

Original Research Article

Risk assessment of type-2 diabetes using the Indian diabetes risk score: a cross-sectional study on medical students from a tertiary care hospital

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ABSTRACT

Background: Diabetes mellitus is a major public health problem which affects all age groups and has now been identified in young. Indian diabetes risk score (IDRS), devised and developed by Mohan et al. at the Madras Diabetes Research Foundation, is a validated tool to identify individuals with high risk of developing type 2 diabetes mellitus.

Methods: Present cross-sectional study was conducted among medical students of a medical college in Jhansi from June 2021 to September 2021. A semi-structured interview schedule for socio demographic details of subjects like age, gender, education/occupation of parents and physical activity. Written informed consent was taken. Statistical analysis used was SPSS trial version was used for data analysis. $P < 0.05$ was considered as statistically significant.

Results: A total of 300 medical students were included in the study. IDRS categorization revealed 10 (3.3%) respondents had score >60 (high risk) and 84 (28%) respondents had score between 30-50 (moderate risk). While 206 (68.6%) respondent had score <30 (low risk).

Conclusions: Our study supports the use of IDRS method as screening of diabetes at mass level as it is cost effective as well as time saving procedure.

Keywords: Indian diabetes risk score, Medical students, Type 2 diabetes mellitus

INTRODUCTION

Diabetes is a chronic, metabolic disease characterized by elevated levels of blood glucose (or blood sugar), which leads over time to serious damage to the heart, blood vessels, eyes, kidneys and nerves. India is facing the dual burden of communicable and Non-communicable disease (NCD). Among the NCD's, the burden of diabetes in India is increasing day by day.¹

About 422 million people worldwide have diabetes, the majority living in low-and middle-income countries, and 1.6 million deaths are directly attributed to diabetes each year.² According to IDF it is estimated that total number of people with diabetes is projected to rise from 425 million (2017) to 629 million (2045) and it is second highest in world after China.³ According to WHO report,

over 19% of the world's diabetic population resides in India.⁴ But, unfortunately more than 50% of the diabetic subjects in India remain unaware of their diabetes status.¹ So, early identification of the high-risk individuals would help in taking appropriate intervention.

Indian diabetes risk score (IDRS), devised and developed by Mohan et al at the Madras Diabetes Research Foundation, is a validated tool to identify individuals with high risk of developing type 2 diabetes mellitus (T2DM) in future. It considers four risk factors namely age, family history, abdominal obesity and physical activity.⁵ This IDRS is a simple tool which can be used by the community health worker to screen the high-risk population (Table 1).

Aim and objective

The aim and objective of this study was to assess risk score using the IDRS and to study association of T2DM risk with other factors among medical students.

Table 1: Indian diabetes risk score.

Particulars	Score
Age in years	
<35	0
35-49	20
>50	30
Abdominal obesity	
Waist<80 cm (F); <90 cm (M)	0
Waist 80-89 cm (F); 90-99 cm (M)	10
Waist >90 cm (F); >100 cm (M)	20
Physical activity	
Exercise regular+strenuous work	0
Exercise regular or strenuous work	20
No exercise regular and sedentary work	30
Family history	
No family history	0
Either parents	10
Both parents	20

METHODS

The present cross-sectional study was conducted among medical students (first year to third year) of a medical college in Jhansi from June 2021 to September 2021. Sample size was calculated assuming that 40% of students would have moderate to high risk score.⁶ Sample size was estimated using the formula:

$$\frac{4pq}{L^2}$$

where prevalence (p)=40%, q=60%, relative error (L)=15% of prevalence and estimated sample size came out to be 266. Adding 10% non-respondents, minimum sample size of 292 was calculated which was rounded off to 300. So, a total of 300 students were participated. Ethical clearance was taken from the Ethics Committee

and written informed consent was taken from study participants.

The participants were selected using simple random sampling from the students which gave consent, students which were not willing to give consent were automatically excluded from the study.

All selected participants were also thoroughly examined and their IDRS was calculated by using a validated questionnaire using age, family history and exercise details along with measurement of waist circumference (Table 2).

Other than these components, participants were also being asked regarding socio-demographic details like age, gender, religion, education/occupation of parents and SES.

Data entry and analysis

Data were entered in Microsoft excel 2007 and analyzed using SPSS version 20.0 (trial version). Chi square test was used to find out the association between the factors.

Table 2: Classification of IDRS.

Maximum IDRS score	Risk category
>60	High risk
30-50	Moderate risk
<30	Low risk

RESULTS

A total of 300 medical students were included in the study, of which 198 (66.0%) were males and 102 (34.0%) were females. Mean and median age of subjects was 19.48±1.4 years and 19 years, respectively. Age range was 17-30 years. According to IDRS 10 (3.3%) respondents had score >60 (high risk) and 84 (28%) respondents had score between 30-50 (moderate risk). While 206 (68.6%) respondent had score <30 (low risk) (Table 3). The present study showed significant association between IDRS and various socio demographic variables like gender, dietary habit, education and occupation (Table 4).

Table 3: Distribution of IDRS among respondents (n=300).

Score category	N	%
>60 high risk	10	3.3
30-50 moderate risk	84	28
<30 low risk	206	68.6

Table 4: Association of characteristics among respondents with IDRS (n=300).

Characteristics		Low		Moderate		High		Chi square, p value
		N	%	N	%	N	%	
Gender	Male	119	61.9	66	34.3	7	3.6	11.37, 0.003*
	Female	87	80.5	18	16.6	3	2.7	

Continued.

Characteristics		Low		Moderate		High		Chi square,
Religion	Hindu	185	69.5	75	28.1	6	0.02	8.68, 0.06
	Muslim	17	62.9	7	25.9	3	11.1	
	Other	4	57.1	2	28.5	1	14.2	
Occupation father/mother	Unskilled/unemployed/semi-skilled /skilled worker	44	65.1	36	31.3	3	3.6	13.8, 0.001*
	Semi-professional/professional	162	70.1	48	26.7	7	3.2	
Dietary habits	Mixed	120	62.8	64	33.5	7	3.6	8.4, 0.01*
	Vegetarian	86	78.89	20	18.3	3	2.75	
Education of parents	Primary	19	57.6	11	33.3	3	9.1	12.9, 0.04*
	Middle	44	63.8	23	33.3	2	2.8	
	Intermediate	64	64.0	33	33.0	3	3.0	
	Graduate and above	79	80.6	17	17.3	2	2.1	

Note: *P value <0.05=significant.

DISCUSSION

The results of our study showed that IDRS is a useful tool to identify high risk individuals who can be targeted for the annual screening for diabetes. This tool is very fast to calculate, using non-invasive procedure and cost effective for implementing at community level. Even, it can be assessed by grass root health workers easily also because it requires four risk factors like age, family history of diabetes, abdominal obesity and level of physical activity. Findings for high-risk category (3.3%) in our study were similar to study conducted by Gopalakrishnan et al, (1.9%) and Bhatia et al (1%) and Singh et al (1%).⁷⁻⁹ Similar observation for moderate-risk category was found in the study conducted by Vardhan et al. (28%).⁴ Higher figures for moderate-risk category were found in studies conducted by Mohan et al (50.3%), Bhatia et al (68%) and Subramani et al (74.7%).^{5,8,10}

Current study showed statistically significant association of IDRS score with male gender ($p=0.003$) which is similar to a study conducted by Chowdhary et al and Gopalakrishnan et al.^{1,7} Educational status of parents is found inversely related with the risk of diabetes. It may be due to increased awareness regarding healthy lifestyle with higher education. This finding was similar with studies done by Ravikumar et al.¹¹ There was significant association found between occupational status of parents and IDRS score. This finding was supported by the study of Namdev et al.¹²

CONCLUSION

Our study supports the use of IDRS method as screening of diabetes at mass level as it is cost effective as well as time saving procedure.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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