Assessment of Risk of Type 2 Diabetes Mellitus Among Rural Population in Tamilnadu by Using Indian Diabetic Risk Score

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Abstract: A cross sectional study was done in rural area of sripuram by using the Indian Diabetes Risk Score. The objectives were to assess the risk of type 2 diabetes among the rural population by using IDRS score and to create awareness among the risky population. *Background*: Indian Diabetes Risk Score (IDRS) developed by Dr.Mohan and his colleagues (Mohan, 2005) is a simplified risk score for identifying undiagnosed diabetic subjects using four simple parameters (age, waist circumference, family history of diabetes and physical activity) in which the minimum score is 0 and maximum is 100 & score 60 and above is indicative of diabetes risk. *Materials and methods*: This cross-sectional study was carried out in the rural area (sripuram). Residents >20 yrs, were selected through house to house survey by simple random technique. Data collection was done by household survey by direct interview using a pre- tested and structured questionnaire. *Results*: Out of 505 people, 12.1% (61) individuals had high risk of diabetes and 74.7% (377) had moderate risk of diabetes and 13.3% (67) individuals had no risk of diabetes. Life style modification and diet advice was given to individuals in the low and medium risk group. High risk group were referred to hospital for further diagnosis and treatment.

Key words: IDRS · Diabetes · Risk Assessment

INTRODUCTION

The prevalence of type-2 diabetic is increasing in all the population worldwide as well as in India day by day [1]. 366 million people worldwide have diabetes in 2011; by 2030 this will have risen to 552 million [2]. It is a major risk factor for death and numerous non fatal complications. More than 80% of diabetes deaths occur in low- and middle-income countries. WHO projects that diabetes will be the 7th leading cause of death in 2030. WHO also reports that over 19% of world's diabetic are residents of India [3]. International Diabetes Federation estimates that the number of diabetic patients in India is more than doubled from 19 million in 1995 to 40.9 million in 2007. It is projected to increase by 69.9 million by 2025. This means by 2025, around 7 cores people will have diabetes in India.

Worldwide 183 million people (50%) with diabetes are undiagnosed. An estimated 1 million new cases are identified each year in people aged ≥20 years [4]. In India undiagnosed diabetic population is underestimated as type 2 diabetes frequently remains undiagnosed until its complication appear. According to ICMR study a high proportion of people with type 2 diabetes 30-80% in India remain undiagnosed and thus untreated [5]. Early detection with life style modification and treatment may reduce the disease burden and its complications. This emphasis the need of mass awareness and screening programmers to detect undiagnosed diabetes and thus to reduce the burden of diabetes in India. There is good evidence that screening tests can detect type 2 diabetes during the early stages. In this study we used simplified Indian diabetic risk score to assess the risk for type 2 diabetes among a rural population of Tamilnadu and to create awareness among the risky groups identified by IDRS.

IDRS was developed by mohan *et al* based on multiple logistic regression model using four simple parameters namely age, waist circumference, physical activity and family history. It is the cost effective method for detect high risk individuals. The IDRS (Table 1) has a sensitivity of 72.5% and specificity of 60.1% and is

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Table 1: Indian Diabetic Risk Score recorded by eliciting the history

	Details	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	Exercise (regular) + strenuous work	0
	Exercise (regular) or strenuous work	20
	No exercise and sedentary work	30
Family history	Nil	0
	Father or mother	10
	Both	20
Minimum score		0
Maximum possible score		100

derived on the largest population based study on diabetes in India by CURES study by Mohan *et al.* [6]. This IDRS score is also validated by Stanley *et al.* in which the score of more than 60 has 100% sensitivity and 17.6% specificity [7].

AIMS and Objective:

- To assess the risk of type 2 diabetes among the rural population by using IDRS score.
- To create awareness among the risky population.

MATERIALS AND METHODS

Age group >20 yrs who are resident in sripuram, are selected through house to house survey by simple random technique. All eligible residents who gave informed consent are taken for the study to get the required sample size of 505.(Prevalence P = 18.4 % (prevalence of undiagnosed diabetes among south Asian population) (12). Patients who are diabetics and pursuing diet, exercise, oral hypoglycemic agents and Insulin are excluded from the study.

Data collection was done by household survey by direct interview using a pre-tested and structured questionnaire including demographic details, family history of diabetes and personal history like smoking and alcohol consumption, socio-economic status, anthropometry measurements like height, weight and waist circumference.

Anthropometric Measurement: Body weight was measured with the subject standing without footwear still on weighing scale with weight equally distributed on each leg. Height was measured using a nonstretchable tape with the subject in an erect position against a vertical surface.

BMI Calculation: Body mass index was calculated by dividing the weight (in kilograms) with the square of height (in meters). BMI defined <18.5kg/m^2 underweight, 18.5-24.9 kg/m^2 normal and 25-29.9 kg/m2 overweight and >30 kg/m^2 obesity [8].

Waist Circumference: Waist circumference was measured using a tailor's tape at a point mid way between tip of iliac crest and last costal margin in the back and at umbilicus in the front. Waist Circumference values >94 and >80 cm for men and women respectively was considered high according to world health organization [9].

RESULTS

A total of 505 people were screened by IDRS score in a sripuram rural area. Among them, 279 (55.2%) were males and 226 (44.8%) were females (Table 2). Among these 39 were smokers, 38 were alcoholic and 91 were both alcoholic and smokers. Nearly 30% were homemakers and 8.3% were illiterate. About 275 (54.5%) people belong to below 35 years age group (IDRS-0) and 32 (6.3%) people were aged above 49 years (IDRS-30). About 87 (17.2%) people had regular exercise and strenuous work (IDRS-0) and 48 (9.5%) people had minimal or no physical activity (IDRS-30). 421(83.4%) people had no family history of diabetes mellitus (IDRS-0) and 26 (5.1%) people had parents who were both diabetic (IDRS-20). According to IRDS score about 12.1% (61) people had high risk of diabetes and 74.7% (377) had moderate risk of diabetes and 13.3% (67) people had no risk of diabetes (Table 3).

Table 2: Demographic profile

		N	%
Sex	Male	279	55.2
	Female	226	44.8
Education	illiterate	42	8.3
	primary	17	3.4
	Middle	16	3.2
	High	65	12.9
	Higher	145	28.7
	UG	193	38.2
	PG	27	5.3
Occupation	Student	1	.2
	Home maker	154	30.5
	unskilled	32	6.3
	Semi skilled	113	22.4
	Skilled	147	29.1
	Professional	58	11.5
Personal H	Nil	337	66.7
	Smoking	39	7.7
	Alcohol	38	7.6
	Smoking + Alcohol	91	18.0

Table 3: Indian Diabetic Score distribution

Waist Circumference	<80 cm (female) , <90 (male)	0	108	21.4
	≥ 80 – 89 cm (female),≥ 90 -99 cm (male)	10	284	56.2
	≥90 cm (female),≥ 100 cm (male)	20	113	22.4
Age	< 35 yrs	0	275	54.5
	35 -49 yrs	20	198	39.2
	> 49 yrs	30	32	6.3
Family History	Nil	0	421	83.4
	Father or mother	10	58	11.5
	Both	20	26	5.1
Physical Activity	Exercise regular + strenuous work	0	87	17.2
	Exercise regular or strenuous work	20	367	72.7
	No exercise or sedentary work	30	48	9.5
IDRS Total	Low		67	13.3
	Moderate		377	74.7
	High		61	12.1

DISCUSSION

In this study, we used simplified Indian diabetes risk score for identifying newly diagnosed high risk subjects in the rural Tamil Nadu. 12.1 % of population had high risk score (>60) for diabetes. In a similar study conducted at Pondicherry by Gupta *et al* [10] *,* 19 % of the population was found to be in the high risk category and similar studies by Mohan *et al* [6] found 43% of study population in the high risk group and Chowdhury *et al* [11] 31.5% of study population had a high risk score (>60) for diabetes. In our study we also found that people with sedentary and mild physical activity had a higher risk for diabetes. Hence, it is imperative to create awareness regarding diabetes among the whole population further confirmation with GTT is required among subjects with IDRS >60 to early detect the occurrence of diabetes. Physical activity like regular exercises, life style modifications for persons with a positive family history is some of the recommendations which can control Diabetes. Interventions involving diet and life style modification reduce the risk of diabetes among people with prediabetes] [2.3].

REFERENCES

1. Lindstorm, J. and J. Tuomihelto, 2003. The diabetes risk score- a practical tool to predict type -2 diabetes risk. Diabetes Care, 26: 725-731

2. International Diabetic Federation; Diabetes Atlas 5th edition., http://www.idf.org/diabetesatlas

3. Wild, S., G. Roglic, A. Green, R. Sicree and H. King, 2004. Global prevalence of diabetes:estimates for the year 2000 and projections for 2030. Diabetes Care, 27(5): 1047-53.

4. Centers for Disease Control and Prevention. National Diabetes Fact Sheet: National Estimates and General Information on Diabetes in the United States, 2000. Atlanta,Ga: US Department of Health and Human Services, Centers for Disease Controland Prevention; 2003.

5. Anjana, R.M., R. Pradeepa, M. Deepa, *et al*, 2011. The Indian Council of Medical Research-India Diabetes (ICMR–INDIAB) Study: methodological details. Journal Diabetes Sci Technol, 5: 906-914.

6. Mohan, V., R. Deepa, M. Deepa, S. Somannavar and M. Datta, 2005. A simplified Indian Diabetes Risk Score for screening for undiagnosed diabeteic subjects. J. Association of physicians of India, 53: 759-763.

7. Lanord Stanley, J.M., D. Elantamilan, K. Mohanasundaram and T.S. Kumaravel, 2012. Evaluation of Indian diabetic risk score for screening undiagnosed diabetes subjects in the community. Indian J. Sci. Technol, 5(6): 2798-2799.

8. Clinical guide lines in the identification evaluation and treatment of overweight and obesity in adults.

9. Waist circumference and waist-hip ratio. Report of a WHO expert consultation World health organization 2008, WHO Press, Geneva.

10. Sanjay Kumar Gupta, Zile Singh, Anil J. Purty and Mohan Vishwanathan, 2009. Diabetes prevalence and its risk factors urban Pondicherry. nt J. Diabetes Dev Ctries. Oct-Dec, 29(4): 166-169 .doi: 10.4103/0973-3930.57348.

11. Chowdhury Ranadip, Mukherjee Abhijit and K. Lahiri Saibendu, A study on distribution and determinants of indian diabetic risk score (idrs) among rural population of west bengal ISSN: 2249 4995|eISSN: 2277 8810.

12. Annemike, M.W. Spijkerman Jacquelinw M. Deeker, F. Matthew, *et al*., 2004. The performance of a risk score a screening test for undiagnosed hyperglycemia in Ethnic minority groups. Diabetic Care, 27(I).