

Prevalence of Musculoskeletal Disorder and its Relation to Stress Among Medical Student at Taif University, Saudi Arabia

Abstract

Background: The purpose of this research is to determine the prevalence of musculoskeletal disorders and their association with psychological stress among medical students at Taif University, Saudi Arabia. **Methods:** A total of 640 medical students were selected by multistage cluster sampling. The data were collected by trained students using a standardized Nordic questionnaire and 10-k questionnaire. Statistical analysis was carried out using the statistical package (SPSS.21). Standardized Nordic questionnaire and 10-k questionnaire besides questionnaire assessing sociodemographic characteristics (age, gender, study year, weight, height, smoking, marital status, chronic disease, and educational degree) were used. **Results:** Among 640 medical students, 45.9% males and 54.1% females reported musculoskeletal pain, it was more prevalent among fourth - and sixth year students, in the last 7 days, neck pain was the highest site of complaint (33.4%) followed by low back pain (15.1%) and shoulder pain (12.8%). Prevention of work was highest due to neck pain (27.7%) and low back (25.1%) followed by knees (19.1%), the stress rate was highest in the second year (67.8%) and third year (67.3%) students followed by the sixth year (65.8%) students. **Conclusions:** Musculoskeletal disorders are a common health problem reported by more than half of medical students, with a significant association with females and preclinical students. Stress is a common psychological problem that affects two-thirds of medical students. However, we found a nonsignificant association between the onset of musculoskeletal disorders and the level of stress among medical students.

Keywords: Musculoskeletal disorders, Saudi Arabia, stress, students, universities

Introduction

Musculoskeletal disorders (MSD) is any skeletal or muscular pain occurring as a result of soft tissue injuries including muscles, bones, nerves, tendons, joints, and cartilage.^[1] It is estimated that MSD accounts for more than 50 million clinic visits in the United States annually in various health care facilities.^[2] Internationally, MSD is becoming a common problem, especially in the last decades that harm work productivity.^[3] In the UK, five and half million working days are missed annually due to MSDs related to physical stress.^[4]

The prevalence of musculoskeletal pain (MSP) is found to be high among offshore oil and gas installation employees in Iran, the highest is knee (47%), neck (38%), and low back (37%) the location of the pain noted to be variable according to the type of the duties, staff

working through the day had more pain in the upper part of the body; however, staff on rotation scheduled had more pain in the lower part of the body^[5]

Musculoskeletal pain is relatively a common finding, especially among medical students compared with the rest of the population as seen in Malaysian medical school (65%), which reported muscular pain at least one site in the last year and (45.7%) encountered MSP in the past week.^[6] MSP could be aggravated by certain risk factors such as work-place environments, heavy lifting, prolonged standing, repetitive movements, and heavy pushing.^[7] Medical students who experience life stressors related to their education can impose the risk of physical MSD and mental disorder due to poor social support, poor coping capability with pain and functional restrictions, and leisure time-related stressors.^[8] Management of MSDs is varying depending on the severity of the disease, for patients with acute

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low back pain the recommendations are to continue their normal daily activities, avoid long hours of resting in bed, and the chronic use of nonsteroidal anti-inflammatory drugs (NSAIDs), in case of chronic low back pain the recommendations are to encourage to start with exercise and psychosocial therapy.^[9] Significant consequences physically, mentally, and financially follow MSDs as it impairs work productivity and increases the compensation cost on the companies, rises medical seeking and sick leaves, and reduces the quality of life.^[7,10] Stress is a process by which we perceive and cope with environmental threats and challenges. Personal and environmental occasions that cause stress are referred to as stressors.^[11-14] The prevalence of physical health and mental health problems are more in medical students than nonmedical students because of academic stress.^[14] The studies among medical students in U. S. and Canada suggest a high incidence of depression and anxiety among medical students, with a significant increase of psychological distress consistently increase compared to the general population.^[15,16] Sources of student stress can be triggered by educational, social, or personal issues as they need to learn how to manage the emotionally difficult experiences.^[13,14] And overcoming the regular daily stressors of life, medical sciences students must handle financial indebtedness, absence of relaxation time, and weight of work, work connections, and professional career decisions.^[17] A high level of stress may harm the scholarly educational plan. Health and emotional problems increase. This can lead to mental troubles and harms cognitive functioning and learning.^[1] The psychological stress can induce physiological responses, including biochemical processes that could lead to short-term symptoms such as muscle tension and increased risk of MSD.^[7,8] A study was conducted in Iran showed that stretching exercise during rest helped to relieve the low back pain among drivers ($P < 0.001$) (REFR).

The aim of this study is to assess the prevalence of musculoskeletal disorders and their association with stress among medical students in Taif University, Saudi Arabia.

Material and Procedures

A cross-sectional study was performed between November 2018 and April 2019 at Taif University, College of Medicine, Kingdom of Saudi Arabia. The survey was perceived by medical students of the entire medical college years. A total of 640 questionnaires were answered by random selection; 100 questionnaires were answered at each level

Inclusion criteria

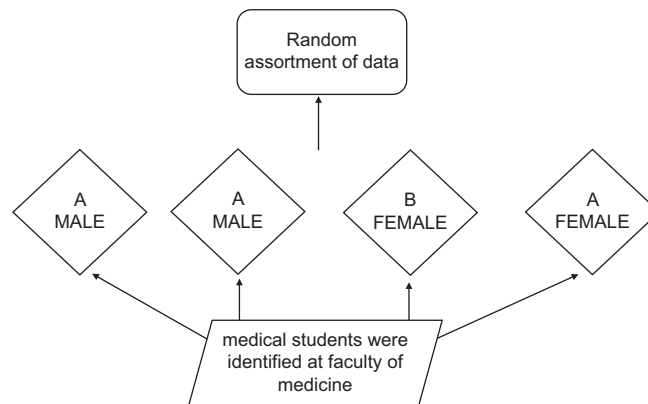
Medical students at the University of Taif, KSA

- 1 The data were collected from male, female sections
- 2 medical specialty
- 3 The data were collected starting from 1st year up to 6th year.

Exclusion criteria

Medical students outside Taif University, students studying health specialties other than medical field such as pharmacy, nursing, radiology, and other nonmedical health specialties and postgraduate programs and medical internship were excluded from the study.

Methods and procedure



Data collection

The research forms a questionnaire based on a literature review. It consists of three sections: 1. First section: sociodemographic characteristics (age, gender, study year, weight, height, smoking, marital status, chronic disease, and educational degree). 2. Second section: Standardized analysis of the questionnaire for musculoskeletal pain to evaluate MSD. Used to assess and analyze the symptoms of the musculoskeletal system

3. Third section: Psychological stress evaluation questionnaire K-10. Kessler Psychological Distress Scale (K10) intended to assess participants' mental conditions by providing ten responses where each issue has 5 points based on the Likert scale that vary from "none of the time" to "all the time." The lowest score that presented is ten and the highest score is 50 and ranges from 10 to 50 as follows: healthy individual less than 20, low stress is 20–24, moderate stress is 25–29, and severe stress is 30–50. We categorized participants according to their stress into average (stress score less than 20) and abnormal (stress score more than 20). The K10 questionnaire is widely used in the general health survey setting and has good psychometric properties with a Cronbach's alpha of 0.89 [95% confidence interval (CI) 0.88–0.90].^[18] Another questionnaire we adopted in this study is the Standardized Nordic Questionnaire applied to assess and analyze musculoskeletal symptoms.^[19]

Ethical considerations

This study received the Taif University Research Ethics Committee approval (41- 360003). This study was conducted in compliance with the World Medical Association Code of Ethics (Helsinki Declaration) of 1975,

as revised in 2000. A verbal consent was obtained from the participant.

Data analysis

Descriptive analysis was done to express continuous variables in the form of mean \pm SD using SPSS version 22, frequencies and percentages were used to express categorical variables. Chi-square test used with a significance level of ($P > 0.05$) to detect the correlation between musculoskeletal disorders and other variables.

Results

In this study, 640 subjects were involved, and females contributed to 54.1% of them. The mean working hours was [Table 1 showed] 30 ± 22.3 and the mean age was 21.5 ± 1.9 among these participants. This sample was almost equally distributed; however, second-year students were in majority (18%). The majority were having normal body mass index (BMI), abnormal level of stress (63%) as well a mean stress score of 22.7 ± 8.8 . Table 2 demonstrates the prevalence

of musculoskeletal disorders among our participants (59.8%), A total of 55.1% reported severe pain to the degree that affect their work, and 42% reported more frequent pain that repeated during the last week. The most frequently complained pain was neck (36.7%), followed by low back (33.3%) then shoulders (22.3%). Table 3 shows the association between general characteristics and musculoskeletal disorders as a significant relation to female gender, second- and third-year students, and frequency of musculoskeletal disorders with P -value= ($<0.001^*$) for both variants. Table 4 demonstrated the association between stress and general characteristics as it shows that most females (65%) and males (60.5%) having an abnormal stress as well as most of second- (67.8%), and third-year students (67.3%). However, it was not statistically significant for both variables, with P -value 0.242 and 0.16, respectively. Table 5 shows the relationship between musculoskeletal disorders and stress as only 39.4% of individuals reported pain during the last 12 months, 34.1% with pain that interferes with work, and 38.5% with pain during the last week were having normal level of stress. However, that was not statistically significant with P -value 0.232, 0.070, and 0.491, respectively.

Variable	Number	Percentage
Mean age \pm SD		21.5 \pm 1.9
Mean working hours/week \pm SD		30 \pm 22.3
Mean stress score \pm SD		22.7 \pm 8.8
Gender		
Male	294	45.9
Female	346	54.1
Academic year		
1 st year	91	14.2
2 nd year	115	18
3 rd year	107	16.7
4 th year	111	17.3
5 th year	105	16.4
6 th year	111	17.3
BMI		
Underweight	75	11.7
Normal	358	55.9
Overweight	123	19.2
Obesity	84	13.1
Marital status		
Single	629	98.3
Married	11	1.7
Smoking		
Yes	73	11.4
No	567	88.6
Chronic Diseases		
Yes	43	6.7
No	597	93.3
Stress Category		
Well	237	37
Mild	157	24.5
Moderate	127	19.8
Severe	119	18.6

Discussion

In this study, we found that the prevalence of MSDs was high among Saudi medical students, and 59.8% of medical students reported pain in at least one site during the past year. The most affected musculoskeletal parts were the neck (36.7%), followed by the lower back (33.3%) and shoulders (22.3%) during the past year and within the past week, but the reports within the past week were less frequent. For pain that interferes with work, students reported neck (27.7%), lower back (25.1%), and knee (19.1%) pain as the most frequently affected body parts. These findings confirm the results that were reported by many other studies because more than half of the medical students had MSDs in the same areas that we mentioned in our study.^[7,20-24] However, percentages and frequency during the past week were variable. This high prevalence was found to be significantly associated with the female gender compared to the male gender (61.9% vs. 38.1%; ($P < 0.000$), which is consistent with findings from several other studies.^[20,25] However, some other studies found that the female gender was a probable risk factor ($P < 0.10$).^[19] MSDs were found to be significantly associated with educational level because they were found to be more frequent among the preclinical year students, especially the second and third year students (20.6%; $P = 0.000^*$). These findings were consistent with some studies^[24] and in conflict with other studies, which suggested that MSDs were more associated with the clinical years and clinical training.^[7,20,23,25] This makes the educational level a questionable risk factor, and it is probably dependent on other factors.

Other studies found that BMI is a risk factor because MSDs were more frequent among students with a higher

Table 2: Prevalence of musculoskeletal disorders

		Pain during last 12 months n=640	Work prevention n=383	Pain during last 7 days n=383
	Yes	383 (59.8%)	211 (55.1%)	161 (42%)
	No	257 (40.2%)	172 (44.9%)	222 (58%)
Neck	Yes	235 (36.7%)	106 (27.7%)	128 (33.4%)
	No	405 (63.3%)	277 (72.3%)	255 (66.6%)
Shoulders	Yes	143 (22.3%)	65 (17%)	64 (12.8%)
	No	497 (77.7%)	318 (83%)	334 (87.2%)
Elbow	Yes	53 (8.3%)	27 (7%)	35 (6.3%)
	No	587 (91.7%)	356 (93%)	359 (93.7%)
Wrist/hand	Yes	118 (18.4%)	63 (16%)	61 (11.5%)
	No	522 (81.6%)	320 (83.6%)	339 (88.5%)
Upper back	Yes	127 (19.8%)	58 (15.1%)	66 (10.2%)
	No	513 (80.2%)	325 (84.9%)	344 (89.8%)
Low back	Yes	213 (33.3%)	96 (25.1%)	109 (15.1%)
	No	427 (66.7%)	287 (74.9%)	325 (84.9%)
Hips/thighs	Yes	64 (10.0%)	31 (8.1%)	30 (3.1%)
	No	576 (90.0%)	352 (91.9%)	371 (96.9%)
knee	Yes	124 (19.4%)	73 (19.1%)	64 (7.8%)
	No	516 (80.6%)	310 (80.9%)	353 (92.2%)
Ankles/feet	Yes	57 (8.9%)	29 (7.6%)	40 (5.7%)
	No	583 (91.1%)	354 (92.4%)	361 (94.3%)

Table 3: Association between general characteristics and Musculoskeletal disorders

		Musculoskeletal disorders		Chi-square	P
		Yes	No		
Gender	Male	146 (38.1%)	148 (57.6%)	23.470	0.000*
	Female	237 (61.9%)	109 (42.4%)		
Academic year	1 st year	52 (13.6%)	39 (15.2%)	28.356	0.000*
	2 nd year	79 (20.6%)	36 (14.0%)		
	3 rd year	79 (20.6%)	28 (10.9%)		
	4 th year	55 (14.4%)	56 (21.8%)		
	5 th year	47 (12.3%)	58 (22.6%)		
	6 th year	71 (18.5%)	40 (15.6%)		
BMI category	underweight	42 (11%)	33 (12.8%)	2.251	0.522
	normal	222 (58%)	136 (52.9%)		
	overweight	68 (17.8%)	55 (21.4%)		
	obese	51 (13.3%)	33 (12.8%)		
Smoker	Yes	40 (10.4%)	33 (12.8%)	0.874	0.350
	No	343 (89.6%)	224 (87.2%)		
Marital status	single	378 (98.7%)	251 (97.7%)	0.964	0.326
	married	5 (1.3%)	6 (2.3%)		
Chronic disease	Yes	29 (7.6%)	14 (5.4%)	1.107	0.293
	No	354 (92.4%)	243 (94.6%)		

BMI.^[8,21] Another study found that MSDs were significantly associated with normal BMI ($P < 0.010^*$),^[26] while other studies found no association.^[21,23] However, although we found that MSDs were more frequent among students with a normal BMI (58%), we found no significant association ($P = 0.522$), which is another point of conflict.

The prevalence of psychological stress among medical students is known to be high because their lifestyle and academic pressure, which cause them a greater

deal of stress compared to their peers and the general population.^[1,12,15] Our study found that only 37% of students had no stress or felt normal stress level, while 63% had abnormal levels; among the 30% who had severe stress that mandated treatment, 39% of them had a mild level and 32% had a moderate level. Many studies found that females were at a significantly higher risk than males.^[1,15] However, our study showed that there was not much difference in the prevalence between females and males (65% vs. 60.5%), which was not statistically

Table 4: Association between stress and general characteristics

		Stress		Chi-square	P
		Normal	Abnormal		
Gender	Male	116 (39.5%)	178 (60.5%)	1.371	0.242
	Female	121 (35.0%)	225 (65.0%)		
Year of study	first year	34 (37.4%)	57 (62.6%)	7.915	0.161
	second year	37 (32.2%)	78 (67.8%)		
	third year	35 (32.7%)	72 (67.3%)		
	fourth year	53 (47.7%)	58 (52.3%)		
	fifth year	40 (38.1%)	65 (61.9%)		
	sixth year	38 (34.2%)	73 (65.8%)		
BMI category	underweight	30 (40.0%)	45 (60.0%)	6.738	0.081
	normal	119 (33.2%)	239 (66.8%)		
	overweight	48 (39.0%)	75 (61.0%)		
	obese	40 (47.6%)	44 (52.4%)		
smoker	Yes	31 (42.5%)	42 (57.5%)	1.044	0.307
	No	206 (36.3%)	361 (63.7%)		
Marital status	single	233 (37.0%)	396 (63.0%)	0.002	0.963
	married	4 (36.4%)	7 (63.6%)		
chronic disease	Yes	17 (39.5%)	26 (60.5%)	0.124	0.725
	No	220 (36.9%)	377 (63.1%)		

Table 5: Association between Musculoskeletal disorders and stress

		Stress category				Chi-square	P
		Well	Mild	Moderate	Severe		
Pain during last 12 months	Yes	151 (39.4%)	84 (21.9%)	78 (20.4%)	70 (18.3%)	4.285	0.232
	No	86 (33.5%)	73 (28.4%)	49 (19.1%)	49 (19.1%)		
Work prevention	Yes	72 (34.1%)	47 (22.3%)	51 (24.2%)	41 (19.4%)	7.059	0.070
	No	79 (45.9%)	37 (21.5%)	27 (15.7%)	29 (16.9%)		
Pain during last 7 days	Yes	62 (38.5%)	31 (19.3%)	38 (23.6%)	30 (18.6%)	2.415	0.491
	No	89 (40.1%)	53 (23.9%)	40 (18.0%)	40 (18.0%)		

significant ($P = 0.242$). Some studies found an association between stress and the level of study, and this association decreased as the student progressed through the years.^[1] Although we found no significant association with the level of study ($P = 0.161$), stress was more frequent among preclinical students.

Some studies found a significant directly proportional association between psychological distress and MSD onset.^[8,25,26] However, our study found no association between the onset of MSDs and the level of stress ($P = 0.232$), which disagrees with all previously mentioned studies and rejects our theory. The onset and occurrence of MSDs might be affected by multiple factors, such as gender, psychosocial, stress, physical activity, and job demand, rather than by a single factor.^[7,8,15] However, the high prevalence of MSDs and stress among this population requires further investigation, prevention, and management. We recommend future studies that use more invasive and in-depth investigations such as a physical and mental examination and radiological investigations to exclude other clinical causes. Additionally, we recommend other, superior study designs to detect risk factors.

Conclusions

MSDs are a common health problem that affected more than half of the medical students, and there was a significant association with female gender and preclinical students. Stress is another common psychological problem among medical students. Stress affected about two-thirds of the students in our study, and there were also stress warning levels. However, this was not related to gender, student level, or BMI. There was no relationship between the onset of musculoskeletal disorders and the level of stress among medical students. Warning levels for stress and the high prevalence of MSDs require attention, management, and prevention.

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Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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