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Prevalence of low back pain and its relation to stress and study hours among medical students in University of Hail in Saudi Arabia

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ABSTRACT

Background: Low Back Pain (LBP) involves the muscles, nerves, and bones of the back are considered a very common disease. It can affect many individuals around the world. The etiology of LBP in relation is influenced by long study hours, high occupational burdens and sedentary lifestyle. We aim to explore the effect of stress and studying on university students at the University of Hail. *Methods:* This is across-sectional questionnaire-based study involving 197 male and female medical students in University of Hail. It was carried out from May to September 2020 using the standardized Nordic questionnaire to assess low back pain while K10 questionnaire was used to assess the psychological stress. *Results:* Out of 197 students, 22.3% of medical students reported LBP, with 68.2% reported LBP in the last 7 days. Furthermore, 97.7% and 86.4% of students had LBP that interfered with their work and leisure activities, respectively. The mean stress score was 23.35 ± 9.68 with a significant association between LBP and stress level (P = 0.000). *Conclusion*: The prevalence rate of LBP was 22.3% while the prevalence of stress was 52.3%. Meanwhile, the risk factors associated with worse LBP are being in medical school for more than two years, female gender, obesity and having severe stress level.

Keywords: Low Back Pain, questionnaire, stress, disease

1. INTRODUCTION

Low Back Pain (LBP) is a very common disorder involving the muscles, nerves, and bones of the back. It is also a common symptom. It affects 60% to 80% of individuals at some point during their lives. However, its prevalence has not increased and stayed in a plateau state in recent years even though the reported disability rates from LBP has risen dramatically (Ralston et al., 2018). Moreover, the burden of the disease often appears between 20 and 40 years of

age (Casazza, 2012). Men and women are equally affected by it and it is more common among people between 40 to 80 years old, with the percentage of individuals affected by it projected to raise as the population ages (Hoy et al., 2012). Generally, there are three general types of low back pain by cause: mechanical back pain, non-mechanical back pain, and referred pain from internal organs (Manusov, 2012). Mechanical or musculoskeletal problems form the most cases with around 90% of all LBP etiology (Cohen et al., 2008). Meanwhile, the description of LBP itself is slightly variable with symptoms ranging from tenderness to diffuse pain (Manusov, 2012). There are many steps that can be taken to prevent and manage LBP. Certain red flags should require immediate intervention, management or referral to a spine specialist. Even though most adults recover promptly with conservative treatment, complete evaluation is necessary to identify rare cases of critical underlying disease (Casazza, 2012).

Psychological stress occurs when a person perceives the environmental demands or tax surpass their adaptive capability (Cohen et al., 2007). It was previously addressed in the literature that psychological stress can make any LBP worst. However, the notion of stress-linked back pain takes this theory further (Flor et al., 2007). The academic burden of such a curriculum might perpetuate a sedentary lifestyle among medical students, possibly making them prone to developing LBP (Nyland & Grimmer, 2003). In our study, we will estimate the prevalence of low back pain and its relation to stress among medical students in university of Hail, Saudi Arabia.

2. METHODS AND MATERIALS

This is a cross-sectional study conducted on medical students at the College of Medicine of University of Hail. Informed consent was obtained from the participants through the electronic survey. A sample size of 197 students participated from a total of 400 medical students in the college of medicine and was estimated by Raosoft sample size calculator, with a 95% confidence interval and 5% margin of error. Second, third, fourth, fifth, and sixth year students were included in the study. However, first year students and interns were excluded from the study population. We used the Standardized Nordic Questionnaire (Kuorinka et al., 1987) to assess LBP and Kessler Psychological Distress Scale (K10) questionnaire (Andrews & Slade, 2001) to assess psychological stress. All questionnaires were translated to Arabic and revalidated back to English as self-answered questionnaires. The Standardized Nordic questionnaires are a measurement tool that analyzes musculoskeletal symptoms occupational medicine. The questions are forced choice variants and self-administered. They focus on symptoms frequently seen in an occupational setting (Kuorinka et al., 1987). 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 Likert 5-point scale that ranges from "1 none of the time" to 5 for "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 questionnaire was distributed randomly through emails from May to September of 2020. Demographical data questionnaire was added, including age, gender, weight, height, academic year. We used the Statistical Package for the Social Sciences (SPSS) software (version 25; IBM, Armonk, New York) to perform all the statistical analyses. We considered P values that are less than 0.05 to be statistically significant.

3. RESULTS

Our sample included 197 students (58.9% male) with a mean age of 21.6 ± 1.59 years. Most of participating students were 4thand 5th year students with a mean body mass index (BMI) of 24.0 ± 4.84 (34%) and most of them were not diagnosed with a chronic disease (90.4%). Moreover, smokers made up to 11.2% of the sample. The mean stress score was 23.35 ± 9.68 with 47.7% of the students being not stressed and 77.7% did not have LBP (Table 1). Out of the 44 students with LBP, only 6.8% were admitted to hospital, 95.5% altered the way they do their daily tasks, and 4.5 % were seeking medical advice and help. Overall, 97.7% of students had LBP that interfered with their work and leisure activities while 68.2% had LBP within the last 7 days before answering the survey questionnaire (Table 2). On the other hand, 68.2% of participants with LBP were females, which were statistically significant (P= 0.000) while a significant association was observed between LBP and stress (P = 0.000) (Table 3) (Figure 1).

Regarding stress and the general characteristics of the respondents, the relationship between stress and gender was significant (P = 0.021) (Table 4) (Figure 2). The relation between stress and the academic year was found significant (P = 0.011). However, BMI, smoking and having a chronic disease had no significant relation with stress. Meanwhile, 60% of participants had LBP that influenced their work and leisure activities from the severe stress level category (P = 0.000). Furthermore, 46.7% of participants with LBP have reported high stress (P = 0.100) over the last 7 days (Table 5) (Figure 3).

Table 1 general characteristics of the sample

		Count	%
Mean age 21.62 ± 1.59 Mean stress score 23.35 ± 9.68			
gender	male	116	58.9%
	female	81	41.1%
Academic year	2nd year	29	14.7%
	3rd year	25	12.7%
	4th year	67	34.0%
	5th year	48	24.4%
	6th year	28	14.2%
BMICAT	UNDER WEIGHT	20	10.3%
	NORMAL WEIGHT	100	51.5%
	OVER WEIGHT	48	24.7%
	OBESE	22	11.3%
	MORBIDLY OBESE	4	2.1%
do you smoke	no	175	88.8%
	yes	22	11.2%
chronic disease	no	178	90.4%
	yes	19	9.6%
stress level	not stressed	94	47.7%
	mild stress	30	15.2%
	moderate stress	23	11.7%
	sever stress	50	25.4%

Table 2 assessment of lower back pain

		LBP	
		Count	%
Have you been hospitalized because of low back trouble?	no	41	93.2%
	yes	3	6.8%
Have you ever had to change job or duties because of low back trouble?	no	2	4.5%
	yes	42	95.5%
What is the total length of time that you have had low back trouble during the last 12 month'?	days	9	21.4%
	weeks	13	31.0%
	months	20	47.6%
Has low back trouble caused you to reduce your activity at work during the last 12 months?	no	1	2.3%
	yes	43	97.7%
Has low back trouble caused you to reduce your leisure activity during the last 12 months?	no	6	13.6%
	yes	38	86.4%
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?	1 to 7 days	26	59.1%
	8 to 30 days	13	29.5%
	more than 30 days	3	6.8%
	0 days	2	4.5%
Have you been seen by a doctor, physiographist, chiropractor or other such person because of low back trouble during the last 12 months?	no	42	95.5%
	yes	2	4.5%
Have you had low back trouble any time during the last 7 days?	no	14	31.8%
	yes	30	68.2%

Table 3 associations between lower back pain and the general characteristics

		LBP				
		no		yes		P value
		Count	%	Count	%	
gender	male	102	87.9%	14	12.1%	0.000
	female	51	63.0%	30	37.0%	
Academic year	2nd year	21	72.4%	8	27.6%	0.650
	3rd year	19	76.0%	6	24.0%	
	4th year	54	80.6%	13	19.4%	
	5th year	35	72.9%	13	27.1%	
	6th year	24	85.7%	4	14.3%	
chronic disease	no	139	78.1%	39	21.9%	0.663
	yes	14	73.7%	5	26.3%	
do you smoke	no	133	76.0%	42	24.0%	0.115
	yes	20	90.9%	2	9.1%	
stress level	not stressed	84	89.4%	10	10.6%	0.000
	mild stress	26	86.7%	4	13.3%	
	moderate stress	15	65.2%	8	34.8%	
	sever stress	28	56.0%	22	44.0%	
BMICAT	UNDER WEIGHT	19	95.0%	1	5.0%	0.194
	NORMAL WEIGHT	75	75.0%	25	25.0%	
	OVER WEIGHT	37	77.1%	11	22.9%	
	OBESE	15	68.2%	7	31.8%	
	MORBIDLY OBESE	4	100.0%	0	0.0%	

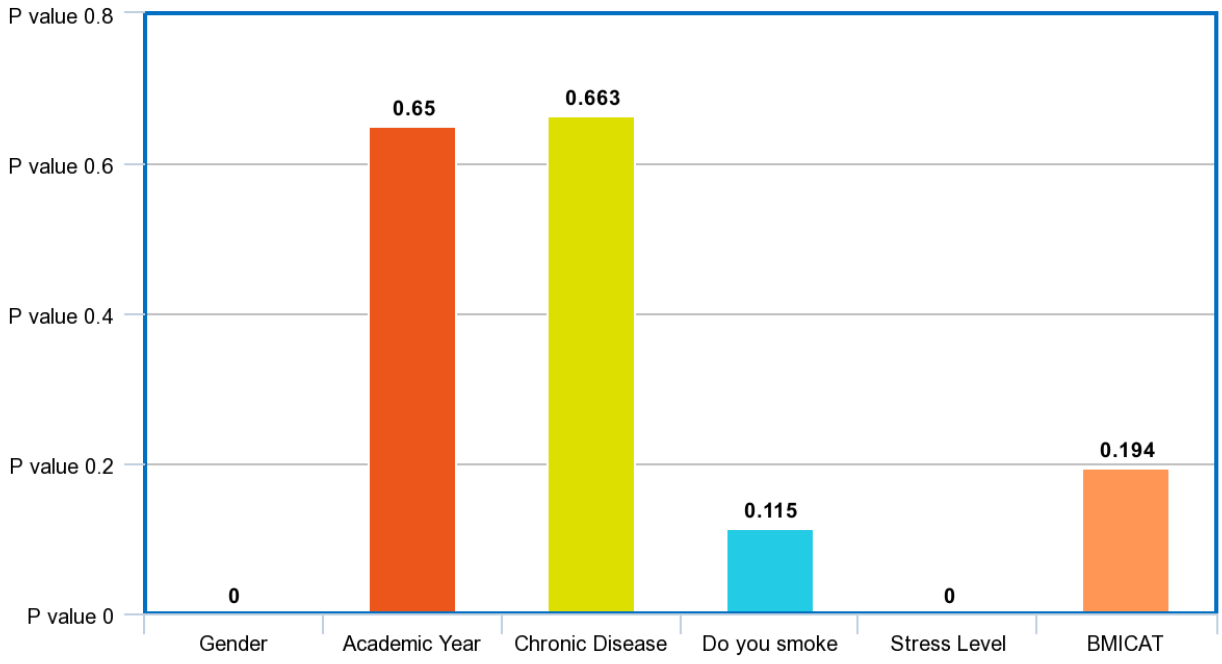

Figure 1 Association between lower back pain and general characteristics

Table 4 associations between stress and the general characteristics

		stress level								
		not stressed		mild stress		moderate stress		sever stress		
		Count	%	Count	%	Count	%	Count	%	P value
gender	male	59	62.8%	23	76.7%	12	52.2%	22	44.0%	0.021
	female	35	37.2%	7	23.3%	11	47.8%	28	56.0%	
Academic year	2nd year	6	6.4%	6	20.0%	5	21.7%	12	24.0%	0.011
	3rd year	13	13.8%	3	10.0%	5	21.7%	4	8.0%	
	4th year	41	43.6%	9	30.0%	4	17.4%	13	26.0%	
	5th year	20	21.3%	7	23.3%	7	30.4%	14	28.0%	
	6th year	14	14.9%	5	16.7%	2	8.7%	7	14.0%	
BMICAT	UNDER WEIGHT	9	9.8%	3	10.0%	4	18.2%	4	8.0%	0.760
	NORMAL WEIGHT	46	50.0%	18	60.0%	8	36.4%	28	56.0%	
	OVER WEIGHT	21	22.8%	6	20.0%	9	40.9%	12	24.0%	
	OBESE	15	16.3%	1	3.3%	1	4.5%	5	10.0%	
	MORBIDLY OBESE	1	1.1%	2	6.7%	0	0.0%	1	2.0%	
do you smoke	no	87	92.6%	29	96.7%	14	60.9%	45	90.0%	0.117
	yes	7	7.4%	1	3.3%	9	39.1%	5	10.0%	
chronic disease	no	88	93.6%	27	90.0%	20	87.0%	43	86.0%	0.117
	yes	6	6.4%	3	10.0%	3	13.0%	7	14.0%	

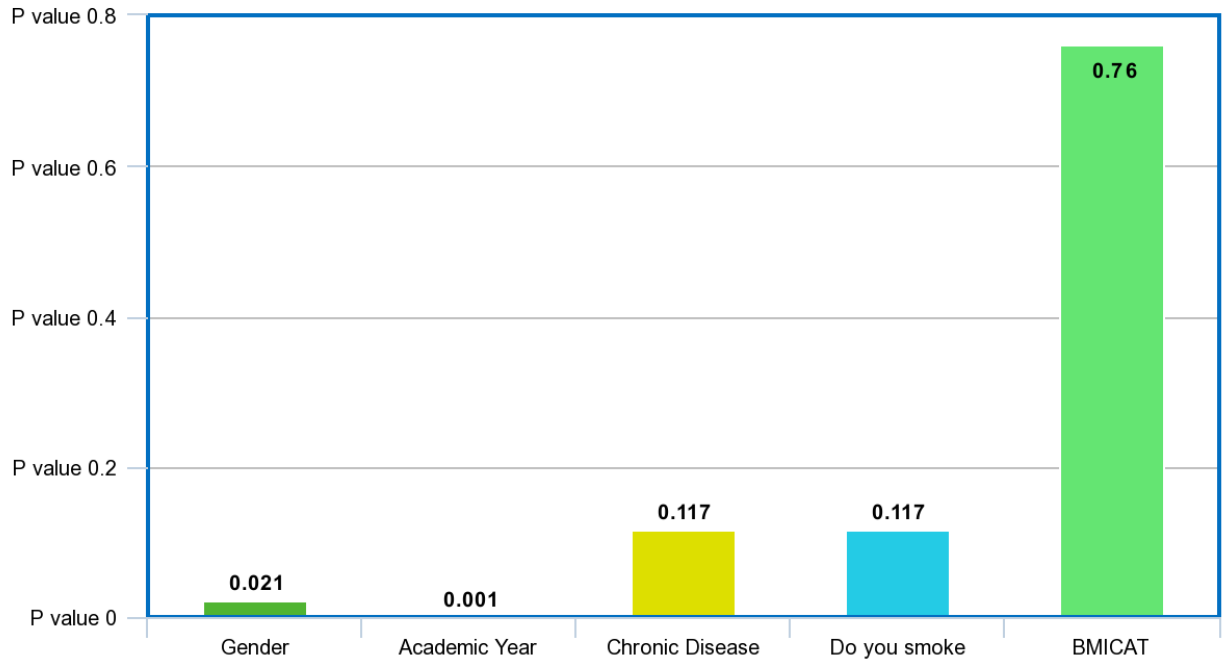

Figure 2 associations between stress and the general characteristics

Table 5 associations between lower back pain and stress level

Lower back pain and stress level										
		not stressed		mild stress		moderate stress		sever stress		P value
		Count	%	Count	%	Count	%	Count	%	
Hospitalization	no	76	96.2%	26	100.0%	23	100.0%	44	95.7%	0.990
	yes	3	3.8%	0	0.0%	0	0.0%	2	4.3%	
Work affection	no	51	66.2%	18	69.2%	11	47.8%	14	30.4%	0.000

	yes	26	33.8%	8	30.8%	12	52.2%	32	69.6%	
Pain during last 12 months	days	16	47.1%	5	62.5%	2	15.4%	13	38.2%	0.484
	weeks	8	23.5%	2	25.0%	6	46.2%	11	32.4%	
	months	10	29.4%	1	12.5%	5	38.5%	10	29.4%	
Work activity	no	61	81.3%	17	81.0%	13	56.5%	18	40.0%	0.000
	yes	14	18.7%	4	19.0%	10	43.5%	27	60.0%	
Leisure activity	no	57	76.0%	16	76.2%	15	65.2%	25	56.8%	0.024
	yes	18	24.0%	5	23.8%	8	34.8%	19	43.2%	
Regular activity affection	1 to 7 days	18	25.4%	4	17.4%	6	26.1%	24	53.3%	0.010
	8 to 30 days	6	8.5%	3	13.0%	4	17.4%	3	6.7%	
	more than 30 days	2	2.8%	0	0.0%	0	0.0%	3	6.7%	
	0 days	45	63.4%	16	69.6%	13	56.5%	15	33.3%	
Medical advice	no	72	96.0%	25	100.0%	21	100.0%	42	95.5%	0.991
	yes	3	4.0%	0	0.0%	0	0.0%	2	4.5%	
pain during last 7 days	no	51	69.9%	17	68.0%	15	71.4%	24	53.3%	0.100
	yes	22	30.1%	8	32.0%	6	28.6%	21	46.7%	

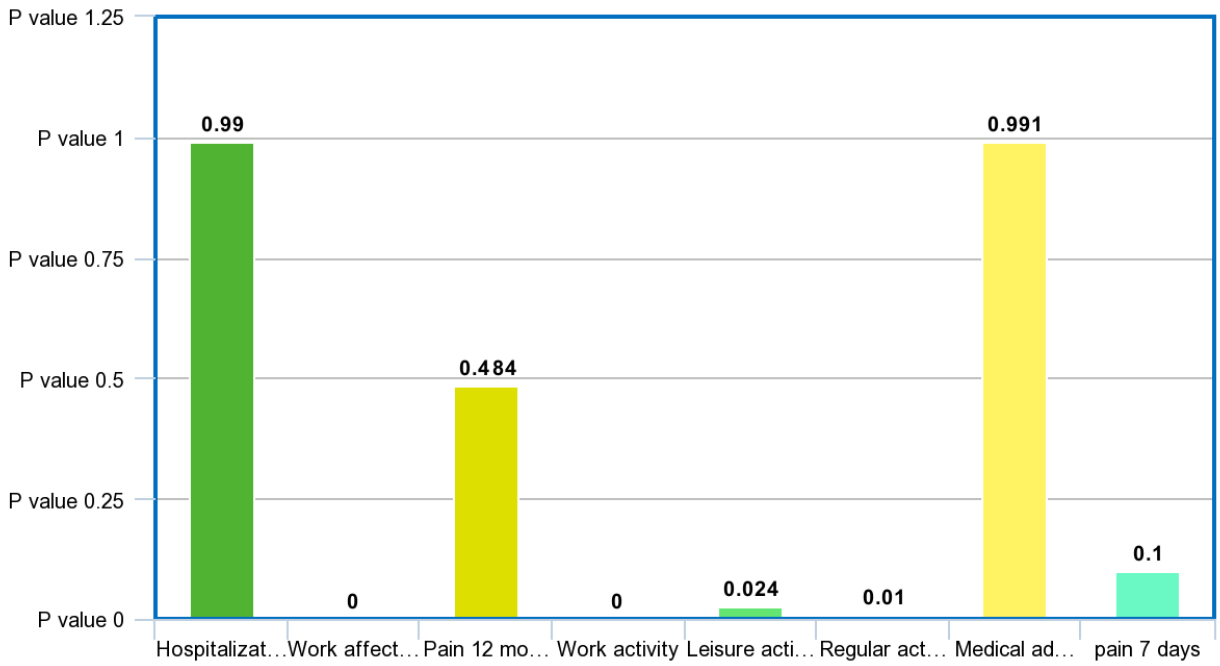

Figure 3 associations between lower back pain and stress level

4. DISCUSSION

In this research, we examined the effects of physical and psychological factors among medical students on LBP. The results of this present study show that 22.3% of the students reported LBP during a 12-month period and 68.2% of those reported pain during the last seven days. Moreover, 59.1% of them stated that they had lower back pain of one to seven days duration and only 4.5% of students who reported LBP were seeking medical advice. For comparison, a study done on Medical Students at University Hospitals in the central region of Saudi Arabia showed that the prevalence of back pain among students reported in the past seven days was 40.5% compared to our study of 34.8% (Algarni et al., 2017). A study in King Saud University showed that the prevalence of LBP among dental students was 16%, with females generally reported more LBP (17% of females) than males (14.8% of males) (Zafar & Almosa, 2019). Compared to our study, the prevalence of LBP among medical student participants was 22.3%; these

findings suggest that more medical student claim to have LBP when compared to dental students. In comparison, females reported more LBP (37% of females) than males (12.1% of males), similarly in both studies males reported LBP less than females (Algarni et al., 2017; Zafar & Almosa, 2019). Furthermore, a study conducted on medical students in Taif University revealed that 33.3% of medical students reported LBP and showed non-significant association to stress (P = 0.409) with 67.1% of medical students who reported LBP were females (Alturkistani et al., 2020). In the present study, 22.3% of medical students reported LBP with 68.2% of them females. Our results disagree with the findings of this study as we observed a strong association between LBP and stress (P = 0.000).

A study conducted on Malaysian office workers found significant association between BMI and pain in the lower back area (p = 0.047) (Shariat et al., 2018). In contrast, the present study showed no relation between BMI and LBP (P = 0.194). However, in the previous study, the age group of that study ranged from 20 to 50 with a majority of women participants (Shariat et al., 2018). Smoking was associated with increased odds of having a moderate level and a high level of stress in one study done in Alabama, United States (Shuaib et al., 2011). In contrast, our findings showed no association between smoking and stress level in medical students (p = 0.117). The sample of the present study, probably, had higher awareness of health implications and consequences of smoking. A medical student undergoes a lengthy curriculum and is pressured to study for prolonged hours all year long (Shuaib et al., 2011). A study which was conducted using a self-answered questionnaire on medical student in Jeddah, Saudi Arabia reported around 59% of their participants to be stressed (Gazzaz et al., 2018). In our present study, 52.3% of the participants were stressed which is consistent with the previously mentioned study above. In our results, stress level was significantly associated with gender (P = 0.021) as females reported greater amounts of stress (56.8%) than males (49.1%). Lastly, a previous study assumed that the greater stress experienced by females was due to the nature of the female gender (Shah et al., 2010). One potential explanation may be the lack of extra-curricular activity due to the constraints placed on them by society.

5. CONCLUSION

Among Hail University medical students, the prevalence of LBP and stress were 22.3% and 52.3 respectively. In this study we observed significant association between LBP and psychological stress. The risk factors associated with worse LBP were being a 2 - year medical student, female gender, obesity and having severe stress level.

Acknowledgement

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Author Contributions

All the authors contributed evenly with regards to data collecting, analysis, drafting and proofreading the final draft.

Funding

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Conflict of Interest

The authors declare that there are no conflicts of interest.

Informed consent

Informed consent was obtained from all individual participants included in the study.

Ethical Consideration

The study acquired the ethical approval from the ethical committee at the College of Medicine, University of Hail (letter number Nr. 1792/5/42- project number H-2020-132).

Data and materials availability

All data associated with this study are present in the paper.

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