

A Comparison between Attitudes and Knowledge Towards Fast-Food and Probiotics of Undergraduates

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Abstract: Consumption of fast-food is increasing rapidly, whereas fast-food does not provide enough nutrients. Probiotics contribute to optimal nutrition and health benefits. This study aims to evaluate the consumption frequency, habits, and knowledge regarding fast-food and probiotics among undergraduates. We used a face-to-face interview method to obtain the data from 405 undergraduates aged 18-24 studying in Konya, Turkey. There were 46.9% of males and 53.1% of females, with an average Body Mass Index (BMI) of $22.3 \pm 0.168 \text{ kg/m}^2$. A difference was detected in BMI according to gender ($p < 0.000$). There were 84% of the students consuming at least one fast food a day, and 58.5% consumed probiotics daily. Statistically, there was no significance between the frequency of fast-food ($p < 0.456$) and probiotic ($p < 0.680$) consumption for BMI. The fast-food knowledge scores differ according to BMI ($p < 0.004$). Probiotic knowledge scores of the overweight and obese group were lower than the other groups. A negative correlation between fast-food knowledge and BMI was ($R^2 = 0.011$). A positive correlation between probiotic knowledge and BMI was ($R^2 = 0.034$). Undergraduates consumed fast-food at high frequency, and they also know about probiotics. Nevertheless, the level of knowledge about both fast food and probiotics should be increased.

Keywords: fast-food; nutrition knowledge; probiotic; undergraduates

INTRODUCTION

Nowadays, diet-related Non-communicable diseases (NCDs) such as obesity are the global cause of cardiovascular diseases and type 2 diabetes in adolescents as well as adults.¹⁻³ Increased NCDs have a high interaction between nutrition behavior to a reduced intake of fiber-rich foods and increased intake of high fat (e.g., trans fatty acids), salt, and sugar with fast food.^{4,5} Food consumption and eating habits are shaped or reshaped during the university education process. It is known that the popular culture created by healthy eating habits and fast foods will have very important effects.⁶⁻⁸ Changing eating habits can be shown as irregular meals, skipping meals, unhealthy eating habits, and fast-food consumption with detrimental effects on adolescents.^{9,10} Fast-food consumption is rising, and the fast-food sector continues to be popular among adolescents, including university students, due to some current reasons (e.g., shorter eating time) and lifestyle. However, fast food manufacturers are creating innovative menus to consume healthier products and reveal the composition (e.g., energy, saturated fat) of the products they market by adding them to their products.¹¹⁻¹³ Unlike fast-food, probiotics were well known for very long time for healthier roles in nutrition. In Türkiye, many probiotic foods were in culinary culture made with dairy, vegetables, and grains preferred by a great majority of society. At the same time, probiotic foods could serve a balanced diet pattern in adolescents.^{14,15} There is no doubt that knowledge, attitudes, and habits are the key elements of promoting health to understanding eating behaviors and patterns in adolescents.^{16,17} Many studies¹⁸⁻²⁰ emphasize that knowledge improves positive attitudes among adolescents about the perceived health repercussions of unhealthy eating, healthy eating choices, and food preferences. Healthy food habits and attitudes involve purchasing food, meal patterns, eating habits, and healthy behaviors to assist people in meeting their nutrient intakes.^{21,22} This study aims to compare and evaluate the consumption frequency, dietary habits, and knowledge scores of university students regarding fast foods and probiotic foods.

MATERIAL AND METHOD

Model and Sampling

The research was designed as a relational survey, and the sample consisted of undergraduates between 18-24 ages who are studying at universities in Konya with a simple randomized sampling method. The data were obtained through a questionnaire using a face-to-face interview. The sample size was determined with the G*Power 3.1.9.2 program, and the effect size was 0.18, the margin of error (α) was 0.05, and the power ($1-\beta$) parameters were determined as 0.95, and the number of participants was calculated as 403.²³ Before conducting the study, approval was obtained from Selçuk University, Faculty of Health Sciences, Non-Interventional Clinical Research Ethics Committee, with the decision dated 31.03.2022 and numbered 2022/266. In addition, written informed consent was obtained from the students participating in the study.

Measurement Instrument and Data Collection

The questionnaire was developed by the researchers using various studies and the Turkish Dietary Guideline (TDG).^{24-27,28} Experts examined the questionnaire. After the necessary corrections were made, a pre-application was carried out with 15 participants. The emerging points were corrected, and the questionnaire was finalized for application. The questionnaire consisted of six sections. The first section includes demographic characteristics (e.g., age, gender) and anthropometric measurements (body weight (kg) and height(m)) of adolescents. Anthropometric measurements were taken based on students' self-records. Body Mass Index (BMI) was calculated (kg/m^2) in the Turkish Dietary Guideline (TDG) 2022. The second section included statements about fast food consumption habits, and the third section included statements about the frequency and habits of consumption of fast foods and probiotics. A 5-point Likert-type scale (every day, 3-4 times a week, once every two weeks, once a month, not consumed) was used to measure the frequency of consumption of fast-food and probiotics. In the fourth and fifth sections, 25 multiple-choice closed-ended questions were used to measure the scoring of knowledge about fast-food and probiotic foods. In both sections, 4 points were given to the correct choice, and an evaluation was made over 100 points in total. The internal consistency Cronbach's α values of the fast-food and probiotics knowledge tests were found to be 0.80 and 0.72, respectively.

Statistical Analysis

Data was analyzed with the SPSS (Statistical Pack Age for The Social Sciences) 22.0 package program. Number (n), percentage (%), mean average (\bar{x}), and standard error (SE) were used in the descriptive analysis of the data. Parametric (e.g., independent T-test, ANOVA) and nonparametric (e.g., Chi-square) tests were used to estimate differences between variables according to the normality test. Correlation and regression (r) analyses were used to analyze the parametric data. The significance (p) was accepted as 0.05 in all analyses.

Limitations

The limitations of the study design and methodology are that anthropometric measurements of undergraduates were taken based on their self-assessments. Another point is that knowledge continuously changes considering education levels in life.

RESULT

According to the results, female and male distribution was found among undergraduates of 53.1% and 46.9%, respectively. The mean age ($\bar{x}\pm\text{SE}$) was 21.5 ± 0.074 years. Another finding was found that 62.2% of the adolescents resided in public/private dormitories, 22.2% in residences/apartments, and 15.6% with their families. The mean BMI of the students was 22.3 ± 0.168 kg/m^2 ; underweight, normal, overweight, and obese detected 10.4%, 71.1%, 16.0%, and 2.5%, respectively. BMI differed by gender ($p=0.000$). Daily, the rate of consumption of only one serving of fast food was 84%, but probiotic consumption was only 58.5% of the undergraduates. Fast-food consumption differed by gender ($p=0.010$), but probiotic consumption did not ($p=0.114$). However, there was no statistical significance between fast food consumption ($p=0.456$) and probiotic consumption ($p=0.680$) according to BMI. Consumption preferences for fast food and the factors affecting preferences are shown in Table 1.

Table 1. Food Preferences and Factors of Undergraduates for Daily Fast Food and Beverage Consumption

Foods		Daily Fast-Food Consumption						P
		Yes		No		Total		
		n	%	n	%	n	%	
Hamburger	Yes	190	46.9	13	3.2	203	50.1	0.000
	No	150	37.0	52	12.8	202	49.9	
Pizza	Yes	157	38.8	18	4.4	175	43.2	0.006
	No	183	45.2	47	11.6	230	56.8	
Çiğ Köfte	Yes	173	42.7	31	7.7	204	50.4	0.637
	No	167	41.2	34	8.4	201	49.6	
Döner	Yes	211	52.1	34	8.4	245	60.5	0.141
	No	129	31.9	31	7.7	160	39.5	
Pide, Lahmacun	Yes	43	10.6	15	3.7	58	14.3	0.028
	No	297	73.3	50	12.3	347	85.7	
Sugary/Sweetened Bubbled Drinks	Yes	180	44.4	8	2.0	188	46.4	0.000
	No	160	39.5	57	14.1	217	53.6	
Factors								
Consumption Location on Campus	Inside	36	8.9	10	2.5	46	11.4	0.001
	Outside	114	28.1	35	8.6	149	36.8	
	Both	190	46.9	20	4.9	210	51.9	
Product Quality	Low	116	28.6	19	4.7	135	33.3	0.044
	High	224	55.3	46	11.4	270	66.7	
Service Staff	Yes	14	3.5	326	80.5	340	84.0	0.693
	No	2	0.5	63	15.6	65	16.0	
The Consumption Environment	Good	42	10.4	298	73.6	340	84.0	0.503
	Bad	10	2.5	55	13.6	65	16.0	
Menu	Fixed	153	37.8	35	8.6	188	46.4	0.191
	A'La Carte	187	46.2	30	7.4	217	53.6	
Service Speed	Slow	114	28.1	28	6.9	142	35.1	0.013
	Fast	226	55.8	37	9.1	263	64.9	
Price	Low	162	40.0	25	6.2	187	46.2	0.173
	High	178	44.0	40	9.9	218	53.8	
Practicability	Yes	161	39.8	22	5.4	183	45.2	0.045
	No	179	44.2	43	10.6	222	54.8	

At least one fast-food meal consumption of the duration of staying at the meal table for 30 minutes, 30-60 minutes, 1-2 hours, and 2 hours or more were determined to be 11.4%, 32.3%, 31.9%, and 8.4%, respectively and did not differ ($p=0.158$). The daily fast-food/drink consumption preferences of the undergraduates were determined as döner (52.1%), hamburger (46.9%), sugary/sweetened bubbled drinks (44.4%), çiğ köfte (42.7%), pizza (38.8%) and pide/lahmacun (10.6%), respectively. When the factors of food consumption were analyzed, the consumption location, product quality, service speed, and practicality were found to be significant ($p<0.05$). The attitudes of the undergraduates towards fast-food consumption are shown in Table 2.

Table 2. Attitudes Towards Fast-Food Consumption

Statements		5		4		3		2		1		P*
		n	%	n	%	n	%	n	%	n	%	
1. I prefer it because it is practical and quick to eat.	Yes	80	19.8	174	43.0	28	6.9	33	8.1	25	6.2	0.003
	No	9	2.2	25	6.2	8	2.0	10	2.5	13	3.2	
2. I prefer it because of its product diversity.	Yes	59	14.6	169	41.7	46	11.4	48	11.9	18	4.4	0.000
	No	4	1.0	19	4.7	15	3.7	14	3.5	13	3.2	
3. I prefer it because it is delicious.	Yes	73	18.0	182	44.9	41	10.1	24	5.9	20	4.9	0.000
	No	14	3.5	15	3.7	18	4.4	8	2.0	10	2.5	
4. I prefer them because of their affordable prices.	Yes	76	18.8	154	38.0	55	13.6	37	9.1	18	4.4	0.260
	No	13	3.2	26	6.4	9	2.2	9	2.2	8	2.0	
5. The quality of the products is important to me.	Yes	115	28.4	122	30.1	52	12.8	27	6.7	24	5.9	0.703
	No	26	6.4	23	5.7	6	1.5	6	1.5	4	1.0	
6. It is important for me that the menus are satisfying.	Yes	125	30.9	140	34.6	27	6.7	28	6.9	20	4.9	0.867
	No	24	5.9	24	5.9	5	1.2	6	1.5	6	1.5	

Statements		5		4		3		2		1		P [*]
		n	%	n	%	n	%	n	%	n	%	
7. It is important for me that the taste of the products is always the same.	Yes	102	25.2	138	34.1	48	11.9	32	7.9	20	4.9	0.868
	No	19	4.7	25	6.2	10	2.5	5	1.2	6	1.5	
8. It is important for me that the order arrives on time.	Yes	139	34.3	148	36.5	17	4.2	16	4.0	20	4.9	0.582
	No	24	5.9	26	6.4	4	1.0	6	1.5	5	1.2	
9. It is important for me that the food is reliable.	Yes	149	36.8	130	32.1	27	6.7	10	2.5	24	5.9	0.643
	No	32	7.9	21	5.2	3	0.7	3	0.7	6	1.5	
10. I pay attention to the fact that it is an institutionalized company.	Yes	85	21.0	125	30.9	70	17.3	36	8.9	24	5.9	0.278
	No	19	4.7	23	5.7	7	1.7	11	2.7	5	1.2	
11. Service excellence and friendly service are important to me.	Yes	114	28.1	153	37.8	38	9.4	17	4.2	18	4.4	0.107
	No	30	7.4	21	5.2	4	1.0	6	1.5	4	1.0	
12. Brand effect is important to me.	Yes	70	17.3	118	29.1	92	22.7	42	10.4	18	4.4	0.056
	No	14	3.5	20	4.9	10	2.5	14	3.5	7	1.7	
13. I pay attention to the assurance of cleanliness and food safety.	Yes	178	44.0	113	27.9	19	4.7	5	1.2	25	6.2	0.021
	No	31	7.7	16	4.0	10	2.5	3	0.7	5	1.2	
14. It is important for me to have menus suitable for different budgets	Yes	136	33.6	148	36.5	25	6.2	11	2.7	20	4.9	0.087
	No	29	7.2	18	4.4	7	1.7	5	1.2	6	1.5	
15. I pay attention to the design of the store decoration.	Yes	44	10.9	111	27.4	100	24.7	61	15.1	24	5.9	0.875
	No	10	2.5	24	5.9	16	4.0	10	2.5	5	1.2	
16. It is important for me that the seating areas are organized and spacious.	Yes	97	24.0	163	40.2	40	9.9	20	4.9	20	4.9	0.940
	No	16	4.0	31	7.7	9	2.2	5	1.2	4	1.0	
17. I pay attention to the ideal heating and cooling in the environment.	Yes	84	20.7	171	42.2	53	13.1	18	4.4	14	3.5	0.380
	No	18	4.4	30	7.4	7	1.7	4	1.0	6	1.5	
18. I pay attention to various promotional applications.	Yes	79	19.5	155	38.3	63	15.6	27	6.7	16	4.0	0.452
	No	13	3.2	24	5.9	16	4.0	7	1.7	5	1.2	
19. It is important for me to have easy access to restaurants.	Yes	98	24.2	159	39.3	46	11.4	23	5.7	14	3.5	0.053
	No	17	4.2	26	6.4	6	1.5	10	2.5	6	1.5	
20. Providing a social environment is important for me.	Yes	67	16.5	144	35.6	82	20.2	33	8.1	14	3.5	0.066
	No	12	3.0	22	5.4	14	3.5	9	2.2	8	2.0	
21. It is important for me that wishes and complaints are taken into consideration in institutions.	Yes	93	23.0	135	33.3	58	14.3	35	8.6	19	4.7	0.930
	No	16	4.0	29	7.2	9	2.2	7	1.7	4	1.0	
22. The advertising effect is important for me.	Yes	42	10.4	100	24.7	107	26.4	60	14.8	31	7.7	0.089
	No	9	2.2	13	3.2	15	3.7	18	4.4	10	2.5	
23. It is important for me to be able to order via the application and phone.	Yes	100	24.7	139	34.3	48	11.9	33	8.1	20	4.9	0.449
	No	15	3.7	24	5.9	12	3.0	7	1.7	7	1.7	
24. The comments of my friends about the business are important to me.	Yes	74	18.3	162	40.0	48	11.9	32	7.9	24	5.9	0.182
	No	15	3.7	22	5.4	14	3.5	10	2.5	4	1.0	
25. It is important to me to be able to sit for a long time.	Yes	110	27.2	145	35.8	44	10.9	23	5.7	18	4.4	0.625
	No	19	4.7	28	6.9	7	1.7	8	2.0	3	0.7	

⁵: Every day, ⁴: 3-4 Times a week, ³: Once every two weeks, ²: Once a month, ¹: Not consume.

^{*}: Chi-Square Test

According to Table 2, statistically important attitudes determined by the undergraduates towards fast-food, included practical and quick to eat, having a variety of products, paying attention to ensuring

cleanliness and food safety, and being delicious significantly affecting their preferences ($p < 0.05$). Table 3 shows probiotic attitudes according to the probiotic consumption of undergraduates.

Table 3. Undergraduates' Attitudes Towards Probiotic Consumption

Statements		5		4		3		2		1		p*
		n	%	n	%	n	%	n	%	n	%	
1. Probiotics contain living microorganisms that provide beneficial health effects when taken in adequate amounts	Yes	165	40.7	48	11.9	19	4.7	3	0.7	2	0.5	0.000
	No	71	17.5	62	15.3	29	7.2	3	0.7	3	0.7	
2. Probiotics help prevent cancer	Yes	72	17.8	88	21.7	68	16.8	7	1.7	2	0.5	0.003
	No	32	7.9	51	12.6	70	17.3	9	2.2	6	1.5	
3. Probiotics help reduce cholesterol levels	Yes	44	10.9	96	23.7	79	19.5	18	4.4	-	-	0.012
	No	26	6.4	58	14.3	74	18.3	6	1.5	4	1.0	
4. Probiotic food consumption regulates the digestive system	Yes	129	31.9	76	18.8	24	5.9	6	1.5	2	0.5	0.000
	No	55	13.6	63	15.6	38	9.4	11	2.7	1	0.2	
5. Probiotics play a role in the treatment of inflammatory bowel disease	Yes	90	22.2	76	18.8	58	14.3	10	2.5	3	0.7	0.011
	No	41	10.1	52	12.8	62	15.3	7	1.7	6	1.5	
6. Probiotics help strengthen the immune system	Yes	116	28.6	87	21.5	25	6.2	5	1.2	4	1.0	0.001
	No	51	12.6	69	17.0	36	8.9	7	1.7	5	1.2	
7. Probiotics help to lose weight.	Yes	56	13.8	76	18.8	86	21.2	15	3.7	4	1.0	0.209
	No	33	8.1	45	11.1	66	16.3	17	4.2	7	1.7	
8. Probiotics help prevent the growth of disease-causing microorganisms	Yes	81	20.0	103	25.4	42	10.4	6	1.5	5	1.2	0.000
	No	35	8.6	52	12.8	59	14.6	18	4.4	4	1.0	
9. Probiotics have positive effects on various allergic diseases	Yes	59	14.6	79	19.5	80	19.8	15	3.7	4	1.0	0.093
	No	31	7.7	44	10.9	72	17.8	15	3.7	6	1.5	
10. Probiotics have therapeutic effects on diarrhea.	Yes	62	15.3	85	21.0	71	17.5	14	3.5	5	1.2	0.698
	No	35	8.6	60	14.8	55	13.6	13	3.2	5	1.2	
11. Probiotic consumption should be continuously	Yes	45	11.1	85	21.0	75	18.5	24	5.9	8	2.0	0.038
	No	31	7.7	33	8.1	77	19.0	18	4.4	9	2.2	
12. Probiotics are addictive	Yes	14	3.5	19	4.7	66	16.3	81	2.0	57	14.1	0.001
	No	11	2.7	23	5.7	65	16.0	53	13.1	16	4.0	
13. Probiotics are safe	Yes	70	17.3	108	26.7	43	10.6	10	2.5	6	1.5	0.038
	No	37	9.1	65	16.0	51	12.6	9	2.2	6	1.5	
14. Probiotics can be consumed every day	Yes	59	14.6	83	20.5	76	18.8	14	3.5	5	1.2	0.000
	No	27	6.7	39	9.6	70	17.3	26	6.4	6	1.5	
15. Probiotics help regulate oral health	Yes	76	18.8	80	19.8	63	15.6	13	3.2	5	1.2	0.024
	No	30	7.4	63	15.6	56	13.8	15	3.7	4	1.0	
16. Consuming probiotics in excess causes health problems	Yes	39	9.6	56	13.8	86	21.2	38	9.4	18	4.4	0.067
	No	32	7.9	55	13.6	57	14.1	19	4.7	5	1.2	
17. Probiotics prevent all diseases	Yes	15	3.7	19	4.7	57	14.1	71	17.5	75	18.5	0.007
	No	21	5.2	18	4.4	56	13.8	38	9.4	35	8.6	
18. Probiotics can be used while on a diet	Yes	68	16.8	102	25.2	53	13.1	7	1.7	7	1.7	0.003
	No	27	6.7	65	16.0	58	14.3	12	3.0	6	1.5	
19. Probiotics affect mood	Yes	30	7.4	61	15.1	89	22.0	35	8.6	22	5.4	0.662
	No	23	5.7	37	9.1	74	18.3	22	5.4	12	3.0	
20. Probiotics have side effects on health	Yes	14	3.5	46	11.4	116	28.6	37	9.1	24	5.9	0.063
	No	17	4.2	42	10.4	81	20.0	21	5.2	7	1.7	
21. Probiotics should only be consumed when needed	Yes	16	4.0	40	9.9	67	16.5	71	17.5	43	10.6	0.000
	No	27	6.7	41	10.1	54	13.3	31	7.7	15	3.7	
22. Probiotics cause vitamin deficiencies	Yes	15	3.7	23	5.7	67	16.5	76	18.8	56	13.8	0.001
	No	11	2.7	20	4.9	75	18.5	44	10.9	18	4.4	
23. Probiotics should not be consumed during the use of antibiotics	Yes	33	8.1	31	7.7	127	31.4	22	5.4	24	5.9	0.057
	No	18	4.4	38	9.4	80	19.8	21	5.2	11	2.7	

Statements		5		4		3		2		1		p [*]
		n	%	n	%	n	%	n	%	n	%	
24. Probiotics help regulate estrogen levels	Yes	22	5.4	47	11.6	137	33.8	16	4.0	15	3.7	0.885
	No	17	4.2	27	6.7	99	24.4	12	3.0	13	3.2	
25. Probiotics inhibits pathogenic bacteria in the gut	Yes	15	3.7	13	3.2	56	13.8	53	13.1	100	24.7	0.000
	No	19	4.7	24	5.9	56	13.8	39	9.6	30	7.4	

⁵: Every day, ⁴: 3-4 Times a week, ³: Once every two weeks, ²: Once a month, ¹: Not consume.

^{*}: Chi-Square Test

When the attitudes and knowledge levels of the undergraduates about probiotics were questioned, “it helps to lose weight”, “it has positive effects on various allergic diseases”, “it has therapeutic effects on diarrhea”, “consuming too much of it causes health problems”, “it affects mood, it has side effects”, “it should not be consumed during antibiotic use”, “it helps to regulate estrogen level” were not found statistically significant ($p > 0.05$). Other attitude statements of probiotics were differed ($p < 0.05$). The mean of fast-food knowledge scores of the undergraduates whether they consumed fast-food daily were determined to be 67.2 ± 0.994 and 63.6 ± 2.478 respectively ($p = 0.158$). In addition, on the contrary to fast-food results, a difference was found between the probiotic knowledge scores by daily probiotic foods consumption (66.6 ± 1.208) and did not (50.3 ± 1.504) ($p = 0.000$). Table 4 represents the relationship between fast-food and probiotic knowledge scores according to BMI.

Table 4. The Assessment of Knowledge Scores Regarding Fast and Probiotic Foods For BMI

Knowledge Score	BMI				p
	Underweight	Normal	Overweight	Obese	
Fast-Food	71.5 ± 2.054^a	67.4 ± 1.087^a	62.2 ± 2.484^{ab}	52.4 ± 7.553^b	0.004 [*]
Probiotic	53.8 ± 3.643	60.5 ± 1.168	60.4 ± 2.638	62.4 ± 7.283	0.245
	B	Standard Deviation	β	t	p ^{**}
BMI/Fast Food	-0.038	0.009	-0.202	-4.141	0.000 ¹
BMI/Probiotic	0.015	0.008	0.088	1.809	0.071 ²
Fast Food/Probiotic	-0.095	0.055	-0.086	-1.731	0.084 ³

^{a, b, ab} Differences between groups according to Oneway ANOVA-Duncan Test

^{*} One Sample Independent T-Test

^{**} Regression Analysis: ¹ F=18.494, p=0.000, R²=0.042; ² F=4.540, p=0.034, R²=0.011; ³ F=2.995, p=0.084, R²=0.007

According to Table 4, there was a difference between the fast-food knowledge scores according to BMI ($p = 0.004$). The scores of the slightly overweight and obese groups were lower than the other groups. On the other hand, probiotic knowledge scores were similar ($p = 0.245$). A negative relationship was determined between BMI and fast-food scores with a regression analysis. As BMI increased, fast-food scores tended to decrease, and a moderate relationship was determined ($R^2 = 0.042$) ($p = 0.000$). In another important finding, a positive relationship was found between BMI and probiotic food knowledge scores, but it is not significantly different ($R^2 = 0.034$) ($p = 0.071$) on fast-food and probiotic knowledge scores ($R^2 = 0.084$) ($p = 0.084$).

DISCUSSION

Daily, only one serving fast-food consumption rate was dramatically high (84%), as in other studies (29–31). On the other hand, another striking result is when compared with the frequency of fast-food consumption of adolescents in the Turkish Nutrition and Health Survey (TBSA) 2017, it was observed that students consumed fast food much more than the average of Turkey.³² These results suggested that national and international nutrition and health organizations should pursue policies to develop healthy alternatives in the fast-food sector. Healthy food choice awareness is much better raised such as public service announcements. In addition, it is thought that undergraduates can develop quick and practical meals with preparation and cooking skills and practice.

The most preferred food was döner among undergraduates, which differed from the studies conducted in other countries.^{33, 34} At the same time, another study conducted in Türkiye revealed that döner is a highly preferred food.³⁵ In addition, it was determined that the undergraduates had a high preference for hamburgers and sugary/sweetened bubbled drinks even if they were lower than döner. Previous studies revealed that exposure to advertisements published on these platforms, along with the use of social media

at an early age, affects nutrition behavior in undergraduates.³⁶⁻³⁹ In this regard, it is thought that advertisements and social media affect on the high and frequent consumption of fast-food and sugary/sweetened bubbled drinks by undergraduates. In addition, the sale of fast food with fixed menus causes an increase in the consumption of bubbled drinks. When fast food knowledge scores and BMI are compared, it may be possible to conclude that undergraduates' weight gain is a result of their low fast-food knowledge, which leads to increased fast-food consumption.

The high prevalence of obesity among undergraduates who consume fast-food in studies conducted in Bangladesh and Saudi Arabia supports the results.^{40,41} To reduce the risk factors of chronic diseases that may occur in the future, it should aim to have targeted BMI values in the normal range of undergraduates in overweight and obese groups. To achieve these goals, undergraduates should be given nutrition education by dietitians, and their awareness about food should be increased. Nutrition education was also needed to be given to the undergraduates. The factors affecting the choice of fast-food were similar with the results of previous studies.⁴²⁻⁴⁵ It has been determined that many factors, such as the desire to socialize, changing taste perception, and practice of food preparation, affect the results of this study. The fact that a great majority of the undergraduates consumed probiotics at least once a day was similar to the results of other studies.^{46,47} By considering the relationship between probiotic knowledge levels and consumption, the fact that the knowledge scores of individuals who use probiotic nutrients are higher than those who do not use probiotic nutrients coincides with the results of studies conducted in Malaysia and Türkiye Knowledge, attitudes, and behavior about the health benefits of probiotics should be provided by experts, and their consumption in appropriate amounts should be made widespread.

CONCLUSION

It can be concluded that university students should be educated on healthy eating behaviors and healthy food preferences, and legislators should implement nutrition policies to reduce fast food consumption. In this direction, students can be educated on cooking skills and the preparation of practical foods at home. The results obtained by planning healthier menus in the fast-food sector revealed that they could be improved positively. In addition, nutrition training should be included in the policies to be implemented to increase the probiotic knowledge levels of the students, and the awareness levels of probiotics on issues such as health and nutrition should be increased. In conclusion, there is a need for further studies on the relationship between undergraduate knowledge, attitudes, and habits of fast-food and probiotics consumption. Policymakers should take action to canalize and reinforce the undergraduates to healthier foods and food choices with public service announcements.

CONFLICT OF INTEREST

There is no conflict of interest in this article.

REFERENCES

1. Bahadoran Z, Mirmiran P, Azizi F. Fast Food Pattern and Cardiometabolic Disorders: A Review of Current Studies. *Health Promot Perspect* 2015;5(4):231–40. <http://dx.doi.org/10.15171/hpp.2015.028>
2. Lachat C, Nago E, Verstraeten R, Roberfroid D, Van Camp J, Kolsteren P. Eating out of home and its association with dietary intake: a systematic review of the evidence. *Obes Rev* 2012;13(4):329–46. <http://dx.doi.org/10.1111/j.1467-789x.2011.00953.x>
3. Ledoux T, Adamus-Leach H, O'Connor DP, Mama S, Lee RE. The association of binge eating and neighbourhood fast-food restaurant availability on diet and weight status. *Public Health Nutr* 2015;18(2):352–60. <http://dx.doi.org/10.1017/s1368980013003546>
4. Fuhrman J. The Hidden Dangers of Fast and Processed Food. *Am J Lifestyle Med* 2018;12(5):375. <http://dx.doi.org/10.1177/1559827618766483>
5. Murray CJL, Abraham J, Ali MK, Alvarado M, Atkinson C, Baddour LM, et al. The state of US health, 1990-2010: burden of diseases, injuries, and risk factors. *JAMA* 2013;310(6):591–608. <http://dx.doi.org/10.1001/jama.2013.13805>
6. Majabadi HA, Solhi M, Montazeri A, Shojaeizadeh D, Nejat S, Farahani FK, et al. Factors Influencing Fast-Food Consumption Among Adolescents in Tehran: A Qualitative Study. *Iran Red Crescent Med J* 2016;18(3):23890. <http://dx.doi.org/10.5812/ircmj.23890>

7. Li L, Sun N, Zhang L, Xu G, Liu J, Hu J, et al. Fast food consumption among young adolescents aged 12-15 years in 54 low- and middle-income countries. *Glob Health Action* 2020;13(1). <http://dx.doi.org/10.1080/16549716.2020.1795438>
8. Man CS, Hock LK, Ying CY, Cheong KC, Kuay LK, Huey TC, et al. Is fast-food consumption a problem among adolescents in Malaysia? An analysis of the National School-Based Nutrition Survey, 2012. *J Health Popul Nutr* 2021;40(1). <http://dx.doi.org/10.1186/s41043-021-00254-x>
9. Deliens T, Clarys P, De Bourdeaudhuij I, Deforche B. Determinants of eating behaviour in university students: a qualitative study using focus group discussions. *BMC Public Health* 2014;14(1). <http://dx.doi.org/10.1186/1471-2458-14-53>
10. Sogari G, Velez-Argumedeo C, Gómez MI, Mora C. College Students and Eating Habits: A Study Using An Ecological Model for Healthy Behavior. *Nutrients* 2018;10(12). <http://dx.doi.org/10.3390/nu10121823>
11. Kiszko KM, Martinez OD, Abrams C, Elbel B. The influence of calorie labeling on food orders and consumption: a review of the literature. *J Community Health* 2014;39(6):1248–69. <http://dx.doi.org/10.1007/s10900-014-9876-0>
12. Petimar J, Zhang F, Cleveland LP, Simon D, Gortmaker SL, Polacsek M, et al. Estimating the effect of calorie menu labeling on calories purchased in a large restaurant franchise in the southern United States: quasi-experimental study. *BMJ* 2019;367. <http://dx.doi.org/10.1136/bmj.l5837>
13. Soo J, Harris JL, Davison KK, Williams DR, Roberto CA. Changes in the nutritional quality of fast-food items marketed at restaurants, 2010 v. 2013. *Public Health Nutr* 2018;21(11):2117–27. <http://dx.doi.org/10.1017/s1368980018000629>
14. Yabancı Ayhan N, Şimşek I. Üniversite öğrencilerinin probiyotik ürün tüketim durumları. *TSK Koruyucu Hekimlik Bülteni* 2007;6(6):449–54.
15. Soemarie YB, Milanda T, Barliana MI. Fermented Foods as Probiotics: A Review. *J Adv Pharm Technol Res* 2021;12(4):335–9. http://dx.doi.org/10.4103/japtr.japtr_116_21
16. Grace GA, Edward S, Gopalakrishnan S. Dietary Habits and Obesity among Adolescent School Children: A Case Control Study in an Urban Area of Kancheepuram District. *Indian J Community Med* 2021;46(4):637. http://dx.doi.org/10.4103/ijcm.ijcm_1013_20
17. Aktaş N, Özdoğan Y. Gıda ve Beslenme Okuryazarlığı. *Harran Tarım ve Gıda Bilimleri Dergisi* 2016;20(2):146-153. <http://dx.doi.org/10.29050/harranziraat.259105>
18. Neumark-Sztainer D, Story M, Perry C, Casey MA. Factors influencing food choices of adolescents: Findings from focus- group discussions with adolescents. *J Am Diet Assoc* 1999;99(8):929–37. [http://dx.doi.org/10.1016/s0002-8223\(99\)00222-9](http://dx.doi.org/10.1016/s0002-8223(99)00222-9)
19. Wang D, Shi Y, Chang C, Stewart D, Ji Y, Wang Y, et al. Knowledge, attitudes and behaviour regarding nutrition and dietary intake of seventh-grade students in rural areas of Mi Yun County, Beijing, China. *Environ Health Prev Med* 2014;19(3):179. <http://dx.doi.org/10.1007/s12199-013-0372-4>
20. Sun S, He J, Fan X. Mapping and Predicting Patterns of Chinese Adolescents' Food Preferences. *Nutrients* 2019;11(9). <http://dx.doi.org/10.3390/nu1092124>
21. Siu JY man, Chan K, Lee A. Adolescents from low-income families in Hong Kong and unhealthy eating behaviours: Implications for health and social care practitioners. *Health Soc Care Community* 2019;27(2):366–74. <http://dx.doi.org/10.1111/hsc.12654>
22. Vilaro MJ, Colby SE, Riggsbee K, Zhou W, Byrd-Bredbenner C, Olfert MD, et al. Food Choice Priorities Change Over Time and Predict Dietary Intake at the End of the First Year of College Among Students in the U.S. *Nutrients* 2018;10(9). <http://dx.doi.org/10.3390/nu10091296>
23. Kang H. Sample size determination and power analysis using the G*Power software. *J Educ Eval Health Prof* 2021;18. <http://dx.doi.org/10.3352/jeehp.2021.18.17>
24. Rajput A, Gahfoor RZ. Satisfaction and revisit intentions at fast food restaurants. *Future Business Journal* 2020;6(1):1–12. <http://dx.doi.org/10.1186/s43093-020-00021-0>
25. Pradito IY, Wardana AA, Lo D, Surono P. Determinants of knowledge and perception of probiotic by Jabodetabek college students. *Journal Homepage* 2020;4(5):1815–9. [http://dx.doi.org/10.26656/fr.2017.4\(5\).133](http://dx.doi.org/10.26656/fr.2017.4(5).133)
26. Dowarah LJ, Bhowmick DR, Chakraborty S. Fast food consumption behaviour among college students- a case study in tinsukia. *Current Research in Nutrition and Food Science* 2020;8(2):371–9. <http://dx.doi.org/10.12944/crnfsj.8.2.02>

27. Arshad MS, Saqlain M, Majeed A, Imran I, Saeed H, Saleem MU, et al. Cross-sectional study to assess the healthcare professionals' knowledge, attitude and practices about probiotics use in Pakistan. *BMJ Open* 2021;11(7). <http://dx.doi.org/10.1136/bmjopen-2020-047494>
28. Turkish Dietary Guideline. (2022). Türkiye Beslenme Rehberi (TÜBER) 2022. T.C. Sağlık Bakanlığı. Yayın No: 1031, Ankara.
29. Bergeron N, Al-Saiegh S, Ip EJ. An Analysis of California Pharmacy and Medical Students' Dietary and Lifestyle Practices. *Am J Pharm Educ* 2017;81(8):56–64. <http://dx.doi.org/10.5688/ajpe5956>
30. Jacob L, Stubbs B, Firth J, Smith L, Haro JM, Koyanagi A. Fast food consumption and suicide attempts among adolescents aged 12–15 years from 32 countries. *J Affect Disord* 2020;266:63–70. <http://dx.doi.org/10.1016/j.jad.2020.01.130>
31. Kazi RNA, El-Kashif MML, Ahsan SM. Prevalence of salt rich fast food consumption: A focus on physical activity and incidence of hypertension among female students of Saudi Arabia. *Saudi J Biol Sci* 2020;27(10):2669–73. <http://dx.doi.org/10.1016/j.sjbs.2020.06.004>
32. Turkish Nutrition and Health Survey. (2019). Türkiye Beslenme ve Sağlık Araştırması (TBSA) 2017. T.C. Sağlık Bakanlığı Halk Sağlığı Genel Müdürlüğü, Yayın No: 1132, Ankara.
33. Khongrangjem T, Dsouza SM, Prabhu P, Dhange VB, Pari V, Ahirwar SK, et al. A study to assess the knowledge and practice of fast food consumption among Pre-University students in Udupi Taluk, Karnataka, India. *Clin Epidemiol Glob Health*;6(4):172–5. <http://dx.doi.org/10.1016/j.cegh.2017.11.003>
34. Saeed S, Mahmoodabad M, Mahbobirad M, Asadpour M, Akbar Vaezi A, Fallahzadeh H, et al. Determiners of fast-food consumption in Iranian university students: Application of prototype/willingness model *J Educ Health Promot* 2020;9:345. http://dx.doi.org/10.4103/jehp.jehp_466_20
35. Öztürk D, Onurlubaş E. Üniversite Öğrencilerinin Fast-Food Tüketim Alışkanlıklarının İncelenmesi. *Gaziosmanpaşa Bilimsel Araştırma Dergisi* 2022;11(3):221-232.
36. Çimke S, Cerit E. Social media addiction, cyberbullying and cyber victimization of university students. *Arch Psychiatr Nurs* 2021;35(5):499–503. <http://dx.doi.org/10.1016/j.apnu.2021.07.004>
37. Gascoyne C, Scully M, Wakefield M, Morley B. Food and drink marketing on social media and dietary intake in Australian adolescents: Findings from a cross-sectional survey. *Appetite* 2021;166:105431. <http://dx.doi.org/10.1016/j.appet.2021.105431>
38. Tami S, Alyousef A. The Effect of Food Advertisements on Social Media on the Dietary Behaviors of the Community of King Faisal University in Saudi Arabia. *Curr Dev Nutr* 2022;6:866. <http://dx.doi.org/10.1093/cdn/nzaco65.050>
39. Velazquez CE, Daepf MIG, Black JL. Assessing exposure to food and beverage advertisements surrounding schools in Vancouver, BC. *Health Place* 2019;58:102066. <http://dx.doi.org/10.1016/j.healthplace.2018.12.007>
40. Goon S. Fast Food Consumption and Obesity Risk among University Students of Bangladesh. *European Journal of Preventive Medicine* 2014;2(6):99. <http://dx.doi.org/10.11648/j.ejpm.20140206.14>
41. Shori AB, Albaik M, Bokhari FM. Fast food consumption and increased body mass index as risk factors for weight gain and obesity in Saudi Arabia. *Obes Med* 2017;8:1–5. <http://dx.doi.org/10.1016/j.obmed.2017.09.002>
42. Lee K, Hyun J, Lee Y. Why do and why Don't people consume fast Food?: An application of the consumption value model. *Food Qual Prefer* 2022;99:104550. <http://dx.doi.org/10.1016/j.foodqual.2022.104550>
43. Ma R, Castellanos DC, Bachman J. Identifying factors associated with fast food consumption among adolescents in Beijing China using a theory-based approach. *Public Health* 2016;136:87–93. <http://dx.doi.org/10.1016/j.puhe.2016.03.019>
44. Mwafi NR, Al-Rawashdeh IM, Al-Kubaisy WAQ, Ezzat WR, Al-Qazaqi RA, Salameh MH. Prevalence and factors related to obesity and fast food consumption among Mutah University students, Jordan. *J Pak Med Assoc* 2021;71(6):1608–12.
45. Namin A. Revisiting customers' perception of service quality in fast food restaurants. *Journal of Retailing and Consumer Services* 2017;34:70–81. <http://dx.doi.org/10.1016/j.jretconser.2016.09.008>
46. Horasan B, Sevinç Ö, Çelikyürek NA. Üniversite Öğrencilerinin Probiyotik Bilgi Düzeyi ve Tüketim Durumlarının Belirlenmesi. *European Journal of Science and Technology* 2021;(31):446–53. <http://dx.doi.org/10.31590/ejosat.999946>

47. Ong TS, Tan ST, Tan SS, Tan CX. Knowledge, attitudes, and practices towards probiotics for gut-skin axis among health science undergraduates: An online cross-sectional study. Food and Humanity 2023;1:38–43. <http://dx.doi.org/10.1016/j.foohum.2023.04.001>