*Research Inventy: International Journal of Engineering And Science*
*Vol.12, Issue 8 (August 2022), PP 05-13*
*Issn (e): 2278-4721, Issn (p):2319-6483, www.researchinventy.com*

# Examination of Changes in Nutritional Habits of High School Students during the COVID-19 Period

Cemre İnan[1], Haydar Özpınar[2], H. Demet Akat[3] andGülay Baysal[4]
*Nutrition and Dietetics Department, Faculty of Health Sciences, Istanbul Aydin University, Istanbul, 34295, Turkey*

***Abstract:***
***Objective:*** *This study aimed to examine the nutritional habits, the food consumption and emotional eating of high school students studying in two different branches of a private school in Istanbul in the Covid-19 pandemic period.*
***Materials and Methods****: The research was carried out between January and July 2022 with students at the ages of 14-19 studying on two separate campuses of a private high school in Istanbul. 105 adolescents (59 female and 46 male) were recruited.A sociodemo graphic form and the Emotional Eating Scale were applied. The Food Consumption Frequency and the 24-hour Food Consumption were recorded.*
***Results and Conclusion****:39% of 105 participants had been infected with Covid-19. While 67.1% of adolescents engaged in physical activity before the pandemic, the rate of those who engaged in physical activity decreased to 46.7% during the pandemic.45.7% gained and 26.7% lost body weight.The number of fast-food consumers increased.The vegetable intake increased; the fruit intake decreased. The carbohydrate ratio in the total energy intake was below 58% for both genders, and the protein and fat ratio were higher than it should be. The participants ate less in negative emotions and negative events but ate the same in positive emotions and positive events.With the increase in the time spent at home, an increase in the consumption of healthy foods has been observed. But the consumption of fast food, sweets, home-made pastries, cakes and pies has also increased. There was no significant changein the body weight of individuals who were slim, but the majority ofthe students were normal-weighted, overweight, and obese gained weight. The physical activity level of children and adolescents decreased and their eating habits changed during the pandemic term.*
***Keywords:****Covid-19, adolescents, physical activity, emotional eating, eating behaviour..*

---

Date of Submission: 12-08-2022 Date of Acceptance: 28-08-2022

---

## I. INTRODUCTION

The coronavirus outbreak (COVID-19), that emerged in Wuhan, China and ravaged the whole world, still has great importance for public health. There is no known type of nutrition that will prevent the transmission of coronavirus. However, it is well-knownthat it is importanttotakefoodsupplementswhich strengthenourbody'simmunesystemandtohave an adequateanda balanceddiet(Mohammad et al., 2021). Itwasfoundthattheobesityrates, which has been in an increasing trend in recent years, has increased even more with the pandemicperiod(Restrepo, 2022).As a result of the pandemic restrictions, increased inactivity, changes in eating habits and an increase in theprevalence of obesityhaveoccured. These negative developments may lead to the formation of chronic diseases and a decrease in the quality of life in the long term. In a study conducted on 131 adolescent individuals in Turkey, it was found that 48.9% of them have not been careful about their nutrition during the restriction period and 55% gained weight(Özçelik Ersü & Harbelioğlu, 2022)**.**

In this study, it was aimed to examine the changes in nutritional habits of high school students during the Covid-19 period.

## II. MATERIALS AND METHODS

In this cross-sectional study, it was aimed to evaluate the changes in nutritional habits of high school students during the Covid-19 pandemic period. This research was carried out between January 2022 and July 2022 with adolescents aged 14-19 who were educated on two different campuses of a private school in Istanbul. The study was conducted with 59 girls and 46 boys which is a total of 105 students. The sociodemographic form was used to determine the general information (age, body weight, height, gender, etc.) of the students.The Food Consumption Record and emotional eating tendencies were measured over a 24-Hour time period to determine dietary and daily food intake. The Food Consumption Frequency Questionnaire and Emotional

EatingQuestionnaire were Applied for these measurements. According to the results obtained, the change in the nutritional habits of the students during the pandemic period was evaluated.

### 1.1 Sociodemographic Form

The parameters of the sociodemographic questionnaire which contains general information such as the age, gender and place of residence of the individuals were applied to the participants. In addition to the food consumption habits of the students, their eating habits and frequency of eating outside were also questioned. In the physical activity section, individuals' physical activity habits, theduration of those physical activities and theirfrequency were examined.

### 1.2 Emotional Eating Scale

Emotional Eating Scale was applied to examine emotional nutritional behaviors. The scale was used to evaluate the eating behaviour of individuals through 14 items related to positive and negative emotions and 8 items related to positive and negative situations. Individuals were asked to score their eating levels as less (1-4), same (5) and more (6-9) while in the given emotions and situations. The negative total score of the Emotional Eating Scale represents the total score of negative emotions and situations. At the same time the positive total score of the Emotional Eating Scale represents the total score of positive emoticons and situations. Evaluation was made by adding positive and negative emotion and situation scores, andDia Negative total score and Dia Positive total score are obtained. (Demirel et al., 2014).

### 1.3 Frequency of Food Consumption and 24-Hour Food Consumption Record

The Food Consumption Frequency Questionnaire and the 24-Hour Food Consumption were recorded in order to determine whether the students' food intake was sufficient, insufficient or excessive in terms of nutrientes. The results of these questionnaires help to identify and solve nutritional problems. Accurate recall of the amount of food and beverages in the questionnaires is important in terms of results. Therefore, each student was individually guided while filling out the questionnaires.

### 1.4 Data Analysis

The frequency and percentage values are given for categorical variables and mean standard deviation values are given for continuous variables. The Cronbach's alpha coefficient was calculated for the reliability of the scales. Kolmogorov-Smirnov test was performed for normal distribution test. Spearman's rho correlation coefficient was calculated in the correlation analysis between variables. All analyses were tested at a 95% confidence level. The analyzes were performed with SPSS 23.0 program. BeBiS program was used to evaluate the 24-hour food consumption record and to determine the nutrients taken.

## III. RESULTS AND DISCUSSIONS

The study was conducted with a total of 105 adolescents, 59 girls (56.2%) and 46 boys (43.81%). 40% of the participants are 15 years old, 26.67% are 14 years old, 26.67% are 16 years old, 3.81% are 17 years old, less than 1% are 13 years old and less than 1% are 18 years old (Figure 1).

**Figure1. Findings Regarding Demographic Variables**

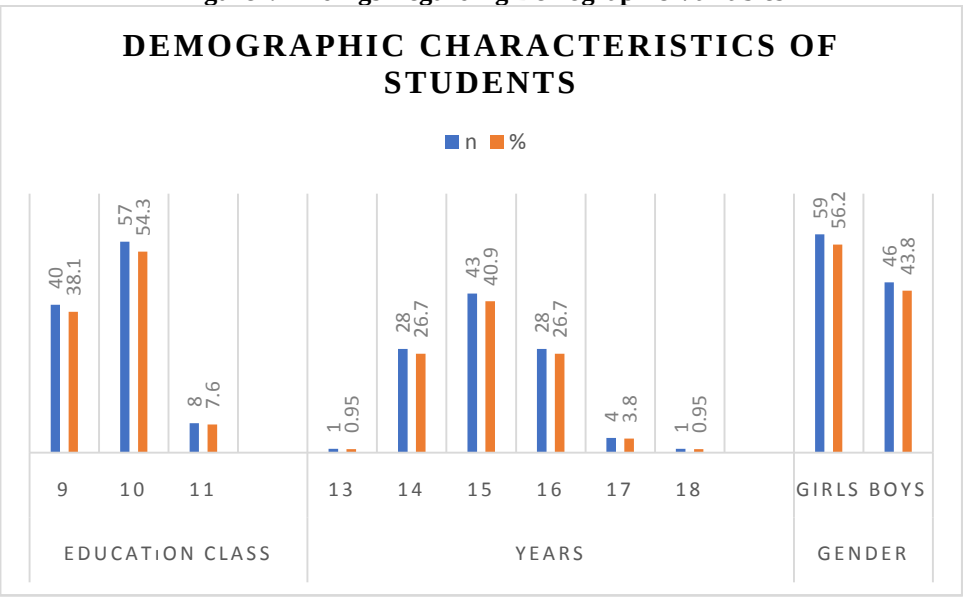
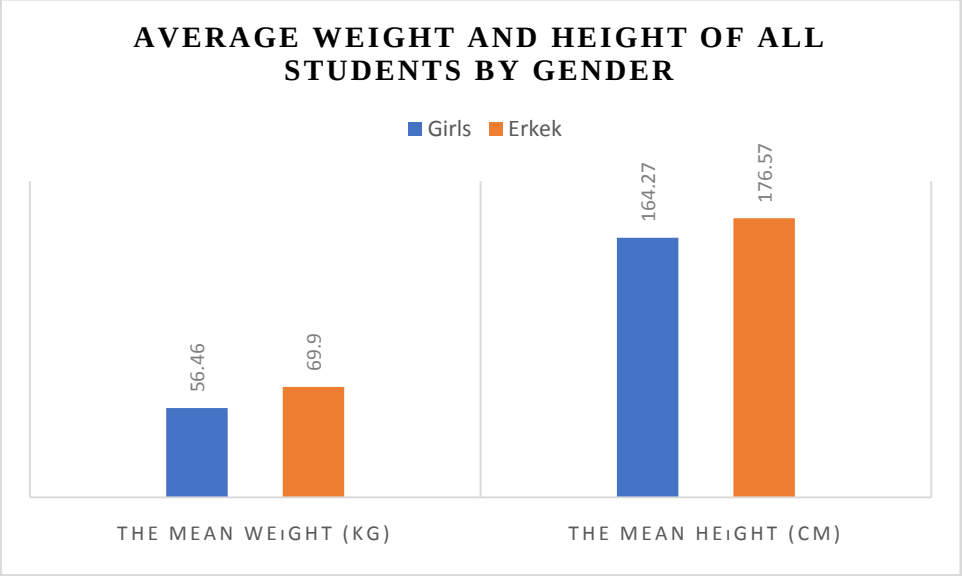
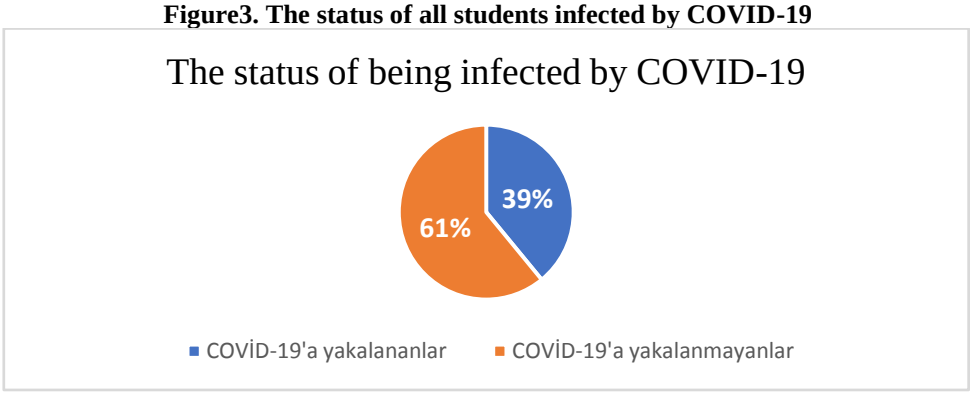


**Figure2. Average weight and height of all students by gender**



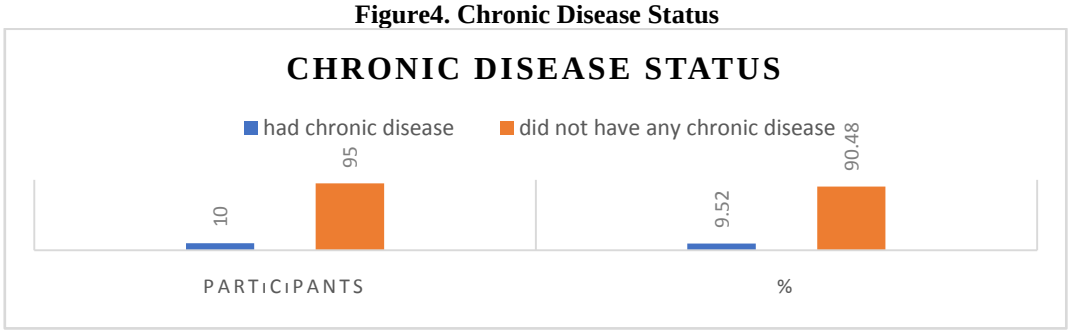

While the mean weight and height of the girls were 56.46±10.9 kg and 164.27 ±5.36 cm, respectively, the mean weight and height of the boys were 69.9±11.93 kg and 176.57±6.86 cm, (Figure 2).

**Figure3. The status of all students infected by COVID-19**



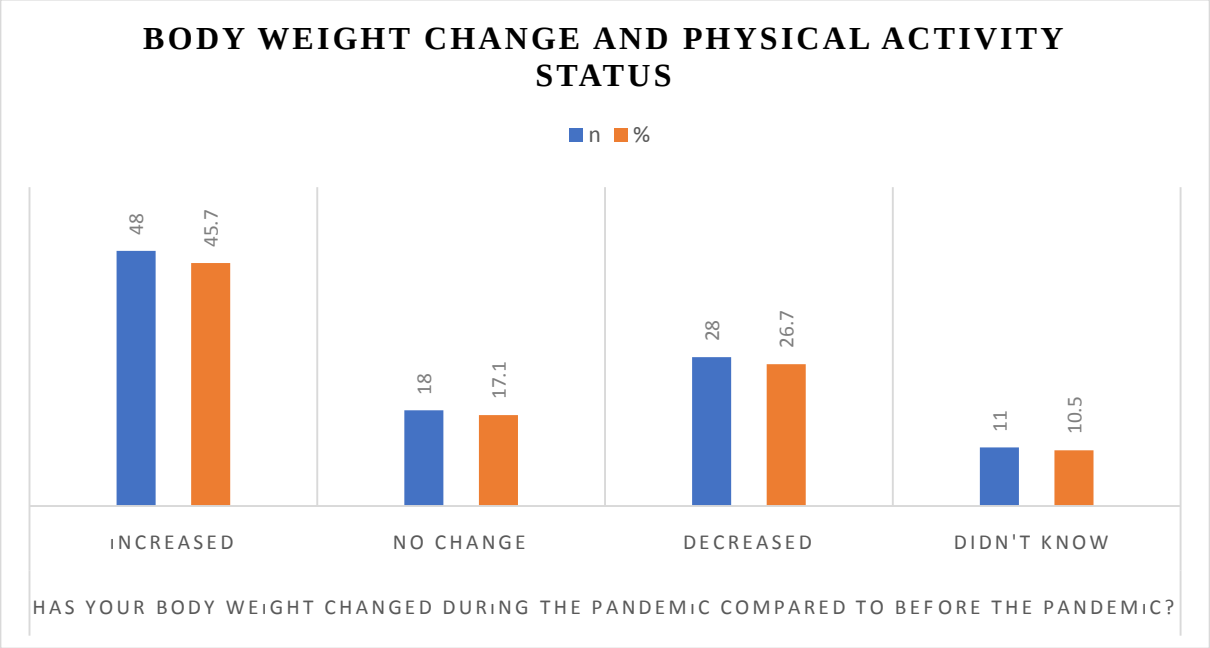

With the beginning of the Covid-19 pandemic in our country, it was found that 39% of 105 individuals had Covid-19 infection and 61% had not (Figure 3).

**Figure4. Chronic Disease Status**



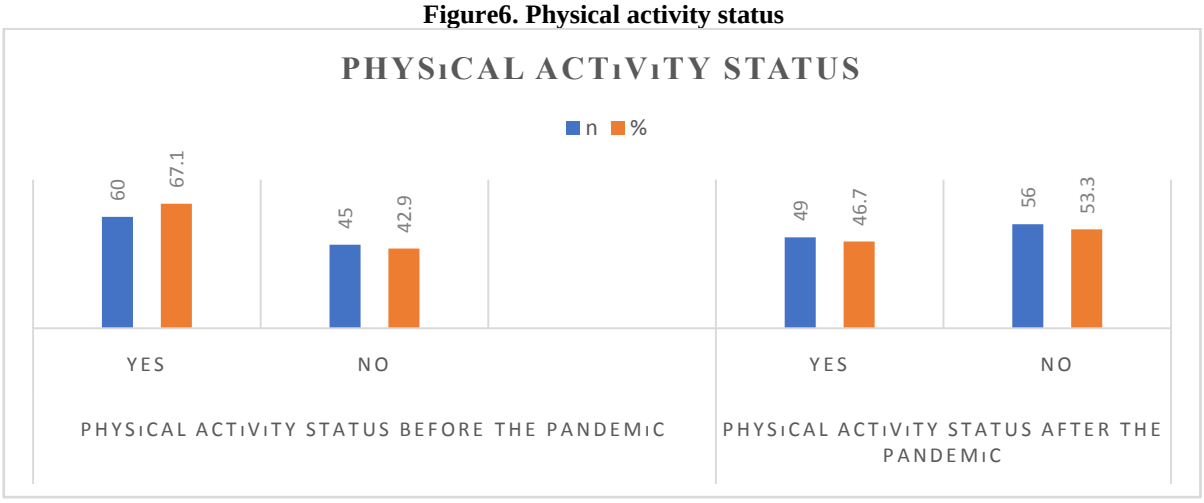

95 (90.5%) of the participants did not have any chronic disease, while 10 (9.5%) had chronic disease. These diseases are listed as asthma, migraine, epilepsy, psoriasis, thyroid, diabetes, cardiovascular diseases and psychological diseases, respectively (Figure 4).

**Figure5. Body Weight Change and Physical Activity Status**




While 45.7% of adolescents stated that there was an increase in body weight during the pandemic, 26.7% stated that their body weight decreased, 17.1% stated that there was no change in body weight, and 10.5% stated that they did not know whether there was a change (Figure 5). There were no changes in general in the body weight of individuals who were slim, but it was found out that body weight increased in the majority of individuals who were normal, overweight, and obese during the pandemic. In particular, more than half of the individuals who had excess body weight and were obese before the pandemic stated that their body weight increased with the pandemic.

**Figure6. Physical activity status**




It was observed that 67.1% of adolescent individuals performed physical activity before the pandemic. During the pandemic period, the rate of physical activity was estimated to be 46.7% (Figure 6).

**Table1. Physical activity status of people with chronic diseases**

| Chronic Diseases | Number of Persons | Physical activity status | Levene's Test Sig. |
|---|---|---|---|
| Yes | 10 | 5 | p>0,05 |
| No | 95 | 5 | |

Considering the physical activity status of 10 people with chronic diseases during the pandemic period, it was determined that 5 people did physical activity and 5 people did not. There was no statistically significant relationship between people with chronic diseases and physical activity (p>0.05) (Table 1).

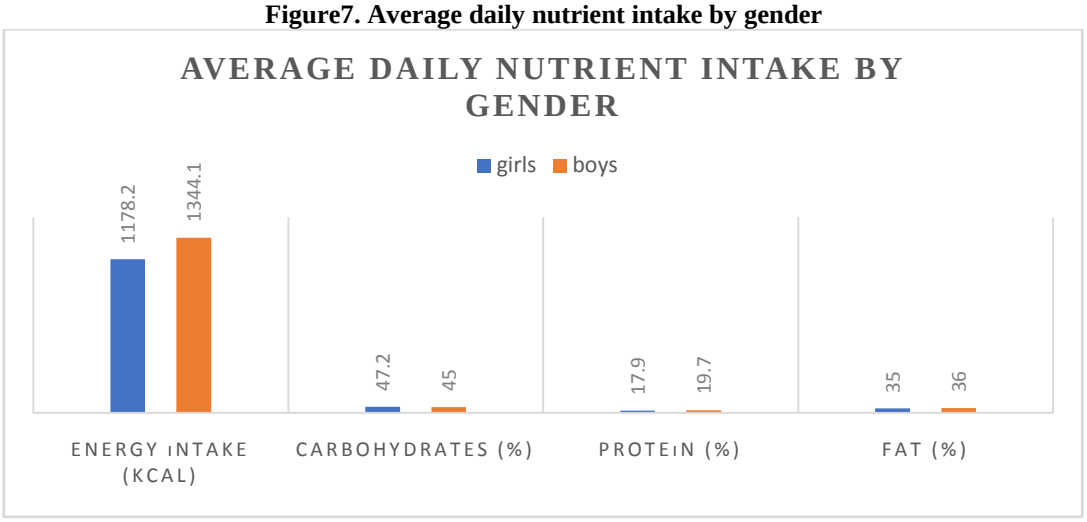
**Table2. Descriptive statistics on Emotional Appetite Scale and its sub-dimensions**

| | X | S | Maximum | Minimum |
|---|---|---|---|---|
| DYYND | 4,30 | 1,57 | 9,00 | 1,00 |
| DYYPD | 5,69 | 1,73 | 9,00 | 1,00 |
| DYYNO | 3,52 | 1,74 | 8,80 | 1,00 |
| DYYPO | 5,25 | 1,81 | 9,00 | 1,00 |
| NT | 3,91 | 1,51 | 8,34 | 1,00 |
| PT | 5,47 | 1,59 | 8,80 | 1,00 |

DYYND: Emotional Eating DYYND: Emotional Eating Negative Status DYYPD: Emotional Eating Positive Status DYYNO: Emotional Eating Negative Event DYYPO: Emotional Eating Positive Event NT: Negative Total PT: Positive Total

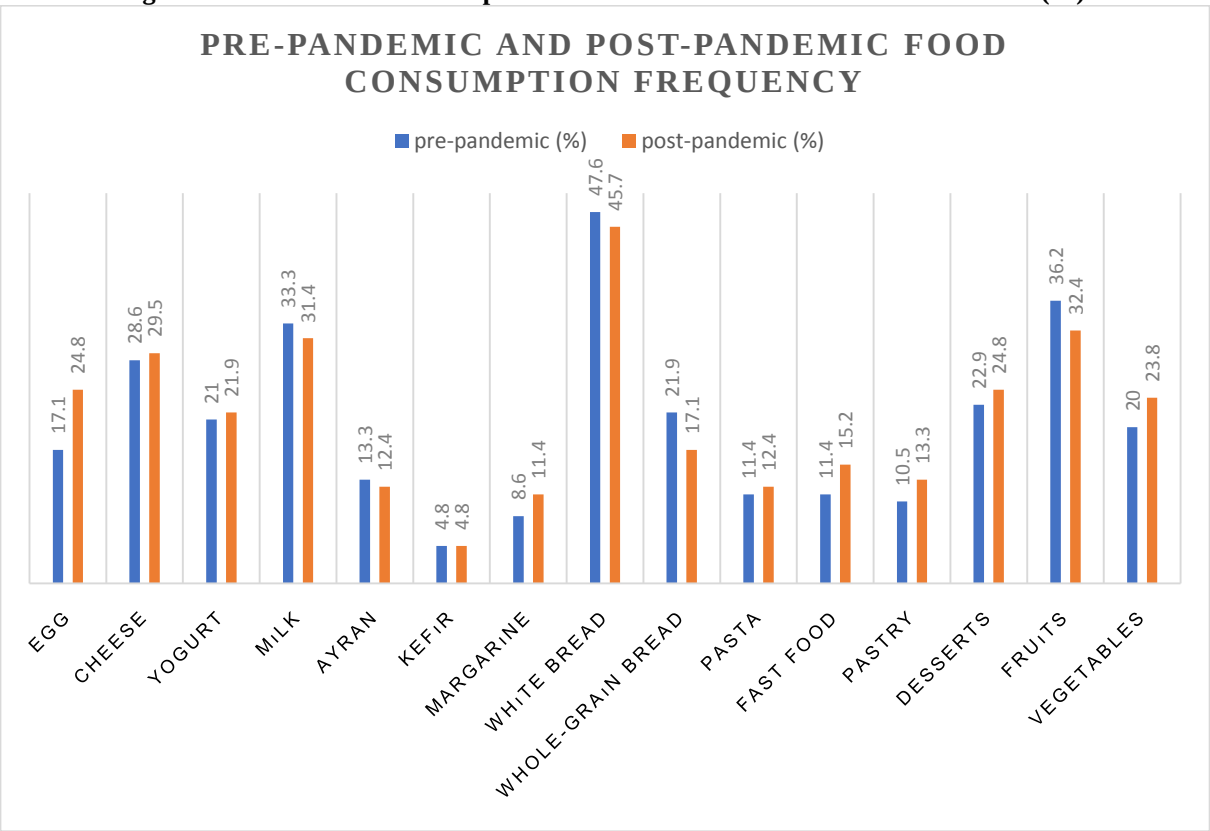
The Emotional Eating Scale is evaluated between 1-9 figures and shows that the appetite decreases between 1-4, the appetite does not change at 5, and the appetite increases between 6-9. In our study, a negative mean of 3.91 indicates that the participants' appetite has decreased, whereas in positive situations and events, their appetite did not change much moreand the average was 5.47 (Table 2).

**Figure7. Average daily nutrient intake by gender**



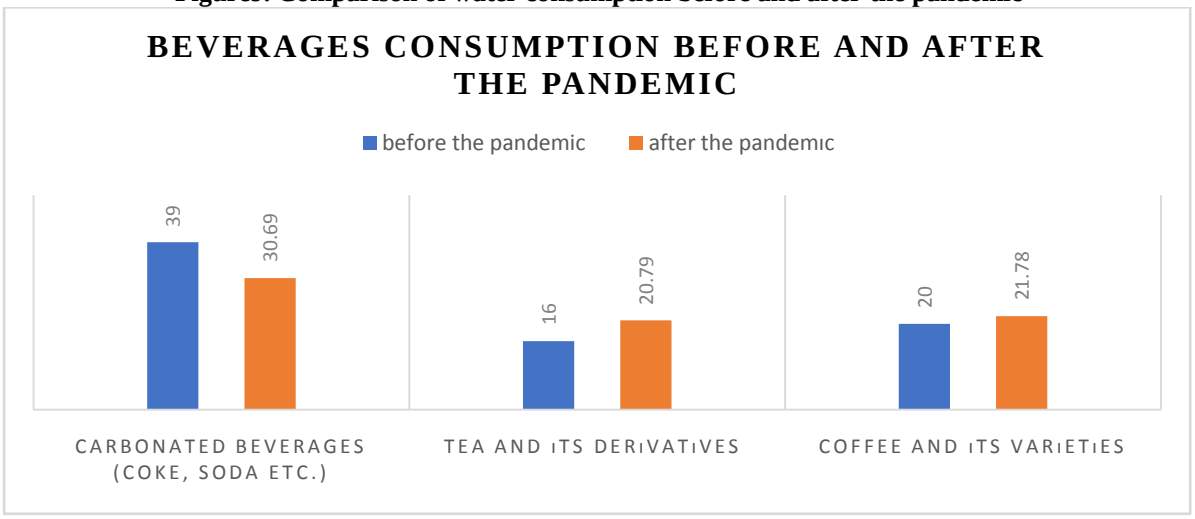

As a result of the analysis of the 24-hour Food Consumption Record with the Nutrition Information System (BeBis) program, the daily energy intake of the girls was found to be 1178.2 kcal, the rate of carbohydrates from the diet was 47.2%, the rate of protein was 17.9% and the rate of fat was 35%. The amount of energy received by men was found to be 1344.1 kcal, carbohydrate 45%, protein 19.7% and fat 36%.(Figure 7).

**Figure8. Distribution of consumption amounts of food before and after Covid-19 (%)**



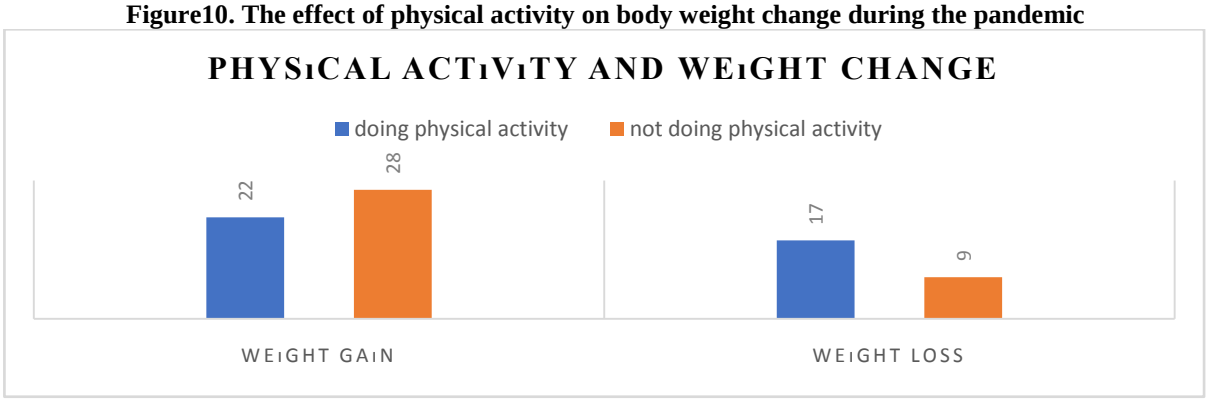

When the pre-pandemic and post-pandemic food consumption frequencies were compared. According to the results, the pre-pandemic frequency of people who consumed eggs every day was 17.1%, while the pre-pandemic frequency of people who consumed eggs every day increased to 24.8%. The daily cheese consumption increased from 28.6% to 29.5%. While the rate of individuals consuming yogurt on a daily basis was 21% during the pandemic, this rate was found to be 21.9% during the pandemic period. There has been a decrease in daily milk and ayran consumption. Kefir consumption did not change with 4.8% before and after the pandemic. While individuals who consumed margarine every day before the pandemic were 8.6%, this rate increased to 11.4% during the pandemic. While white bread consumption was 47.6% before the pandemic, this rate decreased to 45.7% during the pandemic. As a decrease was observed in white bread and whole-grain bread consumption, an increase was observed in pasta consumption. The number of fast food consumers in daily basis increased from 11.4% to 15.2%. It was observed that pastry consumption (cake, pastry, etc.) of the participants increased from 10.5% to 13.3% and dessert consumption (ice cream, rice pudding, etc.) increased from 22.9% to 24.8%. Fruit consumption of the participants decreased. The vegetable consumption rate of students, which was 20% before the pandemic, increased to 23.8% during the pandemic. **(Figure 8).**

**Figure9. Comparison of water consumption before and after the pandemic**




While the rate of beverages with sugar and carbonated beverages consumed before the pandemic period was 39%, this rate decreased to 30.69% during the pandemic period. While the consumption of tea and its derivatives (black tea, white tea, herbal tea, etc.) was 16% before the pandemic, this rate was found to be 20.79% during the pandemic. While the consumption of coffee and its varieties was 20% before the pandemic, it was found to be 21.78% after the pandemic (Figure 9).

**Figure10. The effect of physical activity on body weight change during the pandemic**




When the weight change and physical activity conditions were compared during the pandemic period, it was found that 22 of the people who gained weight were doing physical activity, 28 of them were not doing physical activity, and 17 of the people lose weight were doing physical activity, while 9 of them were not doing physical activity. According to the results, a statistically significant relation was found between physical activity and body weight change ($P<0.05$) (Figure 10).

It has been determined that there is no significant relationship between monthly family income and fast food consumption frequency, in other words, the frequency of fast food consumption is independent of family income levels. ($p>0.05$).

From this point onwards, the findings of this research will be discussed in the light of the literature.

It has been observed that 49% of the students participated in this research had gained weight during the Covid-19 pandemic. This is in line with the literature. It has been one of the common outcomes associated with the Covid-19 quarantine (Zachary, 2020; Zeigler, 2021). Zeigler (2021) emphasized that this situation was associated with decreased physical activity and already existing body weight along with some other factors. In2015 Turkey Dietary Guidelines, at least 60 minutes of physical activity per day is recommended for this age group. However, in the study conducted by Yüksel and Akıl with the participation of 1966 adolescents in 2019, it was revealed that the youth in the 14-17 age group do not spend enough time for physical activity. In this study, only 57 percent of the participants were engaged in physical activity, while this rate decreased further with the pandemic.

The consumption of some healthy food such as egg and vegetables increased during the pandemic period. However, in general, it is not possible to talk about an adequate and balanced diet forthe participants of this study. Similarly, an international study conducted in Italy, Spain, Chile, Colombia and Brazil revealed that

although adolescents started to consume more healthy food such as vegetables and fruits during the pandemic period, their general nutritional quality did not improve (Ruiz-Roso, et al. 2020).

According to the data of the BeBis program, young people between the ages of 13-18 should consume 1934.1 kcal of energy daily. Of the daily energy intake, 58% of the energy should consist of carbohydrates, 30% from fats and 12% from protein. However, the results obtained in this study showed that both genders remained below the required energy intake during the pandemic process. The energy consumption of boys was found to be higher than that of girls. It was determined that the carbohydrate ratio was below 58% for both groups, and the protein and fat ratios were higher than the required ratios. The amount of carbohydrates in the diet of girls was found to be higher than that of boys. The protein intake was found to be higher in boys than girls.

The research conducted by Meşe-Yavuz and Koca-Özer (2019) with the participation of 933 adolescents in Ankara revealed that adolescents were malnourished and inadequately fed. Gonzalez-Monroy and his friends (2021) reported that the pandemic process paved the way for people to acquire bad eating habits. In other words, the already existing inadequate and unbalanced nutrition in adolescents have been further reinforced by the pandemic. The quarantine period has had effects on nutritional behavior in children and adolescents, such as more snacking and increased consumption of processed food (Cena et al., 2021). In this study, an increase was observed in the participants' consumption of margarine, fast food, pastries, sweets and junk food has increased. When the nutritional patterns are examined, higher fat consumption drew attention. 35% of total energy in girls and 36% in boys came from fat. Adolescents' poor eating habits could lead to other health problems in the long run. In addition, it is known that higher fast-food consumption may trigger obesity for all age groups (Satman, 2016).

It has been determined that people with good financial income also prefered to eat at home during the pandemic and this preference is independent of income. Similarly, in the study conducted by Özel and Yıldız (2021), it was stated that people ate out less during the pandemic period due to hygienic concerns.

In a study conducted by Ayyıldız and Karaçil-Ermumcu (2022) with 385 students in Ankara during the pandemic period, a significant correlation was found between people's anxiety about the coronavírus and their apetite.Besides, an increase in the unhealthy eating behavior of adolescents has been observed as a result of the anxiety caused by the Covid-19 pandemic (ÖztürkÇopur, Karasu, &YavaşÇelik, 2021). Accordingly in thisresearch, it was found that when adolescents were in negative emotions and negative events, including anxiety and fear, their appetite decreased. It was determined that their appetite did not change in positive emotions and positive events.

## IV. CONCLUSION

The Covid-19 pandemichas had various health, social and economic implications. Especially the lockdown period has changed the daily lives of the children and the adolescents seriously as well as the other age groups.The dietary habits of children and adolescents also have had their share of this change. In addition to the positive effects such as decreasing the frequency of eating out and consuming some healthy food groups more, they have also acquired consumption habits that may have negative effects in the long run. Besides, it has been observed that the physical activity levels, which were already insufficient, decreased even more. Considering all of these, the children and the adolescents should be closely monitored and trained in nutrition. Further studies are needed to better understand the impact of COVID-19 on the adolescents' and the children's eating habits.

**Conflict of interest**

There is no conflict of interest to disclose.

## REFERENCES


[1]. Ayyıldız, F., KaraçilErmumcu, M.S., 2022. Covid-19 phobia, mindful eating, eating habits and body weight change among university students during pandemic: A pilot study. Food and Health 8(2), 118-126. https://doi.org/10.3153/FH22012

[2]. Cena,H.;Fiechtner,L.; Vincenti, A.; Magenes, V.C.; De Giuseppe, R.; Manuelli, M.; Zuccotti, G.V.; Calcaterra, V., 2021. COVID-19 Pandemic as Risk Factors for Excessive Weight Gain in Pediatrics: The Role of Changes in Nutrition Behavior. A Narrative Review. Nutrients2021,13,4255. https:// doi.org/10.3390/nu13124255

[3]. Demirel, B., Yavuz, K. F., Karadere, M. E., Şafak, Y., & Türkçapar, M. H., 2014. Duygusal İştah Anketi'nin Türkçe Geçerlik ve Güvenilirliği, Beden Kitle İndeksi ve Duygusal Şemalarla İlişkisi. Journal of Cognitive-Behavioral Psychotherapy, 3, 171-181.

[4]. Gonzalez-Monroy, C., Gomez Gomez, I., Olarte-Sanchez, CM., Motrico, E., 2021. "Eating Behaviour Changes during the COVID-19 Pandemic: A Systematic Review of Longitudinal Studies", Int J Environ Res Public Health. 22; 18(21): 11130. doi: 10.3390/ijerph182111130.

[5]. Meşe Yavuz , C. &KocaÖzer, B., 2019. "AdölesanDönemOkulÇocuklarındaBeslenmeAlışkanlıklarıveBeslenmeDurumununDeğerlendirilmesi", Journal of Tourism and Gastronomy Studies, cilt 7, sayı 1, ss.225-243.

[6]. Mohammad, S., Aziz, R., Mahri, A. S., Malik, S. S., Haji, E., Khan, H. A., . . . Bouchama, A., 2021. Obesity and COVID-19: what makes obese host so vulnerable? Immunity & Ageing, 18(1).

[7]. Özçelik Ersü, D., & Harbelioğlu, E., 2022. Pandemi Sürecinde Adölesanların Beslenme Alışkanlıklarının Belirlenmesi . European Journal of Science and Technology (35), 148-156.
[8]. Özel, G. Yıldız, F., 2021. Covid-19 SonrasuDışardaYemekYemeAlışkanlıklarınınPlanlıDavranışTeorisiKapsamındaDeğerlendirilmesi. Gaziantep University Journal of Social Sciences, 20(2), 953-972. DOI: 10.21547/jss.769614
[9]. Öztürk Çopur, E., Karasu, F., & Yavaş Çelik, M., 2021. Pandemi Sürecinde Evde Kalan Adölesanların Beslenme- Egzersiz ve Koronavirüs Kaygı Durumlarının Belirlenmesi. Journal of Hacettepe University Faculty of Nursing, 8(3), 310-320.
[10]. Restrepo, B. J., 2022, July. Obesity Prevalence Among U.S. Adults During the COVID-19 Pandemic. American Journal of Preventive Medicine, 63(1), 102-106.
[11]. Ruiz-Roso, M. B., Padilha, P. C., Mantilla-Escalante , D. C., Ulloa, N., Brun, P., Acevedo-Correa, D., . . . vd., 2020. Covid-19 Confinement and Changes of Adolescent's Dietary Trends in Italy, Spain, Chile, Colombia and Brazil. Nutrients, 12(6), 1807.
[12]. Satman, İ., 2016. ''Türkiye'deObeziteSorunu'', TürkiyeKlinikleri Journal of Gastroenterohepatology Special Topics , cilt 9, sayı 2, ss.1-11
[13]. Türkiye Beslenme Rehberi TÜBER 2015. "T.C. SağlıkBakanlığı Yayın No: 1031, Ankara, 2016.
[14]. Yüksel, E., & Akıl, M., 2019. Adölesanların Fiziksel Aktivite Seviyeleri ile Obezite Farkındalık Düzeyleri ve Beslenme Davranışlarının İncelenmesi. Nigde University Journal of Physical Education and Sports Science, 13(3), 185-193.
[15]. Zachary, Z, Brianna, F., Brianna, L., Garrett, P., Jade, W., Alyssa, D., Mikayla, K., 2020. "Self-quarantine and weight gain related risk factors during the COVID-19 pandemic", Obes Res Clin Pract. 14(3):210-216. doi: 10.1016/j.orcp.2020.05.004. Epub 2020 May 21. PMID: 32460966; PMCID: PMC7241331.
[16]. Zeigler, Z. (2021). "COVID-19 Self-quarantine and Weight Gain Risk Factors in Adults", CurrObes Rep. 10(3):423-433. doi: 10.1007/s13679-021-00449-7. Epub 2021 Jul 12. PMID: 34251647; PMCID: PMC8273568.

Cemre İnan. "Examination of Changes in Nutritional Habits of High School Students during the COVID-19 Period." *International Journal of Engineering and Science*, vol. 12, no. 8, 2022, pp. 05-13.