

# Risk Score Evaluation for the Development of T2D in the Population of Jammu Region of J&K State, India



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## Abstract

The present study evaluates the risk of development of Type 2 Diabetes in the population of Jammu region of J&K using Indian Diabetes Risk Score (IDRS). A detailed scoring pattern where in two modifiable (waist and hip circumference) and two nonmodifiable risk factors (age and family history) were taken into consideration. The results confirmed that almost 50% of the studied population has a very high risk score towards development of T2D. Obese (62%) and pre-obese (56%) participants belonged to the high risk category according to IDRS. More diabetics (54%) compared to non-diabetics (35%) belonged to the high risk IDRS category. In conclusion, IDRS is a simple, fast, non-invasive, inexpensive and a reliable tool to identify the risk of developing T2D in the population of Jammu and Kashmir. Obese and Pre-obese subjects have high risk category of development of T2D.

**Keywords:** Type 2 Diabetes; Risk score; Age; Obese; BMI

**Abbreviations:** IDRS: Indian Diabetes Risk Score; T2D: Type 2 Diabetes

## Introduction

Type 2 Diabetes (T2D) is a complex disorder characterized by chronic hyperglycaemia with disturbances of carbohydrate, fat and protein metabolism, resulting from defect in insulin secretion, insulin action or both [1]. It is estimated that by the year 2030, there will be about 366 million people affected by T2D worldwide, with many of those affected lying in the middle to late adult year group [2,3]. While on one hand T2D as a lifelong disease considerably increases morbidity and mortality at the same time its affliction decreases the quality of life [4]. Also, there is no denying the fact that the disease and its complications cause a heavy economic burden for diabetic patients, their families and society as well. Gene-Environment interaction plays an important role in the development of type 2 diabetes [5]. Obesity characterized by high fat tissue content is a major factor associated with increased risk of developing T2D [6]. Physical activity, diet and medication have collectively been used for management of diabetes since long. The risk factors differ among different population groups. It is therefore imperative to understand why Indians in general and the population of J&K in particular are developing T2D at such a high rate. Once the factors for the high development rates are known, necessary strategic healthcare planning could be pursued and the burden of disease reduced.

## Aim

The aim of the present study was to assess the risk of type 2 diabetes mellitus (T2D) in the adult population of Jammu and Kashmir above the age of 21 years using Indian Diabetes Risk score (IDRS) developed by [7]. Present study was conducted with the following objectives:

- Estimation of the risk scores for detecting high risk cases for diabetes in the population of Jammu and Kashmir.
- To find out the general risk factors conducive for developing diabetes in the population of Jammu and Kashmir.
- Comparison of risk scores for development of T2D among the declared diabetes and non-diabetes subjects.

## Materials and Methods

The present studies were carried out in the Jammu region of the J&K state of India wherein the population belonging to all the three regions of the state participated in the questionnaire based study. A total of 156 individuals participated in the study and various parameters including physical activities, family history of diabetes were assessed using a questionnaire previously developed by [7].

Waist and hip circumference were noted using standard procedures, Height and Weight was also measured using a measuring tape and digital weighing machine. The risk towards the development of T2D was done according to the IDRS scoring pattern wherein two

modifiable (waist circumference and physical activity) and two non-modifiable risk factors (age and family history) were taken into consideration (Table 1). Assessment of Physical activity was done by asking a set of three questions viz;

**Table 1:** Risk factors taken into consideration while scoring using Indian Diabetes Risk Scoring pattern.

| S.No | Modifiable Risk Factors           |             |       | S.No | Non- Modifiable Risk Factors |       |
|------|-----------------------------------|-------------|-------|------|------------------------------|-------|
| 1    | Waist Circumference               |             | Score | 1    | Age                          | Score |
|      | Male (cm)                         | Female (cm) |       |      | <35                          | 0     |
|      | <90                               | <80         | 0     |      | 35-49                        | 20    |
|      | 90-99                             | 80-89       | 10    |      | >50                          | 30    |
|      | >100                              | >90         | 20    | 2    | Family History               |       |
| 2    | Physical Activity                 |             |       |      | No family member affected    | 0     |
|      | Vigorous exercise/strenuous work  |             | 0     |      | Either parent affected       | 10    |
|      | Moderate exercise/work home       |             | 10    |      | Both parents diabetic        | 20    |
|      | Mild exercise/work home           |             | 20    |      |                              |       |
|      | No exercise & sedentary work/home |             | 30    |      |                              |       |

- How physical demanding is your occupation?
- Do you exercise in your free time?
- How would you grade your physical activity at home?

By adding the scores of three above mentioned parameters, the physical activity was considered as Vigorous, moderate or sedentary. The physical activity was considered vigorous if the added score for the above mentioned parameters was 3, moderate if the added score was 2, mild if the total added score was 1 and sedentary if the total added score of 0. The other modifiable factor that was taken into consideration was waist circumference. A waist circumference of less than 80cm (<80cm) for females and less than 90cm (<90cm) for males was given a score of 0. Waist circumference between 80-89cm for females and 90-99cm for males was given a score of 10. A score of 20 was given for the waist measuring >90cm for females and >100cm for males. The first non-modifiable risk factor which was taken into consideration was the age of the individual. The age of an individual less than 35 (<35) years was scored as 0, the age between 35-49 years was given a score of 20 and above 50 years was scored as 30. The second non-modifiable factor that was taken into consideration was the family history of diabetes of the individual. A score of 0 was given if there is no family history of diabetes of the individual. If either of the two parents were diabetic, a score of 10 was given and if both the parents were diabetic, a score of 20 was given.

## Results

A total of 156 individuals who participated in the study included 57 (36.53 %) females and 99 (63.47%) males. Of the total participants 92 (58.97%) were Hindus, 44 (28.21%) Muslims, 18 (11.54%) Sikhs and 2 (1.28%) were Buddhist. Out of 92 Hindus, 24 (26.08%) were Brahmins, 12 (13.04%) Kashmiri Pandits, 21 (22.82%) Mahajans, 22 (23.91%) Khatri Rajputs, 7 (7.6%) Schedule Class and 6 (6.52%) Other Backward Class. Regarding the age of the participants, 55.77% (87) participants were more than 50 years of age, 32.69% (51) participants between 36-49 years of age and

11.54% (18) between 20-35 years of age. 42.31% (66) participants were Graduate, 17.95% (28) participants were senior secondary, 14.74% (23) were secondary pass, 14.10% (22) middle pass and only 10.90% (17) individuals were Post Graduates. 74.74% (74) of males had waist circumference of >90 cm whereas 59.6% (34) females >90 cm. According to physical activity, 17 (10.89%) and 139 (89.1%) belonged to mild to moderate physical activity. A total of 104 (66.67%) individuals had no family history of diabetes. The participants with moderate risk (IDRS 30-50) of developing T2D were 76 (48.71%) while 78 (50%) participants had a very high risk (IDRS >60) of developing T2D (Table 2) 54% of the declared diabetics individuals were having high risk score (IDRS>60) compared to the 35.29 % in the general population.

**Table 2:** Distribution of participants on the basis of age, IDRS and Socio-demographic profile.

| Category              | Number | Percentage |
|-----------------------|--------|------------|
| <b>Sex</b>            |        |            |
| Male                  | 99     | 63.46      |
| Female                | 57     | 36.54      |
| <b>Age Group</b>      |        |            |
| 20-35                 | 18     | 11.54      |
| 36-49                 | 51     | 32.69      |
| >50                   | 87     | 55.77      |
| <b>Religion</b>       |        |            |
| Hindu                 | 92     | 58.98      |
| Muslim                | 44     | 28.2       |
| Sikh                  | 18     | 11.54      |
| Buddhist              | 2      | 1.28       |
| <b>Caste Division</b> |        |            |
| Brahmins              | 24     | 26.08      |
| Kashmiri Pandits      | 12     | 13.04      |
| Mahajan               | 21     | 22.83      |
| Khatri Rajputs        | 22     | 23.92      |

|     |   |      |
|-----|---|------|
| SC  | 7 | 7.61 |
| OBC | 6 | 6.52 |

A total of 33.97% (53) individuals were overweight (BMI>25) with a very high IDRS >60. However, only 15% (3) of the total 20 underweight individuals had a very high risk score (IDRS>60) of developing T2D (Table 3).

**Table 3:** Distribution of respondents according to BMI and IDRS.

| BMI                  | Low (<30) | Moderate (30-50) | Very High (60) | Total     |
|----------------------|-----------|------------------|----------------|-----------|
| <18.5 (Underweight)  | 0         | 5 (62.5%)        | 3(37.5%)       | 8 (100%)  |
| 18.5-24.99 (Normal)  | 2 (3.45%) | 34 (58.62%)      | 22 (37.93%)    | 58 (100%) |
| 25-29.99 (Pre-obese) | 0         | 21 (43.75%)      | 27 (56.25%)    | 48 (100%) |
| 30 and above (Obese) | 0         | 16 (38.09%)      | 26 (61.90%)    | 42 (100%) |
| Total                | 2 (1.28)  | 76 (48.71%)      | 78 (50%)       | 156       |

Of the total subjects studied 78.20% (122) individuals were diabetic and 54.09% (66) of the diabetic subjects had a high IDRS (>60) whereas only 21.80% (34) of the total studied subjects were non-diabetic. Of the studied non-diabetic subjects only 35.29% (12) had a high IDRS (>60) (Table 4).

**Table 4:** Distribution of participants on the basis of known status of Diabetes and IDRS.

|               | Total subjects | High IDRS (>60) |
|---------------|----------------|-----------------|
| Diabetics     | 122 (78.20)    | 66 (54.09)      |
| Non-Diabetics | 34 (21.80)     | 12 (35.29)      |

## Discussion

In the present studies, we used a scoring pattern called Indian Diabetes Risk Score (IDRS) following [7] to identify the risk factors as well as high risk subjects among the selected population of Jammu and Kashmir. As per the best of our knowledge, this is the first study carried out in the Jammu region of the state of Jammu and Kashmir wherein risk scores have been assigned to the subjects on the basis on anthropometric, demographic and behavioural factors to assess the risk of development of type 2 diabetes. The application of such a scoring system is of much significance as it is a simple and low cost, fast and non-invasive tool for preliminary screening and assigning risk score of developing diabetes among the selected population. Use of scoring system is of much help in underdeveloped countries like India where because of lack of resources many cases of diabetes remain undiagnosed. During present studies, 50% of the total population were observed to exhibit a high risk score of more than 60 for developing diabetes.

This percentage of population having high risk score is on higher side compared to the two other studies carried out in South India where using the same scoring pattern 31.2% of the population of Pondicherry and 43% population of Chennai was found to have high risk score of more than 60 [7,8]. Jammu and Kashmir is among

the fastest growing economies of India in the year 2017 [9]. This rapid economic growth is associated with urbanization resulting in change in lifestyle, eating habits and migration of large populations from villages to cities in search of employment [10]. Conflict and war like situation between India and Pakistan is mainly responsible for migration along borders. The growth of militancy in Kashmir valley since the year 1988 has also resulted in the migration of large populations from Kashmir valley and adjoining areas to Jammu city [11]. Migration has resulted in both mental and environmental stress. Environmental stress resulting from the change in subtropical climate of Kashmir valley to the temperate climate of Jammu. All the above mentioned factors possibly seem to result in increased stress and increased risk of developing T2D. The high IDRS among the diabetics was 54.09% compared to non-diabetics (35.29%) indicating that the population is likely to get diabetes if the prevalence of risk factors are not reversed.

Also since the non-diabetic subjects who were observed to have IDRS>60 were high risk group of developing type 2 diabetes in near future. Lifestyle and dietary modifications can be helpful in reversing the development of diabetes in this high risk group. It appears that there is an urgent need to confirm the occurrence of diabetes using Glucose Tolerance test in the subjects with IDRS>60. Besides this, precautionary measures including lifestyle changes, regular exercise and dietary modifications have to be initiated to lower down the risk in these high risk individuals.

## Conclusion

The Indian Diabetes Risk Score is a simple, fast, non-invasive, inexpensive and a reliable tool to identify the risk of developing T2D. This could be a preliminary test to find the risk of developing T2D in an individual. It is observed that the population of Jammu and Kashmir in general has a high risk of developing T2D. Also, people in obese or pre-obese category were having high risk score of developing T2D.

## References

1. Alberti KG, Zimmet PZ (1998) Definition, diagnosis and classification of diabetes mellitus and its complications. Part 1: diagnosis and classification of diabetes mellitus provisional report of a WHO consultation. *Diabet Med* 15(7): 539-553.
2. Wild S, Roglic G, Green A, Sicree R, King H (2004) Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. *Diabetes Care* 27(5): 1047-1053.
3. AD A (1998) Economic consequences of diabetes mellitus in the U.S. in 1997. American Diabetes Association. *Diabetes Care* 21(2): 296-309.
4. Hoskote SS, Joshi SR (2008) Are Indians destined to be diabetic? *J Assoc Physicians India* 56: 225-226.
5. Cornelis MC, Hu FB (2012) Gene-environment interactions in the development of type 2 diabetes: recent progress and continuing challenges. *Annu Rev Nutr* 32: 245-259.
6. Lazar MA (2005) How obesity causes diabetes: not a tall tale. *Science* 307(5708): 373-375.
7. Mohan V, Deepa R, Deepa M, Somannavar S, Datta M (2005) A simplified Indian Diabetes Risk Score for screening for undiagnosed diabetic subjects. *J Assoc Physicians India* 53: 759-763.

8. Gupta SK, Singh Z, Purty AJ, Vishwanathan M (2009) Diabetes prevalence and its risk factors in urban Pondicherry. *Int J Diabetes Dev Ctries* 29(4): 166-169.
9. Tina Edwin (2017) Arunachal Pradesh, J & K are fastest growing economies. In *The Hindu Business Line*, India.
10. Mahajan A, Sharma S, Dhar MK, Bamezai RN (2013) Risk factors of type 2 diabetes in population of Jammu and Kashmir, India. *J Biomed Res* 27(5): 372-379.
11. Raj S SSasm (2014) Migration, Relief & Rehabilitation and Social-Living Condition of Kashmiri Pandit Migrants of Camp and Non-Camp Areas in Jammu District. *IOSR Journal of Economics and Finance* 4: 50-59.



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