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Original Research Article

Prevalence of type 2 diabetes using Indian diabetes risk score and its risk factors in a rural area of Tamil Nadu, India

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ABSTRACT

Background: Currently the number of cases of diabetes worldwide is estimated to be around 150 million. This number is predicted to double by 2025, with the greatest number of cases being expected in China and India. In countries like India, there is also a lack of awareness about the existing interventions for preventing diabetes and the management of complications. This underscores the need for mass awareness and screening programs to identify and overcome the burden due to diabetes in India. The aim and objectives of the study was to find out the people at risk of developing diabetes using a simple risk factor scoring in a rural area in Tamil Nadu

Methods: A community based cross-sectional study was carried out from June 2016 to August 2016 among 974 participants in the three rural blocks in Kancheepuram district of Tamil Nadu. A house to house visit was made and all population above 35 years of age, presenting on the day of survey were included in the study. Socio-demographic variables, risk factors were collected using a pre-tested structured questionnaire and High Risk Analysis for diabetes was done as per Indian Diabetes Risk Score (IDRS).

Results: Out of 974 study subjects, 62 (6.34%) of them reported that they had diabetes. Based on the screening tool, 253 subjects were found to be in the high risk category (score >60). Proportion of subjects with high risk score in the self-reported diabetes group (58.07%) were high compared to apparently normal group (23.79%) and this difference was statistically significant ($p<0.05$) using Chi Square test.

Conclusions: This study estimates the usefulness of simplified Indian diabetes risk score for identifying high risk diabetic subjects in the community. Use of the IDRS can make mass screening for diabetes in India more cost effective.

Keywords: Diabetes, Risk factors, Screening, Scoring

INTRODUCTION

Diabetes mellitus is one of the non–communicable diseases which are now a major global health problem. A range of historical developments, including rapid urbanization, economic growth, technical change and modernization, has brought about significant conversion in behaviors and, subsequently an accelerated rise in Non-communicable diseases, including diabetes. Currently the number of cases of diabetes worldwide is estimated to be around 150 million. This number is predicted to double by 2025, with the greatest number of cases being expected in China and India.[1] The recent World Health Organization report suggests that over 19% of the world's diabetic population currently resides in India.[2] This translates to over 35 million diabetic subjects, and these numbers are projected to increase to nearly 80 million by 2030. This rising trend predicts a

significant health burden due to diabetes in India.[3,4] A study done by Indian Council of Medical Research (ICMR) in 1970 reported a prevalence of 2.3% in urban and 1% in rural areas, which increased to 12-19% in urban and 4-10% in rural areas in 2000. Unfortunately more than 50% of the diabetic subjects in India remain unaware of their diabetes status, which adds to the disease burden.[5] A prevalence study using WHO steps approach found that both the rural and urban populations face an unequally distributed burden of risk factors for non-communicable diseases and the burden among the most well - off group in the rural area has already reached a level similar to that found in the urban area.[6] There is also a lack of awareness about the existing interventions for preventing diabetes and the management of complications. This underscores the need for mass awareness and screening programs to identify and overcome the burden due to diabetes in India.

Rationale of the study

As it is evident that the prevalence of diabetes is increasing even in rural area in our country, there is a pressing need to conduct screening programs periodically by cost effective methods for identifying undiagnosed diabetic subjects in our country. Since most of the rural populations are unaware of their diabetic status, this study aims to find out the people at risk of developing diabetes using a simple risk factor scoring in a rural area in Tamil Nadu.

Objectives

1. To find the prevalence of self-reported diabetes in a rural population
2. To estimate the usefulness of Indian Diabetes Risk Score (IDRS) for detecting undiagnosed diabetes among adults aged 35 years and above in a rural area.
3. To compare the prevalence of risk factors among known diabetes patients and those without diabetes.

METHODS

This is a community based cross-sectional study carried out from June 2016 to August 2016 in the three blocks, near SRM Medical College in Kancheepuram district of Tamil Nadu. This area covers a population of about 15,000 living in 3,014 families spread out in nine villages. These villages have a homogenous population in terms of occupation, socio-economic status and food habits. Out of these blocks, 3 villages (Vadapathy, Mamandoor, Thenpathy) were selected by random sampling (one village from each block) to conduct the study.

Inclusion criteria

Inclusion criteria were individual must be 35 years and above; should be willing to participate in the study; should be a permanent resident of the village/residing for more than 5 years.

Exclusion criteria

Exclusion criteria were terminally ill subjects, who are not able to communicate with the investigation team; subjects with severe physical deformities (scoliosis, kyphosis) hindering the measurement of waist circumference.

Table 1: Indian diabetes risk score (IDRS).

S.no	Risk factor	Class	Score
1	Age	<35 years	0
		35 – 49 years	20
		≥50 years	30
2	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
3	Physical activity	Exercise [regular] + strenuous work	0
		Exercise [regular] or strenuous work	20
		No exercise and sedentary work	30
4	Family history	No family history	0
		Either parent	10
		Both parents	20

A house to house visit was made and all population above 35 years of age, presenting on the day of survey and willing to participate were included in the study. Study subjects were interviewed and their socio-demographic factors like age, sex, religion, Socio economic status using modified Udai Pareek scale, education, occupation was collected using a validated questionnaire. Also their present diabetic status, family history of diabetes, physical activity status was recorded.

Study tool

- A pre-tested semi-structured questionnaire was used to collect relevant data from the study subjects

- Analysis for high risk was done by using Indian Diabetes Risk Score (IDRS)
- Waist circumference was measured from the subjects using a standard measuring tape.

High risk analysis for diabetes was done as per Indian diabetes risk score (IDRS) and parameters comprising two modifiable (waist circumference and physical activity) and two non-modifiable (age & family history) risk factors (refer Table 1).[7]

After adding all four parameters, if the risk score is,

- >60 – high risk
- 30-50 – moderate risk
- <30 – low risk

No ethical issues are involved in the study as no interventions are carried out. However informed verbal consent was obtained from the study subjects before initiation of the survey.

Statistical analysis

Data were entered and analyzed using SPSS version 15.0. Categorical data was expressed as frequencies with percentages. Chi square test was used to compare proportions. A p value of <0.05 was considered statistically significant.

RESULTS

A total of 974 subjects were interviewed which included 392 (40.24%) males and 582 (59.75%). Most of them (70.32%) were Hindus and 63.76% (621) of them were aged 50 and above. 47% of them belonged to middle socio economic status and about 50% of the subjects have done their schooling. Majority of the study subjects were housewives (31.21%). Family history of diabetes mellitus was recorded in 16% of the subjects. (Table 2) Out of 974 study subjects, 62 (6.34%) of them reported that they had diabetes. So, the prevalence of self-reported diabetes was found to be 6.34%.

Table 2: Socio demographic characteristics of the respondents (n=974).

Category	Number	Percentage (%)
Age group		
35-49	353	36.24
50 and above	621	63.76
Gender		
Male	392	40.24
Female	582	59.75
Religion		
Hindu	685	70.32
Muslim	206	21.16
Christian	83	8.52
Education		
Illiterate	195	20.02
Primary school	64	6.57
High school	487	50.0
Graduation	120	12.32
Post-graduation and above	128	13.14
Occupation		
Professional/ white collar	25	2.56
Business	184	18.89
Skilled	162	16.63
Semi-skilled	54	5.54
Coolie/unskilled	183	18.79
Unemployed/retired	62	6.37
housewife	304	31.21
Socio economic status		
Low	251	25.78
Middle	458	47.02
High	265	27.20
Family history of diabetes		
Yes	156	16.02
No	818	83.98

Table 3: Indian diabetic risk scoring (IDRS) among the study population.

Score	Number	Percentage (%)
>60 (high risk)	253	25.98
30-50 (moderate risk)	482	49.49
<30 (low risk)	239	24.53
Total	974	100

Table 4: Association between IDRS and self reported diabetes status among the study population.

S.no	Variable	Known diabetic n=62 (%)	Apparently normal population n=912 (%)	Chi square test p-value
1	IDRS category			
	High	36 (58.07)	217 (23.79)	0.032*
	Moderate/Low	26 (41.93)	695 (76.20)	
2	Family history of diabetes			
	Yes	33 (53.22)	357 (39.14)	0.57
	No	29 (46.77)	555 (60.85)	

Based on the screening tool (Indian diabetes risk scoring) used in this study, 253 subjects were found to be in the high risk category (score >60) and 482 (49.49%) of the subjects were to be in the moderate risk category (score 30-50) (Table 3).

Out of 62 known cases of diabetes, 36 (58.07%) of them had high IDRS score, 15 (24.19%) had moderate IDRS score and 11 (17.74%) had low risk IDRS Score. Proportion of subjects with high risk score in the self-reported diabetes group (58.07%) were high compared to apparently normal group (23.79%) and this difference was statistically significant ($p<0.05$) using Chi Square test. But having positive family history of diabetes was not significant between the two groups (Table 4).

DISCUSSION

In this study, we used a simplified Indian diabetes risk score for identifying newly diagnosed high risk subjects in the rural area Tamil Nadu. This is of great significance as use of such scoring system can prove to be a cost effective tool for screening of diabetes.[7,8] Further use of such a risk score would be of great help in developing countries like India where there is a marked explosion of diabetes and over half of them remain undiagnosed.[9]

About 26% of population had high risk score (>60) for diabetes in the present study. In a similar study conducted at Chennai by Mohan et al[10] 43% of the population were found in high risk category and another study done in urban area of Pondicherry by Gupta et al[9] had 31.2% high risk subjects. This risk difference may be due to variance in lifestyles of the population as our study was done in a rural area, whereas Mohan et al conducted the study in a metropolitan city and another study was in the urban area of Pondicherry. In the present study, 16.02% of the study subjects had a family history of diabetes. In a study done by Rao et al, 12.74% of the study population had positive family history.[8]

The prevalence of self-reported diabetes was found to be 6.34% (62 subjects) in the present study which is similar to 5.99% and among these 62 subjects, 36 (58.07%) had high risk score (>60) which is also similar to 56% found by Gupta, et al in their study.[9]

Though 253 (25.98%) subjects were found to be in the high risk category (score>60), further confirmation with GTT is required among subjects with IDRS>60 to early detect the occurrence of diabetes. This will help in detecting previously unknown cases of diabetes mellitus. Herman et al in their study done in Egypt found 2.5%, 5.1%, and 10.0% undiagnosed diabetes among rural, low socioeconomic status (SES) urban and high SES urban residents respectively.[11] In a similar study done in Saudi Arabia by Al-Nohza et al, 27.9% of diabetics were unaware of their condition despite the readily available healthcare facilities and ease of access.[12] In our study we also found that people with sedentary and mild physical activity had a higher risk for diabetes.

CONCLUSION

This study estimates the usefulness of simplified Indian diabetes risk score for identifying high risk diabetic subjects in the community. This simplified diabetes risk score has categorized the risk factors based on their severity. Use of the IDRS can make mass screening for diabetes in India more cost effective.

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