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Validation of the Finnish Diabetes Risk Score (FINDRISC) questionnaire for undiagnosed type 2 diabetes screening in the Slovenian working population

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ABSTRACT

We performed a cross-sectional population-based study on 632 participants, aged 20–65, who were screened using the Finnish Diabetes Risk Score (FINDRISC) questionnaire. Optimal results for men were achieved at FINDRISC ⩾ 7 (100.0% sensitivity and 0.78 AUC) and for women at FINDRISC ⩾ 13 (60.0% sensitivity and 0.78 AUC).

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1. Introduction

In 2015, there were around 415 million people (8.8%) with diabetes in the world and this number is expected to rise to 640 million (10.4%) by the year 2040 [1,2]. A considerable proportion of this burden is made up of people with undiagnosed diabetes [1,3]. In Slovenia, the number of people with diabetes has increased from 120,000 (8.0%) in 2000 [4] to 170,000 (10.7%) in 2015, and more than 60,000 people are expected to have undiagnosed diabetes [1].

National diabetes screening guidelines in Slovenia [5] follow guidelines similar to those used in many other European countries [6] by setting the Finnish Diabetes Risk Score (FINDRISC) cut-off to select an individual for further examinations at ⩾15. The predictive performance of FINDRISC was previously demonstrated in detecting type 2 DM, impaired

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glucose tolerance, and the metabolic syndrome in Finland and Greece [7–9]. This study focused on validation of the FINDRISC questionnaire in the Slovenian working-age population and the identification of optimum cut-off values.

2. Methods

A cross-sectional population-based study was performed on a sample of 632 individuals in two healthcare institutions between April and December 2015. The FINDRISC questionnaire was fully completed by 551 participants, aged 20–65 years, who were screened from the healthy working population living in the south-eastern region of Slovenia. Individuals who scored ⩾15 were informed that they were, based on existing guidance [5,9], at increased risk of developing type 2 DM. Based on their fasting plasma glucose (FPG) levels, participants were categorised in the diabetes (FPG ⩾ 7,0 mmol/l) group. The diabetes group (n = 12) was compared to a group of participants with normal FPG levels (n = 470) together with participants where impaired fasting glucose was present

Table 1 – Summary of characteristics for patients with diabetes, impaired fasting glucose (IFG), and normal fasting plasma glucose levels.

	Diabetes	IFG	Normal
n (%)	12 (2.2)	57 (10.3)	482 (87.5)
Age (years)	50.3 ± 10.6	49.4 ± 10.0	43.6 ± 11.0
BMI (kg/m^2)	33.6 ± 6.1	29.9 ± 6.0	26.7 ± 5.3
Waist circumference (cm)	104.5 ± 17.7	96.6 ± 14.2	90.72 ± 12.9
Systolic BP (mmHg)	146.4 ± 10.5	137.1 ± 17.1	127.4 ± 14.3
Diastolic BP (mmHg)	96.6 ± 11.3	85.9 ± 9.6	80.0 ± 9.8
FPG (mmol/L)	8.4 ± 3.2	6.3 ± 2.1	5.2 ± 0.4

Data are presented as means ± standard deviation unless otherwise specified; BMI: body mass index; BP: blood pressure, FPG: fasting plasma glucose.

Table 2 – Characteristics of study participants based on FINDRISC variables (n = 551).

FINDRISC question	Male		Female		Difference
	Count (n = 260)	%	Count (n = 291)	%	(p-value)
Age group (years)					
<45	135	51.9%	137	47.1%	0.188
45–55	82	31.5%	88	30.2%	
56–65	43	16.5%	66	22.7%	
BMI (kg/m^2)					
<25	71	27.3%	141	48.5%	<0.001
25–30	119	45.8%	94	32.3%	
>30	70	26.9%	56	19.2%	
Waist circumference (cm)					
Male < 94, female < 80	116	44.6%	80	27.5%	<0.001
Male 94–102, female 80–88	76	29.2%	85	29.2%	
Male > 102, female > 88	68	26.2%	126	43.3%	
Physical activity					
Yes	224	86.2%	254	87.3%	0.696
No	36	13.8%	37	12.7%	
Fruit and vegetables daily					
Yes	196	75.4%	249	85.6%	0.002
No	64	24.6%	42	14.4%	
Hypertension medication					
Yes	77	29.6%	82	28.2%	0.710
No	183	70.4%	209	71.8%	
High blood glucose history					
Yes	32	12.3%	40	13.7%	0.617
No	228	87.7%	251	86.3%	
Family history of Type 2 diabetes					
No relatives with diabetes	193	74.2%	204	70.1%	0.547
Second-degree relatives	42	16.2%	56	19.2%	
First-degree relatives	25	9.6%	31	10.7%	

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