

Original Research

To find out the diabetic risk in study population by subjecting them to Indian diabetic risk scale

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ABSTRACT

Background: Diabetes as a non-communicable disease is significant public health problem the prevalence rate all the world over is raising. Diabetes mellitus is one of the leading causes of long-term complications and a major health hazard in a developing country like India. Indian Diabetes Risk Score developed by Mohan *et al.* in 2005 is one of the strongest predictors of incident diabetes in India. **Materials and Methods:** The present study entitled was conducted in the Department of Physiology Gandhi Medical College and Associated Hamidia Hospital, Bhopal. 120 subjects in the age group range of 30-60 years attending the different medical OPDs. **Results:** The mean age of the 60 subjects included in the control group was 42.61 ± 8.70 years and 60 pre-diabetic subjects were 45.43 ± 8.77 years. Maximum numbers of pre-diabetes were in the age group of 40-50 years. **Conclusion:** The results of the study will help to formulate strategies for future preventive efforts and delay the onset of type 2 diabetes.

Keywords: Diabetes mellitus, diabetic risk group, Indian diabetic risk score

INTRODUCTION

Diabetes as a non-communicable disease is significant public health problem the prevalence rate all the world over is raising.¹ Diabetes mellitus is one of the leading cause of long-term complications and a major health hazard in a developing country like India.² Indian diabetes risk score (IDRS) developed by Mohan *et al.* in 2005 is one of the strongest predictor of incident diabetes in India.³ It is a simplified risk score for identifying undiagnosed diabetic subjects using four simple parameters such as age, waist circumference, family history of diabetes and physical activity. Here the minimum score is 0 and maximum are 100. A score of 60 and above is indicative of diabetes risk.³ Individuals were classified as high risk (score ≥ 60), moderate risk score (30-50) and low risk (score < 30). A recent study from the same group showed that Madras Diabetes Research Foundation (MDRF), Chennai. MDRF-IDRS not only predicted diabetes but also predicted metabolic syndrome, even in subjects who had normal glucose tolerance.⁴ However, the MDRF-IDRS needs to be validated in other population.³

MATERIALS AND METHODS

The present study entitled was conducted in the Department of Physiology Gandhi Medical College and Associated Hamidia Hospital, Bhopal. 120 subjects in the age group range of 30-60 years attending the different medical OPDs were selected based on the inclusion and exclusion criteria of the study.

Inclusion Criteria

Study group:

1. Age 30-60 years.
2. Fasting blood glucose (100-125 mg/dl).
3. No known endocrinal, metabolic and gastrointestinal tract disorders.
4. With or without family history of diabetes.

Control group:

1. Age and sex matched healthy asymptomatic subjects.
2. Fasting blood glucose < 100 mg/dl.

Exclusion Criteria

1. Age below 30 years and above 60 years.

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2. Fasting blood glucose >126 mg/dl.
3. Subjects taking hormonal therapy or hormonal contraceptive, lipid lowering drug and drug to control blood sugar level were excluded.

IDRS

The modified risk factors were recorded using the validated questionnaire and recording method and scored the simplified IDRS was determined by adding the scores for each risk factor (Table 1).

Interpretation: Score < 30 low risk, Score 30-50 medium risk and score > 60 high risk for type 2 diabetes and cardiovascular diseases.³

RESULTS

The study comprised of 120 subjects aged 30-60 years attending the different medical OPDs in Gandhi Medical College and associated Hamidia, Hospital Bhopal.

According to ADA 2007 all the subjects having fasting serum glucose <100 mg/dl were included in the control groups subjects having fasting serum glucose (FSG) ≥100-125 mg/dl categorized into pre-diabetic group (Figure 1).

In the age range 30-40 years 29% men (31.2 ± 1.5 years) and 38% women (33.5 ± 4.3 years) were studied, in the age range 40-50 year 48% men (45.1 ± 2.9 years) and 38% women (43.5 ± 2.7 years) were studied. In the age range 50-60 years 23% men (54 ± 1.4 years) and 24% women (53.6 ± 1.5 years) were studied.

In pre-diabetic group 29% men (34.8 ± 3.74 years) and 38% women (34.3 ± 2.9 years) were studied in the 30-40 age range, 48% men (47 ± 3.0 years) and 38% women (46.8 ± 3.2 years) were in the age range 40-50 years studied.

Table 1: Indian diabetes risk score

Particulars	score	Details	Score
Age (year)	<35		0
	35-49		20
	≥50		30
Abdominal obesity	Waist <80 cm (female) , <90 (male)		0
	Waist ≥ 80-89 cm (female), ≥90-99cm (male)		10
	Waist ≥ 90 cm (female), ≥ 100 cm male		20
Physical activity	Vigorous exercise (regular) or strenuous (manual) labor at home/work		0
	Mild to moderate exercise or mild to moderate physical activity at home/work		20
	No exercise and sedentary activities at home/work		30
Family history	No family history (reference)		0
	Either parent		10
	Both parents		20
Minimum score			0
Maximum score			100

In the age group, 50-60 years 23% men (56.7 ± 3.5 years) and 24% women (57.4 ± 3.5 years) were studied.

Maximum numbers of pre-diabetic were in the age group of 40-50 years. Indian diabetic risk score (IDRS) scale was used to find out the people of the risk for development of type 2 diabetes. The scores obtained revealed that in the control group 18% subjects and in a pre-diabetic group only 7% subjects fell into low-risk category. In medium risk group 57% control and 38% pre-diabetes could be categorized. 25% subjects in the control group and 55% subjects in a pre-diabetic group were identified as high-risk individuals.

Insulin resistance was identified by calculating Homa index. As evident from the data percentage of insulin-resistant subjects was appreciably more in moderate and high-risk category pre-diabetic subjects as compared to the control group (Figures 2 and 3).

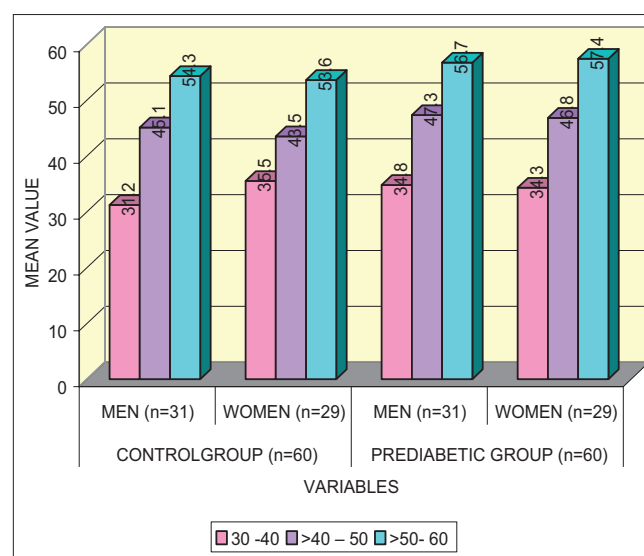


Figure 1: Age-wise classification of study population

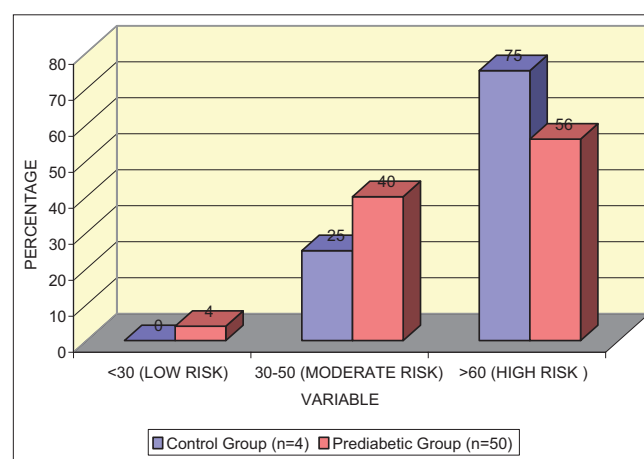


Figure 2: Distribution of insulin resistant subjects on the basis of Indian diabetic risk score scale

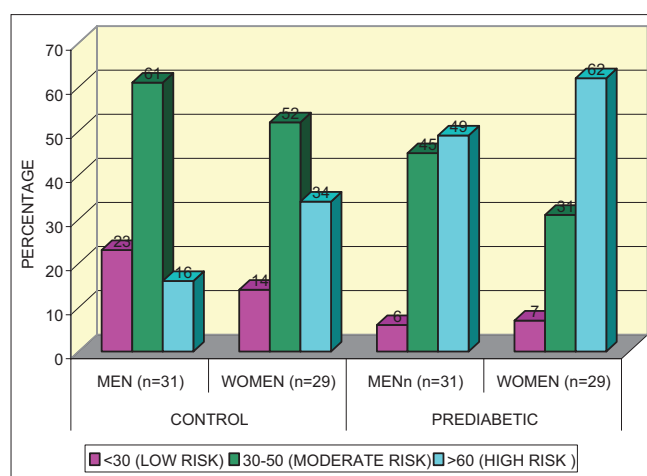


Figure 3: Distribution of study population-based Indian diabetic risk score

DISCUSSION

Our study shows that IDRS consisting of variables such as age, abdominal obesity, physical activity and family history predicted diabetes mellitus with a sensitivity of 100% and specificity of 17.6%

Present work was find out the incidence of pre-diabetes in the study population and association with insulin resistance and associated metabolic factors.

According to criteria of (ADA 2007),⁵ the study comprised of 60 controls and 60 pre-diabetic subjects aged 30-60 years with mean age 42.61 ± 8.70 and 45.43 ± 8.77 years, respectively.

IDRS simplified and developed by Mohan *et al.* (2005)³ was used to identify undiagnosed diabetic subjects, study revealed that out of 60 subjects having serum glucose level <100 mg/dl, 57% subjects (34) fell into moderate risk group (IDRS 30-50) and 25% (15) subjects fell into high-risk group (>60 IDRS). Of 60 subjects having FSG (>100 -125 mg/dl) labeled as pre-diabetic 38% subjects (23) fell into moderate risk group (IDRS 30-50) and 55% (33) subjects fell into high-risk group (IDRS >60).

The observation revealed that blood glucose higher than >100 -125 mg/dl imposes greater future risk for type 2 diabetes.

Unwinn *et al.* wrote in their article entitled impaired glucose tolerance and impaired fasting glycemia that pre-diabetes (dysglycemia) is primarily a risk factor for the development of type 2 diabetes.⁶

Cardio-metabolic risk factors other than dysglycemia are also risk factors for developing type 2 diabetes e.g. insulin resistance. The present study demonstrated that insulin resistance was present in subjects who scored >30 on IDRS scale 7% in the control group despite euglycemia and 80% in a pre-diabetic group.

A recent study showed that IDRS not only predicted diabetes but also identified individuals with higher cardiovascular risk i.e., those with metabolic syndrome even at a stage when

they have normal glucose tolerance.⁴ Now it is beyond doubt that India actually has the highest number of diabetics in the world and Government of India has rightly launched the national program for control of diabetes, cardiovascular diseases and stroke in January 2008 (Diabetes Atlas, third edition 2006).⁷ As the prevalence of and progression to the diabetes continue to increase, diabetes-related morbidity and mortality have emerged as major public health care issues.

Diabetes is now a global problem with devastating human and social consequence and the costs for care of diabetes, and its complications have an overwhelming economic impact globally.⁸

The public health burden of the disease is enormous in terms of health care expenditure. Even the lowest pre-diabetic levels have been found to be associated with increased medical costs.⁹ Zhang *et al.* studied medical claims data to estimate per capita excess health care use and medical costs to calculate national expenditures associated with prediabetes.¹⁰ The results of the study were extrapolated to suggest the national annual medical costs of pre-diabetes exceed 25 billion dollars or an additional 443 dollars for each adult with pre-diabetes.

The diagnosis of pre-diabetes or borderline diabetes is important as scientific evidence suggests that the progression to type 2 diabetes and its associated complication can be delayed or reversed. Lifestyle changes can prevent or delay the development of type 2 diabetes among persons with pre-diabetes irrespective of their age, race, and sex (diabetes prevention, program research group, 2002).¹¹

CONCLUSION

The mean age of the 60 subjects included in the control group was 42.61 ± 8.70 years, and 60 pre-diabetic subjects were 45.43 ± 8.77 years. Maximum numbers of pre-diabetes were in the age group of 40-50 years. The results of the study will help to formulate strategies for future preventive efforts and delay the onset of type 2 diabetes.

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PEER REVIEW

Double-Blinded externally peer reviewed.

CONFLICTS OF INTEREST

Nil

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