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Research Article

INDIAN DIABETES RISK SCORE IN PREDIABETES AND PROFILE OF PREDIABETES IN SUB HIMALAYAN REGION

Roshan Lal[1], Satish Chaudhary[2]*, Ritin Sharma[3] and Neeraj Kanwar[4]

[1,2,3] Resident Department of Medicine IGMC Shimla
[4]Resident, Department of Psychiatry, IGMC Shimla

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Background: India is becoming a diabetic capital (IDRS) of the world. In resource poor country like India, a simple score like Indian Diabetes Risk Score will be of much importance to identify cases for screening for prediabetes and diabetes. In past studies have proved the importance of IDRS in diabetes. Our purpose was to prove the importance and relationship of IDRS with prediabetes.
Methods: 50 subjects of prediabetes were enrolled for this study and pre formed proforma was used to collect the information, data on examination and investigations.
Results: Out of total 50 subjects with prediabetes 19(38%) had IDRS of >50, 23 (46%) had IDRS of 30-50, and 8(16%) had IDRS <30. 8(19.04%) rural pre diabetics and none of urban pre diabetics had IDRS score < 30, 22(28.38%) rural and 1(12.5%) urban pre diabetics had IDRS score 30-50, while 12(28.57%) rural and 7(87.5%) of urban pre diabetics had score of >50 .On examination 48 patients had increased waist circumference , 9 subjects had peripheral neuropathy and 38 subjects had BM I>23 . In biochemical profile 38 subjects had all the three parameters i.e. HbA1C, FBG and IGT deranged, while 38 patients had abnormal HDL and 28 had abnormal fasting TGs.
Conclusion: Indian Diabetes Risk Score is related to prediabetes just like it has been found to be associated with diabetes. More is the IDRS score, the more is the chance of prediabetes and higher is the chance of progression to diabetes. Also IDRS and prediabetes have association with dyslipidemia, HTN, obesity, metabolic syndrome.

INTRODUCTION

India is becoming a diabetic capital of the world and it is important to find its risk factors and also detect it in early stages so that either it is prevented or treated early without the development of complications. Prediabetes means that your blood sugar level is higher than normal but not yet enough to be type 2 diabetes. It is a grey area between green and red of healthy life and diabetes. Many risk factors associated with diabetes like dyslipidemia lead to acceleration of atherosclerosis and further early occurrence of macrovascular complications. The purpose of this study was to observe clinical profile of prediabetes and find out the correlation between the risk factors[indian diabetes risk score IDRS] and prediabetes. Prediabetes can be prevented and also its conversion to diabetes can be prevented and also the complication rate in diabetes can be reduced. The comorbidities like obesity hypertension, dyslipidemia, cardiovascular disease and peripheral neuropathy which are associated with diabetes have been found to be associated with prediabetes also.

Corresponding author:* **Satish Chaudhary
Resident Department of Medicine IGMC Shimla

Epidemiology

The Centers of Disease Control and Prevention report suggested that in United States the adults older than 20 years have 37 % and 23.1 million people older than 65 years had prediabetes in 2009 -2012. (Centers for Disease Control and Prevention(1)**.**

Risk factors for Prediabetes

Indian diabetic risk score (IDRS table 01) uses 4 simple parameters that is age, abdominal obesity, physical activity and family history of diabetes (2). Maximum score of hundred and minimum score of zero is taken into consideration, more is the score higher is the risk for future development of diabetes. This type of score is very helpful in a resource poor setting like in India.

It has been found that more is the score of IDRS, the more is the risk for development of cardiovascular disease and metabolic syndrome whether patient is a known case of prediabetes or Diabetes or not (*3)***.** IDRS has been found to be better linked to incident diabetes in comparison to hypertension and obesity(4-6).With IDRS, recent diabetes risk is 5 fold while with hypertension it is 3 fold risk and with obesity it is 2 fold risk (7) **.**

Indian Diabetes Risk Score

Table 1

1)AGE	SCORE
<35 YEARS	0
35-49 YEARS	20
>49 YEARS	30
2)waist circumference	
<80 cm in female and < 90 cm in male	0
80-90 cm in female and 90-100 cm in male	10
>90 cm in female and >100 cm in male	20
3)physical activity	
regular vigorous exercise/ activity	0
regular moderate exercise/activity	10
regular mild exercise/activity	20
no exercise/activity	30
4)family history of diabetes	
no history	0
one parent diabetic	10
both parents diabetic	20

Clinical Presentation

Prediabetes can present with osmotic symptoms, peripheral neuropathy and can present in association with hypertension, coronary artery disease and cerebrovascular disease.

Diagnosis of Prediabetes

Prediabetes is diagnosed when one of the following criteria is fulfilled (8).

1. Impaired Fasting Glucose [IFG] =100-125 mg%
2. Impaired Glucose Tolerance[IGT] = 140-199 mg % serum glucose at 2 hours following oral glucose challenge with 75 gm glucose.
3. HbA1C= 5.7-6.4%

RESEARCH DESIGN AND METHODS

This study was conducted at Indira Gandhi Medical College Shimla in the departments of Medicine. Permission from institutional ethical committee was taken. Subjects with age of more than 18 years and less than 55 years and who were natives of this area were screened for prediabetes. The subjects who were having risk factors like hypertension, obesity, dyslipidemia, family history of type 2 diabetes, sedentary lifestyle, waist circumference greater than 80 cm in females and more than 90cm in males were selected and screened for p**r**ediabetes. The eligible subjects were subjected to clinical examination and investigations.

Statistical Analysis

The data was recorded on a Microsoft Excel spreadsheet. All discrete variables were expressed as percentages. Statistical analysis was performed using Epi Info 2000 and SPS student version 16.0{SPSS Inc, Chicago, USA].

RESULTS

This prospective observational study included a total number of 50 subjects with a diagnosis of prediabetes. Age group ranged from 18-55 years with a mean age of 44.49 years ±7.01[S.D.].

Indian Diabetes risk score Distribution in Prediabetes

Table 2

IDRS	Males (percent)	Females(percent)	Total
Less than 30	6[21.42]	2[9.09]	8
30-50	15[53.57]	8[28.57]	23
More than 50	7[25]	12[54.54]	19
Total	28	22	50

6 (21.42%) males and 2 (9.09 %) females had IDRS score of < 30, 15 (53.57%) males and 8 (28.57%) females had score of 30-50 while 7 (25%) males and 12 (54.54%) females had a score of more than 50.In totality 19 patients had highest future risk of development of diabetes.

Rural urban Distribution of Prediabetes and Indian Diabetes risk score

Table 3

IDRS	Rural [%]	Urban[%]	total
Less than 30	8[19.04]	0	8
30-50	22[52.38]	1[12.5]	23
More than 50	12[28.57]	7[87.5]	19
Total	42	8	50

8 (19.04%) rural pre diabetics and none of urban pre diabetics had IDRS score < 30, 22 (28.38%) rural and 1 (12.5%) urban pre diabetics had IDRS score 30-50, while 12 (28.57%) rural and 7 (87.5%) of urban pre diabetics had score of >50**.**

Clinical, Biochemical and Anthropometric profile of Prediabetes

Table 4

Characteristics	n=50	%
family history of T2DM	14	28
osmotic symptoms	7	14
HTN	14	28
CVD	1	2
Smoker	6	12
waist circumference>80 cm in females and >90cm in males	48	96
metabolic syndrome	41	82
BMI >23	38	76
peripheral neuropathy	9	18
IFG,IGT and HbA1C [5.7-6.4]	38	76
HDL<40mg% in males and < 50 mg% in females	34	68
fasting TG >150 mg%	28	56

7 patients presented with osmotic symptoms and 6 had a history of smoking, 14 had family history of T2DM. In past history 14 patients were known hypertensives and 1 patient was known patient of CVD. On examination 48 patients had increased waist circumference, 9 subjects had peripheral neuropathy and 38 subjects had BMI>23. In biochemical profile 38 subjects had all the three parameters i.e. HbA1C, FBG and IGT deranged, while 38 patients had abnormal HDL and 28 had abnormal fasting TGs

DISCUSSION

It was a prospective observational study which included 50 subjects who visited medicine OPD for some ailments and were found to have risk factors mentioned in Indian Diabetes Risk score. these selected subjects were further subjected to history , physical examination and biochemical examination. Previous studies have been done with IDRS and its relation with development of diabetes , but the purpose of our study was to look for association between IDRS and prediabetes and its profile.

A study conducted by Adhikari Prabha *et al* shows that if the MDRF – IDRS is applied in population and a score ≥ 60 is used, 62.2% of the people with undiagnosed diabetes in a population can be detected, with a specificity of 73.7%(9). In our study 19 subjects with prediabetes had a score of IDRS > 50 suggesting that these individuals will have a high risk of future development of diabetes . 23 subjects (Table 02) of prediabetes out of 50 had IDRS score of 30-50 having

moderate risk of future progression to diabetes. While 8 subjects had < 30, so low risk of future progression to diabetes.

Table 03 shows rural urban distribution of prediabetic subjects and their IDRS score. As this study was done in a hilly state with most population belonging to rural background so our most subjects also belonged to rural background. Out of 50 subjects 42 belonged to rural background and out of these 42 subjects 28% had IDRS score >50, 52% had score 30-50 while 19% had score <30. Out of 8 urban prediabetic subjects had a score of >50 suggesting high risk of future development of diabetes. this data suggested that in urban prediabetics the IDRS score was higher and so these people had more risk of development of diabetes.

As per table 04, 38 subjects were meeting all three criteria for prediabetes, although we could not find any literature related to this finding. As previously discussed HTN and dyslipidemia has 3 fold and 2 fold risk of diabetes respectively. In our study 14 subjects were hypertensisve while 28 had >150 fasting TGs and 34 had deranged HDL, suggesting association of prediabetes with HTN and dyslipidemia. 41 0ut of 50 subjects fulfilled criteria for metabolic syndrome further suggested association of prediabetes and the metabolic syndrome.

CONCLUSION

Indian Diabetes risk score is related to prediabetes just like it has been found to be associated with diabetes. More is the IDRS score ,higher is the chance of prediabetes and higher is the chance of progression to diabetes. Also IDRS and prediabetes have association with dyslipidemia, HTN, obesity, metabolic syndrome.

IDRS is a simple tool to identify at risk individuals in resource poor country like India. It can help to identify population which needs to be screened for prediabetes and diabetes, leading to early diagnosis and early treatment, and prevention of progression prediabetes to diabetes.

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