

Nutritional Habits According to Gender, Stage of Exercise Behavior and BMI

Tülin Atan^{1A}, Osman İmamoğlu^{1B}

¹ Ondokuz Mayıs University, Yaşar Doğu Faculty of Sport Sciences, Samsun, Turkey

Address Correspondence to T. Atan: e-mail: takman@omu.edu.tr

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A:Orcid ID: 0000-0001-6671-6042 - B:Orcid ID: 0000-0001-5660-8910

Abstract

The aim of this study is to investigate the personal nutritional habits of university students according to gender, BMI and exercise behavior stage. For this purpose, 348 female (age; 22.25±3.67 years) and 362 male (age; 22.49±3.28 years) students filled two questionnaires. First to determine the nutritional habits Personal Nutritional Assessment Questionnaire (PNAQ) was used. A total of 13 and below scores from the PNAQ are poor, 14-18 points are moderate, 19-23 points are good, and 24-25 points are excellent. Secondly, Exercise Stages of Change Questionnaire (ESCQ) was used to determine which stage of readiness the participants are currently in. The "stage based" handouts define the level of readiness and provide useful information on how to increase the amount of physical activity in life. Independent t-test, one way variance analysis and LSD tests were used in statistical analysis. The PNAQ's total nutritional score was found to be 16.26 in females and 16.17 in males, that is, moderate level. There was no statistically significant difference of the total nutritional scores according to gender ($p>0.05$) only a significant difference was found only in "milk" related sub-dimension, according to gender ($p<0.001$). Nutrition scores according to BMI did not differ in the sub-dimension of "meat or alternative nutrition", while nutrition scores in other categories differed statistically according to BMI ($p<0.001$). According to the stage of exercise behavior, the nutritional scores of students who are at the stage of pre-contemplation, contemplation and preparation are significantly lower than those in the stage of action and maintenance ($p<0.001$). As a result, nutrition levels of university students do not change much according to gender, but differ according to the BMI and to the stage of exercise behavior. The level of nutrition is moderate in those who are physically inactive and good in those who are active. Certain changes should be made in the diet of university students. It is thought that they should be educated about nutrition education, changing their eating habits, doing sports and being fit.

Key Words: Nutrition, Exercise, BMI

INTRODUCTION

People often tend to eat in their spare time. They may focus their attention on meals. The level of attention varies by age. Eating too much can cause changes in anthropometric properties and their health may deteriorate (1, 6, 7). Nutrition is the ability to take and use the items necessary for a person to live long, growing, developing, healthy and productive. Scientific studies have proven that people need more than forty nutrients in order to live healthy (29). Balanced nutrition occurs when a person is taken from different food components in desired proportions to meet their energy and nutritional needs (25). It should come from sources that provide enough energy, carbohydrates, protein, fat, and micronutrients, and a wide variety of foods

(27). Adequate and balanced eating habits are essential for good physical performance as well as health (30, 33). Malnutrition is an important risk factor for non-communicable diseases such as cardiovascular diseases, diabetes and some types of cancer (17, 32). It is observed that especially in our country in the researches related to nutritional habits of young people; very serious problems related to nutrition were experienced during this period. It has been determined that students generally do not pay attention to meals, eat a single meal, consume more foods such as sandwiches and bagels, economic difficulties are effective in the problem of inadequate and unbalanced nutrition, and that the students staying in the dormitories do

not feed well due to poor dormitory conditions (11, 15, and 16).

In the study of Yılmaz and Özkan's (35) examining the eating habits of University Students, it was determined that 78.9% of the students did not believe that they were fed healthy. He concluded that the students were fed unbalanced. Although inadequate and unbalanced nutrition is an important problem in our country, university students are one of the groups with the highest nutritional problems. University life is the beginning of a new era in nutrition, as in many other issues in the life of young people. The fact that their lives become faster causes unhealthy and irregular feeding behaviors (13). Sezek et al. (31) stated that approximately one third of the students prefer their favorite food regardless of their importance in terms of health, and Kumartaşlı (20) likewise attach importance to the food they like and satisfy the students in their food preferences. The fact that students highlight "saturation" and "favorite food" in their food preferences show that they do not pay attention to the health-related elements of the meals such as nutritional value and material quality. Undoubtedly, this situation can be considered as a manifestation of students' malnutrition knowledge and habits (5, 13).

While the eating habits of the students continue as required by family life before the university, the lifestyle that changes with the university can also change the feeding behavior of the students (19). Changing nutritional behavior can affect the mental and physical condition of the university student, as well as indirectly affect school performance. For these reasons, it is very important to determine the nutritional information and habits of university students and to develop appropriate suggestions (12). University students are named as the first group after childhood, which is in the stage of transition to adulthood (4). In addition to the education they will receive, many of the students will have to change their lives and their diet in order to get used to a different environment. It is important to determine the nutritional tendencies of the students, to regulate the nutritional habits in the adulthood and to prevent possible disorders that may be caused by inappropriate nutrition.

There are many factors that enable individuals to participate in physical activity. These are being healthy, losing weight, looking good, social interaction, being popular, etc. (2, 3). Based on the

Trans theoretical Model, people's attitudes toward exercise are classified into five different stages of change: people "with no intention to exercise" (Pre-contemplation), people "with the intention to exercise but not in action" (Contemplation), people who "intend to take action in the next month" (Preparation), people who "participate in regular exercise for a period of less than six months" (Action), and people who "participate in regular exercise for more than six months" (Maintenance),(22). Recently, the research on physical activity adherence has shifted its focus to understanding the intentions that motivate people to engage in exercise and identifying the opportunities in the neighborhoods where people live (22, 28).

University students are one of the risky groups related to unhealthy nutrition. University students are in a critical period when forward-looking nutritional habits are established (18). In this study, it was aimed to investigate the personal nutrition habits of university students according to gender and whether they are active or not.

METHOD

Participants: In this study, 348 female (age; 22.25±3.67 years) and 362 male (age; 22.49±3.28 years) students studying in different departments at Ondokuz Mayıs University filled two questionnaires. First to determine the nutritional habits Personal Nutritional Assessment questionnaire (PNAQ) was used. Secondly Exercise Stages of Change Questionnaire (ESQ) was used to determine which stage of readiness the participants are currently in.

Personal Nutritional Assessment Questionnaire (PNAQ): The questionnaire (26) was translated into Turkish by Şener and İmamoğlu (33) and adapted to Turkish cuisine. The questionnaire consists of 5 parts to determine the nutritional status of people. It includes 25 items, including 6 items covering meat or its alternative, 4 items covered by milk-related options, 5 items of vegetable and fruit options, 5 items of cereal options, and 5 mixed items. Each item called yes is given 1 point and the score in that option is calculated by adding up. According to the scale sub-items and total score, it was scored as poor, moderate, good and excellent. In the questionnaire evaluation scores of subscales, 5 points are "excellent", for "meat or its alternative", "vegetable and fruit options", "grain options" and "mixed sub-dimension"; 4 points are excellent for "milk related options". Again, 4 points are "good" (3

points in milk option), 3 points are “moderate” (2 points in milk option) and 2 points and below (1 point in milk option) are considered “poor”. A total of 13 and below scores from the nutrition questionnaire are considered to be poor, 14-18 points are moderate, 19-23 points are good and 24-25 points are evaluated as excellent. These questions show how good or bad you are in nutrition. If your score is in the poor or moderate category, it is stated that some changes should be made in your diet (26).

Exercise Stages of Change Questionnaire (ESCCQ): The "Exercise Stages of Change Questionnaire" (ESCCQ) developed by Marcus et al. (21) aims to determine the individual's exercise behavior steps. The validity and reliability study of the Turkish version of ESCCQ was done by Cengiz et al. (9). The four items in the questionnaire, where the participants' attempts to exercise are determined, are answered as yes / no. Individuals' intention to exercise and their habits of participating in the exercise are divided into five different exercise behavior steps according to their responses to the items: Pre-Contemplation, Contemplation, Preparation, Action, and Maintenance (21). The test-

retest value (ICC = .80) for the reliability of the survey was found to be high (9).

Statistical analyses

SPSS 24.00 package program was used in the statistical evaluation of the study. Kolmogorov-Smirnov test was performed to test whether the data was normally distributed and it was determined that the data showed normal distribution. One way Anova and Independent Sample t test was used for comparisons. As a result of the reliability analysis, the total Cronbach Alpha coefficient of the questionnaire was found to be 0.80. This result shows that the survey results are reliable.

Body Mass Indexes (BMI); BMI = Calculated using the formula Weight (kg) / Height (m²).

RESULTS

Average values of the anthropometric characteristics, standard deviations and other comparison results are presented respectively in the tables below.

Table 1. Age, Height and Body Weight According to Gender

Parameter	Gender	n	Mean	Standard Deviation	t-test
Age (years)	Female	348	22.25	3.67	0.15
	Male	362	22.49	3.28	
Body Height (cm)	Female	348	163,34	5.43	-10.23**
	Male	362	173.10	5.48	
Body weight (kg)	Female	348	60.35	8.69	-12.18**
	Male	362	74.04	9.21	
BMI (kg/m ²)	Female	348	22.71	4.11	-7.52**
	Male	362	24.74	4.97	

** p<0,001

The ages of the participants in the study were determined as 22.25 years for women and 22.49 years for men. Body Mass index values of the participants were found 22.71 kg / m² in women and 24.74 kg / m² in men. A statistically significant difference was found between height, body weight and Body Mass index values of the participants according to gender (p <0.001).

Subscales and total	Gender	Mean	Standard Deviation	t-test
Meat or alternative	Female	3.96	1.06	1.80
	Male	3.60	1.47	
Options related to milk	Female	2.28	1.07	-3.30**
	Male	2.75	0.85	
Vegetable and fruit options	Female	3.46	1.16	0.71
	Male	3.32	1.32	
Grain options	Female	3.29	0.93	1.44
	Male	3.08	0.96	
Mixed	Female	3.29	0.88	-0.78
	Male	3.42	1.28	
Total	Female	16.26	3.11	1.19
	Male	16.17	2.73	

* P<0,001

When the nutritional scores were compared between the genders according to the sub-dimensions, “milk-related options” were found better in males ($p < 0.001$), while other sub-dimensions and total scores did not differ between the genders ($p > 0.05$).

Subscales and total	BMI category	n	Mean	Standard Deviation	F/LSD
Meat or alternative	19 kg/m ² and below (1)	96	3.66	1.06	1.12
	20-22 kg/m ² (2)	272	4.00	1.20	
	23-25 kg/m ² (3)	252	3.73	1.29	
	above 25 kg/m ² (4)	90	3.30	1.59	
Options related to milk	19 kg/m ² and below (1)	96	1.74	0.78	21.15** 1<2,3,4 2,4<3
	20-22 kg/m ² (2)	272	2.87	0.93	
	23-25 kg/m ² (3)	252	3.10	1.06	
	above 25 kg/m ² (4)	90	2.72	0.84	
Vegetable and fruit options	19 kg/m ² and below (1)	96	3.10	1.12	16.24** 1,4<2,3
	20-22 kg/m ² (2)	272	3.57	1.31	
	23-25 kg/m ² (3)	252	4.38	0.50	
	above 25 kg/m ² (4)	90	2.74	1.38	
Grain options	19 kg/m ² and below (1)	96	2.84	0.75	6.94** 1,4<2,3
	20-22 kg/m ² (2)	272	3.29	0.87	
	23-25 kg/m ² (3)	252	3.83	1.53	
	above 25 kg/m ² (4)	90	2.96	0.72	
Mixed	19 kg/m ² and below (1)	96	2.93	1.00	7.62** 1,4<2,3
	20-22 kg/m ² (2)	272	3.73	1.03	
	23-25 kg/m ² (3)	252	3.65	0.65	
	above 25 kg/m ² (4)	90	3.01	1.35	
Total	19 kg/m ² and below (1)	96	14.24	2.80	17,13** 1,4<2,3
	20-22 kg/m ² (2)	272	17.46	2.67	
	23-25 kg/m ² (3)	252	18.69	1.78	
	above 25 kg/m ² (4)	90	14.73	2.98	

**p<0.001

In this study, nutritional scores according to the BMI category did not show a statistically significant difference in the “meat or alternative” sub-dimension ($p > 0.05$). In the sub-dimension of “milk”, the group scores of BMI 19.00 kg/m² and below were found to be significantly lower than other groups ($p < 0.001$). The “vegetable and fruit”, “grain options” subscale scores and “total nutrition” scores of the group with a BMI of 19 kg/m² and below and

the group with a 25 kg/m² were significantly lower than the other groups ($p < 0.001$). In “mixed size”, the scores of the groups with BMI values of 20-22kg/m² and those with 23-25 kg/m² are statistically significantly higher than the other groups ($p < 0.001$).

Sex	Stage of Exercise Behavior	n	Mean	Standard Deviation	F/LSD
Female	Pre-contemplation (1)	68	14.12	3.10	30.87** 1,2,3<4,5
	Contemplation (2)	86	14.21	2.81	
	Preparation (3)	77	14.35	2.80	
	Taking Action (4)	59	19.14	2.89	
	Maintenance (5)	58	19.48	2.78	
	Total	348	16.26	3.32	
Male	Pre-contemplation (1)	62	14.09	2.69	29.33** 1,2,3<4,5
	Contemplation (2)	75	14.15	2.56	
	Preparation (3)	82	14.29	2.78	
	Taking Action (4)	76	19.11	3.81	
	Maintenance (5)	67	19.21	2.75	
	Total	362	16.17	3.32	

*p<0,001

In this study, according to the stage of exercise behavior, the nutritional scores of students who are in “Pre-contemplation”, “Contemplation” and “Preparation” levels are significantly lower than those in “Taking Action” and “Maintenance” level in both females and males (p<0.001).

Parameter	Questions	Yes		No	
		n	%	n	%
Meat or alternative	Do I limit the consumption of meat, fish, poultry and eggs to 1-2 times a day?	520	73.24	190	26.76
	Am I eating 3 or less red meat a week?	340	47.89	370	52.11
	Do I separate the meat fat before cooking?	435	61.27	275	38.73
	Do I limit the consumption of up to 3 or 4 eggs a week, including its use in other meals?	390	54.93	320	45.07
	Occasionally, do I buy dried legumes and dried nuts instead of meat for protein needs?	545	76.76	165	23.24
	Do I usually cook meat, fish and poultry by boiled, grilling or baking instead of frying?	450	63.38	260	36.62
Options related to milk	Do I buy 2 or more milk or dairy products equivalent to this?	540	76.06	170	23.94
	Do I drink or use low-calorie or low-fat milk?	343	48.31	367	51.69
	Do I limit ice cream or iced milk 2 or more times a week?	380	53.52	330	46.48
	Do I consume butter or margarine in less than 3 teaspoons per day?	519	73.10	191	26.90
Vegetable and fruit options	Do I consume at least half a cup of fruit juice and fruit drinks daily?	549	77.32	161	22.68
	Do I eat dark green leafy and dark orange vegetables at least once a day?	511	71.97	199	28.03
	Do I eat fresh vegetables and fruits daily?	509	71.69	201	28.31
	Do I cook your vegetables without oil and calories?	398	56.06	312	43.94
	Do I eat more fresh fruits instead of cakes, biscuits and various pastry products?	438	61.69	272	38.31
Grain options	Do I usually eat white bread?	537	75.63	173	24.37
	Do I usually eat cereal products (whole meal flour) rich in fiber?	450	63.38	260	36.62
	Do I eat sugar-free or low-sugar cereals?	412	58.03	298	41.97
	Do I use brown rice instead of white rice?	405	57.04	305	42.96
	Do I consume at least 4 meals of bread or cereals every day?	452	63.66	258	36.34
Mixed	Is my optimal weight 2.5-5 kg more than your height?	533	75.07	177	24.93
	Do I consume less than 45 grams of alcohol daily (Would I prefer not to consume at all?)	520	73.24	190	26.76
	Do I avoid adding salt to food after cooking and do I prefer foods with little or no salt?	509	71.69	201	28.31
	Do I avoid white sugar foods?	390	54.93	320	45.07
	Do I always eat breakfast with at least cereal milk, eggs and toast, or other carbohydrate combination with fruit or juice?	443	62.39	267	37.61

Answers to the questions in nutrition questionnaire are examined and given as percentage in the table

5.

DISCUSSION

In this study, personal nutritional habits of university students were investigated according to gender, exercise behavior level and BMI. The nutritional score of females was found to be 16.26 and males as 16.17. There was no statistically significant difference between the total nutritional scores of males and females according to gender ($p > 0.05$). According to the scale assessment, 14-18 points are accepted as medium (33). It can be said that the nutrition of students studying in different faculties is at a moderate level. When the nutritional scores of the sub-dimensions were compared between the genders, "milk-related options" were found better in males, while the other sub-dimensions did not differ between the genders. Nutrition education can be realized both with the cultural flow formed depending on the interaction of the individual's family and social environment, and with formal and non-formal education units (13). Similar studies were found with this finding of our study in the literature. While it was stated in the 1995 Monaco Consensus that the subject of sports nutrition was the issue, male athletes were fed better than women (14), the perception of overweight was higher in female students and the rate of dieting in the last year was higher in female students (24).

Contrary to our study, Sarioğlu et al. (29), although female athletes show good eating habits than males, they are in the category of malnutrition. In addition, it was found that the nutrition scores of the School of Physical Education and Sports students were at a bad rate. İmamoğlu et al. (18) found in another study that individuals did not have good eating habits, and females were found to have better eating habits than males. However, although female athletes show good eating habits than men, it is stated that they are in the category of malnutrition. Vançelik et al. (34) stated that the mean score of nutritional habit in university students was higher in males, and the average of nutritional knowledge was higher in females.

In their study, Bayraktar et al. (8) stated that university students' nutritional knowledge was sufficient, but their feeding habits were inadequate. Onurlubaş et al. (23) determined that 36.0% of university students believed that they were healthy and 64.0% did not. In this study, it was observed that the scores obtained according to the PNAQ evaluation were in the moderate and poor range. Nutritional mean score was not found in any

dimension in good and excellent condition. It can be said that it is imperative to provide information and support to those participating in the research on nutrition.

It has been stated in the sources related to nutrition published in our country that the normal Body mass index is between 20-24.9 kg / m² (36). In this study, nutrition points according to BMI category are similar in "meat or alternative" sub-dimension. In terms of "milk", the milk consumption of the group, who's BMI was 19 kg/m² and below, was lower than the other groups. It can be thought that the consumption of milk for the weak people is low. The "vegetable and fruit" and "grain options" subscale scores of the group with a BMI of 19 kg/m² and below and the group with a height of 25 kg/m² were lower than the other groups. Those with low consumption of vegetables and fruits may think that they are prone to a weaker or fatter body. Similar results were found in vegetable and fruit options in grain options. In "mixed" sub-dimension, the nutritional status of groups with BMI values of 20-22 kg/m² and groups with 23-25 kg/m² is better than other groups. When the "total nutrition" scores were examined, the nutritional status of the group with a BMI of 19 kg/m² and below and the group with a 25 kg/m² was found worse than other groups. It is concluded that in general, poor nutrition will make people either weak or fat.

In this study, according to the stage of exercise behavior, the nutritional scores of students who are in "Pre-contemplation", "Contemplation" and "Preparation" levels are significantly worse than those in "Taking Action" and "Maintenance" stage in both females and males. According to the questionnaire total evaluation score, it can be said that those who are at the stage of "Pre-contemplation", "Contemplation" and "Preparation" have a moderate level of nutritional status, and those who are at the "Taking Action" and "Maintenance" level have a good level of nutritional status. Those who are in the "Taking Action" and "Maintenance" stages are highly likely to be active athletes. According to the stage of exercise behavior, no research has been found to examine the nutritional status. But in other respects, stage of exercise behavior has been studied in the literature. For example in the study of Dilek et al., (10), the aggression levels of university students football spectators were found to decrease as the

level of activity increased according to the stages of behavior change.

In this study answers to the questions in nutrition questionnaire are examined and given as percentage. Occasionally, the rate of those who take dried legumes and dried nuts instead of meat for protein needs is 76.76%. The rate of individuals who take 2 or more milk or dairy products equivalent to this is 76.06%. The proportion of those who consume at least half a cup of fruit juices and fruit drinks daily, those who eat dark green leafy and dark orange colored vegetables at least once a day and those who eat daily fresh vegetables and fruits are above 70%. Generally, those who consume white bread are 75.63%. Those who find their weight 2.5-5 kg more than their height are 75.07% (Table 5). Altın (4) stated that, considering the nutritional habits of university students, men are at moderate risk in terms of obesity and women are at high risk. In this study, it was stated that there were excess weight and it was observed that white bread consumption was also high. According to Table 5, it is seen that there are errors or deficiencies in the students' nutrition within the lack of nutritional information or the shortage of possibilities. Korkmaz (19) stated that university students do not have regular eating habits.

Conclusion: As a result, although the university student's nutritional levels did not change much according to gender, it was found that they differed according to the stage of exercise behavior. The level of nutrition is moderate in those who are in physically inactive and good in those who are active. Certain changes should be made in the diet of university students. It is thought that they should get nutrition education, change their eating habits, do sports and be informed about the criteria of being fit.

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