

According to the International Diabetes Federation (IDF) data in 2015 the number of people with diabetes in the world amounted to 415 million and by the end of 2040 IDF predicts the increase of this

## FINDRISC scale as a common tool to assess the risk of diabetes type 2

Wiesława B.Duda-Król<sup>1</sup> MD, PhD, Mateusz Moskal<sup>2</sup>, Maria Pękała<sup>2</sup>, Katarzyna Popielarska<sup>2</sup>, Paweł Sobierań<sup>2</sup>, Aleksandra Król<sup>2</sup>, Aneta Fronczak<sup>2</sup>, Artur Mamcarz<sup>1</sup> MD, PhD, Agnieszka Dobrowolska-Redo<sup>3</sup> MD

1. The 3rd Clinic of Internal Medicine and Cardiology of the Warsaw Medical University, Solec Hospital, Warsaw, Poland
2. Student Scientific Group next to The 3rd Clinic of Internal Medicine and Cardiology, Warsaw Medical University, Poland
3. The 2nd Department of Obstetrics and Gynecology Warsaw Medical University, Poland

**#Corresponding author:** Agnieszka Dobrowolska-Redo, e-mail: agnieszka.dobrowolskaredo@gmail.com, Warsaw Medical University, Karowa St 2, p.o. box 00-315 Warsaw, Poland

<b>RUNNING TITLE</b>	prediabetes, diabetes type 2, FINDRISC scale
<b>KEYWORDS</b>	myoma, pregnancy, impacted submucosal myoma
<b>WORD COUNT</b>	907
<b>CONFLICT OF INTERESTS</b>	no conflicts of interest

### ABSTRACT

**Background:** The aim of the study was to evaluate the risk of developing type 2 diabetes among middle-aged and elderly with the use of FINDRISC scale.

**Material and methods:** The study involved 200 people. Those participating in the study were given the form representing the scale of developing diabetes risk, based on FINDRISC scale and classified into one of five groups of risk of developing type 2 diabetes within 10 years.

**Results:** 47% of examined patients are of a moderate, high or very high risk of developing diabetes type 2. There was no significant difference between men and women. The correlation between age and the risk of developing diabetes type 2 appeared insignificant. The correlation between BMI and the risk as well as waist circumference and the risk appeared to be high, positive.

**Conclusions:** FINDRISC scale is a simple tool to rank the risk of developing diabetes in the general population, among the overweight or obese patients having positive family history of developing diabetes.

## BACKGROUND

According to the International Diabetes Federation (IDF) data in 2015 the number of people with diabetes in the world amounted to 415 million and by the end of 2040 IDF predicts the increase of this number up to 642 million. It has a direct relationship with the obesity epidemic and the aging of the population. The annual cost of treating patients with diabetes in the world accounts for US \$ 673 trillion, including \$ 156 trillion in Europe. Currently, in Europe, 30.8% of the general population are people between 50 and 79 years of age and it is expected that this number will increase up to 35.6% by 2040. In Poland there are over 3 million people with diabetes, about 800,000 do not know about their disease, while the number of people with prediabetes symptoms is similar to or higher than the number of people with diabetes [1]. On the basis of previous studies, it is already known that in the period of prediabetes the complications may develop typical for diabetes: diseases of the cardiovascular system, retinopathy, diabetic nephropathy and neuropathy. They can significantly shorten the survival time and be the cause of increased mortality [2,3,4]. It is also known that hyperglycaemia and hyperinsulinemia accelerate the aging process of cells and may also increase the risk of cancer [5].

Therefore, the assessment of the risk of developing diabetes and taking measures which could hamper its development are becoming more and more critical. More than 10 years ago FINDRISC scale (Finnish Diabetes Risk Score) was developed in Finland enabling to assess the risk of developing diabetes [6].

The aim of the study was to evaluate the risk of developing type 2 diabetes among middle-aged and elderly with the use of FINDRISC scale.

## MATERIAL AND METHODS

The study involved 200 people aged over 45, an average of 62, participants of the University of the Third Age. Among the persons participating in the study there were 66 men and 134 women, the average BMI was 26.65 kg/m<sup>2</sup>. Those participating in the study were given the form representing the scale of developing diabetes risk, based on FINDRISC scale. (Fig.1) FINDRISC scale takes into account the eight risk factors for developing diabetes: age, BMI, waist circumference, daily physical activity (or lack thereof), diet (presence or lack of fruit and vegetables), the treatment of hypertension, the occurrence of an episode of the increased glucose level in blood, positive family history in the direction of diabetes type 1 or 2.

Before the test, the content of the questions was discussed with the participants of the study. Depending on the results, the person participated in the study was classified into one of five groups of risk of developing type 2 diabetes within 10 years:

Group 1: less than 7 points - low risk - 1 in 100 will develop disease,

Group 2: 7-11 points - slightly increased risk - 1 in 25 will develop disease,

Group 3: 12-13 points - moderate risk - 1 in 6 will develop disease,

Group 4: 14-20 points - high risk - 1 in 3 will develop disease,

Group 5: above 20 points - very high risk - 1 in 2 will develop disease.

## RESULTS

1. 47% of examined patients are of a moderate, high or very high risk of developing diabetes type 2. (Fig 2)
2. There was no significant difference between men and women.
3. The correlation between age and the risk of developing diabetes type 2 appeared insignificant.
4. The correlation between BMI and the risk as well as waist circumference and the risk appeared to be high, positive.

## DISCUSSION

Several scales have been worked out to assess the development of diabetes in the general population and in the group of overweight or obese people. In Europe, for the assessment of risk of developing diabetes most often FINDRISC scale is applied. The scale is available in almost all European languages, allows to determine the risk of developing type 2 diabetes within 10 years - including asymptomatic diabetes and abnormal glucose tolerance with an accuracy of about 85% [6, 7].

The European Society of Cardiology guidelines on diabetes, prediabetes and diseases of the cardiovascular system developed in collaboration with the European Society for the Study of Diabetes revealed that the appropriate strategy of screening is to start diagnostics from the application of the scale of assessment of the risk of developing diabetes [8]. However, despite the recommendations FINDRISC scale is not popular to evaluate the risk of developing type 2 diabetes among polish population.

It should be especially recommended for those who are overweight, obese, with a family history of diabetes and with suspected metabolic disorders. It can be performed in the family physician's office, it can be promoted among the families of patients treated in diabetes clinics or departments of internal medicine as well as can be performed independently by all interested persons directly on the website. FINDRISC scale allows to estimate the risk of developing diabetes, enables early implementation of

prophylactics and for those with a high score leads to the performance of the oral glucose tolerance test quickly, determination of glycated haemoglobin and fasting glucose.

**CONCLUSION**

FINDRISC scale is a simple tool to rank the risk of developing diabetes in the general population, among the overweight or obese patients having positive family history of developing diabetes. It should be promoted both in the office of the family physician as well as among specialist doctors.

**CITE THIS AS**

MEDtube Science 2016, Mar 1(4), 8 - 10

**FIG. 1. TYPE 2 DIABETES RISK ASSESSMENT FORM**

**TYPE 2 DIABETES RISK ASSESSMENT FORM**

Circle the right alternative and add up your points.

**1. Age**  
 0 p. Under 45 years  
 2 p. 45–54 years  
 3 p. 55–64 years  
 4 p. Over 64 years

**2. Body-mass index** (See reverse of form)  
 0 p. Lower than 25kg/m<sup>2</sup>  
 1 p. 25–30 kg/m<sup>2</sup>  
 3 p. Higher than 30 kg/m<sup>2</sup>

**3. Waist circumference measured below the ribs** (usually at the level of the navel)  
**MEN**  
 0 p. Less than 94cm  
 3 p. 94–102cm  
 4 p. More than 102cm  
**WOMEN**  
 Less than 80cm  
 80–88cm  
 More than 88cm

**4. Do you usually have daily at least 30 minutes of physical activity at work and/or during leisure time (including normal daily activity)?**  
 0 p. Yes  
 2 p. No

**5. How often do you eat vegetables, fruit or berries?**  
 0 p. Every day  
 1 p. Not every day

**6. Have you ever taken anti-hypertensive medication regularly?**  
 0 p. No  
 2 p. Yes

**7. Have you ever been found to have high blood glucose (e.g. in a health examination, during an illness, during pregnancy)?**  
 0 p. No  
 5 p. Yes

**8. Have any of the members of your immediate family or other relatives been diagnosed with diabetes (type 1 or type 2)?**  
 0 p. No  
 3 p. Yes: grandparent, aunt, uncle or first cousin (but no own parent, brother, sister or child)  
 5 p. Yes: parent, brother, sister or own child

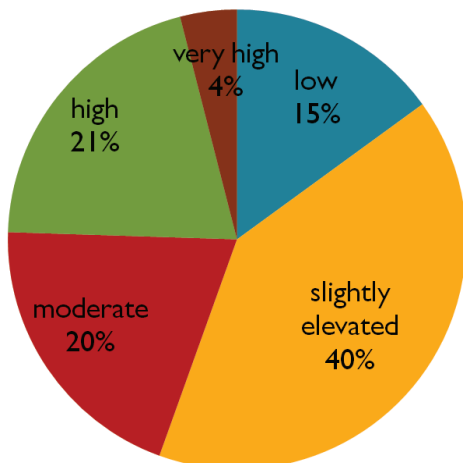
**Total risk score**  
 The risk of developing type 2 diabetes within 10 years is

Lower than 7 Low: estimated 1 in 100 will develop disease  
 7–11 Slightly elevated: estimated 1 in 25 will develop disease  
 12–14 Moderate: estimated 1 in 6 will develop disease  
 15–20 High: estimated 1 in 3 will develop disease  
 Higher than 20 Very high: estimated 1 in 2 will develop disease

Please turn over

Test designed by Professor Jaakko Tuomilehto, Department of Public Health, University of Helsinki, and Jaana Lindström, MFS, National Public Health Institute.

**FIG. 2. THE RISK OF DEVELOPING DIABETES TYPE 2**



**BIBLIOGRAPHY**

- International Diabetes Federation, Diabetes Atlas, seventh edition, 2015 [www.idf.org/idf-diabetes-atlas-seventh-edition](http://www.idf.org/idf-diabetes-atlas-seventh-edition)
- Santaguida PL, Balion C, Hunt D, Morrison K, Gerstein H, Raina P et al. Diagnosis, prognosis, and treatment of impaired glucose tolerance and impaired fasting glucose. Evid Rep Technol Assess (Summ) 2005; 128: 1-11
- Nguyen TT, Wang JJ, Wong TY. Retinal vascular changes in pre-diabetes and prehypertension: new findings and their research and clinical implications. Diabetes Care 2007; 30 (10): 2708-2715
- Barr EL, Zimmet PZ, Welborn TA et al. Risk of cardiovascular and all-cause mortality in individuals with diabetes mellitus, impaired fasting glucose, and impaired glucose tolerance: the Australian Diabetes, Obesity, and Lifestyle Study (AusDiab). Circulation 2007; 116 (2): 151-157
- Zhou XH, Qiao Q, Zethelius B, Pyörälä K, Söderberg S, Pajak A et al. Diabetes, prediabetes and cancer mortality. Diabetologia 2010; 53 (9): 1867-1876
- Lindstrom J, Tuomilehto J. The diabetes risk score: a practical tool to predict type 2 diabetes risk. Diabetes Care 2003; 26 (3): 725-731
- Schwarz PE, Li J, Lindstrom J, Tuomilehto J. Tools for predicting the risk of type 2 diabetes in daily practice. Horm Metab Res, 2009; 41 (2): 86-97
- Wytyczne ESC dotyczące cukrzycy, stanu przedcukrzycowego i chorób układu sercowo-naczyniowego opracowane we współpracy z EASD. Kardiol Pol 2013; 71: 328-330