Risk score evaluation for the development of t2d in the population of jammu region of J&K state, India.

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Aim: Present study has been conducted to evaluate the risk towards the development of Type 2 Diabetes and the comparison of risk scores among diabetics and non diabetics in the population of Jammu region of J&K using Indian Diabetes Risk Score (IDRS). Methods: A detailed scoring pattern where in two modifiable (waist and hip circumference) and two non-modifiable risk factors (age and family history) were taken into consideration. Assessment of physical activity was done by a set of three questions including the physical demand of occupation, grading of physical activity at home and how frequent is the exercise pattern in free time. Waist circumference was measured using standard procedure. Age and family history was noted as reported by the participants. Scoring was done following IDR Scoring pattern. Results: The results confirmed that a large population has a very high or moderate risk score towards development of T2D. Approximately 50% population had IDRS >60 and 49% population with IDRS between 30 and 50. Obesity was found associated with high risk of T2D. Obese participants with a BMI 30 and above were having the maximum subjects (62%) in the high risk category. Similarly, 56% of the pre-obese subjects were having a very high IDRS. 54% of diabetics belonged to the high IDRS category compared to 35% of the non-diabetics. Conclusion: The Indian Diabetes Risk Score is a simple, fast, non-invasive, inexpensive and a reliable tool to identify the risk of developing T2D. It can be concluded that there is a high risk of developing T2D in the population of Jammu and Kashmir. Also, people in obese or pre-obese category were having high risk of developing T2D.
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; (a) How physical demanding is your occupation? (b) Do you exercise in your free time? (c) 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 80 cm (<80 cm) for females and less than 90 cm (<90 cm) for males was given a score of 0. Waist circumference between 80-89 cm for females and 90-99 cm for males was given a score of 10. A score of 20 was given for the waist measuring >90 cm for females and >100 cm 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.

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

| Waist Circumference | Score | Age | Score | Family History | Physical Activity | Non-modifiable Risk Factors |
|---------------------|-------|-----|-------|----------------|------------------|-----------------------------|
| Male (cm)           | Female (cm) | <35 | 0     |                 |                  |                             |
| <90                 | >90   | 0   | 20    |                 |                  |                             |
| 90-99               |       | 10  |       |                 |                  |                             |
| >100                |       | 20  |       |                 |                  |                             |

Physical Activity:
- No family member affected: 0
- Either parent affected: 10
- Both parents diabetic: 20

Health Status:
- No exercise & sedentary work/home: 30

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

| Category               | Number | Percentage |
|------------------------|--------|------------|
| Sex                    |        |            |
| Male                   | 99     | 63.46      |
| Female                 | 57     | 36.54      |
| Age Group              |        |            |
| 20-35                  | 18     | 11.54      |
| 36-49                  | 51     | 32.69      |
| ≥60                    | 87     | 55.77      |
| Religion               |        |            |
| Hindu                  | 92     | 58.90      |
| Muslim                 | 44     | 28.20      |
| Sikh                   | 18     | 11.54      |
| Buddhist               | 2      | 1.20       |
| Caste division         |        |            |
| Brahmins              | 24     | 28.08      |
| Kashmiri Pandits       | 12     | 13.04      |
| Mahajans              | 21     | 22.83      |
| Khatris/Rajputias     | 22     | 20.92      |
| SC                    | 7      | 7.61       |
| OBC                   | 6      | 6.52       |
| Educational Status     |        |            |
| Middle                | 22     | 14.10      |
| Secondary             | 23     | 14.74      |
| Senior secondary      | 28     | 17.95      |
| Graduate              | 66     | 42.31      |
| Post Graduate         | 17     | 10.90      |
| IDRS Score Category    |        |            |
| 60 (Very High Risk)   | 78     | 90.00      |
| 30 (High Risk)        | 76     | 87.50      |
| <30 (Low Risk)        | 2      | 2.50       |

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 overweight 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 |
|-----------|-----------|------------------|----------------|-------|
| Underweight | 0 (0%)   |                  |                |       |
| Normal     | (2.94%)   | (58.38%)         | (22.37%)       | (81.60%) |
| Above      | (43.75%)  | (56.25%)         | (48.10%)       | (95.10%) |
| Total      | 3 (1.0%)  | 78 (48.71%)      | 78 (59%)       | 157   |

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

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

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 35.29% (12) had a high IDRS (>60) (Table 4).

Discussion

In the present studies, we used a scoring pattern called Indian Diabetes Risk Score (IDRS) following Mohan et al. 2005 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 where risk scores have been assigned to the subjects on the basis of 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 its 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 unattended.

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 31.22% 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.

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