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Study of Indian Diabetes Risk Score among pre-obese and obese students in PIMS campus

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Abstract: *Diabetes is the fastest growing chronic disease worldwide, and has become one of the most common non communicable diseases and its burden is on the rise among all age groups. This study was conducted to evaluate the Indian Diabetes Risk Score (IDRS) and its usefulness. 120 subjects were taken and studied for 2 months. The risk score was calculated for everyone. Only 45% were in low-risk category, 34.2% were in moderate risk category and 20.8% were in high-risk group as per the IDRS. Our results were similar to many other studies. We concluded that a diabetes risk score will help us to device effective screening strategies to unmask hidden burden of the disease in countries like India.*

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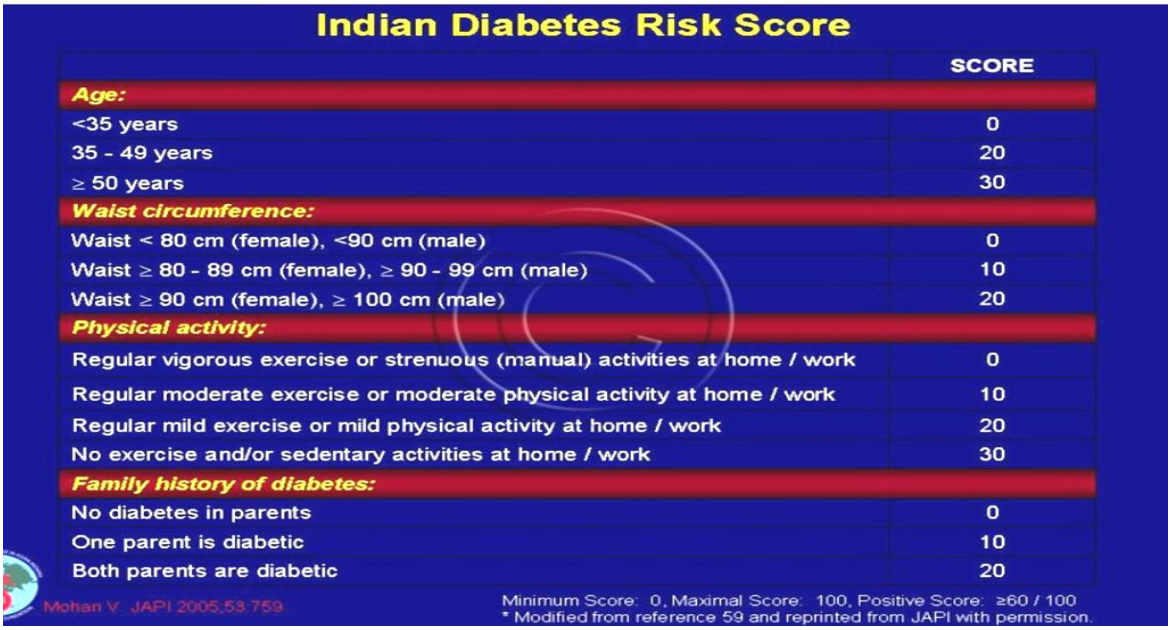
I. Introduction:

Diabetes is the fastest growing chronic disease worldwide, and has become one of the most common non communicable diseases and its burden is on the rise among all age groups affecting urban and rural populace. The etiological basis of DM is not clearly defined. It depends heavily on the risk factors like age, gender, family history which are non-modifiable while others like smoking, diet, physical activity, hypertension which are modifiable. Conventional diagnostic tests recommended by WHO for screening of DM type 2 such as oral glucose tolerance test, fasting plasma glucose and glycosylated haemoglobin. Although they are reliable, they are invasive and relatively expensive for application in low-income countries. Making it less feasible due to cost and other constraints like lack of qualified technicians and equipment. A simple, effective and non-invasive assessment tool could be used in screening for those with or who have potential to develop type 2DM in developing countries. Such as using a short questionnaire to assess the risk development of diabetes on the basis of risk fact can decrease burden of DM. The risk factor approach needs aggressive identification for planning, prevention strategies and early diagnosis. The Indian diabetes risk score is an efficient diabetes screening tool which takes family history, waist circumference, age and physical activity into account. Thus, high risk individuals can be identified by using IRDS and by systematic counselling and intervention it can be used as an efficient tool to reduce the risk in the population. This study was planned to check the value of IRDS as an educational tool for reducing the diabetes risk score among the Indian medical students.



Indian Diabetes Risk Score

	SCORE
Age:	
<35 years	0
35 - 49 years	20
≥ 50 years	30
Waist circumference:	
Waist < 80 cm (female), <90 cm (male)	0
Waist ≥ 80 - 89 cm (female), ≥ 90 - 99 cm (male)	10
Waist ≥ 90 cm (female), ≥ 100 cm (male)	20
Physical activity:	
Regular vigorous exercise or strenuous (manual) activities at home / work	0
Regular moderate exercise or moderate physical activity at home / work	10
Regular mild exercise or mild physical activity at home / work	20
No exercise and/or sedentary activities at home / work	30
Family history of diabetes:	
No diabetes in parents	0
One parent is diabetic	10
Both parents are diabetic	20

Mohan V. JAPI 2005;53:759

Minimum Score: 0, Maximal Score: 100, Positive Score: ≥60 / 100
* Modified from reference 59 and reprinted from JAPI with permission.

II. Materials & Methods:

- Study Design:
  - TYPE OF STUDY: Descriptive Cross-Sectional Study
  - STUDY SITE: Rural Medical College, Loni
  - DURATION OF STUDY: 2 Months
  - NUMBER OF SUBJECTS USED: 120

- Inclusion Criteria:
  - 1. Undergraduate students of M.B.B.S., B.D.S., B.PTH
  - 2. Postgraduate students of M.B.B.S., B.D.S., B.PTH
  - Who were willing to participate in study

- Exclusion Criteria:
  - Faculty members
  - Patients coming to Pravara Rural Hospital
  - Students not willing to participate

- METHOD USED: Questionnaire & measurement of waist circumference in cm

- INFORMED CONSENT PROCEDURES: Consent was enclosed with every questionnaire. Subject's personal information was not disclosed.

All the eligible candidates were interviewed by the examiners with the help of a questionnaire and the information was pooled and tabulated in MS. Excel sheet and statistical analysis was done. Those with IDRS more than 60 were provided health education by explain the risk and suggesting dietary/lifestyle modifications.

III. Results:

→ Age group of our sample was below 35 yrs.

→ 50% of the sample were females and another 50% were males.

→ 33% have normal BMI, 33% come in pre-obese category, 25% are grade 1 obese and rest 9% are grade 2 obese.

BMI → Sex ↓	Normal BMI	Pre-Obese	Obese Grade I	Obese Grade II	TOTAL
Female	20 (33.3%)	20 (33.3%)	15 (25%)	5 (8.3%)	60
Male	16 (26.7%)	23 (38.3%)	16 (26.7%)	5 (8.3)	60
TOTAL	36	43	31	10	120

→ 39.1% have waist circumference <80cm females and <90cm males, 30% have waist circumference 80-89cm females and 90-99cm males, 30.8% have waist circumference >90cm for females and >100cm for males.

Female			Male			Total
<80 cm	80-89cm	>90cm	<90cm	90-99cm	>100cm	120
18	18	24	31	16	13	

→ 34.2% do no physical activity at all, 55% do mild physical activity regularly, and 10.8% do moderate physical activity.

Physical Activity → Sex ↓	No Physical activity	Mild Physical Activity	Moderate Physical Activity	Strenuous Activity	TOTAL
Female	18	39	3	0	60
Male	23	27	10		60
TOTAL	41	66	13		120

→ 55.8% have no family history of diabetes, 29.2% have one parent diabetic, and 15% have both parents with diabetes.

Family History of Diabetes → Sex ↓	No parent Diabetic	One Parent Diabetic	Both Parent Diabetic	TOTAL
Female	32	22	6	60
Male	35	13	12	60
TOTAL	67	35	18	120

→ 61.7% have no family history of HTN, 31.7% have one parent hypertensive, 6.7% have both parents' hypertensive.

→ 5% have score 10, 14.2% have score 20, 25.8% have score 30, 25% have score 40, 9.2% have score 50, 16.7% have score 60, 4.2% have score 70.

→ One individual out of total 120, has a health problem of hypothyroidism and takes thyroxine for the same regularly, her score was 50.

→ Risk Score:

- Low risk <30: 19.2%
- Moderate risk 30-50: 60%
- High Risk >60: 20.8%

IV. Discussion:

The Indian diabetes risk score developed by Mohan V e t al is a simple, fast, inexpensive, non-invasive, and reliable tool to identify individuals at high risk of type 2 diabetes which has been previously validated by other researchers in India.[1-7]IDRS comprises of four risk factors viz. age, family history of diabetes, physical activity and waist circumference. In this study screening for diabetes was conducted for 120 medical students, out of these only 45% were in low-risk category, 34.2% were in moderate risk category and 20.8% were in high-risk group as per the IDRS. These observations made in our study were very close to that made by other authors viz Nandeshwar S, et al[1,] Rao CR et al[4], Bharati DR et al[6]. This shows that a larger number (moderate and high risk) of the study subjects had some kind of risk of developing diabetes in future. In this group active interventions in the form of health education, counselling and further work up is essential. The sooner the interventions are started the later will be the onset of disease and its subsequent complications. In our study, both men and women had a risk of diabetes, and there was no statistically significant difference among gender. These findings were similar to that of Levitt NS [8] However, some researchers found difference in gender. [9,10,11]The calculated value of χ^2 is 40.32, which is more than 12.59 ie. table value of χ^2 at df= 6 for 5% level of significance ($p<0.05$). It is also highly significant as calculated value is also more than 22.46 ie. table value of χ^2 at df=6 for 0.1% level of significance ($p<0.001$). In the overweight and obese group, the risk of diabetes increases as BMI increases, with 33% of overweight and 34% of obese being in the high-risk category in our study. There was a statistically significant association of Diabetes risk with BMI. Many studies[11-14,15,16, 17, 18] have showed quite identical results. Few studies of Tamil Nadu[9] and Kerela[10] did not find any association of Diabetes risk with BMI. As BMI has been found to be an important predictor of risk, more emphasis needs to be given to increase the physical activity. Based on Asian standards[19], central obesity as predicted by waist circumference was prevalent in 40% of females and 35% of males. Central obesity specially is shown to be an important risk factor for cardio metabolic diseases. Unlike subcutaneous fat, visceral fat is drained by the portal venous system and has a direct connection with the liver, resulting in an influx of free fatty acid availability in the liver. In visceral fat, mobilization of free fatty acids is faster because of higher lipolytic activity in visceral adipocytes, resulting in higher free fatty acids in the systemic circulation where it forms plaque on the artery walls, resulting in high blood pressure and cardiovascular disease. Additionally, an influx of free fatty acid availability in the liver decreases hepatic insulin extraction, resulting in systemic hyperinsulinemia, and inhibits the suppression of glucose production by insulin.[20] Parental history of diabetes was present in 44.8% of the students. And 89.2% of the students were not exercising regularly neither were they performing any strenuous work. The sedentary lifestyle is independent risk factor of diabetes. After computing for IDRS scores it was found that 20.8% of the subjects were already in the high-risk group. Around 34.2% were in moderate risk group. If steps are not taken to control their obesity, they may land up in high-risk group after age of 35 years. Our results are consistent with a similar study done in Pune which showed 4% in high-risk group and 76% in moderate risk.[21] Another study done in Mangalore revealed 1/3rd of students at high to moderate risk.[22]

V. Conclusion:

Do we really need a score for India? Yes, we have 32 million Indians with Diabetes and have the largest diabetic pool in the world. The problem is further compounded by the fact that 60% of Indian Diabetics are not diagnosed as compared to 50% in Europe and 33% in USA. Therefore, a diabetes risk score will help us to device effective screening strategies to unmask hidden burden of the disease. Universal screening should be done in high-risk urban cities in India like Mumbai, Delhi, Chennai, etc. However universal screening is neither cost effective nor feasible. There is an urgent need for mass screening programmes. However, it is difficult and expensive to screen everyone, hence selective screening is necessary to make screening cost effective. Therefore, there is a need for having an Indian Diabetes Risk score. This can come only from a geographical cohort with urban and rural component. The cures are a classic cohort which has generated a risk score called IDRS with two modifiable risk factors i.e., Waist circumference and Physical Inactivity and two non-modifiable risk factors ie. Age and family history of diabetes which may be amenable to intervention.[23,24]

Limitations:

- Age is <35 yrs
- Sensitivity is only 70.2%
- Specifity of 60%
- It does not differentiate between type 1 and type 2

- The score was calculated from the students of same institute so no diversity was achieved
- No invasive procedures were done so we do not know the value of blood sugar levels

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