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RESEARCH ARTICLE

Changes in the food preferences and purchase behaviors in the new normal: a cross-sectional study

Yonca Sevim^{a,*}, Tuba Yalçın^b

^aDepartment of Nutrition and Dietetics, Bahçeşehir University, Faculty of Health Sciences, İstanbul, Türkiye.

^bDepartment of Nutrition and Dietetics, Izmir Katip Çelebi University, Faculty of Health Sciences, Izmir, Türkiye.

*yonca.sevim@hes.bau.edu.tr

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KEYWORDS

COVID-19;
Pandemics;
Eating Behavior;
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ABSTRACT

Introduction: During the new coronavirus disease 2019 (COVID-19) pandemic, food preferences and consumption behaviors of consumers began to change. This study aims to examine changes in food preferences and purchasing habits in the new normal of COVID-19 after lockdown.

Methodology: In this cross-sectional study, the anonymous online survey hosted by the forms.app was shared via social media from July to August 2021, targeting Turkish residents 18-65 years old. The questionnaire was developed based on related literature by authors. Statistical analysis was performed using IBM SPSS® Statistics for Windows, version 20.0.

Results: A total of 1,033 women (90.4%) and 110 men (9.6%) participated in this study, between the ages of 26-37. During the new normal period of the pandemic, 40.3% of the participants have increased online food shopping, and 44.1% of the participants decreased food shopping via the markets, greengrocers, or local markets. While sex, age, income, marital status, and chronic disease did not differ significantly in the change in online shopping ($p>0.05$), education level and labor status were significantly different ($p<0.05$). 55.6% of the participants reported that the COVID-19 pandemic affected their food choice. Purchasing of foods perceived as healthy according to participants was a lot and quite a lot as %38.7 affected by the COVID-19 pandemic. A high percentage of the participants increased their consumption of healthy foods such as foods containing vitamin C, fruits, vegetables, nuts, protein-rich foods, probiotic foods, and water.

Conclusions: The food purchasing behavior and the consumption of foods consumed have been changed in the new normal period of COVID-19.



> **Cambios en las preferencias alimentarias y comportamientos de compra en la nueva normalidad: un estudio transversal**

PALABRAS CLAVE

COVID-19;
Pandemias;
Conducta Alimentaria;
Preferencia del Consumidor.

RESUMEN

Introducción: Durante la pandemia de la nueva enfermedad por coronavirus 2019 (COVID-19), las preferencias alimentarias y los comportamientos de consumo de los consumidores han comenzado a cambiar. Este estudio tiene como objetivo examinar los cambios en las preferencias alimentarias y los hábitos de compra en la nueva normalidad de COVID-19 después del cierre.

Metodología: En este estudio transversal, la encuesta anónima en línea organizada por Forms app se compartió a través de las redes sociales de julio a agosto de 2021 y se centró en los residentes Turcos de entre 18 y 65 años. El cuestionario fue desarrollado en base a la literatura relacionada por los autores. El análisis estadístico se realizó utilizando IBM SPSS® Statistics para Windows, versión 20.0.

Resultados: Participaron de este estudio un total de 1.033 mujeres (90,4%) y 110 hombres (9,6%), con edades entre 26 y 37 años. Durante el nuevo período normal de pandemia, el 40,3% de los participantes aumentó las compras de alimentos en línea y el 44,1% de los participantes disminuyó las compras de alimentos a través de los mercados, fruterías o mercados locales. El sexo, la edad, los ingresos, el estado civil y las enfermedades crónicas no difirieron significativamente en el cambio de compras en línea ($p>0,05$). El nivel educativo y la situación laboral fueron significativamente diferentes ($p<0,05$). El 55,6% de los participantes informaron que la pandemia de COVID-19 afectó su elección de alimentos. La compra de alimentos percibidos como saludables según los participantes fue mucho y bastante como 38,7% afectados por la pandemia de COVID -19. Un alto porcentaje de los participantes aumentó el consumo de alimentos saludables como alimentos que contienen vitamina C, frutas, verduras, nueces, alimentos ricos en proteínas, alimentos probióticos y aumentó el consumo de agua.

Conclusiones: El comportamiento de compra de alimentos y el consumo de alimentos consumidos ha cambiado en el nuevo período normal de COVID-19.

KEY MESSAGES

1. 40.3% of the participants have increased online food shopping.
2. A high percentage of the participants increased healthy food consumption.
3. The most increased purchasing frequency was for the foods containing vitamin C.
4. 31% of the participants increased consumption of packaged food during the new normal.

CITATION

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INTRODUCTION

The new coronavirus disease 2019 (COVID-19), first reported in Wuhan, China, has become widespread worldwide, and the World Health Organization (WHO) declared it a pandemic on March 11, 2020¹. Social distancing, self-isolation, mask use, and personal hygiene are important preventive strategies against COVID-19, particularly in the absence of vaccination². The COVID-19 pandemic has led to quarantines, sudden changes in people's lifestyles, and economic and social consequences in various parts of the world³. This isolation has two important consequences: staying at home and stockpiling food due to restrictions in grocery/market shopping⁴. Furthermore, it can be stressful to constantly encounter COVID-19 news from the media. Additionally, prolonged social isolation can cause boredom. Boredom and stress lead people to overeat, especially junk foods that are usually high in sugar, saturated fat, and calories, defined as food cravings^{5,6}.

It has been shown that the COVID-19 pandemic, especially the lockdown, affects the nutritional habits of individuals. While it was shown that the purchase of processed, snacks, junk and ready-to-eat foods have increased during the COVID-19 lockdown (especially the first 3 months)^{7,8}, some studies have shown that the COVID-19 pandemic has led consumers to increase their preferences for organic foods, legumes, seafood, fruits, and vegetables preferences^{4,9}. There was also a remarkable increase in online shopping during the pandemic (from the penultimate week of February to the second week of March, +57%, +81%, +97% increase)¹⁰. In the United States, online grocery shopping was up to 233% at the end of March¹¹. It was observed that purchases decreased in markets that were very crowded and less safe than small stores. A gradual decline in growth was also observed in local markets, many of which were closed due to government restrictions¹⁰. Pandemic has gradually changed consumers' purchase and consume food starting with panic purchases, particularly for foods such as long-lived milk, pasta, rice, and canned vegetables, to reduce the risk of future shortages (purchases of food stock to reduce the number of shopping visits and therefore reduce the exposure and contamination risk of the virus). Second, the first lockdown period resulted in changes in consumers' consumption habits and the quality of diets. Finally, health priority has affected food purchasing patterns, and the perception of physical grocery shopping as a risk has led many people to switch quickly to online shopping¹².

Studies examining general purchasing and food consumption of consumers after lockdown and partial

restricted period which names as "new normal" are limited. It has been observed that consumers' food choices are affected more by reasons for being safer and healthier than by other reasons, such as improving personal appearance or environmental sustainability. Since the fluctuating effects of COVID-19 on the economy, health, well-being, and nutrition may differ according to region and person, it is recommended that the effects of COVID-19 on the health and diet of consumers during pandemics be examined in several locations and populations¹³. Up to date, studies in our country examined the effects of the COVID-19 lockdown on food choices. As far as we know, this is the first study examined the food preferences and purchase behaviors in the new normal. In this study, we aimed to examine changes in food preferences and purchase habits of people during the new normal period of COVID-19 after lockdown.

The hypotheses of the study are based on the questions asked to the participants about their food preferences and purchasing behaviors in the new normal COVID-19 pandemic.

- Hypothesis 1: While the frequency of online food and beverage purchasing increased in the new normal by comparing before the COVID-19 pandemic, the frequency of shopping by going to the supermarket, market, and/or grocery store is decreased.
- Hypothesis 2: The COVID-19 pandemic affected purchasing of foods considered as healthy according to respondents.
- Hypothesis 3: The change in online shopping is different in sex, age, education, income, marital status, chronic diseases and labor status.
- Hypothesis 4: A low risk of virus transmission caused to an increase in packaged foods and beverages products buying.

METHODOLOGY

Study design

In this cross-sectional study, the anonymous online survey hosted by forms.app (Forms App OÜ, Estonia) was shared via social media from July to August 2021, targeting Turkish residents aged between 18-65 years old. To preserve social distancing precautions between the participants and the researchers an online

questionnaire technique was applied. forms.app is used because of its easy accessibility to any device with an internet connection.

After the lockdown period lasted for three months in Türkiye, on June 1, 2020, due to the decrease in the number of new COVID-19 cases, the normalization process started by stepping to control social life. During the ongoing period, the restriction rules have been gradually reduced and a new normal lifestyle has emerged such as restaurant and market services with reduced capacity and, hybrid education systems. Individuals have started to go to places where they can be together collectively, such as food and beverage services, and to adapt to the lifestyle called "new normal". This study was carried out in July-August 2021 after individuals had the opportunity to experience a new normal life pattern for about one year after lockdown (Figure 1).

The study protocol was approved by the Research Ethics Review Board in accordance with the Helsinki Declaration, and participation was entirely voluntary. The questionnaire was anonymous and the privacy of the study participants was protected.

Participants

Participation in the study was voluntary. Participants who had graduated at least high school, and had internet access, were included in the study. Participants who gave missing and inconsistent data were excluded. The sample size of the study was determined as 305 people with the G*power 3.1.9.4 analysis ($1-\beta=0.95$). The number of participants who submitted the online survey was 1,143.

Questionnaire

In this cross-sectional study, a questionnaire was developed based on recent studies, literature reviews, market reports in Türkiye, and pretesting steps. The questionnaire was pretested with several numbers of dietitians first. Some items were removed based on expert feedback, and a few rearrangements were made to obtain a more accurate and

clear questionnaire. After this step, the questionnaire was pretested again on fifteen participants of different sex, age, and occupation to secure data quality, and final adjustments were made before the final survey administration. The questionnaire was presented as an online survey. Together with a brief explanation (aim, inclusion and exclusion criteria) of the study, an online informed consent was obtained as a first question on the questionnaire for all participants. Participants were asked to respond to the questions by considering their general behaviors during the new normal period of the COVID-19 pandemic by comparing them before the COVID-19 pandemic.

The questionnaire consisted of three parts. First part included questions of sociodemographic characteristics such as sex, age, education level, income, marital status, labor status, and information on health status (chronic disease and COVID-19 history). The second part consists of multiple-choice questions, and participants were allowed to choose only one which is proper for themselves. The questions are changes in frequencies of online purchasing and shopping by going to the supermarket, market, and/or grocery store, the effect of the COVID-19 pandemic on food preferences and purchasing foods considered healthy according to respondents. Participants were asked to respond as to be increased, decreased or unchanged purchasing behavior of 18 common foods and beverages such as foods with vitamin C, fruits, water, vegetables, nuts, protein-rich foods, probiotic foods, olive oil, fish, packaged products (biscuits, wafers, milky desserts, bakery products, fruit juices, sodas, desserts with syrup, canned products, alcoholic beverages) during the COVID-19 new normal. The final part is consist of a question on changes in purchasing of packaged foods in the new normal. Participants who only responded as an increased on packaged foods purchasing (404 participants) were directed to answer the next question which is about the reason for the increase in purchasing of packaged foods.

For the reliability of the questionnaire, the internal consistency was analyzed with Cronbach's α coefficient, and it's found to be 0.89 that suggests a good internal consistency.

Figure 1: Time chart of new normal



Statistical analyses

Statistical analysis was performed using IBM SPSS® Statistics for Windows, version 20.0¹⁴. The normality of the data distribution was determined using the Kolmogorov-Smirnov test. Normally distributed continuous variable (Body mass index) is presented as mean, standard deviation ($X \pm SD$), and non-normally distributed variable is expressed as median and the 25th and 75th interquartile ranges (IQR1-IQR3) (age) and categorical data are reported as number (n) and percent (%). General characteristics of participants according to sex were examined using the Mann-Whitney U test. The age of participants was classified as decades and over 50 years. Differences in the change of online food purchasing behaviors

(decreased, increased, unchanged) were examined using Kruskal Wallis test. The level of significance was accepted as $p < 0.05$ for all statistical analyses.

RESULTS

Participants' sociodemographic and general characteristics

The socio-demographic and general characteristics of participants are presented in Table 1. A total of 1,033 women (90.4%) and 110 men (9.6%) voluntarily participated this

Table 1. Characteristics of participants according to sex.

Factors	Female (n=1,033)		Male (n=110)		p	Total (n=1,143)	
	n	%	n	%		n	%
Age (year) Median (IQR1- IQR3)	31 (26-36)		33.5 (26-40)		0.014*	31 (26-37)	
Education							
High School	264	25.6	25	22.7	0.055	289	25.3
Graduate	626	60.6	59	53.6		685	59.9
Postgraduate	143	13.8	26	23.6		169	14.8
Income							
Income < Expenses	328	31.8	24	21.8	0.001*	352	30.8
Income = Expenses	442	42.8	41	37.3		483	42.3
Income > Expenses	263	25.5	45	40.9		308	26.9
Marital Status							
Married	418	40.5	56	50.9	0.035*	474	41.5
Single	615	59.5	54	49.1		669	58.5
Labor							
Employed	535	51.8	89	80.9	0.000*	624	54.6
Unemployed	498	48.2	21	19.1		519	45.4
Chronic Disease							
Yes	239	23.1	24	21.8	0.755	263	23.0
No	794	76.9	86	78.2		880	77.0
COVID-19 History							
Yes	359	34.8	26	23.6	0,019*	385	33.7
No	674	65.2	84	76.4		758	66.3

Statistical analyses were conducted among sex.
P values were calculated using the Mann-Whitney U test. *P<0.05;
COVID-19: The coronavirus disease 2019.

study. As 90.4% were females; to overcome unbalanced sex differences in study population, general characteristics of the participants were divided by sex (Table 1). The age of the participants ranged from 26 to 37, with a median age of 31. Since 74.7% of the participants were graduates of at least four years of university, the study sample size had a high education level, and there was no sex difference in education level. 45.4% of the participants reported that they were unemployed. The income of the majority of the participants was equal to or lower than expenses. 77% of the participants stated that they had no chronic diseases. A total of 66.3% of the participants reported that they did not have COVID-19 infection until the time they participated in the study.

Food and beverage purchasing and preferences during the new normal

The changes in the food purchasing behavior of the participants compared to the pre-COVID-19 period are shown in Table 2. During the new normal period of

pandemic, the frequency of the online food shopping increased at 40.3% of the participants, decreased at 7.9% and remained unchanged at 51.8%. During the new normal period of pandemic, the frequency of food shopping by going to the markets, greengrocers or local markets decreased at 44.1% of the participants, increased at 22.3% and remained unchanged at 33.6%. 55.6% of the participants reported that the COVID-19 pandemic affected their food choice. Purchasing of foods perceived as healthy according to participants was not as 21.6%, somewhat as 39.6%, a lot and quite a lot as %38.7 affected by the COVID-19 pandemic. There was no difference between sexes in any changes in food purchasing preferences (p>0.05).

Differences in the change of online food purchasing behaviors are shown in Table 3. While sex, age, income, marital status, and chronic disease did not differ significantly in the change in online shopping (p>0.05), education level and labor status were significantly different (p<0.05).

Participants were asked to indicate that their overall consumption of 18 common foods and beverages as increased, decreased, and remained unchanged during the new normal period of COVID-19 pandemic; and the results are shown in Figure 2. A high percentage of the participants increased their consumption of healthy foods; foods containing vitamin C (68.7%), fruits (68.2%), water (67.5%), vegetables (64.8%), nuts (58.9%), protein-rich foods (57.5%), probiotic foods (50.1%), olive oil (45.9%), fish (33.4%) consumption increased. In addition, fewer participants' consumption of biscuits, wafers, etc. (25.1%), dairy desserts (23.8%), bakery products (22.6%), fruit juices (16.5%), sodas (13.3%), sorbets (11.8%), canned foods (10%), and alcoholic beverages (9.4%) increased. During the new normal period of COVID-19 pandemic, the most increased purchasing frequency was for the foods containing vitamin C with a rate of 68.7%, the most decreased purchasing frequency was for the carbonated beverages (43.5%), and the beverage type which purchasing frequency did not change the most was alcoholic beverages (53.4%).

Reasons for the increase in packaged foods and beverages consumption

A total of 404 of the participants (31.1%) reported that their consumption of packaged foods and beverages increased during the new normal period of COVID-19 pandemic. The reasons for this increase were asked to the participants by giving them various options, and it was stated that they could mark more than one option (Figure 3). 59.7% of these participants stated that the risk of transmission of the virus to the products sold without any type of package is high, 41.8% of them think that packaged products can be stored

Table 2. Changes in food and beverage purchasing preferences.

Food and beverage purchase habits	n	%
Frequency of online purchasing		
Increased	461	40.3
Decreased	90	7.9
Unchanged	592	51.8
Frequency of shopping by going to the supermarkets, markets, and/or grocery stores		
Increased	255	22.3
Decreased	504	44.1
Unchanged	384	33.6
The effect of the COVID-19 pandemic on food preferences		
Effected	635	55.6
Not effected	508	44.4
The effect of the COVID-19 pandemic on preferences to buy healthier foods		
Quite a lot	215	18.8
A lot	228	19.9
Some	453	39.6
None	247	21.6

Table 3. Differences in the change of online food purchasing behaviors.

Factors	Online Shopping n (%)			p
	Increased	Decreased	Unchanged	
Sex				
Female	422 (91.5)	79 (87.8)	532 (89.9)	0.451
Male	39 (8.5)	11 (12.2)	60 (10.1)	
Age (year)				
19-29	184 (39.9)	39 (43.3)	245 (41.4)	0.961
30-39	216 (46.9)	36 (40.0)	250 (42.2)	
40-49	43 (9.3)	12 (13.3)	73 (12.3)	
>50	18 (3.9)	3 (3.3)	24 (4.1)	
Education				
High School	94 (20.4)	28 (31.1)	167 (28.2)	0.005*
Graduate	288 (62.5)	48 (53.3)	349 (59.0)	
Postgraduate	79 (17.1)	14 (15.6)	76 (12.8)	
Income				
Income < Expenses	136 (29.5)	30 (33.3)	186 (31.4)	0.972
Income = Expenses	207 (44.9)	35 (38.9)	241 (40.7)	
Income > Expenses	118 (25.6)	25 (27.8)	165 (27.9)	
Marital Status				
Married	183 (60.3)	37 (58.9)	254 (57.1)	0.576
Single	278 (39.7)	53 (41.1)	338 (42.9)	
Labor				
Employed	281 (61.0)	44 (48.9)	299 (50.5)	0.002*
Unemployed	180 (39.0)	46 (51.1)	233 (49.5)	
Chronic Disease				
Yes	116 (25.2)	22 (24.4)	125 (21.1)	0.285
No	345 (74.8)	68 (75.6)	467 (78.9)	

P values were calculated using Kruskal Wallis test. *P<0.05.

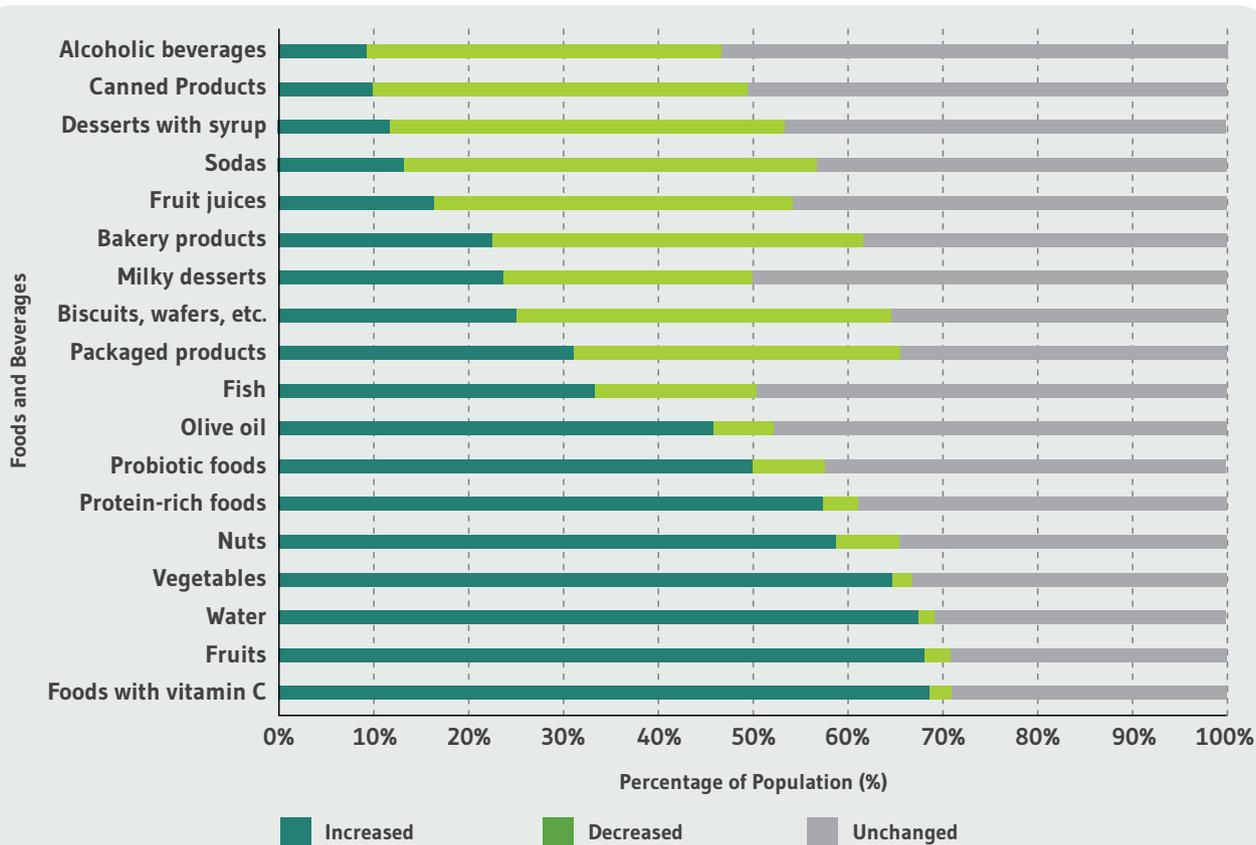
for a longer time, 24% of them think that branded products are safer, and 11.4% of them think that the label information of packaged products gives confidence.

DISCUSSION

In this cross-sectional study, the food preferences and purchase behaviors during the new normal period were

evaluated. It was found that while the online shopping frequency of the majority of the participants increased, the physical shopping frequency decreased in the new normal. The COVID-19 pandemic affected purchasing of foods which considered as healthy according to participants. One-third of participants reported that their consumption of packaged food increased during the new normal period of the COVID-19 pandemic. The participants stated that the risk of transmission of the virus to products sold without any type of package is high, packaged products can be stored

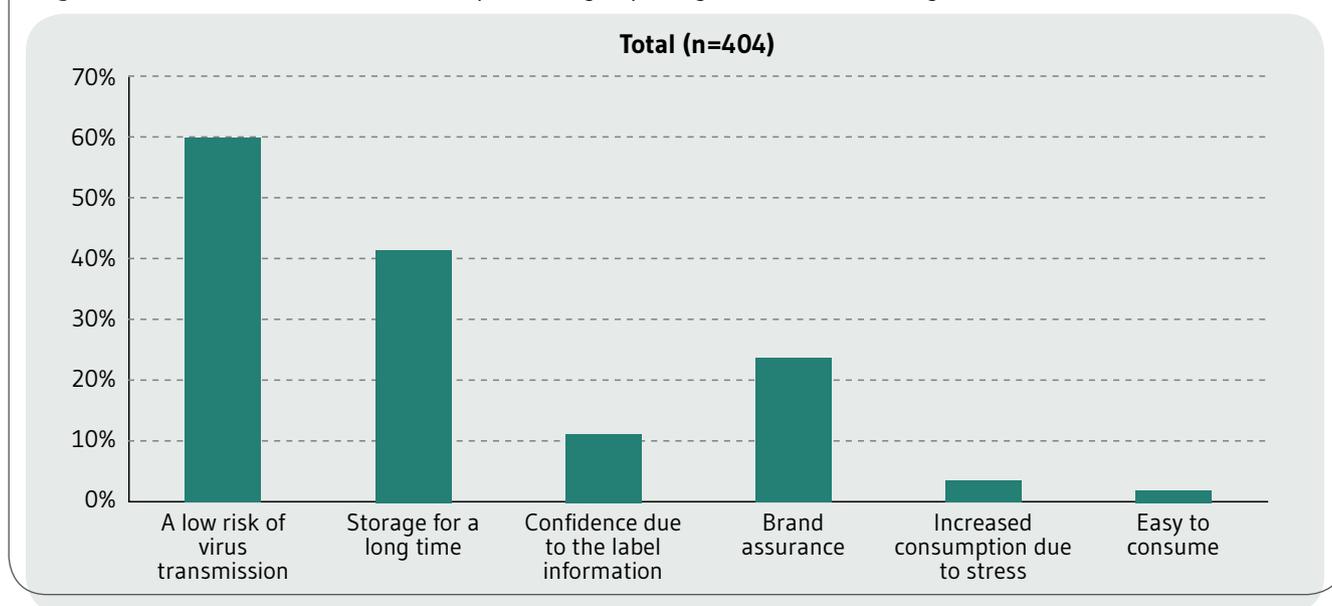
Figure 2. Changes in frequency of common food purchases during the new normal period of COVID-19 compared with the pre-COVID-19 period.



for a longer time. All hypotheses except hypothesis 3 were justified. Education level and labor status were significantly different in the change in online shopping. Economic factors, restrictions and pandemic-related limitations have changed food consumption patterns¹⁵. The COVID-19 pandemic prompted consumers to change their shopping preferences. During this period, there is an increasing trend in consumer purchasing behavior from traditional (market/supermarket) shopping to online shopping¹⁶. While market shopping remains a necessity during the pandemic, many people are concerned about safety shopping in terms of viral contamination. Because of the news that the virus could also live on the surface of boxes and cans, consumers were afraid and worried while physically shopping in the markets. Harper *et al.* found that changes in consumer behavior were partly related to fear of the virus¹⁷. The fact that individuals have to spend less time outside the home because of the unsafe environment and mandatory quarantines in pandemic conditions causes a greater preference for online shopping and a decrease in the frequency of food shopping

from markets/supermarkets. Several studies have also supported pandemic-related outcomes of online food purchases^{18,19}. Although there are different options that consumers can prefer for food needs, the supply method they usually prefer turns in to form a habit²⁰. It seems that online food shopping will continue after the pandemic end. Scacchi *et al.* reported that the COVID-19 pandemic has led Italian consumers to adopt online market shopping as a modern and low-risk shopping method among²¹.

The discovery that COVID-19 originated in the wild animal market in Wuhan, China, has made people more concerned about food safety²². The most critical concern for consumers during a health crisis is access to healthy, nutritious and safe food. With the COVID-19 pandemic, people have become more concerned about food production and transportation owing to uncertain routes of viral transmission²³. In addition to safe food, the fear of not being able to access food due to restrictions and mandatory quarantines due to the pandemic has also caused panic buying, leading to the

Figure 3. The reasons for the increase in purchasing of packaged foods and beverages.

stockpiling of long-life foods¹². This chaotic environment affects individuals' food consumption habits and causes changes in their food preferences. People tend to minimize the risk of infection by choosing packaged foods and buying foods with a longer shelf life because they think they are more hygienic²⁴.

In the present study, it was determined that the food choices of 55.6% of the individuals were affected by the COVID-19 pandemic and their healthy food preferences increased. During the new normal, the foods with the highest increase in purchasing frequency were vitamin C-containing foods, followed by fruits, water, vegetables, nuts, protein-rich foods, and probiotic foods. In addition, the food groups with the highest decrease in purchasing frequency were carbonated drinks and milky desserts. Alcohol consumption did not change during this period. It is well known that nutrition is a crucial factor in modulating immune homeostasis. Health professionals advise people to consume certain foods to strengthen the immune system during the pandemic. Probiotics, proteins, fruits, and vegetables, due to their high antioxidant activity and rich vitamin content, can support immune function, and increased consumption has been recommended²⁵. Several studies conducted at the beginning of the pandemic reported an increase in unhealthy food intake, uncontrolled eating, snacking between meals, and alcohol consumption during the lockdown period^{7,8}. In contrast, a Spanish study showed that quarantine measures led to the adoption of healthier diets in adults²⁶.

Similarly, in a study conducted with university students in Türkiye, it was determined that the nutrition scores of the students before the pandemic were significantly lower than those during the pandemic period. This result shows that individuals pay more attention to their nutrition during the pandemic than during the pre-pandemic period²⁷. In another study in Türkiye²⁸ during the pandemic, it's been found that individuals consumed more fruits and vegetables, especially foods rich in vitamin C, bakery products, probiotic foods, protein-rich foods, and packaged foods. In a study by Ben Hassen *et al.*, it was reported that consumers consumed more healthy food, fruits, vegetables, and water during the pandemic period²⁹. Similarly, another study determined that consumption of fresh and nutritious foods such as vegetables, fruits, and meat increased in many countries, including Germany, Italy, and France, during the pandemic period³⁰. These findings suggest that the effectiveness of vitamin, mineral, and protein intake in strengthening the immune system and their importance in the fight against COVID-19 leads individuals to healthy food choices.

Consumption behaviors and habits, which have been shaped for hundreds of years, have probably undergone irreversible changes in just a few months. It is obvious that these changes will have lasting consequences, and that humanity will have to make great efforts to adapt to the new normal. Although the effects of the COVID-19 pandemic, which is one of the biggest disasters that humanity has experienced in the recent past, naturally focus primarily on human health,

it is understood that this epidemic has socio-cultural, economic, and psychological effects over time. During the new normal, and even after the pandemic, people will likely be more conscious about the content and safety of foods, which will lead to changes in the food industry. However, for the younger and digital generations, traditional grocery/supermarket shopping may be replaced by online shopping.

This present study has some strengths and limitations. The results of this study are among the first evidence of changes in food preferences and purchasing behavior of individuals during the new normal period of COVID-19. We reached a higher number of participants than the calculated sample size, which increase the robustness of the study. For the reliability of the questionnaire, its internal consistency was analyzed with the Cronbach α coefficient and it was found to be 0.89, which is above the recommended value of 0.7 for the questionnaire to be consistent within itself. The most important limitation is the study designed itself, cross-sectional studies cannot pin down a cause-and-effect relationship. The findings cannot be generalized within Türkiye since a possible lack of internet access or preferences of social media use. It should also be noted that the male subset, often observed in voluntary survey studies, is underrepresented. Further studies to examine the sex differences in food preference changes related to new normal will contribute to related literature. A self-reported, web-based online questionnaire has certain limitations such as entered data verification, consulting with possible doubts should be taken into account. Moreover, as the COVID-19 pandemic is still ongoing, the data need to be confirmed and examined in future studies with larger numbers and different populations.

CONCLUSIONS

This research revealed that the COVID-19 pandemic has affected the food preferences and purchasing behaviors of Turkish consumers. These data could form the basis for future research assessing the post-pandemic period.

AUTHORS' CONTRIBUTIONS

YS and TY contributed to the creation and design of the study, designed the statistical plan, and interpreted the data. YS conducted the literature search, and wrote the first draft

with the help of TY. TY conducted performed the analyses. All authors critically reviewed this and previous versions of the paper.

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COMPETING INTERESTS

The authors state that there are no conflicts of interest in preparing the manuscript.

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