



Healthy Nutrition Attitude, Sleep Quality and Musculoskeletal Disorders in University Students During Covid-19 Pandemic

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Keywords

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ABSTRACT

This study aims to college students' healthy nutrition attitude, sleep status, and musculoskeletal disorders during the COVID-19 pandemic.

In total, 165 university students participated in this research. The students filled out the Attitude Scale for Healthy Nutrition, Pittsburgh Sleep Quality Index (PSQI), and Cornell Musculoskeletal Discomfort Questionnaire. The attitude toward healthy eating of 34 (20.6%) students was found to be moderate, 100 (60.6%) high, and 31 (18.8%) very high. There was no meaningful difference between groups according to having COVID-19 disease ($p>0.05$). Among the participants, 43 (26.06%) students were found to be good and 122 (73.94%) to be poor in terms of sleep quality. The global PSQI and sleep duration subgroup scores of those who had COVID-19 were statistically higher ($p=0.010$ and 0.043 , respectively). The five regions with the most musculoskeletal symptoms were the upper back (78.18%), lower back (70.91%), neck (69.09%), right shoulder (55.76%) and left shoulder (49.09%). Significant differences were observed in the scores of the right wrist ($p=0.009$), left wrist ($p=0.007$), right lower leg ($p=0.024$), left lower leg ($p=0.026$), right foot ($p=0.001$), and left foot ($p=0.009$). The COVID-19 pandemic partially affected university students in terms of healthy eating attitudes and, to a greater extent, in terms of sleep and musculoskeletal disorders.

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INTRODUCTION

COVID-19 is a China-based pandemic announced by the World Health Organization on January 30, concerning the world in a short time (WHO, 2020). With the COVID-19 pandemic, states worldwide have gone to other procedures, and the length of stay of most individuals at home has increased with various restrictions. This situation has changed the habits of individuals who go out of their regular routine. These habits mainly were about hygiene and nutrition. It has created radical changes in the attitudes of individuals to foods and their shopping habits. In particular, people have changed their shopping methods to minimize the danger due to the fear of contamination, and an increase in online shopping has been observed (di Renzo et al., 2020). While the preference for perishable foods such as fruits and vegetables has decreased in shopping, the tendency to foods for perishable foods such as fruits and vegetables has decreased in shopping, and the tendency to foods called ready-to-eat foods has increased (Zhao et al., 2020). University students have to cope with the problems brought by university life while trying to fulfill their developmental tasks specific to the period they are in (Altın, 2015). Students generally tend to have inadequate and unbalanced nutrition. The fact that food choices are mainly in the direction of high-carbohydrate foods affects the academic success and general health of this group (Güllü & Küçükkömürler, 2020). It is predicted that the eating habits of young people may deteriorate with the pandemic. Studies have shown that more than half of the students' appetite levels, snack consumption, night eating tendencies, and tendency to packaged foods have increased (Dilmen Bayar et al., 2021; Doyan et al., 2021).

Sleep is a multidimensional factor that affects every aspect of our lives and enables us to maintain our daily routines (Lange et al., 2010). Sleep quality is waking up fresh in the morning, feeling fit and fit, without experiencing any sleep disruptions during the night. Sleep directly affects an individual's quality of life. As a result of poor sleep quality, psychological conditions such as fatigue, memory disorders, deterioration in the immune system, exhaustion, tension, and unhappiness occur that negatively affect daily activities (Birben & Karadeniz, 2010). Depression, anxiety, and stress levels have increased in individuals as a result of changes in sleeping hours, increased use of social media before sleep, and spending more time in bed (Cellini et al., 2020).

COVID-19 disease also adversely affects the musculoskeletal system (Disser et al., 2020; Hasan et al., 2021; O. Öztürk & Özer Kaya, 2020). Students can stay in static and bad postures long due to long hours at home and distance education. This situation may pave the way for

various musculoskeletal disorders. It has been reported that decreased physical activity levels and increased musculoskeletal pain during the COVID-19 pandemic (Kutlutürk & Yıkılmaz, 2021). This study was planned to investigate healthy nutrition attitude, sleep duration, quality and status, and musculoskeletal pain and discomfort, which are thought to be in university students during the COVID-19 pandemic. Another objective of the study is to compare healthy eating behavior, sleep status, and musculoskeletal disorders in individuals who had and had not COVID-19.

METHODS

Study Group

In total, 165 university students participated in this study. The mean age was 21.33 ± 2.20 , the mean height was 165.47 ± 7.28 cm, the body weight was 60.09 ± 13.15 kg, and the Body Mass Index (BMI) was 21.81 ± 3.71 kg/m². Among the participants, 149 (90.30%) of the students were female and 16 (9.70%) were male. Of the students, 75 (45.45%) had Covid-19 disease and 90 (54.55%) had not. The number of students who had no COVID-19 vaccine was 9 (5.45%), one vaccine was 5 (3.03%), two vaccines were 89 (53.94%), and three vaccines were 62 (37.58%). When the BMI values were examined, it was determined that 20 (12.12%) of 165 students were below 18, 118 (71.51%) were between 18-25, 19 (11.52%) were between 25-30, and 8 (4.85%) were over 30. The mean total score of the Attitude Scale for Healthy Nutrition (ASHN) was 74.21 ± 11.70 and classified as having a high attitude towards healthy eating. The mean score of the Knowledge of Nutrition (KN) subgroup was 20.96 ± 4.59 , the Emotion for Nutrition (EN) subgroup was 17.36 ± 5.32 , the Positive Nutrition (PN) subgroup was 17.48 ± 4.91 , and the Malnutrition (MN) subgroup was 18.22 ± 4.96 . The attitude toward healthy eating of 34 (20.6%) students was found to be moderate, 100 (60.6%) high, and 31 (18.8%) very high.

The research was conducted with students at the Faculty of Health Sciences of Demiroğlu Bilim University and the questionnaires were sent via Google Forms. The students filled the Attitude Scale for Healthy Nutrition (ASHN), Pittsburgh Sleep Quality Index (PSQI), and Cornell Musculoskeletal Discomfort Questionnaire (CMDQ). All information provided within the scope of the research is kept confidential, and participation in the study was voluntary. The Informed Consent Form has been added to the survey digitally, and consent will be given by clicking the relevant section of the participant. Demographic information of the students such as age and gender, were evaluated with the questionnaire we have created.

Permission was obtained from Demiroğlu Bilim University Clinical Research Ethics Committee will conduct the study (Decision no: 10.05.2022/2022-09-02).

Data Collection

Data collection tools were Attitude Scale for Healthy Nutrition, Pittsburgh Sleep Quality Index, and Cornell Musculoskeletal Discomfort Questionnaire.

Attitude Scale for Healthy Nutrition: The nutritional status of the students was evaluated using the ASHN developed by Tekkurşun Demir et al. at 2019, and the scale is valid and reliable. It consists of four subgroups and two items. These subgroups were determined as Knowledge of Nutrition (KN), Emotion for Nutrition (EN), Positive Nutrition (PN), and Malnutrition (MN). The lowest score that can be obtained from ASHN is 21, and the highest score is 105. (Tekkurşun Demir & Cicioğlu, 2019).

Pittsburgh Sleep Quality Index: Students' sleep quality was evaluated by the PSQI. PSQI is a scale for sleep quality and disorder that evaluates the last month (Buysse et al., 1989). Ağargün et al. determined at 1996 that the index is suitable for Turkish society. PSQI contains 18 items and seven components. The total score is evaluated between 0-21 a high score between 5-21 is associated with poor sleep quality, and a score of 0-4 means good sleep quality (Buysse et al., 1989, 2008).

Cornell Musculoskeletal Discomfort Questionnaire: Musculoskeletal disorders of the students were evaluated with the CMDQ. Cornell University researchers developed the scale to evaluate the musculoskeletal system of workers (Hedge et al., 1999). Erdinç et al. determined at 2011 that the scale was suitable for Turkish society. The scale evaluates the pain status in 20 different body sections in the last week and its impact on work. Frequency of pain, ache, or discomfort was rated from 1 to 5. The pain intensity and its effect on work performance is scored from 1 to 3. The parts with the highest percentage score relative to the total score of all body parts evaluated are used to identify the body parts with the most severe problems (Erdinc et al., 2011).

Data Analysis

The analyzes were carried out with the IBM SPSS Statistics 21.0 program. Numerical variables were given as mean±standard deviation, and comparisons between groups were calculated by independent sampled t-test. The significance level was determined as $p < 0.05$.

RESULTS

The comparison of ASHN scores according to the status of having COVID-19 disease is given in Table 1.

Table 1

The Comparison of ASHN Scores According to the Status of Having Covid-19 Disease

ASHN Scores	Covid-19		p
	Yes (n=75) Mean±SD	No (n=90) Mean±SD	
Total Score	74.75±12.36	73.41±11.17	0.371
KN	20.08±4.52	21.09±4.66	0.582
EN	18.05±5.01	16.78±5.53	0.269
PN	17.21±4.83	17.70±4.98	0.966
MN	18.68±4.84	17.84±5.06	0.924

Note: SD: standard deviation; KN: Knowledge of Nutrition; EN: Emotion for Nutrition; PN: Positive Nutrition; MN: Malnutrition

The global PSQI score was found as 6.49±2.82, sleep quality 1.32±0.58, sleep onset latency 1.38±0.93, sleep disturbance 1.36±0.58, hypnotic drugs 0.09±0.45, daytime dysfunction 1.45±0.89, sleep efficiency 0.26±0.64, and sleep duration 0.64±0.88. When sleep quality was examined, 43 (26.06%) people were found to be good and 122 (73.94%) to be poor. The comparison of global and PSQI subgroup scores according to the status of having COVID-19 disease is given in Table 2.

Table 2

The Comparison of PSQI Scores According to the Status of Having Covid-19 Disease

PSQI Scores	Covid-19		p
	Yes (n=75) Mean±SD	No (n=90) Mean±SD	
Global score	6.72±3.14	6.30±2.53	0.010*
Sleep quality	1.37±0.56	1.28±0.60	0.819
Sleep onset latency	1.41±0.96	1.34±0.91	0.565
Sleep disturbance	1.36±0.58	1.36±0.59	0.936
Hypnotic drugs	0.07±0.38	0.11±0.51	0.211
Daytime dysfunction	1.52±0.91	1.39±0.87	0.603
Sleep efficiency	0.24±0.61	0.28±0.67	0.475
Sleep duration	0.75±0.99	0.54±0.78	0.043*

Note: SD: standard deviation; PSQI: Pittsburgh Sleep Quality Index

The number of students with musculoskeletal symptoms and their weighted CMDQ scores is given in Table 3.

Table 3

The Number of Students with Musculoskeletal Symptoms and Their Weighted CMDQ Scores

Body Parts	Musculoskeletal symptoms	Weighted CMDQ scores (0-90)
	n (%)	Mean±SD
Neck	114 (69.09)	10.20±18.83
Right shoulder	92 (55.76)	5.93±13.11
Left shoulder	81 (49.09)	5.88±13.76
Upper Back	129 (78.18)	11.47±18.18
Right upper arm	48 (29.09)	1.67±5.37
Left upper arm	46 (27.88)	1.30±3.91
Lower back	117 (70.91)	11.69±20.10
Right forearm	30 (18.18)	1.17±4.23
Left forearm	31 (18.79)	1.25±4.36
Right wrist	51 (30.31)	2.87±9.20
Left wrist	40 (24.24)	2.11±6.03
Hip	55 (33.33)	2.10±5.37
Right thigh	41 (24.85)	1.65±7.48
Left thigh	37 (22.42)	1.55±7.45
Right knee	43 (26.06)	3.35±11.39
Left knee	43 (26.06)	2.46±8.41
Right lower leg	41 (24.85)	2.02±8.09
Left lower leg	42 (25.45)	2.11±8.20
Right foot	49 (29.70)	3.30±12.66
Left foot	48 (29.09)	2.72±10.63

Note: SD: standard deviation; CMDQ: Cornell Musculoskeletal Discomfort Questionnaire

The five regions with the most musculoskeletal symptoms were the upper back (78.18%), lower back (70.91%), neck (69.09%), right shoulder (55.76%) and left shoulder (49.09%). The five regions with the highest weighted CMDQ scores were the lower back, upper back, neck, right shoulder, and left shoulder, respectively. The comparison of the weighted CMDQ scores according to having COVID-19 disease is given in Table 4.

Table 4

The Comparison of the Weighted CMDQ Scores According to Having Covid-19 Disease

Body Parts	Covid-19		p
	Yes (n=75) Mean±SD	No (n=90) Mean±SD	
Neck	9.10±17.36	11.11±20.03	0.406
Right shoulder	5.53±12.49	6.26±13.66	0.560
Left shoulder	5.19±12.69	6.44±14.64	0.295
Upper back	11.66±18.20	11.31±18.26	0.713
Right upper arm	1.88±7.05	1.50±3.42	0.382
Left upper arm	1.43±4.86	1.19±2.90	0.790
Lower back	13.55±22.47	10.14±17.87	0.092
Right forearm	1.27±5.25	1.09±3.15	0.648
Left forearm	1.53±5.46	1.01±3.09	0.228
Right wrist	4.00±12.58	1.92±4.72	0.009*

Table 4 (Continues)

Body Parts	Covid-19		p
	Yes (n=75) Mean±SD	No (n=90) Mean±SD	
Left wrist	2.91±7.72	1.44±4.05	0.007*
Hip	2.01±4.76	2.17±5.86	0.637
Right thigh	2.19±10.54	1.20±3.18	0.191
Left thigh	2.14±10.53	1.05±3.08	0.139
Right knee	3.81±14.77	2.97±7.57	0.326
Left knee	2.86±10.88	2.13±5.63	0.309
Right lower leg	2.92±11.35	1.27±3.49	0.024*
Left lower leg	3.01±11.40	1.37±3.83	0.026*
Right foot	5.25±18.11	1.68±4.12	0.001*
Left foot	3.96±15.07	1.68±4.12	0.009*

Note: SD: standard deviation; CMDQ: Cornell Musculoskeletal Discomfort Questionnaire

DISCUSSION

The mean total score of the ASHN was 74.21 ± 11.70 and classified as having a high attitude towards healthy eating. Out of 165 students, 34 (20.6%) attitudes towards healthy eating were found to be moderate, 100 (60.6%) high, and 31 (18.8%) very high. Studies report different results as well as consistent with our findings. In the study conducted by Gürsoy & Atmaca (2021) on 355 university students, the mean ASHN total score was determined as 77.7 ± 11.0 . Sümen et al. (2022), in their study of 907 adolescent students, found the mean total ASHN score was 61.75 ± 14.94 and classified as moderate. The mean total scores of women were found to be higher. The stress, distress and emotional changes caused by the pandemic have also caused significant changes in individuals' eating habits. Studies show that eating habits are deteriorating (Başaran & Pekmezci Purut, 2021; Cena et al., 2021; Huber et al., 2021). Although studies have investigated the influence of the COVID-19 pandemic on nutrition, few studies compare individuals who have had the disease with those who have not. Although ASHN total score, EN and MN subgroup scores were higher and CN and PN subgroup scores lower in students who had COVID-19 disease, no statistically significant difference was found in the total score and sub-parameters in the group who had COVID-19 disease and the group who have not.

By examining sleep quality, 43 (26.06%) people were found to be good, and 122 (73.94%) to be poor. The global PSQI score was found as 6.49 ± 2.82 , sleep quality 1.32 ± 0.58 , sleep onset latency 1.38 ± 0.93 , sleep disturbance 1.36 ± 0.58 , hypnotic drugs 0.09 ± 0.45 , daytime dysfunction 1.45 ± 0.89 , sleep efficiency 0.26 ± 0.64 , and sleep duration 0.64 ± 0.88 . Timurtaş et al. (2022) examined physical activity, depression, stress, sleep, and quality of life of university

students during the COVID-19 pandemic and determined the average PSQI scores of the participants as 4.2 ± 2.0 . They found poor sleep quality in 25.3% of the participants and good sleep quality in 74.7%. In their study, Alaca et al. (2022) evaluated students' physical activity level, sleep status and time management capacity during the COVID-19 pandemic. Sleep quality was found to be poor in 72.48% of the students. Mean global PSQI score was determined as 5.59 ± 2.57 , subjective sleep quality 1.23 ± 0.59 , sleep latency 1.21 ± 0.84 , sleep duration 0.59 ± 0.79 , habitual sleep efficiency 0.23 ± 0.60 , sleep disorder 1.22 ± 0.52 , sleep drug use 0.05 ± 0.28 , daytime dysfunction as 1.06 ± 0.85 . Öztürk et al. (2022) examined the relationship between university students' anxiety levels, sleep quality, and musculoskeletal pain during the COVID-19 pandemic, and 79.9% of the students were found to have poor sleep quality. Mean global PSQI scores were determined as 7.9 ± 2.8 , sleep quality 1.24 ± 0.78 , sleep onset latency 2.94 ± 0.28 , sleep duration 0.47 ± 0.65 , sleep efficiency 0.76 ± 0.93 , sleep disturbance 1.42 ± 0.65 , hypnotic drugs 0.12 ± 0.5 , daytime dysfunction 0.96 ± 0.95 . When the global and PSQI subgroup scores according to the status of having Covid-19 disease are reviewed, our results suggest that the global PSQI and sleep duration subgroup scores of those with COVID-19 were statistically significantly higher ($p = 0.010$ and 0.043 respectively). No statistically significant difference was found in other subgroups ($p > 0.05$). According to the study of İde and Gündüz (2021), 75.3% of the students had disturbed sleep patterns during the pandemic period. Systematic reviews also show that the COVID-19 pandemic is associated with poor sleep quality (Souza et al., 2021).

It is a controversial issue whether musculoskeletal complaints increase with COVID-19 disease. Our study suggests that the five regions with the most musculoskeletal symptoms were the upper back (78.18%), lower back (70.91%), neck (69.09%), right shoulder (55.76%) and left shoulder (49.09%). The five regions with the highest weighted CMDQ scores were the lower back, upper back, neck, right shoulder, and left shoulder, respectively. Şengül et al. (2020) found that the mean total CMDQ scores and pain levels were statistically significantly different before and during COVID-19 in their study of 1138 people ($p < 0.001$, respectively). They determined the body regions with the most musculoskeletal disorders during the COVID-19 disease period as neck (76.9%), back (70.6%), and waist (66.2%). In a study investigating the effects of home arrangements on the musculoskeletal system in people working at home during the pandemic, Yener et al. (2022) reached 424 people, and 376 (88.7%) people reported pain in one of their body parts. The body parts with the most complaints were the neck (79.48%), shoulder (81.6%), upper back (79.71%), lower back (91.74%), and knee (91.03%). İde and Gündüz (2021) examined 154 university students, and when the CMDQ

results were evaluated, the discomfort scores of the body parts: waist (18.26%), back (17.02%), neck (16.81%) and shoulder (11.54%). In another study (Toprak Celenay et al., 2020) carried out during the pandemic, low back pain was higher in the group working at home compared to the group that went to the workplace physically. Compared to pre-lockdown, neck, upper back, shoulder, and hip thigh pain decreased, and lower back pain increased. In the study of Şengül et al. (2020), pain and musculoskeletal discomfort findings were found to be lower in the COVID-19 period compared to the pre-COVID-19 period. Our findings on comparing the weighted CMDQ scores according to having Covid-19 disease suggest that significant differences were observed in the scores of the wrists, lower legs, and feet. Consistent with our findings, Murat et al. (2021) examined 210 Covid-19 patients at the hospital and found signs of fatigue, pain, fever, and cough. Of the 133 patients with pain symptoms, 92 (69.2%) had muscle and joint pain, 58 (43.6) had back pain, 33 (25.0%) had low back pain, and it was found to be more common than in the pre-COVID-19 period. 139 undergraduate students participated in the study of Şahan and Güler (2022), and the most painful body regions were the neck, back, and waists. Roggioe et al. (2021) interviewed 1654 students at the end of 1 year following Covid-19 and reported that 43.5% of the participants reported neck pain and 33.5% reported low back pain. Most of the students had high healthy eating. There was no statistically significant difference in the tendency to eat healthy food among students with Covid-19. We can conclude that everyone who has or has not had the disease with the COVID-19 pandemic has developed healthy eating behaviors. The majority of students have poor sleep quality. The global score and sleep duration were statistically lower in those who had COVID-19. We can conclude that the COVID-19 lockdown period and disease negatively affect sleep quality. The musculoskeletal system's upper back, lower back, neck, and shoulders were the most affected areas. The most affected areas in the musculoskeletal system are the upper back, lower back, and neck may be the weakening of the paraspinal muscles due to being immobile for a long time or the load due to staying in a fixed position at home. Pain may also develop in the shoulder area due to weakening or spasms of the rotator cuff and upper trapezius muscles.

CONCLUSION

The COVID-19 pandemic partially affected university students in terms of healthy eating attitudes and, to a greater extent, in terms of sleep and musculoskeletal disorders. The attitude toward healthy eating of most students was found to be high. There was no meaningful difference between groups according to having COVID-19 disease. Most students

were found to be poor in terms of sleep quality. The global PSQI and sleep duration subgroup scores of those who had COVID-19 were statistically higher. The five regions with the most musculoskeletal symptoms were the upper and lower back, neck, and shoulders. Significant differences were observed in the wrists, lower legs and foot scores between those with COVID-19 were statistically higher. More research is needed to evaluate the long-term effects of COVID-19 on nutrition, sleep, and the musculoskeletal system.

PRACTICAL IMPLICATIONS

The COVID-19 pandemic has not had much negative impact on the healthy eating attitude of university students, and students generally have healthy eating habits. Efforts should be made to maintain and develop this. Sleep quality and the musculoskeletal system have been negatively affected by the COVID-19 pandemic, and these parameters can be improved with exercise programs that include endurance, strengthening, and relaxation components. In addition, a specialist dietitian can advise on improving a healthy diet.

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Authors' contributions

The first and second author collected data and contributed to the study design. The first author analyzed the data and all authors revised the manuscript and contributed to the interpretation of the results. All authors contributed to the supervision and critical reviewing of the original draft. All authors have read and approved the final version of the manuscript.

Declaration of conflict interest

The authors have no conflicts of interest to report.

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