## Original Research Article

# Assessment of diabetes risk in an adult population using Indian diabetic risk score in urban area of Tamil Nadu

## S. Jayakiruthiga[1], R. Rajkamal[2]*, S. Gopalakrishnan[3], R. Umadevi[4]

[1]Postgraduate, [3]Professor and HOD, [4]Professor, Department of Community Medicine, Sree Balaji Medical College and Hospital, Tamil Nadu, India
[2]Assistant Professor, Department of Community Medicine, ACS Medical College and hospital, Tamil Nadu, India

**\*Correspondence:**
Dr. R. Rajkamal,
E-mail: rajkamalmbbs@gmail.com

## ABSTRACT

**Background:** India has earned the dubious distinction of being the diabetic capital of the world. The majority of people with diabetes (>90%) have Type 2 diabetes (T2DM). While T2DM predominantly affects older individuals in developed countries, in developing nations like India, it affects the younger population in the prime of their working lives and thus poses an even greater threat to the health of these individuals. Objectives of the study were to assess the Type 2 diabetes mellitus risk status of adult population in urban area of Tamil Nadu and to measure the association between sociodemographic factors like age, sex and socio economic status with diabetes risk score.
**Methods:** A community-based, cross-sectional study was carried out in Anakaputhur, an urban area in Kanchipuram district of Tamil Nadu in June 2016 among adult population on risk status for Type 2 Diabetes Mellitus Using Indian Diabetic Risk Score. The data was entered in MS Excel & analyzed by SPSS (Statistical Package for Social Science) 20.0 version. Descriptive statistics like proportions were calculated. Chi square test was used to compare the proportions between the groups. P value less than 0.05 was considered as statistically significant.
**Results:** Out of 351 study subjects, only 30 (8.5%)study subjects were not at risk of having diabetes, 119 (33.9%) were at moderate risk and 202 (57.6%) were at higher risk of having Diabetes. Comparing age, gender, socio-economic status with diabetes risk category, we found that age is associated with diabetes risk category and the p – value was highly significant.
**Conclusions:** Majority of the study subjects were at risk of having diabetes, hence screening is of utmost importance so that interventions can be initiated at an early stage.

**Keywords:** Type 2 diabetes mellitus, IDRS score, Adult population, Urban area

## INTRODUCTION

Epidemiological transitions in India in the 21st century have led to non communicable diseases becoming a major public health problem of growing magnitude. One of the important disease is diabetes, which is considered as a "disease of urbanization".[1-3] The International Diabetes Federation (IDF) indicates that the number of people living with diabetes globally is expected to rise from 366 million in 2011 to 552 million by 2030, if no urgent action is taken. Presently, more than three-quarters of the estimated 179 million people with diabetes are in the 40-59 years of age Hence it is important to screen individuals early to increase the quality of life and delay complications. India has the dubious distinction of being the diabetes capital just next to China having 62.4 million diabetics which is expected to rise to 100 million by 2030.[4] Every fifth diabetic in the world is an Indian. The problem is further compounded by the fact that 66% of

Indian diabetics are not diagnosed as compared to 50% in Europe and 33% in USA.[4] The diagnosis, treatment and management of complications pose a considerable burden on individual and country as well. The Indian Diabetes Risk Score (IDRS) is a simple, low cost, feasible tool for mass screening programme at the community level developed by Mohan et al has been validated by other researchers.[5] In a country like India, it can prove to be a cost effective tool for screening of diabetes at the community level. The purpose of community based screening for diabetes is to differentiate asymptomatic individuals who are at high risk of Diabetes from individuals at lower risk, so that appropriate preventive strategies can be initiated early. Ideally, screening tests should be rapid, simple, and safe. Since diabetes is an ice-berg disease, most of the subjects remain asymptomatic. Screening for diabetes can identify patients at an early stage of the disease, and identify those who will derive benefit from prevention and early treatment methods. With this background the present study was designed to find out the risk status of Diabetes mellitus using Indian Diabetic Risk score among adult population in urban area of Tamil Nadu.

*Objectives:*

1. To assess the Type 2 diabetes mellitus risk status of adult population in urban area of Tamil Nadu.
2. To measure the association between sociodemographic factors like age, sex and socio economic status with diabetes risk score.

## METHODS

A community-based, cross-sectional study was carried out in Anakaputhur in June 2016, which comes under the urban field practice area of Sree Balaji Medical College.

*Inclusion criteria*

All adult population aged 18 years and above who apparently healthy were included in the study.

*Exclusion criteria*

Those people who are critically, not willing to participate in the study, known case of any type of DM were excluded from the study.

*Data collection methods*

In the study area, individuals were interviewed using a structured questionnaire based on IDRS scoring system. Questionnaire captured data regarding sociodemographic details of the study population, modified kuppusamy scale 2017 was used for assessing the socioeconomic status of the study population. Family h/o of DM, Indian diabetes risk score (IDRS). This includes four parameters: age, waist circumference, physical activity and family history. Each parameter has assigned score ranging from 0 to 60 and accordingly the subject was

graded as having, no risk, moderate risk or high risk (Table 1). Waist circumference was measured. Interviewer was trained in collecting the details present in IDRS questionnaire before the data collection. Data was collected after getting written informed consent.

**Table 1: Indian diabetes risk score.[5]**

| | Particulars score |
|---|---|
| **Age [years]** | |
| < 35 | 0 |
| 35- 49 | 20 |
| ≥50 | 30 |
| **Abdominal obesity** | |
| Waist <80 cm [female], <90 [male] | 0 |
| Waist ≥ 80 – 89 cm [female], ≥ 90– 99 cm [male] | 10 |
| Waist ≥90 cm [female], ≥ 100 cm [male] | 20 |
| **Physical activity** | |
| Vigurous regular exercise or strenuous manual labour at home | 0 |
| Moderate regular exercise or moderate physical activity at home or work | 10 |
| Mild exercise regular or moderate physical activity at home or work | 20 |
| No exercise and sedentary work at home or work | 30 |
| **Family history** | |
| No family history | 0 |
| Either parent diabetic | 10 |
| Both parents diabetic | 20 |
| **Total score:…..** | |

*Grade*

No risk <30: risk of having diabetes is probably low.

If the score is 30-50 the risk of having diabetes is Moderate

If the score is >60, very high risk of having diabetes.

*Sample size*

Sample size was calculated based on the previous study conducted by Gupta et al in Pondicherry found that the prevalence of risk of diabetes mellitus using IDRS Score among adult population was 51%, with 95% confidence interval and 11% of relative precision. Calculated sample size was 318.[6]

*Sampling methods*

Participants were recruited using Systematic random sampling.

Total no of houses in the study area- 5296

Sample size=318

Sampling Interval= Total no of Houses/Sample size = 5296/318 =16

Every 16th house will be selected for the study and from each selected house one adult will be included in the study, by simple random sampling (Lottery Method).

### Data analysis

Data were entered in MS Excel and analyzed by SPSS 20.0 version. Descriptive statistics such as proportions were calculated and 95% CI was calculated appropriately. Chi-square test was used to compare the proportions groups. P<0.05 was considered as statistically significant.

### Ethical considerations

Study was approved by Institutional Ethics Committee of Sree Balaji Medical College. An informed consent was taken from each participant before the data collection.

Those who were illiterate, thumb impression were taken in front of a witness. All information collected was kept confidential. All the study subjects who had a diabetic risk score >30 (moderate and high risk) were referred to a secondary level /tertiary level hospital for getting their blood sugar levels checked and further workup.

### RESULTS

The present study was conducted in an urban area near Chennai. A total of 351 study subjects were recruited. Table 2 shows the distribution of study subjects according to IDRS score, only 30 (8.5%) study subjects were not at risk of having diabetes, 119 (33.9%) were at moderate risk and 202 (57.6%) were at higher risk of having diabetes. Table 3 shows that there was a statistical significant association of diabetes risk with age (p=0.001). In gender females were at higher risk of diabetes 09 (9.1%), it was not statistically significant (p=0.974). All the participants were found to belong in the following three socioeconomic groups (Upper middle, 96 (27.4%) lower middle, 158 (45.0%) upper lower 97 (24.6%) respectively.

**Table 2: Distribution of study subjects according to Indian diabetes risk score (IDRS).**

| S. No | Indian diabetes risk score | no of subjects n=351 (%) |
|---|---|---|
| 1. | ≥60 | 202 ( 57.6) |
| 2. | 30–50 | 119 (33.9) |
| 3. | <30 | 30 (8.5) |

**Table 3: Association between socio demographic characteristics and diabetes risk score (n=351).**

| Variables | No risk | Moderate risk | High risk | Total | chi square | P value |
|---|---|---|---|---|---|---|
| **Age** | Number (%) | Number (%) | Number (%) | | | |
| <35 years | 188 (74.3) | 56 (22.1) | 9 (3.6) | 253 | | |
| 35-50 years | 01 (2.7) | 30 (81.1) | 6 (16.2) | 37 | 113.59 | 0.001 |
| >50 years | 14 (23.0) | 32 (52.5) | 15 (24.6) | 61 | | |
| **Gender** | | | | | | |
| Male | 146 (57.9) | 85 (33.7) | 21 (8.3) | 252 | 0.053 | 0.974 |
| Female | 57 (57.6) | 33 (33.3) | 09 (9.1) | 99 | | |
| **Socioeconomic status** | | | | | | |
| Upper middle | 53 (56.4) | 34 (34) | 9 (9.6) | 96 | | |
| Lower middle | 91 (57.6) | 52 (32.9) | 15 (9.5) | 158 | 5.089 | 0.532 |
| Upper lower | 59 (60.8) | 32 (33.0) | 6 (6.2) | 97 | | |

### DISCUSSION

In this study screening for diabetes was conducted for 351 subjects among adult population 18 years and above in the community. Out of these only 30 (8.5%) were in low risk category, 119 (33.9%) were in moderate risk, 202 (57.6%) were at high risk group as per IDRS. Similar finding was observed in a study conducted by Nandeshwar in Bhopal.[6] This shows that a large number (moderate and high risk) of the study subjects had some kind of risk of developing diabetes in future. This is the group where active interventions in the form of counseling, health education are required. The earlier the

interventions are started the later will be the onset of disease and its subsequent complications. However a study done by Gupta showed low risk category had a higher no of individuals.[7] This difference may be due to the study area being rural where less proportion of study subjects had high risk. In our study a highly significant association was observed between Diabetes risk and age, as the age increases the risk of having diabetes is high (p=0.001). Several other studies have noted similar findings.[8-10] Two further studies found a positive association between higher age and undiagnosed diabetes.[11-12] In our study, females are at high risk of having diabetes as compared to males, similar to the

present study, Arora et al noted that more high risk cases were women than men in Urban Haryana and there was a statistically significant assosciation.[13]

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