

Prevalence of Lower Back Pain and its Relation to Stress Among Medical Students in Taif University, Saudi Arabia

Abstract

Background: Lower back pain (LBP) refers to pain in the back between the last rib and the gluteal fold. Recent psychological research indicates a relevant connection between severe pain and emotional stress. The etiology of musculoskeletal pain shown to be influenced by low social support, high job demands, and low job control. **Methods:** A cross-sectional study of 640 medical students in Taif University was carried out from November 2018 to April 2019. A standardized Nordic questionnaire was employed to assess musculoskeletal pain and K10 was used to assess psychological stress. **Results:** Our study found 33.3% of medical students reported lower back pain, 20.7% reported lower back pain 0–7 days during the last 12 months, and 18.8% reported reduction of activity due to lower back pain during the last 12 months. The mean stress score was 22.7 ± 8.8 ; 20.7% of students with mild stress reported lower back pain. LBP showed non-significant association to stress categories ($P = 0.409$). **Conclusions:** Our survey found no significant association between LBP and psychological stress. The three main risk factors associated with lower back pain were being a 2nd year medical student, female gender, and high working hours.

Keywords: Low back pain, medical students, stress

Introduction

Lower back pain (LBP) is a pain in the back between the last rib and the gluteal fold regardless of the presence of radiation to the legs.^[1] LBP is the second-most frequent reason for disability in US adults and a common cause of missing working days. An estimated 149 million days of work are missed each year due to LBP.^[2] The prevalence of LBP is higher among the 55–64 age group and is more common among women than men.^[3] LBP is the most commonly-reported musculoskeletal disorder, and 27.2% of Malaysian medical students complain of LBP during their college years. A healthy lifestyle may reduce particular musculoskeletal symptoms, including poor posture and repetitive movements. A program of regular exercise includes cardiopulmonary resistance and daily flexibility exercises can help maintain physical fitness.^[4-6]

Stress is any upsetting emotional experience that is attached to unsurprising biochemical, physiological, or behavioral alterations.^[7] Stress affects emotional actions and behaviors. The clinical

presentation of stress includes complaints of feeling sad, hapless, anxious, and excessively worrisome, trouble with sleeping, a lack of concentration, a lack of appetite, and feeling overwhelmed.^[8] In the Faculty of Medicine at a local university in Malaysia, among 396 medical students, the prevalence of psychological stress was 41.9%.^[9] A study in the college of medicine at King Saud University found that the prevalence of stress was 74.2% among 1st-year students, 69.8% among 2nd-year students, 48.6% among 3rd-year students, 30.4% among 4th-year students, and 49% among 5th-year students.^[10] Another study revealed that medical students exhibit significant psychosocial distress, especially in the first three years; a Saudi study found that the 3rd year is the most stressful period.^[11,12]

Psychological research has revealed that a great deal of pain is related to emotional stress.^[13] Psychosocial factors play a crucial role in the etiology of musculoskeletal pain, such as low social support, high job demands, and low job control;^[14] also, certain careers require job stressors like heavy lifting, prolonged standing, and heavy pushing.^[15]

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This study aimed to measure the prevalence of LBP and its relationship with stress among medical students in Taif University, Saudi Arabia.

Methods

Study design

This was a cross-sectional study of 600 medical students at Taif University. Approximately, one hundred questionnaires were received from each year (600 in total), out of the total population of 1093, by random selection. The questionnaires were distributed from the period November 2018 to April 2019 at the college of medicine, Taif University, KSA.

Inclusion criteria

All the medical students in Taif University, from the 1st year to the 6th year (both Saudi and Non-Saudi students and males and females), were included in this study.

Exclusion criteria

1. Students studying in health colleges other than medicine, such as pharmacy, dentistry, and applied medical science, were not included in this study
2. Students who did not prefer to be enrolled in the study and did not complete the questionnaires
3. Medical interns.

Methods and procedures

A multistage cluster sampling technique was used in this study.

First stage: We selected medical students at the college of medicine at Taif University.

Second stage: Each year in the college of medicine contains subgroups (e.g. 1st-year A FEMALES, 1st-year B FEMALES, 2nd-year A MALES, 2nd-year B MALES); we selected the A females and A males subgroups randomly from all the students.

Third stage: Data were collected randomly from the involved subgroups.

Data collection

A questionnaire was designed by the researchers based upon a review of the literature. It included three parts:

1. Sociodemographic characteristics (age, gender, year of study, weight, height, smoking, marital status, chronic diseases, and academic grade);
2. A Standardized Nordic Questionnaire to assess musculoskeletal disorders and LBP; and
3. A Kessler Psychological Distress Scale (K10) questionnaire to assess psychological stress.

The K10 is a self-administered questionnaire that is designed to assess the emotional conditions of the participants via 10 questions, in which each question is answered using a 5-point Likert scale that ranges from 1

“none of the time” to 5 “all of the time”; the lowest possible score is 10 and the highest score is 50. Scores between 10 and 50 are classified as follows: 20–24 indicates mild stress, 25–29 indicates moderate stress, and 30–50 indicates severe stress. 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].^[16] The results were confirmative in another study that found K10 is a reliable and valid instrument for screening anxiety and depression with high Cronbach’s alpha of 0.93.^[17]

Another questionnaire we adopted in this study is Standardized Nordic Questionnaire (NMQ), which is used to assess and analyze musculoskeletal symptoms also was proven as a valid and reliable screening tool with sensitivity ranging from 66% to 92%.^[18]

Statistical analysis

All the data in this study were entered into Microsoft Excel 2016 and expressed in the form of mean \pm SD using SPSS version 25. Frequencies and percentages were used to describe the data and the data were evaluated via the Chi-squared test with a significance level of $P < 0.05$.

Ethical considerations

This study received approval from the Research Ethics Committee of Taif province, institutional review board, and Taif University research committee. Verbal consent was obtained from each participant.

Results

Our study included 640 students (54.1% female) with a mean age of 21.5 ± 1.9 years and mean working hours per week of 30 ± 22.3 h. Most of participating students were single, nonsmoking, right-handed 2nd-year students (18%) with normal body mass index (BMI) values and without chronic diseases. The mean stress score was 22.7 ± 8.8 ; 37% of the students had normal stress levels and 66.7% had not experienced LBP [Table 1]. Out of the 213 students with LBP, only 4.2% had been hospitalized, 7.5% changed their jobs, and 8.5% sought medical advice or help. Overall, 18.8% and 12.2% of the students had LBP that interfered with their work and leisure activities, respectively, and 22.1% had LBP within the last 7 days before answering the questionnaire [Table 2]. Among the participants with LBP, 67.1% were female, which was statistically significant ($P = 0.000^*$), and 25.4% were 2nd-year students, which was also significant ($P = 0.002^*$). There was no significant association between LBP and stress ($P = 0.409$) nor between LBP and other variables [Table 3].

Table 4 shows the relationship between stress and the general characteristics of the participants. There was no relationship between stress and gender nor between stress and the year of study ($P = 0.617$ and 0.092 , respectively). Overall, 31.8% and 27.3% of participants had severe

Table 1: General characteristics

Variable	Number	Percentage
Mean age±SD		21.5±1.9
Mean working hours/week±SD		30±22.3
Mean stress score±SD		22.7±8.8
Gender		
Male	294	45.9
Female	346	54.1
Year of study		
First	91	14.2
Second	115	18
Third	107	16.7
Fourth	111	17.3
Fifth	105	16.4
Sixth	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
Low Back Pain		
Yes	213	33.3
No	427	66.7
Dominant Hand		
Right	595	93
Left	45	7

LBP that affected their work and leisure activities, respectively, and severe levels of stress ($P = 0.004^*$ and 0.002^* , respectively). Furthermore, 47.7% of respondents with LBP during the last 7 days also had severe stress ($P = 0.000^*$) [Table 5]. Logistic regression shows that independent variables as gender and years of study have an association with the low back pain P value 0.000 and 0.001 respectively, while there is no association between stress and low back pain [Table 6].

Discussion

In this study, we examined the effects of physical and psychological factors among medical students on LBP. Overall, 33% of the students reported LBP during the previous 12 months; 20.7% of them stated that they had

Table 2: Low back pain severity

Variable	Number	Percentage
Have you been hospitalized because of low back trouble?		
Yes	9	4.2
No	204	95.8
Have you ever had to change job or duties because of low back trouble?		
Yes	16	7.5
No	197	92.5
What is the total length of time that you have had low back trouble during the last 12 months?		
0 days	136	63.8
1-7 days	44	20.7
8-30 days	14	6.6
>30 but not every day	9	4.2
Every day	10	4.7
Has low back trouble caused you to reduce your activity during the last 12 months? Work activity?		
Yes	40	18.8
No	173	81.2
Leisure activity?		
Yes	26	12.2
No	187	87.8
What is the total length of time that low back trouble has prevented you from doing your normal work (at home or away from home) during the last 12 months?		
0 days	158	74.2
1-7 days	39	18.3
8-30 days	14	6.6
>30 days	2	0.9
Have you been seen by a doctor, physiographer, chiropractor or other such person because of low back trouble during the last 12 months?		
Yes	18	8.5
No	195	91.5
Pain during the last 7 days?		
Yes	47	22.1
No	166	77.9

lower back trouble from 1 to 7 days and 22.1% reported pain during the previous 7 days. For comparison, the prevalence of LBP among Malaysian medical students during the past 12 months was 46.1% and 27.2% during the past week. The higher prevalence among Malaysian students is explained by their working hours (24.5 ± 11.9 h) though Taif University medical students worked more hours per week (30 ± 22.3 h).^[7] In addition, LBP was significantly associated with the year of study ($P = 0.002$) since there was a higher observed prevalence among 2nd-year students (25.4%), which is consistent with another study that surveyed health specialty students and also found a significant association between 2nd-year students

and musculoskeletal disorders ($P = 0.013$) (28.3%). We assume that these issues are due to students' long periods

Table 3: Association between low back pain and general characteristics and stress

Variable	Low Back Pain		P	
	Yes	No		
Gender	Male	70 (32.9%)	224 (52.5%)	0.000*
	Female	143 (67.1%)	203 (47.5%)	
Year of study	First	28 (13.1%)	63 (14.8%)	0.002*
	Second	54 (25.4%)	61 (14.3%)	
	Third	33 (15.5%)	74 (17.3%)	
	Forth	33 (15.5%)	78 (18.3%)	
	Fifth	22 (10.3%)	83 (19.4%)	
	Sixth	43 (20.2%)	68 (15.9%)	
BMI	Underweight	20 (9.4%)	55 (12.9%)	0.338
	Normal	127 (59.6%)	231 (54.1%)	
	Overweight	36 (16.9%)	87 (20.4%)	
	Obesity	30 (14.1%)	54 (12.6%)	
Marital status	Single	211 (99.1%)	418 (97.9%)	0.284
	Married	2 (0.9%)	9 (2.1%)	
Smoking	Yes	20 (9.4%)	53 (12.4%)	0.257
	No	193 (90.6%)	374 (87.6%)	
Chronic Diseases	Yes	14 (6.6%)	29 (6.8%)	0.917
	No	199 (93.4%)	398 (93.2%)	
Stress Category	Well	82 (38.5%)	155 (36.3%)	0.409
	Mild	44 (20.7%)	113 (26.5%)	
	Moderate	43 (20.2%)	84 (19.7%)	
	Severe	44 (20.7%)	75 (17.6%)	
Dominant Hand	Right	200 (93.9%)	395 (92.5%)	0.517
	Left	13 (6.1%)	32 (7.5%)	

of sitting with fixed postures during lectures.^[19] In a study conducted among older Americans (age range 60–80), the prevalence of LBP was higher among obese men and women, 31.2% and 25.1%, respectively. Unexpectedly, we found that students with normal BMI values had the highest recorded rate of LBP (58.8%); only 14.3% of obese students reported LBP. The contrast between the two results is due to the different age groups involved and the higher prevalence of chronic diseases among the American sample.^[20] Another study examined LBP among music conservatory students and found that 63.1% of students had experienced LBP at least once in their lifetimes, whereas 58.5% had LBP during the last 12 months and 15% had to change their jobs as consequence of it. This might due to long years of practicing (15 ± 4.0) as the researchers found that 20% of music students practiced 21–26 h weekly.^[10] Unexpectedly, our results compromised the hypothesis of the study, i.e. we found no significant association between LBP and stress ($P = 0.409$). We expected LBP to be linked to inappropriate ways of lifting weights, excessive use of lower back muscles, and unhealthy sitting positions. Medical education is characterized by psychological changes among students that negatively alter the students' academic performance.^[14] 20.7% of students experienced severe stress, which is lower than the prevalence of severe stress among King Saud University's medical students (25.2%). Despite how both schools follow a unified study plan, students find the education at King Saud University more stressful, especially during the 1st year. We assume King Saud University has greater competition among the applicants to the college of medicine and fewer

Table 4: Association between stress and general characteristics

Variable	Stress category				P	
	Well	Mild	Moderate	Severe		
Gender	Male	116 (48.9%)	67 (42.7%)	59 (46.5%)	52 (43.7%)	0.617
	Female	121 (51.1%)	90 (57.3%)	68 (53.5%)	67 (56.3%)	
Year of study	First year	34 (14.3%)	28 (17.8%)	15 (11.8%)	14 (11.8%)	0.092
	Second year	37 (15.6%)	31 (19.7%)	21 (16.5%)	26 (21.8%)	
	Third year	35 (14.8%)	21 (13.4%)	26 (20.5%)	25 (21.0%)	
	Fourth year	53 (22.4%)	25 (15.9%)	25 (19.7%)	8 (6.7%)	
	Fifth year	40 (16.9%)	24 (15.3%)	17 (13.4%)	24 (20.2%)	
	Sixth year	38 (16.0%)	28 (17.8%)	23 (18.1%)	22 (18.5%)	
BMI	Underweight	30 (12.7%)	19 (12.1%)	15 (11.8%)	11 (9.2%)	0.402
	Normal	119 (50.2%)	92 (58.6%)	77 (60.6%)	70 (58.8%)	
	Overweight	48 (20.3%)	29 (18.5%)	25 (19.7%)	21 (17.6%)	
	Obese	40 (16.9%)	17 (10.8%)	10 (7.9%)	17 (14.3%)	
Smoking	Yes	31 (13.1%)	14 (8.9%)	14 (11.0%)	14 (11.8%)	0.647
	No	206 (86.9%)	143 (91.1%)	113 (89.0%)	105 (88.2%)	
Marital status	Single	233 (98.3%)	154 (98.1%)	125 (98.4%)	117 (98.3%)	0.997
	Married	4 (1.7%)	3 (1.9%)	2 (1.6%)	2 (1.7%)	
Chronic disease	Yes	17 (7.2%)	11 (7.0%)	9 (7.1%)	6 (5.0%)	0.883
	No	220 (92.8%)	146 (93.0%)	118 (92.9%)	113 (95.0%)	
Hand dominance	Right	225 (94.9%)	148 (94.3%)	116 (91.3%)	106 (89.1%)	0.166
	Left	12 (5.1%)	9 (5.7%)	11 (8.7%)	13 (10.9%)	

Table 5: Association between low back pain severity and stress

Variable		Stress category				P
		Well	Mild	Moderate	Severe	
Hospitalization ¹	yes	1 (1.2%)	1 (2.3%)	5 (11.6%)	2 (4.5%)	0.044* ^b
	no	81 (98.8%)	43 (97.7%)	38 (88.4%)	42 (95.5%)	
Work affection ²	yes	0 (0.0%)	3 (6.8%)	4 (9.3%)	9 (20.5%)	0.001* ^b
	no	82 (100.0%)	41 (93.2%)	39 (90.7%)	35 (79.5%)	
Pain during last 12 months ³	0 days	69 (84.1%)	24 (54.5%)	21 (48.8%)	22 (50.0%)	0.000* ^b
	1-7 days	12 (14.6%)	8 (18.2%)	15 (34.9%)	9 (20.5%)	
	8-30 days	1 (1.2%)	4 (9.1%)	6 (14.0%)	3 (6.8%)	
	>30 but not every day	0 (0.0%)	5 (11.4%)	1 (2.3%)	3 (6.8%)	
	every day	0 (0.0%)	3 (6.8%)	0 (0.0%)	7 (15.9%)	
Work activity? ⁴	yes	6 (7.3%)	11 (25.0%)	9 (20.9%)	14 (31.8%)	0.004* ^a
	no	76 (92.7%)	33 (75.0%)	34 (79.1%)	30 (68.2%)	
Leisure activity? ⁵	yes	4 (4.9%)	3 (6.8%)	7 (16.3%)	12 (27.3%)	0.002* ^a
	no	78 (95.1%)	41 (93.2%)	36 (83.7%)	32 (72.7%)	
Regular activity affection ⁶	0 days	74 (90.2%)	32 (72.7%)	25 (58.1%)	27 (61.4%)	0.004* ^{b,c}
	1-7 days	6 (7.3%)	9 (20.5%)	12 (27.9%)	12 (27.3%)	
	8-30 days	2 (2.4%)	2 (4.5%)	6 (14.0%)	4 (9.1%)	
	>30 days	0 (0.0%)	1 (2.3%)	0 (0.0%)	1 (2.3%)	
Medical advice ⁷	yes	2 (2.4%)	3 (6.8%)	7 (16.3%)	6 (13.6%)	0.030* ^b
	no	80 (97.6%)	41 (93.2%)	36 (83.7%)	38 (86.4%)	
Pain during last 7 days	yes	5 (6.1%)	12 (27.3%)	9 (20.9%)	21 (47.7%)	0.000* ^a
	no	77 (93.9%)	32 (72.7%)	34 (79.1%)	23 (52.3%)	

¹Have you been hospitalized because of low back trouble? ²Have you ever had to change job or duties because of low back trouble? ³What is the total length of time that you have had low back trouble during the last 12 months? ⁴Has low back trouble caused you to reduce your activity during the last 12 months? ⁵Has low back trouble caused you to reduce your activity during the last 12 months? ⁶What is the total length of time that low back trouble has prevented you from doing your normal work (at home or away from home) during the last 12 months? ⁷Have you been seen by a doctor, physiographer, chiropractor or other such person because of low back trouble during the last 12 months? ^bMore than 20% of cells in this sub-table have expected cell counts less than 5. Chi-square results may be invalid. ^cThe minimum expected cell count in this sub-table is less than one. Chi-square results may be invalid.

Table 6: Logistic regression analysis of the association between low back pain and other independent variables

Independent variables	B	S.E.	Wald	df	P	Odds ratio (95% C.I.)
Age	0.126	0.078	2.593	1	0.107	1.135 (.973-1.323)
Gender	0.988	0.206	23.043	1	0.000	2.685 (1.794-4.019)
Year of study			21.930	5	0.001	
Year of study (1)	1.135	0.514	4.871	1	0.027	3.111 (1.135-8.521)
Year of study (2)	0.105	0.423	0.061	1	0.805	1.110 (.485-2.542)
Year of study (3)	0.782	0.372	4.413	1	0.036	2.186 (1.054-4.533)
Year of study (4)	0.663	0.332	3.999	1	0.046	1.941 (1.013-3.720)
Year of study (5)	1.040	0.327	10.131	1	0.001	2.830 (1.491-5.369)
BMI category			4.831	3	0.185	
BMI category (1)	0.827	0.378	4.793	1	0.029	2.286 (1.090-4.791)
BMI category (2)	0.382	0.284	1.811	1	0.178	1.466 (.840-2.557)
BMI category (3)	0.398	0.323	1.523	1	0.217	1.490 (.791-2.805)
Smoking	-0.221-	0.314	0.493	1	0.482	0.802 (.433-1.485)
Marital status	-0.885-	0.829	1.141	1	0.285	0.413 (.081-2.093)
Chronic disease	-0.068-	0.366	0.034	1	0.853	0.935 (.456-1.914)
Stress category			3.873	3	0.276	
Stress category (1)	0.033	0.250	0.017	1	0.895	1.034 (.633-1.689)
Stress category (2)	0.450	0.276	2.662	1	0.103	1.568 (.913-2.693)
Stress category (3)	0.079	0.283	0.079	1	0.779	1.083 (.622-1.885)
Constant	-2.634-	2.108	1.562	1	0.211	0.072

study seats.^[21] In our study, psychological distress was significantly associated with gender as females sustained

greater amounts of stress than males. The previous studies assumed that the greater stress experienced by females

was due to the nature of the female gender and their busy schedules, among other things.^[22]

Conclusions

In conclusion, among Taif University medical students, the prevalence of LBP was 33.3%. The prevalence of mild stress was 24.5% and the prevalence of severe stress was 18.6%. Our survey found no significant association between LBP and psychological stress ($P = 0.409$). The three main risk factors associated with worse LBP were being a 2nd-year medical student, being female, and high working hours.

Limitations

Although the study achieved its aim, our study did not include investigations like X-ray, magnetic resonance imaging (MRI), or computerized tomography (CT) scan for excluding other causes of LBP.

Recommendations

We recommend encouraging students to pursue physical activities, reducing lecture hours (especially during the preclinical years), and making students aware of how to manage their time and organize their schedules. Additional studies would be useful to better understand the female students' risk factors for developing psychological stress. We recommend the use of radiological investigations to exclude the causes of organic causes of LBP in future studies.

Declaration of patient consent

The authors certify that they have obtained all appropriate participant consent forms. In the form, the participants have given their consent and other clinical information to be reported in the journal. The participants 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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