Prevalence and Risk Factors of Musculoskeletal Pain among Adults in Saudi Arabia: A Cross-Sectional Study

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Abstract

Musculoskeletal (MSK) pain includes all the components of the MSK system and is produced by several causes such as injuries, chronic conditions such as arthritis, muscle overuse, and bodily neglect. This study aimed to evaluate the prevalence of musculoskeletal pain in the adult population of Saudi Arabia as a whole, in addition to determining the risk factors that lead to the development of this pain. This was a cross-sectional study in which data was collected to reflect information on the prevalence of outcomes. In our study, a survey was carried out online. To calculate the disability index, the survey collected information on demographic and clinical data, lifestyles, and questions from the standardized Nordic musculoskeletal pain questionnaire. Next, all data were analyzed with the use of SPSS. The study included 317 participants, 58.7% of them were females and 41.3% were males. The age group of 20-30 years old made up 58.4% of participants. Neck pain during the last 12 months was reported by 65.6% of participants. Upper back pain was reported by 47.3% of participants while 68.1% had pain in the lower back. Moreover, 26.8% of participants had pain in hips/thighs, 40.7% reported knee pain, and 25.6% reported pain in ankles/ feet. The prevalence of musculoskeletal pain was relatively high compared to previous study results. Lower back pain was the most prevalent musculoskeletal pain among study participants followed by neck pain and upper back pain.

Keywords: Musculoskeletal pain, Prevalence, Risk factors, Saudi Arabia

INTRODUCTION

Acute or chronic pain that affects the bones, muscles, ligaments, tendons, and even nerves is known to be musculoskeletal pain or MSP [1]. Both sexes, people of all ages, and members of all societies experience MSP, which is widespread and puts a significant cost on the social and healthcare system [2]. It lowers the mood and worsens general health status while causing irritability, anxiety, despair, and incapacity [3]. Along with stiffness, redness, swelling, and weakness, pain is typically a common symptom of MSD [4]. Osteoarthritis (OA), autoimmune inflammatory arthritis, including rheumatoid arthritis (RA), and crystal-induced inflammatory arthritis, including gout, and fibromyalgia are the most typical causes of MSP [5]. Moreover, MSP may be exacerbated by certain risk factors for instance long-standing, repetitive motions, heavy lifting, and type of work [6]. MSP is becoming more common in the workplace and academic setting and is connected to both persons' professional activity and dietary choices. People who work in public health facilities and are exposed to environmental, psychological, and physical variables have a prevalence of MSP that ranges from 65.7 to 92.1 percent at work [7]. Healthcare personnel, such as dentists, nurses, and physical therapists, frequently report having musculoskeletal pain, with neck and lower back pain being the most prevalent

complaints [8]. They are exposed to physical and psychological elements that might cause MSP, both during their academic experiences and when they are placed in the workplace. Worldwide (67.1%) literature describes high prevalence rates of MSP among health students [7]. In a 2019 study conducted in Jeddah, they found that among 234 dentists the higher prevalence of musculoskeletal pain was in females, and the most common three locations were in the lower back (85%) and neck (84.6%) followed by shoulders (81.2%) [9]. According to another multi-center cross-sectional study in Saudi Arabia among radiologists, it was

concluded that radiologists frequently experience musculoskeletal issues, the most common ones being neck and lower back pain. A higher incidence of disabling musculoskeletal symptoms was found in female radiologists between the ages of 30 and 39 who reviewed CT or ultrasound scans [10]. This study's objectives were to determine the prevalence of musculoskeletal pain among Saudi Arabia's adult population as a whole and to pinpoint the risk factors that contribute to the development of this pain. The main objective of this study is to determine the prevalence of musculoskeletal pain and the associated risk factors among adults living in Saudi Arabia.

MATERIALS AND METHODS
Study Design
This was an observational cross-sectional study carried out In Saudi Arabia between 2022-2023. The study's population consisted of Saudi adults over the age of 18, participants were recruited during September 2022 from people receiving the questionnaire.

Inclusion and Exclusion Criteria
Adult males and females who are older than 18, from all social classes were included. The Saudi adults younger than 18, patients with recent fractures or injuries, and those with rheumatological diseases were excluded.

Sample Size
The population size consisted of all the adults of Saudi Arabia (Worldometer, 2021). Using the statistical sample size formula=

$$\frac{(z)2 \times p\,(1-p)\,/\,e2}{1+(z2 \times p(1-p)\,)/e2N} \tag{1}$$

N = population size, e = Margin of error (percentage in decimal form), z = z-score (SurveyMonkey, 2022), and p = sample proportion.

Method for Data Collection and Instrument (Data Collection Technique and Tools)
The data was collected by distributing a 30-question online survey in Arabic and English to the target group using Google Forms. It comprises questions about socio-demographic data such as age, gender, job, region, height, and weight. In addition to questions from the Nordic Musculoskeletal Questionnaire, which divides the body into 9 anatomical areas to allow comparison of musculoskeletal symptoms between different regions and a series of self-administered questions concerning potential risk factors.

Analysis and Entry Method
The Statistical Package for Social Sciences (IBM®SPSS® Statistics) Version 24 was used to conduct statistical analysis after inserting the data into Microsoft Excel spreadsheets.

RESULTS AND DISCUSSION
The study included 317 participants, 58.7% of them were females and 41.3% were males. Of the participants, 58.4% were aged between 20- 30 years old, and 12.3% were 31- 40 years old. As for BMI, 41.6% of participants were normal weight, 31.2% overweight, and 18.9% were obese. As for jobs, 36.6% of participants were students, 20.8% worked in the private sector, 18.6% worked in the governmental sector, and 13.6% were unemployed as in **(Table 1)**.

Table 1. Sociodemographic characteristics of participants (n=317)

Parameter		No.	%
Age	less than 20	16	5.0
	20 - 30	185	58.4
	31 - 40	39	12.3
	41 - 50	30	9.5
	51 - 60	43	13.6
	more than 60	4	1.3
Gender	Male	131	41.3
	Female	186	58.7
BMI	Underweight	26	8.2
	Normal weight	132	41.6
	Overweight	99	31.2
	Obese	60	18.9
Region	South	10	3.2
	Eastern	40	12.6
	North	18	5.7
	Western	194	61.2
	Central	55	17.4
Occupation	Student	116	36.6
	Unemployed	43	13.6
	Governmental sector	59	18.6
	Private sector	66	20.8
	Retired	33	10.4

As illustrated in **(Table 2)**, 65.6% of participants reported neck pain during the last 12 months while 21.1% reported impairment in normal activity due to neck pain in that time. Additionally, 35.6% of participants had pain in two shoulders, 12.9% in the left shoulder, and 15.5% in the right shoulder with 26.8% reporting impairment in normal activity due to shoulder pain during the last 12 months. In addition, 6.3% of participants had pain in two elbows, 7.3% had pain in the right elbow, and 2.8% had pain in the left elbow consequently, 9.1% of participants had impairment in normal activity due to elbow pain during the last 12 months. Besides, 11.7% of participants had pain in the right wrist, 6.3% in the left wrist, and 6.9% in both wrists with 12% reporting impairment in wrists due to wrist pain during the last 12 months.

Table 2. Prevalence of MSP in different body sites among study participants and its effect on their normal activities (n=317)

| Parameter		No.	%
MSP in the neck during the last 12 month	Yes	208	65.6
	No	109	34.4
MSP in the shoulder during the last 12 month	In left shoulder	41	12.9
	In right shoulder	49	15.5
	Both shoulders	113	35.6
	No	114	36.0
MSP in elbows during the last 12 month	Yes in the left elbow	9	2.8
	Yes in the right elbow	23	7.3
	Yes in both elbows	20	6.3
	No	265	83.6
MSP in wrists during the last 12 month	Yes in the left wrist	20	6.3
	Yes in the right wrist	37	11.7
	Yes in both wrists	22	6.9
	No	238	75.1
MSP in the upper back during the last 12 month	Yes	150	47.3
	No	167	52.7
MSP in lower back during the last 12 month	Yes	216	68.1
	No	101	31.9
MSP in hips/thighs during the last 12 month	Yes	85	26.8
	No	232	73.2
MSP in knees during the last 12 month	Yes	129	40.7
	No	188	59.3
MSP in ankles/feet during the last 12 month	Yes	81	25.6
	No	236	74.4

Moreover, 47.3% of participants had pain in the upper back and 22.7% reported impairment in normal activity due to upper back pain during the last 12 months. Furthermore, 68.1% had pain in the lower back and 33.1% reported impairment in normal activity due to lower back pain during the last 12 months. 26.8% of participants had pain in the hips/thighs. 14.8% reported impairment in normal activity due to hip/thigh pain during the last 12 months. Furthermore, 40.7% reported knee pain and 22.4% reported impairment in normal activity because of it during the last 12 months. 25.6% reported pain in ankles/ feet with 13.9% reporting impairment in normal activity because of it during the last 12 months as shown in **(Table 3)**.

Table 3. Prevalence of MSP in different body sites among study participants and its effect on their normal activities (n=317)

| Parameter		No.	%
Impairment in normal activity due to neck pain during the last 12 months	Yes	67	21.1
	No	250	78.9
	Yes	85	26.8

Impairment in normal activity due to shoulder pain during the last 12 months	No	232	73.2
Impairment in normal activity due to elbow pain during the last 12 months	Yes	29	9.1
	No	288	90.9
Impairment in wrists due to wrist pain during the last 12 months	Yes	38	12
	No	279	88
Impairment in normal activity due to upper back pain during the last 12 months	Yes	72	22.7
	No	245	77.3
Impairment in normal activity due to lower back pain during the last 12 months	Yes	105	33.1
	No	212	66.9
Impairment in normal activity due to hip/thigh pain during the last 12 months	Yes	47	14.8
	No	270	85.2
Impairment in normal activity due to knee pain during the last 12 months	Yes	71	22.4
	No	246	77.6
Impairment in normal activity due to ankles/feet pain during the last 12 months	Yes	44	13.9
	No	273	86.1

As shown in **(Figure 1)**, The Family history of joint diseases among participants was 29%.
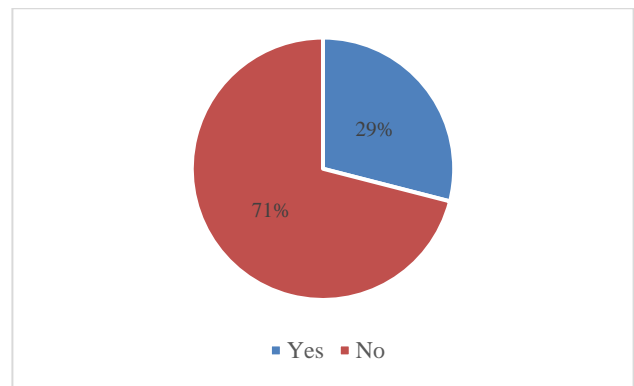
Figure 1. Family history of joint diseases among participants

As illustrated in **(Figure 2)**, The hours of work per day among participants; were 41% 6-8 hours and only 10% more than 12 hours of work per day.
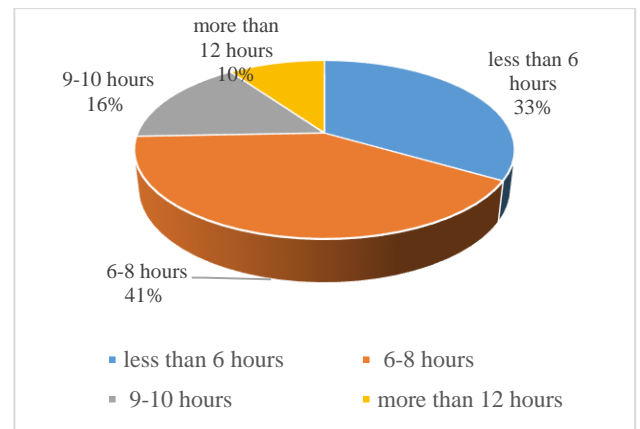
Figure 2. Hours of work per day among participants

Regarding risk factors of musculoskeletal pain in **(Table 4)**, 29% of participants reported a family history of joint diseases. 33.4% reported previous injuries to bones, ligaments, or muscles. 65.9% of participants are exposed to muscle overuse. Of the participants, 41% work for 6- 8 hours per day, 33.4% work for less than 6 hours, and 15.8% work for 9- 10 hours per day.

Table 4. Risk factors for MSP among study participants (n=317)

Parameter		No.	%
Family history of joint diseases	Yes	92	29
	No	225	71
Previous injuries to bones, ligaments, or muscles	Yes	106	33.4
	No	211	66.6
Exposed to muscle overuse	Yes	209	65.9
	No	108	34.1
Hours of work per day	less than 6 hours	106	33.4
	6-8 hours	130	41.0
	9-10 hours	50	15.8
	more than 12 hours	31	9.8
Nature of work	Student	13	4.1
	teaching	57	18.0
	housewife	10	3.2
	healthcare	46	14.5
	office	86	27.1
	field	27	8.5
	other	78	24.6
Exercise regularly	Yes	59	18.6
	No	140	44.2
	Sometimes	118	37.2

The burden imposed by musculoskeletal problems on the person, the country, the healthcare system, and society at large is substantial and frequently undervalued. Professional discomforts may result from consistently using poor body mechanics at work, such as hunching over, arching your back, standing for extended periods, using a computer all day, and adopting poor posture while teaching. This study's primary goal is to ascertain the prevalence of musculoskeletal pain and the risk factors that are connected to it in Saudi Arabian individuals.

According to our study results, lower back pain was the most prevalent musculoskeletal pain among study participants followed by neck pain and upper back pain. According to a recent Saudi research, the neck, shoulder, upper back, and lower back were the body regions most commonly afflicted by WMSDs, with an overall frequency of 40.6% [11]. Although it is lower than the rates reported in Iran [12, 13], the USA [14], and Peninsular Malaysia [15], the overall frequency is consistent with findings from research conducted in Beijing. Lower back complaints (65.7%), ankle and foot issues (41.5%), and shoulder pains (29%) were the most frequently reported musculoskeletal symptoms [16]. The rate of MSDs recorded among instructors was 62.5%, according to a study done in Abha in 2020 [17] However, studies conducted in China and Turkey discovered comparable figures of 66.7% and 60.3% [18]. This was higher than previous similar studies conducted in China (31.8%) and Turkey (28.0%) [19], but it was almost as high as Saudi Arabian research conducted among female secondary school teachers in Dammam (79.17%) [20], Turkey (77%) [21], and China (77%) [22]. This was greater than those found in Mexico (76%) [23], Japan (70%) [24], Canada (66%) [25], and the United States (60%) [26], but equivalent to those reported from Nigeria (85%) [27]. Contrarily, the rate was lower than that of Turkey (90%) and Brazil (93%) [28, 29]. This was in line with a systematic review on mental health disorders (MSDs) in educators, which included research from different nations and areas and discovered that the prevalence of MSDs varied from 39% to 95% [18]. The results were also incongruent with studies of dentists [30], physiotherapists [31], and nurses [32], who reported a higher frequency of MSDs than those seen in our study among schoolteachers. Female prevalence was 75.5%, which is considerably lower than the percentage of female instructors in Dammam (79.17%) [20]. The subjectivity of the terms used, organizational differences in workplace settings, and cultural differences in how pain and disorders are perceived and reported are all put forth as explanations for the discrepancy in MSD prevalence rates reported in the literature. The usual questions should be scrutinized to determine whether any symptoms (pain, numbness, tingling, aching, stiffness, and burning) rather than just one symptom (pain) were scored since this contributes to a larger frequency. The results of these studies should be carefully interpreted.

In this study, LBP is the most common pain experienced by participants as 68.1% had pain in the lower back. 33.1% reported impairment in normal activity due to lower back pain during the last 12 months. Between 19 and 80% of people experience LBP throughout the year, according to prior studies. Greece (75%) [33], Nigeria (73.5%) [34], Germany (73%) [35], Turkey (69%) [29], Sweden (64%) [36], and Italy (60%) [37] had the greatest rates, which were in line with our findings. While LBP remained the most prevalent WMSD in previous research, the frequency did not match our findings. The prevalence of LBP was reported to be 59% in Australia [38], 56% in China [39], 48% in Canada [40], 40% in England [41], 41.1% in France [42], 40.6% in Hong Kong, and 29% in the United States [43]. These findings concur with other Saudi Arabian research from Abha (59.2%) [17], Dammam (63.8%], and a nationwide poll (66.9%) [44]. Additionally, it agreed with research that was published in other nations. This study found a much greater prevalence of lower back pain than studies done in China (45.6%) [22], Brazil (41.1%) [45], or Turkey (38%) [46].

This study shows that 25.6% reported pain in ankles/ feet. 13.9% reported impairment in normal activity due to ankle/foot pain during the last 12 months. In a previous study, 41.5% of nurses had ankle and foot WMSDs at any one time [16]. This number was larger than that of other developing nations, according to research, which reported a frequency of 10.2 to 16.6% [23, 27].

Also, 40.7% reported knee pain. 22.4% reported impairment in normal activity due to knee pain during the last 12 months. According to another study, the third most common MSDs were in the knees (34.5%), which were within a wide range of rates seen among nursing staff in Estonia (32.6%) and Uganda (37%) [46, 47]. According to another survey, knee pain was the third most common condition, with a frequency of 41.04% [30]. Additionally, a strong correlation between knee discomfort and gender and daily sleep duration was found. Nearly identical investigations conducted among schoolteachers in Abha [17] and Dammam [20] with prevalences of knee disorders of 43.3% and 40.0%, respectively, came to the same conclusions.

According to our study results, 35.6% of participants had pain in two shoulders, 12.9% in the left shoulder, and 15.5% in the right shoulder. 26.8% had impairment in normal activity due to shoulder pain during the last 12 months. With a period-prevalence of 29%, shoulder pain was the third most often reported WMSD, according to earlier research [16]. This was lower than the figures from Sweden (60%) [48], Australia (60%) [36], South Africa (41%) [49], and the United States (35.1%) [26]. The second most prevalent issue among instructors, according to a different survey, was shoulder pain (53.39%) [30]. This prevalence was in line with the findings of other Saudi Arabian studies carried out in Abha (47.9%) [17] and Dammam (45.4%) [21], however, it contrasted with a nationwide survey performed in Saudi Arabia that revealed a prevalence of shoulder pain of merely 20.6% [44].

As for risk factors, this study showed that 29% of participants reported a family history of joint diseases. 33.4% reported previous injuries to bones, ligaments, or muscles. 65.9% of participants are exposed to muscle overuse. 41% of participants work for 6- 8 hours per day, 33.4% work less than 6 hours, and 15.8% work for 9- 10 hours per day. This was consistent with research that found a substantial correlation between the development of these symptoms and lengthy work hours as well as underweight status [16]. A previous study reported that participants' development of WMSDs was influenced by two risk variables, such as being underweight and putting in more than ten hours of labor every day. A recent study has focused on the relationship between work stress and WMSDs. Both high-quality and low-quality studies found that a significant risk factor for upper extremity discomfort was job-related stress, according to a systematic analysis carried out in the Netherlands [50].

Conclusion

The prevalence of musculoskeletal pain was relatively high compared to previous studies results. Lower back pain was the most prevalent musculoskeletal pain among study participants followed by neck pain and upper back pain. High-risk groups should prioritize maintaining a comfortable body position while performing their jobs, engaging in physical activity, receiving ergonomic training, and taking breaks throughout the workday as preventive measures to avoid MSDs. When patients have musculoskeletal issues, healthcare professionals are required to recommend that they see physiotherapists.

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