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An Evaluation of Nursing Students' Food Neophobia and Diet Quality

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Abstract- Food neophobia affects food choice and is thought to have an effect on the healthy eating index. The purpose of this study is to evaluate food neophobia of nursing students and to determine whether it affects diet quality. In addition, it aims to examine the effect of changing demographics on food neophobia. The study was consisted of 155 nursing students. The data were collected online using the sociodemographic information form, the Food Neophobia Scale and the Healthy Eating Index-2015. In the analysis of the data, percentage, mean, Student's t test, Mann Whitney U, Anova and Kruskal Wallis tests and Spearman correlation analysis were used. 72.3% of the students participating in the study are women. 58.7% of them have poor diet quality and 32.3% of them need to improve their diet quality. The mean score of food neophobia is 37.31±10.39, and 13.5% of them are neophobic. Food neophobia was found to be significantly higher in those who do not work and those living in rural areas. It was determined that there is a statistically and significantly weak negative correlation between age and food neophobia, and weak positive correlation between age and the healthy eating index. The result of the study reveals that food neophobia varies with demographic conditions. When evaluated in terms of diet quality, it is seen that the diets of the students are weak or needed to be improved.

Keywords: *food neophobia, diet, student, nursing.*

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An Evaluation of Nursing Students' Food Neophobia and Diet Quality

Dr. Ayse Gumusler Basaran [α] & Yagmur Demırel Ozbek [σ]

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I. Introduction

Healthy eating habits are considered important in human life, and it has been reported to reduce the risk of some types of cancer, coronary heart disease, stroke, cataract, and hypertension. Nutritional behavior can be determined not only by the mechanism of hunger and satiety but also by patterns such as food neophobia or selective eating (Galloway et al., 2003). Food neophobia, defined as "reluctance to eat or avoidance of unfamiliar food" by Pliner and Hobden (1992), is a significant feature that affects people's daily food choices. It is a known fact that individuals have a protective mechanism that prevents them from consuming potentially toxic foods (Roßbach et al., 2016). Among the factors affecting the food neophobia is age, gender, education level, place of residence, gastrointestinal system diseases, and food allergies (Muhammad et al., 2015; Staples & Gibson, 2008; Soucier et al., 2019; Schnettler et al., 2017; Olabi et al., 2020; Shim et al., 2011). Food neophobia, which emerges with the transition to the complementary food period, is at its lowest level in early childhood (under 24 months) and the highest level in the 2-6 age range. This may be due to the refusal of unfamiliar food by children to demonstrate their autonomy during this period, which is probably their first year of independence (Muhammad et al., 2015; Staples & Gibson, 2008). Food neophobia decreases with increasing age in later ages, adolescents, and adults. However, it has been reported that food neophobia increases in adults aged ≥65 years (Soucier et al., 2019), and the average score of food neophobiain the 66-80 age group is the highest compared to other age groups. In terms of gender, food neophobiais higher in men than women (Olabi et al., 2020). Food neophobia is at a high level in individuals who are in the potential risk group for gastrointestinal system diseases and food allergy(Shim et al., 2011).It has been observed that it differs among those living in the city or the countryside and decreases as the individuals' education levels increase. Increasing the level of nutrition knowledge may affect food neophobia (Schnettler et al., 2017).

In recent years, research has been made on food neophobia due to its potential to affect nutritional preferences. Food neophobia can influence food choices and the quality and variety of the diet. As reported in the literature, food neophobia restricts dietary diversity (Previato et al., 2015). It can restrict not only the variety of the diet but also the quantity and thus the energy content, resulting in a diet pattern with lower diet quality (Knaapila et al., 2014). Diet quality means nutritional diversity as well as energy and nutrient adequacy. The increase in food diversity provides an increase in the index and supports the protection and improvement of the health of individuals by affecting the diet quality (Uçar, 2018). The aim of this study is to evaluate nursing students' food neophobia, determine whether it affects diet quality, and examine the effect of changing demographic characteristics on food neophobia.

II. Method

a) Population and Sample of the Research

The research is a descriptive cross-sectional study conducted in April-May 2021. The population consisted of 414 students in Rize Recep Tayyip Erdogan

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University, Faculty of Health Sciences, Nursing Department. The incidence of the event was taken as 20%. Considering the number of students required for the study as p: 0.20, t:5, d:0.05, it was calculated that n: 155. Calculations were made using the Roasoft Sample Size Calculator program. The research link was sent to the corporate e-mails of the students using social media tools.

b) Data Collection Tools

The data were collected with the sociodemographic information form developed by the researcher, the Food Neophobia Scale, and the Healthy Eating Index-2015.

i. *The Sociodemographic Information Form:* The form includes general information about the participants like age, gender, marital status, working status, smoking and alcohol consumption, number of meals, the place of residence, and type of high school they graduated from.

ii. *The Food Neophobia Scale:* The Food Neophobia Scale (FNS) was used to evaluate the tendency of individuals to reject or try unfamiliar. The Turkish validity and reliability of the scale, developed by Pliner and Hobden (1992), was performed by Uçar (2018). The 7-point Likert-type scale consisting of ten items has a score range of 10-70, and high scores indicate fear of unfamiliar foods, and low scores indicate enjoying trying them. Individuals with a food neophobia scale score $<\bar{X}\pm SS$ were classified as neophiliac, $\bar{X}\pm SS$ neutral, and $>\bar{X}\pm SS$ neophobic. The Cronbach's alpha value for food neophobia was found to be .806 in the study.

iii. *The Healthy Eating Index (HEI)-2015:* The Healthy Eating Index scores were calculated by considering 24-hour retrospective food consumption records of individuals. The HEI was developed based on the American Dietary Guidelines. The guide is updated every 5 years to reflect current data. The HEI, which was first created in 1995, is revised according to the regularly updated American dietary guidelines. The United States Department of Agriculture (USDA) expert panel reviews the latest updates on nutrition and develops new recommendations.

The HEI-2015 includes13 dietary groups. Of these groups, 9 indicate adequacy components and 4 moderation components. Foods that should be included in the diet adequately are total fruits, whole fruits, total vegetables, greens and beans, whole grains, dairy products, total protein, seafood and plant proteins, and fatty acids. Foods that should be consumed sparingly are refined grains, sodium, added sugars, and saturated fats. The highest and lowest scores on the scale are 100 and 0. The healthy eating index is evaluated in three categories (Panizza et al., 2018): 0-50=malnutrition, 51-80=nutrition that needs to be improved, and 81-100: healthy nutrition.

c) Statistical evaluation of data

SPSS 22 package program was used for statistical analysis of the data. Descriptive data were presented as percentage, mean, and standard deviation, and conformity of quantitative data to normal distribution was evaluated with the Shapiro-Wilk test. Student's t-test and One Way ANOVA analysis were used for normally distributed data, and Mann Whitney U test and Kruskal Wallis analysis were used for data without normal distribution. Spearman correlation analysis was performed. In the correlation analysis, 0-0.39 was accepted as weak correlation, 0.40-0.69 moderate correlation, 0.70-0.89 strong correlation, 0.90-1.00 very strong correlation. The significance value was accepted as $p<0.05$.

d) Ethical aspect: Ethics committee approval numbered 2021/91, and institutional permission of the university was obtained to collect the data.

III. Results

72.3% of the students in the study were female, and 27.7% were male, and their mean age was 20.76±3.07. All the students were single, and 25.2% were first-year students, 29.7% were in the second year, 22.6% were in the third year, 22.6% were in the fourth year.20% graduated from medical vocational high schools, 5.2% were working, and 66.2% lived in an urban area. %9 smoked, and %5.8 drank alcohol. %17 ate 2 main meals a day. The mean score of the Healthy Eating Index was 45.32±14.19. 58.7% had poor quality diet, and 32.3% needed to improve their diet quality. There were no students with a high-qualitydiet.9% did not respond. Descriptive data of the participants are shown in Table 1.

Table 1: Descriptive Data of Participants

Independent Variables		n	%
Gender	F	112	72.3
	M	43	27.7
Class	1	39	25.2
	2	46	29.7
	3	35	22.6
	4	35	22.6
Marital status	Single	155	100
	Married	0	0

High School	Medical Vocational High Schools	31	20.0
	Others	124	80.0
Working status	Yes	8	5.2
	No	147	94.8
Place of residence	Rural	52	33.8
	Urban	102	66.2
Smoking	Yes	14	9.0
	No	136	87.7
	Quitted	5	3.2
Use of alcohol	Yes	9	5.8
	No	145	94.2
Number of meals per day*	2 main meals	27	17.4
	3 main meals	23	14.8
	2 main meals 1 snack	25	16.1
	2 main meals 2 snacks	23	14.8
	2 main meals 3 snacks	6	3.9
	3 main meals 1 snack	17	11.0
	3 main meals 2 snacks	17	11.0
	3 main meals 3 snacks	10	6.5
Quality of diet **	Poor	91	58.7
	Needs improvement	50	32.3
	High	0	0
Food neophobia	Neophiliac Neutral Neophobic	21	13.5
	Neutral	113	72.9
	Neophobic	21	13.5

**7 (%4.5) participants did not respond. **14 participants (%9) did not respond.*

The mean score of the food neophobia scale was 37.31±10.39. The rate of neophiliac students was 13.5%, the rate of neutrality was 72.9%, and the rate of neophobia was 13.5%. The Food Neophobia and the Healthy Eating Index scores according to the characteristics of the participants are presented in Table 2, and their comparisons with the independent variables are in Table 3.

Table 2: The Mean Scores the Food Neophobia Scale and the Healthy Food Index Scale

Scales	n	Min-Max	χ	Sd
Food Neophobia Scale	155	10-66	37.31	10.39
Healthy Food Index Scale*	141	15-70	45.32	14.19

**Calculated with the number of respondents.*

Table 3: Comparisons of Food Neophobiaby Some Characteristics of Participants

Independent Variables		N	Food Neophobia	P	N*	Healthy Food Index Scale	P
			X̄±SS			Rank Mean	
Gender	F	112	37.66±10.71	.499	102	72.84	.383
	M	43	36.40±9.55		39	66.18	
			t= .678			U= 1801.00, Z= -.873	
High school	Health	31	34.74±10.33	.124	27	82.02	.116
	Others	124	37.95±10.34		114	68.39	
			t= -1.545			U= 1241.50, Z= -1.571	
Working status	Yes	8	28.13±11.38	**.010**	8	95.19	.082
	No	147	37.81±10.13		133	69.55	
			t= -2.616			U= 338.50, Z= -1.738	

Place of residence	Rural	52	41.00±9.46	**.001**	46	72.10	.823
	Urban	103	35.45±10.38		95	70.47	
			t= 3.237			U=2134.50, Z= -.224	
Alcohol	Yes	10	36.00±13.22	.682	10	56.90	.254
	No	145	37.40±10.21		131	72.08	
			t= -.411			U= 514.00, Z= -1.141	
Class	1	39	38.44±9.04	.497	37	62.84	**.036**
	2	46	37.87±10.71		37	60.51	
	3	35	34.97±10.02		33	83.83	
	4	35	37.66±11.73		34	78.84	
			F= .798			KW X^2= 8.554	
Smoking	Yes	14	37.14±13.67	.998	13	51.77	.132
	No	136	37.33±10.12		124	73.54	
	Quitted	5	37.20±9.33		4	54.75	
			F=.002			KW X^2= 4.055	
Number of meals **	2 main meals	27	39.11±10.27	.066	26	66.60	**.016**
	3 main meals	23	39.96±7.24		21	63.93	
	2 main 1 snack	25	31.12±11.85		25	65.98	
	2 main 2 snacks	23	39.17±10.06		23	70.17	
	2 main 3 snacks	6	41.00±13.64		6	26.42	
	3 main 1 snacks	17	37.41±9.02		17	91.91	
	3 main 2 snacks	17	34.65±8.83		14	76.75	
	3 main 3 snacks	10	37.70±11.73		9	97.56	
			F=1.952			KW X^2=17.263	

**The Healthy Eating Index was analyzed with the number of respondents*

Table 3 shows that food neophobia levels were significantly higher in those who did not work and those living in rural areas (p=.010,p=.001).Gender, type of high school, smoking, alcohol consumption, class, and the number of meals did not cause a significant difference (p=.499, p=.124, p=.998, p=.682, p=.497, p=.066).

In terms of the Healthy Eating Index, the classes of the participants and the number of meals made a significant difference. The healthy eating index score was significantly higher in the 3rd year students than those of 1st and 2nd year students, and it was significantly lower in those consuming 2 main meals+3 snacks than those consuming 3 main meals+1 snack and 3 main+ 3 snacks (p=.036, p=.016). Gender, type of high school, working status, place of residence, smoking, and alcohol consumption did not differ significantly (p=.383, p=.116, p=.082, p=.823, p=.132, p=.254).

In the correlation analysis, a negative correlation was found between age and food neophobia, and a weak positive correlation between age and healthy eating index (r= -.184, r= .0172). There was no significant relationship between food neophobia and the Healthy Eating Index (Table 4)

Table 4: Correlation Coefficients between Age, the Food Neophobia, and the Healthy Eating Index (Spearman).

		Age	Food Neophobia	Healthy Eating Index
Age	r p	1	-.184* .023	.172* .043
Food Neophobia	r p		1	-.059 .488
Healthy Eating Indexr	r p			1

*$p<0.05$

IV. Discussion

The concept of food neophobia, which many studies have focused on in recent years, is defined as the tendency to avoid new or unfamiliar foods to varying degrees and deals with the approach of individuals to foods and evaluates their eating habits (Soucieret al., 2019). Food neophobia symbolizes the unknown, harmful-beneficial anxiety and dislike (Pliner & Salvy, 2006). In the present study, the mean food neophobia score of the students was found to be 37.31±10.39. The mean food neophobia score was determined as 32.7±12.26 in a study conducted with academicians in Turkey (Kolve Ok, 2020), 41,3±10,93 in another study (Ucar & Kizil, 2018), and 31.2±11.9 in young people (Knaapilaet al., 2011).It was reported to be 36.4±9.8 and 29.8±11.7 in Lebanese and American university students, respectively (Olabi et al., 2009). Adolescents' food neophobia score was reported as 32.96±10.1 in Korea (Cho et al., 2014), 32.83±9.08 in Chinese people, and 36.33±7.85 in Indian people (Muhammad et al., 2015).In our study, 13.5% of the students were found to have food neophobia which is consistent with the ratio of 11.5% in the study with Brazilian young adults (de Andrade Previato et al., 2015).Considering the results, it can be said that the results of this study are compatible with other studies, but the food neophobiais less in America. This may be due to the diversity of food and cultural diversity resulting from the presence of people from different countries.

Food neophobia was found to be significantly higher in unemployed participants in the study, which is because working individuals have to eat out, interact with more different cultures, and have higher income levels. In the literature, food neophobia is reported to decrease with increasing income status in various countries(Jaeger et al., 2017; Meiselman et al., 2010).

The place of residence is effective on food neophobia. It has been determined that the students living in the city in Australia have a lower food neophobia. The fact that individuals living in rural areas are less exposed to cultural differences, and those living in urban areas have a higher chance of trying different foods affects food neophobia (Flight et al., 2003; Olabi et al., 2009). In this study, food neophobia was found to be higher in individuals living in rural areas. In our country, easy access to different foods by those living in urban areas and high cultural diversity can cause individuals living in urban areas to be more open to new foods.

In the study, gender did not make a significant difference in terms of food neophobia, like other studies in Turkey (Kol& Ok, 2020; Doğdubay & Yiğit, 2017).

Dematte et al. found the level of food neophobiato be insignificantly higher in smokers in Italy and showed the appetite suppressing effect of nicotine as the reason (Dematte et al., 2013). However, in this study, smoking did not make a significant difference in food neophobia, which may be due to the low rate of smokers involved in the study.

It is known that age is a significant determinant of food neophobia. Especially in adolescence, food neophobiais quite high and decreases with age (Rodríguez-Tadeo et al., 2018). Similarly, in this study, food neophobia decreased with increasing age.

Diet quality is a frequently mentioned topic to lead a healthy life and optimal well-being. The healthy eating index reflects diet quality and diversity (Kral, 2018). Tek et al. conducted a study with 1104 individuals and reported that the diet of 42.8% of the individuals was of poor quality and the diet of 57.2% should be improved (Teket al., 2011). In another study with 498 university students, about 80% participants needed to improve their diet quality, and no student had a high-quality diet (Erçim, 2014). In this study, 58.7% of the students had a poor-quality diet, 32.3% of them needed to improve their diet, and they were not students with a high-quality diet. As a result of these studies conducted with university students, it is clear that the diet quality of the students is quite low. The reason for this situation may be the obligation of students to comply with mealtimes in the places where they live and in schools, their reluctance to eat the meals offered every day, their preference for fast food, and financial difficulties. In addition, it should not be forgotten that eating disorders can be seen frequently in university students.

Our study showed that 3rd-year students had higher healthy eating index scores than 1stand 2nd-year students. It can be thought that with the increase in their education level, their knowledge about foods increases and they pay more attention to nutrition (Meiselman et al., 2010). Also, the Principles of Nutrition course given in the 2nd year can increase the healthy eating index, so the increase in age may have been caused by this situation.

Diet quality decreased as the level of food neophobia increased in preschool children in the USA (Johnson et al., 2015), adults and the elderly in Finland (Knaapila et al., 2015), adolescents in Korea (Choe & Cho, 2011), children and adults in Spain (Maiz & Balluerka, 2016) and children in Norway (Helland et al., 2017). However, no significant difference was found between the food neophobia and the healthy eating index score in this study, which may be because the diet quality of the students in the study was generally poor or needed to be improved, and no one had a high-quality diet.

V. Conclusion

In this study, in which food neophobia level and diet quality were investigated, food neophobia level was found to be higher in those living in rural areas and those who did not work. Diet quality was found to be better in those who consumed 3 main meals and in 3rd - year students. There was a weak negative correlation between age and food neophobia. Food neophobiais at high levels and varies due to demographic conditions. The place where the individual was born and lived shapes his eating habits and his/her opinion about new foods. In the study, students' diets were poor or needed to be improved. To reduce food neophobia and improve diet quality, it is recommended to conduct informative studies about the content of foods and seek counseling from knowledgeable people about nutrition.

Limitations

The main limitations of the study are that the study was carried out only with the students of the nursing department, a 1-day food consumption record was used to evaluate dietary diversity, and since data were collected online anthropometric measurements such as weight and height could not be evaluated using the same measurement tool.

Declarations of interest: None

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Authors contribution
Ayse Gümüsler Basaran: Methodology, Analysis, Writing –review and editing
Yagmur Demirel Ozbek: Conceptualization, Writing, Resources

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