

# A Work-Related Musculoskeletal Disorders among Physiotherapists during COVID-19 in Western Region of Saudi Arabia

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## ABSTRACT

**Background:** COVID-19 pandemic exposed health care providers such as physiotherapists to physical injuries. Work-related musculoskeletal disorders refer to musculoskeletal injuries caused by the occupation.

**Objectives:** The purpose of this study was to evaluate the prevalence of work-related musculoskeletal disorders among physical therapists during COVID-19 in western region of Saudi Arabia.

**Method:** Researchers performed a cross-sectional web-based survey (questionnaire) targeting physiotherapists in western Saudi Arabia during the COVID-19 pandemic. The questionnaire composed of 3 parts: personal, occupational and physical. One hundred and ten physical therapists who replied were working at 18 public and health hospitals of the western region of Saudi Arabia, providing direct care for patients during the COVID-19 pandemic.

**Result:** A total of 110 physiotherapists [(60%) females and (40%) males] participated in this study. The overall prevalence of work-related musculoskeletal disorders as follows: neck, shoulder, wrist/hand region (42.1%), lower back (28.9%), and neck, upper back (15.8%). The most common types of injuries were muscle strain (42.1%), pain and spasm (28.9%), and vertebral disc problem and ligament sprain (21.1%).

**Conclusion:** The prevalence of work-related musculoskeletal disorders among physiotherapists during the COVID-19 pandemic in western region of Saudi Arabia was high in the neck, shoulder, and wrist/hand regions.

**Keywords:** COVID-19 pandemic, work-related musculoskeletal disorders, physiotherapists.

## INTRODUCTION

In December 2019, a serious respiratory illness was recognized in Wuhan, China named COVID-19 disease. In March 2020 it was declared by World Health Organization (WHO) as a pandemic<sup>[1]</sup>. COVID-19 is an influenza-like illness that is transmitted from person to another via respiratory excretions (Droplets from coughing, sneezing, or rhinorrhea)<sup>2</sup>. Persons with COVID-19 can present with a respiratory tract infection that leads to suffering from fever, cough, fatigue, sputum production, and/or dyspnea<sup>3</sup>. According to Saudi ministry of health (MOH), 2021 it is estimated to have resulted in 110,671 cases in Western region of Saudi Arabia on February 15th, 2021<sup>4</sup>.

The COVID-19 pandemic causes reverse changes in physical activities<sup>5,6</sup>. Physical activity is defined as all energy obtained by motions, it also indicates the body's motions generated by skeletal muscles that lead to energy spent above resting level<sup>7</sup>. This definition indicates all kinds of activities: chores, outdoor, and work activities<sup>8</sup>. The musculoskeletal systems are impacted by COVID-19 and reflected as myalgia and muscle weakness<sup>9-12</sup>. A work-related musculoskeletal disorder (WRMD) is a musculoskeletal system disorder that results from work events<sup>13,14</sup>. It is also defined as pain generated from muscles, ligaments, tendons, bursa, bone and joint capsule that persisted for more than three days because of work. WRMD is the commonest among nursing professionals and physiotherapists<sup>13</sup>. Physiotherapists have more susceptibility to work-related musculoskeletal disorders because of effort-intensive tasks such as transferring a patient, soft-tissue mobilization, assisting with exercises, using heavy device and lifting<sup>[13, 15-17]</sup>. Therefore, the purpose of this study was to evaluate the prevalence of work-related musculoskeletal disorders among physiotherapists during COVID-19 in western region of Saudi Arabia.

## METHODOLOGY

**Study Design:** This was a cross sectional survey study. The local committee of bioethics and medicine at the Umm Al Qura university approved and considered this research ethically feasible (Approval study number: FFDD170421.)

**Research Team:** The team consisted of researchers who were from the Physical Therapy Department, College of Applied Medical Sciences at Umm Al-Qura University.

**Participants and Sampling Strategies:** A total number of 110 physical therapists of both genders, aged from 21 to 42 years old participated in this study. They were working in rehabilitation/physical therapy services at different public health care facilities in the cities of western region of Saudi Arabia, including (Makkah-Jeddah-Medina-Yanbu-Taif) during COVID-19 outbreak.

Participants were recruited through an online questionnaire. One hundred and ten (110) physical therapists were working at 18 public and private hospitals and physical therapy centers of the Western region of Saudi Arabia, providing direct care for patients during COVID-19 outbreak. Sixty-eight (68) physical therapists from 8 public and private hospitals and physical therapy centers in the city of Makkah, Nineteen (19) physical therapists from 5 public and private hospitals and physical therapy centers in city of Jeddah, fifteen (15) physical therapists from 3 public and private hospitals in the city of Medina, Five (5) physical therapists from 1 public and private hospitals physical therapy centers in the city of Taif and 3 physical therapists from 1 public and private hospitals and physical therapy centers in the city of Yanbu.

**Data Collection:** All data were collected from January 26, 2021 to March 2, 2021 by an online questionnaire that consisted of 31 questions. The questionnaire composed of 3 parts: personal, occupational and physical. The researchers requested from the participants to confirm consent to be a part of the survey. The personal section asked about general personal information such as age, height and weight. The occupational section asked whether the participant was a specialist or an intern and what was the area of practice and hours of contact with patients and also asked whether the subject had experienced any musculoskeletal injuries due to working during COVID-19 pandemic. If the answer was Yes, the subject then was moved to the physical impact section and he/she was asked about the details of the injury as the type of injury and what body part(s) was (were) affected<sup>18</sup>.

**Statistical analysis:** Descriptive statistics of mean, standard deviation, percentage, and frequencies were utilized in presenting the subjects characteristics and collected data. Chi-square statistics was utilized to examine associations between physical injuries with subject characteristics. Quantitative variables were summarized using mean and standard deviation while categorical variables were summarized using percentage and frequencies. The level of significance for all statistical tests was set at  $p < 0.05$ . All statistical variables were calculated through the statistical

package for social studies (SPSS) version 25 for windows.

**RESULTS**

**Subjects' characteristics:** 110 physiotherapists from western region of Saudi Arabia participated in this study. The mean ± SD age of the study group was 25.34 ± 3.94 years with minimum of 21years and maximum of 42 years. The mean BMI the study group were 24.12 ± 4.28 kg/m<sup>2</sup> with minimum of 16 kg/m<sup>2</sup> and maximum of 34.6 kg/m<sup>2</sup>. 66 (60%) were females and 44 (40%) were males. 62 (56.4%) were specialists, while 48 (43.6%) were interns. Table (1) showed the subject characteristics.

**Prevalence of work-related musculoskeletal disorders among physiotherapists during COVID-19 in Western region of Saudi Arabia:** The prevalence of the prevalence of work-related musculoskeletal disorders among physiotherapist during COVID-19 in Western region of Saudi Arabia was 34.5% with 95% CI of 26.31- 43.81%.

38 (34.5%) physiotherapists sustained physical injury KSA. The most parts affected were neck, shoulder, wrist/hand in 16 (42.1%), lower back (lumbar/sacral) in 11 (28.9%) and neck, upper back (thoracic) in 6 (15.8%).

The most common types of injuries were muscle strain in 16 (42.1%), pain and spasm in 11 (28.9%) and vertebral disc problem and ligament sprain in 8 (21.1%).

The activities associated with the most common injury occurrence were bending/twisting (18.4%), maintaining a position for a prolonged period of time (18.4%), performing manual therapy techniques (18.4%), working when physically active (18.4%) and lifting heavy equipment or patients (13.2%). More than half of injuries occurred in public hospitals (52.6%) while 23.7 % of injuries occurred in private hospitals and physical therapy centers. (Table 2, Figure 1).

Table 1. Participants' characteristics:

	N	%
City		
Jeddah	19	17.3
Makkah	68	61.8
Medina	15	13.6
Taif	5	4.5
Yanbu	3	2.7
Age classes		
21-24 years	63	57.3
25-45 years	47	42.7
BMI		
Under weight (less than 18.5)	12	10.9
Normal weight (18.5–24.9 kg/m <sup>2</sup> )	57	51.8
Overweight (25–29.9 kg/m <sup>2</sup> )	27	24.5
Obese (≥ 30 kg/m <sup>2</sup> )	14	12.7
Sex		
Female	66	60
Male	44	40
Degree		
A specialist	62	56.4
An intern	48	43.6
Area of practice		
Cardiopulmonary Rehabilitation	5	4.5
General Physical Therapy	82	74.5
Neurological Rehabilitation	3	2.7
Orthopedic Rehabilitation	14	12.7
Pediatric Physical Therapy	6	5.5
Working hours		
1-8 hours	99	90.0
More than 8 hours	11	10.0

**Association between physical injury and subject characteristics:** There was no significant association between physical injury and age, BMI, sex, degree and area of practice (p > 0.05); that means physiotherapists of different age, BMI, degree and area of practice sustained injures at similar rate.

There was a significant association between physical injury and hours of work (p < 0.05). Physiotherapists who worked more

than 8 hours/day, had higher frequency of injuries than physiotherapist who worked less than 8 hours/day, (Table 3, Figure 2).

Table 2. The prevalence of work-related musculoskeletal disorders among physiotherapist during COVID-19 in Western region of Saudi Arabia.

	N	%
Have you sustained any musculoskeletal injuries due to your work during COVID-19 pandemic		
Yes	38	34.5
No	72	65.5
What body part(s) was (were) affected?		
Knee, Ankle/Foot	2	5.3
Lower Back (Lumbar/Sacral)	11	28.9
Neck, Shoulder, Wrist/Hand	16	42.1
Neck, Upper Back (Thoracic)	6	15.8
Upper Back (Thoracic), Lower Back (Lumbar/Sacral)	3	7.9
What type of injury was it?		
Muscle Strain	16	42.1
Pain, Spasm	11	28.9
Tendinitis	3	7.9
Vertebral Disc Problem, Ligament Sprain	8	21.1
What activity were you doing when you were injured?		
Applying modalities	3	7.9
Bending/ twisting	7	18.4
Lifting heavy equipment or patients	5	13.2
Maintaining a position for prolonged period of time	7	18.4
Performing manual therapy techniques	7	18.4
Slipping-Tripping-Falling	2	5.3
Working when physically fatigued	7	18.4
In what type of setting did the injury occur?		
Home	3	7.9
Patient's Home (home care)	2	5.3
Pediatric rehabilitation center	4	10.5
Private physical therapy office	9	23.7
Public hospital	20	52.6
Did you officially report the injury?		
Yes	7	18.4
No	31	81.57
Did you see a physician for the injury?		
Yes	10	26.3
No	28	73.7
Did you lose a half day or more of work as a result of injury?		
Yes	16	42.1
No	22	57.9
Since your injury, have your symptoms been exacerbated by clinical practice?		
Yes	26	68.4
No	12	31.6
If yes, what do you do differently?		
Avoid lifting, change working position frequently, use improved body mechanics	5	20.8
Stop working when hurt or when symptoms occur, encourage patient responsibility for carrying out treatment,	2	8.3
Decrease manual techniques, take more rest breaks or pauses during the workday, Use improved body mechanics	17	70.8
Have you limited your patient contact time as a result of injury?		
Yes	9	23.7
No	29	76.3
Have you limited your area of practice to avoid sustaining another injury?		
Yes	12	31.6
No	26	68.4
Are you considering changing jobs because of this injury or because you fear another Injury?		
Yes	15	39.5
No	23	60.5

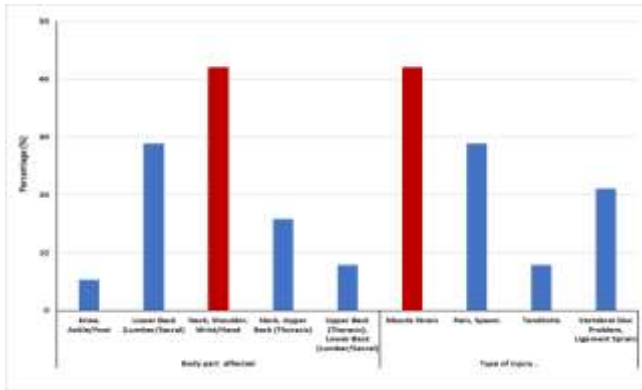


Figure 1. Affected body parts and type of injury in the study group.

Table 3. The frequency distribution of physical injury and association with subject characteristics

	Physical injury		$\chi^2$ value	p-value
	Yes	No		
Age classes			0.82	0.36
21-24 years	24 (38.1%)	39 (61.9%)		
25-25 years	14 (29.8%)	33 (70.2%)		
BMI			3.78	0.28
Under weight (less than 18.5)	3 (25%)	9 (75%)		
Normal weight (18.5-24.9 kg/m <sup>2</sup> )	22 (38.6%)	35 (61.4%)		
Overweight (25-29.9 kg/m <sup>2</sup> )	11 (40.7%)	16 (59.3%)		
Obese ( $\geq 30$ kg/m <sup>2</sup> )	2 (14.3%)	12 (85.7%)		
Sex			1.31	0.25
Females	20 (30.9%)	46 (69.7%)		
Males	18 (40.9%)	26 (59.1%)		
Degree			0.32	0.56
A specialist	20 (32.3%)	42(67.7%)		
An intern	18 (37.5%)	30 (62.5%)		
Area of practice			3.77	0.44
Cardiopulmonary Rehabilitation	0 (0%)	5 (100%)		
General Physical Therapy	28 (34.1%)	54 (65.9%)		
Neurological Rehabilitation	1 (33.3%)	2 (66.7%)		
Orthopedic Rehabilitation	6 (42.9%)	8 (57.1%)		
Pediatric Physical Therapy	3 (50%)	3 (50%)		
Working hours			4.57	0.04
1-8 hours	31 (31.3%)	68 (68.7%)		
More than 8 hours	7 (63.6 %)	4 (36.4%)		

p value, Probability value;  $\chi^2$ , Chi squared value

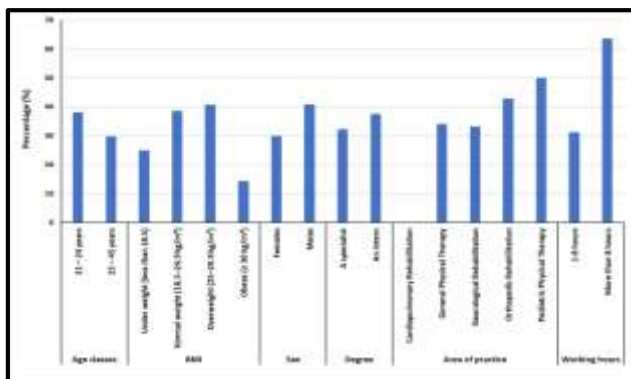


Figure 2. The frequency of physical injury with subject characteristics.

## DISCUSSION

The purpose of this study was to evaluate a prevalence of work-related musculoskeletal disorders among physical therapists during COVID-19 in Western region of Saudi Arabia. The results revealed that there was work-related musculoskeletal disorders

which increased by 34.5% with a significant association with hours of work.

The results of physical impact among physiotherapists during COVID-19 in Western region of Saudi Arabia showed high percentage of musculoskeletal injuries due to work efforts during COVID-19 pandemic which was in line with the problem of suffering from musculoskeletal pain among physiotherapists. These results were supported by the study of Ezzatvar et al.<sup>19</sup> that involved 1006 physical therapists and showed that many work-related factors were associated with the occurrence of musculoskeletal pain. The most common sites were neck pain in 57% of participants and low back pain in 49%.

According to Salik, and Özcan<sup>18</sup> who collected data about causes, responses and prevalence to work-related musculoskeletal disorders reported by physical therapists employed in Izmir, Turkey, it was found that the low back was the body part with the highest frequency of occupational injury (26%). The results of this study contradict with our results, which found that the most affected parts were the neck, shoulder, wrist/hand in (42.1%), then lower back (lumbar/sacral) in (28.9%). Also, the results of another study by West and Gardener<sup>20</sup> on North and Central Queensland contradicted with our results that found the lower back (with prevalence of 35%) was the most common site of injury, then the hand was the second most prevalent site (25%), followed by the neck (24%).

In regard to activities associated with injury, a previous study stated that transfer and lifting activities were associated with 26.6% of injuries causes of back pain and injury in occupational and physical therapist<sup>21</sup>. Another investigation that confirmed the effectiveness of musculoskeletal injury, reported that younger physical therapists had a higher prevalence of musculoskeletal injuries related to occupational condition<sup>18</sup>. In line with this, a study of Australian physical therapy students by Nyland, and Grimmer, 2003 showed that the 20 to 21-year old group had the highest frequency of lower back pain, in contrast to our results that found there was no significant association between physical injury and age<sup>13</sup>.

Our research showed that there was a significant association between physical injury and hours of work, physiotherapists, who worked less than 8 hours/day, had lower frequency of injuries than physiotherapists who worked more than 8 hours/day. This may be due to the lack of physical work and activity because of the Corona pandemic and the lockdown as a previous research by Blake et al.<sup>22</sup> found that about 48% of physical activity was decreased in physiotherapy professionals during the lockdown period when compared to their physical activity before the lockdown period. So we assume that might be one of the causes of injuries, as this finding can be supported by further studies which confirm or deny this theory.

In regard to most common types of injury, the results of the current study showed that a large percentage of injuries were muscle strain in (42.1%). These results showed similar trends to those reported by Holder et al., 1999 who examined the prevalence and causes of occupational musculoskeletal disorders to physical therapists (PTs) and physical therapist assistants (PTAs) during a 2-year period and found that the most common type of injury reported by physical therapists' respondents was a muscle strain (69% and 78%, respectively)<sup>23</sup>.

Also, Holder et al.<sup>23</sup> reported a high percentage of PTAs (68%) and PTs (70%) who reported sustaining work-related musculoskeletal disorders and having their symptoms exacerbated by clinical practice. These results were in line with our study that found that in (68.4%) had symptoms exacerbated by clinical practices, This is because, the percentage of those, who stopped working when hurt or when symptoms occur in (8.3%) or limited the patients contact time in (39.5%), was of a very small, while the results of those who "use improved body mechanics" with the most modification occurred in (70.8%) and "avoid lifting", "change working position frequently", "use improved body mechanics" in (20.8%) was also in line with Holder et al.<sup>23</sup> who

stated that it is normal to see a change in body mechanic as the most mentioned area of improvement and a lot of PTs and PTAs , who were questioned in the study, did not limit the time of their contact with patients. Based on this, we suggest increasing awareness and reducing working hours when any symptom of injury appears.

**Limitations:** Despite the important results of this study, our study had limitation that justify declaration. The sample taken did not include all the physical therapists employed in western region of Saudi Arabia.

## CONCLUSION

The prevalence of work-related musculoskeletal injuries among physiotherapists during the COVID-19 pandemic in western region of Saudi Arabia was high in the neck, shoulder, and wrist/hand regions and most common types of injuries were muscle strain.

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