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E-mail	cjmedicalresearch@gmail.com
Tel	+90(232) 386 08 88
Fax	+90(232) 386 08 88

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Musculoskeletal Health of Medical Students During Covid-19 Lockdown
Musculoskeletal Health During Covid-19

Hilal GUZEL[1], Ozan TURAMANLAR*[2], Ismet DOGAN[3]

[1] Free Scholar Hamminkeln, Germany.

[2] Izmir Katip Celebi University Faculty of Medicine Department of Anatomy, Izmir, Turkey.

[3] Afyonkarahisar Health Sciences University, Faculty of Medicine, Department of Biostatistics, Afyonkarahisar, Turkey.

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ABSTRACT

Objective: The COVID-19 outbreak has had serious global economic, psychological, and physical effects, resulting in many related consequences. All universities in Turkey shifted to online classes during the lockdown. Medical students also had to stay at home for long periods due to distance education and follow their online classes in non-ergonomic positions. Our study aims to examine the musculoskeletal health of medical students during the COVID-19 lockdown.
Materials and Methods: This study was conducted as a cross-sectional study on medical students using an online-based platform to measure medical student's musculoskeletal health. In combination with sociodemographic questions, the Expanded Nordic Musculoskeletal System Questionnaire was utilized to evaluate musculoskeletal pains.
Results: It has been observed that male students exercised significantly more than female students during the lockdown. As the daily exercise duration of the students increased, their upper back pain decreased. Upper back, neck, lower back, and shoulder were the body parts with the highest pain prevalence overall.
Conclusion: During the COVID-19 lockdown, reduction in exercise time and intense curriculum may cause various musculoskeletal system problems in medical students. These findings may be useful in discovering new educational models aimed at both reducing sedentary time and promoting physical activity in medical students.

Kovid-19 Karantinası Sırasında Tıp Öğrencilerinin Kas-İskelet Sağlığı
Kovid-19 Sırasında Kas-İskelet Sağlığı

Makale Bilgisi

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Keywords:
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ÖZET

Amaç: COVID-19 salgını küresel anlamda ciddi ekonomik, psikolojik ve fiziksel bir çok etkileri oldu ve buna bağlı çok sayıda sonuçlar doğurdu. Karantina döneminde Türkiye'de bulunan tüm üniversiteler çevrimiçi derslere geçti. Tıp öğrencileri de uzaktan eğitim nedeniyle uzun süre evde ikamet etmek zorunda kaldı ve çevrimiçi derslerine ergonomik olmayan pozisyonlarda takip etti. Çalışmamızın amacı, COVID-19 karantinası sırasında tıp öğrencilerinin kas-iskelet sistemi sağlığını incelemektir.
Gereç ve Yöntemler: Bu araştırma, tıp öğrencileri üzerinde kesitsel bir çalışma olarak gerçekleştirilmiştir. Tıp öğrencilerinin kas-iskelet sistemi sağlığını ölçmek için çevrimiçi tabanlı bir platform kullanıldı. Kas-iskelet ağrılarını değerlendirmek için sosyo-demografik sorularla birlikte Genişletilmiş İskandinav Kas-İskelet Sistemi Anketi kullanıldı.
Bulgular: Karantina döneminde erkek öğrencilerin kız öğrencilere göre önemli ölçüde daha fazla egzersiz yaptığı gözlemlendi. Öğrencilerin günlük egzersiz süreleri arttıkça sırt bölgesi üst kısım ağrılarının azaldığı görüldü. Üst sırt, boyun, alt sırt ve omuz genel olarak en yüksek ağrı prevalansına sahip vücut bölgeleriydi.
Sonuç: COVID-19 karantinası sırasında, egzersiz süresinin azaltılması ve yoğun müfredat program etkisiyle tıp öğrencilerinde çeşitli kas-iskelet sistemi sorunlarına neden olabilmektedir. Bu bulgular, tıp öğrencilerinde hem hareketsiz geçirilen zamanı azaltmayı hem de fiziksel aktiviteyi teşvik etmeyi amaçlayan yeni eğitim modellerinin keşfedilmesinde faydalı olabilir.

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***Corresponding Author:** Ozan Turamanlar,
Izmir Katip Celebi University Faculty of Medicine Department of Anatomy,Izmir, Turkey.
ozanturamanlar@hotmail.com, +90 232 329 35 35

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Introduction

The COVID-19 pandemic is considered the biggest challenge facing the healthcare system since World War II (1). The outbreak has led to numerous radical changes in the daily habits of millions of people worldwide, with long-term consequences that still need to be uncovered (2). To prevent spreading the virus, different countries have had differing levels of restrictions for the population and people have been advised by health authorities to stay at home. Various governmental restrictions have been implemented, including the closing of universities, sporting events, and social gatherings (3). It has also disrupted medical education. In many countries, including Turkey, medical education has rapidly shifted its first-year curriculum to online classes in response to the need for social isolation (4). Unavoidably, the COVID-19 lockdown tremendously impacted all age groups' everyday lives such as physical activity and social life (5). These public health recommendations to prevent COVID-19 spread can increase longer-term sedentary behavior for students at all levels of education (6). A particular sub-group of the population that has been greatly affected by the COVID-19 outbreak, is university students. Being immobile with social isolation at home, and exposure to long-term static posture on television, computer, tablet, and phone may cause short and long-term pain and postural disorders. Following the COVID-19 pandemic, Greek medical students have experienced sleep and mental health disorders such as insomnia, fatigue, poor sleep quality, anxiety, post-traumatic stress, and depression (7). In general, lack of access to exercise and physical activity can lead to both psychological and physical problems in all age groups (8).

To date, many studies have been published on the effects of COVID-19 on lifestyle behaviors (9- 11). However, only a few studies have so far been published on the COVID-19 lockdown effect on lifestyle changes in medical students (5,12). Considering the intensity of the medical school curriculum, this may have affected the medical faculty students even more negatively. In a study conducted on medical students in Italy, it was shown that the physical activities of the students decreased considerably (13).

Medical students are already at risk for high sedentary behavior and low physical activity levels. We can assume that the lockdown has increased this inactivity even more. The current COVID-19 outbreak can worsen already existing medical students' (as future healthcare professionals) physical, emotional, and mental well-being (14).

In this light, this study was conducted to investigate the possible positive effects of daily exercise duration on the musculoskeletal health of medical students studying with an online intensive curriculum during the COVID-19 lockdown.

Materials and Methods

This study was performed in line with the principles of the Declaration of Helsinki. Ethics committee approval was granted by Afyonkarahisar Health Sciences University Clinical Research Ethics Committee (Approval Date: 01/08/2021, Decision No: 2021/18). The research was planned as a cross-sectional study and was conducted on 209 medical students studying at Afyonkarahisar Health Sciences University. An online-based platform was used to measure medical student's musculoskeletal health during the COVID-19 restrictions in Turkey. The online survey was developed by using Google Forms. The target population comprised preclinical medical students. The questionnaire was applied nine months after the COVID-19 case was seen in Turkey. In combination with

sociodemographic questions, the Expanded Nordic Musculoskeletal System Questionnaire (NMQ-E) was utilized to evaluate musculoskeletal pain. The survey took approximately 10 min to complete. Our exclusion criteria are students from another university, university students outside the medical faculty, and those who did not consent to participate in the study.

Expanded Nordic Musculoskeletal System Questionnaire

To question the musculoskeletal disorders of the students in various body parts, the NMQ-E was used. It consists of two major parts, general and specific. The general part is made to assess the existence of musculoskeletal pain generally without targeting specific anatomical locations while the specific part focuses on nine body regions (neck, shoulders, upper back, elbows, hands/wrists, lower back, hips/thighs, knees, feet/ankles) in the body. The specific part contains questions about symptoms and the duration of the symptoms in the last 12 months, in the last four weeks, and on the day of the assessment. NMQ-E was adapted to Turkish and its validity and reliability were shown by Kahraman et al (15). The Turkish version of NMQ-E was used in the current study.

Statistical Analysis

Data were analyzed using Statistical Program for Social Science (SPSS) version 20.0 (SPSS Inc. Headquarters, 223 S. Wacker Drive, 11th flor, Chicago, IIlinois 60606.). Categorical data are expressed as numbers and percentages. A value of $p < 0.05$ was considered statistically significant. Pearson Chi-square significance test was used to compare both genders and daily exercise time for pain in each body part.

Results

In total N=209 medical students (139 female, 70 male) participated in the study. 37.8% (n=79) of the participants were in 1st Grade, 27.3% (n=57) of them were in 2nd Grade, and 34.9% (n=73) of them were in 3rd Grade. There was no missing data. The cases were classified according to their daily exercise time as 31.1% (n=65) never, 59.8% (n=125) 15-45 minutes a day, and 8.6% (n=18) 1-2 hours a day. Only one student exercised more than 2 hours a day. The distribution of students' daily exercise times by gender is shown in Table 1. It has been observed that male students exercise significantly more than female students during the lockdown ($p = 0.003$).

The presence of musculoskeletal pain in each body part according to daily exercise duration is shown in Table 2. When musculoskeletal health was evaluated according to daily exercise time, there was a significant difference only in the upper back pain ($p = 0.001$). We did not notice a statistically significant relationship between daily exercise duration and other musculoskeletal pains other than upper back. As the daily exercise duration of the students increased, their upper back pain decreased. Upper back (58.9%), neck (49.8%), lower back (44.0%), and shoulders (32.1%) were the body parts with the highest pain prevalence overall. The body parts where the participants experienced pain are shown in Tables 2 and 3.

There were also significant differences between the genders in terms of musculoskeletal health. Pain in the neck, shoulders, upper back, lower back, hips/thighs, and hands was significantly higher in female students than in males (Table 2).

Discussion

Current research showed a sample of medical students reporting the impact of COVID-19 on their musculoskeletal health during the lockdown period. It is reasonable to assume that the COVID-19 outbreak has resulted in

disease-related consequences and serious economic, psychological, and physical impacts globally (16). As expected, individuals gradually adopted a sedentary lifestyle and their physical activity decreased significantly. Lockdown restrictions have fundamentally changed education and social life-related physical activities for the majority of university students

(17). All universities in Turkey shifted to online classes during the lockdown (18). Due to distance education, medical students stayed at home for a long time and sat in non-ergonomic positions during online classes. In the current study, the musculoskeletal health of medical students was examined by NMQ-E nine months after the COVID-19 lockdown in Turkey.

The beneficial effects of physical activity are well established, especially in periods of anxiety, crisis, and even fear. Students in early medical education showed higher anxiety during the outbreak (19). Females have higher COVID-19-associated fear than males (20). Physical activity has a positive effect on both physical and mental health in protecting people from illness and helping them in their treatment (6). Regular physical activity supports maintaining normal weight and diminishes inflammation and oxidative stress. A sedentary lifestyle is associated with certain metabolic effects that could raise cardiovascular risk (21). Young adults should spend at least 150 minutes of moderate-intensity physical activities per week and muscle-strengthening activities at least two days per week (13). Prolonged sitting in the flexor posture can result in increased intervertebral disc pressure and lower back pain. Increasing time spent on technological devices causes physical inactivity, which also increases back pain (22). Prolonged incorrect posture can trigger musculoskeletal changes or pain (23).

While the COVID-19 pandemic has put stress on medical students' personal and work lives, the extent of the impact also depends on how the student cares for and protects himself/herself. In the current study, 31.1% of the students did not exercise at all, 59.8% exercised for 15-45 minutes per day, and 8.6% exercised for 1-2 hours a day. Only 1 student exercised more than 2 hours a day. It has been observed that medical students exercise less than they should. As the daily exercise duration of the students increased, their upper back pain decreased. Upper back, neck, lower back, and shoulders were the body parts with the highest pain prevalence overall. Also, male students exercise significantly more than female students during the lockdown. Pain in the neck, shoulders, upper back, lower back, hips/thighs, and hands were significantly higher in female students than in males. We think that the fact that male students exercise more explains that they suffer less from musculoskeletal disorders. It was determined that in a group of subjects who had computer work sitting for two hours, the feeling of discomfort in all body parts increased, and this also increased creative problem-solving errors (24). A study conducted on university students found that long- term computer use was significantly associated with neck pain. In another study, it was reported that approximately half of the subjects suffered from headache and neck pain (25, 26). In a study on university students, a significant number of students reported that their musculoskeletal symptoms affected their work and leisure activities, and approximately 1/5 of them sought medical help (27).

It was shown that while inactivity increased by 40.6% during the lockdown period, physical activity decreased by 12.6% (28). A reduction in physical activity was also observed in Australian students

(12). Studies conducted in different countries have also revealed similar results regarding the decrease in physical activity during lockdown (29). Such studies aim to emphasize the importance that both public health authorities and medical faculties should consider protecting the health of future medical doctors.

Taken together, reductions in exercise time and intensive curriculum may cause various musculoskeletal disorders in medical students during the COVID-19 lockdown. These findings may be useful in discovering new educational models aimed at both reducing sitting time and promoting physical activity in medical students. Our findings in the current study can be supported by studies showing that individuals who stay at home are less active. Because social isolation is significantly associated with physical activity, socially isolated individuals are less physically active and more likely to report health risk behaviors. In any unusual situation like outbreak, current data needs to be confirmed by future research on medical students from different universities.

Conclusion

It is important to encourage medical students to engage in physical activity and to raise awareness of individuals regarding posture and posture disorders during the duration of the lockdown. This suggests that improving physical activity would be beneficial for medical students, and the vast majority would benefit from spending less time sitting in their daily routines. Prospective studies in different medical students are needed to validate and extend the results here. Physical activity can be more important for medical student's health outcomes under such unusual conditions.

Limitations

The current study comes with limitations. One of them is the duration of sitting time and technology-based activities, were not assessed. Since we know the curriculum of medical students, it was assumed that they were in the online classes from 9.00 am to 5.00 pm. In addition, self- reported musculoskeletal scales are less reliable than device-based scales.

Ethics Approval: This study was performed in line with the principles of the Declaration of Helsinki. Ethics committee approval was granted by Afyonkarahisar Health Sciences University Clinical Research Ethics Committee (Approval Date: 01/08/2021, Decision No: 2021/18).

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Author contributions
Concept: H.G, O.T,
Design: H.G,
Supervision: H.G,
Resources: O.T, İ.D,
Data Collection and Proccesing: H.G, O.T, İ.D,
Analysis and Interpretation: H.G, O.T, İ.D,
Literature Search: H.G, O.T,
Writing Manuscript: H.G, O.T,
Critical Review: H.G

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Table 1. Distribution of medical students' daily exercise time by gender

		Daily Exercise Time					
		Never	15- 45 Min	1-2 Hr	More than 2 Hr	df	P
Female	Count	54	76	9	0	3	*0.003
	Expected Count	43.2	83.1	12.0	0.7		
	%	38.8%	54.7%	6.5%	0.0%		
Male	Count	11	49	9	1		
	Expected Count	21.8	41.9	6.0	0.3		
	%	15.7%	70.0%	12.9%	1.4%		

Hr: Hour, Min: Minute, df: Degrees of freedom. *p<0.050.

Table 2. Comparison of medical students' musculoskeletal pain according to daily exercise time

Body Parts	Pain	N (%)	Never	15-45 min	1-2 hr	More than 2 hr	df	P
Neck	Yes	**104 (49.8%)**	37	62	5	0	3	0.121
	No	105 (50.2%)	28	63	13	1		
Shoulder	Yes	**67 (32.1%)**	27	37	3	0		0.141
	No	142 (67.9%)	38	88	15	1		
Upper Back	Yes	**123 (58.9%)**	48	68	7	0		*0.010
	No	86 (41.1%)	17	57	11	1		
Elbow	Yes	12 (5.7%)	3	8	1	0		0.957
	No	197 (94.3%)	62	117	17	1		
Hand/Wrist	Yes	44 (21.1%)	16	24	4	0		0.793
	No	165 (78.9%)	49	101	14	1		
Lower Back	Yes	**92 (44.0%)**	28	58	6	0		0.587
	No	117 (56.0%)	37	67	12	1		
Hip	Yes	31 (14.8%)	14	13	4	0		0.157
	No	178 (85.2%)	51	112	14	1		
Knee	Yes	39 (18.7%)	15	19	5	0		0.386
	No	170 (81.3%)	50	106	13	1		
Foot/Ankle	Yes	13 (6.2%)	3	9	1	0		0.903
	No	196 (93.8%)	62	116	17	1		

Hr: Hour, Min: Minute, df: Degree of freedom. *p<0.050.

Table 3. Comparison of students' musculoskeletal pain by gender

Body Parts	Pain	N (%)	Female		Male		df	p
			Expected Count	Count	Expected Count	Count		
Neck	Yes	104 (49.8%)	69.2	81	34.8	23		***0.001**
	No	105 (50.2%)	69.8	58	35.2	47		
Shoulder	Yes	67 (32.1%)	44.6	54	22.4	13		***0.003**
	No	142 (67.9%)	94.4	85	47.6	57		
Upper Back	Yes	123 (58.9%)	81.8	92	41.2	31		***0.002**
	No	86 (41.1%)	57.2	47	28.8	39		
Elbow	Yes	12 (5.7%)	8.0	8	4.0	4		1.000
	No	197 (94.3%)	131.0	131	66.0	66		
Hand/Wrist	Yes	44 (21.1%)	29.3	36	14.7	8	**1**	***0.015**
	No	165 (78.9%)	109.7	103	55.3	62		
Lower Back	Yes	92 (44.0%)	61.2	68	30.8	39.2		***0.044**
	No	117 (56.0%)	77.8	71	24	46		
Hip	Yes	31 (14.8%)	20.6	27	10.4	4		***0.007**
	No	178 (85.2%)	118.4	112	59.6	66		
Knee	Yes	39 (18.7%)	25.9	31	13.1	8		0.057
	No	170 (81.3%)	113.1	108	56.9	62		
Foot/Ankle	Yes	13 (6.2%)	8.6	9	4.4	4		1.000
	No	196 (93.8%)	130.4	130	65.6	66		
Total		209 (100%)						

Hr: Hour, Min: Minute, df: Degree of freedom. *p<0.050.