Avrupa Bilim ve Teknoloji Dergisi
Sayı 25, S. 707-714, Ağustos 2021

Araştırma Makalesi

www.ejosat.com ISSN:2148-2683

European Journal of Science and Technology
No. 25, pp. 707-714, August 2021

Research Article

Evaluation of Stress and Nutrition Status of University Students During the Covid-19 Outbreak

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(First received 06 February2021 and in final form 3August 2021)

(**DOI:** 10.31590/ejosat.875539)

ATIF/REFERENCE: Ozay-Arancioglu, I., Yilmaz, H.K., Basturk, B., Derya-Ipek, K., Yildirim-Mavis, C. & Bora, S. (2021). Evaluation of Stress and Nutrition Status of University Students During the Covid-19 Outbreak. *European Journal of Science and Technology*, (25), 707-714.

Abstract

COVID-19 is a disease that spreads rapidly by being transmitted from person to person by droplet infection and is defined as a pandemic by the World Health Organization. Social isolation, compliance with hygiene rules, adequate and balanced nutrition are of great importance in this period. Our study aimed to investigate the impact of the COVID-19 epidemic on the stress experienced by Haliç University students and their eating habits and lifestyle changes. Data collection was carried out through a structured questionnaire created in Google Forms (online). In addition, the stress level was determined using the "Perceived Stress Scale". Change in physical activity level, change in dietary habits, and change in desire to eat out were significantly correlated with perceived stress level (p=0.007; p=0.02; p=0.003, respectively). But it was not found to be associated with BMI (p=0.02). During quarantine, we must encourage healthy eating and physical activity at home. The number of studies examining the adaptation of university students, who have an important role in the development of society both in the world and in our country, to epidemic conditions is limited. Therefore, this study will contribute to the literature.

Keywords: Covid-19, Eating habits, Lifestyle changes, Physical activity, Quarantine, Stress.

Üniversite Öğrencilerinin Covid-19 Salgını Sırasında Stres ve Beslenme Durumlarının Değerlendirilmesi

Öz

COVID-19 damlacık enfeksiyonu ile insandan insana bulaşarak hızla yayılan ve Dünya Sağlık Örgütü tarafından pandemi olarak tanımlanan bir hastalıktır. Bu dönemde sosyal izolasyon, hijyen kurallarına uyum, yeterli ve dengeli beslenme büyük önem taşır. Çalışmamız, Haliç Üniversitesi öğrencilerinin yaşadıkları stres, beslenme alışkanlıkları ve yaşam tarzı değişiklikleri üzerinde COVID-19 salgınının etkisini araştırmayı amaçlamıştır. Veri toplama, Google Formlar'da (çevrimiçi) oluşturulan bir anket aracılığıyla gerçekleştirildi. Ayrıca "Algılanan Stres Ölçeği" kullanılarak stres düzeyi belirlendi. Fiziksel aktivite düzeyindeki değişiklik, beslenme alışkanlıklarındaki değişiklik ve dışarıda yemek yeme isteğindeki değişiklik, algılanan stres düzeyi ile anlamlı düzeyde ilişkiliydi (sırasıyla, p=0,007; p=0,02; p=0,003). Ancak BKİ ile ilişkili bulunmadı (p=0,02). Karantina sırasında evde sağlıklı beslenme ve fiziksel aktiviteyi teşvik edilmelidir. Hem dünyada hem de ülkemizde toplumun gelişmesinde önemli rolü olan üniversite öğrencilerinin salgın koşullara uyumunu inceleyen araştırma sayısı sınırlıdır. Bu nedenle bu çalışma literatüre katkı sağlayacaktır.

Anahtar Kelimeler: Covid-19, Yeme alışkanlıkları, Yaşam tarzı değişiklikleri, Fiziksel aktivite, Karantina, Stres.

1. Introduction

The first human cases of Coronavirus Diseases (COVID-19) were identifed in early December 2019. Several cases of pneumonia of unknown aetiology was reported from Wuhan City in Hubei Province of China. The disease, initially called novel coronavirus disease, was later renamed by the World Health Organization (WHO) as COVID-19(Harapan *et al.*, 2020). Due to the rapid spread of the virus across the globe, and subsequently escalating number of confirmed cases and deaths, the WHO declared the COVID-19 outbreak as a global public health emergency of international concern on January 30, 2020. COVID-19 is spread by human-to-human transmission through droplet, feco-oral, and direct contact and has an incubation period of 2-14 days. To date, no antiviral treatment or vaccine has been explicitly recommended for COVID-19. The on-going COVID-19 epidemic in China is causing major panic and public concerns(Chen *et al.*, 2020). The pandemic outbreak of the COVID-19 with the beginnings of 2020 started to poses a serious threat to global health due to the high fatality rate, besides its wide-scale ramifications on socio-economic and psycho-emotional aspects of people's life. In many countries, drastic changes and stressful conditions have been developed over the progression of the COVID-19 disease, like imposing lockdown, school closures, quarantine, travel restrictions, social distancing, and fast-deteriorating business environment(Buheji *et al.*, 2020). Due to the rapidly spreading coronavirus epidemic, health authorities have advised people to limit their exposure to the virus and reduce travel and staying at home(Chen *et al.*, 2020). This is the first time that a quarantine to control a pandemic has been implemented in most countries worldwide. Therefore, there is a lack of conclusive studies providing data on how this measure can affect children and adolescents. Regarding the specific psychological consequences of COVID-19 and the measures to cope with them, few studies have been published(Orgilés *et al.*, 2020). The continuous spread of the epidemic, strictisolation measures and delays in starting schools, colleges, and uni-versities across the country is expected to influence the mental health of college students. However, the closure of schools and confinement to home has multiple impacts on children in terms of education, social isolation, well-being and child protection(Crawley *et al.*, 2020). If children and adolescents seem relatively protected from COVID-19 infection, their health is affected by prolonged lockdown that may, in itself, trigger risks to the health and well-being of young people(Derbyshire and Delange, 2020). Nutrition, one of the main determinants of health, is a part of the treatment regimen for acute and chronic diseases. Obesity, a risk factor of mortality in COVID-19, suggests the importance of nutrition. Among many factors, diet differs considerably between these low- or high-mortality countries. Nutrition may play a role in the immune defense against COVID-19 and may explain some of the differences seen in COVID-19 across Europe. It will be needed to test dietary differences between low and high-rate countries(Bousquet *et al.*, 2020). The quarantine period applied to control SARS-CoV-2 (COVID-19) virus has caused negative changes in individuals' lifestyles: decreased physical activity, sleep disturbance, malnutrition, anxiety and stres(Gualano *et al.*, 2020). Quarantine-based action plans created a situation where people were in the same place for extended stays and encouraged sedentary behavior, such as exposure to screens. Decreases in physical activity lead to functional and structural deterioration of the organism, leading to a deterioration in metabolic and cardiovascular parameters, a decrease in muscle mass in body composition and an increase in mass fat(Reyes-Olavarría *et al.*, 2020). In Turkey, the pandemic has started later than in other countries but were taken early preventive measures. After the first COVID-19 patients were reported in Turkey, one of the most important measures taken by the Higher Education the Institution is to decide to close by the end of the spring semester of university. University students had to deal with stress due to the unpredictable course of COVID-19 and their limited social life away from friends(Aslan and Pekince, 2020). The aim of the present study was designed to understand university students' the changes in the relationship between perceived stress level and demographic features, screen time, sleep status, physical activity level, dietary habits that are major determinants of health during the COVID-19 outbreak.

2. Material and Method

2.1. Study Design and Participants

The study was conducted with 17-20 year old Haliç University students between June 15 and July 15, 2020.Not being a student at Haliç University and not being in the age range of 17-20 were determined as exclusion criteria in sample selection.

2.2. Questionnaire

Data collection was carried out through a structured questionnaire created in Google Forms (online). The study consisted of a structured questionnaire package that inquired about demographic information (age, gender, parental education status); anthropometric data (weight and height reported before and after the pandemic); knowledge of nutritional habits (daily intake of certain foods, meal frequency and number of meals); knowledge of lifestyle habits (sleep quality, physical activity before and after the pandemic etc.). The frequency of consumption of each product was evaluated using different defined categorical variables. In addition, stress level was determined by the "Perceived Stress Scale" developed by Cohen, Kamarck and Mermelstein in 1983. It is a five-point Likert-type scale consisting of 14 items aimed at evaluating the stressful situations experienced by individuals in the last month. High scores from the scale indicate the high level of stress of the individual. Scoring; In items 1,2, 3,8, 11, 12, "Never" option is "0" point, "Almost Never" option is "1" point, "Sometimes" option is "2 points" "Quite Often" option is "3". The score is evaluated with "Very often" option and "4" points. Since the items no.4, 5, 6, 7, 9, 10, 13 are in opposite directions, the "Never" option is "4" points, the "Almost Never" option is "3". "Sometimes" option is evaluated with "2 points" "Quite Often" option with "1" point, "Very often" option with "0" points. The higher the scores, the higher the perceived stress(Eskin *et al.*, 2013).

2.3. Ethics

Participants gave voluntary informed consent to participate in the study. The study protocol was approved by the Halic University Ethics Committee. (Approval date and number:26.06.2020/114)

2.4. Statistical Analysis

Statistical Package for Social Science (SPSS) version 21.0 for Windows software (SPSS, Inc., Chicago, IL, USA) was used for

all statistical analyses. p-values <0.05 were considered statistically significant.

3. Results and Discussion

3.1. Results

Twenty-nine of the participants were the preparatory class students, 668 of the participants were first-year nutrition and dietetics students, 644 of the participants were second-year nutrition and dietetics students, and 272 participants were third-year nutrition and dietetics students, and 61 of the participants were fourth-year nutrition and dietetics students.

There were significant differences in time spent at the computer, time spent on the television and sleep time before and after COVID-19 (respectively, p=0.001, 0=0.001 and p=0.001). The percentage of participants reported that their physical activity level changed during COVID-19. The physical activity level of 67.5% of the participants increased while the other stated that their physical activity level increased. Besides, 77.5% of the participants reported that their dietary habits changed during COVID-19. The frequency of snacks changed in 53.3%, and the frequency of main meals in 46.7% of the participants. In addition, the desire to eat from outside decreased in 71.1% of the participants. According to Table 3, there is in increase in daily consumption of dairy products such as milk, yoghurt and cheese. The relationship between perceived stress level and demographic features, screen time, sleep status, physical activity level, and dietary habits are shown in Table 4. There was a significant relationship between perceived stress level and sex (rho=0.09, p=0.001). Participation in physical activity was correlated with perceived stress level (rho= -0.05, p=0.02). No correlation was found between the time spent on computer and television and the stress level. On the other hand, sleep time after COVID -19 was related to perceived stress level (rho= -0.06, p=0.01), while sleep time before Covid-19 was not significantly correlated with perceived stress level (rho= -0.03, p=0.19). Change in physical activity level, change in dietary habits, and change in desire to eat out were significantly correlated with perceived stress level (rho= 0.06, p=0.007; rho= 0.05, p=0.02; rho= -0.07, p=0.003, respectively).

Table 1. Sociodemographic Data of Participants (n=1674)

Parameters	Mean±SD
Age, years	19.73±1.15
Sex, n (%)	
Female	1186 (70.8%)
Male	488 (29.2%)
Height, cm	168.92±8.68
Weight, kg	
Before COVID-19	63.16±12.86
After COVID-19	63.98±13.20
Body mass index, kg/m²	
Before COVID-19	22.02±3.42
After COVID-19	22.29±3.47
Undergraduate class	
Preparatory class	29 (1.7%)
1st class	668 (39.9%)
2nd class	644 (38.5%)
3rd class	272 (16.2%)
4th class	61 (3.6%)
Living with another person	
Family	1471 (87.9%)
Friend	69 (4.1%)
Alone	63 (3.8%)
Relative	37 (2.2%)
Roommate	34 (2.0%)
Mother's level of education	
Illiterate	59 (3.5%)
Literate	57 (3.4%)
Primary school	409 (24.4%)
Secondary school	309 (18.5%)
High school	572 (34.2%)
University	268 (16%)
Father's level of education	
Illiterate	10 (0.6%)
Literate	47 (2.8%)
Primary school	272 (16.2%)
Secondary school	328 (19.6%)
High school	644 (38.5%)
University	373 (22.3%)
Change of place due to COVID-19, n (%)	482 (28.8%)
Yes	1192 (71.2%)
No	
Smoking status, n (%)	
Current smokers	482 (28.2%)
Former smokers	91 (5.4%)
Never smokers	1101 (65.8%)

*Data are expressed as number (percentage of the total number) and mean±standard deviation.

Table 2. The Change in Screen Time, Sleep Status, Physical Activity Level and Dietary Habits During COVID-19 (n=1674)

Parameters	Mean±SD	Mean difference [95% CI]	p*
Time spent at the computer, hours	2.11±2.01	2.20±2.22	**0.001**
Before COVID19	4.31±2.77	[2.09-2.31]	
After COVID -19			
Time spent on the television, hours	1.30±1.47	1.21±1.69	**0.001**
Before COVID -19	2.52±2.13	[1.13-1.29]	
After COVID -19			
Sleep time, hours			
Before COVID -19	7.44±1.29	1.63±1.97	**0.001**
After COVID -19	9.08±1.86	[1.54-1.73]	
Physical activity level, n (%)	1491(89.1%)		
Changed	361 (21.6%)	-	-
Increased	1130 (67.5%)		
Decreased	183 (10.9%)		
Unchanged			
Dietary habits, n (%)	1297 (77.5%)	-	-
Changed	377 (22.5%)		
Unchanged			
Meal frequency, n (%)	782 (46.7%)		
Change in frequency of main meal	892 (53.3%)	-	-
Change in frequency of snack			
Boredom Eating, n (%)	1180 (70.5%)	-	-
Yes	494 (29.5%)		
No			
Desire to eat out, n (%)	1385 (82.7%)		
Changed	195 (11.6%)	-	-
Increased	1190 (71.1%)		
Decreased	289 (17.3%)		
Unchanged			

Data are expressed as number (percentage of the total number) and mean±standard deviation [95% Confidence Interval].

**Wilcoxon signed-rank test; significance level set at <0.0*

3.2.Discussion

During the pandemic, quarantine or social distant living practices applied in many countries have had various effects on individual and global dietary habits(Jayawardena and Misra, 2020; Sidor and Rzymski, 2020). Changes in lifestyle during the quarantine period, a decrease in the level of physical activity, staying away from work, and working from home have led people to live monotonous. Changes in people's eating and physical activity habits during the COVID-19 quarantine process is also an expected result. These conditions often caused people to have excessive energy intake, excessive fat, carbohydrate and protein intake(Muscogiuri *et al.*, 2020). These changes may be more challenging for students often with the effect of high stress. Smokers, in turn, often perceive cigarettes as a stress relief. There is a piece of experimental evidence that smoking during unpleasant circumstances may decrease the level of arousal resulting in temporary stress relief although studies have also shown that smoking may eventually lead to generation or aggravation of negative emotional states, support adverse coping strategies, and increase the overall stress level. On the contrary, 5.4% of the individuals in our study stopped smoking. The reason for this is thought to be due to the damage caused by COVID-19 to the lungs(Sidor and Rzymski, 2020). Di Renzo et al. reported that during the COVID-19 quarantine in Italy 48.6% of individuals had an increase in body weight, 3.3% stopped smoking, and 38.3% increased their physical activity(Di Renzo *et al.*, 2020). Despite the increase in stress and changing lifestyle, no significant changes were found in the stress-related body weight changes of individuals in our study. Regarding screen use, the time spent in front of both the comput er and the television has increased twice as much with the epide mic. This finding is consistent with the results of Rolland et al. (63.84%)(Rolland *et al.*, 2020). China have reported a prevalence of depression during quarantine up to 37% and a prevalence of anxiety up to 35%. Young adults have been reported to be more likely to present depression anxiety and reduced sleep quality. Younger people might experience higher anxiety levels because they are likely to reach a greater amount of information through social media, which might influence stress(Gualano *et al.*, 2020). In our study, a negative correlation was revealed in sleep duration and depression (rho=-0.06, p= 0.01). Living alone is another known risk factor for increasing screen use, but in this study, since the majority of the participants (87.9%) live with their family, it cannot be said to have much influence(Rolland *et al.*, 2020). There was a decrease in about two-third of the individual's PA levels. There is a similar trend with the study of Rodríguez-Pérez et al. (59.6%)(Rodríguez-Pérez *et al.*, 2020). It is fair to attribute this result to the lack of incidental walking by commuting, regular activities or as part of one's daily life, including on-campus walking between classes. Epidemiological evidence demonstrated a pre-infection association between PA and a decrease in the frequency, length, or severity of acute respiratory tract infections. Therefore, reduction in physical activity raises health concerns. Outdoor activities can be done safely during COVID-19 if the social distance rules are followed. Fresh air can be obtained by carrying out activities such as walking, cycling and jogging without close contact with others. It is important to note that due to the aerodynamic effects of movement, additional social distance measures must be taken(Gallè *et al.*, 2020).

Most of the students (77.5%) participating in this study stated that their eating habits changed during the pandemic process and they ate when they were bored (70.5%). Approximately half of the participants stated that the frequency of main meals and snacks also changed. The majority of the students stated that the frequency of ordering food decreased during this period. During the quarantine, it has been reported that most individuals exceed the daily energy requirement, as well as undernourished individuals(Mehta, 2020). Various macro and micronutrient components in our daily diet have

immunomodulatory effects and are essential for immunocompetence; on the other hand, nutritional deficiencies are associated with higher host susceptibility to viral infection and a more severe course of clinical disease(Sidor and Rzymski, 2020).

Table 3. Food Consumption Frequency Before and After COVID-19 (n=1674)

	Everyday	Every meal	3-5 times per week	1-2 times per week	Once in every 15 days	Once a month	Rarely	Never
Milk								
Before Covid-19	296 (17.7%)	27 (1.6%)	406 (24.3%)	391 (23.4%)	149 (8.9%)	49 (2.9%)	221 (13.2%)	135 (8.1%)
After Covid-19	384 (22.9%)	39 (2.3%)	440 (26.3%)	343 (20.5%)	124 (7.4%)	43 (2.6%)	161 (9.6%)	140 (8.4%)
Yogurt								
Before Covid-19	440 (26.3%)	57 (3.4%)	528 (31.5%)	382 (22.8%)	103 (6.2%)	26 (1.6%)	92 (5.5%)	46 (2.7%)
After Covid-19	539 (32.2%)	62 (3.7%)	561 (33.5%)	307 (18.3%)	73 (4.4%)	17 (1%)	56 (3.3%)	59 (3.5%)
Cheese								
Before Covid-19	812 (48.5%)	31 (1.9%)	394 (23.5%)	199 (11.9%)	54 (3.2%)	16 (1%)	68 (4.1%)	100 (6%)
After Covid-19	870 (52%)	38 (2.3%)	346 (20.7%)	180 (10.8%)	59 (3.5%)	16 (1%)	53 (3.2%)	112 (6.7%)
Red meat								
Before Covid-19	84 (5%)	21 (1.3%)	492 (29.4%)	645 (38.5%)	225 (13.4%)	70 (4.2%)	79 (4.7%)	58 (3.5%)
After Covid-19	73 (4.4%)	16 (1%)	614 (36.7%)	568 (33.9%)	204 (12.2%)	68 (4.1%)	78 (4.7%)	53 (3.2%)
Poultry meat								
Before Covid-19	80 (4.8%)	13 (0.8%)	524 (31.3%)	699 (41.8%)	205 (12.2%)	51 (3%)	64 (3.8%)	38 (2.3%)
After Covid-19	74 (4.4%)	18 (1.1%)	529 (31.6%)	704 (42.1%)	195 (11.6%)	41 (2.4%)	62 (3.7%)	51 (3%)
Fish and seafood								
Before Covid-19	23 (1.4%)	23 (1.4%)	86 (5.1%)	262 (15.7%)	412 (24.6%)	342 (10.4%)	351 (21%)	175 (10.5%)
After Covid-19	21 (1.3%)	14 (0.8%)	124 (7.4%)	287 (17.1%)	387 (23.1%)	251 (15%)	294 (17.6%)	296 (17.7%)
Salami and sausage								
Before Covid-19	109 (6.5%)	7 (0.4%)	301 (18%)	379 (22.6%)	280 (16.7%)	139 (8.3%)	286 (17.1%)	173 (10.3%)
After Covid-19	139 (8.3%)	22 (1.3%)	293 (17.5%)	390 (23.3%)	245 (14.6%)	111 (6.6%)	252 (15.1%)	222 (13.3%)
Egg								
Before Covid-19	683 (40.8%)	27 (1.6%)	434 (25.9%)	290 (17.3%)	70 (4.2%)	22 (1.3%)	84 (5%)	64 (3.8%)
After Covid-19	794 (47.4%)	21 (1.3%)	392 (23.4%)	236 (14.1%)	77 (4.6%)	24 (1.4%)	63 (3.8%)	67 (4%)
Legumes								
Before Covid-19	115 (6.9%)	23 (1.4%)	535 (32%)	662 (39.5%)	204 (12.2%)	57 (3.4%)	53 (3.2%)	25 (1.5%)
After Covid-19	124 (7.4%)	16 (1%)	581 (34.7%)	653 (39%)	187 (11.2%)	47 (2.8%)	41 (2.4%)	25 (1.5%)
Vegetables								
Before Covid-19	455 (27.2%)	84 (5%)	578 (34.5%)	349 (20.8%)	99 (5.9%)	25 (1.5%)	54 (3.2%)	30 (1.8%)
After Covid-19	499 (29.8%)	89 (5.3%)	547 (32.7%)	359 (21.4%)	84 (5%)	22 (1.3%)	43 (2.6%)	31 (1.9%)

After Covid-19								
Fresh fruits								
Before Covid-19	565 (33.8%)	40 (2.4%)	504 (30.1%)	346 (20.7%)	104 (6.2%)	20 (1.2%)	72 (4.3%)	23 (1.4%)
After Covid-19	660 (39.4%)	30 (1.8%)	489 (29.2)	314 (18.8%)	94 (5.6%)	20 (1.2%)	45 (2.7%)	22 (1.3%)
Dries fruits								
Before Covid-19	160 (9.6%)	32 (1.9%)	316 (18.9%)	389 (23.2%)	220 (13.1%)	102 (6.1%)	297 (17.7%)	158 (9.4%)
After Covid-19	176 (10.5%)	25 (1.5%)	312 (18.6%)	352 (21%)	249 (14.9%)	97 (5.8%)	270 (16.1%)	193 (11.5%)
Rice and pasta								
Before Covid-19	225 (13.4%)	25 (1.5%)	648 (38.7%)	531 (31.7%)	138 (8.2%)	33 (2%)	51 (3%)	23 (1.4%)
After Covid-19	217 (13%)	23 (1.4%)	621 (37.1%)	528 (31.5%)	149 (8.9%)	34 (2%)	63 (3.8%)	39 (2.3%)
Bulghur								
Before Covid-19	69 (4.1%)	24 (1.4%)	372 (22.2%)	628 (37.5%)	322 (19.2%)	91 (5.4%)	116 (6.9%)	52 (3.1%)
After Covid-19	67 (4%)	19 (1.1%)	404 (24.1%)	613 (36.6%)	301 (18%)	81 (4.8%)	115 (6.9%)	74 (4.4%)
Bread								
Before Covid-19	770 (46%)	287 (17.1%)	251 (15%)	147 (8.8%)	33 (2%)	11 (0.7%)	105 (6.3%)	70 (4.2%)
After Covid-19	747 (44.6%)	277 (16.5%)	235 (14%)	160 (9.6%)	52 (3.1%)	16 (1%)	120 (7.2%)	67 (4%)
Sugar and chocolate								
Before Covid-19	451 (26.9%)	52 (3.1%)	466 (27.8%)	356 (21.3%)	135 (8.1%)	51 (3%)	127 (7.6%)	36 (2.2%)
After Covid-19	400 (23.9%)	27 (1.6%)	462 (27.6%)	352 (21%)	166 (9.9%)	60 (3.6%)	138 (8.2%)	69 (4.1%)
Bakery products								
Before Covid-19	155 (9.3%)	18 (1.1%)	389 (23.2%)	536 (32%)	316 (18.9%)	101 (6%)	130 (7.8%)	29 (1.7%)
After Covid-19	148 (8.8%)	18 (1.1%)	435 (26%)	493 (29.5%)	297 (17.7%)	86 (5.1%)	143 (8.5%)	54 (3.2%)
Desserts								
Before Covid-19	75 (4.5%)	23 (1.4%)	248 (14.8%)	508 (30.3%)	419 (25%)	167 (10%)	178 (10.6%)	56 (3.3%)
After Covid-19	93 (5.6%)	6 (0.4%)	294 (17.6%)	488 (29.2%)	351 (21%)	150 (9%)	207 (12.4%)	85 (5.1%)
Fizzy drinks								
Before Covid-19	240 (14.3%)	35 (2.1%)	325 (19.4%)	278 (16.6%)	168 (10%)	93 (5.6%)	274 (16.4%)	261 (15.6%)
After Covid-19	239 (14.3%)	30 (1.8%)	282 (16.8%)	272 (16.2%)	175 (10.5%)	97 (5.8%)	258 (15.4%)	321 (19.2 %)

Data are expressed as number (percentage of the total number).

It was revealed that the number of students consuming fresh fruits and vegetables every day increased after the pandemic. Contrary to the results of this study, there are studies that found consumption decrease during the quarantine(Mehta, 2020; Sidor and Rzymski, 2020). It has been reported that fruits and vegetables may increase immune function due to their antioxidant and anti-inflammatory effects('Turkish Dietetic Association's Recommendations on Nutrition and COVID-19', no date; *Food and nutrition tips during self-quarantine*, no date; *Combatting COVID-19*, no date; Alpert, 2017; Muscogiuri *et al.*, 2020; Sidor and Rzymski, 2020). In the period of COVID-19, the World Health Organization recommends consuming 9 servings a day, 4

portions of fruit and 5 portions of vegetables per day(Jayawardena and Misra, 2020).

In this study, the majority of the participants stated that they consume milk and yoghurt 3-5 times a week, cheese and eggs every day, red meat, processed meat products and poultry 1-2 times a week. There was no change in the consumption frequency of these foods before and after the pandemic. Unlike to our results, some studies have found an increased consumption of such foods during this period(Bracale and Vaccaro, 2020). In particular, processed meat products, fast food diets, frequent consumption of red meats have been associated with pro-inflammatory effects(Sidor and Rzymski, 2020). WHO has recommended the consumption of lean and skinless meat to limit saturated fat intake. In addition, red and fatty meats, butter, full-fat dairy products; suggested a reduction in consumption of palm oil, coconut oil, lard and fat(*Food and nutrition tips during self-quarantine*, no date).

Most of the participants in this study stated that they consume fish and seafood every 15 days. Renzo at al.'s study, it was observed that fish consumption decreased during the pandemic)(Di Renzo *et al.*, 2020).The Turkish Dietetic Association emphasized the importance of fish consumption twice a week in its Nutrition Recommendations on COVID-19('Turkish Dietetic Association's Recommendations on Nutrition and COVID-19', no date). In this study, while consumption of sugar, chocolate and bakery products decreased;consumption of desserts has increased after the pandemic (Table flour increased during the pandemic process(Di Renzo *et al.*, 2020). The WHO recommends consuming oats, brown pasta and rice, quinoa and whole wheat products with high fibre content rather than refined grains such as whole wheat, white pasta, rice and white bread(*Food and nutrition tips during self-quarantine*, no date).

Table 4. The Relationship Between Perceived Stress Level and Demographic Features, Screen Time, Sleep Status, Physical Activity Level, Dietary Habits (n=1674)

	Perceived stress level[§]
Age	0.02 (0.34)
Sex	***0.09 (0.001)*****
Body mass index	
Before COVID -19	0.02 (0.36)
After COVID -19	0.02 (0.37)
Participation in physical activity[a]	***-0.05 (0.02)****
Amount of physical activity	-0.01 (0.67)
Time spent at the computer	
Before COVID -19	0.02 (0.23)
After COVID -19	-0.01 (0.67)
Time spent on the television	
Before COVID -19	0.004 (0.87)
After COVID -19	-0.008 (0.72)
Sleep time	
Before COVID-19	-0.03 (0.19)
After COVID-19	***-0.06 (0.01)****
Change in physical activity level[a]	***0.06 (0.007)*****
Change in dietary habits[a]	***0.05 (0.02)****
Boredom eating[a]	0.04 (0.09)
Change in the desire to eat out[a]	***-0.07 (0.003)*****

*Spearman correlation test $p<0.05$, * $p<0.01$ ***
Data are expressed as rho (p).
[§]As assessed by the Perceived Stress Scale.
[a] Categorized as yes and no

The majority of the participants in this study stated that they consume legumes 1-2 times a week. Although there are studies showing that the consumption of legumes decreased during pandemic(Sidor and Rzymski, 2020), there are also studies that found reduction(Di Renzo *et al.*, 2020; Mehta, 2020). In the Turkish Dietetic Association's Dietary Recommendations on COVID-19, it is stated that legumes can be consumed every day('Turkish Dietetic Association's Recommendations on Nutrition and COVID-19', no date).There is also some evidence that it may exert an anti-inflammatory effect due to the lectins and peptides found in legumes(Sidor and Rzymski, 2020). During the pandemic, various combinations of meat and legumes with whole-grain products have been proposed to minimize micronutrient deficiencies and prevent viral infections such as COVID-19(Jayawardena and Misra, 2020).

In this study, the majority of the participants stated that they consume rice and pasta 3-5 times a week, bulgur 1-2 times a week, and bread every day. In 2 different studies conducted in Italy, it was determined that the consumption of grains, pasta and

Currently, there is limited research on the effect of diet on COVID-19 incidence and mortality A balanced and healthy diet is vital for preventing COVID-19 and diet-related chronic diseases and can positively affect mortality from COVID-19. On the other hand, an increase in chronic non-communicable diseases may be observed due to unhealthy dietary changes, deficiencies in micronutrients and increased intake of empty calories that may occur during the pandemic(Jayawardena and Misra, 2020). Food consumption increased during the social isolation process; there is in vivo evidence that the increase in food consumption is associated with the development of obesity and type 2 diabetes(Sidor and Rzymski, 2020). As a result, a balanced diet with high amounts of minerals, antioxidants and vitamins is important to maintain a strong immune system, prevent or minimize chronic diseases and infections during the COVID-19 pandemic(Jayawardena and Misra, 2020; Muscogiuri *et al.*, 2020)

4. Conclusions and Recommendations

At the end of this study, it was concluded that social isolation conditions cause some dietary and lifestyle changes in individuals. These new habits can be acquired and then have some unwanted effects on health. The role of modifiable lifestyle factors like diet and PA in maintaining health and wellness are fundamental. Therefore, during quarantine, we must encourage healthy eating and physical activity at home. Global action promoting healthy eating and physical activity is imperative to encourage people to return to a good lifestyle. Because the impact of this epidemic on nutrition and dietary intake is already beyond the individual and society to reach national and global levels. Understanding the current nutritional behavior of young adults during the COVID-19 quarantine will help public health officials reshape future policies regarding dietary recommendations for these individuals as new pandemics arrive and quarantine policies are implemented.

References

Alpert, P. T. (2017). The Role of Vitamins and Minerals on the Immune System. Home Health Care Management and Practice, 29(3), 199–202. https://doi.org/10.1177/1084822317713300

Aslan, H., & Pekince, H. (2020). Nursing students' views on the COVID-19 pandemic and their percieved stress levels. Perspectives in Psychiatric Care, (July). https://doi.org/10.1111/ppc.12597

Bhagavathula, A., Aldhaleei, W. A., Rahmani, J. R., Mahabadi, M. A., & Bandari, D. K. (2020). Novel Coronavirus (COVID-19) Knowledge and Perceptions: A Survey of Healthcare Workers. JMIR Public Health and Surveillance. https://doi.org/10.2196/19160

Bousquet, J., Anto, J. M., Iaccarino, G., Czarlewski, W., Haahtela, T., Anto, A., … Zubrinich, C. (2020). Is diet partly responsible for differences in COVID-19 death rates between and within countries? Clinical and Translational Allergy, 10(1), 1–7. https://doi.org/10.1186/s13601-020-00323-0

Bracale, R., & Vaccaro, C. M. (2020). Changes in food choice following restrictive measures due to Covid-19. https://doi.org/10.1016/j.numecd.2020.05.027

Buheji, M., Hassani, A., Ebrahim, A., da Costa Cunha, K., Jahrami, H., Baloshi, M., & Hubail, S. (2020). Children and Coping During COVID-19: A Scoping Review of Bio-Psycho-Social Factors. International Journal of Applied Psychology, 10(1), 8–15. https://doi.org/10.5923/j.ijap.20201001.02

Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. Psychiatry Research, 287(March), 112934. https://doi.org/10.1016/j.psychres.2020.112934

Chen, P., Mao, L., Nassis, G. P., Harmer, P., Ainsworth, B. E., & Li, F. (2020). Coronavirus disease (COVID-19): The need to maintain regular physical activity while taking precautions. Journal of Sport and Health Science, 9(2), 103–104. https://doi.org/10.1016/j.jshs.2020.02.001

Combatting COVID-19. (n.d.). Retrieved July 25, 2020, from https://www.nnedpro.org.uk/post/combatting-covid-19

Crawley, E., Loades, M., Feder, G., Logan, S., Redwood, S., & Macleod, J. (2020). Wider collateral damage to children in the UK because of the social distancing measures designed to reduce the impact of COVID-19 in adults. BMJ Paediatrics Open, 4(1), 1–4. https://doi.org/10.1136/bmjpo-2020-000701

Derbyshire, E., & Delange, J. (2020). COVID-19: is there a role for immunonutrition, particularly in the over 65s? BMJ Nutrition, Prevention & Health, bmjnph-2020-000071. https://doi.org/10.1136/bmjnph-2020-000071

Di Renzo, L., Gualtieri, P., Pivari, F., Soldati, L., Attinà, A., Cinelli, G., … De Lorenzo, A. (2020). Eating habits and lifestyle changes during COVID-19 lockdown: an Italian survey. Journal of Translational Medicine, 18(1), 229. https://doi.org/10.1186/s12967-020-02399-5

Eskin, M., Harlak, H., Demirkıran, F., & Dereboy, Ç. (2013). Algılanan Stres Ölçeğinin Türkçeye Uyarlanması: Güvenirlik ve Geçerlik Analizi, 132–140.

Food and nutrition tips during self-quarantine. (n.d.). Retrieved September 16, 2020, from https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/technical-guidance/food-and-nutrition-tips-during-self-quarantine

Gallè, F., Sabella, E. A., Da Molin, G., De Giglio, O., Caggiano, G., Di Onofrio, V., … Napoli, C. (2020). Understanding Knowledge and Behaviors Related to CoViD–19 Epidemic in Italian Undergraduate Students: International Journal of Environmental Research and Public Health, 17(10), 3481. Retrieved from https://www.mdpi.com/1660-4601/17/10/3481

Gualano, M. R., Lo Moro, G., Voglino, G., Bert, F., & Siliquini, R. (2020). Effects of COVID-19 lockdown on mental health and sleep disturbances in Italy. International

Journal of Environmental Research and Public Health, 17(13), 1–13. https://doi.org/10.3390/ijerph17134779

Harapan, H., Itoh, N., Yufika, A., Winardi, W., Keam, S., Te, H., … Mudatsir, M. (2020). Coronavirus disease 2019 (COVID-19): A literature review. Journal of Infection and Public Health, 13(5), 667–673. https://doi.org/10.1016/j.jiph.2020.03.019

Jayawardena, R., & Misra, A. (2020). Balanced diet is a major casualty in COVID-19. Diabetes & Metabolic Syndrome: Clinical Research & Reviews, (January).

Mehta, V. (2020). The Impact of COVID-19 on the Dietary Habits of Middle-Class Population in Mulund, Mumbai, India, 1–10.

Muscogiuri, G., Barrea, L., Savastano, S., & Colao, A. (2020). Nutritional recommendations for CoVID-19 quarantine. European Journal of Clinical Nutrition, 74(6), 850–851. https://doi.org/10.1038/s41430-020-0635-2

Nyenhuis, S. M., Greiwe, J., Zeiger, J. S., Nanda, A., & Cooke, A. (2020). Exercise and Fitness in the Age of Social Distancing During the COVID-19 Pandemic. Journal of Allergy and Clinical Immunology: In Practice, 8(7), 2152–2155. https://doi.org/10.1016/j.jaip.2020.04.039

Orgilés, M., Alexandra Morales, E. D., Claudia Mazzeschi, J. P. E., & Universidad. (2020). Immediate psychological effects of the COVID-19 quarantine in youth from Italy and Spain.

Reyes-Olavarría, D., Latorre-Román, P. Á., Guzmán-Guzmán, I. P., Jerez-Mayorga, D., Caamaño-Navarrete, F., & Delgado-Floody, P. (2020). Positive and negative changes in food habits, physical activity patterns, and weight status during covid-19 confinement: Associated factors in the chilean population. International Journal of Environmental Research and Public Health, 17(15), 1–14. https://doi.org/10.3390/ijerph17155431

Rodríguez-Pérez, C., Molina-Montes, E., Verardo, V., Artacho, R., García-Villanova, B., Guerra-Hernández, E. J., & Ruíz-López, M. D. (2020). Changes in dietary behaviours during the COVID-19 outbreak confinement in the Spanish COVIDiet study. Nutrients, 12(6), 1–19. https://doi.org/10.3390/nu12061730

Rolland, B., Haesebaert, F., Zante, E., Benyamina, A., Haesebaert, J., & Franck, N. (2020). Global Changes and Factors of Increase in Caloric/Salty Food Intake, Screen Use, and Substance Use During the Early COVID-19 Containment Phase in the General Population in France: Survey Study. JMIR Public Health and Surveillance, 6(3), e19630. https://doi.org/10.2196/19630

Sidor, A., & Rzymski, P. (2020). Dietary choices and habits during COVID-19 lockdown: Experience from Poland. Nutrients, 12(6), 1–13. https://doi.org/10.3390/nu12061657

Singh, D. R., Sunuwar, D. R., Karki, K., Ghimire, S., & Shrestha, N. (2020). Knowledge and Perception Towards Universal Safety Precautions During Early Phase of the COVID-19 Outbreak in Nepal. Journal of Community Health. https://doi.org/10.1007/s10900-020-00839-3

Turkish Dietetic Association's Recommendations on Nutrition and COVID-19. (n.d.), 1–10.

Witt, A., Ordóñez, A., Martin, A., Vitiello, B., & Fegert, J. M. (2020). Child and adolescent mental health service provision and research during the Covid-19 pandemic: Challenges, opportunities, and a call for submissions. Child and Adolescent Psychiatry and Mental Health, 14(1), 8–11. https://doi.org/10.1186/s13034-020-00324-8