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The Effect of University Students' Nutrition Habits and Probiotic Dairy Consumption Equency on Anxiety Disorder

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ABSTRACT

Aim: The main purpose of this study was to determine the dietary habits, consumption habits of probiotic dairy products of university students and their effect on anxiety disorder.

Materials and methods: The study involved 484 students from Aydin Adnan Menderes University of Aydin's Faculty of Health, College of Health Sciences and College of Nursing. Data were collected using the Personal Information Form, the Dietary Habits and Probiotic Dairy Consumption Form, and the Generalized Anxiety Disorder Test 7 (GAD-7).

Results: It was found that 83.9% of the students participating in the study were female, 16.1% male and the mean age was 20.56±1.83 years. An anxiety disorder was found in 62.2%, of which 10.1% was severe. 47.7% of students reported eating probiotic dairy products. The use of baking-steaming as a cooking method, daily consumption of yogurt, frequent consumption of green leafy vegetables and fruits have been found to reduce the risk of anxiety disorder. Major anxiety disorder was more common in those who ate fast food every day and in students who reported not consuming probiotic dairy products.

Conclusion: It is concluded that more than half of the students have an anxiety disorder. Eating yogurt, green leafy vegetables, fruits and eating fast food contribute to the presence of anxiety. Knowing the dietary factors that cause anxiety disorder in students will help identify risk factors for diagnosing, preventing, or reducing nutritional problems.

Key Words: Anxiety, Nutrition, Probiotic, Yogurt consumption.

1. INTRODUCTION

Nutrition is the use of foods and nutrients that the human body needs in sufficient quantities and when necessary to protect and maintain health. A healthy diet requires all nutrients to be taken as much as the body needs. In this way, many nutritional diseases can be prevented (1).

Probiotic means "for life" in Greek and although it has been used for many years, the number of studies on this subject has been increasing, especially in the last 20 years. Probiotics in general; it can be defined as living microorganisms that improve or protect the health of the host when consumed in a certain amount (2).

Mental health is as important as physical health for the general well-being of individuals, communities and countries. Mental and behavioral disorders are present at any one time in about 10% of the adult population (3).

Probiotics produce analogs of certain neurochemicals associated with our behavior and emotions. Therefore, messages from the gut can affect the functioning of the brain, and vice versa, messages from the brain can affect the functioning of the gut. Microorganisms with probiotic properties can produce neurotransmitters such as serotonin, norepinephrine and gamma-aminobutyric acid as a

result of their metabolism in the intestines, and they can regulate the release of neurochemical receptors that act on the brain-intestinal axis, such as endocannabinoid receptors, and thus have antidepressive and anxiolytic effects (4).

Although research on the relationship of diet to depression and anxiety is very limited, both the biological possibilities and the available empirical evidence provide strong support for causal links, particularly between diet and depression. Clinical deficiencies of various vitamins and minerals lead to depression. Foods of particular concern for depression include omega-3 fatty acids, folic acid, cobalamin and zinc. Antioxidant nutrients are other potentially beneficial nutritional factors that need to be investigated. Weight problems can be associated with depression and anxiety in very complex ways. Nutritional strategies to prevent and treat depression are inexpensive and low-risk and should therefore be considered in future research and clinical practice (5).

Fermented foods are an important component of many traditional diets, including the Mediterranean diet, and have recently gained attention for their proven health benefits or a biochemical process involving microorganisms naturally found in foods. Due to the fermentation process, fermented foods (such as sauerkraut, kimchi, miso, soy sauce, tempeh, kombucha, kefir, cheese, and yogurt) contain three main functional components that can be found in varying amounts: functional microorganisms (probiotics), prebiotics, and biogenics - fermented foods functionally activating metabolites. Some or all of these components may affect gut microbiota composition and function. It breaks down and absorbs macronutrients, changes intestinal permeability and stimulates immune cells in the intestine. Fermented foods have also been reported to have anti-inflammatory, immunomodulatory, and direct brain modulatory effects. Therefore, fermented foods may reverse depression and anxiety by altering the downstream pathways involved in the etiology of these common psychiatric disorders (6).

This study was carried out to determine the nutritional habits and probiotic dairy products consumption frequency of university students and to examine their effects on anxiety disorder.

2. MATERIALS AND METHODS

The research was carried out between April and November 2019. The population of the research consists of 2040 students in total. The minimum sample size to be reached was calculated 484 with the G-Power analysis program. Simple stratification sampling method was used in sample selection.

In the study, data were collected using the Personal Information Form, Nutritional Habits and Probiotic Dairy Products Consumption Form and the Generalized Anxiety Disorder 7 (GAD-7) Test. Body Mass Index (BMI) was calculated using the body weight (kg) and height (m) of the individuals (kg/m2). World Health Organization's (WHO) classification was used in the assessment of BMI (7). The normal range is 18.5–24.9 kg/m2, overweight is 25–29•9 kg/m2, and obesity is ≥30 kg/m^2.

GAD-7 is a short, self-reported test developed by Spitzer et al. (2006) to evaluate generalized anxiety disorder. It is a 7-item four-point Likert scale (0=never, 1=many days, 2=more than half of the days, 3=almost every day), which evaluates the experiences asked in the scale items in the last 2 weeks. Total scores from the scale 5, 10, and 15 are cut-off points for mild, moderate, and severe anxiety, respectively. It is necessary to investigate and confirm the diagnosis of GAD with other methods in patients with a total score of 10 or more. The Turkish adaptation, validity and reliability of the scale were performed by Konkan et al. in 2013. In order to test the reliability of the scale, reliability analysis was performed to determine the internal consistency of the items and the Cronbach Alpha coefficient was calculated. The Cronbach's alpha value for the GAD-7 total score was found to be 0.852. The results obtained show that the scale is reliable (8, 9).

2.1. Evaluation of Data and Statistical Methods

The data of the research were analyzed using the SPSS 22 (Statistical Package for the Social Sciences) program. In the analysis of data; Chi-square, Binary

and Linear Logistic Regression analysis to evaluate the effects of students' descriptive characteristics, nutritional habits, thoughts about probiotic dairy products and the number and percentage distribution of GAD-7 test data, students' descriptive characteristics, nutritional habits and thoughts about probiotic dairy products on GAD Post-hoc Anova analyzes were performed to find out which eye the relationship originated from.

3. RESULT AND DISCUSSION

The mean age of the students within the scope of the study is 20.56±1.83. It is seen that 83.9% (n=406) of the students participating in the study were female and 16.1% (n=78) were male. In the statistical analysis, no significant difference was found between the students' gender, department, class, father's occupation and education level, mother's occupation and education level, financial income level, smoking and alcohol use, and GAD-7 test results (p>0.05).

As shown in Table 1, there was no significant difference between the students' gender, physical activity level, smoking and alcohol consumption status, and GAD-7 test results (p>0.05), but a statistically significant difference was found between the cooking method and the results of the GAD-7 test. While moderate anxiety disorder was more common in those who preferred frying-roasting as a cooking method, the presence of anxiety was statistically less in those who preferred boiling-grilled-steamed (p<0.05).

Table 2 shows the distribution of the students' mean age, weight, height and BMI according to the results of the GAD-7 test. In the statistical analysis, no significant difference was found between the students' age, weight, height and BMI values and the results of the GAD-7 test (p>0.05).

Table 3 shows the distribution of some food consumption frequencies of students according to the results of the generalized anxiety disorder test. Severe anxiety disorder was statistically higher in

Table 1. Comparison of students' sociodemographic characteristics according to GAD-7 test results

	Generalized Anxiety Disorder								p*
	None		Mild		Moderate		Severe		
	n	%	n	%	n	%	n	%	
Gender									
Female	147	80.3	133	88.1	85	84.2	41	83.7	X^2=3.685
Male	36	19.7	18	11.9	16	15.8	8	16.3	
Smoking									
Yes	28	15.3	30	19.9	25	24.8	16	32.7	X^2=9.992
No	150	82.0	114	75.5	72	71.3	32	65.3	p=0.125
Quit	5	2.7	7	4.6	4	4.0	1	2.0	
Drinking Alcohol									
Yes	41	22.4	37	24.5	23	22.8	17	34.7	X^2=3.358
No	142	77.6	114	75.5	78	77.2	32	65.3	p=0.340
Physical Activity									
Sedentary	34	18.6	34	22.5	19	18.8	14	28.6	
Mild	107	58.5	85	56.3	64	63.4	28	57.1	X^2=8.657
Moderate	31	16.9	26	17.2	10	9.9	6	12.2	p=0.469
Active	11	6.0	6	4.0	8	7.9	1	2.0	
Way of cooking									
Frying-roasting	94	51.4	89	58.9	73	72.3	31	63.3	X^2=12.147
Boiling-grilling-	89	48.6	62	41.1	28	27.7	18	36.7	**p=0.007***

*p<0.05

Table 2. Comparison of students' age, weight, height and BMI averages according to generalized anxiety disorder test results

	Generalized Anxiety Disorder				
	None (n=183)	Mild (n=151)	Moderate (n=101)	Severe (n=49)	p*
	Mean	Mean	Mean	Mean	
Age	20.82	20.37	20.24	20.87	p=0.063
Weight (kg)	62.36	59.74	60.35	59.04	p=0.065
Height (cm)	166.47	165.24	165.93	165.48	p=0.462
BMI (kg/m²)	22.40	21.84	21.86	21.54	p=0.260

**p<0.05*

Table 3. Comparison of some food consumption frequencies of students according to generalized anxiety disorder test results

Consumption frequencies	Generalized Anxiety Disorder								p*
	None		Mild		Moderate		Severe		
	n	%	n	%	n	%	n	%	
Yogurt									
Everyday	32	17.5	28	18.5	13	12.9	8	16.3	
2-3 times a week	102	55.7	72	47.7	59	58.4	24	49.0	
1 time per week	33	18.0	37	24.5	22	21.8	7	14.3	X^2=31.890
1 time in 15 days	10	5.5	10	6.6	3	3.0	3	6.1	**p=0.007***
1 time per month	4	2.2	1	0.7	3	3.0	7	14.3	
Does not consume	2	1.1	3	2.0	1	1.0	0	0.0	
Green leafy vegetables									
Everyday	45	24.6	26	17.2	13	12.9	18	36.7	
2-3 times a week	80	43.7	71	47.0	50	49.5	15	30.6	
1 time per week	40	21.9	38	25.2	21	20.8	10	20.4	X^2=25.075
1 time in 15 days	7	3.8	9	6.0	9	8.9	0	0.0	**p=0.049***
1 time per month	6	3.3	3	2.0	3	3.0	3	6.1	
Does not consume	5	2.7	4	2.6	5	5.0	3	6.1	
Fruits									
Everyday	64	35.0	42	27.8	22	21.8	10	20.4	
2-3 times a week	75	41.0	68	45.0	45	44.6	16	32.7	
1 time per week	23	12.6	25	16.6	10	9.9	10	20.4	X^2=32.395
1 time in 15 days	8	4.4	8	5.3	15	14.9	5	10.2	**p=0.006***
1 time per month	7	3.8	5	3.3	8	7.9	4	8.2	
Does not consume	6	3.3	3	2.0	1	1.0	4	8.2	
Fast food (pide, hamburger, doner, sandwich, etc.)									
Everyday	7	3.8	4	2.6	4	4.0	12	24.5	
2-3 times a week	38	20.8	41	27.2	29	28.7	14	28.6	
1 time per week	51	27.9	54	35.8	32	31.7	8	16.3	X^2=52.539
1 time in 15 days	42	23.0	26	17.2	19	18.8	8	16.3	**p=0.000***
1 time per month	28	15.3	21	13.9	14	13.9	5	10.2	
Does not consume	17	9.3	5	3.3	3	3.0	2	4.1	
Consuming probiotic foods									
Yes	94	51.4	81	53.6	42	41.6	14	28.6	X^2=11.824
No	89	48.6	70	46.4	59	58.4	35	71.4	**p=0.008***

**p<0.05*

those who consumed yogurt once a month (p<0.05). Severe anxiety disorder was found to be statistically less in students who consumed green leafy vegetables 2-3 times a week (p<0.05). The presence of anxiety disorder is statistically less in those who consume fruit every day, and more in those who do not (p<0.05). While severe anxiety disorder is statistically higher in students who consume fast food every day, the presence of anxiety disorder is less common in students who do not consume (p<0.05). Students who reported that they consumed probiotic foods were less likely to have severe anxiety disorder than those who did not (p<0.05).

The study was conducted to examine the effects of university students' dietary habits and consumption of probiotic dairy products on generalized anxiety disorder. Totally 484 students participated in the study.

University years are quite challenging in terms of psychiatry as they are the last periods of adolescence. During these years, most of the students live in a different city away from their families, and many factors such as housing, nutrition, and social relations may be a problem for the student. In addition, the fact that students in faculties providing health education are dealing with the patient personally during the application may cause anxiety and depressive symptoms in these students (10). While 37.8% of the students participating in the study did not have generalized anxiety disorder, it was observed that 31.2% had mild generalized anxiety disorder, 20.9% had moderate and 10.1% had severe generalized anxiety disorder. In the study of Gümüş and Zengin (2018) in which they examined the frequency of anxiety in nursing students, unlike our study, no student without anxiety symptoms was found, while 49.8% of the students had mild anxiety, 20.0% had moderate anxiety, and 30.2% had severe anxiety (11). In a study by Bassi et al. (2014) in which they examined the relationship between BMI and anxiety in medical students in India, similar to the results of our study, they found that 51.3% of the students had no anxiety, 26.7% had mild, 15.3% had moderate, 6.7% had severe anxiety (12). Considering these results, it can be thought that the anxiety levels of the students studying in health-related departments are similar in terms of the content of the education they receive at schools and this causes anxiety on the students.

In our study, students who reported that they consumed yoghurt once a month and fast food every day had statistically higher levels of anxiety, while students who reported that they consumed green leafy vegetables 2-3 times a week and fruit every day had significantly less anxiety. Parallel to the findings of our study, Mikolajczyk1 et al. (2009) did not find a relationship between food consumption and depressive symptoms in male students in a study conducted with university students studying in Germany, Bulgaria and Poland, while found that depressive symptoms were more common in female students who consumed more sugar and convenience foods and less fresh vegetables and fruits (p<0.05) (13).

Sarlio-Lähteenkorva et al. (2004) reported that women who consume fresh fruits and vegetables, low-fat milk and low-fat cheese every day have better mental health (14). In a double-blind randomized controlled study conducted by Benton et al. (2007), the subjects were divided into two groups, and one group was given yogurt containing probiotics for 3 weeks and the other group was given regular yogurt, and their mood was measured at the beginning, after 10 and 20 days of consumption. At the end of the study, it was observed that the consumption of yogurt with probiotic content improved the mood of those who were initially weak, but it was reported that this improvement was not related to the increase in the number of defecations (15). In another study, it was shown that the activity of the brain regions that control the central processing of emotions and sensations was affected in those who consumed fermented milk products for 4 weeks (16). Hilimire et al. (2015) examined the relationship between the frequency of fermented food consumption and social anxiety and found that frequent consumption of fermented foods was associated with lower social

anxiety symptoms (17). According to the results of a randomized, placebo-controlled, double-blind study investigating the stress-reducing effects of normal yogurt and yogurt enriched with bioactive components, as a result of tests to detect changes in psychological and physiological stress, it has been shown that daily consumption of enriched yogurt can help in coping with stress (18).

Contrary to the results of our study, Yu et al. (2018) showed that there was no significant relationship between habitual yogurt consumption and depressive symptoms in a study they conducted in 19596 people in China, but they found increased depressive symptoms in a small group with high yogurt consumption (2 or more per day) (19). As shown in many studies, the effect of yogurt on mental state can be evaluated positively.

In our study, 5.6% of the students reported that they consume fast food every day. In a study in which Sayılı and Gözener (2013) examined students' fast food consumption habits, they found the rate of students consuming fast-food every day as 19.81%. This rate is considerably higher than the result we found (20). The low rate in our study may be due to the fact that the students are studying in health-related departments. In a study conducted on 3181 young women in Texas, the relationship between posttraumatic stress disease symptoms and fast-food, beverage consumption and BMI was examined and increased post-traumatic stress disease symptoms were found to be associated with people with high fast-food and beverage consumption, and this increase was not associated with BMI (21). In another study examining the relationship between fast food consumption and processed bakery products and depression, it was found that the risk of depression increased as fast food consumption increased, but there was no relationship between processed bakery products and the risk of depression (22). As a result of irregular living conditions, the frequency of consuming fast-food in our lives may be increasing as a result of deteriorating mental health. Improving mental health may contribute to a decrease in the frequency of fast-food consumption, and similarly, decreasing the frequency of consumption of fast-food may contribute to the improvement of mental health.

4. CONCLUSION

More than half of the students included in the study did not consume probiotic dairy products, more than half of them had symptoms of anxiety, using boiled-grilled-steamed cooking method, consuming yogurt every day, and consuming green leafy vegetables and fruits frequently reduced the risk of anxiety disorder while consuming fast food every day increases.

In line with the results obtained from the study, information should be given to the students about nutrition and the health benefits of probiotics, dietitians should raise awareness of the society about nutrition and probiotics, dietary habits and not consuming probiotic dairy products may be risk factors for anxiety disorder and precautions should be taken for this.

More research is needed to determine the nutritional habits of university students and their thoughts on probiotic dairy products.

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