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Indian Diabetic Risk Score: A Non-invasive Tool for Early Screening of Type 2 Diabetes

Review Article

Mishra S* and Pareek N

Department of Home Science, Banasthali Vidyapith, Jaipur, Rajasthan, India

***Corresponding author:** Mishra S, Department of Home Science, Banasthali Vidyapith, Jaipur, Rajasthan, India; E-mail: mshubhi709@gmail.com

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Abstract

The global encumber of type 2 diabetes is escalating each day, and of those affected are still undiagnosed. Early screening of the disease may prove to be a life saver in overseeing the onset of disease. The Indian Diabetes Risk Score (IDRS) may accommodate in the screening of undiagnosed type 2 diabetes. IDRS is simple, less time consuming and economic. Early detection followed by educating population, lifestyle management and their implementation may lessen the overall lumber of disease type 2 diabetes worldwide.

Keywords: Diabetes

Introduction

Diabetes is a severe metabolic state that arises when the body's insulin synthesis is disrupted or when the produced insulin is not used effectively. Type 2 diabetes, despite being entirely preventable, accounts for the significant number of diabetes cases [1]. The causes of type 2 diabetes are varying in person to person among population. It can be managed effectively by supporting, educating, and encouraging them to adopt a healthy lifestyle [2]. Although, there is a clear correlation between the type 2 diabetes, overweight, obese, ethnicity and having family history [3].

Type 1- An autoimmune reaction in which the body's immune system targets the pancreas' insulin-producing beta cells causes type 1 diabetes. As a result, the body produces very little or no insulin [2].

Type 2- Hyperglycaemia in type 2 diabetes is caused by the body's cells' failure to respond properly to insulin, a condition known as insulin resistance. Insulin resistance causes the hormone to become less effective, which leads to an increase in insulin production. Inadequate insulin production can develop over time as a result of the pancreatic beta cells' inability to keep up with demand [3].

Global scenario

Diabetes is seen as a major public health issue as well as a global societal disaster. Diabetes affects 382 million individuals worldwide and this will increase to 592 million people by 2035 [4]. It has major consequences, with the quality of life decreasing. According to the World Health Organization (WHO), diabetes would likely rank seventh among leading causes of human mortality until 2030 and it has been identified as a major cause of premature death and illness around the world. During 2015, diabetes was found in 415 million people worldwide and estimated further increase of 642 million people among global population by 2040 [5]. The Diabetes Atlas data of the year 2016 comes from nations that account for more than 91.2 percent of the worldwide population. Type 2 diabetes is the most common type of diabetes, accounting for approximately 90% of all diabetes cases [1].

The ninth edition of International Diabetes Federation (IDF) 2019 estimated 463 million cases in the year 2019 and also estimated the total increase of 51% till the year 2030 [2]. Currently diabetes affected 537 million people globally. The prevalence of diabetes in adults aged 18-99 years was estimated to be 8.4% in 2017 and predicted to rise to 9.9% in 2045 [3].

Indian scenario

Every fifth diabetic in the planet is an Indian [6]. In 2006, the

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International Diabetes Federation (IDF) predicted that the number of diabetic patients in India will climb to 69.9 million by 2025 unless effective preventative measures were adopted; nonetheless, India reached virtually that figure (69.1 million) in 2015 [5]. In 2021, India was placed second in the top ten nations or territories for the number of adults (20-79 years) with undiagnosed diabetes, trailed by China, Indonesia, and Pakistan. According to the report, there are 39.4 million (53.1%) people in India who have undiagnosed diabetes [3].

India has been dubbed the "Diabetic Capital of the World" due to its high diabetes incidence. Type 2 diabetes accounts for 85-95 percent of all diabetes cases, and the global epidemic of this illness is a major health-care burden [7].

India is the world's diabetes capital, having the highest number of diabetic sufferers. In the population, there are a significant number of diabetic cases that are undiagnosed. Type 2 diabetes is caused by a diet heavy in fat, salt, and sugar, as well as a lack of physical activity. Other key factors that contribute to the development of type 2 diabetes include the subject's family history. Lack of knowledge and understanding about the factors that cause disease increases the risk and leads to disease development [8].

Significance of early screening and prevention

Type 2 diabetes, despite being entirely avoidable, accounts for the great majority of diabetes cases [1]. Many people with type 2 diabetes are diagnosed after they have begun to experience symptoms. It's delayed by the time people get know about the formerly developed type 2 diabetes in them. This state cannot be reversed it can only be managed by some lifestyle modifications. So, this state of affair can be prevented lone by early screening.

If early screening is done on time, the prevalence of type 2 diabetes will get significantly reduced. Early detection, understanding of relevant factors, and the implementation of preventative actions all collectively contribute towards prevention. As a result of early diagnosis, individuals are less likely to acquire type 2 diabetes. Ultimately, this approach may be conducive towards reducing the new cases. Early screening of diabetes may prevent or slow the development of complications if active treatment is implemented early [9].

Early screening can be boon in the prevention of type 2 diabetes as it may vigilant people by presenting the actual picture. Indian Diabetic Risk Score (IDRS) is a non invasive tool used for an early screening of type 2 diabetes. IDRS developed by Madras Diabetes Research Foundation (MDRS) for making screening programmes most cost effective [10]. There are plethora of researches and validations quoted in this article which proves that this tool is entirely fitting for the screening of the disease as it is simple, quick and less outlay.

Screening tool: IDRS

The Indian Diabetic Risk Score is a simple method for detecting type 2 diabetes that hasn't been diagnosed. This screening tool was created with simple characteristics in mind to determine the risk of type 2 diabetes in people of various ages. It is comprised of four simple parameters: (i) age, (ii) abdominal obesity (waist circumference), (iii) diabetes in the family, and (iv) Physical activity. The screening tool IDRS was created by MDRS to make screening programmes more cost effective [11].

A maximum score of 100 is given and subjects with an IDRS score of less than 30 were classified as low risk, those with a score of 30-50 as medium risk and those with a score of more than 60 as high risk for diabetes. This screening tool is totally non invasive, thrifty and less time consuming. Such tools are effective in unmasking the true extent of disease burden.

Relevance of IDRS

IDRS tool has been used by number of Indian researches to find out the risk of type 2 diabetes among different age groups. A study conducted on 1530 adult population for prediction of undiagnosed type 2 diabetes using IDRS. This screening by IDRS tool categorized study subjects into 3 categories i.e., low risk (70.4%), medium risk (19.5%) and high risk (10.1%) population [12]. Another assessed the risk of type 2 diabetes among rural population in Karnataka by using IDRS. According to IDRS in this study, 14.84% of the subjects falls under the category of high risk of type 2 diabetes, 73.19% covered under the moderate risk category and 11.95% were falling in the category of low/no risk of type 2 diabetes [13]. Likewise, one more performed screening for type 2 diabetes in Chennai and concluded that 18% of the study population had low risk, 45% subjects had medium risk and 37% of study population had high risk of developing type 2 diabetes [14].

Studies quoted in this article clearly evidenced that the Indian Diabetic Risk Score is a most suitable non-invasive tool for screening of type 2 diabetes. Studies indicate that IDRS screening tool used majorly among adult population of 20 to 40 years age group in both urban and rural areas. Studies concluded diverse results for each risk categorization given by IDRS i.e., category of high, moderate and low risk In a number of studies higher percentage falls under high risk and several studies revealed data shows higher percentage towards the category of medium or low risk [15-18] (Table 1-3).

Table 1: Indian Diabetic Risk Score.

PARTICULARS	SCORE
AGE	
<35 years	0
35- 49 years	20
>50 years	30
WAIST CIRCUMFERENCE	
Waist <80 cm[female], <90 cm [male]	0
Waist <80 - 89 cm[female], <90 - 99 cm [male]	10
Waist >90 cm[female], >100 cm [male]	20
PHYSICAL ACTIVITY	
Vigorous exercise [regular] or strenuous [manual] work at home/ work	0
Moderate exercise [regular] or moderate physical activity at home/ work	10
Mild exercise [regular] or mild physical activity at home/ work	20
No exercise and sedentary activities at home/ work	30
FAMILY HISTORY OF DIABETES	
No diabetes in parents	0
One parent is diabetic	10
Both parents are diabetic	20

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Table 2: Scoring for the test.

Score	Risk
<30	Low Risk
30 - 50	Moderate Risk
>60	High Risk

Table 3: Specificity and Sensitivity at (>60) of Indian Diabetic Risk Score (IDRS) in numerous studies.

Authors and the year of publication	Age group	Sample size	Specificity-Sensitivity at (>60) of IDRS
Adhikari, et al.(2010); [15]	20 and above	551	Sensitivity : 62.2% Specificity : 73.7%
Bhadoria, et al. (2017); [16]	adults	911	Sensitivity : 60.4% Specificity : 70.7%
Dudeja, et al. (2017); [8]	20 and above	155	Sensitivity : 95.12% Specificity : 28.95%
Khan,et al. (2020); [17]	30 and above	640	Prevalence : 15.2% Sensitivity : 30% Specificity : 98%
Padmanabha, et al. (2017) ;[18]	20 and above	160	Sensitivity : 95.2% Specificity : 45.3%
(Venkatesan, et al. (2020); [19]	35-56 years	60	Sensitivity : 84.21% Specificity : 63.4%

Conclusion

Early detection is an imperative necessitate as it may be conducive towards the prevention process, furthermore delaying the onset of disease. Plethora of cases remains undiagnosed each year. Disease cannot be upturned it can merely be managed. IDRS is the most appropriate and uncomplicated community screening tool for screening the risk of type 2 diabetes. Screening procedures followed by implementation of edification will eventually result in decreasing the overall burden of disease across the globe.

References

1. International Diabetes Federation (2017) Diabetes Atlas: Eight Edition.
2. International Diabetes Federation (2021) Diabetes Atlas: Tenth Edition.
3. International Diabetes Federation (2013) Diabetes Atlas: Sixth Edition.
4. International Diabetes Federation (2015) Diabetes Atlas: Seventh Edition.
5. Joshi S, Parikh R (2007) India - Diabetes capital of the world: Now heading towards hypertension. The J Assoc Physicians India 55: 323-324.
6. Ambedy R, Chamukuttan S (2009) Current scenario of diabetes in India. J Diabetes 1: 18-28.
7. Dudeja P, Singh G, Gadekar T, Mukherji S (2017) Performance of India Diabetic Risk Score (IDRS) as screening tool for diabetes in an urban slum. Med J Armed Forces India 73: 123-128.
8. Prasad AN (2011) Type 2 diabetes mellitus in young: Need for early screening. Indian Pediatr 48: 683- 688.
9. Mohan V, Deepa R, Deepa M, Somannavar S, Datta M (2005) A simplified Indian Diabetes Risk Score for screening for undiagnosed diabetic subjects. J Asso Physicians India 53: 759-763.
10. Mohan V, Anbalagan VP (2013) Expanding role of the Madras Diabetic Research Foundation-Indian Diabetic Risk Score in clinical practice. Indian J Endocrinol Metab 17: 31-36.
11. Saleem MS, Raina AF, Khan SMS, Jan SS (2017) Indian Diabetic Risk Score-A tool for predicting risk of undiagnosed type 2 diabetes mellitus. Int J Cur Res Rev 9: 39-42.
12. Ramaiah R, Jayarama S (2017) Assessment of risk of type 2 diabetes mellitus among rural population in Karnataka by using Indian Diabetic Risk Score. Int J Community Med Public Health 4: 48-52.
13. Nagalingam S, Sundarmoorthy K, Arumugam B (2016) Screening for diabetes using Indian Diabetic Risk Score. Int J Adv Med 3: 415-418.
14. Adhikari P, Pathak R, Kotian S (2010) Validation of the MDRF- Indian Diabetes Risk Score (IDRS) in another south Indian population through the Boloor Diabetes Study (BDS). J Asso Physicians India 58: 434-436.
15. Bhadoria AS, Kasar PK, Toppo NA (2015) Validation of Indian Diabetic Risk Score in diagnosing type 2 diabetes mellitus against high fasting blood sugar levels among adult population of central India. Biomed J 38: 359-361.
16. Khan MS, Ahmad A, Khan AA, Mahmood S E, Arfin MI, et al. (2020) Community-based study to assess the sensitivity and specificity of Indian Diabetes Risk Score, among urban population of district Bareilly, Uttar Pradesh, India. Int J Health Clin Res 3: 199-205.
17. Padmanabha URS, Kundapur R, Puneeth N, Udayakiran N (2017) Validation of Indian Diabetes Risk Score for detecting undiagnosed diabetes in a semi-urban population of Manglore-South India. Indian J Community Health 29: 277-281.
18. Venkatesan S, Susila S, Suthanthiran S, Madhusudan S, Paari N (2020) Identification and assessment of prediabetes-A rural Indians study (Correlative study between questionnaire and biochemical analysis). Int J Pharmacy Pharmaceutical Sci 12: 36-40.

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