

Validation of Indian Diabetic Risk Score in Diagnosing Type 2 Diabetes Mellitus Against High Fasting Blood Sugar Levels among Adult Population of Central India

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Globally the increasing prevalence of diabetes mellitus (DM) is major public health concern. The Indian Diabetes Risk Score (IDRS) was developed by Madras Diabetes Research Foundation (MDRF) as a simple tool to help detect undiagnosed type 2 DM (T2DM) in the community. We conducted a study among 911 adults of Jabalpur District to validate the IDRS score against increased fasting blood sugar levels in diagnosing T2DM. T2DM was confirmed either by history of previously known disease or fasting plasma glucose ≥ 126 mg/dl on two occasions. Sensitivity, specificity, positive predictive value, negative predictive value, Youden index (sensitivity + specificity - 1), likelihood ratio for positive test, and likelihood ratio for negative test were calculated for IDRS cut-offs of ≥ 20 , ≥ 40 , ≥ 60 , and ≥ 80 against the presence of T2DM (either known diabetic or fasting plasma glucose > 126 mg/dl on two occasions). The overall prevalence of T2DM was 9.99% (95% confidence interval, 8.04-11.94%). In the Receiver operating characteristic analysis, IDRS had an area under the curve of 0.736 ($P < 0.001$). The best cut-off was IDRS 40 with a sensitivity, specificity, and Youden index of 60.4%, 70.7%, and 0.31, respectively. The findings of our study indicate that IDRS has excellent predictive value for detecting undiagnosed diabetes in the community and IDRS is also a much stronger risk indicator than examining individual risk factors like age, family history, obesity, or physical activity. (*Biomed J 2015;38:359-360*)

Key words: Diabetes mellitus, Indian diabetic risk score, screening

Globally the increasing prevalence of diabetes mellitus (DM) is major public health concern. International Diabetes Federation has stated that in India alone, the number of people with DM is estimated to be 40.9 million and is expected to rise to 69.9 million by 2025.^[1] The Indian Diabetes Risk Score (IDRS) was developed by Madras Diabetes Research Foundation (MDRF) as a simple tool to help detect undiagnosed type 2 DM (T2DM) in the community.^[2] We conducted a study among 911 adults of Jabalpur District to detect the prevalence of hypertension in the year 2011-2012, which has been published earlier.^[3] We further analyzed the data to validate the IDRS score against increased fasting blood sugar levels in diagnosing T2DM. T2DM was confirmed either by history of previously known disease or fasting plasma glucose ≥ 126 mg/dl on two occasions. Sensitivity, specificity, positive predictive value, negative

predictive value, Youden index (sensitivity + specificity - 1), likelihood ratio for positive test, and likelihood ratio for negative test were calculated for IDRS cut-offs of ≥ 20 , ≥ 40 , ≥ 60 , and ≥ 80 against the presence of T2DM (either known diabetic or fasting plasma glucose > 126 mg/dl on two occasions). The overall prevalence of T2DM was 9.99% (95% confidence interval, 8.04-11.94%). In the Receiver Operating Characteristic analysis, IDRS had an area under the curve of 0.736 and a $p < 0.001$. The best cut-off was IDRS ≥ 40 with a sensitivity, specificity, and Youden index of 60.4%, 70.7%, and 0.31, respectively [Table 1]. The MDRF-IDRS was also validated in the Bolor Diabetes study in Karnataka state where using IDRS, screening of nearly one-third of the population of Bolor locality in Mangalore was done. In that study, using an IDRS score ≥ 60 , 62.2% of people living with undiagnosed diabetes in that population could

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Table 1: Evaluation of different cut-offs of Indian diabetic risk score for diagnosis of type 2 diabetes mellitus (N=911)

Performance parameter	Indian diabetic risk score			
	≥20	≥40	≥60	≥80
Sensitivity (%)	96.7	60.4	26.4	8.7
Specificity (%)	25.2	70.7	91.7	99.0
Positive predictive value (%)	12.5	18.6	26.1	50.0
Negative predictive value (%)	98.6	94.2	91.8	90.7
Youden index	0.22	0.31	0.18	0.08
LR for positive test	1.29	2.06	3.18	9.01
LR for negative test	0.13	0.56	0.80	0.92

Abbreviation: LR: Likelihood ratio

be detected with a specificity of 73.7%.^[4] Further validation of MDRF-IDRS was done by Gupta *et al.* by estimating the prevalence of diabetes in rural and urban Tamil Nadu.^[5] The prevalence of diabetes was 8.3% in urban areas and 5.9% in rural areas. The subjects with diabetes had higher IDRS scores (76% in urban and 56% in rural) than the general population (31%) and the differences were significant.^[5] However, this study found that an IDRS score of ≥40 has higher sensitivity and Youden index than a score of 60 or above in diagnosing diabetes in central India. This could be due to ethnic difference and/or inexplicit staging of daily

physical activities in different studies. The findings of our study indicate that IDRS has excellent predictive value for detecting undiagnosed diabetes in the community and IDRS is also a much stronger risk indicator than examining individual risk factors like age, family history, obesity, or physical activity.

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