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Diabetes Risk Score of Adult Applications to Primary Health Care Center: A Cross-Sectional Study

Birinci Basamak Sağlık Kuruluşuna Başvuran Yetişkinlerin Diyabet Risk Skorları: Kesitsel Bir Çalışma

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ABSTRACT

Objective: Diabetes is a serious public health problem that has increased in frequency in recent years. The aim of this study is to determine the diabetes risk scores of individuals who apply to a primary health care institution.

Material and Method: This descriptive and cross-sectional study was conducted with 982 individuals between 01.12.2021 and 12.03.2022. Data were collected from the sociodemographic characteristics questionnaire and the Finnish Diabetes Risk Score (FINDRISC) questionnaire. Those with a diabetes risk score of 15 points and above were considered high risk.

Results: The mean age of the participated individuals in the study was 37.93±8.63. The mean FINDRISC score of the participants was 8.52±6.83 and 22.8% of them were in the high-risk group. The women included in the study, those who are married, have a low education level, have a low income, have a high BMI, do not exercise, and have a family history of diabetes have a higher risk of diabetes.

Conclusion: Approximately one in four people in the study appear to be at high risk. Primary health care institutions need to conduct risk screenings more frequently. Lifestyle interventions to reduce the preventable risk factors of individuals should be developed and supported.

Keywords: *Diabetes, FINDRISC, Primary care, Adults, Score*

ÖZET

Amaç: Diyabet son yıllarda sıklığı artan ciddi bir halk sağlığı sorunudur. Bu çalışmanın amacı birinci basamak sağlık kuruluşuna başvuran bireylerin diyabet risk skorlarının belirlenmesidir**.**

Materyal ve Metod: Tanımlayıcı- kesitsel tipte olan bu çalışma 01.12.2021-12.03.2022 tarihleri arasında 982 birey ile yürütülmüştür. Veriler sosyodemografik özellikler soru formu ve Fınnısh Diabetes Rısk Score (FINDRISC) anketi toplanmıştır. Diyabet risk skoru 15 puan ve üstü olanlar yüksek riskli olarak kabul edilmiştir.

Bulgular: Çalışmaya katılan bireylerin yaş ortalaması 37.93±8.63 dir. Katılımcıların FINDRISC puan ortalaması 8.52±6.83 olup %22.8'i yüksek riskli grupta yer almaktadır. Çalışmada yer alan kadınlar, evli olanlar, düşük eğitim düzeyinde olanlar, düşük gelire sahip olanlar, BKI'sı yüksek olanlar, egzersiz yapmayanlar ve ailesinde diyabet öyküsü olanlar yüksek diyabet riskine sahiptir.

Sonuç: Çalışmada yer alan yaklaşık her dört kişiden birinin yüksek riske sahip olduğu görülmektedir. Birinci basamak sağlık kuruluşlarının risk taramalarını daha sık yapmaları gerekmektedir. Bireylerin önlenebilir risk faktörlerini azaltılmasına yönelik yaşam tarzı müdahaleleri geliştirilmeli ve desteklenmelidir**.**

Anahtar kelimeler: *Diyabet, FINDRISC, birinci basamak, yetişkin, skor*

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INTRODUCTION

Diabetes Mellitus (DM) is a chronic and metabolic disease caused by the absence or inadequate use of insulin (Turkish Society of Endocrinology and Metabolism, 2020). According to the International Diabetes Federation (IDF), it is predicted that there are 537 million DM patients as of 2021 and this will increase to 643 million in 2030. According to the IDF (2021), the prevalence of DM in Turkey was reported to be 15.9% (Sun et al., 2022). According to the Turkish Diabetes Epidemiology (TURDEP-II) study, the prevalence of DM increased from 7.2% to 13.7% between 1998 and 2010 in Turkey (Satman et al., 2013). It is stated that 45% of individuals with DM are not aware of the disease. This rate is higher in individuals with undiagnosed DM (Satman et al., 2013). It is possible to detect the disease in the asymptomatic period and to prevent or delay the disease by managing the risk factors. For this reason, it is very important for the risk assessment to be made by primary health care institutions. (Hausler et al., 2007; West et al., 2010; Grech et al., 2014; American Diabetes Associatio., 2017). Models that predict the development of Type 2 Diabetes Mellitus (T2DM) in the coming years have been published based on the detection of individuals with T2DM who have not been diagnosed recently or based on known risk factors (Buijsse et al., 2011). However, it has been seen that these models are more suitable for clinical application. Screening questionnaires are used more frequently because they include the basic risk factors and are easy to apply on a community basis (Trefflich et al., 2018). One of these screening surveys is FINDRISC. FINDRISC is an inexpensive, fast and non-invasive measurement tool. It reveals the diabetes risks of individuals in the next ten years (Lindstörm et al., 2003). In previous studies, it has been stated that FINDRISC is a valid measurement tool (Zhang et al., 2014; Vandersmissen and Godderis, 2015; Silvestre et al., 2017; Atayoğlu et al., 2020). The aim of this study is to determine the T2DM risk scores in individuals who have not been diagnosed with diabetes and who apply to a primary health care institution.

MATERIAL and METHOD

Study Type

This study was conducted in descriptive cross-sectional type.

Place and time of Research

This study was carried out in two family health centers located in a city in eastern Turkey between 01.12.2021-12.03.2022.

Study of Sample Size

The population of the research sample was found with the known sample calculation. The number of registered individuals in two family health centers selected at random is 12000, and the incidence of type 2 DM in Turkey is 13.7% (Satman et al., 2013). When the n=N.t2.p.q/d2.(N-1)+ t2.p.q values were substituted, the research sample was found to be 176 individuals. The research was completed with 982 individuals.

Inclusion Criteria in the study

Not being diagnosed with Type 2 DM

Be over 18 years old

Exclusion Criteria from the Study

Being so physically disabled that anthropometric measurements cannot be made

Those without verbal communication skills

Data Collecting

Research data were collected through a questionnaire using face-to-face interview technique. It took approximately 5 minutes to complete each questionnaire. Socio-demographic characteristics questionnaire and FINDRISC were used to collect the data.

Sociodemographic Characteristics Questionnaire

There are expressions including age, gender, marital status, employment status and income status of individuals.

Finnish Diabetes Risk Score

It was developed by Lindstrom and Tuomiletho (1987) to determine the T2DM risks of individuals. It includes expressions such as age, waist circumference, BMI, fruit and vegetable consumption status, exercise status, family history of DM, presence of hypertension. A minimum of 0 and a maximum of 26 points can be obtained. A score of 0-14 is considered low risk, and a score of 15 and above is considered high risk. It is predicted that the higher the score, the higher the individual's risk of diabetes. The questionnaire, which was adapted into Turkish, includes 8 items and does not require permission for its use. (Lindstörm et al., 2003)

Statistical analysis

SPSS 25.0 program was used in the statistical analysis of the research data. Number, percentage, mean, chi-square and multiple regression analysis were used in the analysis of the data. The data were evaluated within the 95% confidence interval and $p<0.05$ was accepted as statistically significant.

RESULTS

Pressures at which anastomotic leakage is detected The mean age of the individuals was 37.93±19.12. 59.1% of the individuals are women, 54.3% are single, 52.7% are university graduates, 47.8% have other job status (student, farmer, self-employed etc.) and 48.2% have a medium income (Table 1).

Table 1. Socio-demographic characteristics of the participants (n:982)

Variables	N	%
Age of mean	37.93±19.12	
Sex		
Female	580	59.1
Male	402	40.9
Marital status		
Married	449	45.7
Single	553	54.3
Educatıon status		
illiterate	88	9.0
literate	49	5.0
Primary education	223	22.7
High school	104	10.6
University	518	52.7
Working status		
Housewife	271	27.6
Retired	40	4.1
Private sector	108	11.0
public employee	93	9.5
Other (student, farmer, self-employed)	470	47.8
Monthly Income status		
Low	460	46.8
Middle	473	48.2
Good	49	5.0

As seen in Table 2, 65% of individuals are under the age of 45, 52.7% are underweight (BMI<25 kg/m2), 57.7% of men have a waist circumference of less than 94 cm, and 49% of women have 5 of them have a waist circumference of less than 94 cm. 88 centimeters It is seen that 61.5% of individuals do not exercise at least 30 minutes a day and 68.7% do not consume vegetables / fruits on a daily basis. While 70.1% of the individuals included in the study did not have hypertension, it was determined that 88.1% of them had not previously had blood sugar at the border. 49.1% of individuals do not have a family history of diabetes. The mean FINDRISC score of the individuals included in the study was 8.52±6.83 and 22.8% of the individuals were found to be at high risk for diabetes (Table 2).

Table 2. Participants' FINDRISC findings

Variables	n (%)
Age	
<45 (0 poınt)	638 (65.0)
45-54 (2 poınt)	81 (8.2)
55-64 (3 poınt)	152 (15.5)
>64 (4 poınt)	111 (11.3)
BMI	
<25 kg/m² (0 poınt)	518 (52.7)
25-30 kg/m² (1 poınt)	288 (29.3)
>30 kg/m² (3 poınt)	176 (17.9)
Waist circumference (male)	
<94 cm (0 poınt)	244 (57.7)
94-102 cm (3 poınt)	84 (19.9)
>102 cm (4 poınt)	95 (22.5)
Waist circumference (female)	
<80 cm (0 poınt)	244 (49.5)
80-88 cm (3 poınt)	84 (22.1)
>88 cm (4 poınt)	95 (22.5)
Exercising for at least 30 minutes a day	
Yes (0 poınt)	378 (38.5)
No (2 poınt)	604 (61.5)
Frequency of consumption of vegetables and fruits	
Everyday (0 poınt)	307 (31.3)
Not everyday (1 poınt)	675 (68.7)
Hypertension detection status	
No (0 poınt)	688 (70.1)
Yes (2 poınt)	294 (29.9)
Previously high blood sugar status	
No (0 poınt)	865 (88.1)
Yes (5 poınt)	117 (11.9)
Presence of a family history of diabetes	
No (0 poınt)	482 (49.1)
second degree (3 poınt)	339 (34.5)
first degree (5 poınt)	161 (16.4)
FINDRISC	8.52±6.83 (min-max:0-26)
FINDRISC risc status	
Low risc (<15 poınt)	758 (77.2)
High risc (≥15 poınt)	224 (22.8)

Women participating in the study (χ2:11.262 p<0.001), those who were married (χ2:231.096 p<0.001), those with low education level (χ2:350.838 p<0.001, those with low income (χ2:24.559 p<0.001), It was determined that obese individuals (χ2:452.428 p<0.001), those who do not exercise (χ2:123.920 p<0.001) and those with a family history of diabetes (χ2:240,519 p<0.001) have a high diabetes risk. There was no relationship between fruit and vegetable consumption (χ2:2.707 p:0.100) and diabetes risk (Table 3).

Table 3. Distribution of participants' FINDRISC scores according to some variables

Variables	Risc score		Statistical testing and significance
	Low rısc <15	High rısc ≥15	
	758(77.2)	224(22.8)	
Sex			χ^2:11.262
Female	426 (73.4)	154(26.6)	**p<0.001**
Male	332 (82.6)	70 (17.4)	
Marital status			
Married	247 (55.0)	202 (45)	χ^2:231.096
Single	511 (95.9)	22 (4.1)	**p<0.001**
Educatıon status			
illiterate	31 (35.2)	57 (64.8)	
literate	5 (10.2)	44 (89.8)	χ^2:350.838
Primary education	136 (61.0)	87 (39.0)	**p<0.001**
High school	92 (88.5)	12 (11.5)	
University	494 (95.4)	24 (4.6)	
Income status			
Low	330 (71.7)	130 (29.3)	χ^2:24.559
Middle	379 (80.1)	94 (19.9)	**p<0.001**
Good	49 (100)	0 (0)	
BMI			
<25 kg/m²	497 (95.9)	21 (4.1)	χ^2:452.428
25-30 kg/m²	229 (79.5)	59 (21.5)	**p<0.001**
> 30 kg/m²	32 (18.2)	144 (82.8)	
Exercise status			
Yes	363(96.0)	15(4)	χ^2:123.920
No	395 (65.4)	209(34.6)	**p<0.001**
Vegetable and fruit consumption status			
Eveyday			
Not everyday	247(80.5)	60 (19.5)	χ^2:2.707
	511 (75.7)	164 (24.3)	p:0.100
Family history of diabetes			
no			
yes	474 (98.3)	8 (1.7)	χ^2:240.519
	284 (56.8)	216 (43.2)	**p<0.001**

Table 4 shows that the FINDRISK diabetes risk questionnaire is the dependent variable; A regression model was established in which gender, age, marital status, family history of diabetes, BMI and exercise were independent variables. It is seen that the established model is significant and the independent variables explain the dependent variable by 88%. Gender, age, family history of diabetes, BMI and exercise status were found to have significant effects on the model (p:0.000), while the contribution of marital status to the model was not statistically significant (p:0.375). It was determined that age, presence of diabetes in the family and BMI contributed the most to the model (Table 4).

Table 4. Effect of independent variables on type 2 diabetes risk

Dependent variable	Independent variables	B	Std. error	Beta	t	p
FINDRISC	Sex	-1.090	0.153	-0.078	-7.132	**<0.001**
	Age	0.150	0.006	0.420	24.214	**<0.001**
	Marital status	0.210	0.237	0.015	0.888	0.375
	Family history of diabetes	2.714	0.114	0.294	23.810	**<0.001**
	BMI	3.120	0.131	0.349	23.844	**<0.001**
	Exercising	2.677	0.170	0.191	15.721	**<0.001**

DISCUSSION

T2DM is a disease that progresses asymptomatically and leads to serious complications over time. The IDF recommends identifying high-risk individuals by performing population-based screenings as a first step, and blood glucose measurement of high-risk individuals in the second step (IDF., 2019). In this study using FINDRISC, the risk of diabetes in individuals who applied to a primary health care institution was revealed. Accordingly, the FINDRISC mean score of the individuals was found to be 8.52±6.83. This finding is similar to studies conducted with the same age group (Makrilakis et al., 2011; Meijnikman et al., 2018). 22.8% of the individuals participating in our study are at high risk for T2DM. There are different results in the literature regarding this finding. While some studies have similar results (Tankova et al., 2011; Zhang et al., 2014; Al-Shudifat et al., 2017; Silvestre et al., 2017), some have different results (Kyrou et al., 2020; Nnamudi et al., 2020). It is thought that this situation arises from the differences in the average age of the individuals, the region they live in and their lifestyles.

It is seen that women participating in the study are at higher risk than men. There are different results in the literature regarding this result. Atayoğlu et al. (2020) stated in their study that women are at higher risk of being diabetic than men. Al-Shudifat et al. (2017) also found that males are at higher risk than females in their study in the young population. This is thought to be due to the fact that the individuals included in the studies are in different age groups and regional differences. It is seen that married individuals in the study are at higher risk than singles. This finding is compatible with the literature (Kyrou et al., 2020; Yildiz et al., 2021). It is seen that the risk of diabetes increases as the income status of individuals decreases. This finding is similar to the literature (Spencer Bonilla et al., 2016; Weisman et al., 2018;). There is no significant difference between the educational status of the individuals participating in the study and their diabetes risk. This finding is consistent with the literature. It has been reported that the risk of diabetes increases as the level of education decreases (Ludwig et al., 2011; Nosrati et al., 2018). It has been determined that there is a significant difference between the BMI levels of individuals and the risk of diabetes. It is seen that the risk of diabetes increases as the BMI level increases. This finding is consistent with the literature. When the studies are examined, it is stated that there is a linear relationship between T2DM and increased BMI (Melidonis et al., 2006; Nyamdorj et al., 2010). It was determined that the difference between the exercise status of the individuals participating in the study and their diabetes risk was significant. This finding is similar to the literature. Considering the studies, it is seen that decreased physical activity contributes to the formation of T2DM (Khetan and Rajagopalan, 2018; Zheng et al., 2018). The difference between individuals having a family history of DM and diabetes risks seems to be significant. This finding is consistent with the literature. When cohort studies conducted in the European region are examined, it is stated that family history of DM is an independent determinant of diabetes risk for individuals (Ning et al., 2013; Scott et al., 2013).

Conclusion

According to the results of the study, it was observed that the risk of T2DM increased as the BMI level and waist circumference increased and the duration of physical activity decreased. Although individuals' FINDRISC mean score is not high, it is recommended to change preventable risk factors with lifestyle changes. Healthy lifestyle strategies should be developed and individuals should be supported. Especially primary health care institutions need to conduct more risk screening.

Conflict of Interest

There is no conflict of interest declaration between the authors.

Financial Support

No financial support was received from any institution/organization throughout the study.

Ethical Approval

Before the research, permission was obtained from the Scientific Research and Publication Ethics Committee of Mus Alparslan University (Decision no: 25.11.2021/12-42). Written and verbal consent was obtained from the individuals. Written permission was obtained from the relevant institution. The whole process of the study was carried out according to the Declaration of Helsinki.

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