of Diabetes at an early age results in rapid progression to chronic vascular complications and organ damage. [5] Early detection of diabetes and subsequent treatment can reduce or prevent the serious complications associated with the disease such as blindness, heart stroke, kidney failure etc. Hence it is very important to identify the risk factors for diabetes at the earliest using cost effective and sensitive tools. In this study, a simplified Indian Diabetic Risk Score (IDRS) [6] is used to assess the risk for type 2 Diabetes among the family members of persons with history of Diabetes Mellitus and without Diabetes.

Aim:

To assess the risk of type 2 Diabetes among the family members of persons with and without Diabetes Mellitus using IDRS score.

MATERIALS AND METHODS

Mumbai is one of the metropolitan city having a population of 20.7 million. About 42 % of the people reside in the slum shanties with limited access to civic amenities. [7] The field practice area, Banganga, under ‘D’ Ward, South Mumbai, was identified and selected for the study. Banganga houses a population of about 33,560. Permission for the study was taken from the concerned authorities. The study was conducted from October 2016 - November 2016. A house to house survey was conducted to find out the history of

Diabetes among the family members. The families with the history of diabetes were identified and enrolled till the count of 50 families. The families without the history of Diabetes were identified and were enrolled till the count of 50 families, as controls. The sample size was calculated based upon following assumptions.

- Average family size 4 members
- Prevalence of diabetes 10%
- Confidence interval 95%
- Allowable difference 20% of estimated prevalence of 10%

A quantitative questionnaire was prepared and data was collected from the participants through door to door data collection method. Respondents with age greater than or equal to 20 years were assessed in this research. The questionnaire included demographic data, Anthropometric measurements and questions related to personal life style. The anthropometric measurement includes body weight, height, Waist and Hip circumference. The weight was measured using a portable weighing scale with weight equally distributed on each leg. The height was measured with measuring tape with the person standing erect against the wall without footwear. The waist circumference was measured in standing position at the umbilical level using tape measure. Hip circumference was measured at the widest part of the hips and buttocks using tape measure. Data analysis was carried out using Chi square test to know the association between the variables. Odds ratio for each variable was also calculated.

OBSERVATION

Table 1: Demographic profile of the respondent

Category	Group I (n=102)		Group II (n=94)		P Value
	f	%	f	%	
< 25 years	33	32.3	27	28.7	0.000
25 -30 years	15	14.7	22	23.4	
31 – 40 years	10	9.8	11	11.7	
41 – 50 years	31	30.4	18	19.2	
51 years and above	13	12.8	16	17.0	
Gender					
Male	38	37.3	23	24.5	0.037
Female	64	62.7	71	75.5	
Type of Family					
Nuclear	62	60.8	31	33.0	0.000
Joint / others	40	39.2	63	67.0	

Table 1 to be continued...

Level of Education					
Illiterate	6	5.9	3	3.2	0.327
Primary Education	32	31.4	40	42.6	
Secondary Education	30	29.4	27	28.7	
Graduate and more	34	33.3	24	25.5	
Occupation					
Unemployed	56	54.9	53	56.4	0.000
Semi-skilled worker	7	6.9	24	25.5	
Skilled worker	25	24.5	15	16.0	
Self Employed	11	10.8	2	2.1	
Semi Professional	3	2.9	0	0	
Personal Habits					
Smoking, Alcohol intake, chewing tobacco	16	15.7	12	12.8	0.769
No risk related habits	86	84.3	82	87.2	

Table 2 : Population distribution according to WHR and BMI

Category	Group I(n=102)		Group II(n=94)		P Value
	f	%	f	%	
Waist Hip Ratio					0.000
0.7	7	6.9	4	4.3	
0.8	24	23.5	26	27.7	
>0.9	71	69.6	63	68.0	
Body Mass Index (BMI)					0.000
< 18.5 Underweight	4	3.9	2	2.1	
18.5 – 24.99 Normal	44	43.1	49	52.1	
25 – 29.99 Pre Obese	38	37.3	32	34.1	
>30 Obese	16	15.7	11	11.7	

Fifty seven (56%) of the females from group I had WHR more than 0.8 as compared to 76 (70%) females from group II. Twenty five (24.5%) of males from group I had BMI more than normal as compared to 17(18%) from group II.

Table 3: Population distribution according to IDRS

Category	Group I(n=102)		Group II(n=94)		P Value
	f	%	f	%	
IDRS					0.001
Low Risk	20	19.6	31	33	
Medium Risk	48	47.1	52	55.3	
High risk	34	33.3	11	11.7	

Eighty four (82.4%) of the members from families belonging to group I had history of diabetes and were on treatment for the same. Members belonging to group II had no history of diabetes.

Table 4: Logistics Regression: Dependent variable as “Low risk Vs. Medium-High Risk” categories

	Frequency	Percentage	Odd ratio	95% C.I
Age (IDRS)				
<35 years	109	55.6	47.79	(5.17 - 44.17)
35 + years	87	44.4		
Gender				
Male	61	31.1	1.53	(0.21 - 11.20)
Female	135	68.9		
Marital Status				
Single	50	25.7	5.44	(1.32 - 22.36)
Married	146	74.5		
Education				
Graduation & above	58	29.6	1.67	(0.46 - 6.10)
Below Graduation	138	70.4		
Occupation				
Unemployed, skilled/semi-skilled	71	36.2		
Self employed / Professional	125	63.8	1.85	(0.52 - 6.55)
Physical Activity				
Regular+/-or Strenuous exercise	54	27.6	59.30	(10.37 - 33.94)
No exercise & Sedentary work	142	72.4		

DISCUSSION

The present study indicates that members with sedentary and mild physical activity had a higher risk for diabetes

(78.67, $p < 0.001$). Similar observations were found in study by Raja Subramani where he found that people with sedentary and mild activities had a higher risk for diabetes. [1]

Personal habits like smoking, chewing tobacco and alcohol consumption showed higher risk for Diabetes (8.77, $p < 0.033$). The risk for Diabetes reduced with exercises and strenuous work.

More than 50% of the participants in both the groups were overweight as per the WHO Classification. They form the important target for primary prevention. In this study more number of females from both the groups had WHR > 0.8 as compared to males with WHR > 1 , which indicates that the females were at higher risk of developing Diabetes (46.07, $p < 0.001$). In a similar study by Shobha Malini, waist Hip ratio was found to be a greater risk factor for Diabetes than general obesity. [8]

Gupta S K observed in his study that chances of high diabetes score increases with increase in BMI. [5] In this study majority of females from group I have increased BMI score > 0.9 thereby increasing the chances of diabetes. IDRS is an appropriate tool in the community to identify the risk groups for the development of Type II diabetes, which is being used widely. In this study 80.4% of participants with family history of diabetes were at medium to higher risk as compared to 67% participants with no family history of diabetes (13.99, $p < 0.001$). Study by Raja Subramani also showed that 12.15% population had high risk (> 60) and 74.7% (30 – 50) had moderate risk for diabetes. [1] This also concludes that members having a family history of Diabetes are at a higher risk as compared to members with no family history of Diabetes.

The table 4 of the study denotes the calculation of logistic regression. The odd ratio is calculated to measure the relative odds of occurrences of diabetes between the two groups, i.e., Low risk group and Medium-High risk group. The table represents odd ratio of multiple elements such as, age, gender, marital status, education, occupation, and physical activity. Physical inactivity and increasing age are major contributing factor for high IDRS. Both sedentary life style (sedentary lifestyle

59.30 [10.37 – 33.94]) and age of more than 35 years (35+ years 47.79 [5.17 - 44.17]) amplify the tendency of getting diabetes. Self-employed /professional 1.85 [0.52 - 6.55] are at advanced risk of acquiring diabetes than Unemployed persons. Marital status (married 5.44 [1.32 - 22.36]) of a person also impacts probability of acquiring diabetes. Females (female 1.53 [0.21 - 11.20]) are at more risk than male counterparts. Similarly education level of below graduation (below graduation 1.67 [0.46 - 6.10]) increases one's propensity of getting diabetes.

CONCLUSION

The study revealed that, gender, lifestyle, body weight and familial histories are some of the major factors, which influence the propensity of acquiring diabetes. Unhealthy eating habits, sedentary lifestyle, excessive body weight, high waist-to-hip ratio, and family history of diabetes among one or both the parents are some of major causes of diabetes in India and the world today. The IDRS score showed that the group of people with familial history of diabetes is at advanced risk of diabetes than the group of people with no familial history of diabetes. Hence people with any or all of the above factors are at higher risk of acquiring diabetes. Unfortunately, many people, particularly disadvantage section of Indian society are not aware of the causes and the consequences. It is important to create awareness regarding risk factors of Diabetes among the whole population. Physical activities like regular exercises, life style modifications for persons with a positive family history are some of the recommendations which can control Diabetes.

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