JOURNAL OF TOURISM AND GASTRONOMY STUDIES

Healthy Nutritional Attitudes and Behaviors During COVID-19 Outbreak Lockdown

* Veli CEYLAN [a] **, Çiğdem MUŞTU** [b] **, Mehmet SARIIŞIK** [a]

[a] Sakarya University of Applied Sciences, Faculty of Tourism, Department of Gastronomy and Culinary Arts, Sakarya/Turkey
[b] Istanbul Aydin University Anadolu BIL Vocational School, Program of Cooking, İstanbul/Turkey

Abstract

The COVID-19 outbreak that emerged in China in December 2019 and influence whole World, took its place among the major epidemic diseases that occurred in the historical process. The main measure taken to prevent the spread of the disease is the social isolation. The main purpose of this research is to determine the healthy nutrition practices of the people in the COVID-19 quarantine process. Within this context, 982 people, who were residing in Istanbul in which more than 60% of COVID-19 cases found in Turkey have been included in this study, and these people were under self-isolation. Research data were collected between March 15th and April 1st, in which COVID-19 cases reached its peak in Turkey. As a result of factor analysis, nutritional information, emotion about healthy nutrition, healthy and unhealthy nutrition dimensions were created. As a result of the research, it was determined that the quarantine process affected the healthy eating behaviors of the participants in positive way, and that the participants have been eating more healthy manner. Healthy eating behavior is more common in the elderly people than in the young people. Having nutritional information showed a positive effect on healthy eating behaviour. In this process, the participants started to consume the foods they have not been consumed before, and to produce the foods they have not been produced.

* Corresponding Author
E-mail: veliceylan@subu.edu.tr (V. Ceylan)

INTRODUCTION

Nutrition is a physiological need for human growth, development, and having a long life by being healthy and productive. People are confronted with various food choices each and every day in order to get the necessary nutrients at the sufficient level. Sufficient supply of nutrients that are needed according to the age, gender and physiological status of the person is important for healthy nutrition (Conner, Norman & Bell, 2002; Vabø & Hansen, 2014). Food preference is actually the consumer preference for one food product over others. Biological differences that affect food preferences of a person, change their perception of basic flavors. In addition, psychological factors starting from infancy and continuing throughout life, and shaped by different food-related learning experiences are also effective in food preferences (Capaldi, 1996; Nestle et al., 1998; Tuorila, 2007).

It is known that the effects of food consumed on healthy eating principles are important (Gaspar, Garcia & Larrea-Killinger, 2020). It is known that people who follow a high-quality and healthy diet are at lower risk for various chronic diseases or mortality due to different causes (Mötteli, Barbey, Keller, Bucher & Siegrist 2016). The World Health Organization (WHO) considers inadequate intake of fruits, vegetables, legumes, nuts and cereals as an unhealthy diet. In addition, excessive saturation of fat, sugar and salt intake is reported to cause the development of various chronic diseases (Schreiber, Bucher, Collins & Dohle, 2020; WHO, 2020a). Fruits and vegetables are considered as both healthy and savouring when they are taken in sufficient amounts for the development and maintenance of health with their vitamins and minerals (Carvalho, Menezes & Lopes 2018; Huitink, Poelman, van den Eynde, Seidell & Dijkstra, 2020). Current studies suggest that adults should consume at least 400 g (or five portions a day) of fruit and vegetables, in which about 150-200 g of vegetables and about 200 g of fruit per day (Baker & Wardle, 2003; Lechner, Bruf, De Vries, Van Assema & Mudde, 1998). Fatty foods are known as delicious foods depending on the food in question, but are considered unhealthy. For this reason, it is recommended to consume foods with low total fat content, and especially containing low levels of saturated and trans fatty acids, and daily fat intake should not exceed 35% of total calories for adults in order to balance the daily calory intake (Bedeschi, Lopes & Santos, 2016; Lechner et al., 1998; Roininen & Tuorila, 1999). Animal protein sources such as red and white meat, fish, eggs and dairy products that support growth and development and contain essential amino acids are also considered healthy and recommended to be consumed regularly (Grigg, 1995; Jantchou, Morois, Clavel-Chapelon, Boutron-Ruault & Carbonnel, 2010). Furthermore, it is recommended to consume at least 48 g of whole grain food products with high carbohydrate content give a feeling of fullness, and improve the intestinal health caused by dietary fiber content, and are included in the diet every day (Barrett, Foster & Beck, 2020; Fardet, 2010). Besides, food products such as chocolate and ice cream are generally considered as delightful foods (Roininen & Tuorila, 1999).

A certain level of nutritional knowledge is required in determining the food preference in order to ensure the healthy food selection and consumption of a person. Many studies for this purpose indicate that there is a positive relationship between individuals' nutritional knowledge and healthy food selection (Cavaliere, Ricci & Banterle, 2015; Dallongeville, Marécaux, Cottel, Bingham & Amouyel, 2001; Handu, Monty & Chmel, 2008; Klohe-Lehman, Freeland-Graves, Anderson, McDowell, Clarke & Hanss-Nuss, 2006; Lee, Lee, Chang & Kim, 2009; Sapp & Jensen, 1997; Wardle, Parmenter & Waller, 2000). Some studies have examined the relationship between the individual's nutritional knowledge and the choice of only certain foods or food groups. De Vriendt, Matthys, Verbeke, Pynaerta & De Henauwad (2009) determined that the increase in nutrition information of Belgian women increased the

consumption of fruits and vegetables; in his study with Swiss consumers, Dickson-Spillmann & Siegrist (2011) indicated that the increased consumption of fruit, vegetables, water, but foods such as sausages, pasta, chips, and fatty foods were less preferred; Gámbaro, Raggio, Dauber, Claudia & Toribio (2011) stated that people who have more knowledge on nutrition consume more fruits and vegetables and less fatty and sugary foods; and Jovanović, Krešić, Žeželj, Mićović & Štefanac Nadarević (2011) reported that the consumption of fish, fruit, vegetables and fibrous foods increased due to the increased nutritional knowledge of consumers, and consumption of coffee, sugar and alcoholic beverage have decreased.

Information labels added on food packaging in order to facilitate healthy food selection aim to increase nutritional information of consumers (Grunert & Wills, 2007). However, it is seen that, diet and the types of food consumed, and also healthy eating behaviors of the young population have changed in recent years, and traditional foods have been replaced by fast foods in their diets (Naeeni et al., 2014).

The coronavirus disease (COVID-19), which emerged in Wuhan, China in December 2019 and spread all over the world, has become a public health problem and has been declared a pandemic by the World Health Organization (Muscogiuri, Barrea, Savastano & Colao, 2020). Since there is no confirmed treatment for COVID-19, the best approach to control the infection is the prevention principles. Specific nutritional deficiencies that weaken the immune system may cause increased susceptibility to infectious diseases (Khayyatzadeh, 2020). Therefore, people should pay attention to their nutritional habits in order to increase their viral resistance, strengthen their immune system, reduce the sensitivity caused by COVID-19 and long-term complications. Accordingly, healthy foods are needed more than ever. In order to strengthen the immune system and reduce risk factors, consumption of foods containing high amounts of saturated fat, refined carbohydrates and sugar should be avoided, and foods with high fiber content, unsaturated fat and antioxidants should be included in their diets (Butler & Barrientos, 2020). Muscogiuri et al. (2020) states that people who live under quarantine to reduce the spread of the virus may consume more food from boredom and stress. In addition, during this period, it is recommended to follow a healthy and balanced diet that includes high amounts of minerals, antioxidants and vitamins, to pay attention to dietary habits and to consume fruits and vegetables to improve immunity.

It is seen that the number of COVID-19 cases and deaths increase globally day by day. According to World Health Organization (WHO) data, there are many COVID-19 cases confirmed in 216 different countries as of October 2020 (WHO, 2020b). In Turkey, the first COVID-19 case confirmed on 11th of March 2020. (Republic of Turkey Ministry of Health, 2020).

In literature studies, no study determining nutritional information in the general population and nutritional attitudes in the COVID-19 process was found. Approximately 40-60% of total COVID-19 cases in Turkey are located in Istanbul. In this context, the research aims to determine thehealthy nutrition attitudes of those who are under compulsory or voluntary quarantine in Istanbul due to the COVID-19 outbreak.

Materials and Methods

The cases of COVID-19 in Istanbul spread in the most populous districts. In this context, adult people living in Kadıköy, Üsküdar, Ümraniye, Beşiktaş, Beyoğlu, Fatih, Şişli, Bakırköy, Bahçelievler, Zeytinburnu, Güngören, Esenyurt and Küçükçekmece districts of Istanbul are included by using the convenience sampling method.

Questionnaire forms were used as data collection tool. A group of 10 students was formed to collect the surveys. Each student communicated with other individuals residing in the district where they resided and informed them about the purpose of the research. The forms were sent online (Google forms) to people who were willing to participate in the research due to this method is both practical and preventing the contact. The questionnaire was sent to 1300 people who were under optional isolation and 982 of them participated in the study (75.53% participation rate). Research data were collected between 15th of April and 1st of May 2020, the peak of COVID-19 cases in Turkey. The ethical consent required to collect research data was obtained with the decision of Sakarya University of Applied Sciences ethics committee, dated 20 July 2020 and numbered 26428519/044.

The data collection form used in the research consists of two parts. In the first part, there are questions created to determine the socio-demographic characteristics of the participants. In the second part, there is an adapted version of the "Healthy Nutrition Attitude Scale" developed by Tekkurşun Demir & Cicioğlu (2019). There are 20 expressions on this scale which is prepared in 5-point likert scale form in the range of strongly disagree and strongly agree. Negative expressions on the scale were reverse coded (Table 2).

The analysis of the data obtained within the scope of the research was made in IBM SPSS (Ver. 24) program. Firstly, reliability analysis was conducted to determine the consistency of the responses to the statements. As a result of the analysis, Cronbach's Alpha (α) coefficient was determined as 0.798 regarding the Healthy Nutrition Attitude Scale.

Frequency analysis was carried out to determine the responses to demographic questions, healthy eating attitude expressions. Furthermore, factor analysis was conducted to examine similar expressions in the attitude scale regarding healthy nutrition more easily (Table 1). In order to determine the type of analysis to be used in the variance analysis, the normality test was applied to the answers given to the expressions and the answers were found to have a normal distribution (All dimensions have skewness and kurtosis values were between -1 and +1). Therefore, parametric (independent samples t-test and One Way ANOVA) tests were applied to expressions with normal distribution. In all statistical analysis, the significance value was accepted as $p < 0.05$.

Results

Sociodemographic Characteristics of the Respondents

Demographic information of the participants are given in Table 1. 60.3% of the participants are women and 39.7% are men. In addition, almost half of the participants (48.2%) are in the age range between 21 and 29. Generally, the education level of the participants is high. While the rate of participants with graduate degree is high (65.7%), the rate of participants with primary school degree is quite low (6.9%). Besides, it is observed that approximately half of the participants (46.5%) have moderate income. The rate of participants with high income group is quite low (8.6%).

Table 1. The profiles of participants' (*n* = 982).

	n	%
Gender		
Male	390	39.7
Female	592	60.3
Age		
20 and below	294	29.9
21-29	473	48.2
30-39	120	12.2
40-49	64	6.5
50 and older	31	3.2
Education		
Primary school	68	6.9
High school	269	27.4
University	645	65.7
Household income (TL)		
2500 and below	151	15.4
2501-5000	457	46.5
5001-7000	210	21.4
7001-9000	80	8.1
9000 and more	84	8.6

Healthy nutrition attitude during COVID-19 lockdown

Factor analysis was performed to gather similar expressions in the attitude scale regarding healthy nutrition and also to facilitate statistical analysis (Table 2). As a result of factor analysis, 20 expressions included in the scale were collected within four groups that explain 56.84% of the variance. The factor analysis's KMO was (,855) and Cronbach's Alpha coefficient was (,798), means at the "good" level.

Table 2. Healthy Nutritional Attitudes and Behaviours of Participants (*n* = 982)

	Mean	Std. Dev.	Factor Loading	Eigenvalues	% of variance	Cronbach's Alpha
NUTRITIONAL KNOWLEDGE						
I know which foods contain protein.	4,04	0,96	,853			
I know which foods contain carbohydrates.	4,09	0,97	,840			
I know which foods contain vitamins / minerals.	3,98	0,96	,775	**25,560**	**16,338**	**,857**
I know what healthy foods are.	4,51	0,73	,747			
I know the benefits of healthy eating	4,46	0,77	,686			
EMOTION FOR NUTRITION						
* I enjoy eating fast-food (hamburgers, pizza etc.).	2,45	1,36	,746			
* I enjoy eating meat products (salami, sausage, etc.).	2,82	1,34	,716			
* I enjoy eating fried foods.	3,25	1,30	,704	**15,177**	**14,598**	**,765**
* I enjoy eating sugary foods (chocolate, cake, biscuit, etc.).	2,19	1,24	,647			
* I enjoy eating desserts (baklava, kunefe etc.)	2,69	1,38	,631			
UNHEALTHY NUTRITION						
*I eat rapidly without sitting down at the table	4,09	1,27	,803			
*I eat biscuits, cakes and cookies etc. instead of main meals	1,60	1,07	-,802			
* I skip the main meals.	3,75	1,27	,701	**8,780**	**13,555**	**,738**
* I eat snack food (chips, chocolate, biscuits, etc.) every day.	3,49	1,33	,565			
* I drink at least one cup of soda (carbonated beverage) every day.	3,81	1,41	,546			

Table 2. Healthy Nutritional Attitudes and Behaviours of Participants (*n* = 982) (Continuation)

HEALTHY NUTRITION						
I consume fruit regularly.	3,55	1,21	,735			
I consume vegetables at least 3 times a week.	3,48	1,28	,692			
I eat the main meals (breakfast, lunch, and dinner) regularly.	3,57	1,33	,647	**7,328**	**12,353**	**,737**
I drink at least 1.5 liters of water a day.	3,83	1,26	,635			
I eat high-protein foods (meat, milk, eggs, etc.) every day.	3,99	1,07	,604			
Total Variance						*56,844*
Bartlett's Test of Sphericity						*,000*
KMO						*,855*
Cronbach Alpha						*,798*

*Items for which scoring is reversed are marked.

Among the expressions included in the scale, the expressions that the consumers mostly agreed upon were the expressions under the nutrition information factor. The expressions have the highest confirmation of the participants were "I know what are the healthy foods" and "I eat biscuits, cakes and cookies etc. instead of main meals", whereas the expressions with the lowest confirmation were "I enjoy eating fast-food" and "I drink at least one cup of soda every day". When the responses to the statements are evaluated, it is observed that the participants pay attention to healthy nutrition during the quarantine period due to COVID-19. Often the action taken from bad eating habits is the replacement of the main course with snacks. However, the participants state that they have a regular, balanced and adequate diet in the quarantine process.

Nutrutional Knowledge

Difference analyzes were carried out to determine the relationship between nutritional knowledge levels and demographic characteristics of the participants. As a result of the analysis of the difference between gender and nutritional knowledge level (independent samples t-test), no statistically significant difference was found, although the nutritional knowledge levels of females (4.25 ± 0.73) were higher than males (4.16 ± 0.80).

Since there are more than two variables in the age, education and income level categories of the participants, one-way analysis of variance (ANOVA) was performed. It is seen that the nutritional knowledge of the participants increased in proportion with the increase in age and educational status. However, even though there was no increase in proportion to income, it was determined that the participants with the highest income had the highest nutritional knowledge. While a statistically significant difference between nutritional knowledge level and educational status was found, there was no significant difference between age and income (Table 3).

Table 3. ANOVA test results of nutritional knowledge depend on age, education, household income

Demographic characteristics	Category	Mean	Std. Deviation	F value	*p* value
Age	20 and below	4.13	0.78	1.752	0.137
	21-29	4.23	0.75		
	30-39	4.22	0.83		
	40-49	4.33	0.66		
	50 and older	4.39	0.66		
Education	Primary school	3.90	0.75	13.513	<0.001
	High school	4.09	0.84		
	University	4.30	0.71		
Income (TL)	2500 and below	4.20	0.77	2.124	0.076
	2501-5000	4.14	0.78		
	5001-7000	4.30	0.71		
	7001-9000	4.26	0.79		
	9000 and more	4.32	0.66		

According to the Post Hoc (Tukey) test performed to determine the difference between nutritional knowledge and education level found in which group, the difference between the level of knowledge is found among elementary-university and high school-university groups. Therefore, the average of those who have university degree (4.30 ± 0.71) was higher than those with high school degree (4.09 ± 0.84), and primary school degree (3.90 ± 0.756) educational level.

Emotion for Nutrition, Healthy and Unhealthy Nutrition

In the COVID-19 process, an independent samples t-test was conducted to determine the relationship between the emotion for healthy nutrition, healthy and unhealthy nutritional behavior, and gender. All three factors tested do not differ by gender. One-way analysis of variance (ANOVA) was conducted to determine the relationship of these factors with education, age and income. As a result of the analysis, only a difference by age was found (Table 4).

The relationship between age and the difference determined factors was examined by Post Hoc (Tukey) test. The significant difference between nutritional mood and age was found between the age group "20 and under" and all other groups. Furthermore, there is also a significant difference between the age group "50 and over" and all other groups. The highest participation in these statements belonged to those in the age group "20 and below" (2.48 ± 0.99), while the lowest participation was in those aged "50 and above" (3.45 ± 0.99). The rate of participation in the statements in the factor decreases regularly with increasing age.

Table 4. ANOVA results of positive nutrition, malnutrition and emotion for nutrition depend on age

Factor	Age	Mean	Std. Deviation	F value	*p* value
Emotion for nutrition	20 and below	2.48	0.994	9.569	<0.001
	21-29	2.62	0.970		
	30-39	2.86	0.998		
	40-49	2.86	0.924		
	50 and older	3.45	0.995		
Healthy nutrition	20 and below	3.51	0.893	6.798	<0.001
	21-29	3.70	0.924		
	30-39	3.78	0.927		
	40-49	3.89	0.800		
	50 and older	4.23	0.617		
Unhealthy nutrition	20 and below	3.27	0.686	5.594	<0.001
	21-29	3.31	0.723		
	30-39	3.43	0.706		
	40-49	3.61	0.634		
	50 and older	3.68	0.600		

The relationship between healthy nutrition and age is similar to the relationship between feeling on nutrition and age. The difference is between those aged "20 and under" and all other groups. There is also a significant difference between those aged "50 and over" and "between 21 and 29". The highest level of participation in these statements is by those aged 50 and over (4.23 ± 0.61), and the lowest by those aged 20 and under (3.51 ± 0.89). Participation rate of these statements increases regularly with age. The relationship between unhealthy nutrition and the age is opposite of the healthy nutrition. The difference in this relationship occurred between those aged 20 and under and those aged 40 and over. There is also a significant difference between those aged "50 and over" and those aged "30 and below". Participation in unhealthy nutritional expressions decreases with increasing age. The highest participation to these statements was by those aged "20 and under" (3.27 ± 0.68), and the lowest by those aged "50 and over" (3.68 ± 0.60).

Depending on the age of the participants, the level of participation in the statements that constitute the emotional eating behaviour in the COVID-19 process is shown in Fig. It is given in 1. the highest participation rate to the expression "he/she is happy to consume fast food foods" was 3.99 ± 1.19, the lowest participation rate was 3.00 ± 1.36. The highest participation rate indicating that "he/she enjoyed eating meat products" was 3.89±1.2, and the lowest participation rate was 1.55±0.99. The highest participation rate of both expressions is seen in those aged 20 and under, while the lowest participation rate is in those aged 50 and over. Participation rate of enjoying delicacy in delicatessen products shows a significant decrease in the participation rate, especially in participants aged 50 and over. Furthermore, the highest participation (3.3 ± 1.34) in the statement indicating that "delicacy to eat fried foods" was seen in participants aged 20 and under and it was observed that fatty foods were avoided with the increasing age.

The highest participation rate (2.85 ± 1.31) in the statement, stating that "he/she was happy when he consumed sugary foods", was seen in participants aged 20 and under. However, this is the statement that the participants aged 20 and under have the lowest participation compared to other expressions for the emotional eating behaviour. The rate of participation in the statement indicating that "he/she was happy when he/she consumed desserts" did not decrease significantly according to age, the highest participation rate (3.60 ± 1.32) was seen in the participants between the ages of 40 and 49.
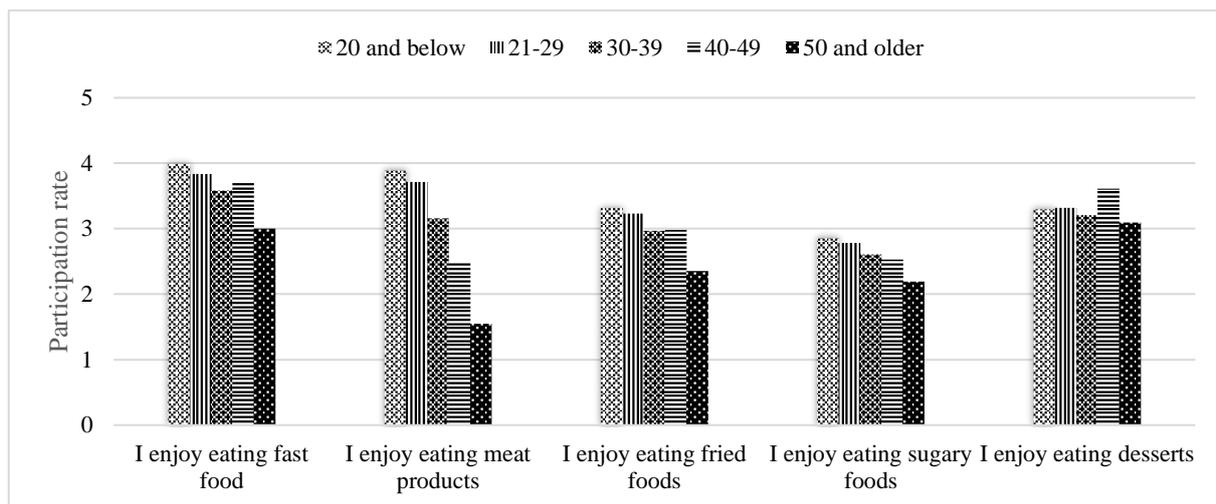

Figure 1. Participation rate in emotion for nutrition based on age

Participation rate in healthy nutritional behavior expressions regarding age and healthy eating attitudes is given in Fig.2. In general, the level of participation by the participants in the expressions of "consuming fruits and vegetables regularly", "eating the main course regularly", "drinking water regularly" and "consuming high-protein foods regularly" increased with age, and the lowest participation rate in the expressions was seen in the participants aged 20 and under, while the highest participation rate was seen for the participants aged 50 years and above. The lowest participation rate (3.27 ± 1.36) of the participants aged 20 and under to the healthy nutrition statements was about consuming main course in regular manner. The participation rate of the statement that indicates that the participants consume protein containing foods every day, is generally high.
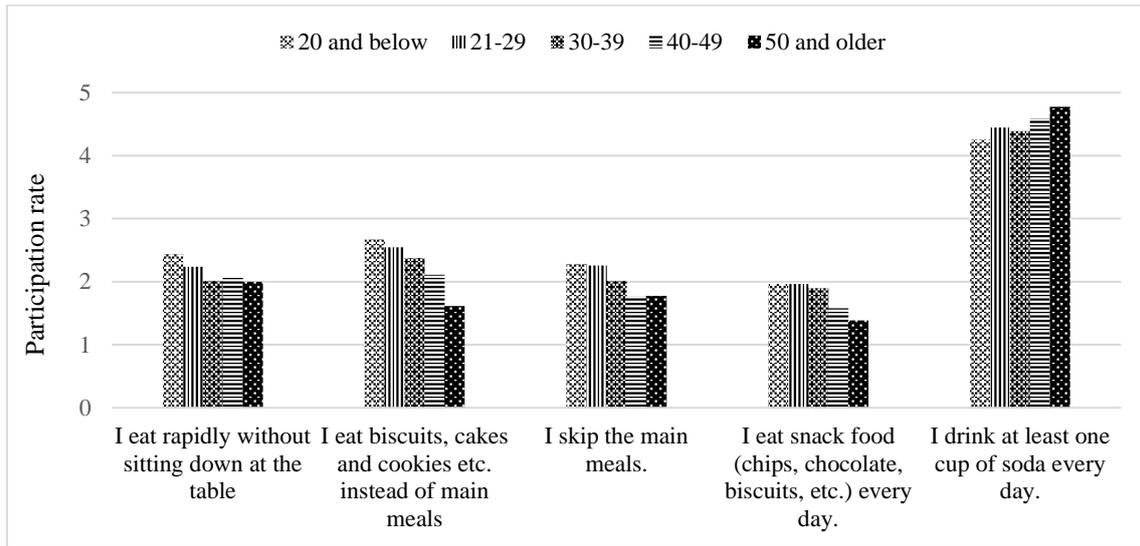
Figure 2. Participation rate in healthy nutrition based on age

Changes in the rate of participation in unhealthy nutritional expressions indicative of divergence from healthy eating attitude according to age categories is given in Fig.3. The highest rate of participation in statement of "eating only snack foods" (2.44 ± 1.26) is seen in participants aged 20 and under, confirming that they show the highest participation in expression of "omitting main meals" (2.28 ± 1.44), and the lowest participation in the expression of "consuming main meals" in healthy nutrition statements. Although the rate of participation in unhealthy nutritional statements decreased regularly with increasing age, this situation was observed as the opposite of the statement indicating "consumption of one glass of soda every day". The rate of participants who stated that they consume various soda every day is quite high.
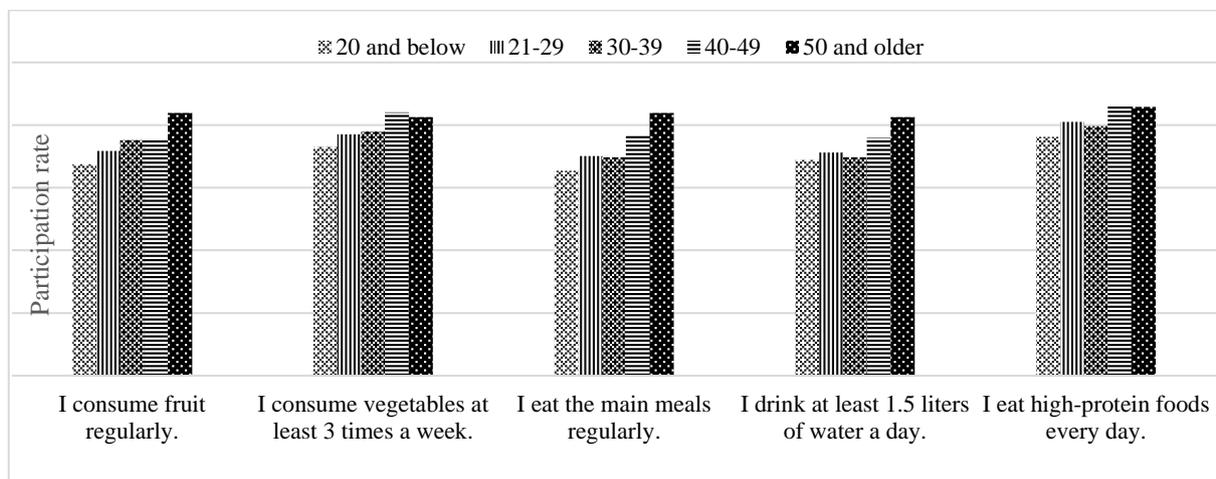

Figure 3. Participation rate in unhealthy nutrition based on age

Table 5 shows the relationship between attitudes and behavioral factors related to healthy nutrition. As a result of the analysis performed, a high relationship was found between nutritional knowledge level and healthy and unhealthy nutritional behaviors. Nutrition knowledge affects healthy nutrition more than the unhealthy nutrition. In addition, there is a high relationship between nutritional mood and healthy and unhealthy nutritional behaviors. Emotional eating behaviour affects unhealthy nutrition more than healthy nutrition. The correlation coefficient between nutritional information and emoional eating is low. The relationship between nutritional knowledge and unhealthy

nutrition indicates that the participants had unhealthy nutritional behaviors in the quarantine process caused by COVID-19, although their level of nutritional knowledge was high.

Table 5. Correlation values among nutritional knowledge, healthy nutrition, unhealthy nutrition, and emotion for nutrition

	Nutritional Knowledge	Emotion for nutrition	Healthy nutrition	Unhealthy nutrition
Nutritional Knowledge				
Emotion for nutrition	,082*			
Healthy nutrition	,354**	,211**		
Unhealthy nutrition	,143**	,395**	,302**	

*Correlation is significant at the 0.05 level.
*Correlation is significant at the 0.01 level.

Many people in Turkey, who are in their home within quarantine process whether voluntarily or compulsory began to cook foods that they have never cooked at home before. In addition, many people stated from their social media accounts that they have started to consume some foods that they did not consume before, in their quarantine process. For this reason, in the first part of the questionnaire, the participants were asked two questions regarding these two statements (Fig. 4 - Fig. 5). One of the questions is: "Which foods have you started to consume more than in the past in the quarantine process from COVID-19?". Participants were given the right to choose more than one product. In this context, yoghurt was the product that its consumption increased the most (36%). Yogurt was followed by pickles (20%), probiotic products (probiotic convenience foods, supplements) (16%), kefir (10%) and fermeted carrot juice drink (5%), respectively. Moreover, 13% of the participants stated that they started to consume different foods more than these.
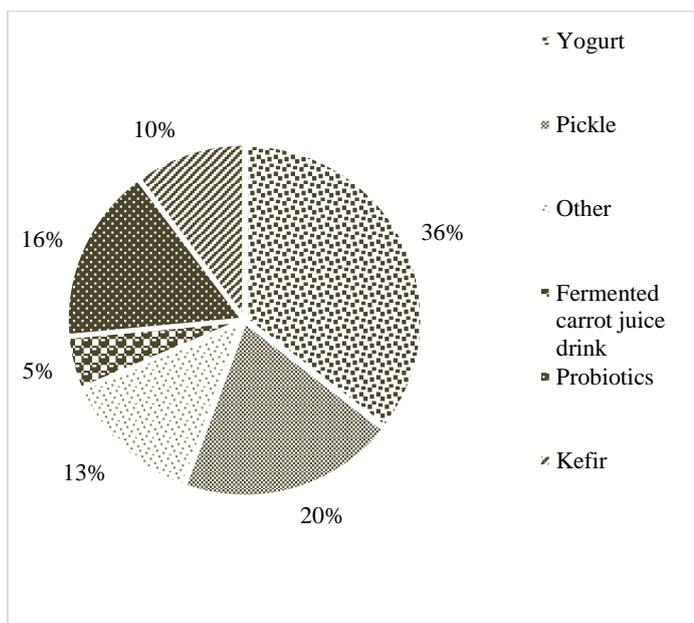

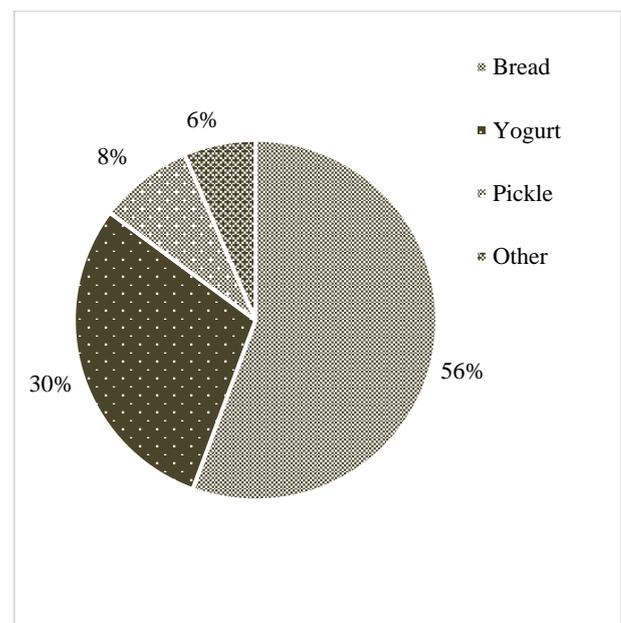**Figure 4.** Foods with increased consumption

Figure 5. Foods produced for the first time at home

The second question is "What kind of foods did you start cooking at home during the COVID-19 quarantine process?". Participants were also given the right to choose more than one food for this question. Among the participants, 356 people stated that they did not cook any different food. The food cooked by the most participant is bread (56%). Yogurt (30%), pickle (8%) and other foods (6%) are followed by bread, respectively.

Discussion

The COVID-19 quarantine process has influenced food consumption practices as well as being effective in all areas of life. Based on this, the research confirms this argument. Since March 11, 2020, in which the first Covid-19 case confirmed and announced in Turkey, programs emphasizing the importance of healthy nutrition were made by the media during the epidemic. food and beverage companies in Turkey continued to serve in the very beginning of the outbreak. However, anxiety in people has directed these people to cook the foods they will consume at home. Experts emphasized the importance of keeping the immune system strong in combating COVID-19 disease (Khayyatzadeh, 2020) and directed people to adequate and balanced nutrition. The high level of healthy eating desire and behavior in people is directly proportional to the high knowledge of food and nutrition. Nørgaard & Brunsø (2009) stated that healthy nutritional information is usually obtained from the family or gained through experience. In a study conducted in Turkey in the past years, it is stated that there is a knowledge gap in consumers in choosing food suitable for healthy nutrition (Topuzoğlu, Hıdıroğlu, Ay, Onsuz & İkiışık, 2007). In order to increase the nutritional information of the consumers, information labels were placed on the packaging but due to the fact that it contains technical information, it was limited to understand the consumers with low education level (Carrillo, Varela, & Fiszman, 2012). In this study, the increase in the tendency of the participants regarding healthy nutrition can be explained by both the increase of the education level of the society in the last decade and the continuous programs related to the healthy nutrition in the media during the COVID-19 process.

In the study conducted by Dickson-Spillmann and Siegrist (2011), as the age of the participants increased, their nutritional information decreased, Parmenter, Walker and Wardle (2000) stated that participants aged 65 and over had the lowest nutritional knowledge, followed by participants aged 18-34. Drichoutis and Lazaridis (2005) state that there is a positive relationship between age and nutritional knowledge, and this attributes this to the fact that people over the age of 40 pay attention to their health status and receive medical advice. In this study conducted in the COVID-19 process, it was observed that as the age of the participants increase, the knowledge of nutrition increase, and also the healthy diet attitude increase. Young participants were determined to be willing to consume convinience food in the COVID-19 process. In the previous years, it has been concluded in studies conducted with young people (especially high school and university students), young people are very eager to consume convenient foods (Yıldırım, Uskun & Kurnaz, 2017; Özgen & Süren, 2019).

In the COVID-19 outbreak, medical authorities report that the most risky group is those with chronic disease and those over 65 years old (Butler & Barrientos, 2020). Continuous repetition of this situation in written and visual media has enabled people in the high age group to take care of healthy nutrition as well as measures such as avoiding contact and isolation. Research results confirm this statement. In the study, the reason why the participants in the high age group pay more attention to healthy nutrition is explained by the emphasis on the importance of healthy nutrition in this process.

In the quarantine process, it has been observed an increase in the consumption of foods contributing to the strengthening the immune system, along with the perception of healthy nutrition of the participants. Many authorities in Turkey have suggested in this process that, in particular, the consumption of fermented foods and probiotic additives. For example, Turkey Dietetic Association (2020) recommended to consume of probiotics added yogurt and kefir in the quarantine process. In this study, it was determined that the participants consumed these foods more frequently than before the quarantine process. In addition, a great increase has been observed in the consumption of fermented products such as pickles and turnips. In this process, in addition to pickle consumption, there was a 4-5 fold increase in pickle export as well (Karakuzulu, 2020). This process has led people to produce some foods at home that are usually bought from markets before, as well as consuming healthy foods. People often produce bread at home, and this has become a "phenomenon" on social media. The results of the research confirm this situation. More than half of the participants in the research stated that they started to produce their bread at home. Bread production at home showed a large increase not only in Turkey, but in the world. According to information collected by Jones (2020) from the five most used shopping and news web-sites in the world, sales of bread machines increased by 652% as of April 2020. In addition to bread production at home, a significant increase was observed in yogurt and pickle production. The reason for this situation can be explained by the opinions of the experts mentioned above.

Conclusion

The main result of the research is that people show healthy eating behavior during the COVID-19 quarantine process. Undoubtedly, the quarantine process has affected healthy eating attitudes and behaviors. During this process, the participants took care of consuming less ready and frozen food, but more vegetables, fruits and liquids. In addition, many participants stated that they started to consume foods in this process that they had not consumed before, and to cook foods that they had not cooked before. News and programs aimed at healthy nutrition and strengthening the immune system have played an important role in showing healthy eating attitudes and behavior by individuals. However, young participants showed less healthy eating tendencies than older participants. Continuation of the quarantine process for about 2 months remain limited with the change in the nutritional behavior of the young people. Conducting a similar research in the same universe after the quarantine is important for the confirmation of this study. Because experts predict that the COVID-19 outbreak will continue for about a year in Turkey and the world. Until the disease vaccination is developed, people should keep their immune system very strong, and therefore healthy eating behaviors should be continued in the post-quarantine process. During the epidemic period, many nutrition programs are featured on television and social media. However, many of these programs contain recommendations that lack scientific truth. As a result of this research, it is recommended to local administrations and relevant institutions, to provide nutritional advice to individuals in accordance with scientific truth, and even to employ expert consultants in this regard.

Limitations

The fact that the epidemic is scarcely new and the lack of knowledge on this subject have affected individuals in the context of nutrition and living conditions. The difficulty of reaching the participants during the epidemic process is one of the limitations of this study. In addition, the lack of willingness of individuals to participate in the research is another limitation.

REFERENCES

Baker, A. H., & Wardle, J. (2003). Sex differences in fruit and vegetable intake in older adults. *Appetite*, *40*(3), 269-275. https://doi.org/10.1016/S0195-6663(03)00014-X.

Barrett, E. M., Foster, S. I., & Beck, E. J. (2020). Whole grain and high-fibre grain foods: How do knowledge, perceptions and attitudes affect food choice?. *Appetite*, *149*, 104630. https://doi.org/10.1016/j.appet.2020.104630.

Bedeschi, L. B., Lopes, A. C. S., & Santos, L. C. D. (2016). Stages of change and factors associated with misperceived eating behavior in obese individuals. *Revista de Nutrição*, *29*(1), 33-42. https://doi.org/10.1590/1678-98652016000100004.

Butler, M. J., & Barrientos, R. M. (2020). The impact of nutrition on COVID-19 susceptibility and long-term consequences. *Brain, Behavior, and Immunity, 83*, 53-54. https://doi.org/10.1016/j.bbi.2020.04.040.

Capaldi, E. D. (1996). *Why we eat what we eat: The psychology of eating*. Washington: American Psychological Association, (Chapter 2). https://doi.org/10.1037/10291-000.

Carrillo, E., Varela, P., & Fiszman, S. (2012). Influence of nutritional knowledge on the use and interpretation of Spanish nutritional food labels. *Journal of Food Science, 77*(1), H1-H8. https://doi.org/10.1111/j.1750-3841.2011.02479.x.

Carvalho, M. C. R. D., Menezes, M. C. D., & Lopes, A. C. S. (2018). Perception versus intake of fruit and vegetables. *Revista de Nutrição*, *31*(2), 221-233. https://doi.org/10.1590/1678-98652018000200008.

Cavaliere, A., Ricci, E. C., & Banterle, A. (2015). Nutrition and health claims: Who is interested? An empirical analysis of consumer preferences in Italy. *Food Quality and Preference*, *41*, 44-51. https://doi.org/10.1016/j.foodqual.2014.11.002.

Conner, M., Norman, P., & Bell, R. (2002). The theory of planned behavior and healthy eating. *Health psychology*, *21*(2), 194. https://doi.org/10.1037/0278-6133.21.2.194.

Dallongeville, J., Marécaux, N., Cottel, D., Bingham, A., & Amouyel, P. (2001). Association between nutrition knowledge and nutritional intake in middle-aged men from Northern France. *Public Health Nutrition*, *4*(1), 27-33. https://doi.org/10.1079/PHN200052.

De Vriendt, T., Matthys, C., Verbeke, W., Pynaerta, I., & De Henauwad, S. (2009). Determinants of nutrition knowledge in young and middle-aged Belgian women and the association with their dietary behaviour. *Appetite, 52*(3), 788–792. https://doi.org/10.1016/j.appet.2009.02.014.

Dickson-Spillmann, M. & Siegrist, M. (2011). Consumers' knowledge of healthy diets and its correlation with dietary behaviour. *Journal of Human Nutrition and Dietetics*, *24*(1), 54–60. https://doi.org/10.1111/j.1365-277X.2010.01124.x.

Drichoutis, A. C., Lazaridis, P., & Nayga, R. M. (2005). Nutrition knowledge and consumer use of nutritional food labels. *European Review of Agricultural Economics, 32*(1), 93-118. https://doi.org/10.1093/erae/jbi003.

Fardet, A. (2010). New hypotheses for the health-protective mechanisms of whole-grain cereals: what is beyond fibre? *Nutrition Research Reviews*, *23*(1), 65-134. https://doi.org/10.1017/S0954422410000041.

Gámbaro, A., Raggio, L., Dauber, C., Claudia, A. E., & Toribio, Z. (2011). Nutritional knowledge and consumption frequency of foods--a case study. *Archivos Latinoamericanos de Nutricion, 61*(3), 308-315.

Gaspar, M. C. D. M. P., Garcia, A. M., & Larrea-Killinger, C. (2020). How would you define healthy food? Social representations of Brazilian, French and Spanish dietitians and young laywomen. *Appetite*, *153*, 104728. https://doi.org/10.1016/j.appet.2020.104728.

Grigg, D. (1995). The pattern of world protein consumption. *Geoforum*, *26*(1), 1-17. https://doi.org/10.1016/0016-7185(94)00020-8.

Grunert, K. G., & Wills, J. M. (2007). A review of European research on consumer response to nutrition information on food labels. *Journal of Public Health*, *15*(5), 385-399. https://doi.org/10.1007/s10389-007-0101-9.

Handu, D. J., Monty, C. E., & Chmel, L. M. (2008). Nutrition education improved nutrition knowledge, behavior, and intention among youth in Chicago public schools. *Journal of the American Dietetic Association*, *108*(9), A91. https://doi.org/10.1016/j.jada.2008.06.253.

Huitink, M., Poelman, M. P., van den Eynde, E., Seidell, J. C., & Dijkstra, S. C. (2020). Social norm nudges in shopping trolleys to promote vegetable purchases: A quasi-experimental study in a supermarket in a deprived urban area in the Netherlands. *Appetite*, *151*, 104655. https://doi.org/10.1016/j.appet.2020.104655.

Jantchou, P., Morois, S., Clavel-Chapelon, F., Boutron-Ruault, M. C., & Carbonnel, F. (2010). Animal protein intake and risk of inflammatory bowel disease: The E3N prospective study. *American Journal of Gastroenterology*, *105*(10), 2195-2201. https://doi.org/10.1038/ajg.2010.192.

Jones, K. (2020). *The pandemic economy: What are shoppers buying online during COVID-19?*. https://www.visualcapitalist.com/shoppers-buying-online-ecommerce-covid-19/ accessed 28 May 2020.

Jovanović, G.K., Krešić, G., Žeželj, S.P., Mićović, V., & Štefanac Nadarević, V. (2011). Cancer and kardiovascular diseases nutrition knowledge and dietary intake of medical students. *Collegium Antropologicum, 35*(3), 765-774.

Karakuzulu, M. (2020). *Koronavirüs turşu satışlarını artırdı*. https://www.dha.com.tr/yurt/koronavirus-tursu-satislarini-artirdi/haber-1769330 accessed 28 May2020.

Khayyatzadeh, S. S. (2020). Nutrition and infection with COVID-19. *Journal of Nutrition and Food Security*, *5*(2), 93-96. http://dx.doi.org/10.18502/jnfs.v5i2.2795.

Klohe-Lehman, D. M., Freeland-Graves, J., Anderson, E. R., McDowell, T., Clarke, K. K., Hanss-Nuss, H., & Milani, T. J. (2006). Nutrition knowledge is associated with greater weight loss in obese and overweight low-income mothers. *Journal of the American Dietetic Association*, *106*(1), 65-75. https://doi.org/10.1016/j.jada.2005.09.047.

Lechner, L., Brug, J., De Vries, H., Van Assema, P., & Mudde, A. (1998). Stages of change for fruit, vegetable and fat intake: consequences of misconception. *Health Education Research*, *13*(1), 1-11. https://doi.org/10.1093/her/13.1.1-a.

Lee, J. W., Lee, H. S., Chang, N., & Kim, J. M. (2009). The relationship between nutrition knowledge scores and dietary behavior, dietary intakes and anthropometric parameters among primary school children participating in a nutrition education program. *Korean Journal of Nutrition*, *42*(4), 338-349. https://doi.org/10.4163/kjn.2009.42.4.338.

Mötteli, S., Barbey, J., Keller, C., Bucher, T., & Siegrist, M. (2016). Measuring practical knowledge about balanced meals: development and validation of the brief PKB-7 scale. *European Journal of Clinical Nutrition*, *70*(4), 505-510. https://doi.org/10.1038/ejcn.2015.173.

Muscogiuri, G., Barrea, L., Savastano, S., & Colao, A. (2020). Nutritional recommendations for COVID-19 quarantine. *European Journal of Clinical Nutrition*, *74*, 850-851. https://doi.org/10.1038/s41430-020-0635-2.

Naeeni, M. M., Jafari, S., Fouladgar, M., Heidari, K., Farajzadegan, Z., Fakhri, M., Karami, P., & Omidi, R. (2014). Nutritional knowledge, practice, and dietary habits among school children and adolescents. *International journal of preventive medicine*, *5*(2), 171-178.

Nestle, M., Wing, R., Birch, L. DiSorga, L., Drewnowski, A., Middleton, S., Sobal, J., & Winston, M. (1998). Behavioral and Social Influences on Food Choice. *Nutrition Reviews, 56*(5), 50-74. https://doi.org/10.1111/j.1753-4887.1998.tb01732.

Nørgaard, M. K., & Brunsø, K. (2009). Families' use of nutritional information on food labels. *Food Quality and Preference, 20*(8), 597-606. https://doi.org/10.1016/j.foodqual.2009.07.005.

Ozgen, L., & Suren, T. (2019). Öğrencilerde fast food ve slow food tüketim nedenleri arasındaki farkın incelenmesi. *Journal of Tourism and Gastronomy Studies, 7*(3), 1836-1851. https://doi.org/10.21325/jotags.2019.451.

Parmenter, K., Waller, J., & Wardle, J. (2000). Demographic variation in nutrition knowledge in England. *Health Education Research, 15*(2), 163-174. https://doi.org/10.1093/her/15.2.163.

Republic of Turkey Ministry of Health (2020). Current Situation in Turkey. https://covid19.saglik.gov.tr/ accessed 28 June 2020.

Roininen, K., & Tuorila, H. (1999). Health and taste attitudes in the prediction of use frequency and choice between less healthy and more healthy snacks. *Food Quality and Preference*, *10*(4-5), 357-365. https://doi.org/10.1016/S0950-3293(98)00057-3.

Sapp, S. G., & Jensen, H. H. (1997). Reliability and validity of nutrition knowledge and diet-health awareness tests developed from the 1989–1991 diet and health knowledge surveys. *Journal of Nutrition Education*, *29*(2), 63-72. https://doi.org/10.1016/S0022-3182(97)70157-2.

Schreiber, M., Bucher, T., Collins, C. E., & Dohle, S. (2020). The Multiple Food Test: Development and validation of a new tool to measure food choice and applied nutrition knowledge. *Appetite*, *150*, 104647. https://doi.org/10.1016/j.appet.2020.104647.

Tekkursun Demir, G., & Cicioglu, H. I., (2019). Sağlıklı Beslenmeye İlişkin Tutum Ölçeği (SBİTÖ): Geçerlik ve Güvenirlik Çalışması. *Gaziantep Üniversitesi Spor Bilimleri Dergisi, 4*(2), 256-274. https://doi.org/10.31680/gaunjss.559462.

Topuzoglu, A., Hıdıroglu, S., Ay, P., Onsuz, F., & Ikiisik, H. (2007). Tüketicilerin Gıda Ürünleri ile İlgili Bilgi Düzeyleri ve Sağlık Risklerine Karşı Tutumları. *TSK Koruyucu Hekimlik Bülteni, 6*(4), 253-285.

Tuorila, H. (2007). Sensory perception as a basis of food acceptance and consumption. In H. MacFie (Ed.), *Consumer-led food product development* (pp. 34-65). Boca Raton, Cambridge: CRC Woodhead.

Turkey Dietetic Association. (2020). *COVID-19 beslenme önerileri*. http://www.tdd.org.tr/index.php/duyurular/69-covid-19-beslenme-onerileri accessed 28 May 2020.

Vabø, M., & Hansen, H. (2014). The relationship between food preferences and food choice: a theoretical discussion. *International Journal of Business and Social Science*, *5*(7), 145-157.

Wardle, J., Parmenter, K., & Waller, J. (2000). Nutrition knowledge and food intake. *Appetite*, *34*(3), 269-275. https://doi.org/10.1006/appe.1999.0311.

WHO (2020a). *Noncommunicable diseases: Unhealthy diet.* http://www.emro.who.int/noncommunicable-diseases/causes/unhealthy-diets.html accessed 28 May 2020.

WHO (2020b). *Coronavirus disease (COVID-19) pandemic*. https://www.who.int/emergencies/diseases/novel-coronavirus-2019 accessed 28 May 2020.

Yıldırım, S., Uskun, E., & Kurnaz, M. (2017). Bir il merkezinde liselerde eğitim gören öğrencilerin yeme tutumları ve ilişkili faktörler. *The Journal of Pediatric Research, 4*(3), 149-155. https://doi.org/10.4274/jpr.97659.