Risk Assessment of Type 2 Diabetes Mellitus using Indian Diabetic Risk Score (IDRS): A study on Young Nursing Students at RIMS, Ranchi, Jharkhand

Dr. Suhash Tetarway[1], **Dr. Shishir Kumar Mahto[2], Dr. Pradeep Minz[3], Dr. Neha[4]

1. *Associate Professor, Department of Physiology, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand*
2. *Tutor, Department of Physiology, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand*
3. *Tutor, Department of Physiology, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand*
4. *Post Graduate Student, Department of Physiology, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand*
**Corresponding author: Dr. Shishir Kumar Mahto, Tutor, Department of Physiology, Rajendra Institute of Physiology.*

Abstract: Prevalence of type 2 diabetes mellitus (T2DM) has increased beyond the proposed value in India as the Indian population is particularly vulnerable to the disease due to its genotype and changing lifestyle. Incidence is also rapidly growing in young individuals. Hence, it is very necessary to screen population to recognize Type 2 Diabetes Mellitus patients earlier to prevent associated complications. Aim of this study was to assess the risk score of Type 2 Diabetes Mellitus in B. Sc. nursing students of RIMS, Ranchi, Jharkhand who are of young age group and to counsel the subjects of high and medium risk group to take care of the modifiable risk factors like obesity and sedentary life style. Assessment of Indian Diabetes Risk Score (IDRS) in B. Sc. Nursing students of RIMS, Ranchi and comparison of IDRS among different groups were the two objectives of this study. It was a cross sectional study done on 135 students. Age, waist circumference, details of physical activities and family history of diabetes were recorded by supplying a questionnaire to each student. Based on that, risk was calculated as high (≥60), medium (30 - 50) and low risk (< 30). Out of 135 subjects 24 (17.78%) had medium risk for developing Type 2 Diabetes Mellitus. None of the subjects had high risk of Diabetes development. In conclusion, there is an urgent requirement of early identification of at risk population of young nursing students and to increase awareness. Lifestyle modifications and exercise should be instituted at the earliest to prevent or delay the onset of diabetes mellitus and its complications in later life.
Keywords: Indian Diabetic Risk Score (IDRS), Diabetes Mellitus, Waist circumference

----
Date of Submission: 22-02-2020   Date of Acceptance: 06-03-2020

I. Introduction

Diabetes mellitus is very rapidly gaining the status of a potential epidemic in India with more than 62 million diabetic individuals currently diagnosed with the disease[1, 2]. Recent data shows, India (31.7 million) has topped the world list with the highest number of people with diabetes mellitus, followed by China (20.8 million) and United States (17.7 million) in second and third place respectively[3].

The etiology of Diabetes in Indian population is multifactorial and it mainly includes genetic factors coupled with environmental influences such as obesity associated with rising living standards, steady urban migration and lifestyle changes[3].

Most common form of Diabetes Mellitus in India is type 2 with projected cases of about 79.4 millions by the year 2030[4, 5].

Indians and many other Asian populations have the "metabolically obese" phenotype characterized by higher abdominal obesity despite normal Body Mass Index (BMI), low muscle mass higher percentage of body fat and increased level of insulin resistance, which makes them highly susceptible to diabetes[6].

It has also been noted that the age at diagnosis of the disease has decreased considerably among the Indian patients[7]. Type 2 Diabetes Mellitus has become increasingly common among adolescents and youth[8].

The development of the disease at a younger age predisposes the patients to develop the chronic long term complications at a relatively young age and due to that severe morbidity and early mortality occur in the most productive years of life. This adversely affects their quality of life and impose considerable physical, psychological and economical burden.

In view of these facts, it becomes extremely important to assess the risk of type 2 Diabetes Mellitus in young individuals and screen them for the same as Indian youths are particularly susceptible due to their genotype and changing lifestyle.

Indian Diabetes Risk Score (IDRS) is a very simple and user friendly scoring system for the quantification of risk of type 2 Diabetes Mellitus in Indian population developed by Mohan et al's group from their Chennai Urban Rural Epidemiology Study (CURES) cohort[9]. This risk score is based upon two modifiable risk factors (waist circumference and physical inactivity) which may be amenable to intervention, and two non modifiable risk factors (age and family history of diabetes).

Indian Diabetes Risk Score (IDRS)[10]

CRITERIA		SCORE
AGE	< 35 Years	0
	35 – 49 Years	20
	≥ 50 Years	30
WAIST CIRCUMFERENCE	< 80 cm (female), < 90 cm (male)	0
	≥ 80 – 89 cm (female), ≥ 90 – 99 cm (male)	10
	≥ 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
Score < 30: Low risk; 30 – 50: Medium risk and ≥ 60: High risk		

Studies have shown that an IDRS value ≥ 60 had the optimum sensitivity (72.5%) and specificity (60.1%) for determining undiagnosed diabetes in the community with a positive predictive value of 17.0%, negative predictive value of 95.1%, and accuracy of 61.3%[9]. The advantages of IDRS are its simplicity, low cost and are easily applicable for mass screening programmes.

Hence, we chose to perform this study in nursing students of RIMS, Ranchi, who are young adults, in order to assess the risk of development of type 2 diabetes mellitus in them.

II. Aims and Objectives
Aim of our study was to assess the risk score of type 2 diabetes mellitus in B. Sc. nursing students of RIMS, Ranchi, Jharkhand who are of young age group and to counsel the subjects of high risk group to take care of the modifiable risk factors like obesity and sedentary life style.
We had following objectives for this study:
1. Assessment of Indian Diabetes Risk Score (IDRS) in B. Sc. Nursing students of RIMS, Ranchi.
2. Comparison of IDRS among different groups.

III. Materials and Methods
A total of 135 B. Sc. Nursing students of three batches, who were enrolled in their course at RIMS, Ranchi, Jharkhand were included in this cross sectional study. Subjects who had already been diagnosed as overt cases of Diabetes Mellitus or who were suffering from any other endocrinopathy were excluded from this study. After taking consent, a properly structured questionnaire was supplied to the subjects and all the data were gathered online. Anthropometric measurements were done in the Department of Physiology, RIMS, Ranchi following standard protocols and taking all necessary precautions. IDRS of the study subjects was calculated and data was analyzed. Ethical clearance was taken from Institutional Ethics Committee (IEC) at RIMS, Ranchi, Jharkhand.

IV. Observation
Table 1: IDRS Criteria and Number of Students

IDRS Criteria (Score)		No. of Subjects (n = 135)	Percentage
AGE	< 35 Years (0)	135	100.00
	35 – 49 Years (20)	0	0
	≥ 50 Years (30)	0	0
WAIST CIRCUMFERENCE	< 80 cm (female), < 90 cm (male) (0)	117	86.67
	≥ 80 – 89 cm (female), ≥ 90 – 99 cm (male) (10)	18	13.33
	≥ 90 cm (female), ≥ 100 cm (male) (20)	6	4.44
PHYSICAL ACTIVITY	Regular vigorous exercise OR Strenuous (manual) activities at home/work (0)	0	0.00

	Regular moderate exercise OR Moderate Physical activity at home/work (10)	24	17.78
	Regular mild exercise OR Mild physical activity at home/work (20)	39	28.89
	No exercise AND/OR Sedentary activities at home/work (30)	72	53.33
FAMILY HISTORY OF DIABETES	No diabetes in parents (0)	111	82.22
	One parent is diabetic (10)	21	15.56
	Both parents are diabetic (20)	3	2.22

Age Distribution

Waist Circumference

- < 80 cm
- ≥ 80 – 89 cm
- ≥ 90 cm

Physical Activity

- Regular vigorous exercise
- Regular moderate exercise
- Regular mild exercise
- No exercise

Family History of Diabetes

- No diabetes in parents
- One parent is diabetic
- Both parents are diabetic
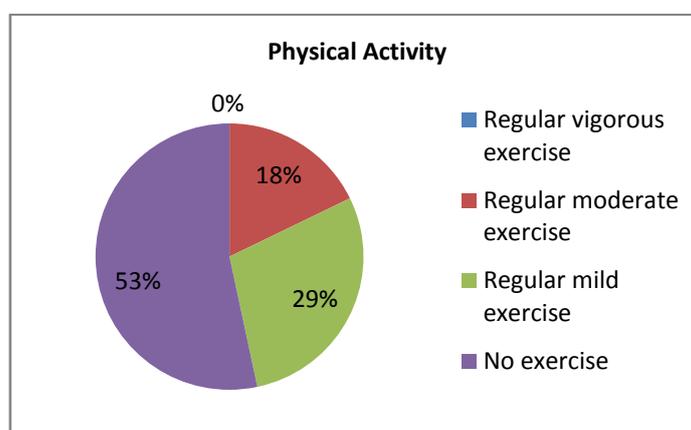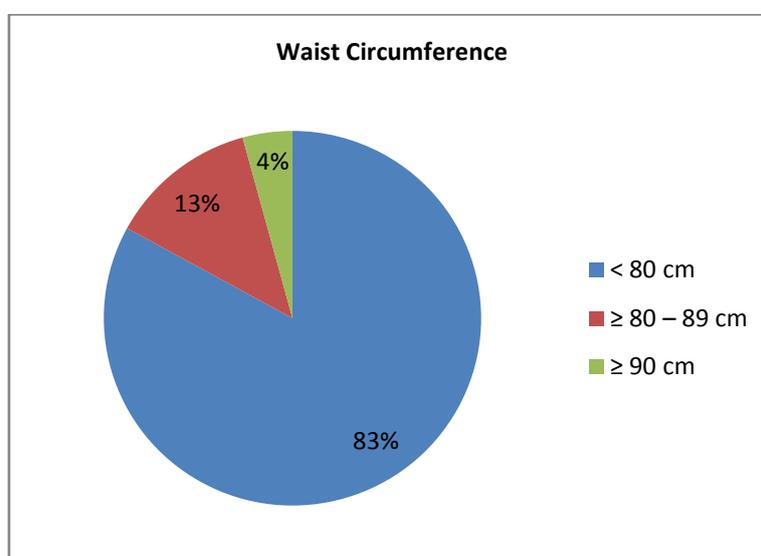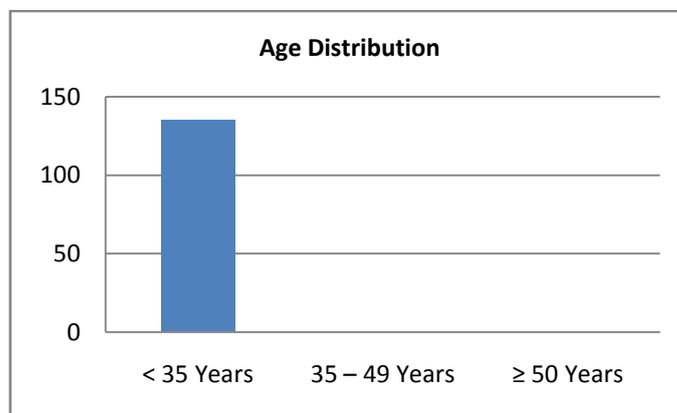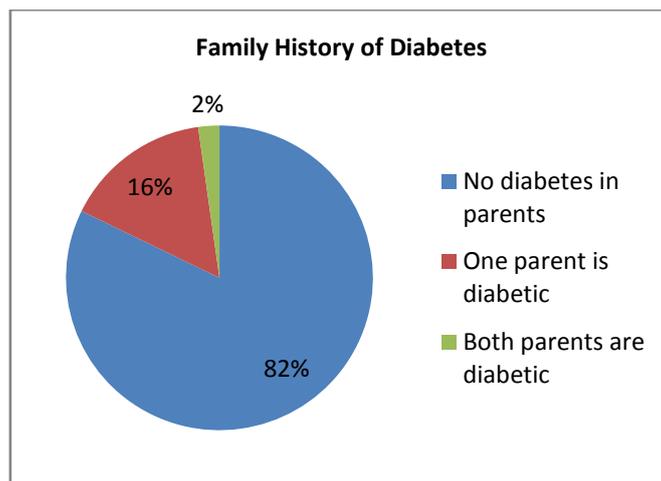
In this study we observed that all of our subjects (n = 135) were aged below 35 years, so the "Age" criteria of IDRS scoring was zero for all of them. Among our subjects, 117 (86.67%) nursing students had waist circumference < 80 cm, 18 (13.33%) had waist circumference of $\geq 80 - 89$ cm and 6 (4.44%) had that of ≥ 90 cm. When we took the history of physical activity we found that none of our subjects was doing regular vigorous exercise. 24 (17.78%) students were doing regular moderate exercise and 39 (28.89%) were doing regular mild exercise. Around half (53.33%) of our study subjects were not doing any form of exercise. Most of the subjects i.e. 111 (82.22%) had no family history of diabetes. We found that 21 (15.56%) subjects had one diabetic parent and only 3 (2.22%) subjects had both parent diabetic.

Table 2: Total IDRS Score and Number of Students

Total IDRS Score	No. of Subjects	Percentage
Score < 30: Low risk	111	82.22
Score 30 – 50: Medium risk	24	17.78
Score $\geq$ 60: High risk	0	0

We calculated the total IDRS score of our study subjects & stratified them in three risk groups as shown in table 2. We observed that 111 (82.22%) subjects had low risk of Type 2 Diabetes Mellitus with IDRS score < 30 and 24 (17.78%) subjects had medium risk with IDRS score between 30 and 50. None of our subjects fell in high risk category.

Our observations were in congruence with that of other researchers' findings of previous similar studies, such as study done by Mongiam Meghachandra Singh et al[11] and by Dr. Shweta Sahai et al[12].

Total IDRS Score Distribution
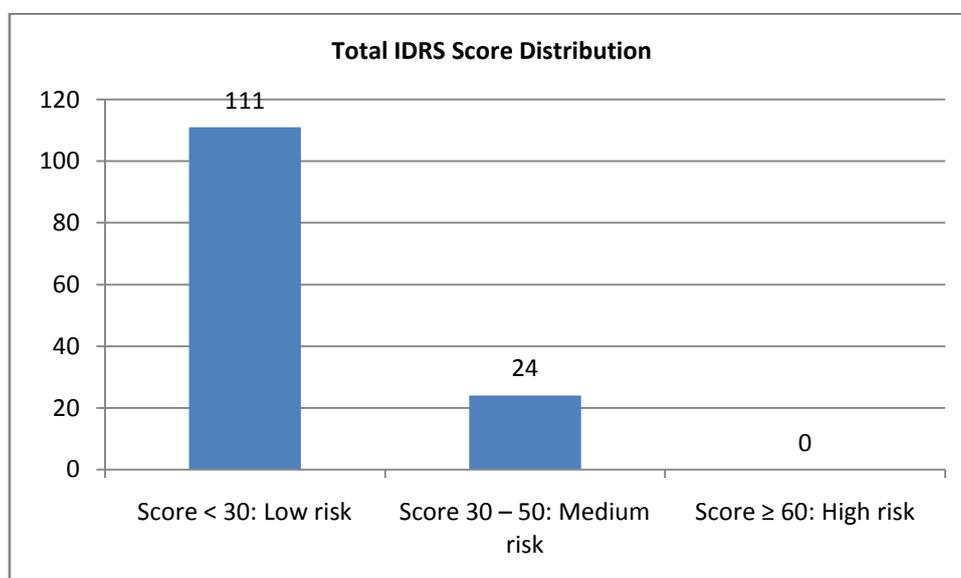
V. Discussion

IDRS is simple and cost effective screening tool for the assessment of the risk of developing type 2 diabetes mellitus. Special attention must be paid to subjects who fell within the high or medium risk category. 17.78% (24) of our subjects (n = 135) fell in medium risk group whereas majority 82.22% subjects were in low risk group. Dr. Shweta Sahai et al found in their study titled "Risk of developing diabetes in the Indian youth: An evaluation using Indian diabetes risk score (IDRS)" that 24 female subjects of their study design had medium risk of developing type 2 Diabetes Mellitus when assessed by this scoring system[12]. Many other studies have shown the similar results. These facts clearly indicate that risk of disease burden of Type 2 Diabetes Mellitus is consistently increasing in young Indian population also and it is no more a disease of elderly now. Lack of physical activity, central obesity and positive family history being the main reasons for this along with other minor contributory factors.

Limitations of the Study

Present study has used simplified IDRS scoring system to assess Type 2 Diabetes Mellitus risk among young nursing students, so the effect of age on diabetes risk could not be considered as all were below 35 years of age. Another limitation of the study was that cross sectional analysis does not permit observation of trend of diabetes risk among the subjects over time.

VI. Conclusion

It is alarming that 24 (17.78%) subjects, as evident in our study have medium risk of developing Type 2 Diabetes Mellitus in their very young age. These findings highlight the importance and need to focus and strengthen the activities of health promotion in young population so as to reduce the future burden of disease. There is an urgent requirement of early identification of at risk population of young nursing students and to increase awareness. Lifestyle modifications and exercise should be instituted at the earliest to prevent or delay the onset of diabetes mellitus and its complications in later life. Large studies in relation to IDRS should be conducted in community settings to find out population at risk and the vulnerable groups must be screened further for Type 2 Diabetes Mellitus.

It will not just aid in early detection and prevention of complications but will also reduced morbidity and mortality caused by T2DM. Hence IDRS can be used to motivate people for primary prevention of diabetes, metabolic syndrome and cardiovascular disease.

References

[1]. Joshi SR, Parikh RM. India - diabetes capital of the world: now heading towards hypertension. J Assoc Physicians India. 2007; 55:323–4. [PubMed]
[2]. Kumar A, Goel MK, Jain RB, Khanna P, Chaudhary V. India towards diabetes control: Key issues. Australas Med J. 2013;6(10):524–31. [PMC free article] [PubMed]
[3]. Australas Med J. 2014; 7(1): 45–48. Published online 2014 Jan 31. doi: 10.4066/AMJ.2013.1979 PMCID: PMC3920109 PMID: 24567766 The current state of diabetes mellitus in India Seema Abhijeet Kaveeshwar and Jon Cornwall
[4]. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes-estimates for the year 2000 and projections for 2030. Diabetes Care. 2004;27(3):1047–53. [PubMed]
[5]. Whiting Dr, Guariguata L, Weil C, Shawj. IDF Diabetes atlas: Global estimates of the prevalence of diabetes for 2011 and 2030. Diabetes Res Clin Pract. 2011; 94:311–21. [PubMed]
[6]. Ramachandran A, Ma RC, Snehalatha C. Diabetes in Asia. Lancet. 2010; 375(9712):408-18. doi: 10.1016/S0140-6736(09)60937-5. Epub 2009.
[7]. Ramachandran A, Mary S, Yamuna A, et al. High prevalence of diabetes and cardiovascular risk factors associated with urbanization in India. Diabetes Care. 2008;31(5):893-8. doi: 10.2337/dc07-1207. Epub 2008.
[8]. Ramachandran A, Ma RC, Snehalatha C. Diabetes in Asia. Lancet. 2010;375(9712):408-18. doi: 10.1016/S0140-6736(09)60937-5. Epub 2009.
[9]. Mohan V, Deepa R, Deepa M et al. A Simplified Indian Diabetes Risk Score for Screening for Undiagnosed Diabetic Subjects. J Assoc Physicians India 2005; 53:755-63.
[10]. Mohan V, Sandeep S, Deepa M, Gokulakrishnan K, Datta M, Deepa R. A diabetes risk score helps identify metabolic syndrome and cardiovascular risk in Indians-the Chennai Urban Rural Epidemiology Study (CURES-38) Diabetes Obes Metab. 2007; 9:337–43.
[11]. Singh Mongiam Meghachandra, Mangla Vipra, Pangtey Ruchira, Garg Suneela; Risk assessment of diabetes using the Indian diabetes risk score: A study on young medical students from Northern India; Year : 2019, Volume : 23, Issue : 1, Page : 86-90
[12]. Sahai Shweta, Ahuja Nishtha; Risk of developing diabetes in the Indian youth: An evaluation using Indian diabetes risk score (IDRS)International Journal of Medical and Health Research ISSN: 2454-9142, Impact Factor: RJIF 5.54 www.medicalsciencejournal.com Volume 3; Issue 5; May 2017; Page No. 17-19