

Diabetes Risk among Selected Obese/Overweight Female College Students in Coimbatore City

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Abstract - Background: Occurrence of Type II Diabetes among youngsters can be prevented or delayed if the risk factors are targeted. **Objectives:** To study 1) the risk factors of diabetes among selected students and 2) the level of risk of developing diabetes using the tool 'Indian Diabetes Risk Score' (IDRS). **Methodology:** Ethical clearance was obtained from Coimbatore Medical College Hospital. Overweight / obese female college students (n=93) of 19 - 22 years of age in Coimbatore city were selected. Using a questionnaire framed as per the tool 'IDRS', data on age, waist circumference, physical activity pattern and family history of diabetes were elicited, scores were given, summed up and the overall level of risk was arrived at. **Results:** With respect to age all the selected students registered zero 'IDRS' as all were below 34 years of age. Waist circumference of 80 - 90 cm and ≥ 90 cm with the corresponding risk score of 10 and 20 were recorded by 58% and 42% of the selected students respectively. Coming to the physical activity pattern, majority (90.3%) of the students performed no exercise / strenuous work recording a maximum 'IDRS' of 30. With regard to family history of diabetes, risk score of 'zero', 10 and 20 were recorded by 47.3%, 38.7% and 14% of the students respectively. Coming to overall risk of developing diabetes, moderate risk (IDRS: 30 - 50) and high risk (IDRS: ≥ 60) were observed among 59% and 41% of the selected students respectively. No one recorded low risk.

Index Terms - Indian Diabetes Risk Score, Overweight/Obesity, Type 2 diabetes, Waist Hip Ratio

1. INTRODUCTION

Diabetes mellitus is a major public health problem which affects all age groups and has now been identified in youth. 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 (Mohan et al., 2005).

India is facing the dual burden of communicable and non-communicable diseases (NCD). Among the NCDs the burden of diabetes in India is increasing day by day. According to International Diabetes Federation (IDF) the total number of people with diabetes in India is projected to rise from 61.3 million (2011) to 101.2 million (2030) and it is second highest in the world after China. Unfortunately, more than 50% of the diabetic subjects in India remain unaware of their diabetes status, which adds to the disease burden similar to the world scenario as 183 million people (50%) with diabetes are undiagnosed. Several prospective studies have shown that lifestyle modifications help in preventing the onset of diabetes. Early identification of the high-risk individuals would help in taking appropriate intervention in the form of dietary changes and increasing physical activity, thus helping to prevent, or at least delay, the onset of diabetes. This means that identification of individuals 'at risk' is extremely important if we are to prevent diabetes in India (Ranadip et al., 2012). Hence this study was taken up with the following objectives: 1) To study the risk factors of diabetes among selected female college students in Coimbatore city and 2) to study the level of risk of developing diabetes using the tool 'IDRS' among them.

2. METHODOLOGY

The methodology was framed and a presentation was made to the ethical committee at the Coimbatore

Medical College Hospital. Necessary documents were submitted to the panel, queries raised were answered and the ethical clearance was obtained.

It is a proven fact that obesity is one of the major etiological factors predisposing to diabetes mellitus. Mohan et al. (2005) came up with a few criteria based on which the risk of developing diabetes may be assessed. They named it as IDRS (Indian Diabetes Risk score) and the tool is given hereunder in Table 1. Table 1 -Indian Diabetes Risk Score (Mohan et al., 2005)

Particulars	Score
Age:	
< 35 years	0
35 - 49 years	20
≥ 50 years	30
Waist Circumference:	0
Waist < 80cm [female], < 90 cm [male]	10
Waist < 80 - 89cm [female], < 90 - 99 cm [male]	20
Waist ≥ 90cm [female], ≥ 100 cm [male]	
Physical Activity:	
Vigorous exercise [regular] or strenuous [manual] work at home / work	0
Moderate exercise [regular] or moderate physical activity at home / work	10
Mild exercise [regular] or mild physical activity at home / work	20
No exercise and 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

Overweight / obese female college students (n=93) of 19 - 22 years of age in PSG College of Arts & Science and GRD College of Arts & Science in Coimbatore city were selected by convenience sampling method. A questionnaire was framed to elicit information from the selected students on age, waist circumference, physical activity pattern and family history of diabetes to assess the ‘diabetes risk’ as proposed in the tool ‘IDRS’. The filled-up questionnaires were collected, scores were given as per the tool and the scores were summed up for every individual subject. The overall score and the level of risk of developing diabetes mellitus [low/moderate/high risk] were arrived at. The interpretation of risk according to IDRS is given in Table 2.

Table 2-Interpretation - Level of Risk based on IDRS

Scores	Level of Risk
≥ 60	High risk
30 - 50	Moderate risk
< 30	Low risk

3. RESULTS AND DISCUSSION

‘DIABETES RISK’ AMONG THE SELECTED OVERWEIGHT / OBESE FEMALE COLLEGE STUDENTS (n=93)

a) Age of the Selected Overweight / Obese Female College Students and the Respective Scores (Table 3) Age of the selected overweight / obese female college students ranged from 19 to 22 years and hence it came in the category of 0 - 34 years of age mentioned in the “Indian Diabetes Risk Score” (IDRS) tool with a score of only zero. Age has been specified as the first criterion in the tool ‘IDRS’ to assess the risk of developing diabetes.

Table 3-Age of the Selected Overweight / Obese Female College Students and the Respective Scores as per IDRS (n=93)

Indian Diabetes Risk Score (IDRS)	Age (Yrs)	Number / Per cent of Female College Students(n=93)	
		Total (n=100)	
		No.	%
0	0- 34	93	100
20	35-49	-	-
30	≥ 50	-	-

The global increase in diabetes is triggered by, and associated with many factors, including the ageing population, and the unhealthy diets and sedentary lifestyles that heighten one's propensity towards obesity. In the industrialized countries of the West, diabetes is common among the elderly, in contrast with developing countries where diabetes most frequently affects those between the ages of 35 and 64. In some countries, diabetes mellitus also frequently occurs in youths (Shafae et al., 2008).

b)Waist Circumference in the Selected Overweight / Obese Female College Students and the Respective Scores (Table 4)

Table 4 gives the range of waist circumference in cm and the respective score as per IDRS. Waist circumference of 80 - 90 cm and ≥ 90 cm with the corresponding risk score of 10 and 20 as per the IDRS were recorded by 58% and 42% of the selected overweight / obese female college students respectively. According to El - Sherbiny (2015), weight gain in college places students at risk for developing type II diabetes. Waist circumference is the most widely used measure to quantify central obesity opined Min and Stephens (2015).

Table 4

Waist Circumference of the Selected Overweight / Obese Female College Students and the Respective Scores as per IDRS (n=93)

Indian Diabetes Risk Score (IDRS)	Female College Students (n=93)		
	Waist Circumference (cm)	Total (n=100)	
		No.	%
0	< 80	-	-
10	80 - 89	54	58
20	≥ 90	39	42
	Total	93	100

WHO (2008) found that waist circumference (WC) correlates more closely with abdominal adipose tissue than Body Mass Index (BMI). It is much easier and more accurate to measure WC than to measure weight and height. Seidell (2010) reported that WC is a strong predictor of all-cause mortality in young and middle-aged adults compared with older individuals and those with low BMI.

c) Physical Activity Pattern among the Selected Overweight / Obese Female College Students and the Respective Scores (Table 5)

In the present study, majority (90.3%) of the selected overweight / obese students performed no exercise / strenuous work and hence recording an IDRS of 30. Only 9.7% of the selected subjects were involved in some form of exercise or strenuous work recording an IDRS 20.

Table 5-Physical Activity Pattern among the Selected Overweight / Obese Female College Students and the Respective Scores as per IDRS (n=93)

Indian Diabetes Risk Score (IDRS)	Types of Physical Activities	Number/Per cent of Female College Students (n=93)	
		Total (n=100)	
		No.	%
0	Exercise+strenuous work	-	-
20	Exercise(or)strenuous work	9	9.7
30	No.Exercise/strenuous work	84	90.3
	Total	93	100

Diabetes risk reduction of 58% was reported in the Finish Diabetes Prevention Study that prescribed 210 min / week of moderate to strenuous intensity exercise (including resistance training) and dietary intervention to reduce fat and increase fiber intake in selected patients. In Asian Indians with IGT, lifestyle advice to undertake 210 min / week of brisk walking resulted in a 28.5% risk reduction of incident diabetes. The Da Qing Study from China reported a 46% risk reduction

when moderate intensity activity was prescribed at 140 min/week and 280 min / week for persons ≥ 50 years and < 50years, respectively (Hordern et al., 2012).

Globally, physical inactivity acts as a major risk factor for obesity, which has a significant relationship with diabetes. Over the past few decades, a huge proportion of the working population has shifted from manual labor associated with the agriculture sector to less physically demanding office jobs. India is undergoing rapid urbanization, which is associated with increasing obesity and decreasing physical activity, owing to changes in lifestyle and diet and a change from manual work to fewer physical occupations (Patil and Gothankar, 2016).

d) Family History of Diabetes among the Selected Overweight / Obese Female College Students and the Respective Scores (Table 6)

The IDRS given is 'zero' if there is no family history of diabetes. If one parent is diabetic the score given is 10 and if both parents are diabetics the score given is 20. In the present investigation 47.3% of the selected subjects recorded 'zero' risk score as they had no family history of diabetes. Risk score of 10 (one parent diabetic) and 20 (both the parents diabetics) were recorded by 38.7% and 14% of the selected subjects respectively.

Table 6 -Family History of Diabetes among the Selected Overweight / Obese Female College Students and the Respective Scores as per IDRS (n=93)

Indian Diabetes Risk Score (IDRS)	Family History of Diabetes	Number/Per cent of Female College Students (n=93)	
		Total (n=100)	
		No.	%
0	No. Family History	44	47.3
10	Either Parent	36	38.7
20	Both Parents	13	14.0
	Total	93	100

Scott et al. (2012) found that even after accounting for prominent T2D risk factors such as physical activity, BMI, waist circumference and a multi-SNP (single nucleotide polymorphisms) genetic risk score, family history was strongly associated with future risk of T2D, and that the majority of this risk remained unexplained. Similarly, Valdez et al. (2007) reported that independent of sex, race and ethnicity, age, Body Mass Index (BMI) and family history of diabetes had

a significant, independent and marked connection with diabetes.

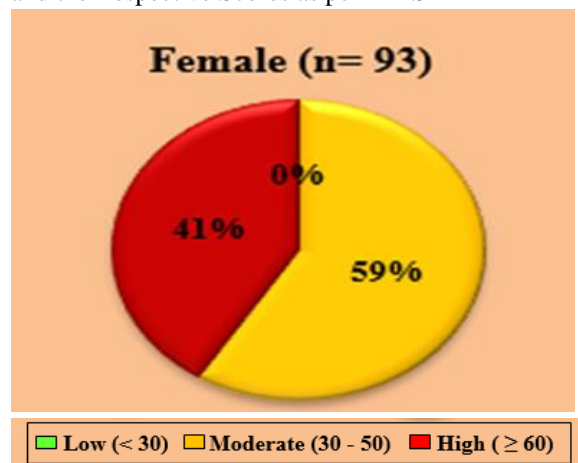
e) Overall Level of Risk of Diabetes among the Selected Overweight / Obese Female College Students based on Overall Scores (Table 7 and Figure 1)

It was discouraging to note that none of the selected female overweight / obese college students recorded low risk (<30). Moderate risk (IDRS: 30 - 50) of developing diabetes was observed among 59% of selected students and High risk (IDRS: ≥ 60) was seen among 41%. This result is highlighted in the Figure 1. Table 7-Overall Level of risk of Diabetes among the Selected Overweight / Obese Female College Students and the Respective Scores as per IDRS

Indian Diabetes Risk Score (IDRS)	Number / Per cent of Female College Students (n=93)	
	Total (n=100)	
	No.	%
<30 (Low Risk)	Nil	-
30 - 50 (Moderate Risk)	55	59
≥ 60 (High Risk)	38	41
Total	93	100

The higher risk recorded among the selected female college students could be attributed to higher waist circumference (central body obesity) and physical inactivity. In a similar study, conducted in Pune, where 99 female students and 162 male students participated, 4%, 76%, and 20% had high, moderate, and low - risk, respectively, for developing T2DM (Ashok et al., 2011).

Figure 1-Overall Level of risk of Diabetes among the Selected Overweight / Obese Female College Students and the Respective Scores as per IDRS



4. CONCLUSION

As ‘prevention is better than cure’, younger generation should be cautioned about the deleterious effects of risk factors causing diabetes. As studying the risk factors are non-invasive, every individual should be assessed for these factors and suitable intervention programs like nutrition education programs and exercise programs should be initiated nationwide in the future.

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