Original Research Article

Assessment of risk of type 2 diabetes mellitus among rural population in Karnataka by using Indian diabetes risk score

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ABSTRACT

Background: Diabetes has emerged not only as a major public health problem, but also as a global societal catastrophe. Governments worldwide are struggling to meet the cost of the diabetic care. The proportion of people with diabetes is rapidly increasing in many countries, with the documented increase in low and middle income countries. With this background a study was planned with the objective of assessing the risk of diabetes among adults in a rural area using a simple diagnostic tool.
Methods: A community based, cross-sectional study was done among 485 adults aged 20 years and above residing in a rural area of Karnataka. Data collection was done by household survey by direct interview using a pretested, structured questionnaire. The questionnaire had 2 parts with part one of socio-demographic variables and part two made up of Indian diabetes risk score (IDRS) questionnaire. IDRS was developed by Mohan et al and its parameters comprise of 2 modifiable (waist circumference, physical activity) and 2 non-modifiable risk factors (age, family history) for diabetes. Analysis was done with open Epi and Microsoft excel.
Results: In the present study, according to IDRS, 14.84% of the study subjects had high risk of diabetes, 73.19% had moderate risk and 11.95% had no/low risk of diabetes.
Conclusions: The risk of diabetes among adults is on rise in rural areas. Physical activity likes regular exercises, diet and lifestyle modification are some of the interventions that can reduce the risk of diabetes.

Keywords: Indian diabetes risk score, Diabetes, Rural adults

INTRODUCTION

With the Epidemiologic transition, Diabetes mellitus has emerged as an important public health problem. Diabetes is not only a health crisis but also a global societal catastrophe. Worldwide, governments are struggling to meet the cost of diabetes care.

According to the International Diabetes Federation, 415 million adults have diabetes and is estimated that it would rise to 642 million by 2040.[1] The South-East Asian region reported the second highest number of deaths attributable to diabetes.[1] According to the latest global figures on diabetes, India is home to 65 million diabetes and nearly 52% of Indians are not aware that they are suffering from diabetes.

The proportion of people with diabetes is rapidly increasing, with documented increase in low and middle income countries. WHO projects that diabetes will be the 7th leading cause of death in 2030.[2]

The Indian Council of Medical Research (ICMR) study done in the 1970s reported a prevalence of 2.3% in urban areas which has risen to 12-19%; in rural areas the

prevalence rates have increased from around 1% to 5-8% and 13% in one study.[3-7]

Using four simple parameters namely age, waist circumference, physical activity and family history, Indian diabetes risk score was developed by Mohan et al based on multiple logistic regression models. It is a cost effective method for detection of undiagnosed diabetes in the community. The IDRS has a sensitivity of 72.5% and specificity of 60% and is derived on the largest population based study on diabetes in India by Cures study by Mohan et al.[8]

Various studies conducted in different parts of India has validated IDRS as useful for identifying diabetes, can make screening programmes more cost effective, can be reliably applied as effective tool for the mass screening of diabetes in the community.[9-12]

A large proportion of diabetes cases are preventable. Simple measures like maintaining normal body weight, engaging in regular physical exercise, having a healthy diet can reduce the risk of diabetes.

Diabetes remains highly undiagnosed and considered to be associated with the increased risk of all-cause mortality.[13] The onset of diabetes at an earlier age, results in rapid progression to chronic vascular complications and end organ damage.[14] Hence it is very important to identify the risk factors for diabetes at the earliest, using sensitive and cost effective tools. With this background a study was planned with the objective of assessing the risk of diabetes among the adults in a rural area using Indian diabetes risk score.

METHODS

Study area

Chunchanahalli, one of the rural field practice area of Department of Community Medicine, AIMS, B.G. Nagara, Karnataka.

Study design

Community based Cross-sectional study.

Study period

June 2016 to Aug 2016.

Study subjects

Adults of age 20 years and above, residing in the study area.

Inclusion criteria

Residents of the study area of age 20 years and above and gave informed consent for the study participation.

Exclusion criteria

Residents who are diabetics and pursuing diet, exercise, oral hypoglycemic agents and insulin, patients suffering from chronic illness, pregnant & lactating mothers.

After meeting the inclusion and exclusion criteria, the study subjects constituted 485 adults of age 20 years and above residing in the study area.

The lists of the residents of age 20 years and above were obtained from the family folder maintained at PHC.

The written informed consent from the study participants and the Institutional Ethical Committee approval was taken.

Method of data collections

The whole team was divided into 5 groups with 2 members in each. All the team members were trained by one subject specialist to ensure internal validity.

Data collection was done by household survey by direct interview using a pre-tested and structured questionnaire. The questionnaire had 2 parts with part one of socio-demographic variables and part two made up of IDRS questionnaire as shown in Table 1.

IDRS was developed by Mohan et al and its parameters comprise of 2 modifiable (waist circumference, physical activity) and 2 non-modifiable risk factors (age, family history) for diabetes.

Table 1: Indian diabetes risk score.

	Details	Score
Age (years)	<35	0
	35-49	20
	≥50	30
Waist circumference	<80 cm (F),< 90 cm (M)	0
	≥80-89cm (F), ≥90-99cm (M)	10
	≥90cm(F), ≥100cm(M)	20
Physical activity	Exercise(regular) + strenuous work	0
	Exercise(regular) + strenuous work	20
	No exercise and sedentary work	30
Family history	Nil	0
	Father/Mother	10
	Both	20
Minimum score		0
Maximum possible score		100

Waist circumference was measured using standardized technique (by using tailor's tape at a point between tip of iliac crest and last costal margin in the back and at umbilicus in the front). Grading of physical activity was assessed by asking the following questions:

- How physically demanding is your work (occupation)?
- Do you exercise regularly in your leisure time?
- How would you grade your physical activity at home?

For answer, reflecting physical activity score of 1 is given or else score 0 was given. For each study subjects a combined score was calculated. If A+B+C = >3 vigorous-strenuous, 2 moderate, 1 mild, 0 sedentary.

IDRS analysis was done with help of all four parameters. If age < 35 years score=0, if 35-49 years score =20, if > 50 years = 30; waist circumference < 80 cm (F) and < 90 cm (M) score = 0, > 80-89 cm (F) and > 90-99 cm (M) score = 10, > 90 cm(F) and 100 cm for male score = 20; physical activities: vigorous / strenuous work score = 0, moderate exercise work-home score = 10, mild exercise work / home =20, no exercise and sedentary work –home = 30; family history: no family history score = 0, family history present either parent =10, both parents = 20. After adding all four parameters, if risk score > 60 very high risk, 30 -50 moderate risk, < 30 low risk.

Analysis was done using open Epi and Microsoft excel.

RESULTS

Out of 485 study subjects, 269(55.46%) were males and 216(44.53%) were females as shown in Table 2. About 265 belong to below 35 years age group (IDRS-0); 32(6.59%) were aged above 50 years (IDRS-30). About 77 (15.87%) had regular exercise and strenuous work (IDRS-0) and 48 (9.89%) had minimal or no physical activity (IDRS-30).

Table 2: Demographic profile.

		N	%
Sex	Male	269	55.46%
	Female	216	44.53%
Education	Illiterate	17	3.51%
	Primary	42	8.65%
	Middle	26	5.36%
	High	65	13.40%
	Pre university	135	27.83%
	Graduate	183	37.73%
	Post Graduate	17	3.51%
Occupation	Unskilled	45	9.27%
	Semi-skilled	214	44.12%
	Skilled	167	34.43%
	Professional	59	12.16%
Personal habits	Nil	317	65.36%
	Smoking	39	8.04%
	Alcohol	38	7.83%
	Smoking+Alcohol	91	18.76%

406 (83.71%) had no family history of diabetes mellitus (IDRS-0); 36 (7.42%) had parents who were both diabetic (IDRS-20).

According to Indian Diabetic Risk Score, in our study, 14.84% (72) of study subjects had high risk of diabetes and 73.19% (355) had moderate risk of diabetes; 11.95% (58) had no /low risk of diabetes as shown in Table 3.

Table 3: Indian diabetic risk score distribution.

		Score	N	%
Waist Circumference	<80cm (F), <90cm(M)	0	103	21.23%
	≥80-89cm (F), ≥90-99cm(M)	10	274	56.49%
	≥90cm (F), ≥100cm (M)	20	108	22.26%
Age	<35 years	0	265	54.63%
	35-49 years	20	188	38.76%
	>50 years	30	32	6.59%
Family history	Nil	0	406	83.71%
	Father or Mother	10	43	8.86%
	Both	20	36	7.42%
Physical activity	Exercise regular + Strenuous work	0	77	15.87%
	Exercise regular/strenuous work	20	357	73.60%
	No Exercise or sedentary work	30	48	9.89%
IDRS Total		Low	58	11.95%
		Moderate	355	73.19%
		High	72	14.84%

DISCUSSION

This study reports findings of risk of diabetes among adults from a rural field practice area of a rural teaching hospital in South India.

In the present study 14.84% of population had high risk score (>60) for diabetes.

In a similar study conducted at TamilNadu by Subramani et al, 12.1% of the population was found to be in the high risk category.[14]

A similar study conducted at Pondicherry by Gupta et al, 19% of the population had high risk for diabetes.[15]

Similar studies by Mohan et al found 43% of study population in the high risk group and Chowdhury et al 31.5% of study population had a high risk for diabetes.[15,16]

CONCLUSIONS

The present study among rural adults revealed that the magnitude of risk for diabetes is on rise in rural areas. Hence, there is a need to create awareness regarding diabetes among the whole population. Physical activity likes regular exercises, diet and lifestyle modification are some of the intervention that can reduce the risk of diabetes. For early detection, confirmation with GTT is required among the subjects with IDRS >60.

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