Volume 2-2, October 2020, 800845

GUHES

Journal of Gazi University Health Sciences Institute

journal homepage: https://dergipark.org.tr/tr/pub/guhes

Changes In Food Intake Patterns During Covid-19 Pandemic: A Pilot Study

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Article info:

Received: 27.09.2020

Accepted: 15.10.2020

Keywords:

COVID-19, food, nutrition

Abstract

The "coronavirus disease 2019" (COVID-19) pandemic, which emerged in China at the end of 2019 and then affected the whole world, brought along many health and nutrition problems. Due to various reasons, people's food intake was also affected during the pandemic, and many eating habits were changed. In this pilot study, it was aimed to determine the changes in people's nutrition after the COVID-19 pandemic. In the study, 150 (32 males, 118 females) individuals were included, and the study data were obtained through an online questionnaire. Food consumption frequency was used to look at the difference in nutrition pre and post-pandemic. As a result, there was no statistically significant change in food consumption pre and post-pandemic in males, while it was found that yoghurt, garlic, lemon and turmeric consumption increased significantly in females after the pandemic.

1. Introduction

In Wuhan, a pneumonia outbreak was reported in December 2019, and in the following weeks the infection spread to China and other countries around the world (Zu et al., 2020). The World Health Organization (WHO) declared this outbreak a Public Health Emergency of International Concern on January 30, 2020 (Organization, 2005). WHO named the disease caused by the new coronavirus "coronavirus disease 2019" (COVID-19) on February 12, 2020 (WHO, 2020).

Clinical symptoms of patients include fever, cough, dyspnoea, myalgia, fatigue, normal or decreased leukocyte count, but also organ dysfunction (e.g. shock, acute respiratory distress syndrome, acute heart injury and acute kidney injury) and in severe cases, death may occur (Wang et al., 2020). Therefore, an effective treatment is urgently needed (Mehta et al., 2020).

Besides all this, the COVID-19 pandemic is very risky for global malnutrition. This pandemic process harms the nutritional status of individuals through multiple mechanisms (Headey & Ruel, 2020). Especially because quarantine is associated with the interruption of the work routine, boredom in this process has been associated with greater energy intake as well as higher consumption of fat, carbohydrates and protein (Moynihan et al., 2015). At the same time, the negative emotions felt during quarantine increase people's preference for foods high in sugar, salt and fat (Yılmaz & Gökmen, 2020). These bad eating habits, on the other hand, damage the immune system, and negatively affect the fight against COVID-19. Therefore, the importance of nutrition is very clear in this pandemic process that affects the whole world (Laviano, Koverech, & Zanetti, 2020), and it is emphasized that it is vital to maintain a healthy eating and lifestyle (Zabetakis, Lordan, Norton, & Tsoupras, 2020). Based on this, this study aimed to question the changes in the eating habits of individuals after the COVID-19 pandemic.

2. Materials and Methods

This cross-sectional study was carried out on 150 adults (32 males, 118 females) between April and July 2020. For the study, “Ethical Commission Approval” numbered 13/178 has been obtained from Gazi University Ethics Commission. Individuals were informed about the study, and those who agreed to participate in the study were included in the study.

In this study, which aims to evaluate the changes in nutritional habits of individuals during the COVID-19 pandemic process, an online questionnaire form created over Google was applied to individuals, and the questionnaire forms were collected electronically. In the questionnaire, the general and health information, body weight and height of individuals questioned. In addition, the food frequency questionnaire form, in which various foods were questioned, was presented separately for the pre and post-pandemic in order to determine the changing food consumption of individuals. For the consumption frequency of the questioned foods, it was asked to select one of the options "every day", "3-5 times a week", "1-2 times a week" and “1 / nothing per month”.

When the consumption frequencies of the food groups are evaluated, “every day” and “3-5 times a week” considered as "high"; “1-2 times a week” as "modest", and “1 / nothing per month” as "low/no".

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3. Statistical Analysis

SPSS 23.0 program was used to evaluate the data obtained. Qualitative variables are expressed as number (S) and percentage (%), while quantitative variables are expressed as mean and standard deviation ($\bar{x} \pm SD$). Since our data did not have anormal distribution, Mann Whitney U test was used to evaluate the difference between groups; however, Mc Nemar-Bowker test was used to evaluate the difference pre and post-pandemic. In all analyzes, $p < 0.05$ was considered as statistically significant difference.

Table 1: General characteristics of the participants

	Females (n=118)	**Males (n=32)**	**p**
Age (years)	28.08±8.17	26.96±8.66	0.516
Current Body Weight (kg)	62.83±13.02	82.38±13.27	**<0.001***
Pre-Pandemic Weight (kg)	62.29±12.85	81.63±13.31	**<0.001***
	r=0.981 **p<0.001***	r=0.982 **p<0.001***	
Height (m)	163.31±6.28	181.09±7.84	**<0.001***
Current BMI (kg/m^2)	23.51±4.33	25.03±3.07	0.066
Pre-pandemic BMI (kg/m^2)	23.30±4.28	24.78±2.96	**0.027***
	n (%)	**n (%)**	
Education Status			
Primary school	3 (2.5%)	-	0.883
Middle School	2 (1.7%)	1 (3.1%)	
High school	9 (7.6%)	3 (9.4%)	
Undergraduate	8 (6.8%)	2 (6.3%)	
Bachelor	79 (66.9%)	23 (71.9%)	
Postgraduate	17 (14.4%)	3 (9.4%)	
Profession			
Public	55 (46.6%)	9 (28.1%)	0.142
Student	27 (22.9%)	12 (37.5%)	
Housewife	12 (10.2%)	-	
Private sector	22 (18.6%)	9 (28.1%)	
Not working	2 (1.7%)	2 (6.2%)	
Smoking			
Yes	17 (14.4%)	9 (28.1%)	0.064
No	101 (85.6%)	23 (71.9%)	
Pre-Pandemic cigarette amount (number/day)	6.62±6.6.67	13.63±10.50	**0.022***
Post-Pandemic cigarette amount (number/day)	4.79±5.58	8.45±10.56	0.186
	r=0.716 **p=0.001***	r=0.792 **p<0.001***	

*Data are given as a percentage. *Mann Whitney U Test and Chi-square Test, p<0,05.*

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4. Results

4.1. Sample characteristics

The total number of participants who completed the questionnaire was 150 that 32 males (21.3%) and 118 females (78.7%). The average age were 26.96±8.66 and 28.08±8.17 years for male and female participants, respectively. Average current Body Mass Index (BMI) were 25.03±3.07 and 23.51±4.33 kg/m^2; average pre-pandemic BMI were 24.78±2.96 and 23.30±4.28 kg/m^2 for male and female participants, respectively ($p>0.05$). Most of the female (66.9%) and male (71.9%) individuals had bachelor education status. It has been found that 46.6% of female participants, the 28.1% of male participants working in public institution. Examining the smoking status, while 85.6% of women and 71.9% of men did not smoke, both female and male participants who smoke after the pandemic decreased the amount of cigarettes. Table 1 shows the characteristics of the participants at baseline.

4.2. Nutritional Habits

In this study, the changes caused by the pandemic in the eating habits of male and female participants were examined. According to the results of the food frequency questionnare; it was found that the consumption of yoghurt, garlic, lemon, and turmeric increased significantly after the pandemic in females. However, there was no statistically significant change in food consumption of male participants pre and post-pandemic (Table 2).

5. Discussion

The long-term quarantine, and fear and stress experienced due to COVID-19 greatly affect nutrition. Due to stress, individuals can increase the consumption of junk food. On the other hand, people who are in great fear can also increase on the consumption of foods that support the immune system. Due to, the nutrition of individuals is significantly affected during the pandemic process (Muscogiuri, Barrea, Savastano, & Colao, 2020).

In the present study, it was found that the consumption of yoghurt, garlic, lemon, and turmeric increased significantly after the pandemic in females. However, there was no statistically significant change in food consumption of male participants pre and post-pandemic (Table 2). This change in food intake is thought to be due to the positive effects of these foods on health. In recent years, garlic has been gaining a lot of attention for its wide variety of therapeutic properties and great health benefits. It has been reported; garlic extract have many therapeutic properties such as antimicrobial, antiviral, antifungal, anti-protozoal, hepatoprotective, cardioprotective, anti-inflammatory, neuroprotective, anti-amnesic, anticarcinogenic, antimutagenic, antiasthmatic, immunomodulator, hypolipidemic, anti-hypertensive and antioxidant (Bisen & Emerald, 2016). Rich in flavonoids, acids, caffeine, pectin and minerals, lemon has many properties such as antimicrobial, antifungal, anti-inflammatory, anti-cancer, and depurative (Al-Qudah et al., 2018). It is also reported to be beneficial in lowering serum cholesterol levels and controlling body weight (Ajugwo et al., 2012). Turmeric/curcumin, a member of the ginger family and widely grown in Asian countries, is a functional food used as an anti-inflammatory and to treat bloating, jaundice, menstrual difficulties, hematuria, bleeding and colic or many skin diseases (Labban, 2014).

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Table 2: Consumption of food groups pre and post-pandemic

	Females (n=118)			Males (n=32)		
Food Group Consumption	**Pre-Pandemic n (%)**	**Post-Pandemic n (%)**	**p**	**Pre-Pandemic n (%)**	**Post-Pandemic n (%)**	**p**
Egg						
High	45 (38.1%)	55 (46.6%)	0.119	10 (31.3%)	10 (31.3%)	0.368
Modest	67 (56.8%)	57 (48.3%)		17 (53.1%)	19 (59.4%)	
Low/No	6 (5.1%)	6 (5.1%)		5 (15.6%)	3 (9.4%)	
Yogurt						
High	44 (37.3%)	54 (45.8%)	**0.044***	9 (28.1%)	10 (31.3%)	0.311
Modest	72 (61.0%)	62 (52.5%)		20 (62.5%)	21 (65.6%)	
Low/No	2 (1.7%)	2 (1.7%)		3 (9.4%)	1 (3.1%)	
Kefir						
High	1 (0.8%)	2 (1.7%)	0.380	1 (3.1%)	1 (3.1%)	0.317
Modest	46 (39.0%)	41 (34.7%)		5 (15.6%)	7 (21.9%)	
Low/No	71 (60.2%)	75 (63.6%)		26 (81.3%)	24 (75.0%)	
Pickle						
High	5 (4.2%)	7 (5.9%)	0.587	3 (9.4%)	2 (6.3%)	0.135
Modest	78 (66.1%)	78 (66.1%)		17 (53.1%)	21 (65.6%)	
Low/No	35 (29.7%)	33 (28.0%)		12 (37.5%)	9 (28.1%)	
Garlic						
High	26 (22.0%)	37 (31.4%)	**0.027***	5 (15.6%)	5 (15.6%)	0.607
Modest	78 (66.1%)	70 (59.3%)		23 (71.9%)	22 (68.8%)	
Low/No	14 (11.9%)	11 (9.3%)		4 (12.5%)	5 (15.6%)	
Lemon						
High	43 (36.4%)	52 (44.1%)	**0.021***	4 (12.5%)	6 (18.8%)	0.223
Modest	71 (60.2%)	65 (55.1%)		26 (81.3%)	23 (71.9%)	
Low/No	4 (3.4%)	1 (0.8 %)		2 (6.3%)	3 (9.4%)	
Turmeric						
High	7 (5.9%)	7 (5.9%)	**0.046***	3 (9.4%)	3 (9.4%)	0.564
Modest	47 (39.8%)	47 (39.8%)		9 (28.1%)	8 (25.0%)	
Low/No	64 (54.2%)	64 (54.2%)		20 (62.5%)	21 (65.6%)	
Ginger						
High	7 (5.9%)	7 (5.9%)	0.891	2 (6.3%)	2 (6.3%)	0.102
Modest	47 (39.8%)	45 (38.1%)		13 (40.6%)	9 (28.1%)	
Low/No	64 (54.2%)	66 (55.9%)		17 (53.1%)	21 (65.6%)	

**McNamer-Bowker Test, p<0,05*

On the other hand, yogurt is one of the most popular fermented dairy products worldwide and is widely used as a healthy food. It contains many nutrients (especially calcium) depending on its energy and fat content and is a nutritious food. In addition, it has many benefits for health thanks to the probiotic bacteria it contains (Mckinley, 2005). It is beneficial for improving bone health, maintaining health throughout the life cycle, improving diet quality and reducing the prevalence of chronic diseases such as obesity, metabolic syndrome and cardiovascular disease (Donovan & Shamir, 2014). In addition to these properties, studies have reported that yogurt has an antiviral effect (Choi, Song, Ahn, Baek, & Kwon, 2009; Choi et al., 2010).

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In addition to all this, there is a difference between men and women in terms of food choices for many reasons (Ares, & Gambaro, 2007; Chambers, Lobb, Butler, & Traill, 2008). Women tend to prefer foods that they think are healthier than men (Wardle, Haase, Steptoe, Nillapun, Jonwutiwes, & Bellisie, 2004). Considering this situation, it is thought that the fact that the number of men in our study was quite low compared to women also affected the results.

6. Conclusion

The COVID-19 pandemic has brought many adversities, especially health, all over the world. At the same time, due to the quarantine process and the stress experienced due to the pandemic, the nutrition of the people was also greatly affected. Due to the fear of pandemic, individuals prioritize more healthy food consumption in order to strengthen immunity. As a result of this study, it was found that there was a significant increase in consumption of yogurt, garlic, lemon and turmeric post-pandemic in females. In this process, it is extremely important to pay more attention to nutrition than usual in order to protect immunity. It is thought that this pilot study can be a guiding for future studies on the change of eating habits during the pandemic process.

Conflicts of interest

The authors declare they have no conflict of interest.

References

Ares, G., & Gambaro, A. (2007). Influence of gender, age and motives underlying food choice on perceived healthiness and willingness to try functional foods. *Appetite, 49(*1), 148-158.

Ajugwo, A.O., Erhabor, T., Mokogwu, T., Digban, K., Ojieh, G., & Nnatuanya, I. (2012). Nutritional value of lime and lemon in hypercholesterolaemic induced rats. *Asian Journal of Medical Sciences, 3*(1), 13-16.

Al-Qudah, T. S., Zahra, U., Rehman, R., Majeed, M. I., Sadique, S., Nisar, S., Tahtamouni, S.A., & Tahtamouni, R. W. (2018). Lemon as a source of functional and medicinal ingredient: A review. *International Journal of Chemical and Biomedical Sciences, 14*, 55-61.

Bisen, P.S., & Emerald, M. (2016). Nutritional and therapeutic potential of garlic and onion (Allium sp.). *Current Nutrition & Food Science, 12*(3), 190-199.

Chambers, S., Lobb, A., Butler, L. T., & Traill, W. B. (2008). The influence of age and gender on food choice: a focus group exploration. *International Journal of Consumer Studies, 32*(4), 356-365.

Choi, H.J., Song, J.H., Ahn, Y.J., Baek, S.H., & Kwon, D.H. (2009). Antiviral activities of cell-free supernatants of yogurts metabolites against some RNA viruses. *European Food Research and Technology, 228*(6), 945-950.

Choi, H.J., Song, J.H., Park, K.S., Baek, S.H., Lee, E.S., & Kwon, D.H. (2010). Antiviral activity of yogurt against enterovirus 71 in vero cells. *Food Science and Biotechnology, 19*(2), 289-295.

Donovan, S.M., & Shamir, R. (2014). Introduction to the yogurt in nutrition initiative and the First Global Summit on the health effects of yogurt. *The American Journal of Clinical Nutrition, 99*(5), 1209S-1211S.

Headey, D.D., & Ruel, M.T. (2020). The COVID-19 nutrition crisis: What to expect and how to protect. *IFPRI Book Chapters*, 38-41.

Labban, L. (2014). Medicinal and pharmacological properties of Turmeric (Curcuma longa): A review. *International Journal of Pharmaceutical and Biomedical Sciencesi, 5*(1), 17-23.

Laviano, A., Koverech, A., & Zanetti, M. (2020). Nutrition support in the time of SARS-CoV-2 (COVID-19). *Nutrition (Burbank, Los Angeles County, Calif.), 74*, 110834

Mckinley, M. C. (2005). The nutrition and health benefits of yoghurt. *International Journal of Dairy Technology, 58*(1), 1-12.

Mehta, P., McAuley, D.F., Brown, M., Sanchez, E., Tattersall, R.S., Manson, J.J., & Collaboration, H.A.S. (2020). COVID-19: consider cytokine storm syndromes and immunosuppression. *Lancet (London, England), 395*(10229), 1033.

Moynihan, A.B., Van Tilburg, W.A., Igou, E.R., Wisman, A., Donnelly, A.E., & Mulcaire, J.B. (2015). Eaten up by boredom: Consuming food to escape awareness of the bored self. *Frontiers in Psychology, 6*, 369.

Muscogiuri, G., Barrea, L., Savastano, S., & Colao, A. (2020). Nutritional recommendations for CoVID-19 quarantine. *European Journal of Clinical Nutrition*, 1-2.

Wang, D., Hu, B., Hu, C., Zhu, F., Liu, X., Zhang, J., Wang, B., Xiang, H., Cheng, Z., Xiong, Y., Zhao Y., Li, Y., Wang, X., & Peng, Z. (2020). Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus–infected pneumonia in Wuhan, China. *Jama, 323*(11), 1061-1069.

Wardle, J., Haase, A. M., Steptoe, A., Nillapun, M., Jonwutiwes, K., & Bellisie, F. (2004). Gender

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e-mail address: esracitar@gmail.com

differences in food choice: the contribution of health beliefs and dieting. *Annals of Behavioral Medicine*, *27*(2), 107-116.

World Health Organization. (2005). Statement on the Second Meeting of the International Health Regulations. *Emergency Committee Regarding The Outbreak of Novel Coronavirus* (2019-nCoV); 2005.

World Health Organization. (2020). WHO Director-General's remarks at the media briefing on 2019-nCoV on 11 February 2020. *World Health Organization, Geneva. Available via https://www. who. int/dg/speeches/detail/who-director-general-s-remarks-at-the-media-briefing-on-2019-ncov-on-11-february-2020. Accessed*, *10*.

Yılmaz, C., & Gökmen, V. (2020). Neuroactive compounds in foods: occurrence, mechanism and potential health effects. *Food Research International*, 128, 108744.

Zabetakis, I., Lordan, R., Norton, C., & Tsoupras, A. (2020). COVID-19: The Inflammation Link and the Role of Nutrition in Potential Mitigation. *Nutrients*, *12*(5), 1466.

Zu, Z.Y., Jiang, M.D., Xu, P.P., Chen, W., Ni, Q. Q., Lu, G.M., & Zhang, L.J. (2020). Coronavirus disease 2019 (COVID-19): a perspective from China. *Radiology*, *200490*.

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