



Evaluation of university students' food purchasing behaviors and food safety concerns

Üniversite öğrencilerinin gıda satın alma davranışları ve gıda güvenliği endişelerinin değerlendirilmesi

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ABSTRACT

Aim: This research aimed to determine the factors contributing to the awareness of university students about food purchasing and safety.

Materials and Methods: In the research, a questionnaire was applied to the purchasing behaviors and attitudes of the participants, their awareness and their knowledge about purchasing.

Results: 64.8% (n=175) of the students participated in the research. The three most important factors that the participants considered when purchasing food were food hygiene with 92.6% (n=162), expiry date with 91.4% (n=160), and food poisoning with 85.7% (n=150). Among the independent variables affecting purchasing, only the mean scores of 'convenient to cook' were higher in those in their first and second years compared to those in their third and fourth years (t=2.459; p<0.05). Among the participants, the male participants had less food concerns than the female participants about the feed given to livestock (OR=2.99, CI=1.53-5.81; p<0.01). Those in their first and second years had less concerns re-garding food hygiene (OR=7.52, GA=1.18-47.96; p<0.05) and the use of pesticides to grow food (OR=2.65, CI=1.01-6.96; p<0.05) compared to those in their third and fourth years.

Conclusion: It was found that the purchasing behavior of the food products offered to the participants was moderately affected, while their food safety concerns were found to be highly affected.

Keywords: Behaviors, food safety, food concerns, purchasing behaviors, university student

ÖZ

Amaç: Bu araştırma, üniversite öğrencilerinin gıda satın alma ve güvenlik konusunda farkındalık kazanmalarına katkı sağlayan faktörlerin belirlenmesi amacıyla yapılmıştır.

Gereç ve Yöntem: Araştırmada, katılımcıların satın alma davranış ve tutumları, satın alma konusundaki farkındalıkları ve bilgilerine yönelik bir anket uygulanmıştır.

Bulgular: Araştırmaya öğrencilerin %64,8'i (n=175) katılmıştır. Katılımcıların gıda satın alırken dikkat ettikleri en önemli üç faktör %92,6 (n=162) ile gıda hijyeni, %91,4 (n=160) ile son kullanma tarihi ve %85,7 (n=150) ile gıda zehirlenmesidir. Satın almayı etkileyen bağımsız değişkenlerden sadece 1. ve 2. sınıftakilerin 'yemek yapmaya uygun' puan ortalamaları 3. ve 4. sınıftakilere göre daha yüksekti (t=2.459; p<0.05). Katılımcılar arasında erkek katılımcılar, büyükbaş hayvanlara verilen yem konusunda kadın katılımcılara göre daha az gıda kaygısına sahipti (OR=2.99, CI=1.53-5.81; p<0.01). Birinci ve ikinci sınıftakilerin üçüncü ve dördüncü sınıftakilere göre gıda hijyeni (OR=7.52, GA=1.18-47.96; p<0.05) ve gıda yetiştirmek için pestisit kullanımı (OR=2.65, CI=1.01-6.96; p) ile ilgili daha az endişeleri vardı. <0.05).

Sonuç: Katılımcılara sunulan gıda ürünleri satın alma davranışlarının orta düzeyde etkilendiği, gıda güvenliği kaygılarının ise yüksek düzeyde etkilendiği tespit edilmiştir.

Anahtar kelimeler: Davranış, besin güvenliği, gıda endişeleri, satın alma davranışları, üniversite öğrencisi

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INTRODUCTION

Approximately 9.8% (8.3 million) of Turkey's population ⁽¹⁾ are enrolled in higher education at a university. Campus life at the university and the duration of education in different programs vary between 2 and 6 years. Higher education settings contain a large population of predominantly 18-24-year-old individuals. This age range is a period of a series of life changes ^(2,3) and autonomy in food choice. Many university students take on the responsibility of managing their own nutritional needs in a new and large social structure away from home ⁽³⁾. Since this responsibility is not undertaken adequately, it is known that students' eating habits are generally bad ^(4,5) and that healthy nutrition is not a priority among students ⁽⁶⁾. This situation contributes to the increase in the incidence of diseases related to unhealthy diet ^(7,8).

Ecological models for health behavior change, such as PRECEDE-PROCEED, reveal the importance of environmental effects on nutritional behavior ⁽⁹⁾. Research shows that the complex interplay of personal and environmental factors affects students' eating habits. University students choose food for reasons such as taste, time, schedule, convenience, cost, physical/social environments, and health or weight control ^(10,11). As these different factors affect eating behavior, they contribute to the change in body composition ⁽¹²⁾.

It is known that the diet in childhood has a critical importance in the development of food behaviors that are carried into later life ^(12,13). University students spend most of their daily lives on campus, and university institutions are, therefore, thought to have an important role in shaping students' food behaviors ⁽¹⁴⁾. However, it is known that energy-dense and nutrient-poor foods are available in most higher education settings. In addition to this situation, since a special food safety course has not been developed for students, students face additional barriers in choosing safe food ⁽¹⁵⁾.

Food purchasing behavior in young adults is most related to taste, convenience, cost, and health ^(16,17). For example, young adults tend to consume more sugar-sweetened beverages and foods than older adults ⁽¹⁷⁾. Considering this situation, it can be predicted that university students gain weight in their first year and become obese in their later years. Thus, chronic diseases such as cardiovascular

diseases, hypertension and diabetes are triggered ⁽⁹⁾. Therefore, university environments offer an important opportunity to promote and improve health. There are also studies showing that food interventions carried out at the purchasing points of universities result in a healthy behavior in food selection ⁽¹⁷⁾. In addition to all these, it is important to explore purchasing and food safety concerns, especially considering that occupational health and safety students have a high perception of occupational risks. For these reasons, this research aimed to determine the factors contributing to the awareness of university students about food purchasing and safety.

METHODS

Participants

This descriptive epidemiological study was conducted between 1-15 December 2022. The population of the research consisted of students studying in the occupational health and safety department of a university in Turkey. 64.8% (n=175) of the students participated in the research. Written informed consent was obtained from the participants, whereas ethical approval (Date:04.11.2022; Issue:2022/24) was obtained from the Scientific Research Ethics Committee of the University of Health Sciences.

Design of the Study

This study used a larger dataset and some of the subject variety. Here, the research of Liu and Niyongira (2017) ⁽¹⁸⁾ was used to determine awareness on food safety issues. The survey includes four questions on participants' socio-demographic information, eight questions on purchasing behaviors and attitudes (4-point Likert scale: 1 very concerned, 2 moderately concerned, 3 somewhat concerned, 4 slightly concerned, 5 not concerned at all), nine questions (Yes, No) on participants' awareness and knowledge about purchasing, and an open-ended question for the determination of the institution responsible for food safety.

Data collection

The data were collected by the researchers through the face-to-face survey collection technique, under observation, during the students' school days.

Analysis

The initial forms of the data arguments are as follows: date of birth (year), gender (female/male), year (1/2/3/4), and income (poor/moderate/good).

The variables affecting purchasing were prepared in a Likert-type rating scale ranging from 1 to 5 points from too much (1 point) to too little (5 points). Since these dependent variables were normally distributed according to their skewness and kurtosis, the t-test was performed with the independent variables of gender, age ($\leq 21/\geq 22$) and year (junior/senior), and the One-Way ANOVA test was performed with income from the independent variables. The variables (yes/no) affecting the participants' food concerns had a dichotomous structure. The Enter method, which is a binary logistics model, was used to predict the outcome between the variables affecting food concerns and possible factors. Nine separate logistic regression models were established from the following variables: Food hygiene, expiry date, food poisoning, food additives, hormones/steroids/antibiotics in food, genetically modified foods, the use of pesticides to grow food, mad cow disease and the feed given to livestock, as well as gender, age, year, and income. The Hosmer-Lemeshow test was used for model fit in the analyses, and the cases where the type 1 error level was below 5% were interpreted as statistically significant. The SPSS 25.0 statistical package program (IBM; Armonk, New York USA) was used for data entry of the research.

RESULTS

50.3% (n=88) of those who agreed to participate in the study (64.8%; 175 people) were women, and the mean age (SD; min-max) was 21.63 (1.50; 19-27) years. 28.0% (n=49) of the participants were in their fourth year, and 72.6% defined their income as medium. The three factors that the participants considered when purchasing were price (M=1.90), shelf life (M=2.07), and nutritional content (M=2.21), respectively (Table 1).

Table 1. Factors affecting purchasing (n=175)

#	Mean	Standart deviation
Convenient to cook	2.26	1.04
Production and processing factories	2.42	1.09
Relevant inspection certificate	2.49	1.17
Brand	2.22	1.06
Price	1.90	0.89
Nutritional content	2.21	1.02
Food color	2.67	1.23
Shelf life	2.07	1.07

The three most important factors that the participants considered when purchasing food were food hygiene with 92.6% (n=162), expiry date with 91.4% (n=160), and food poisoning with 85.7% (n=150). The lowest factor considered by the participants when purchasing food was the feed given to livestock with 53.1% (n=93) (Figure 1). 91 participants answered the open-ended question regarding the determination of the institution responsible for food safety. 86.8% (n=79) of the participants correctly answered the country's institution responsible for food inspection and management (Ministry of Agriculture and Forestry) (Table 2).

There was no relationship between the independent variables production and processing factories, relevant inspection certificate, brand, price, nutritional content, food color and shelf life, and gender, age, year and income ($p < 0.05$). Among the independent variables affecting purchasing, only the mean scores of 'convenient to cook' were higher in those in their first and second years compared to those in their third and fourth years ($t = 2.459$; $p < 0.05$) (Table 3).

Nine separate logistic regression models were conducted between the participants' food concerns

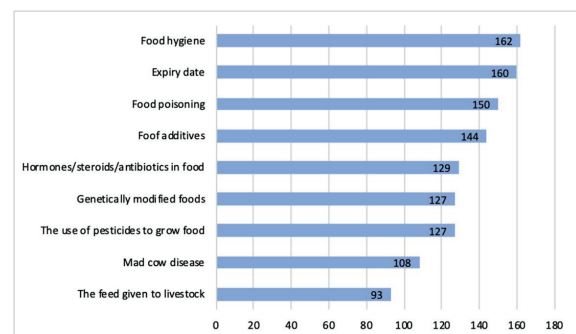


Figure 1. Participants' food concerns (n=175)

Table 2. Responses on who is responsible for food safety in Turkey (n=91)

	Frequency	%
Ministry of Agriculture and Forestry	79	86.8
Ministry of Health	8	8.8
Consumer Rights Institution	2	2.2
Municipalities	1	1.1
Turkish Armed Forces	1	1.1
Total	91	100.0

Table 3. Relationships between factors affecting purchasing and some variables (n=175)

Mean #	Gender†			Age†			Year†			Income*			
	Male	Female	p	≤21	≥22	p	Junior	Senior	p	Bad	Medium	Good	p
Convenient to cook	2.36	2.16	0.21	2.41	2.14	0.09	2.46	2.08	0.02	2.40	2.23	2.22	0.71
Production and processing factories	2.54	2.31	0.16	2.42	2.43	0.96	2.48	2.38	0.55	2.40	2.46	2.17	0.55
Relevant inspection certificate	2.57	2.40	0.32	2.51	2.47	0.83	2.62	2.37	0.16	2.50	2.53	2.17	0.48
Brand	2.23	2.22	0.93	2.22	2.23	0.93	2.26	2.19	0.70	2.43	2.22	1.89	0.22
Price	2.00	1.81	0.15	1.92	1.89	0.78	1.93	1.88	0.74	1.77	1.92	2.00	0.62
Nutritional content	2.29	2.14	0.33	2.18	2.24	0.69	2.23	2.19	0.81	2.30	2.24	1.83	0.24
Food color	2.77	2.57	0.28	2.61	2.72	0.55	2.71	2.63	0.07	2.60	2.75	2.22	0.22
Shelf life	2.17	1.97	0.20	2.03	2.10	0.63	2.01	2.12	0.10	2.43	1.98	2.06	0.12

† t=independent sample t-test, * F=one-way analysis of variance

and some variables. Among the participants, the male participants had less food concerns than the female participants about the feed given to livestock (OR=2.99, CI=1.53-5.81; p<0.01). Those in their first and second years had less concerns regarding food hygiene (OR=7.52, GA=1.18-47.96; p<0.05) and the use of pesticides to grow food (OR=2.65, CI=1.01-6.96; p<0.05) compared to those in their third and fourth years (Table 4).

DISCUSSION

This study aimed to analyze the attitudes of the students of a university's occupational health and safety department towards purchasing food offered to them on and off campus, and food safety concerns. The findings of this study showed that various factors influencing the purchasing behavior of the university students were moderately effective and that the students had a high level of anxiety about food-related hazards. The price factor related to purchasing food received the highest approval among the other factors. There are studies showing that being more price sensitive affects the behavior of accessing safe food negatively. Here, it means that a one-unit payment increase within the scope of safe food will cause a decrease in the purchase amount (18,19). In the study, it was seen that the purchasing behaviors of the participants were highly affected by product price, in accordance with the literature.

Among the factors affecting purchasing, foods that are more suitable for cooking were preferred more among those students in their third and fourth years. Studies reveal that university students are more likely to eat ready meals because of their poor cooking

skills and less time spent (20,21). This situation reveals that the best nutrition motivation of the students was convenience or comfort. However, convenience can limit both the opportunity to prepare and cook food and the possibility of transferring basic cooking knowledge from generation to generation (21).

It is seen that food hygiene has the highest percentage among the food concerns of the participants. There are studies reporting that inadequate food hygiene practices are at the root of food poisoning outbreaks in food safety studies conducted in schools, restaurants, and home settings (22,23). These include problems such as contamination between raw and cooked food, poor hand hygiene, inadequate cleaning of cooking utensils, improper defrosting of food, and insufficient cooking temperature (24,25). It is seen that the sensitivity of the participants to bacterial food poisoning caused by packaged foods and quick meals is higher for various reasons. This sensitivity is supported by research (22) showing that suboptimal food hygiene practices can cause microbiological contamination (26) and lead to bacterial food poisoning.

Among the food concerns, the feed given to livestock appears to have the lowest percentage among the respondents. At the same time, the women were found to be more concerned about the content of feed used in raising animals and the health hazards that it may cause in the future. The need for food intensifies with population growth, and as a result, the environmental problems experienced due to agriculture and animal production also increase. In particular, various strategies that allow for sustainable food production have begun to be

Table 4. Logistic regression results between participants' food concerns and some variables (n=175)

#	n	Food hygiene	Expiry date	Food poisoning	Food additives	Hormones/ steroids/ antibiotics	Genetically modified foods	Pesticides	Mad cow disease	The feed given to livestock
Gender										
Female (ref)	88									
Male	87	2.83 (0.79-10.14); 0.11	2.11 (0.66-6.70); 0.21	1.69 (0.68-4.23); 0.26	1.73 (0.75-3.98); 0.19	1.09 (.53-2.25) 0.81	1.73 (0.85-3.53); 0.13	1.81 (0.88-3.74); 0.12	0.99 (0.52-1.89); 0.99	2.99 (1.53-5.81); 0.001
Age										
22 and above (ref)	96									
21 and below	79	1.32 (0.29-6.10); 0.72	0.30 (0.06-1.47); 0.14	1.94 (0.58-6.44); 0.28	1.91 (0.63-5.83); 0.26	1.11 (0.43-2.87); 0.82	1.20 (0.47-3.06); 0.70	0.57 (0.22-1.50); 0.26	0.65 (0.27-1.57); 0.34	1.37 (0.57-3.26); 0.48
Year										
Third and Fourth (ref)	93									
First and Second	82	7.52 (1.18-47.96); 0.03	1.65 (0.40-6.84); 0.49	0.67 (0.39-4.28); 1.29	1.14 (0.38-3.44); 0.82	1.67 (0.65-4.30) 0.29	1.17 (0.46-2.96); 0.74	2.65 (1.01-6.96); 0.04	1.84 (0.77-4.42); 0.17	1.21 (0.51-2.87); 0.66
Income										
Good (ref)	18									
Medium	127		0.36 (0.04-3.01); 0.34	1.40 (0.22-8.93); 0.72	0.59 (0.10-3.46); 0.56	2.43 (0.54-10.82); 0.25	1.43 (0.36-5.73); 0.62	2.70 (0.61-11.95); 0.19	1.41 (0.42-4.73); 0.58	1.35 (0.38-4.86); 0.65
Poor	30		0.60 (0.11-3.13); 0.54	1.71 (0.35-8.41); 0.51	1.47 (0.38-5.73); 0.58	1.89 (0.50-7.10); 0.35	1.45 (0.43-4.83); 0.55	1.75 (0.46-6.65); 0.41	0.83 (0.29-2.32); 0.72	2.39 (0.79-7.26); 0.12
Constant		0.00; 0.99	0.13; 0.002	0.05; 0.001	0.09; 0.002	0.13; 0.006	0.17; 0.009	0.12; 0.004	0.61; 0.376	0.202; 0.010
CS: Correct classification		%92.6	%91.4	%85.7	%82.3	%73.7	%72.6	%72.0	%63.4	%60.0
HL: Hosmer-Lemeshow		0.754	0.952	0.916	0.774	0.728	0.303	0.850	0.954	0.328
Ref: Reference										

* Logistic regression

discussed. For example, insects, which represent a large animal mass on the planet and are an important source of protein in every ecosystem, are considered to be used as animal feed^(27,28). Since the background of such issues is beyond the scope of the research, women's sensitivity to animal feed may be affected by different factors because women establish a stronger link between food and health than men⁽²⁹⁾.

The use of pesticides by farmers to cope with various production problems and the use of antibiotics in the livestock sector raise a number of public health concerns. As a result, the students in their third and fourth years reported higher levels of concern about food hygiene and the hazards associated with pesticide residues in food. Concerns of pesticides and veterinary drugs were demonstrated by different communities in similar studies⁽³⁰⁾. Especially in this study, it is seen that the students studying in the field of occupational health and safety were more sensitive to health safety issues in the field of agriculture and animal husbandry due to their education. However, it can be stated that the participants had a high level of awareness and knowledge, although there was no statistical relationship between them on other issues.

Almost all of those who answered the question regarding the institution responsible for food safety gave the correct answer. However, it is seen that there was an information inconsistency between those who did not answer the question correctly and those who answered correctly. Liu and Niyongira (2017) showed that the police force⁽¹⁸⁾ was more responsible for food safety, as an example of information inconsistency. The other answers in the study, such as the ministry of health or the consumer rights institution, all refer to government agencies. Contrary to some studies⁽³¹⁾, this shows that the government is reliable and responsible for food safety, as in the study of Ortega et al (2011)⁽³²⁾. In this study, the ministry of health was shown as a second responsible institution by very few of the participants. The participants may have believed that the issue was related to health or that they could access the correct information from here. In their study, Liu et al. (2014)⁽³⁰⁾, on the other hand, showed medical doctors and research institutes as reliable sources of information.

The findings of this study should be considered in the context of the following issues. The study is based on university students' personal information

regarding food purchasing and food safety concerns. Due to information probability and recall bias, the accuracy and reliability of such statements cannot be guaranteed. Although a cross-sectional design was planned, the majority of the population could not be reached. In addition, the study did not include questions about (1) the place, staff, kitchen appliances, and food safety practices of the enterprises, (2) the nutritional value of the products sold, and (3) the packaging information.

CONCLUSIONS

It was found that the purchasing behavior of the food products offered to the participants was moderately affected, while their food safety concerns were found to be highly affected. While the price factor came to the fore at the highest level in purchasing, food hygiene issues came to the fore in food concerns. Although the institution responsible for food safety in Turkey was highly known among the respondents, almost half of the respondents gave wrong answers or had no idea. The students in their third and fourth years reported purchasing anxiety regarding the cooking suitability of a food. In addition, the women had high food concerns about the characteristics of the feed given to livestock, while high food concerns about food hygiene and pesticides were detected in the students in their third and fourth years. It is recommended that the participants be included in a training activity regarding food purchasing and food safety in line with the topics specified in the discussion section.

Author contribution

Study conception and design: CC, KK; data collection: CC, KK; analysis and interpretation of results: CC, KK; draft manuscript preparation: CC, KK. All authors reviewed the results and approved the final version of the manuscript.

Ethical approval

The study was approved by the Scientific Research Ethics Committee of the University of Health Sciences (Protocol no. 2022/24/04.11.2022).

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Conflict of interest

The authors declare that there is no conflict of interest.

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REFERENCES

1. Yükseköğretim Bilgi Yönetim Sistemi. 2022. Öğrenim düzeyine göre öğrenci sayısı. URL: <https://istatistik.yok.gov.tr/> Jan 28, 2023
2. Anderson DA, Shapiro JR, Lundgren JD. The freshman year of college as a critical period for weight gain: An initial evaluation. *Eat Behav* 2003; 4(4): 363-7. [\[Crossref\]](#)
3. Wengreen HJ, Moncur C. Change in diet, physical activity, and body weight among young-adults during the transition from high school to college. *Nutr J* 2009; 8(1): 32. [\[Crossref\]](#)
4. Racette SB, Deusinger SS, Strube MJ, Highstein GR, Deusinger RH. Changes in Weight and Health Behaviors from Freshman through Senior Year of College. *J Nutr Educ Behav* 2008; 40(1): 39-42. [\[Crossref\]](#)
5. Burke JD, Reilly RA, Morrell JS, Lofgren IE. The University of New Hampshire's Young Adult Health Risk Screening Initiative. *J Am Diet Assoc* 2009; 109(10): 1751-8. [\[Crossref\]](#)
6. Strong KA, Parks SL, Anderson E, Winett R, Davy BM. Weight Gain Prevention: Identifying Theory-Based Targets for Health Behavior Change in Young Adults. *J Am Diet Assoc* 2008; 108(10): 1708-1715.e3. [\[Crossref\]](#)
7. Demir G, Özer A. Development and validation of food and nutrition literacy instrument in young people, Turkey. *Progress in Nutrition* 2022; 24(4): e2022133).
8. Ateş H, Demir Özdenk G, Çalışkan C. Determinants Of Science Teachers' Healthy Eating Behaviors: Combining Health Belief Model and Theory Of Planned Behavior. *Journal of Baltic Science Education* 2021; 20;20(4): 573-89. [\[Crossref\]](#)
9. Horacek TM, Erdman MB, Byrd-Bredbenner C, Carey G, Colby SM, Greene GW, et al. Assessment of the dining environment on and near the campuses of fifteen post-secondary institutions. *Public Health Nutr* 2013; 18;16(7): 1186-96. [\[Crossref\]](#)
10. Greaney ML, Less FD, White AA, Dayton SF, Riebe D, Blissmer B, et al. College Students' Barriers and Enablers for Healthful Weight Management: A Qualitative Study. *J Nutr Educ Behav* 2009; 41(4): 281-6. [\[Crossref\]](#)
11. Horacek TM, Betts NM. Students Cluster into 4 Groups According to the Factors Influencing their Dietary Intake. *J Am Diet Assoc* 1998; 98(12): 1464-7. [\[Crossref\]](#)
12. Fedewa M V., Das BM, Evans EM, Dishman RK. Change in Weight and Adiposity in College Students. *Am J Prev Med* 2014; 47(5): 641-52. [\[Crossref\]](#)
13. Wadhera D, Capaldi Phillips ED, Wilkie LM, Boggess MM. Perceived recollection of frequent exposure to foods in childhood is associated with adulthood liking. *Appetite* 2015; 89: 22-32. [\[Crossref\]](#)
14. Tam R, Yassa B, Parker H, O'Connor H, Allman-Farinelli M. University students' on-campus food purchasing behaviors, preferences, and opinions on food availability. *Nutrition* 2017; 37: 7-13. [\[Crossref\]](#)
15. Bertrand J, Crerar A, Randall Simpson J. A Canadian University "Understanding Foods" Course Improves Confidence in Food Skills and Food Safety Knowledge. *Canadian Journal of Dietetic Practice and Research* 2018; 79(4): 170-5. [\[Crossref\]](#)
16. Hebden L, Chan HN, Louie JC, Rangan A, Allman-Farinelli M. You are what you choose to eat: factors influencing young adults' food selection behaviour. *Journal of Human Nutrition and Dietetics* 2015; 28(4): 401-8. [\[Crossref\]](#)
17. Roy R, Kelly B, Rangan A, Allman-Farinelli M. Food Environment Interventions to Improve the Dietary Behavior of Young Adults in Tertiary Education Settings: A Systematic Literature Review. *J Acad Nutr Diet* 2015; 115(10): 1647-1681.e1. [\[Crossref\]](#)
18. Liu A, Niyongira R. Chinese consumers food purchasing behaviors and awareness of food safety. *Food Control* 2017; 79: 185-91. [\[Crossref\]](#)
19. Epstein LH, Jankowiak N, Nederkoorn C, Raynor HA, French SA, Finkelstein E. Experimental research on the relation between food price changes and food-purchasing patterns: a targeted review. *Am J Clin Nutr* 2012; 95(4): 789-809. [\[Crossref\]](#)
20. Labrecque J, Dufour J, Charlebois S. Perceived health value of ready meals and side dishes: regional and gender differences. *Young Consumers* 2011; 12(3): 204-15. [\[Crossref\]](#)
21. Marquis M. Exploring convenience orientation as a food motivation for college students living in residence halls. *Int J Consum Stud* 2005; 29(1): 55-63. [\[Crossref\]](#)

22. Soares LS, Almeida RCC, Cerqueira ES, Carvalho JS, Nunes IL. Knowledge, attitudes and practices in food safety and the presence of coagulase-positive staphylococci on hands of food handlers in the schools of Camaçari, Brazil. *Food Control* 2012; 27(1): 206-13. [\[Crossref\]](#)
23. Akabanda F, Hlortsi EH, Owusu-Kwarteng J. Food safety knowledge, attitudes and practices of institutional food-handlers in Ghana. *BMC Public Health* 2017; 17(1): 40. [\[Crossref\]](#)
24. Todd ECD, Greig JD, Bartleson CA, Michaels BS. Outbreaks Where Food Workers Have Been Implicated in the Spread of Foodborne Disease. Part 3. Factors Contributing to Outbreaks and Description of Outbreak Categories. *J Food Prot* 2007; 70(9): 2199-217. [\[Crossref\]](#)
25. Chan SF, Chan ZCY. A review of foodborne disease outbreaks from 1996 to 2005 in Hong Kong and its implications on food safety promotion. *J Food Saf* 2008; 28(2): 276-99. [\[Crossref\]](#)
26. McIntyre L, Vallaster L, Wilcott L, Henderson SB, Kosatsky T. Evaluation of food safety knowledge, attitudes and self-reported hand washing practices in FOODSAFE trained and untrained food handlers in British Columbia, Canada. *Food Control* 2013; 30(1): 150-6. [\[Crossref\]](#)
27. Ordoñez-Araque R, Quishpillo-Miranda N, Ramos-Guerrero L. Edible Insects for Humans and Animals: Nutritional Composition and an Option for Mitigating Environmental Damage. *Insects* 2022; 13(10): 944. [\[Crossref\]](#)
28. Musundire R, Ngonyama D, Chemura A, Ngadze RT, Jackson J, Matanda MJ, et al. Stewardship of Wild and Farmed Edible Insects as Food and Feed in Sub-Saharan Africa: A Perspective. *Front Vet Sci* 2021; 8: 1-9. [\[Crossref\]](#)
29. Rappoport L, Peters GR, Downey R, McCann T, Huff-Corzine L. Gender and Age Differences in Food Cognition. *Appetite* 1993; 20(1): 33-52. [\[Crossref\]](#)
30. Liu R, Pieniak Z, Verbeke W. Food-related hazards in China: Consumers' perceptions of risk and trust in information sources. *Food Control*. 2014 Dec;46:291-8. [\[Crossref\]](#)
31. Pieniak Z, Verbeke W, Scholderer J, Brunsø K, Olsen SO. European consumers' use of and trust in information sources about fish. *Food Qual Prefer* 2007; 18(8): 1050-63. [\[Crossref\]](#)
32. Ortega DL, Wang HH, Wu L, Olynk NJ. Modeling heterogeneity in consumer preferences for select food safety attributes in China. *Food Policy* 2011; 36(2): 318-24. [\[Crossref\]](#)