

University Students' Nutritional Literacy and Associated Factors

Ayşe Sezer Balcı Kerime Ögüt Düzen Department of Nursing, Faculty of Health Sciences,
Mehmet Akif Ersoy University, Burdur, Türkiye

Sorumlu Yazar / Corresponding Author:

Ayşe Sezer Balcı

Email: asbalci@mehmetakif.edu.tr

Abstract

Objective: The aim of this study is to examine the nutritional literacy of university students and identify associated factors.**Methods:** The sample of the descriptive cross-sectional study consisted of 1306 university students from health and non-health departments of a university. The Adolescent Nutrition Literacy Scale and sociodemographic form were used as data collection tools. Mann-Whitney U test and Kruskal Wallis test were used to analyze the data.**Results:** The study revealed that the overall mean score of the Adolescent Nutrition Literacy Scale (ANLS) was 66.35 ± 7.5 (range: 34-107). Among the subscales, the Functional Nutrition Literacy (FNL) mean was 18.16 ± 5.26 , Interactive Nutrition Literacy (INL) was 18.77 ± 4.53 , and Critical Nutrition Literacy (CNL) was 29.40 ± 3.87 . The lowest score was observed in the INL subscale. Statistically significant differences were found based on gender ($p < .05$) for INL, academic department ($p < .05$ for ANLS), and food label reading ($p < .05$ for all subscales).**Conclusion:** These findings suggest that curricula in universities should be reviewed, and comprehensive nutrition education programs should be implemented for all students to improve nutrition literacy.**Keywords:** Literacy, Nutrition, Students, Turkey, University

Öz

Üniversite Öğrencilerinin Beslenme Okuryazarlığı ve İlişkili Faktörler

Amaç: Bu çalışmanın amacı, üniversite öğrencilerinin beslenme okuryazarlığı ve ilişkili faktörleri belirlemektir.**Yöntem:** Tanımlayıcı kesitsel tipteki araştırmanın örneklemini bir üniversitenin sağlık ve sağlık dışı bölümlerinde öğrenim gören 1306 üniversite öğrencisi oluşturmuştur. Veri toplama aracı olarak Adölesan Beslenme Okuryazarlığı Ölçeği ve sosyodemografik form kullanılmıştır. Verilerin analizinde Mann-Whitney U testi ve Kruskal Wallis testi kullanılmıştır.**Bulgular:** Çalışmada Adölesan Beslenme Okuryazarlığı Ölçeğinin (ABOÖ) genel ortalama puanının 66.35 ± 7.5 (min=34, max=107) olduğu bulundu. Alt ölçekler arasında Fonksiyonel Beslenme Okuryazarlığı Ölçeği (FNL) ortalaması 18.16 ± 5.26 , Etkileşimli Beslenme Okuryazarlığı Ölçeği (EBOÖ) puan ortalaması 18.77 ± 4.53 ve Kritik Beslenme Okuryazarlığı Ölçeği (KBOÖ) puan ortalaması 29.40 ± 3.87 olarak bulundu. Alt ölçeklerde en düşük puan EBOÖ alt ölçeğindeydi. Ölçek puanları ile cinsiyet (EBOÖ için $p < .01$), bölüm (ABOÖ için $p < .01$) ve gıda etiketi okuma (tüm alt ölçekler için $p < .01$ göre istatistiksel olarak anlamlı farklılıklar bulundu).**Sonuç:** Bu bulgular, üniversitelerdeki müfredatın gözden geçirilmesi ve beslenme okuryazarlığını geliştirmek için tüm öğrencilere yönelik kapsamlı beslenme eğitimi programlarının uygulanması gerektiğini göstermektedir.**Anahtar Kelimeler:** Beslenme, Okuryazarlık, Öğrenci, Türkiye, Üniversite

Geliş Tarihi/Received	11.01.2025
Revizyon Tarihi/ Revised	20.04.2025
Kabul Tarihi/Accepted	29.07.2025
Yayın Tarihi/Publication Date	22.08.2025

Atıf/Cite; Balcı Sezer A., Düzen Ögüt, K. (2025). University students' nutritional literacy and associated factors. *Halk Sağlığı Hemşireliği Dergisi*, 7(2), 87-95. <https://doi.org/10.54061/jphn.1617335>



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INTRODUCTION

The World Health Organization (WHO) defines health as a state of complete physical, mental, and social well-being, not merely the absence of disease (Nutbeam & Muscat, 2021). Health literacy, the ability to access, understand, and utilize health-related information, is essential for maintaining and improving health (Nutbeam, 2000). Adequate health literacy allows individuals to effectively navigate health services, make informed decisions, and adopt healthy lifestyle behaviors (Sorensen et al., 2021).

In this context, nutritional literacy, a sub-field of health literacy, encompasses the ability of individuals to access and understand information about nutrition and to make healthy nutritional decisions in their daily lives (Hillier-Brown, 2017; Bojang & Manchana, 2023). Nutrition literacy is a fundamental tool for maintaining and improving health and enables individuals to make the right food choices (Truman et al., 2020). Levels of nutrition literacy in the general population vary widely depending on a variety of factors, including educational level, socioeconomic status, and cultural differences (Koch et al.; Scalvedi et al., 2021; Chen et al., 2021). Low nutritional literacy leads to unhealthy eating habits, increased risk of chronic diseases and worsening overall health (Kaur et al.; 2018; Graca et al.; 2021). In cases where nutrition literacy is inadequate, individuals may have difficulty in accessing accurate information and using this information to improve their health (Savkin et al. 2022).

University years are critical period of life where students' nutritional habits and health behaviors are shaped for life (Wickham et al., 2020). In this period, nutrition literacy is of great importance for individuals to adopt and maintain healthy eating habits. During the education period, students often skip meals and frequently consume unhealthy foods such as restaurant meals, meals eaten outside the home, and fast-food (Larson et al., 2020). These eating habits can increase weight gain and increase the risk of obesity, type 2 diabetes, cardiovascular diseases, and some types of cancer (Ludwig et al., 2023).

In the existing literature, most of the studies on nutrition literacy focus on the general population, specific patient groups or high school students (Ayer & Ergin, 2021; Yilmazel & Bozdogan, 2021; Demirer & Yardimci, 2023; Bas et al., 2024; Oral & Kiziltan, 2024). There are some studies on nutrition literacy in university students (Dandin et al., 2023; Aslan Ceylan & Bayindir Gumus, 2024), but this study stands out as the study with the largest sample. This large sample increases the generalizability of the findings and provides comprehensive and reliable data on students' nutrition literacy.

The aim of this study was to determine the nutritional literacy of university students and related factors.

Research Questions:

1. What is the level of nutrition literacy of university students?
2. What are the factors affecting nutritional literacy in university students?

METHODS

Study Design: A descriptive cross-sectional epidemiologic study.

Setting: Faculty of Health Sciences, Faculty of Education, Faculty of Arts and Sciences, Faculty of Economics and Administrative Sciences, Faculty of Theology, Faculty of Engineering and Architecture, Faculty of Sports Sciences and Faculty of Veterinary Medicine of a university.

Participants

The required minimum sample size was calculated as 374 using a 95% confidence interval and 5% margin of error for a population of 13,640 students. However, as suggested in descriptive cross-sectional studies, a larger sample can provide more reliable estimates and increased generalizability. Therefore, we aimed to reach approximately four times the minimum sample size ($n=1496$), as recommended in similar studies (Pourhoseingholi, Vahedi, Rahimzade, 2013). Students were divided into two clusters as health sciences and science/social sciences students. There were 2472 students in health-related departments. There were 5 faculties related to science/social sciences with a total of 11168 students.

Dependent Variable: Adolescent Nutrition Literacy Scale score

Independent Variables: Class, gender, socio-economic status, department, income level, parents' education status, nutritional habits

Data Collection Tools: Socio-demographic Form and Adolescent Nutrition Literacy Scale were used for data collection.

Socio-demographic Form: This form was prepared by the researchers in line with the literature. A questionnaire form consisting of 32 questions determining the socio-demographic characteristics and nutritional habits of the students was used (Yilmazel, & Bozdogan, 2021; Ayer, & Ergin, 2021; Demirer & Yardimci, 2023).

Adolescent Nutrition Literacy Scale

The Adolescent Nutrition Literacy Scale (ANLS) was developed by Bari (2012) and its Turkish validity and reliability was conducted by Turkmen et al. (2017). The scale, which was developed to determine the level of nutrition literacy, consists of 22 items and three sub-dimensions. Each item is a five-point Likert scale that can be scored between 1 and 5 (1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree). The lowest score that can be obtained from the scale is 22 and the highest score is 110. Scale subscales; Functional Nutrition Literacy (FNL) subscale; This subscale consists of a total of 7 items to determine the status of adolescents to follow national and international information sources on nutrition-related issues, and all items are reverse coded. The lowest score that can be obtained from this subscale is 7 and the highest score is 35. Cronbach's alpha internal consistency coefficient is 0.66. The Interactive Nutrition Literacy (INL) subscale consists of 6 items measuring the individual's behaviors to change their eating habits with the information they have learned. The lowest score that can be obtained from this subscale is 6 and the highest score is 30. Cronbach's alpha internal consistency coefficient is 0.71. The Critical Nutrition Literacy (CNL) subscale consists of 9 items measuring the behavior of individuals to take an active role in nutrition-related issues. The lowest score that can be obtained from this subscale is 9 and the highest score is 45. Three items are reverse coded. According to the Turkish validity and reliability study by Türkmen et al. (2017), the Cronbach's alpha coefficient was found to be 0.80 for the total scale, 0.66 for FNL, 0.71 for INL, and 0.84 for CNL subscales.

The increase in the scores obtained from the scale and sub-dimensions indicates an improvement in the level of nutritional literacy.

Data Collection Procedure: Data was collected between January and June 2022. Data collection forms were distributed to the volunteer students between classes and then the completed forms were collected. The researchers took height and weight measurements of the students. During the measurements, students removed their extra clothes and shoes to obtain more accurate data. A traditional scale was used for weight measurements; a non-elastic tape measure was used for height measurements. All measurements were taken with participants standing in an upright position. The following equation was used to find BMI: $BMI = \text{weight (kg)} / \text{height (m}^2\text{)}$ and WHO standards were used for BMI classifications (WHO, 2024). The administration of the data collection tools took approximately 10 minutes for each student.

Data Analysis

IBM SPSS Statistics 22.0 (IBM) program was used for statistical analysis of the study data. Socio-demographic

characteristics were analyzed with descriptive statistics (numbers, percentages, mean and standard deviation). The suitability of the variables for normal distribution was evaluated using the Kolmogorov Smirnov Z test. Mann Whitney-U test and Kruskal Wallis-H test were used for the comparison between the descriptive characteristics of the students and their mean scores on the Adolescent Nutrition Literacy Scale (ANLS).

Ethics Issues

Ethical approval (G0=2021/356) was obtained from the Ethics Committee for Non-Interventional Clinical Research of a university before the research and institutional approval was obtained from the Provincial Directorate of National Education. All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and the Helsinki Declaration of 1964 and subsequent amendments, or comparable ethical standards. Written informed consent was obtained from the parents of children enrolled in the study.

RESULTS

Of the participants in the study, 65% were female, 88.3% were enrolled in non-health-related departments, 72.5% had a normal BMI, and 44.2% lived in student housing. The fathers of 38% of the students were primary school graduates, while 46.6% of the mothers had only completed primary school. Additionally, 55.2% of the participants reported a medium income level (see Table 1). Regarding eating habits, 55.5% of the participants consumed two meals a day, 50.7% ate breakfast regularly, and 73.1% reported skipping meals. In terms of dietary intake, 48.5% of the students consumed one serving of fruit, 59.1% ate one serving of vegetables, 67.7% had at least one serving of red meat, and 78.8% consumed fish or chicken weekly. Furthermore, 53.6% of the students reported reading food labels. When selecting food, their primary concern was cleanliness, followed by price (Table 2). The mean scores of the students ANLS were 66.35 ± 7.5 (34-107). The mean scores on the FBO, IBO, and KBO subscales were 18.16 ± 5.26 (7-35), 18.77 ± 4.53 (6-38), and 29.40 ± 3.87 (11-41) respectively.

The demographic characteristics of the students were analyzed in relation to the Adolescent Nutrition Literacy Scale (ANLS) and its subscale scores. The results revealed no statistically significant difference between gender and the scores of the ANLS and FNL subscales ($p > .05$). However, there was a statistically significant difference between gender and the mean scores of the INL and FNL subscales ($p < .05$). Additionally, a statistically significant difference was observed between students' academic departments and the mean scores of the ANLS, CNS, and INL subscale ($p < .05$), while no significant difference was found for the FNL subscale ($p > .05$). The students' place of residence

was significantly associated with the mean scores of the ANLS and FNL subscales ($p < .05$). In contrast, the analysis indicated no statistically significant relationship between the mothers' educational level and the mean scores of the ANLS and its subscales ($p > .05$). A statistically significant difference was found between the students' income level and the mean scores of the FNL and CNL subscales ($p < .05$; Table 3). Furthermore, no statistically significant differences were observed between students' BMI, fathers' education levels, and the mean scores of the ANLS, FNL, INL, and CNL subscales ($p > .05$).

The mean scores of the Adolescent Nutrition Literacy Scale and its subscales were analyzed in relation to

the students' eating habits. A statistically significant difference was found between the number of daily meals and the mean scores of the FNL and INL subscales ($p < .05$). However, no statistically significant difference was observed between the number of meals and the total scores of the ANLS subscales ($p > .05$). Furthermore, a significant association was identified between students' food label reading habits, their completion of a nutrition course, and their mean scores on the ANLS, INL, CNL and FNL subscales ($p < .05$). Additionally, there was a statistically significant difference between the habits of eating breakfast regularly and paying attention to food safety, and the mean scores of the ANLS and FNL subscales ($p < .05$).

Table 1. The sociodemographic characteristics of the participants (n=1360)

Sociodemographic characteristics	n	%
Gender		
Female	871	65
Male	489	36
Department		
Health	159	11.7
Non-health	1201	88.3
BMI		
Underweight	129	9.5
Normal weight	986	72.5
Overweight	217	16
Obese	28	2.1
Residence		
Dormitory	489	36
Student housing	598	44
Family	273	20
Father's Education Status		
Illiterate	14	1
Literate	53	3.9
Primary school	517	38
Secondary school	458	33.7
University	318	23.4
Mother's Education Status		
Illiterate	85	6.2
Literate	108	7.9
Primary school	634	46.6
Secondary school	355	26.1
University	178	13.2
Income Level		
Income less than expenses	142	10.4
Income equal to expenses	751	55.2
Income greater than expenses	467	34.4

Table 2. Participants' dietary habits (n=1360)

Dietary Habits		n	%
Number of daily meals	Two meals	444	32.6
	Three meals	755	55.5
	More than three meals	161	11.8
Breakfast Habit	Regular breakfast	689	50.7
	Irregular breakfast	671	49.3
Meal skipping behavior	Skips meals	994	73.1
	Does not skip meals	366	26.9
Daily Fruit Intake	None	356	26.2
	One serving	659	48.5
	Two servings or more	345	25.4
Daily Vegetable Intake	None	262	19.3
	One serving	804	59.1
	Two servings or more	294	21.6
Weekly Dietary Habit	Consumes at least one serving of red meat	921	67.7
	Consumes at least one serving of fish/ chicken	1071	78.8
Food Label Reading	Reads food labels	729	53.6
	Does not read food labels	631	46.4
*Factors Considered in Food Selection	Caloric content of the meal	214	15.7
	Protein content of the meal	307	22.6
	Carbohydrate content	121	8.9
	Ease of preparation	235	17.3
	Price	671	49.3
	Safety/cleanliness	936	68.8

*More than one option has been selected.

Table 3. Comparison of participants' Nutrition Literacy Scale scores with independent variables

	INL	CNL	FNL	ANLS
	Mean \pm Sd	Mean \pm Sd	Mean \pm Sd	Mean \pm Sd
Gender				
Female	19.31 \pm 4.21	29.54 \pm 3.88	17.63 \pm 5.16	66.50 \pm 7.58
Male	17.81 \pm 4.91	29.15 \pm 3.85	19.12 \pm 5.31	66.09 \pm 8.04
Statistics	Z=-5.89	Z=-1.76	Z=-5.64	Z=-.26
	p=.00	p=.07	p=.00	p=.78
Department				
Health	20.44 \pm 4.18	30.66 \pm 4.66	19.45 \pm 7.40	70.56 \pm 10.44
Non-health	18.55 \pm 4.53	29.24 \pm 3.73	17.99 \pm 4.89	65.79 \pm 7.14
Statistics	Z=-4.94	Z=-4.13	Z=-1.90	Z=-4.842
	p=.00	p=.00	p=.05	p=.00
Residence				
Private dormitory	18.61 \pm 4.52	29.30 \pm 3.71	18.45 \pm 5.17	66.37 \pm 7.38
With family	18.83 \pm 4.49	29.39 \pm 3.91	17.36 \pm 4.97	65.59 \pm 7.49
Student housing	18.94 \pm 4.63	29.63 \pm 4.08	19.40 \pm 5.76	67.97 \pm 8.69
Statistics	$\chi^2=.30$	$\chi^2=1.32$	$\chi^2=25.65$	$\chi^2=12.80$
	p=.86	p=.51	p=.00	p=.00
Mother education				
Illiterate	18.22 \pm 4.69	29.55 \pm 3.69	17.39 \pm 5.15	66.14 \pm 7.81
Literate	18.00 \pm 4.45	28.53 \pm 4.14	18.03 \pm 5.29	65.06 \pm 8.98
Primary school	18.75 \pm 4.63	29.44 \pm 3.75	18.13 \pm 5.18	66.33 \pm 7.58
Secondary school	19.00 \pm 4.19	29.47 \pm 3.91	18.52 \pm 5.46	66.51 \pm 7.65
University	19.15 \pm 4.75	29.59 \pm 4.09	20.12 \pm 5.34	67.90 \pm 1.53
Statistics	$\chi^2=5.34$	$\chi^2=5.11$	$\chi^2=15.10$	$\chi^2=8.72$
	p=.25	p=.27	p=.00	p=.06
Income level				
Income more than expenditure	18.53 \pm 4.95	28.72 \pm 4.23	19.61 \pm 5.60	66.88 \pm 8.54
Income equals expenditure	18.82 \pm 4.40	29.50 \pm 3.92	18.06 \pm 5.28	66.39 \pm 7.81
Income less than expenditure	18.77 \pm 4.62	29.46 \pm 3.67	17.89 \pm 5.06	66.13 \pm 7.41
Statistics	$\chi^2=1.46$	$\chi^2=6.45$	$\chi^2=12.27$	$\chi^2=.545$
	p=.48	p=.04	p=.00	p=.76

INL: Interactive Nutritional Literacy, CNL: Critical Nutrition Literacy, FNL: Functional Nutrition Literacy, ANLS: Adolescent Nutrition Literacy Scale, Z= Mann-Whitney U test, χ^2 = Kruskal Wallis test

Table 4. Comparison of Nutrition Habits and Nutrition Literacy Scale scores of participants

	INL	CNL	FNL	ANLS
	Mean \pm Sd	Mean \pm Sd	Mean \pm Sd	Mean \pm Sd
Daily meal				
Two meals	18.41 \pm 4.47	29.44 \pm 3.89	18.96 \pm 5.24	66.83 \pm 7.87
Three meals	18.83 \pm 4.45	29.34 \pm 3.82	17.94 \pm 5.04	66.13 \pm 7.55
More than three meals	19.47 \pm 5.01	29.57 \pm 4.08	17.03 \pm 6.02	66.08 \pm 8.30
Statistics	$\chi^2=10.05$	$\chi^2=.72$	$\chi^2=20.52$	$\chi^2=1.76$
	p=.00	p=.69	p=.00	p=.41
Food label reading behavior				
Reading the nutrition label	19.93 \pm 4.45	29.99 \pm 3.80	19.01 \pm 5.09	67.36 \pm 7.62
Not reading food labels	17.43 \pm 4.25	28.73 \pm 3.85	17.43 \pm 5.30	65.18 \pm 7.74
Statistics	Z=-10.31	Z=-6.12	Z=-6.29	Z=-4.87
	p=.00	p=.000	p=.00	p=.00
Regular Breakfast Consumption				
Regular breakfast	19.30 \pm 4.74	29.68 \pm 3.73	18.36 \pm 5.19	66.97 \pm 7.91
Does not eat breakfast regularly	18.23 \pm 4.24	29.12 \pm 4.00	17.97 \pm 5.32	65.71 \pm 7.54
Statistics	Z=-5.01	Z=-2.56	Z=-1.73	Z=-3.11
	p=.00	p=.10	p=.08	p=.00
Meal Skipping Behavior				
No skipping meals	19.49 \pm 4.75	29.78 \pm 3.78	18.10 \pm 5.62	67.38 \pm 7.90
Skipping meals	18.51 \pm 4.42	29.26 \pm 3.90	18.19 \pm 5.12	65.97 \pm 7.66
Statistics	Z=-4.15	Z=-2.18	Z=-.63	Z=-2.80
	p=.00	p=.29	p=.52	p=.00
Nutrition Course Attendance				
Taking a nutrition course	19.70 \pm 4.36	29.90 \pm 3.93	18.48 \pm 4.96	67.14 \pm 8.06
Not taking a nutrition course	18.31 \pm 4.55	29.15 \pm 3.82	17.53 \pm 5.77	65.96 \pm 7.57
Statistics	Z=-5.135	Z=-3.893	Z=-3.670	Z=-2.047
	p=.00	p=.00	p=.00	p=.041
Attention to Food Safety				
Paying attention to food safety	18.92 \pm 4.49	29.45 \pm 3.88	18.08 \pm 5.26	66.47 \pm 7.74
Not paying attention to food safety	17.49 \pm 4.68	29.01 \pm 3.77	18.84 \pm 5.20	65.35 \pm 7.77
Statistics	Z=-3.34	Z=-1.41	Z=-1.68	Z=-1.99
	p=.00	p=.15	p=.09	p=.04

INL: Interactive Nutritional Literacy, CNL: Critical Nutrition Literacy, FNL: Functional Nutrition Literacy, ANLS: Adolescent Nutrition Literacy Scale, Z= Mann-Whitney U test, χ^2 = Kruskal Wallis test

DISCUSSION

Adolescence represents a critical period during which individuals begin to take greater responsibility for their dietary choices, including what, when, and how they eat (Slater et al., 2018). Concurrently, the food environment is increasingly complex and dynamic, which poses challenges for making informed and healthy food decisions. Poor dietary habits and suboptimal diet quality can elevate the risk of malnutrition, which, over time, may lead to an increased susceptibility to non-communicable diseases later in life. Consequently, fostering healthy eating habits during the transition to adulthood is crucial for long-term health outcomes (Norris et al., 2022).

This study examined the nutritional literacy of university students and the factors associated with it. The findings indicated that students generally exhibited above-average levels of nutritional literacy, with the lowest scores observed in interactive nutritional literacy. Furthermore, students who regularly ate breakfast, did not skip meals, took nutrition courses, paid attention to food safety, and were enrolled in health-related academic programs demonstrated higher levels of nutritional literacy compared to their peers.

The finding that university students' nutritional literacy levels were above average suggests that this group generally possesses sufficient nutritional knowledge and is capable of managing their dietary behaviors. However, the low level of interactive nutrition literacy indicates that students struggle to apply their nutritional knowledge in social contexts and to effectively communicate it with others. Similar results are reported in the literature. Kalkan (2019) found that interactive nutrition literacy among young adults in Turkey was lower than in other dimensions. Likewise, Aslan Ceylan (2024) and Demirer & Yardımcı (2023) identified interactive literacy as the weakest dimension among university students. Groufh-Jacobsen et al. (2023) also noted low interactive nutrition literacy among young adults. These findings highlight that nutritional literacy is not only about acquiring knowledge but also involves the ability to apply this knowledge effectively and share it within social contexts.

In the study, it was found that students who took nutrition courses had higher nutritional literacy. This finding is consistent with similar studies in the literature. For example, Gao et al. (2023) reported that nutrition literacy levels were higher in medical students who received nutrition education. Similarly, Kalkan (2019) and Demirer & Yardımcı (2023) reported that nutrition education is effective in increasing nutrition literacy. Groufh-Jacobsen et al. (2023) found that nutrition education has positive effects especially on interactive and critical nutrition literacy. These findings suggest that nutrition education is a critical tool for improving students' nutrition knowledge

and practice skills. Therefore, the inclusion of nutrition courses in the curriculum at universities may contribute to overcoming these knowledge gaps and promoting healthy eating habits.

The study found that students enrolled in health-related departments had higher levels of nutritional literacy. This result indicates that health-related education is effective in enhancing students' nutritional knowledge and enabling them to make more informed dietary choices. Implementing more healthy eating programs and creating supportive nutrition environments in universities could further assist students in developing and maintaining healthy eating habits. This highlights the importance of incorporating health and nutrition-focused curricula to foster better nutrition practices among students.

The higher nutritional literacy of students who regularly eat breakfast suggests that these individuals tend to make more balanced food choices throughout the day. Regular breakfast eaters are less likely to consume high-calorie and low-nutrient foods later in the day. This may contribute to weight management and reduced risk of obesity, especially in young adults (Rani et al., 2021). The fact that nutritional literacy is an important element that supports healthy lifestyle choices emphasizes the importance of promoting breakfast habits.

The finding that students who do not skip meals have higher nutritional literacy highlights the influence of consistent dietary habits on individuals' overall health knowledge and their ability to adopt a healthy lifestyle. Chung (2017) emphasized that nutritional literacy enhances an individual's capacity to evaluate food choices, interpret food labels, and apply healthy cooking methods. Similarly, Spiteri Cornish & Moraes (2015) pointed out that many consumers struggle with making healthy food choices, often due to limited or misleading information obtained from sources driven by commercial interests. This underscores the importance of accurate nutritional education in empowering individuals to make informed and healthier food decisions.

The study's finding that nutritional literacy levels did not vary with BMI indicates that having nutritional knowledge alone is insufficient for ensuring healthy lifestyle choices. Aslan et al. (2023) similarly found that maternal nutritional literacy did not impact the BMI of their children. This suggests that while nutritional knowledge is important, other factors—such as behavioral, environmental, and psychological influences—also play a critical role in shaping health outcomes and lifestyle choices.

The study found that women had higher levels of critical nutrition literacy compared to men. Dandin et al. (2023) reported that female students exhibited greater nutritional knowledge and better diet quality than their male

counterparts. Similarly, Krause et al. (2018) noted that women generally display higher critical thinking skills. Ayer and Ergin (2021) also found that female students in Turkey have higher levels of nutrition literacy. These findings suggest that women may have a greater interest in health issues. To address this disparity, targeted interventions to enhance nutritional literacy among male students are needed.

CONCLUSION

This study revealed that college students' overall nutrition literacy is above average, but interactive and critical nutrition literacy needs improvement. The higher nutritional literacy observed among students in health-related fields underscores the substantial impact of education and information on dietary behaviors. Nonetheless, it is clear that knowledge alone does not ensure healthy lifestyle choices; environmental, psychosocial, and economic factors must also be considered. The association between nutrition literacy and healthy habits such as regular breakfast consumption, not skipping meals, and participation in nutrition classes highlights the importance of promoting these practices. The observed low level of interactive nutrition literacy suggests that students may struggle with applying their knowledge in social contexts. Additionally, the higher nutritional literacy among female students indicates that gender differences should be considered in designing health education programs.

In conclusion, broadening and enhancing nutrition education programs to reach all students is crucial for fostering the development of healthy eating habits and addressing knowledge gaps.

Acknowledgements: We would like to express our sincere appreciation to all the students who participated in this study for their voluntary involvement and valuable contributions. We are also grateful to the university administration for their support during the data collection process.

Financial Support: This research received no financial support

Conflict of Interest: The authors declare that they have no conflict of interest.

Ethics: This study was approved by the Burdur Mehmet Akif Ersoy University Non-Interventional Clinical Research Ethics Committee (Date: 03.11.2021, Decision no:356).

Peer-review: Externally peer-reviewed.

Author Contributions:

Research idea: ASB, KOD

Design of the study: ASB, KOD

Acquisition of data for the study: ASB, KOD

Analysis of data for the study: ASB

Interpretation of data for the study: ASB, KOD

Drafting the manuscript: ASB, KOD

Revising it critically for important intellectual content: ASB

Final approval of the version to be published: ASB, KOD

Data Availability Statement: The datasets used and analyzed during the current study are available from the corresponding author upon request.

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