# **Original Research Article**

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# Study of type II diabetes mellitus risk assessment in medical students of Davangere district, Karnataka, India using India diabetic risk score

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#### **ABSTRACT**

**Background:** Diabetes as a non-communicable disease is significant public health problem all over the world. In a non-communicable disease due to lack of clear etiological agent, it is heavily dependent on identifying and tackling risk factors. The disturbing finding of diabetes mellitus as the earlier age of onset combined with increasing prevalence of diabetes could have adverse effects on the nation's health and economy this underscores the need for mass awareness and screening programs to detect diabetes at an early stage. The main objectives were to study the type II diabetes mellitus risk among medical student and to understand the association of Indian diabetes risk score (IDRS) with the body mass index (BMI).

**Methods:** A cross sectional study was done among 600 students belonging to class I to class III part II in SSIMS & RC Davangere, from 1st February 2015 to 1st March 2015. A predesigned questionnaire was developed and was used to collect the data. Microsoft Office 2013 version was used for analysis of data.

**Results:** According to body mass index (BMI) of the subjects, majority 225 (50.6%) were normal, 102 (20.2%) were pre-obese and 147 (29.2%) were considered as obese. Most of pre-obese and obese students were consuming mixed diet. IDRS shows that 80% (405) of the study population were having mild risk and chances of developing diabetes in future, whereas 6% (28) of the study participants had high risk and were counselled and asked to cut down weight and were told about life style modifications and 14% (71) of the volunteers had a moderate risk of developing diabetes.

**Conclusions:** There is increased risk of type 2 diabetes mellitus among the First Grade College students. BMI has strong association with Indian Diabetes Risk Score, which indicates that most of the risk is modifiable with life style modifications and dietary changes in the students.

Keywords: Diabetes mellitus, IDRS, Medical students, Risk assessment

# INTRODUCTION

Diabetes as a non-communicable disease is significant public health problem all over the world. Diabetes Mellitus is a group of common metabolic disorders and is characterised by a state of chronic hyperglycaemia due to a defective production or action of insulin causing disturbance of carbohydrate, fat and protein metabolism<sup>1</sup>.

The rising prevalence of type 2 diabetes mellitus is closely associated with industrialisation and socio-economic development.<sup>2</sup> Diabetes mellitus (D. M) is a leading cause of morbidity and mortality in developing

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countries. A report by World Health Organisation (WHO) report suggests that over 19% of the world's diabetic population currently resides in India.<sup>3</sup> This translates to over 35 million diabetic subjects and these numbers are projected to increase to nearly 80 million by 2030, hence India is considered to be the Diabetic capital of the world by the year 2030. According to another report by WHO, type II Diabetes Mellitus has recently increased in all age groups and is now being identified in younger age groups. Unfortunately 50% of the diabetic subjects in India remain unaware of their diabetes status, which adds to the disease burden.<sup>4</sup> We can expect diabetes to have a serious damaging impact on the longevity and as well as the quality of life in India. The increasing modernisation, sedentary lifestyles and unhealthy dietary habits and increased stress adds up to the burden in the younger age group.5

In a non-communicable disease due to lack of clear etiological agent, it is heavily dependent on identifying and tackling risk factors. The risk factors like age, gender, family history are non-modifiable while others like smoking, diet, physical activity and other comorbid conditions like hypertension will aggravate the disease evolution in man, a classic screening or preventive strategy may not work.<sup>6</sup>

This emphasizes the need for mass awareness and screening programs to detect diabetes at an early age. Usually the diabetic detection is getting delayed due to perception that type II diabetes mellitus disease occurs or manifest in the later part of middle age, has escalated in all age groups and is now being identified in younger age groups, including adolescents and children, especially in high risk populations.<sup>7</sup>

Indian diabetic risk scoring (IDRS) was developed using four simple parameters namely age, abdominal obesity, family history of diabetes, and physical activity. A maximum score of 100 is given for these categories. It has shown to be a highly cost effective way of testing for diabetes in a resource poor setting like India. IDRS also helps to distinguish type 2 from other type of diabetes mellitus.

The disturbing finding of diabetes mellitus as the earlier age of onset combined with increasing prevalence of diabetes could have adverse effects on the nation's health and economy this underscores the need for mass awareness and screening programs to detect diabetes at an early stage.

# **Objectives**

- To study the type II diabetes mellitus risk among medical students.
- To understand the association of Indian diabetes risk score (IDRS) with the body mass index (BMI).

#### **METHODS**

#### Study design

This present study was a cross-sectional study.

# Study area

This study was conducted in the SSIMS &RC Davangere

#### **Study period**

The study was done from 1<sup>st</sup> February 2015 to 1<sup>st</sup> March 2015.

#### Study tool

A predesigned questionnaire was developed and was used. All the study participants were interviewed by the interviewer with it.

### Sample size

There were about 600 medical students from class I to class III part II. All the students were included for the study. Those students who were not willing to participate were excluded from the study

#### Method

The total strength of the students were 600 students. All those who were willing to participate in the study, a written informed consent were obtained from them. Each student was given a questionnaire and they were asked to refrain from comparing their answers and discussing among themselves. All the volunteers of the study were assessed for their basic details, family history of diabetes, physical activity, habits and the type of diet consumed.

IDRS which requires answers to three simple questions and a physical examination was conducted in a separate room for boys and girls. Physical examination included waist measurement along with blood pressure measurement, height, weight and hip measurements were noted.

Any study participant with an IDRS of <30 was categorized as low risk; 30-50 as medium risk and;  $\geq 60$  as high risk for diabetes.

For the purpose of detecting pre-diabetes the blood sugar testing random blood sugar (RBS) was done to those with an IDRS score of 50 and above. Those who consented for RBS were investigated. All the students were assured about the confidentiality of their information. All the data was tabulated and entered into Microsoft Office 2013 version and analyzed.

#### **RESULTS**

Among the 600 students, 16 students were chronic absent, 110 female students did not consent and 6 male students did not consent for the study. So a total of 504 students were included in the study.

A total of 242 students were below 20 years of age and 262 students were above 20 years of age. The mean age of students were 20.55 with a standard deviation of 2.02 (Figure 1).

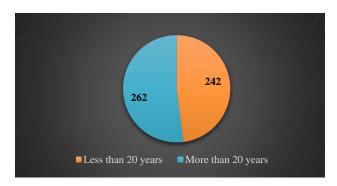


Figure 1: Age wise distribution of study population.

Out of 504, 256 were females and 248 were males as shown in Figure 2.

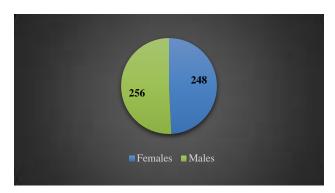


Figure 2: Sex wise distribution of study population.

Majority of the study participants consumed mixed diet 63% (315) and 37% (189) were pure vegetarians (Figure 3).

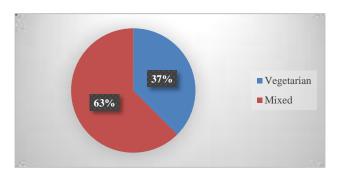


Figure 3: Type of diet consumed by the study population.

Among the study population 20% (101) students were from rural areas and 80% (403) students were from urban counterparts who had all the luxury of having junk food any time (Figure 4).

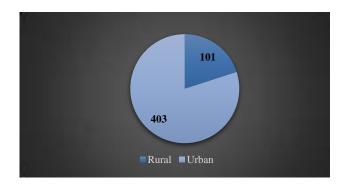


Figure 4: Place of residence among study population.

Among study population 160 males and 142 females had <90 waist circumference Whereas 96 males and 106 females had >90 waist circumference. Most of the study participants had waist circumference more than the normal prescribed limit (Table 1).

Table 1: Waist circumference among study population.

Waist circumference	Males	females
<90	160	142
>90	96	106

According to body mass index (BMI) of the subjects, majority 225 (50.6%) were normal, 102 (20.2%) were pre-obese and 147 (29.2%) were considered as obese. Most of pre-obese and obese students were consuming mixed diet. Obese students were given education about life style management and were asked for a blood examination for diabetic screening for them (Figure 5).



Figure 5: BMI of study population.

IDRS shows that 80% (405) of the study population were having mild risk and chances of developing diabetes in future, whereas 6% (28) of the study participants had high risk and were counselled and asked to cut down weight and were told about life style modifications and

14% (71) of the volunteers had a moderate risk of developing diabetes Figure 6 and Table 2).

Table 2: Table showing comparison of IDR Scoring with gender.

IDRS* gender	Male	Female	Total
<30	47	24	71
30-50	195	210	405
>60	14	14	28
Total	256	248	504

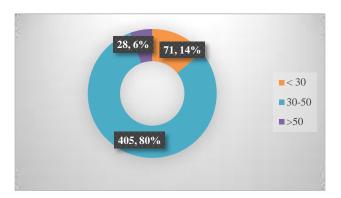


Figure 6: IDR scoring of study population.

#### DISCUSSION

This present study showed that college students are at high risk of getting diabetes, as about 44% had sedentary life style, about 31% had family history of diabetes and about 70.4% of students had central obesity. The present study age has been excluded for calculating IDRS score as all the students were less than 35 years. In a study conducted by Nandeshwar S et al at Bhopal revealed (2.80%) were in low risk, (28.40%) in moderate risk and (68.80%) were in high risk group as per the IDRS. No diabetic subject was observed in low risk group, (8.40%) in moderate risk group and (51.16%) were diagnosed as diabetes.<sup>8</sup>

Current study showed that there was increase in IDRS score as the BMI increases, which is also an independent risk factor for diabetes mellitus. Another study done by Pranita A, et al showed that most of the children who develop type 2 diabetes have a family history of type 2 diabetes. It was found that 45–80% children had a parent with type 2 diabetes. <sup>10</sup>

Present study shows that in younger age group, we can exclude the age factor and take BMI as important marker for non-communicable disease. Study conducted on 300 medical students by Garg S showed that Risk of developing diabetes was high in 18 (6%), moderate in 133 (44.3%) and low in 149 (49.7%) students and risk of diabetes was present in more than 50% of medical students as assessed by Indian Diabetes Risk Score. 9

#### **CONCLUSION**

The present study shows that there is increased risk of type 2 Diabetes Mellitus among the First Grade College students. About a three fourth (3/4<sup>th</sup>) {433} of the examined students are at risk of getting Diabetes Mellitus. BMI has strong association with Indian Diabetes Risk Score, which indicates that most of the risk is modifiable with life style modifications and dietary changes in the students. Higher IDRS is also associated with higher risk of metabolic syndrome and CVD risk even among people without pre-diabetes or diabetes.

#### Recommendations

- IDRS can be used to screen, identify and educate specific group of people those who are at risk of developing diabetes as seen here in First Grade College.
- Family history is a non-modifiable factor. Therefore immediate steps should be taken to reduce the obesity by encouraging these students to increase physical activity and strict diet control.
- This study showed that as the IDRS Score increases BMI also increases. Therefore BMI can also be included as a proxy for assessing Diabetes Mellitus risk.
- IDRS score more than 50 should be screened for diabetes to identify between pre-diabetes and diabetes.
- Canteen facility in all colleges with good nutritious food has to be made available so the students can understand how a healthy diet will be.
- Health education about the non-communicable diseases in the college will create awareness about the disease and helps the students to have a life style modification is an early age.
- Health education about hazards of smoking and alcohol should be emphasized to students in the college, so that they will lead a healthy life later on.
- Making campuses a smoke free campus will definitely help students in curbing the smoking habits and having a healthy lifestyle.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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