

RESEARCH ARTICLE

Assessment of risk of diabetes in medical students using the Indian diabetes risk score

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ABSTRACT

Background: Diabetes is one of the most common causes for morbidity and mortality. Among which type 2 diabetes is the most rampant in which body does not make synthesize or utilize insulin effectively insulin is a hormone that helps the body cells to utilize glucose for energy production. Deficiency of insulin leads to high level of glucose in the plasma. Sustained high blood glucose level for a longer duration can lead to serious problems in heart, eyes, kidneys, and nerves. This may lead to complications such as neuropathy, retinopathy, nephropathy, and atherosclerosis. **Aim and Objectives:** The aim of this study was to identify the risk of diabetes in medical students. **Materials and Methods:** One hundred medical students in the age group of 18–21 years were screened for prediabetic state using the diabetic risk score and were statically analyzed. **Results:** Out of 100 students, 57 were found to have low risk, 41 moderate risk, and only two had high risk of diabetes. The results of the present study showed that 49% of students were indulged in mild activity and 25% of the students were not involved in any kind of physical activity. **Conclusion:** Lack of physical exercise was found to be the major risk factor for diabetes among medical students, and hence, it is suggested that medical students should also stress on physical exercise along with studies.

KEY WORDS: Indian Risk Score; Diabetes; Medical Students

INTRODUCTION

Diabetes is a non-communicable disease and is one of the leading causes of morbidity and mortality. There are two types of diabetes, insulin dependent diabetes mellitus (IDDM) and non-IDDM (NIDDM). NIDDM, also known as type 2 diabetes, is the most common type, in which the body does not synthesize or utilize insulin effectively. The body cells utilize glucose to release energy with the help of a hormone called Insulin. Lack of insulin causes inefficiency of the body cells to

utilize glucose leading to high blood glucose level. When there is an increased blood glucose level, it leads to many symptoms such as excessive thirst, overeating, and weight loss with decreased vision. Increased levels of glucose in the blood for a longer duration leads to severe infections. Vital organs of the body such as heart, eyes, kidneys, and nerves may be affected as a result of increased blood glucose level. Higher risk of developing diabetes is seen in elderly population. Physical inactivity is commonly seen with obese individuals, along with family history of diabetes.^[1] Earlier type 2 diabetes was seen only in elderly population unlike the present generation where it is common in all age groups. Diabetes is a major risk factor for mortality among patients and leads to multiple complications causing morbidity. These complications and intervention involved in their treatment causes excessive financial burden on patients and their families. It is also increasing the burden on health-care system of our country as resources are limited as a result of increased population.^[2-4] India has around 19%

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of the world's diabetic population according to the report by the World Health Organization.^[5] This amounts to about 35 million diabetics and may increase to around 80 million by 2030 as predicted. Around 50% of the diabetics are unaware of their diabetic status in our country, which further contributes to the burden of the disease.^[6-8] There is a necessity for screening programs and to create awareness among the population in India to overcome the burden of diabetes. There is a major risk of developing NIDDM among individuals with impaired glucose tolerance (IGT).^[2] NIDDM can be prevented or delayed by modifications of lifestyle in terms of diet and exercise as shown by experimental evidence in recent times. Therapeutic intervention in form of drugs should be restricted only to individuals with IGT.^[2,3,4,9,10] Invasive procedure such as measurement of blood glucose is not economical and is time consuming. The blood glucose levels show enormous variation in an individual and reflect the person's current glycemic status. The identification of high-risk individuals in their normoglycemic state will be the crucial step toward the true primary prevention. Appropriate interventional measures should be undertaken in these individuals to prevent their transition from normoglycemia to IGT and development of diabetes.^[11-20]

This present study was undertaken to identify prediabetic status using an Indian diabetes risk score [IDRS]) in Indian population. The implementation of IDRS contributes to lessen the burden on health system as it is cost-effective.^[10,11] In the present study, high-risk individuals among medical students can be identified with the help of a screening tool based on questionnaire. This screening may contribute in prevention of transition from their normoglycemic state to IGT and development of diabetes in them by implementation of lifestyle modification and therapeutic intervention.

MATERIALS AND METHODS

Study was undertaken at Kempegowda Institute of Medical Sciences and Hospital, Department of Physiology, Bangalore. Ethical clearance was taken by the Ethical Committee of the Institution. One hundred medical students in the age group 18–21 years who volunteered were recruited as subjects for the study.

The participants were excluded from the study based on their medical illness such as metabolic syndrome, suffering from other endocrine disorder, had impairment of cognition or any physical disability.

Informed consent in the written form was taken from all the volunteers who took part in the study. The diabetes risk score was taken in volunteers who fulfilled the inclusion criteria after obtaining history regarding their health status.

The parameters included in the IRDS were age, abdominal obesity, familial history of diabetes, and physical activity.

The abdominal obesity was determined in male and female participants based on their waist circumference. The maximum score in IDRS was 100. IRDS of <30 was considered as low risk, 30–50 as medium risk, and >60 as high risk for diabetes.

PARAMETERS

- Age was divided into three groups; age <35 years, 35–49 years, and 50 or above were coded as 0, 20, and 30, respectively.
- Abdominal obesity: Males: the coding for waist circumference was done as follows, Individuals with ≥ 90 –99 cm were coded as 10, those with >100 cm were coded as 20, and rest were coded as 0. In females with waist circumference ≥ 80 –89 cm were coded as 10, those with waist circumference ≥ 90 cm as 20 and rest were coded as 0.
- Family history of diabetes: 0, 10, and 20 were used for coding participants without family history of diabetes, one diabetic parent, and both parent being diabetic, respectively.
- Physical activity: 0, 10, 20, and 30 were used for coding participants doing vigorous physical activity, moderate physical activity, mild physical activity, and no physical activity, respectively.

RESULTS

Results were obtained using suitable statistical methods and were represented in the form of percentage. One hundred subjects who took part in this study, out of which 66 were female and 34 were male.

IDRS Score

Out of 100 students, 57 students were under low-risk group, 47 students were under moderate-risk group, and two students were in high-risk group [Table 1].

Physical Activity

No physical activity was seen in 23% of the students, 49% had mild physical activity, 27% had moderate physical activity, and only 1% showed vigorous activity [Table 2].

Waist Circumference in Males

About 82 % had <90 cm and 18 % had between 90 and 99 cm [Table 3].

Waist Circumference in Females

About 82 % had <80 cm, 17% between 80 and 89 cm, and 1 % more than 90 cm [Table 3].

Table 1: Number of students in each risk group

Group (risk score)	Number of students	Mean risk score
Group 1 (low risk) (up to 30)	57	16.8
Group 2 (moderate risk) (30–50)	41	34.1
Group 3 (high risk) (≥ 60)	2	60

Table 2: Physical activity

Physical activity	<i>n</i>	% Study
Vigorous	1	1%
Moderate	27	27%
Mild	49	49%
No physical activity	23	23%

Family History of Diabetes

About 26% of the students had positive family history of diabetes, out of which 25 % had only one diabetic parent and in 1% both parent were diabetic. About 74% of students did not have any history of diabetes in their family [Table 4].

DISCUSSION

This study showed that 57% of the students have the IDRS <30 which implies that majority of students are at low risk of developing diabetes. However, a large fraction of students were at moderate risk of diabetes (41%) which should not be ignored. Only 2% were at high risk of developing diabetes. The majority of students who were physically inactive were categorised in the low-risk group because they were in the younger age group. In this study, 18% of the males had more than 90 cm waist circumference and 18% of the females had more than 80 cm waist circumference. About 49% of the students were involved in mild physical activity and 23% had no physical activity.

Vardhan *et al.* conducted a similar study on medical students of same age group and found that 67% students were in lower-risk category, 28% were in moderate-risk, and 5% at high risk of diabetes which is similar to the present study.^[21] Taksande *et al.* conducted a similar study in rural community for people aged more than 45 years and found that 84% of their study population were at moderate risk, in contradiction to the present study, where majority were in low-risk group which implies that age may be a determining factor. This finding is similar to the present study, where the majority of participants were included in the low-risk category in spite of being physically inactive when they were young.^[14] Age as a determining factor for diabetes can also be substantiated by a similar study done by Dhippayom *et al.* on pharmacy's clients aged ≥ 35 years who were found that 50% were at increased risk of developing diabetes.^[15] The IDRS showed the stronger association with incident diabetes compared to obesity or hypertension.^[16,17] In the previous studies, abdominal obesity

Table 3: Waist circumference

Waist circumference	<i>n</i>	% Study
Male		
<90 cm	28	82%
90–99 cm	6	18%
≥ 100 cm	0	0%
Female		
<80 cm	54	82%
80–89 cm	11	17%
≥ 90 cm	1	1%

Table 4: Family history

Family history	<i>n</i>	% Study
One parent	25	25%
Both parent	1	1%
None	74	74%

showed two-fold risk of developing diabetes, whereas three-fold risk of developing diabetes was seen among hypertensives.^[12,22] Association was also seen between IDRS and metabolic syndrome and also cardiovascular disease.^[22]

Tuomilehto conducted a study, in which non-pharmacologic therapy such as exercise was adapted in the prevention of type 2 diabetes and it showed that physical activity in form of exercise can help to prevent development of diabetes.^[16] Lack of physical activity might be the major risk factor for the medical students to develop diabetes. In a similar study by Vardhan *et al.*, it was seen that females with waist circumference more than 80 cm and males with waist circumference more than 90 cm were seen only in small fraction of students that correlate with the observation of this study.^[21] In the study by Vardhan *et al.*, majority of the participants showed negative family history of diabetes similar to the present study, which implies that family history may not be a determining factor for development of diabetes.^[21]

The study is purely a questionnaire-based study, the risk was calculated using the IDRS, but no intervention was done to confirm the results which are the limitation of this study.

CONCLUSION

It can be said that however approximately half of the participants in this study had lower risk of developing diabetes; there was a considerable fraction of students who were at moderate risk of diabetes. The present study also reveals that lack of physical activity might be the major risk factor for developing diabetes in medical students as family history is negative in majority of the students and waist circumference is also within normal limits in most of the students. The blood glucose levels should be tested in those individuals with IDRS score of 50 and above and would be of

great help in identifying majority of Indian population with prediabetes.^[12,22-25]

The medical students are more prone for prediabetes due to lack of physical activity.

The hectic schedules of the medical students which involve long study hours may be the reason for lack of physical exercise. Thus, steps should be undertaken to improve the physical activity for better health of individuals who are involved in the treatment of the diseased.

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