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Food safety knowledge, hygiene practices, and eating attitudes of academics and university students during the coronavirus (COVID-19) pandemic in Turkey

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Abstract

The purpose of this study is to assess the effect of the coronavirus (COVID-19) pandemic on food safety knowledge, hygiene practices, and eating attitudes of academics and university students in Turkey. A cross-sectional survey invitation was emailed to the participants from various academic ranks and departments at chosen universities from different region of country. Academics were requested to forward the invitation email to enrolled students to their classes. Responds were accepted in the period of 45 days in April and May 2020 during this pandemic. The relationships between socio-demographic factors (gender, marital status, parental status, faculty/student status, academic rank, and age) and food safety knowledge, hygiene practices, and eating attitudes of respondents were determined. Academics ($n = 240$) and university students ($n = 479$) responded to food safety knowledge statements with similar percentages during the coronavirus pandemic. Improved hygiene practices were observed for both groups to avoid disease during the coronavirus pandemic. Both groups had eating attitudes toward consumption at home due to the coronavirus pandemic. Gender was the most prominent factor associated with 9 out of 10 hygiene practices before and during the coronavirus pandemic ($p < .05$). No, single, and multiple socio-demographic factors were in association with food safety knowledge or eating attitudes of respondents. This study indicates that reactions of both academics and university students are similar during the coronavirus pandemic for food safety-associated knowledge, practices, and attitudes.

1 | INTRODUCTION

Consumer concerns about food safety have evolved from having a foodborne pathogen causing gastrointestinal disease to fear of getting the coronavirus (COVID-19) from food, food packages, and shopping bags. In reality, transmission of coronavirus has not been associated with food handling or food consumption (USCDC, 2020; USFDA, 2020a). Also, coronavirus contamination of fruit and vegetables is not considered as a food safety concern, but a worker health concern that transmission from worker to fresh produce can be reduced with current food safety strategies in practice (Dunn, 2020). In case of ingestion, persistence of coronavirus is not completely characterized in digestive system environments as stomach; however, respiratory system tissues as bronchial epithelial cells represent the principal target of coronavirus to proliferate (Anelich, Lues, Farber, & Parreira, 2020). Individuals in contact with contaminated foods and food packaging may get coronavirus when touching their own nose, mouth, and possibly eyes (USCDC, 2020).

The effect of unexpected global disasters, such as the coronavirus pandemic, have been experienced in almost all countries influencing eating habits, food safety knowledge, and hygiene practices of consumers (Luo et al., 2020). Several questions about the coronavirus disease and food safety have been raised by consumers from safe shopping suggestions for food during the pandemic to how to kill virus

on food, food packages, and food contact surfaces in the kitchen, properly. Despite no evidence suggesting coronavirus transmission from food or packaging, precautions and safety recommendations have been introduced for food handlers, producers, and household consumptions to prevent from disease (EFSA, 2020; USCDC, 2020; USFDA, 2020a, 2020b, 2020c). Following safe practices for everyday handling of packaged food and fresh produce has become more important for consumers during the coronavirus pandemic.

The coronavirus pandemic has been having a significant impact on food industry and consumer lifestyle as in economy, environment, education, and sport. Education institutions such as universities and vocational colleges are among the major transmission sites for the coronavirus (ECDC, 2021). To our knowledge, food safety-related reactions of young adults attending a university as students have not been examined during any pandemic. Academics as professors with various ranks, research and teaching assistants, and lecturers have also not been assessed in terms of food safety knowledge, hygiene practices, and eating attitudes. The purpose of this study is to examine the effect of the coronavirus (COVID-19) pandemic on food safety knowledge, hygiene practices, and eating/shopping attitudes of academics and university students in Turkey. We hypothesized that food safety-related reactions of university students and academics have been impacted during the coronavirus pandemic compared to normal conditions.

2 | MATERIALS AND METHODS

2.1 | Questionnaire development

Total of six questions related to socio-demographics were selected to ask the participants including age, gender, academic status, academic rank, marital and parental status. A questionnaire with two different sections including a set of 10 hygiene practice statements and 5 eating attitude questions were prepared based on previous studies and recommendations by authorities and universities (Al-Shabib, Husain, & Khan, 2017; Food Standards Scotland, 2020; Marklinder et al., 2020; Osaili, Obeidat, Abu Jamous, & Bawadi, 2011; Ovca, Jevšnik, & Raspor, 2014; UFIFAS, 2020; USCDC, 2020; USFDA, 2020a, 2020b, 2020c). A 5-point Likert-type scale were used (1 = *never*, 2 = *rarely*, 3 = *sometimes*, 4 = *often*, 5 = *always*) for hygiene practices and eating attitudes questionnaires.

Another set of 10 statements was used as food safety knowledge data collection tool. Each question was prepared based on frequently asked questions about food safety published during the coronavirus pandemic by authorities as Food and Drug Administration (USFDA, 2020a, 2020b, 2020c), Center for Disease Control and Prevention (USCDC, 2020), and Food Standards Scotland (2020). Also, recommendations from University of Florida Institute of Food and Agricultural Sciences for shopping and handling groceries were considered to finalize statements and questions (UFIFAS, 2020). The coronavirus and food safety knowledge statements had three options without any open-ended answer option (0 = *false*, 1 = *true*, 2 = *I do not know*). Opinions of four different experts with Ph.D. degree in the field of food safety were obtained for the appearance and content validity of the questionnaires. The same experts were requested for the translation of survey statements into Turkish. Experts were also asked for the evaluation of statements and questions for possible cultural differences and meaning shifts. Cronbach alpha and (Kuder Richardson) KR-21 reliability tests were conducted on the questionnaires and knowledge test before analyzing the data (https://www.cedu.niu.edu/~walker/calculators/kr.asp).

2.2 | Participants and study sites

Online survey invitation was sent to the academic participants from various ranks and departments at randomly chosen 18 universities with convenience sampling from all seven geographical regions of country via email. At least, two universities from each geographical regions were targeted to have representative responds. Chosen universities included Atatürk University, Aydın University, Balıkesir University, Bayburt University, Bingöl University, Çukurova University, Dokuz Eylül University, Fırat University, İnönü University, Gaziantep University, İstanbul University, İstanbul University-Cerrahpaşa, Ege University, Karadeniz Technical University, Marmara University, Middle East Technical University, Muş Alparslan University, and Uludağ University. Invitations were sent to over 3,694 academics. Also, academics were requested to forward invitation email to currently enrolled students to their classes.

2.3 | Data collection process

The volunteer participation was enunciated in invitations. Responds were accepted during the period of 45 days between April 15, 2020 and May 31, 2020. Research data were collected through a research inventory form created online by the researchers (https://docs.google.com/forms/d/e/1FAIpQLSc9aM3BQKCVj1V2eGluhJnCJ_hC4IMd5-dixnfv5F0B6jkzlw/viewform?usp=sf_link). This form was prepared using Google forms application. During the data collection process, potential participants were reminded every other week. Participants were requested to reply all statements and questions to finish survey. No open-ended answer options were included to questionnaire. Academics and university students were requested to respond each statement or question according to their hygiene practices and eating attitudes before and during the coronavirus pandemic. There were 759 survey returns in total. The answers of 40 different participants considered as incomplete, incorrect, or not answered were removed for further data analysis. The valid survey return rate was 94.7%. Participant consent form was obtained from the participants before the questionnaire.

2.4 | Statistical analysis

The reliability analyzes were performed on the data obtained from the participants. Reliability results were calculated between limit values

suggested by Kaplan and Saccuzzo (1982). Afterward, descriptive analysis steps suggested by Corder and Foreman (2009) were followed. In this process, the data were converted into appropriate categorical variables including gender, marital status, parental status, faculty/student status, academic rank, and age. Respondents were categorized by age into young adults from ages 17 to 35 and over 35 based on age distribution of the participants as described by Petry (2002) with slight modifications. The process was completed with chi-square test. After the pretests, percentage, frequency, average, and Cronbach alpha was analyzed with *jamovi* (version 1.2; The jamovi project, 2020). Chi-square and post hoc analyzes were performed with and IBM SPSS software. Chi-square significance level for all analyzes was taken as $p < .05$.

3 | RESULTS

3.1 | Socio-demographic characteristics of respondents

Detailed information about socio-demographic characteristics of the respondents are shown in Table 1. The study groups of the research consisted of 240 academics, 402 undergraduate students, and 77 vocational school students (associate's degree) affiliated by universities ($n = 719$ in total). Survey was completed by 403 female (56.1%) and 316 male (43.9%) respondents. Almost three quarters of the academics were married, whereas the majority of student respondents were single participants (95.8%). The number of academics with children was 20 times higher than students with children (2.8%). Overall, the average age of respondents was around 27 years old. Students had ages ranging from 17 to 28 years old. Academics had a broad range of age. Lecturers, research, and teaching assistants consisted of 52.6% of all academic respondents. Remaining academic respondents (47.4%) was distributed among assistant, associate, and full professors.

3.2 | Perceptions of consumers on food safety

The KR-21 reliability level of test was 0.789 for food safety knowledge statements. All respond percentages of *true*, *false*, and *I do not know* for food safety-related statements are shown in Table 2. Food and fresh produce eaten raw like fruits and vegetables are considered as carrier for transmission of coronavirus by more than 45% of both academics and university students. Both groups think that risk of coronavirus transmission from food packaging or containers and preparation area is high with a percentage ranging from 78 to 82%. Risk of getting sick from fruits and vegetables are considered lower by both groups compare to food packaging or containers and preparation area. Food workers are seen as a source for coronavirus transmission by almost 9 out of 10 respondents. Almost half of the academics and university students think that delivery is a safer option compared to going to shopping. No association was determined between any socio-demographics and food safety knowledge statements including getting the coronavirus from fruits and vegetables eaten raw, transmission from food workers (except for age), delivery as safer option compared to grocery shopping ($p > .05$) (Table 2). Getting the coronavirus from food packaging or containers and preparation area had a relationship with marital, parental, and student/faculty status ($p \leq .05$). Majority of academics (66.3% agreed and 24.6% unsure) confirmed the possible destructive effect of cooking on coronavirus. Only less than half of the university students agreed that cooking kills

TABLE 1 Socio-demographics of respondents

		Number of respondents (%)			
		Academics	Undergraduate student	Vocational student	Total
Gender	Male	156 (65.0)	136 (33.8)	24 (31.2)	316
	Female	84 (35.0)	266 (66.2)	53 (68.8)	403
Marital status	Married	167 (69.6)	18 (5.5)	2 (2.6)	187
	Single	73 (31.4)	384 (94.5)	75 (97.4)	532
Parental status	I have children	139 (57.9)	12 (3.0)	1 (1.3)	152
	I have no children	101 (42.1)	390 (97.0)	76 (98.7)	567
Age	17–35	134 (55.8)	399 (99.3)	76 (98.7)	328
	>35	106 (44.2)	3 (0.7)	1 (1.3)	136
Academic rank	Professor	20 (8.3)	NA	NA	20
	Associate Prof.	20 (8.3)	NA	NA	20
	Assistant Prof.	74 (30.8)	NA	NA	74
	Assistants (RA/TA)	69 (28.8)	NA	NA	69
	Lecturer	57 (23.8)	NA	NA	57

Note: Percentages have calculated as a proportion of the total number of participants in each group (i.e., male academics 156 [65.0%] of male + female academics 240 [100%]).
Abbreviations: NA, not available; RA/TA, research assistant/teaching assistant.

TABLE 2 Percentages of academics and students responding each food safety knowledge-related statement with associations among gender, marital status, parental status, student/academics status, age ($n = 719$), and academic rank ($n = 240$) on food safety knowledge of participants at universities during the coronavirus (COVID-19) pandemic

	Academics (%)			Students (%)			*p*-values					
Food safety knowledge statements	True	False	I do not know	True	False	I do not know	Gender	Marital status	Parental status	Student/ faculty	Academic rank	Age
I can get the coronavirus from food	47.9	34.6	17.5	64.1	16.5	19.4	.726	.000*	.032*	.000*	.000*	.006*
I can get the coronavirus from food packaging or, food containers and preparation area	78.3	10.8	10.8	81.8	4.8	13.4	.331	.007*	.021*	.008*	.082	.315
I can get the coronavirus from foods eaten raw like fruits and vegetables	56.3	24.6	19.2	55.3	21.7	23.0	.055	.230	.804	.434	.202	.422
I can get the coronavirus from a food worker handling my food	88.8	6.3	5.0	87.1	5.9	7.1	.884	.840	.913	.550	.666	.032*
Cooking kills the coronavirus	66.3	9.2	24.6	40.5	15.9	43.6	.002*	.000*	.000*	.000*	.000*	.000*
Delivery is a safer option than going to grocery shopping	47.1	35.4	17.5	44.3	37.2	18.6	.850	.392	.792	.772	.877	.660
It is safe to buy foods from countries impacted by the coronavirus	12.5	69.2	18.3	3.3	83.3	13.4	.045*	.000*	.002*	.000*	.000*	.006*
I should clean food packages before they are used	82.9	12.1	5.0	90.8	5.2	4.0	.000*	.006*	.011*	.003*	.067*	.144
I should wash fruits and vegetables with soap or disinfectants before eating	19.2	74.2	6.7	29.9	61.0	9.2	.087	.081	.247	.002*	.098	.029*
I can handle food for others in my house even if I have tested positive for the coronavirus	2.9	92.9	4.2	2.9	94.8	2.3	.947	.205	.359	.373	.416	.987

*$p \leq .05$.

the coronavirus. Around three quarters of academics and students do not trust foods from countries with high prevalence of the coronavirus. Over 80% of both groups believe that food packages should be cleaned before use. Getting the coronavirus from food (except for gender), killing the coronavirus by cooking, having foods from impacted countries, and cleaning food packages before use (except for age) were determined as the statements associated with all socio-demographic factors ($p \leq .05$) (Table 2).

The use of soap or disinfectant to wash fruit and vegetables are not considered as a correct way of protection by about two third of both academics and university students and in association with only student/faculty status and age ($p \leq .05$). More than 90% of both groups responded that handling food by a coronavirus positive person for others is not appropriate in a household with no socio-demographic association ($p > .05$).

3.3 | Hygiene practice statements

Percentages of academics and students responding each hygiene practice statement before and during the coronavirus pandemic are shown in Figure 1. Cronbach alpha reliability value of hygiene

practices was calculated as 0.546. Shopping bags were never or rarely placed on kitchen countertop by around more than 80% of academics and students during the coronavirus pandemic. This situation was in association with socio-demographic factors as marital and parental status before and with academic rank during the coronavirus pandemic ($p \leq .05$). Also, around half of both groups started to clean shopping bags sometimes and more frequent after shopping during the coronavirus pandemic. Percentage of people always washing their hand before preparing food increased from 56.3 to 76.6% by academics and 52.8 to 64.3% by university students and associated with only student/faculty status during the coronavirus pandemic ($p \leq .05$). Number of respondents in both groups always controlling food preparing surfaces and utensils for cleanness increased in percentages similar to hand washing during the coronavirus pandemic. There was a

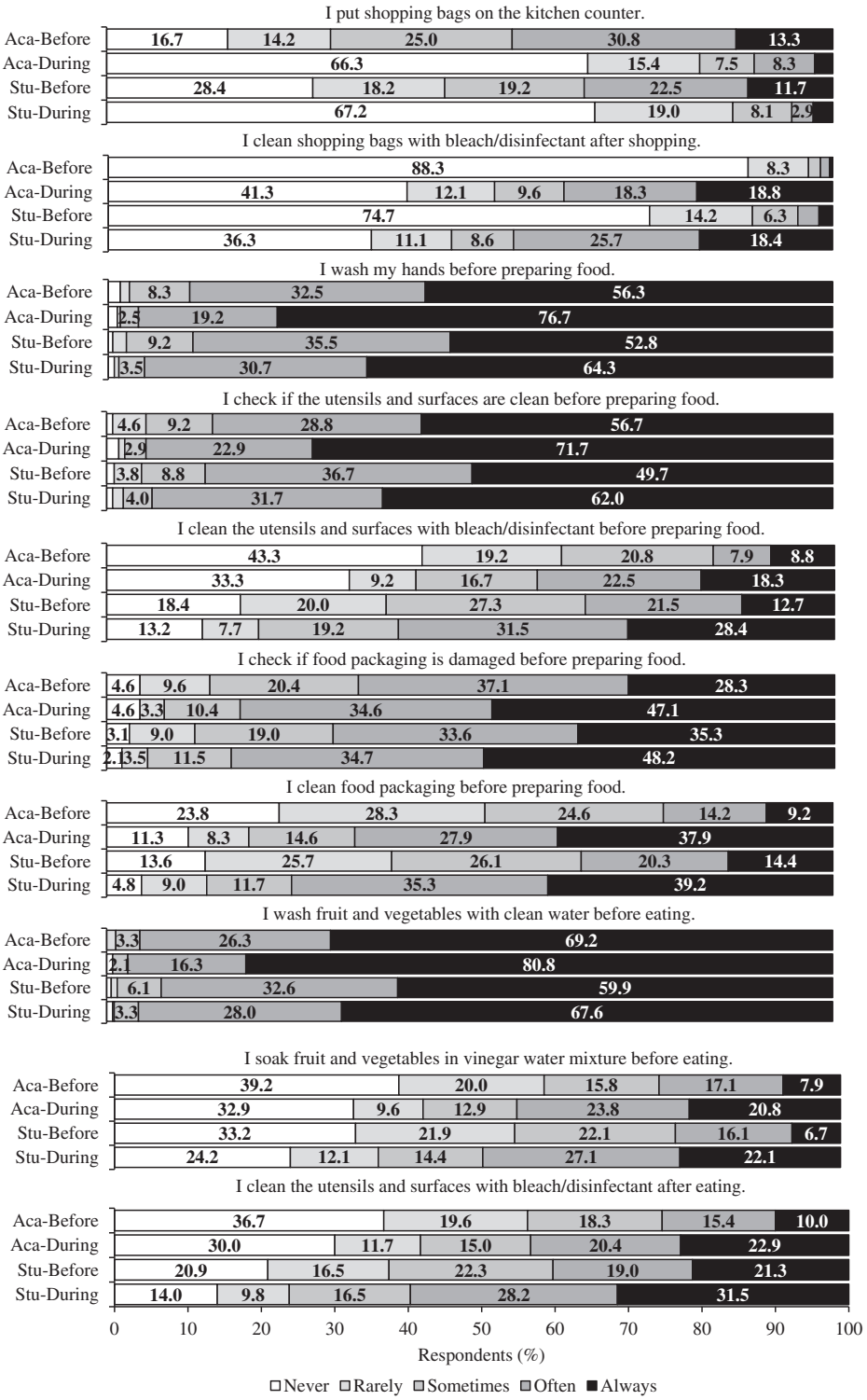

FIGURE 1 Percentages of academics (Aca; $n = 240$) and students (Stu; $n = 479$) responding each hygiene practice statement before and during the coronavirus (COVID-19) pandemic

relationship between academic rank and checking utensils, surfaces, and food packaging during the coronavirus pandemic ($p \leq .05$). However, up to 10% changes occurred in frequencies of cleaning surfaces and utensils before preparing and after eating food in both groups during the coronavirus pandemic in association with all socio-demographic factors ($p \leq .05$). Percentage of both academics and university student always cleaning packaging and checking packaging damage ranged from 37.9 to 48.2% by increasing up to 19% during the coronavirus pandemic. Only student/faculty status and academic rank was associated with the statement, cleaning the food packaging both before and during the coronavirus pandemic ($p \leq .05$) (Table 3). Over 90% of both academics and students indicated that they often or always wash fruit and vegetables with clean water before eating during the coronavirus pandemic in association with student/faculty status and age ($p \leq .05$). The number of people in both groups always using vinegar water mixture to soak fruit and vegetables increased up to three times during the coronavirus pandemic. Except for gender and academic rank, no relationship existed between socio-demographics and the use of vinegar water mixture to soak fruit and vegetables ($p > .05$). An association existed between gender and 9 out of 10 hygiene practices before and during the coronavirus pandemic ($p \leq .05$) (Table 3).

3.4 | Eating attitude questions

Percentages of academics and university students responding each eating attitude question before and during the coronavirus pandemic are shown in Figure 2. Cronbach alpha reliability value of eating attitudes was calculated as 0.854. More than half of academics and students never ate together with any person(s) besides family members during the coronavirus pandemic. Number of students

TABLE 3 Associations among gender, marital status, parental status, student/academics status, age ($n = 719$), and academic rank ($n = 240$) on hygiene practices of participants at universities before and during the coronavirus (COVID-19) pandemic

	p-values											
	Gender		Marital status		Parental status		Student/faculty		Academic rank		Age	
Hygiene practice statements	Before	During	Before	During	Before	During	Before	During	Before	During	Before	During
I put shopping bags on the kitchen counter	.014*	.022*	.016*	.083	.016*	.182	.001*	.025*	.062	.002*	.460	.488
I clean shopping bags with bleach/ disinfectant after shopping	.016*	.000*	.051	.315	.010*	.033*	.001*	.279	.122	.183	.059	.252
I wash my hands before preparing food	.000*	.005*	.749	.845	.240	.584	.549	.014*	.009*	.006*	.432	.164
I check if the utensils and surfaces are clean before preparing food	.000*	.076	.642	.629	.238	.807	.301	.072	.254	.032*	.038*	.220
I clean the utensils and surfaces with bleach/ disinfectant before preparing food	.000*	.000*	.000*	.000*	.000*	.000*	.000*	.000*	.000*	.000*	.000*	.003*
I check if food packaging is damaged before preparing food	.018*	.011*	.456	.154	.511	.860	.398	.457	.069	.016*	.484	.901
I clean food packaging before preparing food	.244	.000*	.055	.064	.015*	.160	.002*	.009*	.006*	.006*	.078	.210
I wash fruit and vegetables with clean water before eating	.008*	.031*	.375	.607	.315	.198	.079	.006*	.288	.051	.072	.015*
I soak fruit and vegetables in vinegar water mixture before eating	.000*	.000*	.369	.621	.699	.513	.239	.168	.001*	.003*	.481	.613
I clean the utensils and surfaces with bleach/ disinfectant after eating	.000*	.000*	.000*	.000*	.000*	.011*	.000*	.000*	.001*	.001*	.001*	.025*

*$p \leq .05$.

(from 15.0 to 28.8%) and academics (from 23.8 to 54.6%) cooking at home doubled during the coronavirus pandemic in association with all socio-demographic factors except for gender ($p \leq .05$) (Table 4). Partial decrease was observed on the frequencies of going to shopping for food with no relationship gender and age ($p > .05$). Over 80% of both academics and students totally stopped going out for eating in association with gender during the coronavirus pandemic ($p \leq .05$) (Table 4). Also, taking out meal or food delivery from a restaurant were not considered as an option by around three quarters of academics and university students during the coronavirus pandemic. This situation had an association with gender ($p \leq .05$).

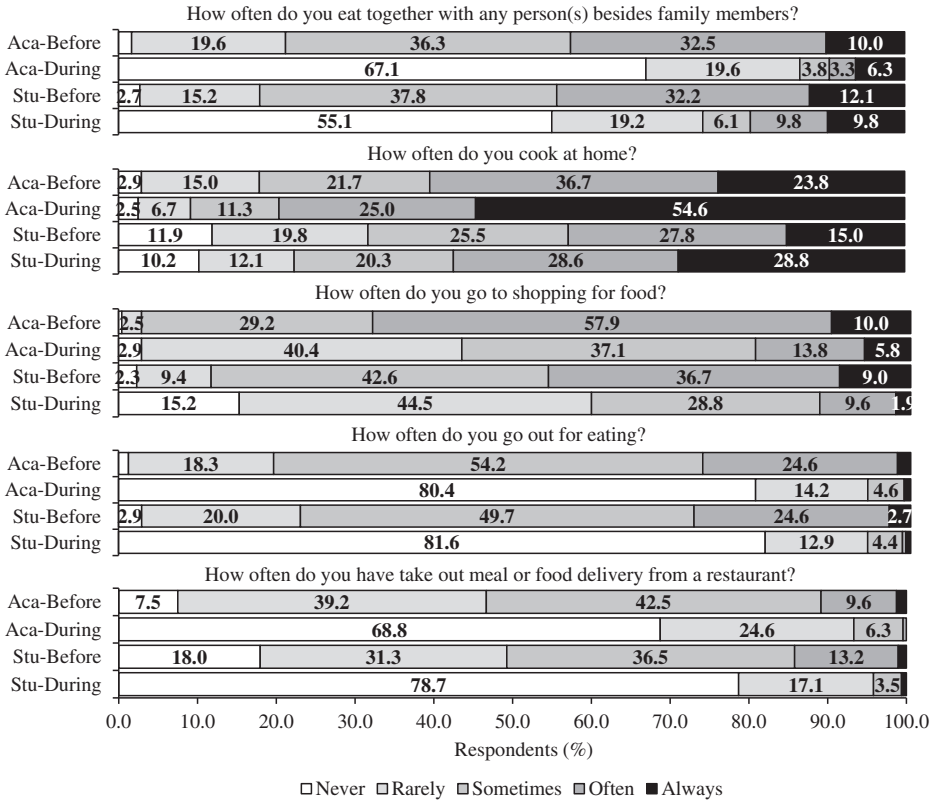

FIGURE 2 Percentages of academics (Aca; $n = 240$) and students (Stu; $n = 479$) responding each eating attitude question before and during the coronavirus (COVID-19) pandemic

TABLE 4 Associations among gender, marital status, parental status, student/academics status, age ($n = 719$), and academic rank ($n = 240$) on eating attitudes of participants at universities before and during the coronavirus (COVID-19) pandemic

	p-values											
	Gender		Marital status		Parental status		Student/faculty		Academic rank		Age	
Eating attitude questions	Before	During	Before	During	Before	During	Before	During	Before	During	Before	During
How often do you eat together with any person(s) besides family members?	.182	.719	.453	.005*	.454	.013*	.512	.002*	.786	.021*	.901	.122
How often do you cook at home?	.468	.001*	.000*	.000*	.000*	.000*	.000*	.000*	.000*	.000*	.001*	.000*
How often do you go to shopping for food?	.036*	.053	.000*	.006*	.000*	.146	.000*	.000*	.000*	.000*	.281	.050*
How often do you go out for eating?	.387	.004*	.001*	.606	.017*	.508	.478	.857	.595	.661	.047*	.812
How often do you take out meal or food delivery from a restaurant?	.188	.001*	.000*	.005*	.001*	.012*	.001*	.033*	.260	.074	.068	.268

*$p \leq .05$.

4 | DISCUSSION

Both academics and university students consider food packaging or containers and preparation area as riskier transmission source of the coronavirus compared to food itself during the coronavirus pandemic. Increasing exposure to the information about the risk of getting coronavirus from surfaces on broadcast and social media may be a reasonable logic for both academics and university students to consider materials used to protect or prepare food with more transmission risk. Both European Food Security Authority and United States Food and Drug Administration announced that no evidence has been found about food, food containers, or food packaging being associated with transmission of the coronavirus (EFSA, 2020; USFDA, 2020a). However, the possibility of coronavirus survival on surfaces and objects are addressed and proper handwashing is recommended after handling food by both authorities (EFSA, 2020; USFDA, 2020a). Coronavirus transmission from food workers is considered highly possible for almost all the participants from both groups. USFDA (2020a) warns consumers about the spread of coronavirus due to person to person contact with coronavirus positive food handlers rather than transmission from food with safe handling procedures. Cooking was considered deadly for coronavirus by 66.3% of academics, but only 40.5% of university students. From a positive aspect, similar numbers of student (43.6%) acknowledged their lack of knowledge for possible destructive effect of cooking rather than wrong information. World Health Organization (2020) states that foods should be thoroughly cooked to at least 70°C as described in manual about five keys to safer food. Proper cooking at restaurants and households is recommended to avoid foodborne illnesses by United States Center for Disease Control and Prevention (USCDC, 2020). However, no science-based data are available to inactivate coronavirus on food (UFIFAS, 2020).

Delivery is considered as an effective risk management to reduce possibility of transmission in the stores especially for population at risk (UFIFAS, 2020). Almost half of the academics and university students think that delivery is a safer option than going to grocery shopping possibly due to less probability of interaction with a coronavirus positive person or employee. According to final coronavirus update by USFDA (2020b), no evidence presents to support transmission of coronavirus associated with imported goods from impacted countries. Also, legislations may require hygiene practices by importers and exporters during the packing and shipping process (Food Standards Scotland, 2020). Both academics (69.2%) and university students (83.3%) do not believe that imported goods are safe during the coronavirus pandemic. Despite no evidence for transmission of coronavirus from food packaging as mentioned above, cleaning food packages before use is approved as an extra precaution by USFDA (2020c). The use of soap or disinfectant to wash fruit and vegetables is not recommended by USCDC (2020). Three out of four respondents chose not to wash fruit and vegetables with soap or disinfectant inconsistent with USCDC recommendation. This is an important indicator of food safety awareness.

In general, coronavirus increased hygiene practices of both groups. Transmission probability from shopping bags have been tried to be reduced by cleaning and placing them on the floor rather than kitchen countertop by both academic and student respondents during the coronavirus pandemic. In Turkey, 91.1% of people from various age groups and socio-economic levels always wash their hands after the use of restroom, but only 61.1% always wash their hands before meals on average (Tüzün, Karakaya, & Deniz, 2015). In this study, academics always washing their hand before preparing food increased at least 20% during the coronavirus pandemic. USCDC (2020) does not recommend the use of soap, detergent, bleach solution to clean food and packaging. Only clean running water is recommended. The participants often and always washing fruit and vegetables with clean water before eating stayed over 90% by both academics and university students before and during the coronavirus pandemic. Seemingly, coronavirus had a small impact on how often fruit and vegetables are washed due to high rate of washing practices by academics and students at universities in Turkey.

In China, an internet-based survey was conducted to understand impact of the coronavirus pandemic on consumers' food safety knowledge and behavior (Min, Xiang, & Zhang, 2020). Cutting board disinfection frequencies of consumers was considered as indicator of house-hold food safety behavior. Food safety knowledge of consumers (1,373 residents) living a communities COVID-19 cases from various ages and income groups was positively affected in China (Min et al., 2020). Similarly, hygiene practices of both academics and

TABLE 5 Overall associations among, marital status, parental status, student/academics status ($n = 719$), and academic rank ($n = 240$) on eating attitude, hygiene practices and food safety knowledge of participants at universities before and during coronavirus (COVID-19) pandemic

		p-values					
	Time period	Gender	Marital status	Parental status	Student/faculty	Academic rank	Age
Eating attitudes	Before the coronavirus	.311	.000*	.000*	.001*	.135	.000*
	During the coronavirus	.036*	.031*	.102	.002*	.358	.010*
Hygiene practices	Before the coronavirus	.000*	.107	.009*	.009*	.043*	.045*
	During the coronavirus	.000*	.002*	.059	.012*	.008*	.065
Knowledge[a]		.094	.014*	.268	.081	.876	.153

[a]Only during the coronavirus (COVID-19) pandemic.
*$p \leq .05$.

university students in Turkey have been impacted during the coronavirus pandemic in this study.

During the coronavirus pandemic in China, consumers started to pay more attention food safety degree of dining places (Zhang, Jiang, Jin, & Chen, 2021). Similarly, the coronavirus pandemic has had an important effect on some eating and shopping behaviors of both university students and academics in this study. Over 80% of both groups stopped going out for eating during the coronavirus pandemic. Taking out meal or food delivery from a restaurant were also not accepted as appropriate by majority of participants from both groups during the coronavirus pandemic. In Turkey, precautions have been strictly applied in provinces with high disease rate by government during pandemic. Decrease in going out for eating can be considered important effect of forced precautions by government.

Luo et al. (2020) reported that gender, age, educational and professional background, disease history, and the attention paid to coronavirus-related knowledge were associated with food safety knowledge of Chinese people during the pandemic. Only marital status was in association with overall responds for food safety-related statements ($p = .014$) (Table 5). When combined, hygiene practices of academics and university students were not in relationship with marital status before the coronavirus and parental status during the coronavirus pandemic ($p > .05$) (Table 5). However, gender, status as faculty/student, and academic rank were associated with hygiene practices before and during the coronavirus pandemic ($p \leq .05$). People over 65 years old are more vulnerable to the coronavirus based on death rates; however, many young people (even children) also lost their lives during the pandemic. Overall, age was calculated as associated factor for hygiene practices before the coronavirus pandemic ($p \leq .05$). However, age of respondents did not significantly relate to hygiene practices during the coronavirus pandemic probably due to severity of disease affecting all people to some extent. In China, diet habits from all ages have been changed during the coronavirus pandemic (Luo et al., 2020) In this study, eating attitudes of academics and university students were in association with age, marital, parental, and faculty/student status ($p \leq .05$) but not gender and academic rank before the coronavirus pandemic ($p > .05$) (Table 5). However, parental status were not associated with overall eating attitudes, food safety knowledge, and hygiene practices statements and questions during the coronavirus pandemic ($p > .05$). This indicates participants with or without children started to be more careful during the coronavirus pandemic.

5 | CONCLUSIONS

With the huge impact of the coronavirus (COVID-19) pandemic, universities have moved to online education in Turkey in a short period of time. Digital transformation movement started before pandemic has accelerated to adapt new normal in academia as in all country. However, the reaction and preparedness of university student and academics to sudden changes have not been evaluated for various aspects of academia. In this study, academics from various ranks and university students were surveyed to understand how their food safety-related perspectives have affected during the coronavirus pandemic. Similar responses were given to food knowledge, hygiene practice-related statements, and eating attitude-related questions by both groups. Responds indicate that both academics and university students are more careful about food safety during the coronavirus pandemic to avoid the spread of disease and getting sick. Academics and university students have exposed the same mainstream media content for long time via television. The findings of this study may be an indicator for the importance of communication tools as mainstream media for training (in this case food safety) since campaigns during the coronavirus pandemic have affected food knowledge, hygiene practices, and eating attitudes of both tested groups, similarly. Participants limited to university students and academics can be considered as limitation in this study. Since the respondents included only people with prospective higher education and academic level education and experience, application of the same questionnaires to overall society would probably reduce encouraging results about food safety-related recommendations for the coronavirus pandemic. Another limitation is that food safety knowledge, hygiene practices, and eating attitudes are difficult to evaluate because of self-reported bias. Further research is needed to understand possible reasons for results of this study.

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CONFLICT OF INTEREST

The authors declare no potential conflict of interest.

AUTHOR CONTRIBUTIONS

Nurullah Görür and Zeynal Topalcengiz performed conceptualization, data curation, formal analysis, methodology, and writing – original draft. Zeynal Topalcengiz organized funding acquisition, project administration, resources, software, supervision, writing – review & editing.

ETHICS STATEMENT

Ethical approval was obtained from Muş Alparslan University Committee for Scientific Research and Publication Ethics with a decision number of 10879717-050.01.04. Informed consent was obtained from all individual participants included in the study. The authors affirm that human research participants provided informed consent for publication.

DATA AVAILABILITY STATEMENT

The authors declare that data available on request.

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