

## **Awareness of late adolescents with a diabetic family member of their health risks.**

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### **Abstract**

**Objective:** The purpose of this study was to determine the influence of an individual with diabetes on late adolescents, a period during which many behaviors and models of thought are formed and the awareness of health risks develop.

**Methods:** This study was carried out with 385 late adolescents randomly selected at the Ankara Baskent University Campus. Participants were given a questionnaire of 33 questions to determine their demographical characteristics; their habits related to diet and exercise; and their knowledge, attitudes, and behaviours regarding diabetes mellitus together with the Health Anxiety Inventory-Short Form (HAI-SF).

**Results:** Participants were divided into two groups: relatives of DM patients and relatives of non-DM patients. Late adolescents with DM in their family showed significant differences in nutritional choices for healthy snack foods and were found to have a more accurate understanding of "what to expect when a person in the risk group for DM is fed to reduce the risk". There was no statistically significant difference in the data except these two areas.

**Conclusion:** The results of the present study found that the awareness of health risks of late adolescents with DM in their family is insufficient. Developing behavioral changes and raising awareness in late adolescents who are at risk of developing DM will be a protective measure against it.

**Keywords:** Diabetes mellitus, Adolescent, Family, Medicalization, Health behaviour.

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### **Introduction**

Diabetes mellitus (DM) is considered a syndrome in which glucose intolerance occurs, with the development of a group of genetically heterogeneous diseases. Family history positivity is reported in the 25%-50% range [1]. Simple lifestyle changes can delay or prevent DM risks in 58% of people with a diabetic family history [2-4].

The prolongation of the expected life span has led to an increase in the prevalence of DM with the rate of population growth, obesity associated with urban life, and more sedentary lifestyles. These changes in today's lifestyle greatly influence the adolescent stage during which many behaviours and models of thought are formed [3]. Some habits acquired during adolescence decrease the individuals' health and productivity level at that life stage and adversely affect their health and productivity at advanced ages [5]. Studies show that people overweight in adolescence tend to be overweight in adult life, and most of them lead sedentary lifestyles [6].

The most important goals of many DM prevention programs for combating increased DM prevalence is to prevent the disease in the early period by creating disease awareness in high-risk individuals, to screen asymptomatic individuals, and to minimize or prevent the development of complications [1].

obesity, physical inactivity, family history of DM, family history of gestational DM, history of delivering a macrosomic baby, smoking, and aging were the main risk factors for DM [7]. The recent relationship between DM and genetics suggests that creating disease awareness in the late adolescent age group of 18-21 year olds, when many habits are developed, is one of the most important and fundamental steps in the fight against DM.

DM, a chronic disease, affects an individual's lifestyle and requires routine changes in his or her daily life. These changes have a significant impact on healthy lifestyle behaviours and anxiety levels of the other members of the family, and this is, perhaps, most likely to affect the late adolescent family member in whom many individual habits begin to emerge [8]. Because of the lack of adequate research, a preliminary study was planned considering the recent decline in the age of onset of DM, the importance of the relationship between DM and genetics, and increasing adolescent anxiety as a psychological problem in late adolescence.

In this study, late adolescents with a history of DM disease in their families and their health behaviours, physical activity status, information about DM, attitudes and behaviours, health effects, and awareness of health risks were compared to late

adolescents who do not have DM in the family and the resulting health anxiety.

## Methods

This was a cross-sectional epidemiological study. Among 400 randomly selected students from the University of Baskent, late adolescents who agreed to participate in this study and met the criteria for participation were selected. A total of 385 students participated (96%). Participants were divided into two groups: ones who had DM patients in their family and ones who did not know if there was a DM patient in their family formed the first group and ones who did not have any DM patients formed the second group. The Health Anxiety Inventory Short Form (HAI-SF) [9], consisting of 18 questions, was used as a data-collection tool to measure the awareness of health risks of late adolescents with DM in their family, together with a 33-question questionnaire prepared by the researchers with the help of the literature. In the questionnaire, 13 questions investigated the participants' demographic information, 8 inquired about nutrition and sport. Four questioned the presence of DM patients in their family. If there was a DM patient, the characteristics of the DM patient were requested. There were 2 questions about their knowledge of participants about DM; 3 about their attitude on DM, and 3 about their behaviour toward DM if they would become diabetic.

Data were analyzed using SPSS 20.0 (Statistical Package for the Social Sciences, version 20, Chicago, IL, USA) package program. In statistical analyses, continuous variables were evaluated using the t-test, and intermittent variables were evaluated using the chi-squared test. The normal distribution suitability of the variables was examined using Kolmogorov-Smirnov/Shapiro-Wilk tests. For the variables that were determined as not meeting the normal distribution, the Mann-Whitney U and Kruskal-Wallis tests were used as statistical methods. In multivariate analysis, the effect of different predictors on having healthy lifestyle behaviours was assessed using logistic regression analysis. The analytical results were in the 95% confidence interval, and p values < 0.05 were considered statistically significant.

## Results

The average age of the 385 participants was  $20.0 \pm 1.0$  years. There were 229 (59.5%) participants with DM in the family and 156 participants (40.5%) without DM in the family (control group). The mean age was  $20.4 \pm 1.7$  in the study group and  $20.5 \pm 1.8$  in the control group. Distribution by age was as follows: 162 participants (42.1%) were 21 years old, 111 (28.8%) were 20, 67 (17.4%) were 19, and 45 (11.7%) were 18. In total, 269 (69.9%) were female, with 164 (71.6%) in the study group and 105 (67.3%) in the control group. There was no statistically significant difference between the groups in terms of age ( $p > 0.05$ ). The body mass index (BMI) calculated according to height and body weight declared by the adolescents was  $22.2 \pm 3.7$  kg/m<sup>2</sup>. There was no statistically significant difference between the groups in terms of BMI,

which was  $22.55 \pm 4.08$  kg/m<sup>2</sup> in the study group and  $21.74 \pm 3.02$  kg/m<sup>2</sup> in the control group ( $p > 0.05$ ).

**Table 1.** General characteristics of participants by groups.

Characteristics	Family Member with Total		P Value	
	Diabetes Mellitus			(n=385)
	Yes (n=229)	No (n=156)		n (%)
	n (%)	n (%)	n (%)	
<b>Gender</b>				
Female	164 (71.6)	105 (67.3)	269 (69.9)	0.366
Male	65 (28.4)	51 (32.7)	116 (30.1)	
<b>Department</b>				
Medicine/Dentistry	30 (13.1)	14 (9.0)	44 (11.4)	0.352
Other Faculties	78 (34.1)	48 (30.7)	126 (32.7)	
College	121 (52.8)	94 (60.3)	215 (55.9)	
<b>Number of Individuals in the Family</b>				
2-3	44 (19.2)	29 (18.6)	73 (19.0)	0.621
4-5	156 (68.1)	112 (71.8)	268 (69.6)	
6+	29 (12.7)	15 (9.6)	44 (11.4)	
<b>Family Living</b>				
Family Together				0.768
Yes	118 (51.5)	78 (50.0)	196 (50.9)	
No	111 (48.5)	78 (50.0)	189 (49.1)	
<b>Family Household Income per Month (TRY)</b>				
≤ 2,000	27 (11.8)	24 (15.4)	51 (13.2)	0.083
2,001-3,000	85 (37.1)	53 (34.0)	138 (35.8)	
3,001-5,000	52 (22.7)	46 (29.5)	98 (25.5)	
5,001-8,000	34 (14.8)	24 (15.4)	58 (15.1)	
≥ 8,001	31 (13.5)	9 (5.8)	40 (10.4)	
<b>Chronic Illness</b>				
Yes	41 (17.9)	25 (16.0)	66 (17.1)	0.631
No	188 (82.1)	131 (84.0)	319 (82.9)	
<b>Smoking</b>				
Yes	73 (31.9)	48 (30.8)	121 (31.4)	0.818
No	156 (68.1)	108 (69.2)	264 (68.6)	
<b>Alcohol Use</b>				
Yes	86 (37.6)	61 (39.1)	147 (38.2)	0.759
No	143 (62.4)	95 (60.9)	238 (61.8)	
<b>Regular Health Check</b>				
Yes	217 (94.8)	148 (94.9)	365 (94.8)	0.998*
No	12 (5.2)	8 (5.1)	20 (5.2)	

Thinking about Body Weight Problems				
Yes	89 (38.5)	60 (38.5)	149 (38.7)	0.936
No	140 (61.1)	96 (61.5)	236 (61.3)	
Playing Regular Sports				
Yes	103 (45.0)	85 (54.5)	188 (48.8)	0.067

\*Yates-corrected chi-squared test

In the study group, 103 (45.0%) participated in regular sports, and this rate was 85 (54.5%) in the control group. In the study group, 64% of participants who were active in sports spent less than 60 minutes a day actively participating in sports. This shows that a large part of the sporting adolescents were not actually active at an effective level. There was no significant difference between the groups regarding the adolescents' regular sports' activity, the number of days they played weekly sports, and the sporting times they had participated in recent times ( $p > 0.05$ ). In the study group, 163 (71.5%) and 115 (73.7%) in the control group did not practice any nutrition program. The difference between the groups was not significant ( $p > 0.05$ ) (Table 1).

There was no significant difference between the 150 study group participants (60.7%) who had snacks and the 97 control group participants (39.3%) who had snacks ( $p > 0.05$ ). There was a significant difference between the study group and the control group in the selection of meals ( $p < 0.001$ ). The difference in results between the comparisons of the two groups was due to those who prefer to consume milk or yogurt with fruit during the break. The rate of participants who indicated that they would consume milk or yogurt with fruit during the break was significantly higher in the study group (26.1% vs. 73.9%) (Table 2).

**Table 2.** Distribution of nutrients according to snack groups.

Snack Meals	Family Member with Diabetes Mellitus			P Value
	Yes (n=227)	No (n=154)	Total (n=381)	
	n (%)	n (%)	n (%)	
Waffles, bagels, cakes, pies, etc.	81 (57.9)	59 (42.1)	140 (100.0)	0.000
Milk or yogurt with fruit	102 (73.9)	36 (26.1)	138 (100.0)	
Fruit alone/dried fruit	34 (39.5)	52 (60.5)	86 (100.0)	
Carbonated drinks/ready-made fruit juices	10 (58.8)	7 (41.2)	17 (100.0)	

\*Missing data=4

Participants were grouped into the following categories: those who did not smoke or drink alcohol, those who played sports, those who regularly had health check-ups every 6 months and annually, those who did not skip meals during the day, those who had healthy lifestyle behaviours, and those who met none

of these criteria. The independent effects of the presence of family members with DM on healthy life behaviours were examined. The analysis revealed that 11 subjects (7.1%) and 145 people (92.9%) had healthy lifestyle behaviours in the control group. In the study group, 23 (10.0%) had a healthy lifestyle and 206 (90.0%) did not exhibit healthy lifestyle behaviours. However, the difference was not significant ( $p = 0.405$ ).

Regarding the knowledge-level questions measuring the effect of family members with DM on the knowledge level of DM disease, 151 (65.9%) in the study group and 91 (58.3%) in the control group gave affirmative answers. There was no significant difference between the knowledge-level responses of the groups ( $p = 0.129$ ). In the questionnaires of the risk groups for DM, there were 48 affirmative responses in the study group (21.0%) and 26 (16.7%) in the control group; the difference was not significant ( $p = 0.294$ ).

The frequency of an individual in the DM risk group, even if the results of previous examinations were normal, and the attitudes related to the correct attitudes toward frequent exercise to reduce the risk of DM were not significant between the groups ( $p > 0.05$ ). The response rate for attitudes that should be considered when a person in the DM risk group follows a diet to reduce the risk of DM was significantly different between the groups (79% vs. 66%,  $p < 0.005$ ) (Table 3).

**Table 3.** The distribution of the responses to the DM attitude questions according to the groups.

Attitude Questions	Family Member with Diabetes Mellitus			P Value
	Yes (n=229)	No (n=156)	Total (n=385)	
	n (%)	n (%)	n (%)	
Frequency of Doctor Visits				
True	22 (9.6)	12 (7.7)	34 (8.8)	0.516
False	207 (90.4)	144 (92.3)	351 (91.2)	
Frequency of Exercise				
True	94 (41.0)	55 (35.3)	149 (38.7)	0.252
False	135 (59.0)	101 (64.7)	236 (61.3)	
Nutritional Properties				
True	181 (79.0)	103 (66.0)	284 (73.8)	0.004
False	48 (21.0)	53 (34.0)	101 (26.2)	

The responses of the participants to the behavioural questions they answered by assuming they were DM patients did not show any significant difference between the groups ( $p > 0.05$ ). Forty people (17.5%) in the study group and 23 people (14.7%) in the control group preferred regular behaviour and frequent screening. Fifty-nine people (25.8%) in the study group and 45 people in the control group (28.8%) were calibrated as balanced, preferring the right behaviour to pay attention to eat frequent and small amounts of food. To reduce current DM

risks, 137 people (59.8%) in the study group and 104 people (66.7%) in the control group preferred the appropriate behaviour to regulate nutrition and lifestyle according to physician's recommendations.

There was no significant difference between the total HAI-SF scores according to demographic characteristics, regular sporting activities, and snack consumption ( $p>0.05$ ).

**Table 4.** Demographics, sports, and eating characteristics of late adolescents according to the status of distribution of the health anxiety levels.

	Level of Health Anxiety*		P Value
	Normal	High	
	Number (%)**	Number (%)**	
Gender			
Female	86 (81.9)	19 (18.1)	0.647 <sup>a</sup>
Male	44 (86.2)	7 (13.8)	
Department			
Medicine and Dentistry	13 (92.8)	1 (8.2)	0.244
Engineering	6 (85.7)	1 (14.3)	
Technical	74 (78.7)	20 (21.3)	
Social Science	6 (75)	2 (25)	
Other	31 (93.9)	2 (6.1)	
Family Living Together			
Yes	64 (82.0)	14 (18.0)	0.830 <sup>a</sup>
No	66 (84.6)	12 (15.4)	
Regular Health Check			
Yes	124 (83.7)	24 (16.3)	0.621 <sup>b</sup>
No	6 (75)	2 (25)	
Thinking about Body Weight Problems			
Yes	49 (81.6)	11 (18.4)	0.825 <sup>a</sup>
No	81 (84.3)	15 (15.7)	
Playing Regular Sports			
Yes	71 (83.5)	14 (16.5)	0.998 <sup>a</sup>
No	59 (83.0)	12 (17.0)	
Eating Snacks			
Yes	81 (83.5)	16 (16.5)	0.989 <sup>a</sup>
No	49 (83.0)	10 (17.0)	

\*Cut-off score: 18; \*\*Percentage of row; <sup>a</sup>Yates-corrected chi-squared test; <sup>b</sup>Fisher's exact test

There was no statistically significant difference between the levels of health anxiety according to the gender of the non-DM, sex, non-DM, living with the family, regular health

check-ups, weight problems, regular sports, and snacking ( $p>0.05$ ) (Table 4).

## Discussion

Of the participants, 59.5% had DM patients in the family and formed a working group. This research investigated the hypothesis that late adolescents may be affected by having a family member with diabetes where the health risks associated with awareness and healthy behaviours are shared in the same environment. Because of the characteristics of DM, these young people have a risk of developing DM. Thus, the young people in our study group are able to control the risk of DM with healthy behaviours and attitudes. Compared to the control group, the study group had more awareness of both meals and dietary habits to protect against DM. In the other areas, the differences found in the control group were not significant.

Huseyin et al. reported that 35.3% of students used alcohol and 35.6% used cigarettes in a study of university students' alcohol and cigarette addiction [10]. Similarly, in our study, 31.9% of late adolescents with DM in their family smoked cigarettes and 37.6% consumed alcohol. The fact that these ratios are lower than Turkey's general university student population suggests that participants are aware of the health-threatening effects of smoking and alcohol.

Despite the body shape anxiety of the young age group, the lack of frequent exercise is remarkable. According to the results of Turkey's Youth Profile Survey published in 2012, it was determined that 40.8% of youth did not play sports [11]. Similarly, in our study, 51.2% of adolescents did not participate in sports, despite healthy living and aesthetic concerns. On the other hand, 54.3% of adolescents with a DM in the family and who participated in sports stated that they engaged in active sports 1 or 2 days a week. The low rate of sport activity in the adolescents at risk for DM and the fact that most of them do not engage in an effective level of activity is noteworthy. Given the importance of physical appearance and socialization to late adolescents, they can use sport as a way to socialize and enhance their physique, but it is vital to be aware that active participation in sports provides the primary protection against future chronic diseases.

The prevalence of dieting is particularly high among young women, with rates ranging from 14% to 77% [12]. A study by Demir et al. to determine the nutritional and health problems of university students in Ankara found that 40% of students dieted to maintain their physique and to avoid weight gain or to lose weight [13]. While the adolescents in our study had similar in their dietary practices, the desire for a healthy lifestyle should be the main goal of an aesthetic-anxiety diet program. However, despite the fact that 59.9% of the total, 38.9% of who were first-degree relatives, the fact that 28.5% had a healthy diet indicates that there is not enough awareness in late adolescents of the importance of reducing the health risk of a poor diet and implementing a healthy diet.

One of the biggest mistakes among young people's diet is skipping meals. In a study by Secord et al. [14], 55.5% of the

young people skipped meals. Another study by Neumark-Sztainer et al. found that 69.5% of the students skipped meals during the day in [15]. Among the adolescents in our study, 60.3% of those who stated that they consumed three meals regularly without skipping, and 62.9% of those who stated that they consumed four to six meals have DM in their families. Regular meal habits in adolescents who have DM in their families may be better than the literature suggests. This underscores the importance of the parents' food choices and their effect on the nutritional habits of young people [16]. However, as adolescents with family members with DM are more attentive to what they eat to reduce the risk of DM supports the fact that family members with DM increase the nutritional awareness of late adolescents.

It is thought that, in the presence of DM, there is no significant difference between the number of meals and the number of snacks.

Two-thirds of the diabetic family members were second- or third-degree relatives and about half of the late adolescents with a diabetic family member were living apart from their family, which may be the cause of insignificant difference. About two-thirds of those with DM in the family had second- and third-degree relatives living apart from about half of the late adolescents. People living in the same environment had more influence on the nutritional habits of late adolescents.

The late adolescents' responses to the DM questions suggest that the DM information was insufficient. The reason the difference between the two groups was not significant is that having a diabetic family member was not sufficient to increase adolescents' knowledge about DM. In addition, the answers given by others at risk for DM support this idea. The responses to the DM questions indicated that the individual with diabetes is not contributing to the late adolescents' knowledge of the disease; these family members should be trained.

Gallo et al. [17] studied the siblings of children with chronic illnesses and found that a large number of children with diabetic siblings are worried that something will happen to them and are afraid of being infected by their sibling's disease. The level of anxiety was higher in children who did not know about DM. In our study, 68% of the late adolescents who had DM in the family had a higher level of health anxiety, but there was no difference with the DM in the family. This may be due to developmental anxiety, body shape anxiety, and anxiety caused by developmental processes in late adolescents; however, the lack of awareness of the impact of DM on family health risks is supported.

## **Conclusion**

Nutritional status (DM, diet and sports habits, frequency of sports, number of daily meals, and snacking habits and choices) and adaptation to healthy lifestyle behaviours were compared in the late adolescents' families. The lack of significant differences between the two groups, apart from the choices of healthy interim meals, suggests that there is a lack of knowledge about health risk awareness and preventive

measures in this group. This shortcoming may lead to the acquisition of poor habits that may follow them into adulthood and also increases the possibility of more DM patients in the future by increasing the risk of DM in the present. Adolescents should bear in mind that the presence of DM in their families threatens their own health and that regular exercise with healthy eating habits reduces this risk. In this respect, it is important to expose adolescents to diabetes awareness, exercise, training, and seminars to ensure the continuity of individual and group education, personal nutrition, the development of good sports habits and weight control, monitoring blood tests at regular intervals, and to ensure continuity of nutrition and sports education. A holistic approach to lifestyle changes can be beneficial.

The results of our study show that those with DM in the family do not have enough knowledge about the disease, disease prevention, and risk factors. This can be rectified. The family physician has a great responsibility to cover health requirements as a whole and to provide preventive health care. Physicians should include other family members in disease education given to patients diagnosed with DM. They should be informed of the risk factors of DM in terms of preventive measures for those with DM. Social media also play an important role in raising awareness. In terms of recognizing DM and raising awareness about risk factors and prevention, social media could make a significant contribution to social awareness, especially for late adolescents.

## **Ethical Approval**

This study was approved by Baskent University Faculty of Medicine Research and Ethical Committee (number KA14/317).

## **Acknowledgements**

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