

Original Article

# Prevalence and Risk Factors of Work-Related Musculoskeletal Disorders among occupational versus physical therapists in Saudi Arabia

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## Abstract:

**BACKGROUND:** Work-Related Musculoskeletal Disorders (WRMSD) is considered one of the worldwide major problems across the health care system and It affects the productivity, quality of work and the employee's daily life activities.

**OBJECTIVE:** This study was designed to estimate the prevalence and associated factors of WRMSD among occupational therapists versus physical therapists in Saudi Arabia.

**MATERIALS and METHODS:** A cross-sectional study in which an online questionnaire was circulated through social media applications to target occupational and physical therapist in Saudi Arabia only 363 subjects completed the questionnaire. The questionnaire consisted of three sections [1] an introduction to explain the study goals; [2] questions about demographic information such as gender, years of experience, the highest educational degree completed, work setting, and specialty; [3] questions about the anatomic distribution of musculoskeletal injuries, potential risk factors, and coping responses to injuries.

**RESULTS:** There was a high prevalence of WRMSD among 363 occupational and physical therapists who completed the survey. The most affected regions were knees (92.6%) followed by lower back area (72.7%), neck (54.5%), upper back area (41%) and shoulder (38%). The most commonly associated job risk factor for WRMSD is working in awkward positions such as bending knees of flexing back (71.3%) followed by dealing with heavy patients (60.6%). In addition, there was no significant difference between occupational and physical therapists regarding prevalence and risk factors of work-related musculoskeletal disorders ( $P < 0.05$ ).

**CONCLUSION:** The WRMSD are common among occupational and physical therapists in Saudi Arabia. The most common risk factors were working in awkward positions such as bending knees of flexing back followed by dealing with heavy patients. There is a need to develop ergonomics training programs and effective interventions to overcome WRMSD and improve working environment among occupational and physical therapist

## Keywords:

Work Related Musculoskeletal Disorders; Pain; Occupational Therapy; Physical Therapy.

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## Introduction

Work-Related Musculoskeletal Disorders (WRMSD) are regarded as one of the biggest issues facing the medical community globally. It has an impact on the worker's everyday activities, productivity, and quality of work. It also raises the financial burden of treating these injuries [1,2]. The WRMSD includes a "wide range of inflammatory and degenerative diseases and disorders that result in pain and functional impairment," according to the World Health Organization. They mainly appear when individuals are exposed to work-related activities and circumstances that, in addition to other variables, greatly encourage the development of WRMSD symptoms or worsen them [3,4].

The majority of WRMSD develops over time, where many variables often interact to create musculoskeletal problems rather than a single cause. Many of the physical causes and risk factors of work-related motion sickness (WRMSD) include handling loads while bending and twisting, dynamic or repetitive movements, static and bad postures, shaking movements, inadequate lighting or cold work environments, and working quickly and for extended periods of time while sitting or standing in the same posture, according to the European Agency for Safety and Health (EU-OSHA) [5].

Occupational injuries are prevalent among healthcare professionals [6]. Occupational therapists [7] and Physical therapists (PTs) in specific are routinely exposed to work-related physically demanding tasks such as handling patients, applying manual techniques and assuming sustained improper positions, which may lead to the development of WRMSD [8]. This subsequently may reduce therapists' quality of life [9] as well as increase the economic cost associated with treating such injuries [10].

For the best of our knowledge, limited studies available about WRMSD and musculoskeletal disorders among occupational therapists, therefore the present study was the first study was the first trail to compare the risk WRMSD among occupational and physical therapists. Therefore, this study was designed to find out the prevalence and possible associated factors of WRMSD among occupational therapists versus physical therapists in Saudi Arabia.

## Materials and Methods

This is a cross-sectional survey study. The study was approved and conducted in accordance to the guidelines of the Ethics committee of the Faculty of Medical Rehabilitation Sciences; Jeddah; Saudi Arabia.

## Recruitment method

Invitations were sent to Saudi occupational and physical therapists with a standard message to motivate therapists to participate in the survey. Further, the online questionnaire was distributed by using a google form link. In addition, therapists from different governorates were contacted directly and were invited to participate.

## Eligibility criteria

Male and female therapists were eligible to participate if they fulfilled the following inclusion criteria: (1) licensed to work in Saudi, and (2) have at least one year of experience. Participants were excluded if they were occupational and physical therapy students and intern or other healthcare professionals, or had an experience of less than one year after graduation.

## Statistical analysis

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0 (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp). Qualitative data were described using number and percent. The Shapiro-Wilk test was used to verify the normality of distribution. Quantitative data were described using range (minimum and maximum), mean, standard deviation, and median. Descriptive statistics was used to express the prevalence of WRMSD, risk factors, and coping responses. Chi-square test was used to examine the association between the highest prevalent WRMSD and demographic variables. Moreover, Mann Whitney test was used for abnormally distributed quantitative variables in order to compare between the two studied groups ( $P < 0.05$ ).

## Results

### Demographic data

More than half of participants are males (50.1%) and 49.9% are females with male to female ratio is 1.01: 1. The mean age of participants ranged between 22 years to 48 years with mean of  $27.61 \pm 5.84$  years. The mean weight, height and BMI in our studied participants are  $69.43 \pm 18.13$  Kg,  $166.25 \pm 9.35$  cm and  $24.69 \pm 5.09$  Kg/m<sup>2</sup> respectively. More than half of them (59.8%) are from Jeddah followed by Riyadh (13.8%) then Makkah (8.3%). Right hand is the dominant hand in most participants (85.4%).

**Table 1: Demographic and baseline characteristics of studied participants.**

Items	Studied participants (n= 363)	
	No	%
<b>Gender</b>		
Male	182	50.1%
Female	181	49.9%
<b>Age (years)</b>		
Mean± SD	27.61± 5.84	
Range	22- 48	
<b>Weight (Kg)</b>		
Mean± SD	69.43± 18.13	
Range	40- 120	
<b>Height (cm)</b>		
Mean± SD	166.25± 9.35	
Range	150- 190	
<b>BMI (Kg/m<sup>2</sup>)</b>		
Mean± SD	24.69± 5.09	
Range	16.02- 39.18	
<b>City</b>		
Jeddah	217	59.8%
Riyadh	50	13.8%
Makkah	30	8.3%
Madinah	22	6.1%
Taif	11	3.0%
Yanbu	11	3.0%
Al Rass	6	1.7%
Tabuk	6	1.7%
Jazan	5	1.4%
Abha	5	1.4%
<b>Dominant Hand</b>		
Right	310	85.4%
Left	48	13.2%
Ambidextrous	5	1.4%
<b>Physical Activity</b>		
Highly Active	49	13.5%
Active (Moderate)	190	52.3%
Light Active (Sedentary)	124	34.2%
<b>The highest obtained education qualification</b>		
Bachelor	295	81.3%
Diploma	5	1.4%
Master	47	12.9%
Doctorate	16	4.4%
<b>Years of Experience</b>		
1-5 years	252	69.4%
6-10 years	43	11.8%
11-15 years	42	11.6%
16 -20 years	15	4.1%
Above 20 years	11	3.0%
<b>Specialty:</b>		
Physical therapist	167	46.0%
Occupational therapist	196	54.0%
<b>Type of work facility</b>		
Public Hospital	159	43.8%
Private facility	147	40.5%
Both	57	15.7%

According to physical activity, 52.3% participants reported moderate activity, 34.2% of them are less active and 13.5% are highly active. Regarding education qualification, the majority (81.3%) had Bachelor's degree, 1.4% of them had diploma degree, 12.9% of them had master degree and 4.4% of them had doctorate degree. Concerning years of experience, 69.4% participants had 1-5 years' experience, 11.8% of them had 6-10 years' experience, 11.6% of them had 11-15 years' experience, 4.1% of them had 16 -20 years' experience and 3% of them had above 20 years' experience. More than half participants (54%) are occupational therapist, while 46% of them are physical therapists (Table 1).

The most commonly associated environmental/job risk factor for work related musculoskeletal disorders is working in awkward positions such as bending knees of flexing back (71.3%) followed by dealing with heavy patients (60.6%) then incorrectly using your body mechanics (53.2%) and taking stationary positions for a long time & having to move patients passively (51.5%). Other factors are illustrated in (Table 2).

**Table 2: Job risk factors contributing to work-related pain among the studied participants.**

	participants (n= 363)	
	No.	%
<b>3. What are the routinely occupational tasks that may cause your pain? (You may choose all that applies)</b>		
Working in awkward positions such as bending knees of flexing back	259	71.3%
Dealing with heavy patients	220	60.6%
Incorrectly using your body mechanics	193	53.2%
Taking stationary positions for a long time	187	51.5%
Having to move patients passively	187	51.5%
Lack of sufficient resting time between cases	176	48.5%
Repeating the same treatment technique	171	47.1%
Repeated bending and twisting	171	47.1%
Examining and treating lots of patients daily	160	44.1%
Continue work despite injury or pain	138	38.0%
Working beyond your physical abilities	121	33.3%
Having to save falling patients	116	32.0%
Working area is very narrow and wouldn't allow me to work without adding physical stress	94	25.9%
Lack of receiving proper training to accommodate your body mechanics with work demands	94	25.9%
Using ergonomically improper tools	61	16.8%

### Affected body parts with work-related pain

The knees are the most commonly affected body area (92.6%) followed by lower back area (72.7%) then neck (54.5%), upper back area (41%), shoulder (38%), hands (33.3%), thumbs (30.3%), hips (9.1%), ankles (7.7%) as well as elbows (4.7%) (Table 3).

**Table 3: Affected body parts with work-related pain among the studied participants.**

	participants (n= 363)	
	No	%
<b>In the last 12 months, which of the following regions do you feel pain as a result of manual work:</b>		
Knees	336	92.6%
Lower back area	264	72.7%
Neck	198	54.5%
Upper back area	149	41.0%
Shoulder	138	38.0%
Hands	121	33.3%
Thumbs	110	30.3%
Hips	33	9.1%
Ankles	28	7.7%
Elbows	17	4.7%

### Strategies and altered work habits to reduce body strain

The most commonly used strategy by the studied participants to reduce body strain & pain was adjusting the patient's or physician's position (33.3%) followed by performing warm-ups or exercise regularly (22.9%), taking regular breaks or at fatigue (21.2%), seeking help of a physiotherapist or requesting help from a colleague for handling the case (7.7%) and using a splint or Kinesio taping or adjusting the plinth height (6.1%) (Table 4&5). Occupational & physical therapists had significant different gender, age, weight, height, city, dominant hand, physical therapy, educational level and years of experience.

Regarding the comparison between occupational & physical therapists regarding affected body parts, there is no significant difference between occupational & physical therapists regarding affected body part (Table 6).

Comparison between occupational & physical therapists regarding symptoms revealed there is no significant difference (Table 7).

**Table 4: Strategies and altered work habits that the studied participants to reduce body strain.**

	participants (n= 363)	
	No	%
<b>How do you handle your symptoms from your occupational tasks?</b>		
Adjust the patient's position or mine	121	33.3%
Perform warm-ups or exercise regularly	83	22.9%
Take regular breaks or at fatigue	77	21.2%
Seek help of a physiotherapist	28	7.7%
Request help from a colleague for handling the case	28	7.7%
Use a splint or Kinesio taping	22	6.1%
Adjust the plinth height	22	6.1%

**Table 6: Comparison between occupational & physical therapists regarding affected body parts.**

	Occupational therapist (n=196)		Physical therapist (n=167)		Test value	P-value
	n	%	n	%		
<b>In the last 12 months, which of the following regions do you feel pain as a result of manual work</b>	Knees	175	89.3%	161	96.4%	X <sup>2</sup> = 6.86 (NS)
	Lower back area	126	64.3%	138	82.6%	
	Neck	98	50.0%	100	59.9%	
	Upper back area	80	40.8%	69	41.3%	
	Shoulder	68	34.7%	70	41.9%	
	Hands	61	31.1%	60	35.9%	
	Thumbs	60	30.6%	50	29.9%	
	Hips	20	10.2%	13	7.8%	
	Ankles	10	5.1%	18	10.8%	
	Elbows	10	5.1%	7	4.2%	

P value >0.05: Not significant (NS), P value <0.05 is statistically significant (S), p<0.01 is highly significant (HS), X<sup>2</sup>:Chi-Square test

**Table (5): Comparison between occupational & physical therapists regarding participants' baseline data.**

		Occupational therapist (n=196)		Physical therapist (n=167)		Test value	P-value
		n	%	n	%		
<b>Gender:</b>	<b>Male</b>	66	33.7%	116	69.5%	$\chi^2= 46.20$	<b>&lt;0.001 (HS)</b>
	<b>Female</b>	130	66.3%	51	30.5%		
<b>Age (years), median (IQR)</b>		25 (23- 27)		30 (24- 35)		$Z_{MWU}= 5.89$	<b>&lt;0.001 (HS)</b>
<b>Weight (Kg) , median (IQR)</b>		62 (50- 83.5)		72 (58- 85)		$Z_{MWU}= 3.94$	<b>&lt;0.001 (HS)</b>
<b>Height (cm) , median (IQR)</b>		162 (157- 171)		170 (163- 175)		$Z_{MWU}= 5.67$	<b>&lt;0.001 (HS)</b>
<b>BMI (Kg/m2) , median (IQR)</b>		22.22 (20.28- 28.14)		23.78 (22.48- 27.68)		$Z_{MWU}= 1.95$	0.052 (NS)
<b>City</b>	<b>Jeddah</b>	111	84.2%	116	87.5%	$\chi^2= 82.95$	<b>&lt;0.001 (HS)</b>
	<b>Riyadh</b>	44	22.4%	6	3.6%		
	<b>Makkah</b>	12	6.1%	18	10.8%		
	<b>Madinah</b>	12	6.1%	10	6.0%		
	<b>Taif</b>	0	0.0%	11	6.6%		
	<b>Yanbu</b>	0	0.0%	11	6.6%		
	<b>Al Rass</b>	6	3.1%	0	0.0%		
	<b>Tabuk</b>	6	3.1%	0	0.0%		
	<b>Abha</b>	5	2.6%	0	0.0%		
	<b>Jazan</b>	23	10.4%	2	6.3%		
	<b>Right</b>	164	83.7%	146	87.4%		
<b>Dominant Hand</b>	<b>Left</b>	32	16.3%	16	9.6%		
	<b>Ambidextrous</b>	0	0.0%	5	3.0%		
<b>Physical Activity</b>	<b>Highly Active</b>	16	8.2%	33	19.8%	$\chi^2= 31.67$	<b>&lt;0.001 (HS)</b>
	<b>Active (Moderate)</b>	89	45.4%	101	60.5%		
	<b>Light Active (Sedentary)</b>	91	46.4%	33	19.8%		
<b>The highest obtained education qualification</b>	<b>Bachelor</b>	179	91.3%	116	69.5%	$\chi^2= 44.74$	<b>&lt;0.001 (HS)</b>
	<b>Diploma</b>	0	0.0%	5	3.0%		
	<b>Master</b>	6	3.1%	41	24.6%		
	<b>Doctorate</b>	11	5.6%	5	3.0%		
<b>Years of Experience</b>	<b>1-5 years</b>	169	86.2%	83	49.7%	$\chi^2= 81.6$	<b>&lt;0.001 (HS)</b>
	<b>6-10 years</b>	11	5.6%	32	19.2%		
	<b>11-15 years</b>	0	0.0%	42	25.1%		
	<b>16 -20 years</b>	10	5.1%	5	3.0%		
	<b>Above 20 years</b>	6	3.1%	5	3.0%		
<b>Type of work facility</b>	<b>Public Hospital</b>	87	44.4%	72	43.1%	$\chi^2= 2.083$	0.353 (NS)
	<b>Private facility</b>	74	37.8%	73	43.7%		
	<b>Both</b>	35	17.9%	22	13.2%		

**Table 7: Comparison between occupational & physical therapists regarding symptoms.**

	Occupational therapist (n=196)		Physical therapist (n=167)		Test value	P-value
	n	%	n	%		
Pain	153	78.1%	139	83.2%		
Weakness	84	42.9%	43	25.7%	$\chi^2=7.42$	0.060 (NS)
Stiffness	38	19.4%	34	20.4%		
Heaviness	20	10.2%	13	7.8%		

P value >0.05: Not significant (NS), P value <0.05 is statistically significant (S), p<0.01 is highly significant (HS),  $\chi^2$ : Chi-Square test

## Discussion

The findings of the present study proved that the prevalence of the WRMSD among Saudi occupational and physical therapists is high, the most common anatomical sites are the knees followed by lower back area then neck, upper back area, shoulder, hands. The most common occupational tasks that may lead to WRMSD were working in awkward positions such as bending knees of flexing back followed by dealing with heavy patients then incorrectly using body mechanics. Therapists mostly handle their symptoms by modifying the working position of the therapist or the patient, performing warm up or exercise regularly, taking regular breaks or at fatigue or asking for help from other therapists.

The prevalence rates of WRMSD are usually high among most of physiotherapists around the world. Similarly, occupational therapists are at risk of work-related injuries because of the demanding nature of their work, therefore occupational and physical therapists face similar and significant risks of injury and WRMSD [7]. However, information about work-related injuries and musculoskeletal disorders among occupational therapists is limited, this study designed to measure the prevalence and risk factors of WRMSD among occupational versus physical therapists in Saudi Arabia as well as the most adapted coping strategies.

Although limited previous studies analyzed WRMSD among occupational therapist, there were many previous studies have been conducted on physical therapists regarding WRMSD. The findings of this present study agreed with many previous studies which showed that pain is the most common symptom in five body areas included lower back, knees, shoulder, and neck [11-15].

We found that the five most affected body areas with WRMSD were knee, lower back, neck, upper back and shoulders, this order was different in many previous studies that reported that WRMSDs was higher in lower back,

shoulders and neck than upper back knee [13, 14,16 and 17]. Also, a study was conducted in Bangladesh, showed that the most painful areas were the lower back, upper back, and neck [18]. Moreover, a study was conducted on occupational therapists in Northern Europe reported that the most area they complained was the neck. Similarly, several studies reported that occupational and physical therapists felt numbness and pain in the shoulder and lower back areas. The reason for this contradict with our findings that reported that the most commonly affected areas with WRMSD were knee, lower back, neck, upper back and shoulders may be due to the differences in the commonly used techniques of manual therapy used by the occupational and physical therapists in Saudi Arabia and northern Europe [19-23].

Moreover, a study was conducted among Greek physiotherapist, workers in the private sector are most affected by WRMSD [5]. While in our research it appeared that the percentages are similar to each other in both the government and private sectors. While, according to our results, repeated bending and twisting and working in awkward positions were the most common occupational tasks that may cause pain, these results agreed with many previous studies [1,5,14,17]. On the other hand, Alnaser and Aljadi,2019 reported that manual therapy techniques and transferring a patient were the top two risk factors [11]. However, adjust of the position of the patient or the position of the therapist was the most common strategy used to handle the symptoms according to the results of the present study which agreed with Kakaraparthi et al, 2021 [13].

The nature of using an online-based survey is the major limitation of this study. It was impossible to control who could access this study. However, before accessing the survey, a brief statement was written indicating that this survey was developed only for licensed occupational and physical therapists who are working in Saudi Arabia and are actively treating patients participated in this study. In addition, the small sample size may limit generalization of results. Moreover, this study used self-reported data, so there was possibility that the participants tended to over or underestimate their response. However, further trail is required to assess the association between work related musculoskeletal disorder and the psychosocial factors of the occupational and physical therapists.

## Conclusion

The results of this study reveal that the prevalence of WRMSD among occupational and physical therapists in Saudi Arabia was high. The most affected body region was

the knee, followed by low back then neck, upper back area and shoulder. The most common risk factors were working in awkward positions such as bending knees or flexing back.

The most common coping strategies were adjusting patient's or therapist's body position and giving up the technique for a less painful one. These findings call for the need to develop ergonomics training programs and effective interventions and modifications to overcome WRMSD and improve working environment among therapists in Saudi Arabia.

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### Ethical approval statement

This study was approved by the Ethical Committee for Scientific Research, Faculty of Applied Medical Sciences, King Abdulaziz University.

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### Conflicts of interest

The authors declare that they have no conflicts of interest.

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# انتشار وعوامل خطر الاضطرابات العضلية الهيكلية المرتبطة بالعمل بين المعالجين المهنيين مقابل المعالجين الفيزيائيين في المملكة العربية السعودية

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## المستخلص:

**الخلفية:** تعتبر الاضطرابات العضلية الهيكلية المرتبطة بالعمل إحدى المشاكل الرئيسية في جميع أنحاء العالم عبر نظام الرعاية الصحية وتؤثر على الإنتاجية وجودة العمل وأنشطة الحياة اليومية للموظف. الهدف: تم تصميم هذه الدراسة لتقدير مدى انتشار تعتبر الاضطرابات العضلية الهيكلية المرتبطة بالعمل والعوامل المرتبطة به بين المعالجين المهنيين مقابل المعالجين الفيزيائيين في المملكة العربية السعودية. **المواد والأساليب:** دراسة مقطعية تم فيها تداول استبيان عبر الإنترنت عبر تطبيقات وسائل التواصل الاجتماعي لاستهداف أخصائي العلاج الوظيفي والفيزيائي في المملكة العربية السعودية أكمل الاستبيان 363 شخصا فقط. تألف الاستبيان من ثلاثة أقسام (1) مقدمة لشرح أهداف الدراسة. (2) أسئلة حول المعلومات الديموغرافية مثل الجنس، وسنوات الخبرة، وأعلى درجة تعليمية مكتملة، وبيئة العمل، والتخصص؛ (3) أسئلة حول التوزيع التشريحي للإصابات العضلية الهيكلية، وعوامل الخطر المحتملة، واستجابات التأقلم مع الإصابات. **النتائج:** كان هناك انتشار كبير للاضطرابات العضلية الهيكلية المرتبطة بالعمل بين 363 من المعالجين المهنيين والفيزيائيين الذين أكملوا المسح. وكانت المناطق الأكثر تضررا هي الركبتين (92.6%) تليها منطقة أسفل الظهر (72.7%) والرقبة (54.5%) ومنطقة الظهر العليا (41%) والكتف (38%). عامل الخطر الوظيفي الأكثر شيوعا هو العمل في أوضاع محرجة مثل ثني الركبتين من ثني الظهر (71.3%) يليه التعامل مع المرضى الثقيلين (60.6%). بالإضافة إلى ذلك، لم يكن هناك فرق كبير بين المعالجين المهنيين والفيزيائيين فيما يتعلق بانتشار وعوامل الخطر للاضطرابات العضلية الهيكلية المرتبطة بالعمل.

**الخلاصة:** تعتبر الاضطرابات العضلية الهيكلية المرتبطة بالعمل شائعة بين المعالجين المهنيين والفيزيائيين في المملكة العربية السعودية. كانت عوامل الخطر الأكثر شيوعا هي العمل في أوضاع محرجة مثل ثني الركبتين من ثني الظهر متبوعا بالتعامل مع المرضى البدناء. هناك حاجة لتطوير برامج التدريب على بيئة العمل وتحسين بيئة العمل بين المعالجين المهنيين والفيزيائيين. **الكلمات الدالة:** الاضطرابات العضلية الهيكلية المرتبطة بالعمل؛ الألم؛ العلاج الوظيفي؛ العلاج الطبيعي.

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