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Investigation of Motives Underlying Food Choice of Health Science Students: Cross Sectional Study

Sağlık Bilimleri Öğrencilerinin Besin Seçimlerini Belirleyen Motive Edicilerin İncelenmesi: Kesitsel Çalışma

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ABSTRACT Objective: Poor eating habits are widespread among university students. This study aimed to investigate the motives underlying food choices of health science students by using a food choice questionnaire (FCQ). Moreover, the correlations between food choice dimensions and anthropometric characteristics such as body mass index (BMI) and waist-to-height ratio were investigated. **Material and Methods:** Voluntary students (n=335) from the faculty of health sciences participated in the study. Their demographic properties and anthropometric measurements were recorded. Turkish version of the FCQ was applied to the participants. For analyzing the data, chi-square test and Pearson correlation analysis were performed. **Results:** Research findings revealed that the most important food choice dimensions were sensory appeal, price, and mood, respectively, and the least important were weight control, natural content, and ethical concern, respectively. Health dimension had a lower importance in food choice compared to sensory appeal dimension. Females gave higher scores compared to males. The BMI was positively correlated with both convenience and weight control dimensions. No correlation was found between the waist-to-height ratio and food dimensions. **Conclusion:** To reduce health risks related to poor eating habits, university students' awareness of healthy foods and nutrition should be increased. For this reason, activities should be organized to improve their knowledge about healthy nutrition.

Keywords: Food choice; healthy foods; obesity; students

ÖZET Amaç: Kötü beslenme alışkanlıkları, üniversite öğrencileri arasında yaygındır. Bu çalışmada, sağlık bilimleri öğrencilerinin besin seçimini belirleyen motive edicilerin besin seçimi ölçeği kullanılarak araştırılması amaçlanmıştır. Ayrıca besin seçimi boyutları ile beden kitle indeksi ve bel/boy oranı gibi antropometrik özellikler arasındaki ilişkiler de incelenmiştir. **Gereç ve Yöntemler:** Çalışmaya sağlık bilimleri fakültesinden gönüllü öğrenciler (n=335) katılmıştır. Katılımcıların demografik özellikleri ve antropometrik ölçümleri kaydedilmiştir. Katılımcılara besin seçimi ölçeğinin Türkçe versiyonu uygulanmıştır. Verilerin analizi için ki-kare testi ve Pearson korelasyon analizi uygulanmıştır. **Bulgular:** Araştırma bulguları, besin seçimi boyutlarının en önemlilerinin sırasıyla duyusal görünüm, fiyat ve duygudurum olduğunu ve en önemsiz boyutların sırasıyla ağırlık kontrolü, doğal içerik ve etik kaygılar olduğunu ortaya koymuştur. Besin seçiminde sağlık boyutunun, duyusal görünüm boyutuna göre daha düşük bir öneme sahip olduğu görülmüştür. Kadınlar erkeklere göre daha yüksek puanlar vermiştir. Beden kitle indeksi hem uygunluk hem de ağırlık kontrolü boyutları ile pozitif korelasyon göstermiştir. Bel/boy oranı ile gıda boyutları arasında korelasyon bulunmamıştır. **Sonuç:** Kötü beslenme alışkanlıklarına bağlı sağlık risklerini azaltmak için öğrencilerin sağlıklı besinler ve beslenme konusundaki farkındalıkları artırılmalıdır. Bu nedenle öğrencilerin sağlıklı beslenme konusundaki bilgi düzeyini artırmak için etkinlikler düzenlenmelidir.

Anahtar Kelimeler: Besin seçimi; sağlıklı besinler; obezite; öğrenciler

Obesity is a precursor for non-communicable disorders.[1] Its rate has increased dramatically. Unhealthy nutrition is a major risk for obesity. The university period is one of the critical times for the development of obesity. Changes in living arrangements can affect university "students" lifestyles. Surveys on food consumption showed that consumption of unhealthy foods was widespread during the university period.[2] They generally tend to consume calorie-dense foods with high fat and high sugar. They mostly consume palatable and processed foods. Poor eating habits with unhealthy behavioral patterns can

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result in weight gain associated with obesity. This situation can not affect only in the present but also their future, and they can be potential patients. Improvement of knowledge about "students" eating habits and better understanding of motives underlying their food choice can contribute to develop healthier eating habits.[3]

The food choice process is related to many factors affecting behavioral nutritional patterns. Sensory properties of foods (taste and smell, etc.), non-sensory properties of foods (availability and price, etc.) and socio-demographic properties (sex and age, etc.) have impacts on food choice decisions.[4,5] Steptoe et al. developed a food choice questionnaire (FCQ), consisting of 36 items, testing health-related and non-health-related motives of food choice, grouped into 9 dimensions as health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity, and ethical concern.[6] Each dimension includes 3-6 items. The FCQ surveys were conducted in many countries to measure motives underlying "people"s selection of foods and to evaluate differences among countries.[7-9] The determination of motives underlying food choice is an essential to develop activities for gaining healthy eating habits. Surveys on food choice have focused on adults mostly.[10] More information is needed for university students. Therefore, it was aimed to determine motives for food choice of health science students using the FCQ. Correlations between food choice dimensions and anthropometric measurements such as body mass index (BMI) and waist-height-ratio were also investigated.

MATERIAL AND METHODS

ETHICS APPROVAL

This study was carried out in accordance with the Declaration of Helsinki. For this survey, ethical approval was obtained Gümüşhane University Ethical Committee (date: March 22, 2022, number: 2022/02). Before the participation of the survey, the informed consent was obtained from each participant.

STUDY DESIGN

This study was conducted with the undergraduate students from the Faculty of Health Sciences, Gümüşhane University. The randomly selected students (n=335) participated to the study. The minimum sample size was calculated as 327.[11]

$$n=(N\ t^2\ p\ q)/[(d^2\ (N-1)+(t^2\ p\ q)][1]$$

Where n is the sample size, n is the main population (2,207), t is the t value (1.96 at a 95% confidence level), p is the possibility of actualization (0.5), q is the possibility of non-actualization (0.5), and d is the deviation proportion between the main and the sample solution (0.05).

Students from 6 departments as Emergency and Disaster Management (EDM), Health Management (HM), Nutrition and Dietetics (ND), Nursing (N), Occupational Health and Safety (OHS), and Social Service (SS) participated in the study.

DATA COLLECTION

Data collection with a face-to-face survey was conducted between March 2022 and June 2022. Demographic properties such as age, gender, department, income level, and accommodation and anthropometric characteristics such as weight, height, and waist circumference were recorded. The validated Turkish version of FCQ was also applied.[9]

ANTHROPOMETRIC MEASUREMENTS

Weight (kg), height (cm) and waist circumference (cm) were measured. A digital scale was used for weight measurement, and a tape measure was used for height and waist circumference measurements. The BMI and weight-to-height ratio (WHR) were calculated.[12]

FCQ

The permission of using the validated Turkish version FCQ was obtained from author via e-mail.[9] It composed of 9 dimensions as health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity, and ethical concern. Turkish version of the FCQ was answered on a 4-point Likert type scale (1: Not much important, 2: A little important, 3: Moderate important, 4: Much important). For each dimension, the mean value and standard deviation were calculated.

STATISTICAL ANALYSIS

The frequencies were calculated for demographic and anthropometric properties. Moreover, the mean value

and standard deviation were calculated for each food choice dimension. To evaluate difference according to gender, department, BMI, and WHR, a chi-square test was applied. Correlations between anthropometric measurements and food choice dimensions were investigated by a Pearson correlation analysis. SPSS 22.00 (IBM Coorp., NY, USA) software was used for data processing.

RESULTS

Table 1 presents the demographic properties of participants. A total of 335 participants participated to the survey. Most of the participants (80.3%) were in the range of 18-22 years of age. Students from 6 departments (EDM, ND, OHS, N, SS, and HM) participated in the study. Most of the students lived in the public dormitory (68.1%) and had income levels lower than 1,001 TL (68.9%).

Table 2 presents the BMI values of students. According to the BMI values, there were four groups as underweight (<18.50 kg/m^2), normal (18.50-24.99 kg/m^2), overweight (25.00-29.99 kg/m^2) and obese (³30.00 kg/m^2).[13] Most of the students (71.9%) had normal BMI values. However, some students (14.6%) were in the overweight group. The females exhibited a higher percentage in the thin and normal groups, whereas the males exhibited a higher percentage in the overweight group. The BMI values showed significant difference according to gender (c^2: 285.78, p<0.001).

Table 3 presents the WHR of students. According to the WHR values, there are four groups as "under risk" (<0.4), normal (0.4-<0.5), "at risk" (0.5-<0.6) and treatment needed (>0.6).[13] The most of students (60.6%) had normal values. However, some

TABLE 1: Demographic properties of the participants.

	n	%
Age		
18-22	269	80.3
≥23	66	19.7
Gender		
Female	176	52.5
Male	159	47.5
Maritaus status		
Married	3	0.9
Single	332	99.1
Department		
EDM	69	20.6
ND	44	13.1
N	66	19.7
OHS	31	9.3
SS	62	18.5
HM	63	18.8
Class		
1st	67	20.0
2nd	103	30.7
3rd	117	34.9
4th	48	14.3
Accomodation		
Public dormitory	228	68.1
Private dormitory	40	11.9
House-alone	10	3.0
House-friends	30	9.0
With family	21	6.3
Other	6	1.8
Monthly income (TL)		
0-500	52	15.5
501-1,000	179	53.4
1,001-1,500	51	15.2
1,501-2,000	21	6.3
2,001-3,000	16	4.8
≥3,000	16	4.8
Total	335	100.0

EDM: Emergency and Disaster Management; ND: Nutrition and Dietetics; N: Nursing; OHS: Occupational and Health Safety; SS: Social Service; HM: Health Management.

TABLE 2: BMI class of the participants.

	BMI (kg/m^2)									
	<18.50		18.50-24.99		25.00-29.99		>30.00		Total	
Gender	n	%	n	%	n	%	n	%	n	%
Female	27	15.3	130	73.9	13	7.4	6	3.4	176	52.5
Male	6	3.8	111	69.8	36	22.6	6	3.8	159	47.5
Total	33	9.9	241	71.9	49	14.6	12	3.6	335	100

BMI: Body mass index.

TABLE 3: WHR class of the participants.

	WHR									
	<0.4		0.4-<0.5		0.5-<0.6		>0.6		Total	
Gender	n	%	n	%	n	%	n	%	n	%
Female	51	29.0	102	58.0	20	11.4	3	1.7	176	52.5
Male	21	13.2	101	63.5	35	22.0	2	1.3	159	47.5
Total	72	21.5	203	60.6	55	16.4	5	1.5	335	100

WHR: Weight-height-ratio.

students (37.9%) were in the risky groups. The females exhibited higher percentage in the "under risk" group (<0.4), whereas the males exhibited higher percentage in the normal (0.4-<0.5) and "at risk" (0.5-<0.6) groups. The WHR values showed significant differences according to gender (c^2: 285.09, p<0.001).

Table 4 presents the mean values of food choice dimensions. The sensory appeal followed by price and mood dimensions, were the most important ones whereas weight control, followed by ethical concern and natural content, were the least important ones.

TABLE 4: Food choice dimension scores: Gender.

Dimension	Female	Male	All
Health	2.91±0.74	2.84±0.69	2.87±0.72
Mood	3.09±0.72	2.84±0.66	2.97±0.70
Convencience	2.85±0.72	2.76±0.66	2.81±0.69
Sensory appeal	3.35±0.69	3.11±0.69	3.24±0.70
Naturel content	2.75±0.83	2.55±0.81	2.66±0.82
Price	3.02±0.81	3.02±0.77	3.02±0.79
Weight control	2.50±0.83	2.34±0.70	2.42±0.77
Familarity	2.91±0.73	2.77±0.73	2.84±0.73
Ethical concern	2.66±0.78	2.48±0.84	2.58±0.81

The females exhibited higher mean values than the males, except the price dimension. Mood (c^2: 28.86, p=0.037), sensory appeal (c^2: 21.61, p=0.025) and weight control (c^2: 19.33, p=0.023) dimensions showed significant differences according to gender.

Table 5 presents the mean values of food choice dimensions according to the departments. For all departments, the most important dimension was the sensory appeal, whereas the least important one was the weight control. The highest mean value of sensory appeal dimension and the lowest mean value of weight control dimension were obtained for the OHS. All food dimensions showed no significant difference according to department (p>0.10)

Table 6 presents the mean values of food choice items according to the BMI groups. The first important food choice dimension was the sensory appeal, followed by price and mood for thin, normal, and overweight groups. However, sensory appeal, convenience, and mood were important ones for the obese group. Price (c^2: 33.06, p=0.085) and weight control (c^2: 33.02, p=0.095) dimensions presented significant differences according to the BMI

TABLE 5: Food choice dimension scores: Department.

Dimension	EDM	ND	N	OHS	SS	HM
Health	2.87±0.78	2.93±0.63	2.77±0.71	2.96±0.72	2.81±0.65	2.95±0.78
Mood	2.86±0.72	3.01±0.73	2.88±0.68	3.16±0.59	3.04±0.63	2.99±0.78
Convencience	2.70±0.69	2.75±0.63	2.84±0.67	2.93±0.67	2.91±0.66	2.75±0.79
Sensory appeal	3.04±0.79	3.28±0.73	3.25±0.58	3.48±0.61	3.37±0.64	3.16±0.75
Natural content	2.74±0.88	2.70±0.63	2.44±0.80	2.48±0.78	2.68±0.81	2.82±0.89
Price	2.90±0.88	3.00±0.83	3.16±0.69	3.03±0.73	3.03±0.73	3.00±0.85
Weight control	2.38±0.78	2.54±0.69	2.38±0.77	2.34±0.82	2.40±0.72	2.49±0.87
Familarity	2.68±0.78	2.80±0.73	2.76±0.70	3.02±0.58	2.87±0.70	3.02±0.72
Ethical concern	2.63±0.81	2.71±0.76	2.39±0.83	2.55±0.79	2.60±0.77	2.61±0.88

EDM: Emergency and Disaster Management; ND: Nutrition and Dietetics; N: Nursing; OHS: Occupational and Health Safety; SS: Social Service; HM: Health Management.

TABLE 6: Food choice dimension scores: BMI class.

	BMI (kg/m²)			
Dimension	**<18.50**	**18.5-24.99**	**25.00-29.9**	**>30.00**
Health	2.79±0.79	2.88±0.72	2.86±0.70	2.96±0.50
Mood	2.96±0.76	2.94±0.70	3.05±0.69	3.19±0.62
Convencience	2.78±0.74	2.76±0.69	2.94±0.62	3.23±0.74
Sensory appeal	3.39±0.66	3.20±0.72	3.24±0.64	3.48±0.55
Naturel content	2.77±0.89	2.64±0.84	2.67±0.73	2.58±0.73
Price	2.99±0.81	3.01±0.78	3.86±0.81	3.17±0.97
Weight control	1.99±0.83	2.44±0.78	2.61±0.68	2.56±0.43
Familarity	2.86±0.56	2.79±0.77	2.79±0.77	3.11±0.57
Ethical concern	2.57±0.84	2.54±0.81	2.78±0.82	2.50±0.61

BMI: Body mass index.

group. A positive significant correlation between the BMI and both dimensions of weight control (r=0.200, p<0.001) and convenience (r=0.113, p=0.039) were determined. However, no significant correlation was found between the BMI and other dimensions.

Table 7 presents the mean values of food choice dimensions according to the WHR groups. The important ones were sensory appeal, price, and mood for "under risk" (<0.4) and normal (0.4-<0.5) groups. However, sensory appeal, mood, and familiarity were determined as the most important dimensions for "at risk" (0.5-<0.6) category. Moreover, sensory appeal, price and convenience were the important ones for the treatment needed (>0.6) category. No significant correlation was found between the WHR and food choice dimensions.

DISCUSSION

The food choice process is related to many factors such as biological, psychological, and social ones. Sensory properties of foods are known to be important in food choice. In our study, the highest scores were obtained for the sensorial appeal dimension. In the previous surveys, European adolescents and adults placed the sensorial appeal in the top of their choice as well as our study.[7,14-16] Taste has an important role in food choice and can act as a barrier to healthy eating behavior.[17] As healthy foods are often considered tasteless, unhealthy foods with high sugar and high fat are mostly consumed.

Socio-demographic characteristics (gender and age, etc.) also have importance in food choice. Previous studies reported differences in food choices

TABLE 7: Food choice dimension: WHR class.

	WHR			
Dimension	**<0.4**	**0.4-<0.5**	**0.5-<0.6**	**>0.6**
Health	2.83±0.75	2.88±0.7	2.89±0.76	2.97±0.68
Mood	3.01±0.72	2.93±0.70	3.06±0.69	3.03±0.59
Convencience	2.90±0.72	2.77±0.67	2.77±0.75	3.32±0.52
Sensory appeal	3.27±0.75	3.20±0.69	3.32±0.70	3.45±0.45
Naturel content	2.58±0.91	2.68±0.80	2.68±0.82	2.60±0.55
Price	3.01±0.84	3.03±0.75	2.98±0.87	3.40±0.83
Weight control	2.16±0.82	2.48±0.76	2.53±0.72	2.80±0.30
Familarity	2.87±0.69	2.78±0.76	3.03±0.69	2.87±0.51
Ethical concern	2.51±0.80	2.55±0.81	2.80±0.84	2.33±0.47

WHR: Weight-height-ratio.

among genders. According to da Silva et al., motives of health, mood, convenience, sensory appeal, natural content, weight control, familiarity, and ethical concern in food choice were higher in females than males.[4] Schliemann et al. found that 7 food dimensions as health, mood, convenience, sensory appeal, natural content, price, and weight control were associated with sex, and females had exhibited higher scores than males as our study.[18] In the present study, sensory appeal and weight control scores showed significant differences with respect to gender. Females were expected to be more anxious about their weight than males, but this situation could not be related to health reason. Because they gave higher scores for sensory appeal and mood dimensions than health dimensions. They are willing to control their weight since body size is more important for females than males.[18]

Motives underlying food choice can be changed according to culture. Pearcey and Zhan studied with American and Chinese college students and reported that price and convenience scores were higher in American students and natural content and ethical concern scores were higher in Chinese students.[19] Our findings were comparable with the previous study, with some exception. Turkish students ranked sensory appeal in the top 2 as well as American and Chinese students. They placed price in the top 2 as American students. Ethical concern was the least important dimension for Turkish students as well as American and Chinese ones. However, mood was more important for Turkish students than American and Chinese students.

According to a validation study for the Turkish population, sensory appeal, natural content, and price were more important in food choice, whereas ethical concern and weight control were least important.[9] The natural content was less important dimension in food choice for health science students. Differences between studies may be related to the age ranges of participants. Natural content was found to be valuable with increasing age in the previous study.[18] Dikmen et al. studied a population ranging from 18 to 64 years old, while the participants of present study ranged from 18 to 26 years old.[9]

After sensory appeal, students ranked price and mood in their food choices, respectively. Students may not have a stable income and need their "parents" support. University years are stressful. Limited income and stressful-life conditions could make price and mood as top three motives for food choice. The health dimension was less important in food choice than the sensory appeal dimension, as reported in the literature.[18,20] Turkish students gave the least score for weight control, revealing that they were not concerned about their weight in food choices. Students may not have access to healthy foods because of their availability and price. Most of the Turkish students lived in public dormitories and their income level was at the lower range of income level (<1,001 TL).

BMI is the most used anthropometric method to determine obesity.[21] However, information on the distribution of fat in the body is not obtained by using BMI. Waist-to-height ratio has been accepted as a valid measure of abdominal obesity.[22] Our findings showed that weight control in food choice was significantly correlated with the BMI. For the weight control dimension, the overweight and obese participants gave higher scores than the thin and normal participants. Moreover, the participants in the treatment needed category (>0.6) showed the highest score. When choosing foods, weight loss should be more important for overweight and obese participants. Previous studies supported this situation.[18,20]

This study can't be generalized to all university students since it was conducted with health science students.

CONCLUSION

Poor eating habits with unhealthy behavioral patterns can result in serious health issues. Eating habits are modifiable behaviors. A better understanding of food choice determinants is essential to develop activities, improving health and social well-being. For Turkish health science students, the most important dimensions in the selection of food were a sensory appeal, price, and mood, and the least important ones were weight control, ethical concern, and natural content. These findings indicated that students were prone to select unhealthy foods. To prevent health risks in "students" future lives, their eating behavior should be improved. For this reason, training programs on

food and nutrition literacy, healthy foods, and nutrition should be organized at the universities.

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