Research Paper / Araştırma Makalesi

Effect of Nutrition Education on Nutrition Knowledge Levels of Midwifery Students

Serpil Özbaş[1] (iD) ✉, Seray Gerey[1] (iD), Şükran Özkahraman Koç[1] (iD), Sıddıka Ersoy[2] (iD)

[1]Suleyman Demirel University, Faculty of Health Sciences, Department of Midwifery, Isparta, Türkiye
[1]Suleyman Demirel University, Faculty of Health Sciences, Department of Nursing, Isparta, Türkiye

ABSTRACT

Adequate, balanced and healthy nutrition at every stage of life are of great importance for the protection of health and prevention of diseases. The spread of unhealthy eating habits, especially during adolescence and young adulthood, is associated with deficiencies in the nutritional knowledge levels of young people. This study was conducted to determine the effect of nutrition education given to midwifery students on their nutrition knowledge levels. The population of the study consisted of 87 undergraduate students studying in the midwifery department of a state university who had not received nutrition education before. It was aimed to reach all of them without sample selection. Except for 12 students who did not volunteer to participate in the study, the other students constituted the sample of the study (n=75). In the study, a socio-demographic questionnaire form prepared as a result of a literature review and the "Nutrition Knowledge Scale" developed in a previous study were used. The data were collected before and after nutrition education. In the study, it was found that while the mean score of the Nutrition Knowledge Scale of midwifery students was 82.20±14.06 before the training, this score increased to 89.34±11.71 after the training. As a result, it was revealed that nutrition education given to midwifery students significantly increased their level of nutrition knowledge, and this education was effective in strengthening their professional competencies. It is important for midwifery students to acquire general nutrition knowledge. Thus, students can both protect their own health and make proper nutrition recommendations to the individuals around them. In this way, midwifery students may become health professionals who can contribute not only at the individual but also at the social level.

Keywords: Midwifery, Nutrition education, Nutrition knowledge

Ebelik Öğrencilerine Verilen Beslenme Eğitiminin Beslenme Bilgi Düzeylerine Etkisi

ÖZ

Yaşamın her evresinde yeterli, dengeli ve sağlıklı beslenme, sağlığın korunması ve hastalıkların önlenmesi açısından büyük önem taşımaktadır. Özellikle ergenlik ve genç yetişkinlik dönemlerinde sağlıksız beslenme alışkanlıklarının yaygınlaşması, gençlerin beslenme bilgi düzeylerindeki eksikliklerle ilişkilendirilmektedir. Bu çalışma ebelik öğrencilerine verilen beslenme eğitiminin beslenme bilgi düzeylerine etkisini belirlemek amacıyla yapılmıştır. Araştırmanın evrenini bir devlet üniversitesinin ebelik bölümünde okuyan ve daha önce beslenme eğitimi almamış 87 lisans öğrencisi oluşturmuştur. Örneklem seçimi yapılmadan hepsine ulaşılması hedeflenmiştir. Çalışmaya katılmaya gönüllü olmayan 12 öğrenci dışında diğer öğrenciler çalışmanın örneklemini oluşturmuştur (n=75). Çalışmada literatür taraması sonucu hazırlanan sosyo-demografik anket formu ve daha önce yapılan bir çalışmada geliştirilen "Beslenme Bilgi Ölçeği" kullanılmıştır. Veriler beslenme eğitimi öncesinde ve sonrasında toplanmıştır. Araştırmada ebelik öğrencilerinin eğitim öncesinde Beslenme Bilgi Ölçeği puan ortalaması 82,20±14,06 iken, eğitim sonrasında bu puanın 89,34±11,71'e yükseldiği bulunmuştur. Sonuç olarak, ebelik öğrencilerine verilen beslenme eğitiminin beslenme bilgi

düzeylerini önemli ölçüde artırdığı ve bu eğitimin mesleki yeterliliklerini güçlendirmede etkili olduğu ortaya çıkmıştır. Ebelik öğrencilerinin genel beslenme bilgisi edinmeleri önemlidir. Böylece öğrenciler hem kendi sağlıklarını koruyabilir hem de çevrelerindeki bireylere doğru beslenme önerilerinde bulunabilirler. Bu sayede ebelik öğrencileri sadece bireysel değil toplumsal düzeyde de katkı sağlayan sağlık profesyonelleri haline gelmektedir.

Anahtar Kelimeler: Ebelik, Beslenme eğitimi, Beslenme bilgisi

INTRODUCTION

Adequate and balanced nutrition is important for an individual to be physically and mentally healthy throughout his/her life [1]. Starting from the development of the baby in the womb, adequate and balanced nutrition has vital importance in many aspects throughout all life periods [2,3]. At the same time, healthy nutrition contributes to the improvement of mother-child health, stronger immune system, safe pregnancy and birth processes, reduced risk of chronic diseases such as diabetes and hypertensive diseases, long life span, and may help to reduce the risk of disease by preventing vitamin mineral deficiencies [2,4,5].

According to the World Health Organisation (WHO) data for 2022, approximately 390 million adults aged 18 years and over in the world are underweight, 2.5 billion people are overweight and 890 million of them have obesity [6]. With the significant acceleration of growth and development in young people, especially during the university period, changes in lifestyle and eating habits, unhealthy diet programmes, presence of chronic diseases, and personal factors such as smoking may affect the nutrient and energy needs [7,8]. In addition, since the majority of university students receive education far away from their families, they may experience difficulties in meeting their nutritional, housing and health-related needs [9,10]. The development of healthy eating and lifestyle habits of university students during their education years helps to maintain these habits in adulthood and has a significant effect on their general health in the future [11]. For this reason, it is highly important to increase the level of knowledge about nutrition. Nutritional knowledge level, nutritional behaviours and eating habits vary in students with the effect of cultural differences [12]. Nutritional knowledge is gained through proper nutrition education, and nutrition education programmes have a direct effect on individuals' knowledge and behaviours related to nutrition [13].

Providing nutrition counselling services appropriate to the needs of individuals is only possible by planning training programmes and measuring nutrition knowledge accurately [14]. For this reason, it is very important that midwives, who are part of the health service, receive training on general nutrition, acquire nutritional habits, and increase and measure their nutritional knowledge levels during the university period. In this study, it is aimed to determine the effect of nutrition education given to midwifery students receiving undergraduate education on their nutrition knowledge levels and to evaluate the changes in the knowledge levels of the students before and after the education. Our study may contribute to the applications and literature in this field.

MATERIALS and METHODS

Type and Purpose of the Study

This one-group quasi-experimental study was conducted to determine the effect of nutrition education given to midwifery students on their nutrition knowledge levels and to evaluate the changes in the knowledge levels of students before and after the education.

Population and Sample of the Study

The population of the study consisted of 87 midwifery students who continued their undergraduate education in the midwifery department of a state university and did not receive nutrition education. In the study, the sampling selection method was not used and it was aimed to reach all students on the basis of volunteerism. In this case, there were 75 students who were willing to participate in the study and 12 students who did not want to participate. The sample of the study consisted of 75 students.

Data Collection Tools

Socio demographic data form and Nutrition Knowledge Scale were used to collect the data. Socio demographic data form is a form created by the researchers by reviewing the literature and consists of 22 questions. [10-12,15]. The 'Nutrition Knowledge Scale' developed by Öngun Yılmaz et al. [12] consists of 31 items. The five-point Likert-type scale is scored between 4 and 0 from 'completely agree' to 'completely disagree'. The 10 items (1, 5, 6, 9, 10, 16, 17, 21, 27, 28) that give false information about nutrition knowledge are reverse scored. The highest score that can be obtained from the scale is 126. The scale was classified as low nutritional knowledge level ($\leq$79), medium nutritional knowledge level (80-90), high nutritional knowledge level (91-100) and very high nutritional knowledge level ($\geq$101). As the score obtained from the scale increases, the level of nutritional knowledge increases, and as the score decreases, the level of nutritional knowledge decreases. Cronbach's alpha value of the scale was found to be 0.851 [12]. In this study, Cronbach's alpha value was 0.915.

Data Collection

The data were collected between April and June 2024 and an online form prepared through Google Forms was applied before the nutrition education to be given to the students. Considering that the students were studying in a health-related department and in accordance with the principles of adult education [16,17], an informative presentation was made to the students under the titles of

food and food groups, food safety and principles, 45 minutes of general nutrition education, 15 minutes of question and answer for a total of 60 minutes. [18]. The content of the training was designed in accordance with the items of the scale we used. The training was supported by visual presentations and conducted by the researcher in a face-to-face interactive manner. The training was given by one of the researchers, a professor who teaches nutrition in the field of public health. During the training, the training content was distributed to the participants in written form. Participants' questions were answered immediately and awareness was created by reinforcing the information. The same questionnaire was reapplied 2 months after the training to measure students' knowledge retention.

Statistical Analysis

Statistical analyses of the study were performed with SPSS 27.0 (IBM Inc, Armonk, NY, USA). Descriptive statistics were presented as frequency (percentage ratio) for categorical data and mean score for numerical data. Nutritional knowledge levels were obtained from the students before and after the education and a knowledge score was formed. The suitability of the knowledge scores for normal distribution was checked by Kolmogorov-Smirnov test. For the comparisons of the scores, Student's t-test was performed in case of two independent groups and one-way ANOVA tests were performed in case of multiple groups. Scheffé post-hoc test was used for significant results. Paired t-test was used to compare the scores before and after the training. Chi-square analysis was used to determine the relationships between categorical data. In all analyses, $p < 0.05$ value was considered statistically significant for a type-I error rate of 5%.

Ethical Aspects of the Research

The ethics committee approval of the study was obtained from Süleyman Demirel University Health Sciences Ethics Committee on 13-3-2024 with decision number 74/2. The purpose of the study was explained in detail to the students in the sample group and they were assured of the confidentiality of the information to be obtained from them. Participants were asked to participate in the study voluntarily. The students participating in the study were explained about the purpose of the research, the process and the questionnaire, and their informed consent was obtained. For the use of the scale, permission was obtained from the developers of the scale (12) via e-mail.

RESULTS and DISCUSSION

The average age of the students participating in the study was 19.15±0.94, 64.9% of the students were in the middle income group, 53.3% of the mothers had primary school education, 34.7% of the fathers had high school education, 72% of the mothers were housewives and

25.3% of the fathers were self-employed. The place of residence was mostly district (48%), family type was nuclear (69.3%) and the place of residence was generally public dormitory (66.7%). The majority did not have any chronic disease (90.7%). 65.5% of the students stated that they skipped any meal. The majority of the participants stated that they were not on a diet (84%) (Table 1).

In a study conducted by Arpa Zemzemoğlu et al. [19] in the Faculty of Health Sciences, it was found that 24.2% of the students were 19 years of age or younger and 75.8% were 20 years of age or older, 83.9% of them had a medium income level and 2.4% had a high income level, the majority of the fathers (36.7%) and mothers (49.3%) were primary school graduates, 71.7% lived in dormitories, and 90.9% did not have any diagnosed disease. Kartal et al. [20] reported that the mean age of the students was 22.2±2.5 years, 32.2% lived in dormitories, and 44.1% skipped breakfast. Belogianni et al. [21] concluded that 85.5% of the students did not follow a diet. In a study conducted by Ermiş et al. [22] with university students, it was found that 43.3% of them skipped any meal. The sociodemographic characteristics of the students in the studies in the literature are similar to the midwifery students in our study.

While the mean total score of the scale was 82.20±14.06 before the training, it was found to be 89.34±11.71 after the training and it was concluded that there was a significant increase according to the Paired t-test test (p=0.001). This shows that the nutritional knowledge level of the students is at medium level. Considering that the participants were students studying in the field of health sciences and that their high school education mostly included information on the subject, it can be considered as a natural result that the students had a medium level of nutritional knowledge. Similarly, the literature associates the high mean scores obtained as a result of the pretest with the students' readiness levels [23,24].

In the study of Korkmaz et al. [23], the mean total score of the Nutrition Knowledge Scale taken by the students before the training was 91.15±10.19 and the mean total score of the scale taken after the training was 102.95±9.76, and it was concluded that the mean scores of the students after the training showed a significant increase compared to the pre-training. It is thought that the reason why the mean total score of the scale was higher in Korkmaz et al. study than in our study was due to the fact that the participants were students of food processing department. Çelebi et al. [25] found that the mean total score of the Nutrition Knowledge Scale was 77.89±10.23 in university students. In the study of Ece and Samar [26], it was found that the mean total score of the Nutrition Knowledge Scale was 78.69±13.02 in female athletes and 78.48±16.63 in male athletes. It is thought that the reason why the mean scores of female athletes are lower than the midwifery students in our study is due to the fact that they see food consumption as focused on increasing performance and bodybuilding.

Table 1. Distribution of sociodemographic characteristics of the students

Sociodemographic Characteristics		n	%
Income status	Income less than expenditure	22	29.3
	Income equals expenditure	50	64.9
	Income more than expenditure	3	5.8
Mother's education level	Literate	5	6.7
	Primary School	40	53.3
	Middle School	7	9.3
	High School	15	20.0
	Undergraduate and postgraduate	8	10.7
Father's education level	Literate	2	2.7
	Primary School	24	32.0
	Middle School	11	14.7
	High School	26	34.7
	Undergraduate and postgraduate	12	16.0
Mother's occupation	Housewife	54	72.0
	Labourer	11	14.7
	Officer	4	5.3
	Pensioner	2	2.7
	Other	4	5.3
Father's occupation	Self-employment	19	25.3
	Labourer	17	22.7
	Officer	9	12.0
	Pensioner	18	24.0
	Other	12	16.0
Where the family lives	Province centre	25	33.3
	District	36	48.0
	Village	14	18.7
Family type	Extended family	18	24.0
	Nuclear family	52	69.3
	Fragmented family	5	6.7
Place of residence	With my family	6	8.0
	State dormitory	50	66.7
	Private dormitory	5	6.7
	Apartment/House	14	18.7
Any chronic disease status	Yes	7	9.3
	No	68	90.7
Meal skipping status	Yes	49	65.3
	No	1	1.3
	Sometimes	25	33.3
Dieting status	I'm not on a diet	63	84.0
	Lose weight	8	10.7
	Gaining weight	1	1.3
	Due to illness	3	4.0

According to the income levels of the participants, the mean total scores of the Nutrition Knowledge Scale did not differ significantly before and after the training. A significant difference was found between the level of education of the mother and the mean total score of the scale after the training (p=0.031). While the knowledge score was low in students whose mothers were literate, the knowledge score was significantly higher in students whose mothers were university graduates. The reason for this is thought to be that the nutritional habits and knowledge of young people are affected by the increase in the level of education of the mother and lead to positive lifestyle changes [27]. According to family type, the post-training knowledge score was found to be lower in nuclear families and significantly higher in fragmented families (p=0.045). In nuclear families, parents play a major role in eating habits and it is usually the parents who decide on meals. For this reason, students may not be able to form their own eating habits and their level of knowledge about nutrition may be insufficient [28]. In a study different from our study, it was found that approximately 60% of young people ate with their families for 5 or more meals per week, and eating with family increased fruit and vegetable consumption and reinforced the habit of eating breakfast [29]. Many sociodemographic factors, family structure and family eating habits may explain this difference [30-32]. In our study, the post-training knowledge score was higher in participants who skipped meals and lower in those who did not skip meals (p=0.031). No statistically significant difference was found between the educational status of the fathers, mother's occupation, father's occupation, place of residence, presence of chronic disease and reason for dieting before and after the training (Table 2).

Table 2. Distribution of students' total scale scores before and after the training according to sociodemographic characteristics*

| Feature | Nutrition Knowledge Scale Total Score | | | |
| | Pre-Training | | After Training | |
	Mean±SD	p	Mean±SD	p
Income status				
Income less than expenditure	79.31±14.12		87.22±12.42	
Income equals expenditure	83.22±22.03	0.492	89.54±11.35	0.132
Income more than expenditure	82.20±14.06		101.66±5.13	
Mother's education level				
Literate	90.00±24.43		89.66±9.60	
Primary School	79.72±12.02		90.80±10.07	
Middle School	88.14±11.00	0.432	84.85±9.52	0.031*
High School	81.46±13.54		85.46±13.42	
Undergraduate and Graduate	91.16±18.13		100.66±11.69	
Father's education level				
Literate	85.00±32.52		90.50±0.70	
Primary School	81.83±13.96		90.87±11.56	
Middle School	74.54±13.75	0.459	89.72±10.16	0.173
High School	85.38±10.57		88.76±11.86	
Undergraduate and Graduate	82.81±18.65		87.63±12.14	
Mother's occupation				
Housewife	82.57±14.42		88.33±11.21	
Labourer	82.00±13.97		92.45±11.24	
Officer	77.50±9.74	0.976	100.25±13.25	0.173
Pensioner	82.00±4.24		92.50±7.77	
Other	82.50±20.56		82.00±15.97	
Father's occupation				
Self-employment	80.68±9.87		85.89±10.10	
Labourer	82.00±15.82		86.41±13.71	
Officer	80.33±18.51	0.944	91.55±12.57	0.263
Pensioner	83.88±14.91		92.27±9.65	
Other	83.75±14.16		92.91±12.58	
Family type				
Extended family	85.33±12.63		83.88±13.52	
Nuclear family	81.57±14.30	0.461	90.59±10.61	0.045*
Fragmented family	77.40±17.21		96.0±10.83	
Place of residence				
With my family	78.66±13.88		89.33±10.63	
State dormitory	81.96±14.32	0.369	89.84±10.85	0.706
Private dormitory	75.40±10.50		92.80±15.22	
Apartment/House	87.00±14.00		86.35±14.40	
Chronic disease status				
Yes	86.28±9.34	0.423	91.42±8.99	0.625
No	81.77±14.45		89.13±11.99	
Do you skip meals?				
Yes	82.26±14.43		91.91±11.15	0.031*
No	83.00±0.00	0.996	84.00±0.00	
Sometimes	82.04±13.91		84.52±11.64	
If you are on a diet, what is the reason?				
I'm not on a diet	81.84±14.35		88.79±11.90	0.692
Lose weight	82.25±10.22	0.162	91.25±12.48	
Gaining weight	62.00±0.00		101.00±0.00	
Due to illness	96.33±8.08		92.00±6.08	

*: Significant at 0.05 level according to One-Way ANOVA test

Nutrition education given to midwifery students increases the level of nutrition knowledge and awareness at the individual level. This education enables them to have knowledge on basic issues such as nutrients and food groups, food safety and principles. This information helps students to develop correct eating habits not only in their professional lives but also in their personal lives. Thus, students can both protect their own health and make proper nutrition recommendations to the individuals around them. Finally, nutrition education improves the lifelong learning skills of midwifery students by raising their level of awareness. At the same time, it encourages students to take an active role in creating a healthy society by increasing their awareness of responsibility for public health. In this way, midwifery students become

health professionals who contribute not only at the individual but also at the social level.

Limitations of the Study

This study has some limitations. Since the study data were collected using an online survey, there may have been response errors associated with internet technology. The analysis was based only on students' self-reports on the questionnaire, which may be subject to biases such as social desirability or recall bias. The data obtained are limited to the statements in the scales used in the research and students' self-reports. Furthermore, the results of the study were based on data collected from students at a single state university, making it difficult to generalise the findings to all midwifery students in the country. The absence of a control group in this study also limits the ability to compare the effectiveness of nutrition education with other education programmes. Another important limitation was the lack of food consumption record tracking. This prevents the assessment of whether improvements in students' nutritional attitudes were sustained over time.

CONCLUSIONS

This study revealed that nutrition education given to midwifery students had a significant effect on their nutrition knowledge levels. The evaluations made before and after the training show that there is a significant increase in the level of nutritional knowledge of the students. The results of the study show that individual and social factors play an important role in increasing the level of nutrition knowledge. In particular, it was determined that factors such as the education level of the students' mothers, family type and skipping habits were effective on nutritional knowledge. These findings emphasise the importance of family and environmental factors in shaping nutritional habits. However, some variables such as income level, father's education level and parents' occupations did not have a significant effect on nutritional knowledge. This shows that dietary habits depend not only on demographic characteristics but also on personal motivation and environmental conditions.

Similar studies in the literature also support this finding. In the study conducted by Çelebi et al. [25] significant relationships were identified between body mass index (BMI), disordered eating attitudes, and nutritional knowledge levels. The study emphasized the importance of awareness-raising education and policy recommendations concerning nutrition and public health, particularly for overweight individuals. Arpa Zemzemoğlu et al. [19] reported that although the majority of students had a normal BMI, they exhibited unhealthy eating habits. Behaviors such as frequent consumption of street food, skipping main meals, and high fast-food intake were highlighted as potential contributors to future health problems. These findings further underscore the need for more comprehensive and systematic nutrition education at the university level. Korkmaz et al. [23] demonstrated that video-, image-, and resource-supported content in online learning environments is effective in correcting students' misconceptions regarding nutritional knowledge. Belogianni et al. [21] stated that although students generally had basic knowledge about healthy food choices, there were significant deficiencies in areas such as food sources and weight management. They emphasized that these gaps could be addressed through targeted nutritional education interventions. Moreover, it was highlighted that in order to address these deficiencies effectively, nutrition education programs should not solely focus on content but also adopt multidimensional approaches that consider students' cultural and ethnic backgrounds. Similarly, the study by Ermiş et al. [22] found that students enrolled in health-related programs were more knowledgeable compared to those in other fields. However, the study also pointed to the need for fostering a culture of healthy living and nutrition among all students. It recommended the widespread implementation of scientific and educational activities at universities to raise awareness on topics such as healthy eating, regular physical activity, and smoking. In the light of all these studies, increasing the level of nutrition knowledge of midwifery students is of great importance for public health. The fact that there is a certain increase in scale evaluations in the field of health sciences and even the preservation of existing knowledge shows the effectiveness of the training provided. Since the midwifery profession plays an important role in the health services of the society, individuals who will work in this field should have accurate and up-to-date information. In addition, this study emphasises that nutrition education should not be limited to midwifery students, but should reach wider masses. Improving the nutritional habits of the society has a critical importance in terms of raising a healthy generation. Therefore, nutrition education should be supported and disseminated through continuous education programmes at the community level. However, the study also has some limitations. For example, the long-term effects of the increase in nutritional knowledge level after education were not analysed. In future studies, long-term follow-up studies are recommended to measure the permanence of nutrition education. In addition, the fact that the study focused only on midwifery students indicates that the effect of similar trainings should be investigated for other health professionals and the general population.

SUPLEMANTARY MATERIAL

Training materials will be provided by the authors upon a resonable request.

REFERENCES

[1] Grajek, M., Krupa-Kotara, K., Białek-Dratwa, A., Sobczyk, K., Grot, M., Kowalski, O., Staś, W. (2022). Nutrition and mental health: A review of current knowledge about the impact of diet on mental health. *Frontiers in Nutrition, 9*, 1-14.

[2] Marshall, N.E., Abrams, B., Barbour, L.A., Christian, P., Friedman, J.E., Jr, W.W.H., Purnell, Q., Roberts, J.M., Soltani, H. (2022). The importance of nutrition in pregnancy and lactation: Lifelong consequences. *American Journal of Obstetrics and Gynecology, 226*(5), 607-632.

[3] Rodriguez, A.M., Sánchez, A.B., Guardado, I.M., Jimenez, E.N., Sanjuan, E.P., Aguilera, J.F.T., Suarez, J.V.C. (2022). Infancy dietary patterns, development, and health: An extensive narrative review. *Children, 9*(7), 1072:1-21.

[4] Kiani, A. K., Dhuli, K., Donato, K., Aquilanti, B., Velluti, V., Matera, G., Iaconelli, A., Connelly, S. T., Bellinato, F., Gisondi, P., Bertelli, M. (2022). Main nutritional deficiencies. *Journal of Preventive Medicine and Hygiene, 63*(2), E93–E101.

[5] World Health Organization. (2013). *Global nutrition policy review: What does it take to scale up nutrition actio?* [Date of access: 11.01.2025] https://www.who.int/publications/i/item/9789241505 529

[6] World Health Organization. (2024). *Malnutrition*. [Date of access: 11.01.2025] https://www.who.int/news-room/fact-sheets/detail/malnutrition

[7] Yun, T. C., Ahmad, S. R., David, K., Quee, S. (2018). Dietary habits and lifestyle practices among university students in Universiti Brunei Darussalam. *Malaysian Journal of Medical Sciences, 25*(3), 56-66.

[8] Lonati, E., Cazzaniga, E., Adorni, R., Zanatta, F., Belingheri, M., Colleoni, M., Riva, M. A., Steca, P., & Palestini, P. (2024). Health-related lifestyles among university students: Focusing on eating habits and physical activity. *International Journal of Environmental Research and Public Health, 21*(5), 1-12.

[9] Bruening, M., Argo, K., Sturges, D.P., Laska, M.N. (2017). The struggle is real: A systematic review of food insecurity on postsecondary education campuses. *Journal of the Academy of Nutrition and Dietetics, 117*(11), 1767-1791.

[10] Nikolaus, C.J., An, R., Ellison, B., Nickols-Richardson, S.M. (2020). Food insecurity among college students in the United States: A scoping review. *Advances in Nutrition, 11*(2), 327–348.

[11] Haq, I.U., Tian, Q., Ahmed, B., Nisar, M., Zubair, H.M., Yaqoob, A., Majeed, F., Shah, J., Ullah, A., Wang, S. (2021). Assessment of nutrition knowledge among university students: A systematic review. *Progress in Nutrition, 23*(2), 1-15.

[12] Öngun Yılmaz, H., Hakli, D.A., Toğuç, H., Çobanoğlu, Z., Sayar, C.Ö., Erkul, C., Günal, A.M. (2021). Nutrition knowledge scale (NKS): Development, factor structure, and validation for healthy adults. *Progress in Nutrition, 23*(3), 1-9.

[13] Yardımcı, H., Özçelik, A.Ö. (2015). Üniversite öğrencilerinin öğün düzenleri ve beslenme eğitiminin beslenme bilgisine etkisi. *Beslenme ve Diyet Dergisi, 43*(1), 19–26.

[14] Zychowicz, M.J., Plichta, M. (2022). Diet quality, dieting, attitudes and nutrition knowledge: Their relationship in Polish young adults-A cross-sectional study. *International Journal of Environmental Research and Public Health, 19*(11), 6533:1–15.

[15] Ekici, G. (2013). Yurtta kalan kız öğrencilerde beslenme alışkanlıkları ile vücut imajı, duygusal durum ve akademik başarı ilişkisi. *Ergoterapi ve Rehabilitasyon Dergisi, 1*(2), 11-19.

[16] Güneş, F., & Deveci, T. (2024). Yetişkin Eğitimi ve Hayat Boyu Öğrenme. Pegem Akademi, Sonçağ Yayıncılık Matbaacılık Reklam San Tic. Ltd. Şti. ISBN 978-605-80114-5-8.

[17] Örs, M. (2020). Öğretmenlerin beslenme bilgisine non-formal beslenme eğitiminin etkisi. *Milli Eğitim Dergisi*, 49(228), 387-419.

[18] Subaşı, Z., Türker, P.F. (2020). Özel bir kurumda çalışan bireylere verilen beslenme eğitiminin, bireylerin beslenme bilgi düzeyi ve sağlıklı yaşam biçimi davranışlarına etkisi. *Türkiye Klinikleri Journal of Health Sciences*, 5(2), 191-200.

[19] Arpa Zemzemoğlu, T.E., Erem, S., Uludağ, E., Uzun, S. (2019). Sağlık bilimleri fakültesi öğrencilerinin beslenme alışkanlıklarının belirlenmesi. *Food and Health, 5*(3), 185–196.

[20] Kartal, M., Bucak, F.K., Balcı, E. (2017). Üniversite öğrencilerinin beslenme kültürleri. *Sağlık Akademisyenleri Dergisi, 4*(4), 332–338.

[21] Belogianni, K., Ooms, A., Lykou, A., Moir, H.J. (2022). Nutrition knowledge among university students in the UK: A cross-sectional study. *Public Health Nutrition, 25*(10), 1-8.

[22] Ermiş, E., Doğan, E., Erilli, N. A., Satıcı, A. (2015). Üniversite öğrencilerinin beslenme alışkanlıklarının incelenmesi: Ondokuz Mayıs Üniversitesi örneği. *Spor ve Performans Araştırmaları Dergisi, 6*(1), 30–40.

[23] Korkmaz, N., Ürek, H., Dolu, G. (2024). Improving students' nutritional knowledge and conceptual understanding: An online course design supported by videos and images. *Journal of Formative Design in Learning, 8*(1), 47–61.

[24] Ünal, N., Şanlıer, N., Şengil, A. (2021). Pandemi döneminde üniversite öğrencilerinin çevrimiçi öğrenmeye hazırbulunuşluklarının ve uzaktan eğitime ilişkin deneyimlerinin değerlendirilmesi. *İnönü Üniversitesi Sağlık Hizmetleri Meslek Yüksek Okulu Dergisi, 9*(1), 89-104.

[25] Çelebi, İ., Koçak, H., Çalışkan, C. (2023). The relationship between disordered eating attitudes, nutritional knowledge levels, and overweight and obesity among university students: A single-center study in Türkiye. *Online Türk Sağlık Bilimleri Dergisi, 8*(4), 418–424.

[26] Ece, C., Samar, E. (2023). Determination of nutrition knowledge levels of the individual and team sport athletes. *International Journal of Eurasian Education and Culture, 8*(22), 1898-1907.

[27] Van Ansem, W.J.C., Schrijvers, C.T.M., Rodenburg, G., Van de Mheen, D. (2014). Maternal educational level and children's healthy eating behaviour: Role of the home food environment (cross-sectional results from the INPACT study). *International Journal of Behavioral Nutrition and Physical Activity, 11*(113), 1–12.

[28] Liu, K.S.N., Chen, J.Y., Ng, M.Y.C., Yeung, M.H.Y., Bedford, L. E., Lam, C.L.K. (2021). How does the family influence adolescent eating habits in terms of knowledge, attitudes and practices? A global systematic review of qualitative studies. *Nutrients, 13*(11), 3717.

[29] Aydenk Köseoğlu, S. Z., Çelebi Tayfur, A. (2017). Adölesan dönemi beslenme ve sorunları. *Güncel Pediatri*, 15(2), 44-57.

[30] Bocci, B.M., Lipari, D., Pammolli, A., Simi, R., Frongillo, E., Miserendino, A., Manini, I., Lazzeri, G.

(2024). How family structure can influence adolescents' eating habits: An Italian Health Behaviour in School-Aged Children (HBSC) 2022 sample. *Children, 11*(11), 1368.

[31] Chowaniec, A.G., Dobrowolska, M.N., Akbas, A., Bezuglov, E., Sikora, T., Waskiewicz, Z. (2024). Socio-demographic influences on dietary habits and nutritional awareness: A case study of Polish Biathlon Association National Team members. *Nutrients, 16*(21), 3784.

[32] Okumuş, B. (2004). İlköğretim öğrencilerinin okul kantinlerinden yoğun olarak satın aldıkları besinler ve tercih nedenlerine yönelik bir alan araştırması. *Akademik Gıda, 2*(4), 5–7.