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Investigation of the change of lockdowns applied due to COVID-19 pandemic on musculoskeletal discomfort

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Abstract

Objectives: COVID-19 pandemic has affected public health to a large extent. The rapid contamination of the disease has necessitated social distance and lockdown. Musculoskeletal discomforts are the most common complaints among routine medical complaints. Restraints caused by the pandemic and psycho-social effects have caused such complaints increase. In the present study, the aim is to determine whether there is a difference between the Musculoskeletal System Discomforts of the people before and during the COVID-19 pandemic and to reveal the factors affecting such a difference.

Material and Method: This study was carried out in descriptive design. In the study, the study group consisted 1138 people living at different cities of Turkey who accepted to participate in the study. As the data collection tool, the personal information form prepared by the researcher and the "Cornell Musculoskeletal Discomfort Questionnaire (T-CMDQ)", which was developed by Cornell and translated into Turkish by Erdinç et al. who also tested the validity and adaptation of the questionnaire, were used in the study. The test method conducted in computer environment was used as the data collection method. In the study, decision of the ethics committee was taken for the non-interventional practices (Dated 2020 with no. 06). Paired Sample t-Test statistics was used for data comparison in the study. Significance level was accepted as $p < 0.001$. In the study, Cronbach alpha value of the total score of Musculoskeletal Discomfort Questionnaire was found as 0.92.

Results: It was determined that there was a statistically significant difference between the total mean scores of the participants before COVID-19 and during COVID-19 ($p < 0.001$). There was a statistically significant difference between the total mean scores of the participants regarding the pain level before COVID-19 and during COVID-19 ($p < 0.001$).

Conclusion: During COVID-19, it is determined that there is a decrease in the frequency of feeling pain, aches, and discomfort in body regions, but an increase in the severity of the emergent discomforts.

Key words: Pandemic; Covid-19; lockdown; musculoskeletal system discomforts.

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1. Introduction

The etiology of musculoskeletal discomforts is still not exactly understood however, there is a consensus that such discomforts are multifactorial in the nature (1). It is reported that physical exposures at work and the psychosocial risk factors have strong relationships with the musculoskeletal complaints related to neck, shoulder, forearm, and hands. Increasing computer use, static posture, and continuously repeating hand movements constitute an increased risk for musculoskeletal diseases (2).

In recent years, people do not only use computers at work or school, but also use cell phones, laptops, or tablet computers for communication and entertainment. Physical inactivity, being at the same posture for a long time, desk work, time elapsed with electronic devices such as mobile phones or tablets affect the comfort of the musculoskeletal system of people. Previous research has shown that using computers for more than four hours a day may contribute to the increase in the risk of musculoskeletal diseases (2, 3). Such discomforts include neck pain, shoulder rigidity, forearm tenosynovitis, carpal tunnel syndrome, and de Quervain syndrome (4). There are many studies on the negative effects of physical inactivity and being at the same posture, on the musculoskeletal system. Static and continuous sitting in front of the computer, unsettling postures of the shoulders, permanent non-neutral positions of the upper extremities including the upper back and neck, take place among numerous risk factors related to the musculoskeletal system. Studies conducted in the countries of European Union have shown that workplace-related musculoskeletal discomforts are more than all the other health problems and they constitute about half of work-related health problems. About one fourth of the European workers report that they experience pain in their upper extremities, shoulders, and neck (5).

In the studies conducted, the said problem related to the use of computers in the offices was related to the posterior segments, upper extremity, and neck (6, 7). According to a study conducted in Canada, three of every five office workers are dependent on computers while doing their jobs, and the annual rate of musculoskeletal discomforts is essentially affected by the above-mentioned risk factors. Thus, it can be specified that the arrangements made as a result of ergonomic evaluations and the trainings to be given reduce these risk factors proactively (8). Improving the sitting standards or giving active breaks prevents the occurrence of the situations causing musculoskeletal discomforts. However, due to the COVID19 pandemic, the increase in working at home and failure to pay attention to the sitting standards in the home environment is an obstacle for taking the advantage of this opportunity.

COVID19 pandemic has forced people to stay and work at home. Turkey, especially in the context of pandemic Covid19 curfew restrictions applied to those living in metropolitan areas, people are forced to stay at home and work and reduce the mobility of people in this situation. This lockdown has also extended the time elapsed in front of the computers, mobile phones, and similar electronic devices. As the lockdown was applied to the general population only on weekends, it was declared for adolescents and children under 20 and people over 65 on all the days of the week. Due to the restraints applied for COVID 19 pandemic, a certain risk is posed for musculoskeletal discomforts (MSD). COVID19 has also caused anxiety and psycho-social discomforts in the population. Psycho-social discomfort is an important factor for the emergence of MSD (9).

There are various scales used to determine the musculoskeletal system discomforts. Nordic and Cornell are the most commonly used scales for this purpose (10, 11). Cornell questionnaire is used to determine the pain level among the office workers as a response to relaches and ergonomic changes. Cornell questionnaire, which has been shown to be a valid and reliable tool to measure the pain level caused by MDS, can be especially used for this purpose (12).

In the current study, it is aimed to determine whether there is a difference between MSD of people before and during the COVID-19 pandemic and to reveal the factors affecting this by using Cornell questionnaire due to the psycho-social effects and inactivity caused by COVID.

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2. Material and Method

2.1 Type of the Study

This study was carried out in descriptive design.

2.2. Hypotheses

H_1: There is a statistically significant difference between the mean frequency of musculoskeletal discomforts in any region of the body before and after COVID-19.

H_2: There is a statistically significant difference between the mean frequency of the pain level due to the musculoskeletal discomforts in any region of the body before and after COVID-19.

2.3. Sample Group

The sample group of the study consisted of a total of 1138 people including 650 male and 488 female, who were aged between 12 and 78 years, who were living in different cities in Turkey, and who agreed to participate in the study.

2.4. Data Collection Tools

In the study, "Personal Information Form" and Turkish "Cornell Musculoskeletal Discomfort Questionnaire (T-CMDQ)" were used as the data collection tools.

2.4.1. Socio-Demographic Information Form

In the study, the personal information form prepared by the researcher consists of the variables as gender, age, educational status of the participants, the nature of the house where they lived, the status of lockdown, status of working from home due to COVID-19 (Table 1), playing active sports-exercise before and during COVID-19, and status of working actively at a job before and during COVID-19 (Table 2).

2.4.2. Cornell Musculoskeletal Discomfort Questionnaire (T-CMDQ)

T-CMDQ is a questionnaire that is developed by Cornell and is primarily based on the Scandinavian Musculoskeletal System Questionnaire (13). In the first section of Likert-type scale, the frequency of pain in the body regions are scored. Similarly, in the second and third sections of the scale, the pail level experienced in the specified body regions and the relation of the pain with work are scored by the users.

Original questionnaire is translated into Turkish by Erdinç et al. and the validity and reliability of the questionnaire is tested (14). T-CMDQ is based on the score calculation system and the total discomfort score of different body regions is found by multiplying the scores of frequency, level, and the impact of the discomfort on work (Degree of Affection = Frequency of Pain x Pain Level x Relation of Pain with Work) and the areas with the highest percentage score compared to the total score of all the body regions evaluated in the questionnaire is used to identify the body regions having the most serious problems.

In the study, the section about the pain related to work was excluded from the questionnaire due to the transition to homeworking system and the lockdown because of the COVID-19 pandemic. It was decided to evaluate the discomfort due to inactivity in different body regions related to the decrease in daily exercise, sports, or routine activities of the participants and the pain level caused by discomfort before and during the pandemic. In the original scale, the body regions were evaluated totally as 20 different body regions due to the separation of 12 different body regions and 8 regions that are separated as left and right. In the current study, since 8 regions of the body were not evaluated as right-left but one-way, the regions of the body that may cause discomfort were evaluated over 12 different body regions in total and the total mean scores were obtained. Questions about musculoskeletal comfort were prepared for participants in two parts. First, they were asked to retrospectively consider the comfort of the musculoskeletal system prior to the COVID-19 pandemic

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and respond. In the second part, they were also asked about their current musculoskeletal comfort due to the curfew restriction imposed due to the COVİD-19 pandemic.

At first, the participants were asked to assess the frequency of total discomfort of different body regions on a 5-point Likert scale (None=1, 1-2 times a week=2, 3-4 times a week=3, Once a day=4, many times every day=5). Although the lowest score that can be obtained from this section is "12", the highest score is "60". Secondly, it was asked to the participants to indicate the pain level regarding the discomfort at different body regions on a 3-Likert scale (Mild=1, Moderate=2, Very severe=3). The lowest score that can be obtained from the pain level section is "12", while the highest score is "36".

In the study, Cronbach alpha value of the total score of Turkish version of Cornell, T-CMDQ, was found as 0.92. It explains 91.9% of the total variance.

2.5. Data Collection Method

The test method conducted in computer environment applied to 1138 participants, who agreed to participate in the research with their own consent, was used as the data collection method in the study. According to the results of a meta-analysis carried out in Turkey, there was no statistically significant difference between the paper and pencil form the student performances shown in the tests applied in a computer environment (15). The form of the scale applied to the participants in the study was sent to the participants in computer environment. After the sufficient sample size was reached in the study, the application was terminated.

2.6. Ethical Direction of the Research

In the study, decision of the ethics committee was taken for the non-interventional practices from the ethics committee of Sabahattin Zaim University (Dated 2020 with no. 06).

2.7. Data Analysis

Data analysis was performed by using SPSS (Statistical Package for Social Sciences) for Windows 24 program. According to the answers of a total of 1138 participants, who accepted to participate in the research and were living at different cities in Turkey, the distribution of the questions in the personal information form was determined by the frequency analysis and descriptive statistics were conducted.

In the study, parametric test statistics were used to compare the data. Paired Sample t-Test statistics was used for the comparison of the total mean scores obtained from the scale. Significance level was accepted as $p < 0.001$.

3. Results

Table 1 shows socio-demographic characteristics of the participants. The average age was 35.69±11.6 and the genders of the participants were male with 57.1% and female with 42.9%. It was determined that the education level of the participants was "undergraduate" with the highest rate of 48.9%, the quality of the house was the apartment flat of 61.2%, and the application of lockdown was 92.8%.

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Table 1. Socio-demographic characteristics of the participants (n=1138)

Variables	n	%
Gender		
Female	488	42.9
Male	650	57.1
Age: (Ave=35.69; ±11.6)		
Between 12 and 18 years old	19	1.7
Between 19 and 25 years old	274	24.1
Between 26 and 50 years old	711	62.5
51-year-old and over	134	11.8
Educational status		
Primary education	54	4.7
High School	161	14.1
Associate degree	115	10.1
Undergraduate	557	48.9
Postgraduate	251	22.1
Quality of the house		
Detached house	148	13.0
Flat	696	61.2
Site with no social opportunities	129	11.3
Site with social opportunities	165	14.5

Table 2 shows characteristics of the business life and daily activity routines of the participants regarding the COVID-19 pandemic. It was reported that the status of working at home due to COVID-19 was 60.3%, status of performing active sports-exercise before and before and during COVID-19 decreased from 42.6% to 25.9%, and the status of actively working at a job decreased from 72.5% to 49.6% before and during COVID-19.

Table 2. Characteristics of status of the participants to be affected by COVID-19 pandemic (n=1138)

Variables	n	%
Status of Lockdown		
No lockdown	82	7.2
Lockdown	1.056	92.8
Working at home due to COVID-19		
No	686	60.3
Yes	452	39.7
Actively working at a job before COVID-19		
No	313	27.5
Yes	825	72.5
Performing active sports-exercise before COVID-19		
No	653	57.4
Yes	485	42.6
Actively working at a job during COVID-19		
No	573	50.4
Yes	565	49.6
Performing active sports-exercise during COVID-19		
No	843	74.1
Yes	295	25.9

Table 3 shows the distribution of the daily activities of the participants before and during COVID-19. Accordingly, the period of the participants spent in sleep increased from 7.23 hours

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to 7.98 hours, sitting period increased from 5.69 hours to 8.74 hours, period elapsed before computer increased from 3.37 hours to 4.56 hours, and period elapsed by using mobile phones increased from 3.41 hours to 5.49 hours before and during COVID-19.

Table 3. Distribution of daily activities of the participants before and during COVID-19 (n=1138)

	Before COVID-19								During COVID-19							
	Sleep duration		Sitting duration		Period for using computer		Period for using mobile phones		Sleep duration		Sitting duration		Period for using computer		Period for using mobile phones	
Mean	7.23		5.69		3.37		3.41		7.98		8.74		4.56		5.49	
Sd.	1.12		3.04		3.15		2.82		1.84		4.16		3.79		3.8	
Groups	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1-5 hours	56	4.9	652	57.3	870	76.4	985	86.6	86	7.6	258	22.7	739	64.9	701	61.6
6-10 hours	1.077	94.6	422	37.1	249	21.9	118	10.4	973	85.5	592	52	324	28.5	351	30.8
11-15 hours	5	0.4	52	4.6	18	1.6	21	1.8	78	6.9	226	19.9	67	5.9	54	4.7
16-24 hours	0	0	12	1.1	1	0.1	14	1.2	1	0.1	62	5.4	8	0.7	32	2.8

Table 4 shows the distribution of the participants regarding the frequency of the feeling pain, aches, and discomfort in the body regions before COVID-19. The first three body regions where total MSD frequency of the participants at all levels before COVID-19 was the highest were determined to be neck at the rate of 76.0% (n=865), back at the rate of 75.7% (n=860) and waist at the rate of 73.4% (n=835).

Table 4. Frequency of MSD of the participants according to the body regions before COVID-19 (n=1138)

Frequency	None		1-2 times a week		3-4 times a week		Once a day		Many times every day		Total frequency of MSD	
	n	%	n	%	n	%	n	%	n	%	n	%
Neck	273	24.0	603	53.0	180	15.8	32	2.8	50	4.4	865	76.0
Shoulders	332	29.2	544	47.8	169	14.9	42	3.7	51	4.5	806	70.8
Back	277	24.3	530	46.6	232	20.4	42	3.7	57	5.0	861	75.7
Between the shoulder and elbow	453	39.8	522	45.9	110	9.7	29	2.5	24	2.1	685	60.2
Waist	303	26.6	546	48.0	192	16.9	40	3.5	57	5.0	835	73.4
Forearm (between the elbow and wrist)	536	47.1	505	44.4	63	5.5	19	1.7	15	1.3	602	52.9
Wrist	508	44.6	514	45.2	79	6.9	23	2.0	14	1.2	630	55.3
Fingers	524	46.0	512	45.0	66	5.8	22	1.9	14	1.2	614	53.9
Hip	479	42.1	500	43.9	100	8.8	31	2.7	28	2.5	659	57.9
Upper leg (between the hip and the knee)	523	46.0	482	42.4	91	8.0	18	1.6	24	2.1	615	54.0
Knee	474	41.7	496	43.6	118	10.4	24	2.1	26	2.3	664	58.3
Lower leg (between the knee and the foot)	534	46.9	473	41.6	91	8.0	24	2.1	16	1.4	604	53.1
Feet	479	42.1	507	44.6	102	9.0	26	2.3	24	2.1	659	57.9

Table 5 shows the distribution of the participants regarding the frequency of the feeling pain, aches, and discomfort in the body regions during COVID-19. The first three body regions where total MSD frequency of the participants at all levels during COVID-19 was the highest were determined to be neck at the rate of 76.9% (n=875), back at the rate of 70.6% (n=803), and waist at the rate of 66.2% (n=853).

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Table 5. Frequency of MSD of the participants according to the body regions during COVID-19 (n=1138)

Frequency	None		1-2 times a week		3-4 times a week		Once a day		Many times every day		Total frequency of MSD	
	n	%	n	%	n	%	n	%	n	%	n	%
Neck	263	23.1	753	66.2	72	6.3	19	1.7	31	2.7	875	76.9
Shoulders	393	34.5	642	56.4	57	5.0	14	1.2	32	2.8	745	65.5
Back	335	29.4	682	59.9	74	6.5	21	1.8	26	2.3	803	70.6
Between the shoulder and elbow	540	47.5	539	47.4	39	3.4	8	0.7	12	1.1	598	52.5
Waist	385	33.8	632	55.5	88	7.7	11	1.0	22	1.9	753	66.2
Forearm (between the elbow and wrist)	604	53.1	493	43.3	28	2.5	9	0.8	4	0.4	534	46.9
Wrist	581	51.1	512	45.0	32	2.8	6	0.5	7	0.6	557	48.9
Fingers	611	53.7	491	43.1	26	2.3	5	0.4	5	0.4	527	46.3
Hip	544	47.8	529	46.5	45	4.0	8	0.7	12	1.1	594	52.2
Upper leg (between the hip and the knee)	570	50.1	515	45.3	37	3.3	9	0.8	7	0.6	568	49.9
Knee	529	46.5	536	47.1	50	4.4	9	0.8	14	1.2	609	53.5
Lower leg (between the knee and the foot)	585	51.4	503	44.2	32	2.8	9	0.8	9	0.8	553	48.6
Feet	569	50.0	513	45.1	35	3.1	13	1.1	8	0.7	569	50.0

Table 6 shows the distribution of the pain level felt in the body regions of the participants due to MSD before COVID-19. The first three body regions where total pain level of the participants at all levels before COVID-19 was the highest were determined to be neck at the rate of 76.0% (n=865), back at the rate of 75.7% (n=860) and waist at the rate of 73.4% (n=835).

Table 6. Distribution of the pain level felt in the body regions of the participants due to MSD before COVID-19

Frequency	Mild severity		Moderate severity		Extreme severity		Total of the pain strength level	
	n	%	n	%	n	%	n	%
Neck	554	48.7	257	22.6	54	4.7	865	76.0
Shoulders	268	23.6	37	3.3	501	44.0	806	70.8
Back	505	44.4	296	26.0	59	5.2	860	75.6
Between the shoulder and elbow	536	47.1	127	11.2	22	1.9	685	60.2
Waist	481	42.3	295	25.9	59	5.2	835	73.4
Forearm (between the elbow and wrist)	497	43.7	97	8.5	8	.7	602	52.9
Wrist	523	46.0	93	8.2	14	1.2	630	55.4
Fingers	521	45.8	81	7.1	12	1.1	614	54.0
Hip	456	40.1	174	15.3	29	2.5	659	57.9
Upper leg (between the hip and the knee)	436	38.3	150	13.2	29	2.5	615	54.0
Knee	464	40.8	169	14.9	31	2.7	664	58.3
Lower leg (between the knee and the foot)	444	39.0	137	12.0	23	2.0	604	53.1
Feet	496	43.6	141	12.4	22	1.9	659	57.9

Table 7 shows the distribution of the pain level felt in the body regions of the participants due to MSD during COVID-19. The first three body regions where total pain level of the participants at all levels during COVID-19 was the highest were determined to be neck at the rate of 76.9% (n=875), back at the rate of 75.2% (n=856), and waist at the rate of 72.8% (n=828).

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Table 7. Distribution of the pain level felt in the body regions of the participants due to MSD during COVID-19

Frequency	Mild severity		Moderate severity		Extreme severity		Total of the pain strength level	
	n	%	n	%	n	%	n	%
Neck	513	45.1	276	24.3	86	7.6	875	76.9
Shoulders	470	41.3	280	24.6	70	6.2	820	72.1
Back	440	38.7	327	28.7	89	7.8	856	75.2
Between the shoulder and elbow	511	44.9	168	14.8	24	2.1	703	61.8
Waist	427	37.5	320	28.1	81	7.1	828	72.8
Forearm (between the elbow and wrist)	525	46.1	138	12.1	17	1.5	680	59.8
Wrist	525	46.1	130	11.4	23	2.0	678	59.6
Fingers	529	46.5	116	10.2	21	1.8	666	58.5
Hip	441	38.8	202	17.8	48	4.2	691	60.7
Upper leg (between the hip and the knee)	473	41.6	164	14.4	35	3.1	672	59.1
Knee	472	41.5	192	16.9	45	4.0	709	62.3
Lower leg (between the knee and the foot)	462	40.6	164	14.4	39	3.4	665	58.4
Feet	483	42.4	162	14.2	37	3.3	682	59.9

In the study, the comparison of MSD frequency and pain level related to MSD of the participants according to the gender groups before and during COVID-19 were analyzed by the t-test and the results are given in Table 8. As a result of the independent t-test, a statistically significant difference was found between the total scores of the MSD frequency of the participants before and during COVID-19 and the gender variable ($p < 0.001$). A statistically significant difference was found between the total scores of pain level related to MSD of the participants before and during COVID-19 and the gender variable ($p < 0.001$).

When the effect size of MSD before COVID-19 was assessed according to gender, a significant difference having a small effect value (Cohen's $d=0.036$) was found between the groups. When the effect size of MSD during COVID-19 was assessed according to gender, a significant difference having a small effect value (Cohen's $d=0.031$) was found between the groups.

When the effect size of the pain level related to MSD frequency before COVID-19 was assessed according to gender, a significant difference having a moderate effect value (Cohen's $d=0.055$) was found between the groups. A significant difference having a moderate effect value (Cohen's $d=0.061$) was found between the groups when the effect size of the pain level related to MSD frequency during COVID-19 was assessed according to gender.

Table 8. t-test results of the participants according to gender

Gender		N	$\bar{x}$	sd	t	p	Cohen's d
MSD frequency before COVID-19	Female	488	23.8	8.1	6.527	<0.001	0.036
	Male	650	21.0	6.7			
Pain level related to MSD before COVID-19	Female	231	17.5	4.7	5.408	<0.001	0.055
	Male	269	15.3	4.3			
MSD frequency during COVID-19	Female	488	21.4	7.2	6.012	<0.001	0.031
	Male	650	19.0	6.0			
Pain level related to MSD during COVID-19	Female	266	18.3	5.3	6.075	<0.001	0.061
	Male	308	15.8	4.6			

In the study, the comparison of MSD frequency and pain level related to MSD of the participants according to the groups with the status of performing sports or exercise before and after COVID-19 were analysed by the t-test and the results are given in Table 9.

As a result of the independent t-test, no statistically significant difference was found between the total scores of the MSD frequency of the participants before COVID-19 and the

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variable of playing sports or exercise (p >0.05). No statistically significant difference was found between the total scores of pain level related to MSD and the variable of playing sports or exercise of the participants before COVID-19 (p >0.05).

As a result of the independent t-test, a statistically significant difference was found between the total scores of the MSD frequency and the variable of playing sports or exercise of the participants during COVID-19 (p <0.05). A statistically significant difference was found between the total scores of pain level related to MSD and the variable of playing sports or exercise of the participants of the participants during COVID-19 (p <0.05).

A significant difference having a small effect value (Cohen's d=0.008) was found between the groups when the effect size of MSD during COVID-19 was assessed according to the status of playing sports or exercise. When the effect size of the pain level related to MSD frequency during COVID-19 was assessed according to the status of playing sports or exercise, a significant difference having a small effect value (Cohen's d=0.009) was found between the groups.

Table 9. T-test results of the participants according to their status of playing sports or exercise

Status of playing sports or exercise		**N**	$\bar{x}$	**sd**	**t**	**p**	**Cohen's d**
MSD frequency before COVID-19	Not playing sports or exercise	653	22.2	7.6	0.270	0.787	
	Playing sports or exercise	485	22.1	7.2			
Pain level related to MSD before COVID-19	Not playing sports or exercise	269	16.4	4.4	0.618	0.537	
	Playing sports or exercise	231	16.2	4.8			
MSD frequency during COVID-19	Not playing sports or exercise	843	20.4	6.7	3.083	**0.002***	0.008
	Playing sports or exercise	295	19.0	6.2			
Pain level related to MSD during COVID-19	Not playing sports or exercise	429	17.2	5.1	2.243	**0.025***	0.009
	Playing sports or exercise	145	16.1	5.0			

*p <0.05

In the study, the mean total scores of the frequency of pain, aches and discomfort in the body regions of the participants before and during COVID-19 are shown in Table 10. It was determined that there was a statistically significant difference between the total mean scores of the participants before COVID-19 and during COVID-19 (p <0.001). The frequency of feeling pain, aches and discomfort in the body regions before COVID-19 was found to be higher than during COVID-19. Decrease was observed in feeling pain, aches and discomfort in the body regions and also in the MSD frequency during COVID-19. When the effect size of the difference was examined, it was found that the effect was small (Cohen's d=0,38).

Table 10. Paired samples t-test for the difference between the scores of the MSD frequency of the participants before COVID-19 and during COVID-19

	N	$\bar{x}$	**sd**	**t**	**df**	**p**	**Cohen's d**
Before COVID-19	1.138	22.20	7.43	12.881	1.137	<0.001	0.38
During COVID-19	1.138	20.05	6.60				

In the study, Table 11 shows the mean total scores of pain level according to feeling pain, aches and discomfort in the body regions of the participants before and during COVID-19. There was a statistically significant difference between the total mean scores of the participants regarding

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the pain level before COVID-19 and during COVID-19 (p <0.001). Total mean scores of the pain level before COVID-19 were found to be lower than the scores during COVID-19. It was also determined that an increase occurred in the pain level during COVID-19. When the effect size of the difference was examined, it was found that the effect was small (Cohen's d=0,32).

Table 11. Paired samples t-test for the difference between the scores of the pain level related to MSD of the participants before COVID-19 and during COVID-19

	N	$\bar{\chi}$	sd	t	df	p	Cohen's d
Pain level before COVID-19	500	16.30	4.61	-6.638	441	<0.001	0.32
Pain level during COVID-19	574	16.91	5.09				

4. Discussion and Conclusion

The impact of COVID-19 on the musculoskeletal system in the population and whether it will cause any new-onset MSD is currently not known. There are various studies that may suggest that there is a relation between MSD and stress and distress (16,17). A statistically significant differences was observed in terms of time elapsed on sports and exercise before and during quarantine. This can be attributed to the restriction of people from going out for sports, the closure of gyms, and the suspension of such activities by people due to the fear of possible risk of contamination. However, it may verify the facts that sports is actually a habit and an attitude, people are complaining about the lack of time and space, they can actually do their sports at home, and that this is a lifestyle. There was a statistically significant increase in the severity level of lumbar pain, neck pain, and back pain during quarantine when compared to the level before quarantine. Despite it is considered that excessive use of mobile phones and computers causes more stress on posture, it would be possible to say that the large majority do not mind considering postural suggestions, especially when using such devices. This situation is shown together with the statistically significant difference results. The results found in the current assessment supports the results of the study of Rimba et al. conducted in 2019 specifying that improper posture was related to MSD (18). At the same time, statistically significant differences in exposure to electronic devices and musculoskeletal outcomes between genders were found study of Woo, 2016 (19).

Other factors causing MSD are insufficient sleep and reduced physical activity. Sleep withdrawal may cause various musculoskeletal system symptoms that could almost not be distinguished from widespread pain, fatigue, and widespread sensitivity (20). A statistically significant difference was found between the sleeping hours and the severity of MSD as reported by the participants, and in parallel to the current study, it was reported by Topping, 2019 that sleep was related to stress (20). In a study of Almojali et al. conducted in 2017, it was shown that sleep affected MSD and in the study of Tantawy, 2017, sleep affected the level. This also supports the results of the current study (21, 22). Heavy workloads and excessive working hours increase musculoskeletal disorders. In the Covid 19 pandemic, people working from home may be the reason for a reduction in musculoskeletal disorders overall.

Various factors exceeding the geographic boundaries around the world contribute to high stress levels. Almost everyone is exposed to unmerciful news and conflicting messages about COVID-19 in the media and this causes the emergence of concerns about routine medical care, family life, working life, and economic issues. The social support system, that decreases with increasing stress factors, social distance, isolation, and quarantine, exacerbates the picture. Giving positive messages to society by benefitting from social media to reduce development of MSD, recommending several exercises for people to do at home, and sharing postural information mentioning about the required sitting position while sitting in front of computer and television or

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using mobile phone during such severe pandemic periods affecting public health would contribute to reduce severity of MSD.

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