

# Musculoskeletal problems, attitudes and behaviors related to physical activity, and social media addiction in musicians during the COVID-19 pandemic

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## Abstract.

**BACKGROUND:** Musculoskeletal problems are common in musicians. Coronavirus 2019 (COVID-19) has brought with it lockdowns and quarantine periods, and as a result, caused physical and psychological problems.

**OBJECTIVE:** To evaluate musculoskeletal problems, attitudes and behaviors related to physical activity, and social media addiction in musicians during the COVID-19 pandemic.

**METHODS:** This cross-sectional study was conducted on a total of 137 musicians (string, keyboard, wind, percussion instrument players, and vocalists) online. Musculoskeletal problems with Cornell Musculoskeletal Discomfort Questionnaire (CMDQ), attitudes and behaviors related to physical activity with Cognitive Behavioral Physical Activity Questionnaire (CBPAQ), social media addiction with Bergen Social Media Addiction Scale (BSMAS) were evaluated.

**RESULTS:** In CMDQ, it was found that upper back, lower back, and neck problems were more common in all musicians. There were no differences between instrument groups in terms of CBPAQ sub-dimensions, total CBPAQ, and total BSMAS ( $p > 0.05$ ).

**CONCLUSION:** Considering the dramatic effects of COVID-19, it may be important not to ignore musicians' musculoskeletal problems. It is recommended to design future studies investigating the effects of social media platforms on physical activity awareness by turning the opportunities of COVID-19 into advantages for challenges in musicians.

Keywords: Awareness, lockdown, online, pain, quarantine

## 1. Introduction

Musculoskeletal problems are common in musicians [1, 2]. Its prevalence varies depending on whether it is associated with playing an instrument or not. The 12-month prevalence not associated with playing an instrument ranges from 86-89%, while it is between 41-93% associated with playing an

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instrument [3]. In a recent study for the development of an injury prevention model, nine titles, including “posture, individual characteristics, psycho-social, environment, biomechanics, workload, injury management, life habits, and physical conditioning”, were stated the predisposing risk factors on playing-related musculoskeletal problems in musicians [4]. On the other hand, coronavirus 2019 (COVID-19) has brought with it lockdowns and quarantine periods. The consequences of COVID-19 include “physical inactivity, behavioral addiction disorders due to long-term isolation (increased time spent watching television, online games, or social networks), and resulting psychological, musculoskeletal problems, social isolation-related depression, and anxiety” that have been shown [5]. Therefore, COVID-19 pandemic may also be one of the predisposing risk factors for musicians’ musculoskeletal problems.

In the literature, the insufficient physical activity (PA) levels of the musicians have been explained due to reasons such as pregnancy, recent illness [2], lack of time [2, 6] inadequate knowledge/information, and organizational structures [6]. It was also stated that a pandemic of physical inactivity emerged with the advent of the COVID-19 pandemic and that even if the COVID-19 pandemic ends, the pandemic of physical inactivity will continue [7]. Considering the previous literature and the consequences of the COVID-19 pandemic, it was considered important to raise awareness of PA among musicians. In this context, we thought that the evaluation of attitudes and behaviors related to PA of individuals could be a guide for awareness.

Also, during the COVID-19 pandemic, it was found that the use of social media increased [8] and social media addiction affected the physical health of individuals [9]. Online addiction caused symptoms such as neck pain, tension-type headache, and other atypical musculoskeletal pain due to poor posture and prolonged inactivity [10, 11]. It was recommended to increase PA participation in the fight against social media addiction [12].

In the light of the above literature, this study aimed to evaluate musculoskeletal problems, attitudes and behaviors related to PA, and social media addiction in musicians during the COVID-19 pandemic. Our hypotheses; 1) H1: Musicians have musculoskeletal problems during the COVID-19 pandemic; 2) H2: Musicians have positive attitudes and behaviors related to PA during the COVID-19 pandemic; 3) H3: Musicians have social media addiction during the COVID-19 pandemic.

## 2. Methods

### 2.1. Design and sample

This study, which is a cross-sectional study design, was conducted online through “Google Forms” between February-August 2021, after receiving the ethics committee approval with the decision number 2020/30-26 and date of approval 21 December 2020, by the Non-Interventional Research Ethics Committee of the Dokuz Eylul University. It was conducted in accordance with the Declaration of Helsinki Recommendations. Amateur or professional musicians who have played an instrument or been a vocalist for at least three years were included in this study. A total of 137 musicians (80 Female, 57 Male) participated [string ( $n=79$ ), keyboard ( $n=28$ ), wind ( $n=24$ ), percussion ( $n=3$ ) instrument players, and vocalists ( $n=3$ )]. Exclusion criteria were a) the presence of any psychological problem diagnosed, b) the presence of a neurological and/or orthopedic problem that would hinder PA and/or exercise, c) the presence of a surgical operation that would hinder PA and/or exercise.

### 2.2. Measures

The conditions included in the exclusion criteria were given as a warning sentence before “Google Forms” was started to identify those who should be excluded from the study. If any of these conditions are not seen in the participant, “The conditions above are not available. I want to start the survey” button is requested to be clicked. If any of these conditions are observed, the participant was not allowed to start the survey.

Since the study was conducted online during the pandemic period, an informative text was created on “Google Forms” and participants were asked to approve the Informed Consent Form if they agreed to participate in the study. First of all, the Demographic Information Form prepared for the musicians was filled in by the participants. Musculoskeletal problems with the Cornell Musculoskeletal Discomfort Questionnaire (CMDQ), attitudes and behaviors related to PA with Cognitive Behavioral Physical Activity Questionnaire (CBPAQ), social media addiction with the Bergen Social Media Addiction Scale (BSMAS) were evaluated online.

### 2.2.1. Cornell Musculoskeletal Discomfort Questionnaire (CMDQ)

The original version of the questionnaire was developed by “Cornell University Human Factors and Ergonomics Laboratory” [13]. The cross-cultural adaptation, validity, and reliability study of the Turkish version was performed by Erdinc et al. [14]. On the questionnaire, different body parts are evaluated. The frequency, severity, and work interference of pain, ache or discomfort felt by the person within a week in body parts are questioned separately. For each body part, it is scored as “frequency x severity x work interference” [14].

### 2.2.2. Cognitive Behavioral Physical Activity Questionnaire (CBPAQ)

The questionnaire was developed by Schembre et al. [15], to evaluate attitudes and behaviors related to PA. It was made Turkish validity and reliability study by Eskiler et al. [16]. It has sub-dimensions: outcome expectations, self regulation, and personal barriers. Total scoring is calculated as “outcome expectations+self regulation-personal barriers” [16].

### 2.2.3. Bergen Social Media Addiction Scale (BSMAS)

The scale was developed by Andreassen et al. [17] to assess social media addiction. It was adapted into Turkish by Demirci [18]. A high score on the scale indicates a high level of addiction [18].

## 2.3. Statistical analysis

SPSS for Windows version 23.0 software (IBM Corp., Armonk, NY, USA) was used for statistical analysis. In descriptive statistics, numerical variables with median and minimum (min)-maximum (max) values, and categorical variables with frequency (n) and percentage (%) values were given. Kruskal-

Wallis H Test was used to compare more than two groups (instrument groups). Mann-Whitney U Test was used for pairwise comparisons of the variables with significant differences as a result of multiple group comparisons in the Kruskal-Wallis H Test. The Chi-squared Test was used to compare categorical variables. Statistical significance was taken as  $p < 0.05$ .

## 3. Results

A total of 137 musicians (80 Female, 57 Male) with a mean age of  $30.20 \pm 11.16$  participated in the study. The musicians were divided into string ( $n = 79$ , 57.7%), keyboard ( $n = 28$ , 20.4%), wind ( $n = 24$ , 17.5%), and percussion ( $n = 3$ , 2.2%) instrument groups, and vocalists ( $n = 3$ , 2.2%). 70.2% of instrument players have been playing instruments for more than ten years. In the results below, since the numbers of musicians who played percussion instruments and vocalists were low, they were not included to the evaluations.

Although there were no differences in terms of age and gender among those who played string, keyboard, and wind instrument groups ( $p > 0.05$ ), there was a difference in terms of Body Mass Index (BMI) ( $p = 0.032$ ). String instrument group had a higher BMI than keyboard instrument group ( $p = 0.008$ ) (Table 1).

According to CMDQ, it was seen that upper back, lower back and neck problems were more common in all musicians. There was a difference only in the right knee problem between instrument groups in terms of body parts scores in CMDQ ( $p = 0.031$ ) and string instrument group reported more right knee problem than keyboard instrument group ( $p = 0.034$ ) (Table 2). There were no differences between instrument groups in terms of CBPAQ sub-dimensions, total CBPAQ and total BSMAS ( $p > 0.05$ ) (Table 3).

Table 1  
Comparison of instrument groups in terms of demographic characteristics

	String instrument group ( $n = 79$ ) median (min-max)	Keyboard instrument group ( $n = 28$ ) median (min-max)	Wind instrument group ( $n = 24$ ) median (min-max)	$p$	Pairwise comparisons
Age (years)	27 (18-55)	21.50 (18-58)	28.50 (18-57)	~0.060	–
BMI (kg/m <sup>2</sup> )	23.52 (16.02-42.52)	21.30 (17.36-34.89)	23.00 (17.86-30.59)	~ <b>0.032*</b>	String-keyboard ( $p = 0.008^*$ ) <sup>α</sup>
Gender (%)	F: 41 (51.9%) M: 38 (48.1%)	F: 19 (67.9%) M: 9 (32.1%)	F: 16 (66.7%) M: 8 (33.3%)	#0.216	–

min, minimum; max, maximum; n, frequency; BMI, Body Mass Index; F, Female; M, Male; \*Statistical significance ( $p < 0.05$ ). ~Kruskal Wallis Test; <sup>α</sup>Mann-Whitney U Test; #Chi-squared Test.

Table 2  
Comparison of instrument groups in terms of CMDQ body parts and total CMDQ

CMDQ	String instrument group (n = 79) median (min-max)	Keyboard instrument group (n = 28) median (min-max)	Wind instrument group (n = 24) median (min-max)	p	Pairwise comparisons
Neck	1.50 (0-90)	1.50 (0-90)	1.50 (0-90)	~0.741	–
Right shoulder	0 (0-90)	0.75 (0-90)	0 (0-60)	~0.644	–
Left shoulder	0 (0-60)	0 (0-90)	0 (0-31.50)	~0.669	–
Upper back	1.50 (0-90)	1.50 (0-90)	1.50 (0-45)	~0.594	–
Right upper arm	0 (0-40)	0 (0-6)	0 (0-90)	~0.457	–
Left upper arm	0 (0-60)	0 (0-3)	0 (0-21)	~0.691	–
Lower back	1.50 (0-90)	0.75 (0-90)	2.25 (0-90)	~0.773	–
Right forearm	0 (0-40)	0 (0-3)	0 (0-7)	~0.347	–
Left forearm	0 (0-90)	0 (0-3)	0 (0-7)	~0.516	–
Right wrist	0 (0-90)	0 (0-20)	0 (0-90)	~0.889	–
Left wrist	0 (0-90)	0 (0-20)	0 (0-90)	~0.797	–
Hip	0 (0-21)	0 (0-90)	0 (0-6)	~0.680	–
Right thigh	0 (0-90)	0 (0-14)	0 (0-0)	~0.071	–
Left thigh	0 (0-21)	0 (0-7)	0 (0-0)	~0.286	–
Right knee	0 (0-60)	0 (0-7)	0 (0-90)	~ <b>0.031*</b>	String-keyboard (p = <b>0.034*</b> ) <sup>α</sup>
Left knee	0 (0-21)	0 (0-7)	0 (0-90)	~0.324	–
Right lower leg	0 (0-40)	0 (0-3)	0 (0-0)	~0.063	–
Left lower leg	0 (0-40)	0 (0-3)	0 (0-10)	~0.614	–
Right foot	0 (0-20)	0 (0-21)	0 (0-1.50)	~0.188	–
Left foot	0 (0-20)	0 (0-21)	0 (0-1.50)	~0.195	–
Total CMDQ	30 (0-593)	22.50 (0-581)	20 (0-491.50)	~0.591	–

min, minimum; max, maximum; n, frequency; CMDQ, Cornell Musculoskeletal Discomfort Questionnaire; \*Statistical significance (p < 0.05). ~Kruskal Wallis Test; <sup>α</sup>Mann-Whitney U Test.

Table 3  
Comparison of instrument groups in terms of CBPAQ sub-parameters, and total CBPAQ and total BSMAS

	String instrument group (n = 79) median (min-max)	Keyboard instrument group (n = 28) median (min-max)	Wind instrument group (n = 24) median (min-max)	p	Pairwise comparisons
CBPAQ outcome expectations	4.80 (2-5)	4.80 (3.80-5)	4.80 (2.80-5)	~0.533	–
CBPAQ self-regulation	3 (1.20-5)	3.40 (2.20-4.80)	3.60 (1.80-5)	~0.070	–
CBPAQ personal barriers	3 (1-5)	2.50 (1-4.60)	3 (1.20-4.40)	~0.449	–
Total CBPAQ	5 (0.40-9)	5.80 (2-8.80)	5.60 (2.40-8)	~0.131	–
Total BSMAS	16 (6-30)	14.50 (6-30)	16 (6-27)	~0.920	–

min, minimum; max, maximum; n, frequency; CBPAQ, Cognitive Behavioral Physical Activity Questionnaire; BSMAS, Bergen Social Media Addiction Scale; ~Kruskal Wallis Test.

#### 4. Discussion

This study evaluated musculoskeletal problems, attitudes and behaviors related to PA, and social media addiction in musicians during the COVID-19 pandemic. It was found that upper back, lower back and neck problems were more common in all musicians. In terms of the effect of musculoskeletal problems according to body parts, right knee problem was more common in string instrument group. There were no differences between the instrument groups in terms of social media addiction and attitudes and behaviors related to PA.

There were restrictions and lockdown due to the COVID-19 pandemic at the time we conducted this study. Our results on musculoskeletal problems may

be related to reasons such as increased time spent on daily activities at home, physical inactivity, psychological stress, spending a long time in front of the screen, playing an instrument in leisure time at home. In a study, during prolonged lockdowns for COVID-19, physical inactivity, weight gain, behavioral addiction, insufficient sunlight exposure, and social isolation were stated as health risks, and musculoskeletal disorders were stated as one of the health consequences associated with behavioral addiction (longer time spent watching television, etc.) [5]. Another study on the effects of the COVID-19 lockdown on performing arts professionals, where the participation of musicians is the majority; challenges such as “1- lost or uncertain work and income, 2- constraints of lockdown working, 3- loss,

threat, and vulnerability, 4- detrimental effects on health and wellbeing” were specified [19]. These challenges may also have triggered musculoskeletal problems. Therefore, COVID-19, which is an extraordinary, unexpected situation that enters our lives very quickly, may be one of the risk factors that cause musculoskeletal problems in musicians.

Musculoskeletal problems are seen in different body parts according to the instrument played in musicians. Among the body parts where these problems are seen, there are body parts such as upper back, lower back, neck, temporomandibular joints, shoulder, forearm, elbow, hand, wrist, fingers [20–24]. The majority of our study consisted of string instrument players and upper back, lower back and neck problems were common. Similar to our study, these problems were common in a study that evaluated posture with the PostureScreen Mobile application. This was explained by the musicians holding the proximal muscles of the trunk and upper extremities in a static position for a long time [20]. In a recent study, musculoskeletal problems in musicians were grouped as “posture, individual characteristics, psycho-social, environment, biomechanics, workload, injury management, life habits, and physical conditioning” [4]. According to instrument groups, prolonged flexion of the head and shoulders in violinists and violists [21], asymmetrical playing posture in flautists [22], static loading due to instrument weight in woodwind players [23], forced posture, and static loading during difficult technical passages in pianists [24] were stated. In light of the literature, considering that the majority of our study consisted of string instruments and that musicians may have taken time to play their instruments at home during the COVID-19 lockdown, the reason for the upper back, lower back, and neck problems may have been due to staying in a static position and sitting for a long time while playing the instrument. It was stated that playing-related musculoskeletal disorders were caused by both repetitive, awkward postures while playing, and postural stress was caused by sitting or standing for a long time [25]. Prolonged sitting increases the discomfort in body parts such as the upper back, lower back and neck [26]. On the other hand, there was a difference between the two groups in terms of right knee problem in our study. String instrument group had more right knee problem. This might be because string instrument group had a higher BMI than keyboard instrument group. Indeed, it has been shown in the literature that BMI is associated with knee pain [27]. Therefore, this situation makes us think that follow-

up will be important in terms of weight control in preventing musculoskeletal problems in musicians. Indeed, during the long-term quarantine for COVID-19, weight gain was stated as a health risk [5]. The importance of multidisciplinary teamwork seems to come into play here as well.

Although the challenges brought by COVID-19 are always mentioned, there are also benefits. In a study evaluating the effects of COVID-19 lockdown on performing arts professionals, it was stated that COVID-19 provides professional and personal opportunities. In the study, musicians stated that they exercised more, had more time to do sports, and felt healthier than before [19]. Therefore, the reason why musicians’ attitudes and behaviors related to PA are positive and there was no difference between the instrument groups in our study may be that the COVID-19 lockdown provides the opportunity to take time for oneself and live a healthier lifestyle. However, the PA levels of the musicians were not questioned in our study. Therefore, there was no information about whether these attitudes and behaviors were actually reflected to the behavior.

According to Digital 2021 Global internet usage data, the rate of active social media users worldwide reached 53.6% by January 2021 [28]. Only about two years ago, in November 2019, the rate of active social media users was 48% [29]. Again, according to January 2021 data, the 25-34 age group used social media the most. The total number of active social media users in Turkey was (70.8%), higher than the rest of the world (53.6%) [28]. In our study, social media addiction was not high and there was no difference between musicians according to instrument groups in terms of it. Although there has been an increase in the use of social media in the general population with the pandemic, the reason for the lack of this increase in addiction level among musicians may be that the musicians may have wanted to spend their leisure time exercising, playing instruments, and doing their daily activities rather than surfing social media. On the other hand, they may have used social media to improve themselves. It was stated that performing arts professionals focused on digital and creative skills during the COVID-19 lockdown [19]. Social media could be used as a promising intervention to increase PA and to provide lifestyle change among young adults [30]. In a study evaluating the informative behavior of social media during COVID-19, it was stated that a range of information about health conditions and lifestyles, such as PA, was shared on social media and social media can positively affect

PA [31]. In this way, the use of social media can be made more useful by creating PA awareness in musicians. Conferences, videos, and meetings can be organized, online exercise programs can be created, and brochures and post templates can be made via social media platforms.

Our study had some limitations. First limitation was that the number of participants was less compared to other survey studies of musicians. However, the number of participants was determined by considering the study of Baadjou et al. [32] who investigated the PA and musculoskeletal complaints in music students and conducted electronic questionnaires, and the number of participants in our study was sufficient according to this study. Second limitation was that although the attitudes and behaviors related to PA and social media addiction were evaluated, PA levels and the duration of social media use were not. Third limitation was that body parts such as hands, fingers, and jaw joint were not evaluated for musculoskeletal problems. Fourth limitation was the lack of specific assessments that questioned the causes of musculoskeletal problems. Fifth limitation, musicians' pre-pandemic and post-pandemic musculoskeletal problems, attitudes and behaviors related to PA, and social media addiction were not questioned. If the pre-pandemic and post-pandemic situations had also been evaluated, it could have been compared with the current results. The strength of our study was that it was the first study to the best of our knowledge to evaluate musculoskeletal problems, attitudes and behaviors related to PA, and social media addiction in musicians during the COVID-19 pandemic. Other strengths in our study are: 1-To bring a different perspective to the studies on musculoskeletal problems in musicians through the COVID-19 pandemic. 2-To provide insight into PA awareness, as musician health is often under-studied. 3-To present the idea to investigate the effects of social media platforms on PA awareness by turning the opportunities of COVID-19 into advantages for challenges in musicians.

## 5. Conclusion

In conclusion, it was thought that it would be important to be more aware of the problems of musicians who experience musculoskeletal problems due to many reasons and not to ignore these problems due to the dramatic consequences of the COVID-19 pandemic. On the other hand, the COVID-19 pandemic caused the concept of PA to come to the fore

again and reminded the importance of PA. Therefore, in our study, we think that it is valuable to evaluate the attitudes and behaviors related to PA of musicians during the pandemic. Although the COVID-19 pandemic brought an increase in the use of social media platforms, it could be beneficial when used correctly. Therefore, why shouldn't these platforms be suitable platforms for PA and exercise for musicians as well. Conferences, videos, and meetings can be organized, online exercise programs can be created, and brochures and post templates can be made via social media platforms. In musicians, future studies investigating the effects of social media platforms on PA awareness by turning the opportunities of COVID-19 into advantages for challenges are recommended. In addition, studies that question pre-pandemic or post-pandemic results can be designed, rather than just presenting the results during the pandemic.

## Ethical approval

The study was conducted in accordance with the Declaration of Helsinki and was approved by the Non-Interventional Research Ethics Committee of the Dokuz Eylul University (decision number 2020/30-26 and date of approval 21 December 2020).

## Informed consent

Since the study was conducted online during the COVID-19 pandemic, an informative text was created on Google Forms and participants were asked to approve the informed consent form if they agreed to participate in the study.

## Conflict of interest

The authors declare that they have no conflict of interest.

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