RESEARCH ARTICLE

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What is the Risk of Type 2 Diabetes in Relatives of Patients Hospitalized in the Internal Medicine Clinic? A Hospital-Based Survey Study

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Abstract

BACKGROUND/AIMS: Type 2 diabetes is an important health problem and its worldwide frequency is increasing day by day. The study was conducted in order to determine the risk of type 2 diabetes in the relatives of patients hospitalized in internal medicine clinics.

MATERIALS and METHODS: This descriptive and cross-sectional study consisted of 337 relatives of patients hospitalized in the internal medicine clinics of a university hospital in the south of Türkiye. Data were collected using the "Introductory Information Form" and the "Finnish Diabetes Risk Score (FINDRISC)" Scale. The chi-squared test, t-test, the Mann-Whitney U test, and Binary logistic regression analysis were used for statistical analysis.

RESULTS: The mean age of the research participants was 42.69±15.80 years and their mean total FINDRISC score was 9.65±5.51. According to the FINDRISC score, 22.3% of the participants were in the high-risk group. In One-Way analysis, the risk of diabetes was determined to be significantly high according to random capillary blood glucose levels, systolic blood pressure, marital status, educational status, and income status (p<0.005). Moreover, in logistic analysis, age, body mass index, waist circumference, physical activity and family history of diabetes had a significant effect on the risk of developing type 2 diabetes (p<0.005).

CONCLUSION: About a quarter of the participants were in the high-risk group for developing type 2 diabetes within 10 years. By means of tools such as the FINDRISC, the early detection of individuals at risk of diabetes can be provided so as to take measures to prevent or delay diabetes.

Keywords: Type 2 diabetes, risk factor, FINDRISC, patients' relatives, screening

INTRODUCTION

Diabetes is a chronic broad-spectrum metabolic disorder in which the organism cannot benefit from carbohydrates, lipids or proteins due to insulin deficiency or insulin-related defects and so it requires continuous medical care.[1] Generally, life expectancy has increased as a result of advances in developing technology and health care systems; therefore, the incidence of chronic diseases such as diabetes has also increased. Factors such as fast-food habits due to working conditions or time constraints, obesity, low physical activity rates, and family history also pose a risk for diabetes.[2,3]

Diabetes is an important public health issue with an increasing global, national, and regional prevalence. According to the 2019 data of the International Diabetes Federation, there were 463 million (9.3%) individuals aged between 20-79 diagnosed with diabetes mellitus (DM)

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in the world and this number is predicted to reach 578 million (10.2%) by 2030 and 700 million by 2045.[4,5] The increase in DM prevalence is highest in low- and middle-income countries (74-96%). In Europe, Türkiye ranks first in terms of DM prevalence with a rate of 11.1% (6.5 million) and almost half of diabetic individuals are not aware of their diagnosis.[4,5] Diabetes prevalence was reported to be 7.2% in the Turkish Diabetes Epidemiology Study (TURDEP-I) conducted nationally in our country in 2002 and it reached 13.7% with an approximately 90% increase as seen in the TURDEP-II study conducted in 2010.[6,7]

Approximately 90% of all diabetic individuals have type 2 diabetes and go through a prediabetic period in which the symptoms of type 2 diabetes do not appear. The rate of prediabetes is 7.5% in the world and 8.2% in Türkiye.[4,5,7] These data demonstrate that DM and DM-related complications will significantly increase both in the world and in Türkiye. Type 2 diabetes is a long-term chronic metabolic disease which progresses asymptomatically for a long period. Significant dysfunctions can develop in organs such as the heart, blood vessels, and kidneys when symptoms appear and even a secondary disease (such as myocardial infarction or kidney failure) accompanying DM can be diagnosed. Therefore, a delay in the diagnosis of type 2 diabetes may lead to increased morbidity, mortality, and health expenditures.[1,4,5] For this reason, it is very important to determine the disease risk and risk factors affecting the development of DM in the prediabetes period, in which symptoms are not seen, in order to prevent type 2 diabetes and/or bring it under control.[4,8-12]

The development of diabetes can be prevented or delayed in these risk groups by adopting healthy living habits such as increased physical activity, healthy nutrition, and the maintenance of normal weight.[1,4,8-12] The relatives of patients hospitalized in internal clinics are also at risk of some diseases [such as diabetes, hypertension (HT), or obesity] due to their family history. For this reason, this study was conducted in order to determine the risk of type 2 diabetes in patients' relatives, so as to inform those at risk regarding protective measures and to direct them towards the relevant units.

The research question is given below:

1. What the risk of type 2 diabetes in the relatives of those patients hospitalized in the internal medicine clinic?

MATERIALS AND METHODS

Study Design

This descriptive and cross-sectional study was conducted in order to determine the risk of type 2 diabetes in the relatives of patients hospitalized in internal medicine clinics.

Study Participants and Sampling

The population of this study consisted of the relatives of patients hospitalized in internal medicine clinics of a university hospital in the south of Türkiye between April, 2019 and August, 2019. The sample size was determined by power analysis taking type 1 error as 0.05 and a power of 80%. The sample consisted of 337 patient relatives.

The relatives of those patients who had not previously been diagnosed with diabetes, who were aged over 18, who had mental and cognitive competence, who did not have hearing, comprehension or speech problems, who agreed to participate in this study, and of whom

standing weight and height measurements were possible were included in this study. Those who had previously been diagnosed with DM by a physician and/or did not agree to a blood sugar measurement were excluded.

Data collection

The research data were collected using the "Introductory Information Form" and the "Finnish Diabetes Risk Score (FINDRISC)" scale. The Introductory Information Form includes variables related to sociodemographic characteristics (such as age, gender, marital status and educational status).

The Diabetes Risk Score (FINDRISC) consists of eight questions regarding age, body mass index (BMI), waist circumference, exercise, vegetable-fruit consumption, HT, history of high blood glucose, and family history. The total FINDRISC score ranges between 0 and 26. A total score below 7 points indicates a low 10-year risk of developing type 2 diabetes; a score between 7-11 points indicates mild risk; a score between 12-14 points indicates moderate risk; a score between 15-20 points indicates high risk; and a score above 20 points indicates very high risk.[9] The cut-off value of the scale was determined as 15 or above in some studies which had used FINDRISC to determine the risk of type 2 diabetes.[10,11] In this study, a FINDRISC score of 15 or above was defined as being "high-very high risk" for type 2 diabetes.

Data Collection Procedures

The researchers applied the questionnaire form to those patient relatives who met the inclusion criteria via a face-to-face interview method. Data collection, anthropometric, blood pressure and random capillary blood glucose measurements were performed by the researchers in the patient waiting room. Body weight was measured in a standing position to the nearest 0.1 kg on a calibrated "Seca" electronic balance, with the participants wearing light clothes and no shoes and their height was measured with a wall-mounted meter. The waist circumference of the participants was measured using a non-stretch tape measure. The participants' BMI was calculated and classified according to the World Health Organization criteria. Random blood glucose was determined from a capillary blood sample using a calibrated device from the same brand (Viva Check). The participants' blood pressure was measured from the right arm in a sitting position after a 10-15-minute rest using an appropriate cuff, a perfect aneroid mercury sphygmomanometer (Erka), and a stethoscope (Erka). Those with a FINDRISC score of 12 or above and random capillary blood glucose (RCBG) of 140 mg/dL or above were directed to a healthcare facility for further examination. After the evaluation, all participants were informed regarding their risk levels.

Prior to this research, permission was taken from the Clinical Research Ethics Committee (approval number: 2019/147, date: 03.04.2019) and the Mersin University Hospital where the study was conducted. Before the implementation of the data collection forms, all of the participants were informed about the purpose of this study, and its voluntary and confidentiality principles. Their written and verbal consent were taken.

Statistical Analysis

Data were analyzed using the Statistical Package for Social Science 22.0 (SPSS, IBM Corp., Armonk, NY, USA). Numbers, percentages, means, and standard deviations were used to evaluate descriptive characteristics. The Kolmogorov-Smirnov test was performed to examine normal distribution conformity. The independent t-test, chi-squared test and

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Fisher's exact test were used in the statistical analysis of the data. The Mann-Whitney U test was employed for variables which were not normally distributed. Binary logistic regression was performed in multivariate analysis. The goodness of fit of the model was assessed with the Hosmer-Lemeshow test (p>0.05) and the significance of the model was assessed with the Omnibus test (p<0.05). Statistical significance was accepted as p<0.05 in all tests.

RESULTS

The mean age of the 337 patients' relatives was 42.69±15.80 years. Of the participants, 58.2% were female, 65.6% were married, 61.1% had a middle income, 73% were unemployed or retired, and more than half (60.3%) had a high school degree or above.

According to the FINDRISC scores of the participants, the 10-year risk of developing type 2 diabetes was moderate in 15.7%, high in 19.6% and very high in 2.7% (Table 1). The mean total FINDRISC score was determined as being 9.65±5.51 (minimum: 0, maximum: 26). The mean FINDRISC score for women (10.45±10.00) was higher than that for men (8.53±8.00) (Z=-2.99, p=0.003).

In the study, those participants with a FINDRISC score of <15 were defined as the "low to moderate risk" group and those with a score of ≥15 were defined as the "high-risk" group. When the socio-demographic characteristics of the participants were compared according to the FINDRISC group, the risk was found to be higher in those who were married (p<0.001), who were illiterate (p<0.001) and those who had low incomes (p=0.044). There was no significant difference between gender, working status, and the RCBG threshold value and the risk groups (p>0.05). Age (p<0.001), RCBG (p=0.001), BMI (p<0.001), waist circumference (p<0.001) and systolic blood pressure (p=0.002) were low in the high-risk group, being significantly higher compared to the low/moderate risk group (Table 2).

When the FINDRISC scores were compared according to the variables included in the FINDRISC calculation, the FINDRISC score and the risk level were found to increase as age, BMI and waist circumference increased. It was determined that 37.7% of those in the 55-64 age group and 47.1% of those aged over 64 were in the high-risk group in terms of type 2 diabetes and that this difference was significant (p<0.001). Of those with a BMI of >30 kg/m², 55.4% were in the high-risk group and this difference was significant (p<0.001). 58.1% of men with a waist circumference of >102 cm and 36.9% of women with a waist circumference of >88 cm were in the high-risk group and this difference was significant (p<0.001) (Table 3). Those who did not exercise, who had high blood pressure or who used antihypertensive medicine, those who had blood glucose at a high levels or at the upper limit and those who

had a family history of diabetes were in the high risk group in terms of type 2 diabetes (p<0.001); however, there was no significant difference between the groups in terms of vegetable-fruit consumption (p=0.681) (Table 3).

The variables of age (p<0.001), BMI (p<0.001), waist circumference (p<0.003), physical activity and family history of diabetes (p<0.001) had a significant effect on the participants' risk of developing type 2 diabetes. The risk of developing type 2 diabetes within 10 years was found to be 1,347 times higher, especially in those with a family history of diabetes compared to those without. This risk was estimated to be 48 times higher in those who did not exercise than in those who did (Table 4).

DISCUSSION

The mean age of the patients' relatives was 42.69±15.80 years and 22.3% were evaluated as being in the high or very high-risk groups in terms of the 10-year risk of developing type 2 diabetes. Moreover, the FINDRISC score and risk levels were found to increase with increasing age. Insulin resistance may develop with advanced age due to decreased physical activity, an increased incidence of accompanying chronic diseases (especially HT) and increased abdominal fat, etc.; therefore, the risk of developing type 2 diabetes may increase as well.[2,7,10-13] Cosansu et al.[10] determined the risk of developing type 2 diabetes within 10 years as being 7.9%; Kılıç et al.[11] as 11.5%; Awad and Alsaleh[14] as 17.6%; İğci and Basat[15] as 32% and the risk of developing type 2 diabetes was seen to increase with increasing age. Although the mean age of the patients' relatives included in our study group was low, the risk of developing type 2 diabetes within 10 years was found to be high or very high. All these results suggest that type 2 diabetes is a serious health issue.

In our study, the mean total FINDRISC score of the participants was 9.65±5.51 and the mean FINDRISC score for women (10.45±10.00) was found to be higher than that for men (8.53±8.00). This result indicates that the number of risk factors associated with type 2 diabetes is higher in women compared to men. Likewise, Cosansu et al.[10], Berber et al.[16] and Awad and Alsaleh[14] found that the FINDRISC scores of women were higher than those of men. Ural et al.[17] conducted a systematic meta-analysis study investigating the prevalence of obesity and waist circumference in Türkiye and found that the prevalence of both obesity (32.2% in women, 18.2% in men) and abdominal obesity (50.8% in women, 20.8% in men) was higher in women. Additionally, the TURDEP II study revealed that the prevalence of both DM and obesity were higher in women than in men.[7] These results may be associated with the fact that women spend more time on housework, such as cooking and cleaning due to traditional and cultural characteristics, and so cannot spend time on physical activities, thus women have a more sedentary life and become fatter.

The risk of developing type 2 diabetes was found to be higher in those patients' relatives who were married, who were illiterate and those who had low incomes. Likewise, Cosansu et al.[10], Liu et al.[18], Ramezankhani et al.[19] and Oruganti et al.[20] reported that individuals with low incomes and low educational levels had a higher risk of developing type 2 diabetes within 10 years. Furthermore, the literature revealed that those individuals with low income and educational levels also have low levels of health literacy.[21,22] Having a low educational level and low income can create an obstacle in accessing the appropriate resources (correct information, accessing appropriate health services, consuming

Table 1. Participants' 10-year risk of developing type-2 DM			
Risk level	n	%	Estimated number of diabetics (n)*
Low: <7 (1/100)	119	35.3	1.1
Mild: 7-11 (1/25)	90	26.7	3.6
Moderate: 12-14 (1/6)	53	15.7	8.8
High: 15-20 (1/3)	66	19.6	22
Very high >20 (1/2)	9	2.7	4.5
*Number of individuals who may be diagnosed with type-2 diabetes in 10 years. DM: Diabetes mellitus.			

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Table 2. Comparison of the socio-demographic variables with 10-year risk of developing type-2 diabetes

Variables	Low and medium risk (<15 points), n (%)	High risk (≥15 points), n (%)	Total (n=337), n (%)	Test values
Gender				
Female	146 (74.5)	50 (25.5)	196 (58.2)	X^2=2.86
Male	116 (82.3)	25 (17.7)	141 (41.8)	p=0.111
Marital status				
Married	153 (69.2)	68 (30.8)	221 (65.6)	X^2=26.89
Single	109 (94.0)	7 (6.0)	116 (34.4)	**p<0.001**
Educational status				
Illiterate	8 (61.5)	5 (38.5)	13 (3.9)	X^2=29.73
Primary school	77 (63.6)	44 (36.4)	121 (35.9)	**p<0.001**
High school	61 (80.3)	15 (19.7)	76 (22.6)	
University or higher	116 (91.3)	11 (8.7)	127 (37.7)	
Working status				
Employed	75 (82.4)	16 (17.6)	91 (27.0)	X^2=1.57
Unemployed	187 (76.0)	59 (24.0)	246 (73.0)	p=0.240
Income				
Low	76 (76.0)	24 (24.0)	100 (29.7)	X^2=6.22
Middle	157 (76.2)	49 (23.8)	206 (61.1)	**p=0.044**
High	29 (93.5)	2 (6.5)	31 (9.2)	
RCBG				
<140 mg/dL	239 (78.6)	65 (21.4)	304 (90.2)	X^2=1.36
≥140 mg/dL	23 (69.7)	10 (30.3)	33 (9.8)	p=0.271
Age (mean ± SD)	39.47±15.28	53.94±12.06		Z=-7.09 **p<0.001**
RCBG (mean ± SD)	107.58±25.38	122.22±51.86		Z=-3.40 **p=0.001**
BMI (mean ± SD)	25.30±4.70	30.37±4.61		t=-8.25 **p<0.001**
Waist circumference (mean ± SD)	87.21±12.84	102.45±10.22		t=-10.71 **p<0.001**
SBP (mmHg) (mean ± SD)	118.04±13.23	124.60±15.38		Z=-3.40 **p=0.002**
DBP (mmHg) (mean ± SD)	75.76±9.55	77.14±10.88		Z=-0.68 p=0.491

RCBG: Random capillary blood glucose, SD: Standard deviation, BMI: Body mass index, SBP: Systolic blood pressure, DBP: Diastolic blood pressure.

healthy foods, etc.) and in using these resources effectively in order to prevent, control and manage these risk factors. Some studies have also reported that those who are married have a higher risk of developing type 2 diabetes.[10,19] Our study results are consistent with the literature.

In our study, the FINDRISC scores and risk levels of the participants were found to increase as their BMI and waist circumferences increased. Moreover, those patients' relatives who did not exercise were determined to be in the high-risk group in terms of type 2 diabetes. Studies have reported that obesity is the most important changeable risk factor in the development of type 2 diabetes, that the age of obesity onset and the number of obese-years significantly increase the risk of type 2 diabetes,[16,20,23,24] and that weight loss may prevent or delay the development of type 2 diabetes.[4,8,12,24] In obesity, some hormones (adipokines such as resistin) produced by adipose tissue increase insulin resistance. Therefore, obesity contributes to the development of type

2 diabetes and type 2 diabetes contributes to the development of obesity.[2,12,25] Our study results are consistent with the literature.

Regular physical activity increases glucose tolerance and insulin sensitivity and ectopic adipose tissue decreases by burning extra calories. Additionally, exercising increases glucose utilization by increasing muscle mass.[2,12,26-30] Similar to our findings, the literature reported that those individuals with low levels of physical activity have a high risk of developing type 2 diabetes,[11,15,20,23,27] and that excessive sitting contributes to the development of type 2 diabetes independent of sociodemographic characteristics and obesity.[29] Being consistent with the literature,[10,11,13,15,20,23,27] half of the participants were found to be physically inactive and above normal weight and both variables were determined as being independent risk factors in the development of type 2 diabetes.

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Table 3. The distribution of FINDRISC Scale scores by FINDRISC variables				
Variables	Low and medium risk (<15 points), n (%)	High risk (≥15 points), n (%)	Total (n=337), n (%)	Test values
Age group				
0 point: <45	169 (92.3)	14 (7.7)	183 (54.3)	X^2=50.77
2 points: 45-54	42 (62.7)	25 (37.3)	67 (19.9)	**p<0.001**
3 points: 55-64	33 (62.3)	20 (37.7)	53 (15.7)	
4 points: >64	18 (52.9)	16 (47.1)	34 (10.1)	
BMI (kg/m²)				
0 point: <25 kg/m²	133 (93.0)	10 (7.0)	143 (42.4)	X^2=66.60
1 point: 25-30 kg/m²	96 (80.0)	24 (20.0)	120 (35.6)	**p<0.001**
3 points: >30 kg/m²	33 (44.6)	41 (55.4)	74 (22.0)	
Waist circumference (men)				
0 point: <94 cm	176 (95.1)	9 (4.9)	185 (54.9)	X^2=84.66
3 points: 94-102 cm	60 (66.7)	30 (33.3)	90 (26.7)	**p<0.001**
4 points: >102 cm	26 (41.9)	36 (58.1)	62 (18.4)	
Waist circumference (women)				
0 point: <80 cm	69 (97.2)	2 (2.8)	71 (21.1)	X^2=57.58
3 points: 80-88 cm	70 (98.6)	1 (1.4)	71 (21.1)	**p<0.001**
4 points: >88 cm	123 (63.1)	72 (36.9)	195 (57.9)	
Physical activity				
0 point: Yes	147 (88.0)	20 (12.0)	167 (49.6)	X^2=20.21
2 points: No	115 (67.6)	55 (32.4)	170 (50.4)	**p<0.001**
Vegetable-fruit consumption				
0 point: Every day	172 (78.5)	47 (21.5)	219 (65.0)	X^2=0.228
1 point: Not every day	90 (76.3)	28 (23.7)	118 (35.0)	p=0.681
Hypertension or use of anti-hypertensive medicine				
0 point: No	238 (85.6)	40 (14.4)	278 (82.5)	X^2=56.79
2 points: Yes	24 (40.7)	35 (59.3)	59 (17.5)	**p<0.001**
History of high blood glucose				
0 point: No	239 (87.9)	33 (12.1)	272 (80.7)	X^2=83.51
5 points: Yes	23 (35.4)	42 (64.6)	65 (19.3)	**p<0.001**
Family history of diabetes				
0 point: No	131 (92.9)	10 (7.1)	141 (41.8)	X^2=35.70
3 points: Second-degree relatives	52 (74.3)	18 (25.7)	70 (20.8)	**p<0.001**
5 points: First-degree relatives	79 (62.7)	47 (37.3)	126 (37.4)	
BMI: Body mass index, FINDRISC: Finnish Diabetes Risk Score.				

Those who had high blood pressure and used antihypertensive medicine were found to be in the high-risk group in terms of type 2 diabetes. Likewise, some relevant studies determined that those individuals who had HT and who used antihypertensive medicine had a higher risk of developing type 2 diabetes than normotensive individuals.[11,15,16,23] Genetic characteristics, insulin resistance, dyslipidemia and obesity are common risk factors for the development of both type 2 diabetes and HT.[31,32] Identifying at risk individuals by screening with easy-to-apply scales such as FINDRISC and raising awareness will make a significant contribution to the increased quality of life of individuals and reduced morbidity, mortality and costs.

In our study, those patients with a family history of diabetes were found to be in the high-risk group for type 2 diabetes. Our study results are consistent with those that reported that individuals who had a family history of DM had a higher risk of developing type 2 diabetes compared to those with no family history.[10,16,18,20,23] The literature states that high carbohydrate intake causes oxidative stress and increased inflammatory response in individuals with genetic susceptibility in terms of DM, leading to the impairment of insulin sensitivity and insulin receptor signaling and so it increases the risk of developing DM in the long term.[3,33,34]

Study Limitations

Our results cannot be generalized as this study was conducted in only one hospital. One of the limitations of this study was that it was conducted only on the patients' relatives in the internal medicine clinic. Another limitation was that the random blood glucose level was measured from capillaries and not from plasma. However, the targeted sample size was reached and the at risk individuals were informed about

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Table 4. Binary logistic regression analysis of factors affecting the risk of developing type-2 DM

Variables	β	p	OR	95% CI
Age	0.138	**0.001**	1.149	1.068-1.235
BMI	0.333	**0.001**	1.395	1.167-1.667
Waist circumference	0.103	**0.003**	1.109	1.036-1.187
RCBG	0.007	0.444	1.007	0.989-1.026
SBP	0.035	0.254	1.036	0.975-1.100
Physical activity	3.883	**0.001**	48.587	8.683-271.860
Family history of diabetes	7.206	**0.001**	1347.989	70.727-25691.358
Marital status	0.606	0.534	1.833	0.272-12.374
Educational status	-0.641	0.347	0.527	0.138-2.006
Income	0.467	0.773	1.595	0.067-38.172

DM: Diabetes mellitus, BMI: Body mass index, RCBG: Random capillary blood glucose, SBP: Systolic blood pressure, CI: Confidence interval, OR: Odds ratio, Independent variables: Physical activity, family history of diabetes, marital status, educational status and income status were categorical variables and age, BMI, waist circumference, RCBG and SBP were continuous variables.

measures of protection from type 2 diabetes and directed towards the relevant units. These factors increase the strength of our study.

CONCLUSION

FINDRISC can help in the early identification of individuals at risk of diabetes. In this study, 22.3% of the patients' relatives were found to be at high risk in terms of developing type 2 diabetes within 10 years. The risk of developing type 2 diabetes was determined to be higher in women, in those who were married, in those who had low income and low educational levels, and in those who had a family history of DM. Moreover, our study revealed that the classic risk factors such as physical inactivity, BMI, waist circumference, and HT also had an important effect on the development of type 2 diabetes. Therefore, strategies (screenings, training/counseling, guidance to related units) should be developed, especially in order to raise awareness in at risk individuals and to prevent and control the development of type 2 diabetes. Performing studies for risk screening can facilitate in taking early precautionary measures in order to prevent or delay diabetes.

MAIN POINTS

- The mean score of the relatives of the patients on the FINDRISC was 9.65±5.51. This result showed that 22.3% of patients' relatives were at high risk of developing type 2 diabetes within 10 years.

- The mean FINDRISC score of women (10.45±10.00) was higher than that of men (8.53±8.00).

- Age, body mass index and waist circumference, physical inactivity and a family history of diabetes increased the risk of developing type 2 diabetes.

- The FINDRISC tool can help in the early identification of individuals at risk of diabetes and facilitate in taking early precautionary measures.

- In terms of type 2 diabetes, screening programs should be applied periodically in order to raise awareness among those individuals

with a family history of chronic diseases, in order to prevent or delay the development of DM by identifying at risk individuals.

ETHICS

Ethics Committee Approval: This study was approved by the Ethics Committee of Mersin University Hospital (approval number: 2019/147, date: 03.04.2019).

Informed Consent: Their written and verbal consent were obtained.

Authorship Contributions

Concept: B.V.D., M.G., E.Ç., F.T.Ç., E.T., Design: B.V.D., M.G., E.Ç., F.T.Ç., E.T., Supervision: B.V.D., M.G., Resource: B.V.D., M.G., E.Ç., Materials: B.V.D., M.G., E.Ç., Data Collection and/or Processing: B.V.D., M.G., E.Ç., F.T.Ç., E.T., Analysis and/or Interpretation: B.V.D., M.G., Literature Search: B.V.D., M.G., Writing: B.V.D., M.G., Critical Reviews: B.V.D., M.G., E.Ç., F.T.Ç., E.T.

DISCLOSURES

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