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Research Article

Investigation of University Students' Packaged Food Consumption and Label Reading Knowledge*

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Abstract

Objective: Food labels are the identity of foods. They enable us to access information about the reliability of foods and how clean their content is. This study aims to examine university students' packaged food consumption and label reading knowledge.

Method: The study was conducted with 258 university students studying in the faculty of health sciences and other departments at a foundation university. The packaged food consumption and label reading information of both groups were examined. The data in the study was collected face to face with a survey method on a voluntary basis.

Results: Fifty-three percent of the participants stated that they consume packaged food 3-4 times a week, and 56.7% of these people prefer chocolate and chocolate packaged foods. 41% of the participants who consume packaged food stated that the reason for consuming packaged food was ease of access. 56.7% of them stated that they were unsuccessful in understanding the nutritional value table on the labels. 78% of the participants stated that they consulted the label information when buying packaged food. 84.7% of the participants who read the label information said that they examined the expiration date. Those staying at the dormitory preferred the reason for consuming packaged food to a higher extent than those staying at family homes and student houses (p<0.05).

Conclusion: The lack of nutrition and health education courses or activities at universities may prevent this awareness from developing. Increasing label reading skills can be an important step towards improving general health and establishing healthy lifestyle habits. Instead of using complex terms on labels, simple language that everyone can understand should be encouraged. For this purpose, governments and food manufacturers can work on making labels more understandable.

Keywords: Nutritional label reading level, Packaged food consumption, Undergraduate departments.

INTRODUCTION

Nutrition is a basic food need that refers to the intake of what is necessary for growth, survival and maintenance of health. Research has shown that nutritional habits have significant impacts on health (Özer et al., 2021). Among university students, unhealthy eating behaviors such as irregular meals and skipping breakfast are more common than among high school students. This may be due to increased time spent away from home, lack of cooking skills, and limited time (Erdenebileg et al., 2018).

Food Labeling

The labeling of packaged foods refers to "any written, printed, or graphic matter that is present on the packaging, documents, notices, or labels accompanying or referring to the food." The type and content of nutrition labels must clearly state nutritional value, instructions for use, and shelf life. Labels must include information on total fat, total energy, sodium, sugars, vitamins, minerals, carbohydrates, and protein (TGK, 2017; Mansingh et al., 2015).

Nutrition labeling on packaged food products is increasingly important in helping consumers make informed choices. It is essential for public health that food labels be easy to understand and that consumers read them. These labels serve as a means of communication from production to the final consumer. Encouraging broader use of nutrition labels is critical for monitoring food and calorie intake and making informed dietary decisions (FAO, 2020; Ikonen et al., 2020; WHO, 2019; Kim et al., 2016). Reading food labels before purchasing allows consumers to make healthier and more conscious food choices. Educating global consumers to read and understand food labels could help prevent both communicable and non-communicable diseases. Since consumer food behaviors are linked to food label reading habits, manufacturers are responsible for ensuring that label information is accurate and compliant with regulations.

University students face new demands in adult life, such as living away from home and being responsible for purchasing and preparing their meals. However, they do not always opt for healthy choices, and their diets are often of low nutritional quality and nd generally not aligned with scientifically recommended healthy dietary patterns (e.g., Mediterranean diet). Students often attend classes after long hours of physical and mental effort with insufficient or skipped meals, which may affect their academic performance (Chacón-Cuberos, 2018). Habits formed during university often persist into later life (Sprake, 2018).

Food labels are tools that directly communicate product information and support adequate and balanced nutrition. They contribute to making quality, accurate, and reliable food choices (Çapar & Çimen, 2024).

The purpose of food labels is to facilitate food selection, provide nutritional knowledge, and thus protect public health. Nutrition labels with regulated content, used in many countries, help increase consumers' awareness of nutrition (Kim et al., 2016).

Food labels on product packages contain various essential details to inform consumers. These include:name of the food ingredients, serving size, energy value, carbohydrates, fat, protein, fiber, sugar, salt, vitamins, and minerals, reference intake values, nutrition claims, net quantity, country of origin, expiry date, storage and consumption conditions, manufacturer/packer's name, brand, address, place of production, batch number, serial number, production license date and number, registration number, import certificate details (Norman, 2023).

Food labels are generally categorized under three main headings: a) Ingredient List: Lists additives, oils, added sugars, grains, and other food items in the product. b) Nutrition Facts Label: Includes serving size, total servings, total energy, total fat, saturated fat, cholesterol, trans fat, sodium, carbohydrates, dietary fiber, sugar, protein, and vitamins/minerals. 98% of packaged products in the U.S. and 84% in Europe contain nutrition labels. c) Nutrition Claims: If a product is enriched with a nutrient, claims such as fat-free, low-fat, low-calorie, or source of fiber may be used. These claims must be approved by regulatory authorities (Norman, 2023).

Turkish Food Codex (TGK)

TGK defines the standards for food products sold in Türkiye. Regulations are enforced by the Ministry of Agriculture and Forestry (TGK, 2017). Nutrient amounts on labels must be specified per 100 g, 100 ml, or per portion. If a vitamin or mineral meets at least 5% of the Reference Nutrient Intake, this must be indicated. According to TGK's Nutrition and Health Claims Regulation, expressions such as "treats" or "cures" are prohibited and all claims must be based on scientifically accepted evidence. According to TGK's Food Additives Regulation, additives must be listed on labels, and the species of animal source must be stated for animal-derived additives (TGK, 2017).

The 2017 update to TGK's Food Labeling and Consumer Information Regulation introduced limitations on terms such as "super," "extra," "premium," and banned expressions like "homemade" or "just like mom made" for industrial foods. Claims like "real" or "authentic" for specific ingredients are also prohibited (TGK, 2017).

Studies show that individuals with higher education levels are more inclined to read food labels. This suggests they understand and benefit more from the information provided (Alotoibi et

al., 2023). The rise in health concerns has made individuals more cautious about food and encouraged label reading (Yıldırım, 2012). Joseph and Tan's study of 310 young people examined the relationships between label reading and food choice motivations. The results indicate significant and positive relationships between label reading and food choice motivations such as health, weight control, and natural ingredients. However, it is emphasized that these changes are complex, and further research is needed to determine whether label reading alone directly influences healthy food choices (Joseph & Tan, 2023). Consumers with nutrition knowledge tend to use labels for healthier choices, whereas those without are more likely to make poor choices (Kemaloğlu & Kemaloğlı, 2024).

The primary objective of this study is to examine university students' packaged food consumption habits and their reading of food labels. This study aims to assess students' frequency of packaged food preferences, label-reading behaviors, and utilization of label information (content, nutrients, additives, expiration date, etc.) and to investigate the impact of label-reading habits on students' nutritional preferences, awareness of healthy eating, and informed product selection.

METHODS

Research Group

Among those registered on the study day of 30.12.2023-30.02.2024, there were 258 sighted undergraduate students gathered at Istanbul Kültür University. Participants were enrolled in the Faculty of Health Sciences (Departments of Nutrition and Dietetics, Nursing, Physiotherapy and Rehabilitation), and additional departments such as Psychology, Architecture, Engineering, Molecular Biology and Genetics, Business Administration, and Media and Communication. Data was collected voluntarily through an online and/or face-to-face

questionnaire. It is a descriptive and crosssectional research.

Data Collection Tools

A structured, two-part survey form, developed by the researchers using literature, was used as the data collection tool. The first part included questions regarding the participants' sociodemographic characteristics (age, gender, department, grade, living situation, economic status), as well as multiple-choice questions to assess packaged food consumption habits (frequency of consumption, reasons for preference, perceived health effects, and external factors such as family/friends/media). The second section examined food label reading habits. This included questions about the frequency of label reading, the most frequently observed label information (energy nutritional information, ingredients, additives, expiration dates, allergen information, etc.), participants' awareness of label information, and whether they had received any training on this topic. Additionally, the 11-item Food Label Reading Attitude Scale was administered to measure students' attitudes toward reading food labels. This scale was developed by Seçkin S. in 2019 (Seçkin 2019). It is a five-point Likert-type scale and consists of 11 items. Responses to the items in the scale are scored as "strongly disagree = 1," "disagree = 2," "undecided = 3," "agree = 4," and "strongly agree = 5." Higher scores on the scale indicate that students have more positive attitudes toward food labels.

Data Analysis

SPSS (Statistical Package for Social Sciences-IBM, Chicago, IL, USA) program was used for statistical analysis of the data used in the study. Categorical variables were expressed as frequency, percentage, mean and standard deviation in the demographic information section (gender, education, living environment, income view,

employment status, BMI, weight change, diet type, etc.).

In determining the method to be used in the analysis of the data, normality analysis was applied. In this sense, Shapiro-Wilk Test and kurtosis-skewness measures were evaluated. The study was conducted at 95% confidence level (p<0.05). In the light of the results of the normal distribution analysis, t-test was used to find the statistical difference between the two groups. ANOVA test was used to find statistical differences between three groups. Chi-Square analysis was used to examine the relationships between categorical variables.

RESULTS

When Table 1 is analyzed, 53% of the participants stated that they consume packaged food 3 to 4 times a week. 20.5% of the participants stated that they consume packaged food once a week. Most of the participants (56.7%) stated that they prefer packaged foods in chocolate and chocolate food consumption. 41% of individuals cited ease of accessibility as the reason for packaged food consumption. 61.2% of the individuals think that packaged food consumption affects body weight. Approximately half of the participants (49.3%) think that where they live has an effect on packaged food consumption. 78% of the participants stated that they consult label information when buying packaged food. 36.7% of the individuals considered macronutrients important. 31% of the participants did not consider the labels of packaged foods to be adequate. In general, participants stated that they did not access product information using QR codes (72%). About half of the individuals (50.4%) stated that they had information about how the label content of packaged foods would affect their bodies. 60.4% of the participants stated that they had the habit of reading labels. A large majority said that they examined the expiry date (84.7%). 60.4% of the individuals stated that they do not examine calories. 63.8% of the participants stated that they do not examine the sugar

content of packaged foods. 82.1% of individuals stated that they were not interested in fiber content. Overall, half of the respondents reported having an idea about the nutritional value table (56.7%). About half of the individuals stated that they were aware of the label

information on the packaging (50.7%). 54.1% of the respondents said that label reading had an impact on packaged product consumption. Most of the participants stated that they had not received any training on food label reading (73.1%).

Table 1. Distribution of participants' packaged food consumption and label opinions

Variable	Level	n	%
English of the class of feed	Once or more daily	71	26.5
Frequency of packaged food consumption	3–4 times a week	142	53.0
Consumption	Once a week	55	20.5
	Taste	97	36.2
Peacen for concuming nackaged food	Accessibility	110	41.0
Reason for consuming packaged food	Lack of time	48	17.9
	Living independently	13	4.9
	Chocolate/chocolate-based products	152	56.7
Droformed type of packaged food	Fit/healthy products	42	15.7
Preferred type of packaged food	Baked goods	32	11.9
	Sugary foods	42	15.7
Da con third was lossed for all affinite con-	Yes	164	61.2
Do you think packaged food affects your body weight?	No	32	11.9
body weight:	Sometimes	72	26.9
Do you think your place of residence	Yes	132	49.3
affects your packaged food	No	82	30.6
consumption?	Sometimes	54	20.1
	Yes	91	34.0
Do you read the labels when consuming packaged food?	No	59	22.0
packageu 100u:	Sometimes	118	44.0
	Yes	74	27.6
Are macronutrient distributions important to you?	No	97	36.2
Important to you:	Sometimes	97	36.2
	Yes	72	26.9
Do you find the food labels sufficient?	No	83	31.0
	Sometimes	113	42.2
	Yes	25	9.3
If you find labels insufficient, would you scan a QR code for more information?	No	193	72.0
scarra QN code for more information:	Sometimes	50	18.7
	Yes	135	50.4
Are you aware of how the label contents affect your body?	No	54	20.1
arrect your body:	Sometimes	79	29.5
Do you have a habit of reading food	Yes	162	60.4
labels?	No	106	39.6
Do you shock the expiration data?	Yes	227	84.7
Do you check the expiration date?	No	41	15.3

Variable	Level	n	%
Do you check calories?	Yes	106	39.6
Do you check calonies!	No	162	60.4
Do you shock sugar content?	Yes	97	36.2
Do you check sugar content?	No	171	63.8
Do you check fiber content?	Yes	48	17.9
Do you check liber content:	No	220	82.1
Harris all days and anaton dates	Poorly	65	24.3
How well do you understand the nutritional value table?	Well	152	56.7
ilutificinal value table:	Very well	51	19.0
Are you aware of mandatory labeling	Yes	136	50.7
requirements on packaging?	No	132	49.3
Does label reading affect your	Yes	145	54.1
consumption of packaged foods?	No	123	45.9
Have you received any education on	Yes	72	26.9
reading food labels?	No	196	73.1

In Table 2, it is seen that the level of attitude towards nutritional labeling of individuals studying in the faculty of health sciences (46.0 ± 8.1) is higher than that of individuals studying in other faculties (36.3 ± 10.8) (p<0.05). It was determined that the attitude towards reading food labeling did not differ according to gender (p>0.05). It was determined that there was no difference in attitude towards reading food labels according to place of residence (p>0.05). When Table 3 is examined, it is determined that there is a relationship between packaged food consumption according to the place of residence (p<0.05).

When the table is examined, the reason for packaged food consumption of those staying in the dormitory preferred the reason of accessibility at a higher rate than those staying in the family house and student house. Likewise, those who stayed in the student house showed the reason of accessibility compared to those who stayed in the family house. The reason for the preference of those staying in the family house was flavor more than the other reasons for preference.

Table 2. Differences in food label reading attitudes based on faculty, gender, and place of residence

Variable	Group	n	Mean	SD	t	р
Faculty	Health Sciences	Health Sciences 114 46		8.1	7.002	0.000
	Other Faculties	154	36.3	10.8	7.992	0.000
Gender	Female	184	41.2	10.3	1 70	0.076
	Male	84	38.7	11.8	1.78	
Place of Residence	Family Home	184	40.8	10.66		
	Student Apartment		39.6	11.36	0.447	0.640
	Dormitory	31	39.3	11.33		

p=significance level; if p<0.05 is significant between groups.

Table 3. Relationship between place of residence and reason for packaged food consumption

Place of Residence	Taste	%	Accessibility	%	Time Constraint	%	Living Independently	%	Total	%
Family Home	86	88.7	65	59.1%	33	68.8	0	0.0	184	100
Student Apartment	9	9.3	21	19.1%	12	25.0	11	84.6	53	100
Dormitory	2	2.1	24	21.8%	3	6.3	2	15.4	31	100

Table 4. Relationship between faculty and certain label reading behaviors

Behavior	Response	Health Sciences (%)	Other Faculties (%)	Total (%)	p-value
Expiration Data	Check	84.2	85.1	84.7	0.489
Expiration Date	Don't Check	15.8	14.9	15.3	
Calories	Check	45.6	35.1	39.6	0.049
Calonies	Don't Check	54.4	64.9	60.4	
Sugar Contont	Check	47.4	27.9	36.2	0.001
Sugar Content	Don't Check	52.6	72.1	63.8	
Fibor Contont	Check	28.9	9.7	17.9	0.000
Fiber Content	Don't Check	71.1	90.3	82.1	
	Yes	45.61	25.32	33.96	0.000
Label Info Reading	No	12.28	29.22	22.01	
	Sometimes	42.11	45.45	44.03	
Label Booding Habit	Yes	74.56	50.00	60.45	0.000
Label Reading Habit	No	25.44	50.00	39.55	
Awareness of Required Label	Yes	73.68	33.77	50.75	0.000
Info	No	26.32	66.23	49.25	
Impact of Label Reading on	Yes	65.79	45.45	54.10	0.001
Packaged Food Consumption	No	34.21	54.55	45.90	

p=significance level; if p<0.05 is signifivant between groups

When Table 4 was analyzed, it was found that the date of expiry did not show a relationship with the faculty of study (p>0.05). It is a statistical result that calorie reading is higher in students studying in the faculty of health sciences (p<0.05). It was determined that the level of reading sugar content and fiber content was higher in students studying in health sciences compared to other departments (p<0.05). According to the table, it was determined that the attitude towards reading label information differed according to the department studied (p<0.05). It is seen in the table that the attitude

of students studying in the faculty of health sciences towards reading label information is higher than students studying in other departments. It was statistically determined that the label reading habit of the students studying in the faculty of health sciences was higher than the students studying in other faculties (p<0.05). It was statistically determined that the awareness of label information of the students studying at the Faculty of Health Sciences was higher than the students studying at other faculties (p<0.05). When the table is examined, it is statistically determined that the effect of label

reading on packaged food consumption of students studying in the Faculty of Health

DISCUSSION

In this study, 68.7% of the participants were female. A total of 68.7% stated that they lived with their families. Among those included in the study, 42.5% reported studying in a faculty of health sciences.

Regarding the consumption of packaged foods, 53% of participants stated they consumed packaged foods 3-4 times a week, 26.5% consumed them once a day, and 20.5% consumed them once a week. The frequency of packaged food consumption appears to be increasing across all food groups. In Bulut's (2022) study, a significant portion of participants (61%) consumed packaged foods at least 3-4 times a week. Regardless of their views on the healthiness of such products, young people seem to consume packaged foods frequently. Westernstyle and traditional foods were consumed 1–2 times a week, whereas bakery products were consumed daily. Increased appetite could be a contributing factor, and rising consumption may lead to weight gain. Individuals should manage their appetite and not allow easy access to food to become a disadvantage.

According to a study by Fondevila et al. (2022), 52% of students preferred packaged foods to save time, 38% for taste and satisfaction, and 20% for economic reasons. Uğur (2018) found that university students cited practicality (59.5%) as the top reason for consuming ready-to-eat foods, followed by affordability (18.3%), taste (16.5%), healthiness (2.5%), popularity (2.3%), and safety (1%). In a study by Bayhan et al. (2015), factors influencing students' preference for fast food outlets included taste and freshness (30.43%), quality (23.46%), cleanliness (16.07%), price (12.50%), quick and good service (7.61%), staff attitude (4.35%), accessibility (3.04%), and

Sciences is higher than the students studying in other faculties (p<0.05)

advertising (2.54%). In our study, 36.2% of participants preferred packaged foods for taste, 41% due to accessibility, 17.9% due to time constraints, and 4.9% because they lived independently (Fondevila et al., 2022).

Food labels provide information at the point of purchase and help consumers make healthier choices. Therefore, it is important that labels are simple and understandable, and that consumers develop the habit of reading them. However, it is known that most consumers do not use labels correctly or do not have the habit of reading them. A study in Turkey found that 72.3% of individuals reported reading food labels. Another study showed that this habit varies by country: 52% in the UK, 65% in Ireland, 50% in Sweden, 63% in France, 44% in Portugal, and 33.2% in Italy reported reading labels (Cebeci & Güneş, 2017). While the habit seems higher in Turkey compared to European countries, factors like education level, age, and economic status could influence these results. Few studies focus on how effectively people use label information.

Studies investigating the causes of obesity—resulting from unhealthy food choices and linked to chronic diseases—highlight factors such as age, gender, education level, income, marital status, eating habits, smoking, alcohol consumption, and physical activity. Therefore, correctly reading and interpreting labels is important for consumer health. Among individuals in our study who reported reading labels, the most commonly read sections were the ingredients list, production date, and expiration date (Gül & Dikmen, 2018).

Yaman found that 75.7% of consumers sometimes and 24.3% always read label information. In a survey by Yalçın (2024), 66.3% of 523 consumers said they did not read label information. Another study found that 25% never

read labels and 75% read them occasionally. A relationship was found between gender and label reading, with women reading labels more often than men (Yalçın & Sevim, 2024). Similarly, in our study, 55.8% of female students and 45.0% of male students read label information when buying packaged foods. In the study by Fondevila et al., 36% of participants always, 54% sometimes, and 10% never read nutrition information on labels. In our findings, 78% of participants reported consulting label information when purchasing packaged food, and 60.4% had a regular habit of reading labels (Yaman et al., 2017).

In Duran's study, 55.4% of participants found label information insufficient, citing reasons such as incomplete information, lack of clarity, poor visibility, failure to reflect full content, not describing the preparation process, and not mentioning harmful aspects. Özgül and Aksulu noted that low consumer sensitivity to label information is primarily due to distrust in the information provided by food companies. Among those with a label-reading habit, 65.7% found the labels insufficient, compared to 45.4% of those without the habit. In the study by Coşkun and Kayışoğlu, 7.3% of female participants considered labels very reliable, 72.4% somewhat reliable, and 20.3% not reliable. Among males, 6.3% found them very reliable, 76.4% somewhat reliable, and 17.2% not reliable (Coşkun et al., 2016). In our study, 26.9% found label information sufficient, 31% did not, and 42.2% found it sufficient sometimes.

In the study by Coşkun, female students read label information more than male students. Özgen reported that 65.0% of women and 51.0% of men examined nutrient values on labels (Coşkun & Kayışoğlu, 2016). However, other studies have found the opposite. Some studies show a gender difference in label-reading habits, with women showing higher levels. Aksulu's

study found no significant relationship between gender and label reading. Kayışopğlu (2020) found that men read labels less and were less concerned with nutrition and health than women. Gökçen's study showed women read labels more often than men, though the difference was not statistically significant (Gökçen, 2021). Christoph et al. found that female students had higher knowledge and awareness about reading nutrition labels than male students. Our findings indicated no significant gender difference in label-reading attitudes (Christoph et al., 2016).

In a study conducted by Wang, provides detailed data on consumer attention to various components of food nutrition labels. The study found that among label readers, the most frequently checked items were: expiration date: 98.4%, production date: 65.6%, ingredients list: 59.3%, origin: 28.1%, additives: 46.8%. (Wang, 2024). Label readers pay more attention to freshness and expiration dates when purchasing food. Duran found that those who read labels paid more attention to nutritional values, particularly carbohydrates and fat. Alpuğuz et al. found that students mostly focused on expiration date, whether the package was sealed, and the brand. In our study, 84% of participants checked the expiration date on the package.

According to Gürbüz et al., factors influencing packaged food preference included price, accessibility, cleanliness, time-saving, liking the environment, variety, being with friends, advertising influence, satiety, curiosity, taste, and popularity. The most influential factor was "environmental conditions" (Gürbüz et al., 2022). Tarabishi et al. found that In a study conducted by Tarabishi et al., male students reported eating most of their meals outside, while female students reported eating more at home. This difference was found to be statistically significant. (Tarabishi et al., 2024). In our study,

dormitory residents cited accessibility more than those living with family or in student housing. Similarly, student housing residents cited accessibility more than those living at home. Those living with family prioritized taste more than other reasons. These findings suggest that living standards in dormitories lead to increased accessibility to packaged foods among university students.

Our study found that 34.0% of students received training on nutrition and food labeling, and 75.5% of these received this training as part of the school curriculum. These findings reflect the prevalence of nutrition education in schools in Türkiye and its place in school curricula. For example, one study reported that 60.8% of students received a healthy nutrition course at school (Akman et al.,2017). However, 36.0% of students consider their diet healthy, while 64.0% do not. This suggests that the impact of nutrition education on student perceptions may be limited. Another study noted that 66.8% of students received information about adequate and balanced nutrition, but this information did not have a significant impact on their eating habits (Ayer & Ergin, 2021). These results suggest that simply incorporating nutrition education into the school curriculum is not sufficient to improve students' perceptions and habits of healthy eating. Factors such as the content, delivery method, and continuity of education are also believed to be influential. Furthermore, students' individual characteristics, their families' eating habits, and environmental factors are also important factors influencing nutritional perceptions. Consequently, to increase the effectiveness of nutrition education, it is recommended that the curriculum be revised, education be supported with interactive and hands-on methods, and families be included in the process. This will positively impact students' perceptions and habits of healthy eating.

The findings show that attitudes toward label reading differ based on the student's department. Students in the health sciences had significantly higher label-reading habits compared to students from other faculties. This suggests that students in health sciences have more knowledge about food content, additives, macro and micronutrients, and thus, more developed label-reading skills.

In this study, 72% of participants reported that they could not access detailed product information using QR codes on packages. According to Kocaman and Sariahmetoğlu, smart packaging tools and QR applications are key for traceability systems and sustainable food safety. They can help prevent the consumption of improperly stored products by verifying expiration dates and freshness, potentially preventing foodborne illnesses and economic loss, while providing effective solutions for producers and consumers alike.

CONCLUSION

This study reveals the food label reading habits of university students and the relationship between these habits and various demographic factors. The findings showed that most of the students recognized the importance of reading food labels, but had difficulty in fully understanding them. Factors such as gender, education level and place of residence significantly influence students' food label reading habits. In particular, female students and those with higher education levels were found to read food labels more carefully. This emphasizes the need to improve food label reading habits and the positive effects of these habits on healthy nutrition.

Expanding nutrition education programs at universities can improve students' ability to read and understand food labels. These programs should include how to read food labels and what information to consider. Awareness campaigns on university campuses can increase students' food label reading habits. These campaigns can

encourage students to make more informed food choices in their daily lives. Food manufacturers should improve label design to make nutrition labels more understandable and user-friendly. Simpler and more descriptive labels can make it easier for consumers to understand them. Supporting materials for university students, such as brochures, leaflets, handbooks and mobile apps, can provide practical information on how to read food labels and healthy eating. Universities can increase knowledge and develop effective strategies by conducting research on improving food label reading habits.

These recommendations are aimed at increasing university students' food label reading habits and promoting healthy eating behaviors. Education and awareness activities will play a critical role in helping students adopt healthy lifestyles.

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REFERENCES

Alotaibi, N.M., Alshammari, G.M., Alabdulkarem, K. & Yahya, M.A. (2023). A cross-sectional study of gender differences in calorie labeling policy among students: Dietary habits, nutritional knowledge, and awareness. *Nutrients*, *15*(4), 879.

Akman, M., Akan, H., Izbirak, G., & Tanriöver, Ö. (2017). Eating patterns of Turkish adolescents: a cross-sectional survey. *Nutr J.*, *19*;9:67.

Ayer, Ç., Ergin, A.(2021). Status of nutritional literacy in adolescents in the semi-rural area in Turkey and related factors. *Public Health Nutrition*, *24*(*12*), 3870-3878.

Bulut, E.T., Kenanoğlu, Z. (2022). Fast food consumption preferences of consumers: Izmir Province case. *Ege Üniv. Ziraat Fak. Derg., 59 (1),*119-133.

Cebeci A., Güneş, E. (2017). Türkiye ve Avrupa'daki tüketicilerin gıda etiketi okuma tutumlarını etkileyen faktörlerin değerlendirilmesi. *Gümüşhane Üniversitesi Sağlık Bilimleri Dergisi*, *6*(4),261 – 267.

Cecchini M, Warin L. (2016). Impact of food labelling systems on food choices and eating behaviours: a systematic review and meta-analysis of randomized studies. *Obesity Reviews*, 17(3), 201-210.

Chacón-Cuberos, R., Zurita-Ortega, F., Martínez-Martínez, A., & Olmedo-Moreno, E.M. (2018). Adherence to the mediterranean diet is related to healthy habits, learning processes, and academic achievement in adolescents: a cross-sectional study. *Nutrients*, *23*,10(11), 566.

Christoph MJ, An R, Ellison B. (2016). Correlates of nutrition label use among college students and young adults: a review. *Public Health Nutr.*, *19*(*12*),2135-48.

Coşkun, F., Kayışoğlu, S. (2016). Besin etiketi okuma alışkanlıklarına tüketici yaşının etkisinin araştırılması. *Journal of Human Sciences*, *13(3)*, 4876-4890.

Çapar, A.G., Çimen, B.B. (2024). Besin etiketleri besin seçimlerinde etkili midir? *Gümüşhane Üniversitesi Sağlık Bilimleri Dergisi,13 (1),*147-151.

Çoşkun, F., Kayışoğlu, F. (2018). Besin etiketi okuma alışkanlıklarına ve etiket okumanın satın alma tercihlerine cinsiyetin etkisi: Tekirdağ ili örneği. *Akademik Gıda,* 16(4),422-430.

Demir, G., Gökoğlu, F., Kılıçkalkan, B., Baş, B., Altunel, H.(2020).Kadın ve erkek tüketicilerin gıda katkı maddeleri ile ilgili bilgi, tutum ve davranışları. *Food Health*, *6*(4), 225-237.

Erdenebileg, Z., Park, S.H., Chang, K.J. (2018). Comparison of Body Image Perception, Nutrition Knowledge, Dietary Attitudes, and Dietary Habits Between Korean and Mongolian. *Nutr. Res Pract.12(2)*,149-159.

FAO. (2020). Food safety. Retrieved from: https://www.who.int/news-room/fact-sheets/detail/food-safety

Fondevila, J.G., Giménez, F.G, Vidal-Portés, E., Hurtado-Galarza, K. (2022). Ultra-processed foods in university students: implementing nutri-score to make healthy choices. In Healthcare, 10(6),984. MDPI.

Gökçen M, Seylam Küşümler A.(2021). Yetişkinlerde Gıda Etiketi Okuma Bilgi Düzeyi ile Davranışa Geçirme Arasındaki İlişki. *OTSBD*, *6*(1),82-91.

Gül, F., Dikmen, D. (2018). Kadın Tüketicilerde Besin Etiketi Okuma Alışkanlıkları ve Alerjen Bilgi Düzeyinin Saptanması. *Bes Diy Derg.*, 46(2),157-165.

Gürbüz, İ.B., Kadağan, Ö. (2022). Gıda Ambalajlarında Değişen Tüketici Tercihleri. *Bursa Uludağ Üniversitesi Ziraat Fakültesi Dergisi*, 36(2), 357-376.

Ikonen, I., Sotgiu, F., Aydinli, A., Verlegh, P. W. (2020). Consumer effects of front-of-package nutrition labeling: An interdisciplinary meta-analysis. *Journal of the Academy of Marketing Science*, 48(3), 360–383.

Joseph, J., Tan, S. T. (2023). Food label reading habits and their correlations with food choice motives among young consumers during the transition to the endemic phase of COVID-19. *Measurement: Food*, 12, 100115.

Kayişoğlu, S., İçöz, A. (2024). Ön lisans öğrencilerinin hazır gıda tüketim tercihlerinin araştırılması: Namık Kemal Üniversitesi örneği. *Tekirdağ Ziraat Fakültesi Dergisi, 21(3),* 578-590.

Kemaloğlu, M., Kemaloğlu, E. (2024). Examining the food label reading habits and attitudes towards healthy nutrition among healthcare professionals: a cross-sectional study. *Turkish Journal of Health Science and Life*, 7(2), 113-120.

Kim HS, Oh C, No JK.(2016). Can nutrition label recognition or usage affect nutrition intake according to age?. *Nutrition*, *32*(1), 56-60.

Kim, H.S., Oh, C., No, J.K. (2016). Can nutrition label recognition or usage affect nutrition intake according to age? *Nutrition*, *32*, 56-60.

Mansingh, J.P., Bayissa, D.D., Erena, F.A. (2015). Research Article Awareness Of Nutritional Information And Trans-Fat

North J Health Sci____

Trans Fat In Food Label Among Teaching Staff Of Ambo University, Ambo, Ethiopia.

Norman, J. (2023). Front-of-package food labels: A narrative review. *Appetite*, 144, 104485.

Özer, E.R., Tekinşen, K.K. (2021). Akdeniz diyeti ve sağlık. Akademik Et ve Süt Kurumu Dergisi, 2, 13-23.

Seçkin, S. (2019). Üniversite Öğrencilerinin Besin Etiketi Okuma Alışkanlıklarının ve Tutumlarının Saptanması [Yüksek lisans tezi, Doğu Akdeniz Üniversitesi].

Sprake, E.F., Russell, J.M., Cecil, J.E. (2018). Dietary patterns of university students in the UK: a cross-sectional study. *Nutr J.*, 17, 90.

Tarabishi, N., Yılmaz, M., Demirtaş, E. (2024). Effect of gender on fast-food consumption habits of high school and university students in Tekirdağ, Turkey. *Journal of Nutrition and Health Sciences*, 22(3), 123-130.

TGK.(2017). Türk gıda kodeksi gıda etiketleme ve tüketicileri bilgilendirme yönetmeliği hakkında kılavuz.https://www.researchgate.net/publication/3626969 55_TGK_Gida_Etiketleme_ve_Tuketicileri_Bilgilendirme_Yo netmeliginin_Incelenmesi.

Uğur, U. (2018). Gençlerin fast food tüketimlerinin sembolik tüketim kapsamında değerlendirilmesi: Sivas ilinde bir araştırma. *Akademik Bakış Derqisi*,67.

Yalçın, T., Sevim, Y. (2024). Yetişkin bireylerin besin etiketi okumaya yönelik tutum ve davranışlarının değerlendirilmesi. *Mersin Univ Saglık Bilim Derg.*, *17*(1),109-118.

Yaman, M., Özgen, L.(2007). Üniversite öğrencilerinin yurtlarındaki besin hijyeni yaklaşımları ve besin hazırlama uygulamaları. *Gazi Üniversitesi Endüstriyel Sanatlar Eğitim Fakültesi Dergisi,20, 28-38*.

Yıldırım, S. (2012), Besin etiketlerinin tüketici talebine etkisi: İstanbul- Ankaraİzmir illerinde bir çalışma, [Yüksek lisans tezi, Celal Bayar Üniversitesi].

Wang X. (2024). The impact of food nutrition labels on consumer behavior: a cross-national survey and quantitative analysis. *International Journal of Public Health and Medical Research*, 1(2),8-27.

WHO (2019). Safety and quality of water used in food production and processing: meeting report. https://www.who.int/publications/i/item/9789241516402.

WHO, (2023). Global action plan for the prevention and control of noncommunicable diseases. https://www.who.int/teams/noncommunicable-diseases/governance/roadmap