DETERMINING THE TYPE 2 DIABETES RISKS AND HEALTHY LIFESTYLE BEHAVIORS OF FIRST YEAR UNIVERSITY STUDENTS

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ABSTRACT

Introduction: The present study was planned and carried out as a descriptive and cross-sectional study for determining the Type 2 diabetes risks and healthy lifestyle behaviors of first year university students.
Material and Methods: The study was carried with 185 students at a foundation university in Istanbul during the dates of November-December 2019. The data were acquired online via Student Information Form, Type 2 Diabetes Questionnaire (FINDRİSK) and Healthy Lifestyle Behaviors Scale.
Results: The mean age of the students in the study was 19.79±2.47 years, 53.5 % (n=99) were male, 29.7 % (n=55 previously graduated from another university, 62.1 % (n=115) were students and it was determined that 50.3 % (n=93) had diabetic relatives. It was observed when the diabetes risk status was examined for all participants that they are in the low risk group due to a FINDRISK total score of <7.
Conclusion: The study results emphasize the importance of determining the risk for university students to be diabetic in the next decade, putting forth the individuals with high risk and moving onto the next stage for diagnosis. In addition, it has been determined that the level of knowledge of students may have a positive impact on their healthy lifestyle behaviors.

Key Words: Type 2 diabetes, diabetes risk, healthy lifestyle, university student

INTRODUCTION

The prevalence of diabetes is on the rise. International Diabetes Federation (IDF) states that there are globally 463 million adults with diabetes in 2019 which makes up 9.3 % of the population of adults worldwide. It is estimated that this number will increase up to 578 million (10.2 %) people in by 2030 and 700 million (10.9 %) by 2045 (1). The primary reasons for the continuous increase in the prevalence of Type 2 diabetes are socioeconomic changes in the world and in Turkey along with their reflections on lifestyle (2).

Awareness can be increased at schools and universities by implementing various informational programs on lifestyle related diseases, healthy nutrition and the importance of physical activity.

Information is the primary requirement for inducing health related behavioral changes. However, it is observed that the sensitivity of students towards diseases is not improved, that they do not understand the impacts of their family health histories on individual health results and that they do not adopt the required lifestyle changes (3).

It is known that the modifiable risk factors of type 2 diabetes among young individuals are becoming more prevalent. It can be observed that type 2 diabetes risk factors such as being overweight or obese, physical inactivity and unhealthy diet

applications are very common among university students. Majority of them tend to gain weight during the first year of their education. It has been put forth that students generally malnourished and that the prevalence of obesity increases significantly towards the end of their university education (4).

Creating a healthy life is choosing and controlling a life that can affect their health and practicing appropriate life behaviors. This sound, health and well-being standardization, practices that enable self-development includes. Being in the health sector, nutrition, it is an exercise that is effective in the development of practices such as practicing, not gaining weight, drinking alcohol, stress management, effective communication and applying the development development mini (2,5).

Consequently, the prevalence of modifiable risk factors along with the related prevalence of type 2 diabetes continues to increase in all societies, age groups and among the young population (5). Risky individuals should be identified early on and their awareness should be increased in order to prevent Type 2 diabetes. Society specific programs can be developed, early diagnosis can be made and thus the disease can be prevented or delayed if the risk levels of the individuals are determined and their knowledge and levels of awareness are increased.

MATERIAL AND METHODS
Aim and Type of the Study
The present study was planned and carried out as a descriptive and cross-sectional study for determining the Type 2 diabetes risks and healthy lifestyle behaviors of first year university students.

Research Questions
1. What are the Type 2 diabetes risks of first year university students?
2. What is the relationship between the Type 2 diabetes risk of students and their health lifestyle behaviors?

Location and Date of the Study
The study was carried at a foundation university in Istanbul during the dates of November-December 2019.

Study Population and Sample Group
The universe of the study consisted of first-year students of all faculties and departments within the university (n = 380). The reason why first year students are preferred is that students in this class have not yet taken health education courses. The sample of the research is; The population was found to be 164 students by calculating according to the known minimum sample size formula. At least 200 students were planned to be included in the study, assuming students who did not meet the criteria for inclusion and did not agree to participate in the study. 185 students who met the relevant conditions formed the sample.

Inclusion Criteria:
- Those who volunteered to participate in the study,
- Those who were university freshmen were included in the study.

Exclusion Criteria:
- Those with disabilities in communicating,
- •Students with diabetes were not included in the study.

Data Collection Method
Data has been filled in online. Approximately 20 minutes was allotted to fill in the data. Before the data was collected, an explanation was made to the students and their informed consent was obtained. Anthropometric measurements were collected according to the student's statement in the relevant form.

Data Acquisition Tools
Information Form: The information form prepared by the researchers consists of 7 questions involving questions on the socio-demographic characteristics and social securities of students as well as questions such as those for determining whether there are any diagnosed diabetes patients among their first degree relatives.

Type 2 Diabetes Questionnaire (FINDRISK): FINDRISK developed by the Finnish Diabetes Association within the scope of Finland Type 2 Diabetes Prevention Program is a tool that can be used easily for this purpose in daily applications. Turkey Endocrinology and Metabolism Society in guidelines published by the Turkish version of the proposed and widely used in our country in the early stages of Type 2 FINDRISK survey is stated to be useful in determining the risk of diabetes. FINDRISK determines the risk of the individual for being diabetic in the next decade thus providing the opportunity to pass onto the next step for diagnosis. FINDRISK is simple, easy to use and understand and is comprised

of eight questions. FINDRISK evaluates age (scores of 0, 1, 2, 3 and 4), body mass index (scores of 0, 1 and 3), waist circumference (evaluated differently for women and men with scores of 0, 3 and 4), physical activity (scores of 0 and 2), daily consumption of vegetables and fruits (scores of 0 and 1), history of antihypertensive treatment (scores of 0 and 2), history of hyperglycemia (scores of 0 and 5) and family history of diabetes (scores of 0, 3 and 5). The maximum score that can be obtained from the questionnaire is 26. Risk increases for scores of 15 and above and it may be suggested to screen the individuals for diabetes via laboratory methods and enroll them in the protection program.

Healthy Lifestyle Behaviors Scale: Healthy Lifestyle Behaviors Scale II healthy behaviors were collected via the "Healthy Lifestyle Behaviors Scale". The scale has been developed by Walker et al. (1987) and was revised in 1996. The scale measures the healthy behaviors of the individuals that are related with the healthy lifestyles of the individuals. The scale is comprised of 52 items and 6 sub-factors. Having adapted the scale to Turkish by making its validity and reliability, Bahar et al. (2008). The sub-groups are spiritual development, health responsibility, physical activity, nutrition, interpersonal relationships and stress management. The general score of the scale yields the healthy lifestyle behaviors score. All items of the scale are positive. Scoring is in the form of 4-point Likert. The responses are "never" (1), "sometimes" (2), "often" (3), "regularly" (4). The lowest and highest scores of the scale are 52 and 208 respectively. The Alpha reliability coefficient of the scale is 0.94'. This study Alpha coefficient reliability values of the sub-factors vary between 0.79-0.87 (5).

Statistical Analysis

The acquired data were evaluated in SPSS 20 (Statistical Program for Social Sciences) package software. Parametric and non-parametric tests were used in the evaluation of the data. The data were analyzed using statistical tests such as frequency distribution, arithmetic mean, standard deviation, chi-square test, independent groups' t-test, independent groups one-way variance of analysis.

Ethical Aspect of the Study

Study has been approved by Fenerbahce University Ethics Committee (Date: 15.04.2020, Number: FBU/2020-008) to carry out along with the approvals of the students on the informed consent forms.

Table 1. Demographic Data (N=185)

Individual Characteristics			
Age (Mean ± SD)	19.79± 2.479	**n**	**%**
Gender	Women	86	46.5
	Men	99	53.5
Education	High school	130	70.3
	University	55	29.7
First Degree Relatives Diagnosed with Type 2 Diabetes	Mother	12	6.5
	Father	15	8.1
	Mather and Father	5	2.7
	Sister	4	2.2
	Brother	2	1.1
	Children	1	.5
	Other Relatives	93	50.3
	No diabetes diagnosis	53	28.6

RESULTS

According to Table 1, the mean age of the whole group was 19.79±2.47 years. Of the students who participated in the study, it was determined that 46.6 % (n=86) were women, 53.5 % (n=99) were men, that 70.3 % (n=130) were high school graduates, 29.7 % (n=55) previously graduated from another university, 62.1 % (n=115) were students and 50.3 % (n=93) have diabetic relatives.

It was determined that 47.5 % (n=88) of the students who participated in the study had a body mass index of 25-30 kg/m2, that the waist circumference of 55.55 % (n=55) of the male participants is <94 cm, that the waist circumference of 76.74 % (n=55) is <80 cm, that 50.3 % (n=93) exercise daily for at least 30 min., that 53.0 % (n=98) eat fruit-vegetable daily, that 97.82 % (n=181) do not have high tension, that 88.1 % (n=163) have not been previously told to have high blood glucose level and that 62,7 % (n=116) do not have a family member diagnosed with diabetes. It was determined when the diabetes risk status was examined for all participants that they are in the low risk group with a total FINDRISK score of <7 (Table 2).

Table 3 presents the distribution of the responses of the students to the sub-dimensions of the healthy lifestyle behaviors scale. It was determined when the responses were examined that; the level of agreement to the "I consult a health personnel for my health problems" of the health responsibility sub-dimension was 2.60 ± 0.86; that the level of agreement to the "I do light to moderate levels of

Table 2. Diabetes Risk Questionnaire Data (FINDRISK) (N=185)

		n	%	Mean	SD	X²	p
Body Mass Index	<25 kg/m2	77	41.6	1.43	5.181	114.91	.000
	25-30 kg/m2	88	47.5				
	>30 kg/m2	20	10.8				
Waist Circumference of Men (N=99)	<94 cm	55	55.55	1.92	2.093	43.39	.000
	94-102 cm	33	33.34				
	>102 cm	11	11.11				
Waist Circumference of Women (N=86)	<80 cm	66	76.74	1.25	1.865	99.02	.000
	80-88 cm	11	12.79				
	>80 cm	9	10.47				
At least 30 min. exercise daily	Yes	93	50.3	.99	1.003	.005	.941
	No	92	49.7				
Frequency of Fruit-Vegetable Consumption	Daily	98	53.0	.47	.500	.654	.419
	Rarely	87	47.0				
Do You Have Hypertension?	Yes	4	2.2	.04	.292	169.34	.000
	No	181	97.82				
Have you been told previously that you have high blood glucose level?	Yes	22	11.9	.59	1.623	107.46	.000
	No	163	88.1				
Do you have any family member diagnosed with diabetes?	No	116	62.7	6.95	3.17	77.71	.000
	Yes but in uncle, aunt, cousin or nephew/niece (2nd degree relatives)	48	25.94				
	Yes but in the biological father or mother, siblings or child (1st degree relatives)	21	11.35				
FINDRISK Total Score	**Risk level**			**10 year risk**			
<7	Low			%1 (1/100)			

exercise (for example, I go walking 5 times or more per week)" of the physical activity sub-dimension was 2.77± 1.003; that the level of agreement to the "I eat milk, yoghurt or cheese 3-4 times daily" of the nutrition sub-dimension was 2.50±0.89; that the level of agreement to the "I believe in the presence of a divine being" of the spiritual development sub-dimension was 3.35±0.96; that the level of agreement to the "I appreciate people for their successes" of the interpersonal relations sub-dimension was 3.23±0.70 and that the "I take guidance and consultancy from others when I need it" of the stress management sub-dimension was 2.71±0.89. The mean score of the healthy lifestyle behaviors scale was determined as 2.46±0.39 (Table 4).

It was determined when the healthy lifestyle behaviors scale total score was compared with the diabetes rick questionnaire data that there is a statistically significant difference between having first

degree relatives diagnosed with Type 2 diabetes and age, body mass index, women and men waist circumference, daily exercise for at eat 30 minutes, frequency of eating vegetables-fruits, presence of hypertension, being told previously to have high blood glucose level or a blood glucose level at the limit (p<0.05) (Table 5).

DISCUSSION

Diabetes, which is considered as a chronic disease due to its incidence and long-term treatment requirement, is one of the most important health problems in the world and in our country. Type 2 diabetes, which progresses insidiously for a long time without symptoms, constitutes a large part of all diabetes. Today, in FINDRISK, which is used to determine the diabetes risk according to age, body mass index, waist circumference, exercise status, the frequency of consuming vegetables and fruits, history

of antihypertensive treatment, history of hyperglycemia and diabetes history in the family, the risk of 15 points or more increases in FINDRISK. In terms of diabetes, it is recommended to be screened by laboratory methods and included in a prevention

Table 3. Distribution of the Responses of the Students to the Healthy Lifestyle Behaviors Scale Sub-Dimensions (N=185)

	Questions	Mean	SD
Health responsibility	3. I tell all extraordinary symptoms and findings in my body to the doctor or healthcare personnel	2.57	.845
	9.I watch health related TV programs and read books on this subject	1.82	.744
	15. I ask questions to healthcare personnel in order to learn about their suggestions	2.44	.852
	21. I consult other healthcare personnel following the suggestions of the healthcare personnel I visit regularly in case I have questions	2.16	.753
	27.I consult healthcare personnel in case of health problems	2.60	.867
	33.I check my body for any physical changes, suspicious findings at least once a month	2.16	.924
Physical activity	4. I have a regular exercise program.	2.16	.957
	10. I exercise for 20 minutes and/or more at least three times per week (fast walking, biking, aerobics, dance etc.)	2.61	1.005
	16. I do light to moderate exercise (for example I go walking for 5 times or more per week)	2.77	1.003
	22. I am involved in entertaining physical activities such as swimming, dancing, biking in my spare time.	2.17	.773
	28. I work on muscle strengthening exercises for at least three times per week.	1.92	1.032
	34. I exercise during daily activity (for example, I walk to lunch. I use the stairs instead of the elevator. I park my car far away).	2.49	.950
	40. I control my heart rate and pulse while exercising.	1.97	.856
	46.I do exercises that increase my heart rate.	2.13	.964
Nutrition	2. I prefer a low-cholesterol diet with low fat	2.07	.821
	8. I limit sugar and desserts	2.07	.967
	14. I eat 6-11 meals of bread, cereal, rice and macaroni every day	1.84	.739
	20. I eat 2-4 meals of fruits every day	2.20	.865
	26.I eat 3-5 meals of vegetable every day	2.10	.808
	32. I eat milk, yoghurt or cheese for 3-4 times per day.	2.50	.892
	38. I eat at 3-4 portions of meat, chicken, fish, dry legumes, egg etc. every day	2.31	.872
	44. I read the labels on the food packages that indicate their nutritional content (fat and sodium etc.)	2.20	1.072
	50.I eat breakfast	2.81	.945

Table 3. Continued

Spiritual development	6. I feel that I am changing and improving in the positive direction	2.62	.878
	12.I believe that my life has a purpose	2.94	.880
	18. I look to the future with hope	2.80	.977
	24. I feel at peace with myself and also competent	2.77	.898
	30. I work to attain the long term goals in my life	3.02	.853
	36. I find different and interesting things to do every day	2.44	.826
	42. I am aware of the important things in my life	3.12	.815
	48. I believe in the presence of a divine power	3.35	.962
	52. I am open to new experiences and conditions	3.11	.849
Interpersonal relations	1.I discuss my concerns and problems with the people close to me	2.56	.820
	7. I appreciate people for their successes	3.23	.709
	13.I lead meaningful and satisfying relations with people	3.12	.771
	19. I spare time for my close friends	3.04	.800
	25.It is easy for me to display attention, love and affection to others	2.87	.875
	31. I embrace the people I love	3.10	.912
	37.I strive to acquire close friends	2.23	.874
	43. I take support from people with similar problems	2.46	.933
	49.I resolve the conflicts by talking and reconciliation	3.10	.892
Stress management	5. I sleep sufficiently	2.58	.958
	11. I spare time for relaxation every day	2.38	.938
	17. I accept the things that I cannot change in my life	2.23	.850
	23. I think of good things before sleeping	2.52	.990
	29. I use proper methods for controlling my stress	2.29	.896
	35. I balance out my work and fun times	2.43	.825
	39. I consult healthcare personnel on issues related with how I can look after myself better	1.97	.817
	41. I do various applications to relax and feel at ease for 15-20 minutes per day	1.98	.878
	45.I take part in educational programs on healthcare and related subjects	1.65	.745
	47.I refrain from getting tired	2.00	.821
	51. I either consult others or provide guidance when required	2.71	.890

Table 4. Healthy Lifestyle Behaviors Scale Total Score Distribution (N=185)

Healthy Lifestyle Behaviors Scale	Mean	SD	Minimum	Maximum
	2.4684	.39785	1.11	3.62

Table 5. Comparison Between the Healthy Lifestyle Behaviors Scale Total Score and Diabetes Risk Questionnaire Data (FINDRISK) (N=185)

	Mean	SD	t	p
Age	17.32	2.49	94.54	.000
Body mass index (BMI)	-1.04	5.24	-2.70	.008
Waist Circumference of Men	-1.17	1.91	-6.09	.000
Waist Circumference of Women	-1.12	1.91	-7.96	.000
At least 30 min. exercise daily	-1.47	1.19	-16.75	.000
Frequency of Fruit-Vegetable Consumption	-1.99	.69	-39.14	.000
Do You Have Hypertension?	-2.42	.50	-64.70	.000
Have you been told previously that you have high blood glucose level?	-1.87	1.67	-15.21	.000
Do you have any family member diagnosed with diabetes?	4.50	3.11	16.61	.000

program. When the diabetes risk status of the students participating in our study was examined, it was determined that they were in the low risk group since the FINDRISK total score was <7. Koçak et al. (2017) has a high risk for type 2 diabetes in his study at school(6). Kulak et al. (2019) stated that the participants were at a slightly low risk level and that the risk of developing diabetes in ten years is considered, if no precautions are taken, participants may face a diagnosis of diabetes within ten years(7). Liyubomirova et al. (2019), the FINDRISK score of individuals up to the age of 25 is in line with our study (8).

Healthy lifestyle behaviors; taking the behaviors that affect the health of the individual under control and taking responsibility for the health of the individual. In order to gain healthy lifestyle behaviors to individuals, first of all, the lifestyle behaviors they have should be determined. Thus, training programs can be developed to help individuals gain healthy lifestyle behaviors in line with their needs. Studies conducted with different groups revealed that the demographic characteristics of individuals and the health education they received had an important effect on their development of healthy lifestyle behaviors. Accordingly, spiritual development, exercise, adequate and balanced nutrition, interpersonal relationships and stress management are the

parameters taken into account in healthy lifestyle behaviors. It is known that regular exercise combined with a healthy diet maintains normal blood pressure, increases the capacity of the lungs, supports oxygen intake, and has positive effects on lipid-fat metabolism. Healthy life has an important place in the management of type 2 diabetes. Healthy life has an important place in the management of type 2 diabetes (7). In our study, in the health responsibility sub-dimension of the responses given by the students to the sub-dimensions of the healthy lifestyle behaviors scale, "I consult the healthcare personnel about my health problems"; "I exercise light and medium level" in the physical activity sub-dimension; "I eat milk, yoghurt or cheese 3-4 times a day" in the nutritional sub-dimension; "I believe in the existence of a divine power" in the spiritual development sub-dimension; "I appreciate people for their success" in the interpersonal relations sub-dimension; In the stress management sub-dimension, it was found that they responded to the items "I get counseling and guidance from others when I need it" at a higher rate. Kulak et al. According to (2019), physical activity, one of the healthy lifestyle behaviors, is among the changeable risk factors of diabetes. A total of 150 minutes per week. Regular moderate physical activity has many benefits such as providing weight control, decreasing cardiovascular risk factors, increasing

success in blood sugar regulation and improving health. Approximately 60% of the participants stated that they are physically inactive (7). Koçak et al. (2017), the highest mean score belongs to the spiritual development sub-dimension, and the lowest average score belongs to the physical activity sub-dimension(6). Hoying et al. (2020), the daily meal consumed did not meet the recommended amount of physical activity (9).

In our study, when the total score of the healthy lifestyle behaviors scale is compared with the diabetes risk questionnaire data; age, body mass index, waist circumference of women and men, exercising for at least 30 minutes a day, frequency of consuming vegetables and fruits, presence of high blood pressure, being told that their blood sugar is high or borderline before, and their first-degree relatives have been diagnosed with type 2 diabetes It was determined that there is a statistically significant difference between and. Koçak et al. (2017) found that the relationship between FINDRISC and age, gender, education level, smoking and alcohol use was not statistically significant, while the relationship between FINDRISC score and perceptions of health was statistically significant, and the nutritional and physical activity mean scores were higher in women(6). These results are in parallel with our study.

A negative and low level statistically significant correlation was observed in our study between the Physical Activity sub-dimension of the Healthy Lifestyle Behaviors Scale and FINDRISK and a negative and low level statistically significant correlation was also determined with the stress management sub-dimension. Downes (2015) determined as a result of the study carried out that physical activity and nutritional habits are correlated with motivation and perceived obstacles(10). It has been determined as a result of the studies carried out that the college and postgraduate students in the USA generally obey the physical activity and healthy nutrition suggestions by the Ministry of Health Human Services and the Ministry of Agriculture (10, 11). Melnyk et al. (2016) set forth in their study that the healthy lifestyle behaviors of postgraduate health science students are related with their beliefs, depression and anxiety and that it is important to determine the support of associations, knowledge and the potentially effective interventions(12). Hoying et al. (2016) reported as a result of a study on high school and secondary school students that there are

improvements in healthy life style behaviors and academic performance(13). Various other studies have also indicated that healthy lifestyle behaviors reduce symptoms of depression and anxiety while improving academic performance(14,15,16,17). Collen et al. (2018) put forth that it is necessary to strengthen the beliefs of adolescents and to improve their positive health behaviors in order to enable them to develop healthy lifestyle behaviors(18). Malatskey et al. (2017) determined as a result of a study on faculty of medicine students that doctors will not be able to provide effective guidance as a result of gaining weight, fast food consumption and less exercise due to changes in lifestyle resulting in the failure to sustain their healthy behaviors (19).

Limitations of the Study
The limitations of this study are limited to this group, it cannot be generalized.

CONCLUSION
As a result of the research, the low FINDRISK scores of the students while they have not yet taken the health education courses indicate that they create awareness in the society about healthy lifestyle habits. The study created awareness among students in terms of Type 2 diabetes risk factors. Accordingly, it is recommended to provide sufficient information to determine risk factors early and to increase their knowledge / awareness levels in health screenings of individuals, to prepare training and consultancy programs for lifestyle change, and to evaluate the effectiveness of these programs. In addition, it is recommended to increase the number of studies on healthy lifestyle behaviors and factors affecting them, and to develop effective and applicable strategies to control these factors in line with the findings.

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