

COVID-19 lockdown and low back pain among students of healthcare faculties at Northern Border University, Saudi Arabia

COVID-19 lockdown and low back pain

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Abstract

Aim: The study aimed to investigate low back pain (LBP) among students of three healthcare faculties at Northern Border University (NBU) and the effect of COVID-19 lockdown on LBP among study participants.

Materials and Methods: This study was a cross-sectional descriptive electronic questionnaire-based survey. The questionnaire collected data on LBP risk factors, severity and disability, frequency, and implemented protective measures. Also, the effect of COVID-19, which has altered lifestyles over the past 3 months, on LBP among the participants was evaluated.

Results: Three hundred nine participants were voluntarily enrolled in the study. Among the participants, 123 (39.8%) reported at least one LBP attack in their medical history during their lifetime. Multivariate analysis showed that diabetes mellitus, neck pain and prolonged sitting were the most independent risk factors (p -values = 0.001, 0.003, and 0.000, respectively). Based on the Oswestry disability scoring, most of (73/123) participants with LBP reported no disability (59.3%). The majority of participants with LBP (32.4%) reported one attack per month. The proper sitting practice has been shown to be the most commonly applied protective measure (51% of LBP cases). Interestingly, during the last 3 months, 25/123 (20.4%) of the participants reported their first attack of LBP. Also, LBP intensity was reported to be increased in 21/123 (20.6%) participants, and the frequency was increased in 36/123 (29.4%) LBP cases whose life patterns were altered by COVID-19.

Discussion: Medical students are more prone to LBP due to various causes. COVID-19 lockdown has also been shown to initiate LBP and worsen already existing LBP among participants.

Keywords

Low back pain; COVID-19 lockdown; Medical students; Northern border university

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Introduction

Low back pain (LBP) is a common musculoskeletal problem worldwide with significant physical, psychological as well as negative economic drawbacks. The global prevalence of LBP was estimated to range from 15% to 45% [1-3]. Furthermore, it was expected that about 50% of the general population have a history of LBP at any time in their lives [4]. The estimated prevalence of LBP in Saudi Arabia ranges from 53.2% to 79.17% of the total population based on seven published cross-sectional studies on the Saudi population [5].

LBP can arise for a variety of reasons. However, the majority of LBP cases are of unknown etiology [6]. Skeletal causes of LBP include intervertebral disc degeneration and/or herniation, osteoarthritis of facet joints, fractures of pars interarticularis, spondylolisthesis. In addition, LBP can be originated from ligaments, paravertebral and gluteal muscle injuries, or inflamed sacroiliac joints. Furthermore, primary and metastatic malignant conditions of the spine can be considered as causes of LBP. In addition to the spine diseases, LBP can be caused by visceral causes due to genitourinary or gastrointestinal diseases [7].

Several published studies have evaluated the risk factors for the development of LBP among populations. The most important reported factors were aging, genetic factors, occupational hazards, obesity, and a sedentary lifestyle [8]. People above 30 years old have been shown to be at a higher risk for LBP due to the beginning of wear and tear processes of the spine such as disc degeneration and spinal stenosis. The risk increases with aging and the development of osteoarthritis among elderly aged over 60 years [9]. Regarding the genetic background of LBP, it is mainly related to the genetic causes of certain spinal diseases which cause LBP as the degenerative disc disease [10]. On the other hand, LBP is more prevalent among certain occupations as jobs with repetitive bending and lifting activities as construction workers and nurses. It has also been reported that those employed in jobs with prolonged standing or sitting that require long hours of standing or sitting, such as barbers or software developers are at higher risk for LBP [11, 12]. In addition, persons with a sedentary lifestyle and excess body weight are at high risk of developing a more severe form of LBP [13]. Furthermore, other epidemiological studies have correlated LBP with psychological stress, smoking, neck pain, alcohol intake, diabetes mellitus, headache, and unbalanced diet [8].

Previous studies have shown that medical and nursing students had a higher prevalence of LBP [14–17] without clear data regarding the medical undergraduate students. However it is expected that the hard curricula of the healthcare faculties with anticipated prolonged studying hours with a sedentary lifestyle make these students more prone to LBP. Also, the stressful, crowded schedule of repeated exams makes them more vulnerable to psychological stress which is another reported LBP risk factor. In addition, prolonged hours of standing in their practical and clinical rounds is another risk factor, especially with poor sitting and standing postural habits [17, 18].

COVID-19 is a life-threatening acute respiratory infection which caused a worldwide pandemic. Being an airborne infection, strict precautions have been taken all over the world to limit

its spread among the population especially vulnerable groups. Lockdown was one of the precautions which were decided by many governments worldwide. Saudi Arabia was one of the countries which started the lockdown since the 24th of March, 2020. This results in home-based e-learning classes, staying at home, prolonged sitting, and a sedentary lifestyle with long lockdown hours, lack of exercising and walking, and increased psychological stress due to new online assessment methods. All these lockdown-related lifestyle changes with prolonged sitting, increased body weight, and psychological stress are expected risk factors for increased LBP among the students.

Hence the purpose of the current study was to investigate the prevalence of LBP among students of three healthcare faculties (Faculty of Medicine, Faculty of Applied Medical Sciences, and Faculty of Nursing) at the Northern Border University (NBU) through a redesigned electronic questionnaire. The questionnaire also will cover risk factors among the enrolled students as well as the severity and frequency of LBP. Also, the effect of COVID-19, which altered lifestyles, on LBP among the participants will be evaluated. In addition, questions on the protective measures will be included to evaluate the awareness of these protective strategies as well as their extent of implementation.

Material and Methods

The current study was conducted to evaluate LBP among the students of healthcare faculties in NBU as well as the effect of COVID-19 on the intensity and severity of LBP among the study population. This study was conducted as a cross-sectional descriptive survey-based study. The study was based on a predesigned structural questionnaire composed of four sections after the consenting of the participants. Data were collected using a self-administered online survey using Google documents. Informed consent was included at the beginning of the questionnaire, showing the aim and objectives of the study as well as the data of the investigator. The first section of the questionnaire was designed to collect the demographic data of the students enrolled in the study, including the name of their faculty, gender, and academic years. The second section of questions was prepared to investigate the causes and suggested risk factors of LBP among the participants, such as high body mass index (BMI) smoking, family history of LBP, DM, neck pain, headache, gastrointestinal problems, and prolonged sitting for more than 3 hours. The third section was designed to ask about the presence of LBP, duration since the first attack, intensity based on the Oswestry LBP disability questionnaire [19], frequency. The Oswestry LBP disability questionnaire is based on the pain intensity and the effect of pain on daily life activities including washing, dressing, lifting objects, walking, sitting, standing, traveling, sleeping, social life, and employment and home activities. Also, the survey questionnaires took into account the life-changing effect of COVID-19 over the last three months. The last section of questions was based on the the students' awareness of protective strategies for LBP and the extent of their implementation.

Statistical methods:

The sample size was estimated based on the number of students in the healthcare faculties (Medicine, Applied Medical

Sciences, and Nursing) at the Northern Border University. The total number of students was 1040 students (572, 260, and 208 students in the faculties of medicine, applied medical sciences, and nursing respectively), hence at confidence interval (95%) and an assumed 5% precision, the minimal targeted sample size was 281. The Chi-square test was used to study the effect of each factor, while a multivariate regression model was used to evaluate the combined effect of the variables. All statistical analyses were conducted using SPSS package 16. Significance was considered with a p-value<0.05.

Results

The study was conducted electronically via an electronic link to a Google questionnaire form. Three hundred nine participants were voluntarily enrolled in the study. According to their faculties, 207 (66.9%) participants were from Faculty of Medicine, while 44 (14.2%) and 58 (18.7%) were from Applied Medical Sciences and Nursing, respectively. Genders and academic years of the participants are shown in the Table 1.

Among the participants, 123 (39.8%) reported at least one LBP attack in their medical history during their lives; 25/123 (20.4%) participants reported the first attack in the last 3 months. The number of participants reported LBP was 13/123 (10.6%), 81 (65.8%), and 29 (23.65) participants from faculties of Applied Medical Sciences, Medicine, and Nursing, respectively with no significant difference of LBP among the 3 faculties participants (p-value: 0.16).

Regarding the LBP, eight risk factors (gender, ages, smoking, BMI, Family history of LBP, neck pain, DM, and prolonged sitting for more than 3 hours) were evaluated. Interestingly,

Table 1. Faculties, gender and academic years of the participants enrolled in the study

Faculty	Gender				Year				Total
	Male		Female		First to third academic year		Fourth to sixth academic year and interns		
	n	%	n	%	n	%	n	%	
Applied	13	29.5	31	70.5	25	56.8	19	43.2	44 (100%)
Medicine	86	41.5	121	58.5	72	34.8	135	65.2	207 (100%)
Nursing	0	0.0	58	100.0	37	63.8	27	46.6	58 (100%)
Total	99	32.0	210	68.0	128	41.4	181	58.6	309 (100%)

132/309 (42.7%) participants reported that they had noticed an increase in the body weight in the last 3 months. Weight gains were less than 5 kilograms in 76 participants and from 5 to 9 kilograms in 47 participants and 10 kilograms or more in 9 participants. Smoking was reported by 37/309 (12%) participants, of whom, 3 reported that they started smoking in the last 3 months. Prolonged sitting was reported in 206/309 participants (66.6%). The most common cause of prolonged sitting was studying (152/206). Univariate and multivariate data analyses are shown in Table 2. Gastro-intestinal problems were reported by 65 (21%) participants, among them, 40 participants reported irritable bowel syndrome. DM, neck pain, and prolonged sitting were shown as the most significant risk factors in the multivariate models (p-values: 0.001, 0.003, and 0.000, respectively). The cause of LBP was diagnosed in only 9

Table 2. Univariate and multivariate analysis of low back pain (LBP) risk factors among the participants responded to the questionnaire.

variables		Total		Univariate analysis					Multivariate analysis			
		N	%	NO LBP		With LBP		p-value	p-value	OR	OR 95% CI	
				N	%	N	%				Lower Limit	Upper Limit
Gender	Female	210	68.0	139	74.7	71	57.7	0.002**	.052	.498	.247	1.006
	Male	99	32.0	47	25.3	52	42.3					
Years	1st to 3rd	128	41.4	84	45.2	44	35.8	0.101	.436	.792	.440	1.425
	> 3rd year	181	58.6	102	54.8	79	64.2					
BMI	<18.5	39	12.6	21	11.3	18	14.6	0.002**	.064	1.44	.978	2.124
	18.5-24.9	144	46.6	98	52.7	55	44.7					
	25-29.9	97	31.4	50	26.9	47	38.2					
	≥30	29	9.4	26	14.0	3	2.4					
Smoking	No	272	88.0	168	90.3	104	84.6	0.126	.183	.522	.201	1.359
	Yes	37	12.0	18	9.7	19	15.4					
Family History	No	224	72.5	148	79.6	76	61.8	0.001*	.065	.547	.288	1.038
	Yes	85	27.5	38	20.4	47	38.2					
DM	No	271	87.7	154	82.8	107	87.0	0.001**	.001	6.534	2.110	20.233
	Yes	38	12.3	32	17.2	16	13.0					
Neck pain	No	231	74.8	153	82.3	78	63.4	0.000***	.003	.321	.152	.677
	yes	78	25.2	33	17.7	45	36.6					
GIT	No	244	79.0	153	82.3	91	74.0	0.08	.242	.660	.329	1.324
	Yes	65	21.0	33	17.7	32	26.0					
Sit	No	103	33.3	89	47.8	14	11.4	0.000***	.000	.168	.082	.344
	Yes	206	66.7	97	52.2	109	88.6					
Total		309	100	186	100	123	100					

Table 3. Severity and frequency of low back pain among participants enrolled in the study with a history of LBP

LBP Criteria	n	%
Severity		
No disability (scored 0-4)	73	59.3
Mild (Scored 5-14)	29	23.6
Moderate (Scored 15-24)	17	13.8
Severe (Scored 25-34)	4	3.3
Complete (Scored 35-50)	0	0
Frequency		
Daily	21	20.6
Once weekly	15	14.7
Once monthly	32	32.4
Once yearly	21	20.6
Single attack	12	11.8

cases (7.3%). Physical trauma (5 cases) and prolapsed disc (2 cases) were the most common causes.

LBP intensity was categorized based on the Oswestry LBP disability questionnaire. The Oswestry LBP disability questionnaire is based on the pain intensity and the effect of pain on daily life activities. Most of the participants with LBP (73/123) reported no disability (59.3%), while none of the participants reported disability data scored as complete disability (Table 3). Multivariate analysis showed that the studied risk factors did not affect the severity of the reported disability among study participants with a history of LBP. The frequency data of LBP among the participants are shown in Table 3. Most participants with LBP reported a single attack per month. Interestingly, LBP intensity was reported to be increased in 21/123 (20.6%) participants in the last 3 months, while the frequency was increased in 36/123 (29.4%) cases of LBP.

Regarding the used strategies to control LBP, the proper sitting practice was shown to be the most commonly used by participants with a history of LBP [63/123 (51%)] followed by firm mattress [58/123 (47.1%)] and proper healthy shoes [58/123 (47.1%)]. While healthy diet and exercising were practiced by 54/123 participants (44.1%), the least common protective measure was a proper standing practice which was applied only by 51/123 participants (41.2%).

Discussion

The current study was designed to investigate the prevalence of LBP among students of three healthcare faculties (Faculty of Medicine, Faculty of Applied Medical Sciences, and Faculty of Nursing) at Northern Border University (NBU) through a redesigned electronic questionnaire. The questionnaire covered the risk factors among the enrolled students as well as the severity and frequency of LBP. Also, the effect of COVID-19, which altered lifestyles, on LBP among the participants has been evaluated. According to the reported data, 123 (39.8%) of all participants reported at least one LBP attack in their medical history during their lives and 25/123 (20.4%) participants reported the first attack in the last 3 months. DM, neck pain and prolonged sitting were shown as the most significant risk factors in the multivariate models. According to the Oswestry

LBP disability questionnaire, most of the participants (73/123) with LBP reported no disability (59.3%), while no participants reported disability data scored as a complete disability. Most participants with LBP reported a single attack per month. Interestingly, lifestyle changes due to Covid-19 were associated with the first attack of LBP in about one-fifth of the reported cases of LBP. In addition, intensity and frequency of pain were observed in about one-fifth and one-third of LBP cases, respectively.

The current data reported that among the participants, 123 (39.8%) reported a history of at least one attack of LBP during their lives. This prevalence is much lower than reported in previous studies on medical students from other countries such as Vujcic et al. (2018) [15] who reported a lifelong LBP prevalence of 75.8 among medical students from Belgrade, while Falavigna et al. (2011) [20] reported 73.4% as prevalence of lifelong LBP among Brazilian medical students . These lower levels may be due to better practices regarding positioning and better facilities in the training hospitals with fewer requirements for physical activities in patients handling among the training hospitals, in addition to lower levels of obesity and other risk factors among our studied group compared to other studied populations.

Multivariate data analysis showed that family history of LBP, DM, and prolonged sitting are the most independent risk factors in the study population. Family history is known to play an important role in a lot of spine diseases which can cause LBP [21]. In addition, stressful traits of personality are commonly running in families or persons who are sharing similar life stressors [22]. Regarding DM in LBP, it was shown that diabetics have a 35% higher risk to suffer LBP and a 24 % higher risk of experiencing neck pain compared to other non-diabetic population [23]. While prolonged sitting is a well-known risk factor for LBP due to high stress over the back muscles and spinal discs, especially with bad positioning of the back and shoulders. Slouching and/or leaning forward can cause or aggravate already existing LBP [24].

According to the Oswestry LBP disability questionnaire, most of the participants with LBP (73/123) reported no disability (59.3%), while no participants reported disability data scored as a complete disability. Most participants with LBP reported a single attack per month. These levels of disability and frequency are expected in these middle ages group students. Interestingly, there was a reported increase in frequency and intensity in LBP in the last 3 months, which are associated with the Covid-19 pandemic. Covid-19 is expected to increase LBP due to the following causes: (1) increased hours of sitting among students to attend their online courses at home with more stain on the spine and intervertebral discs, (2) expected weight gain due to prolonged sitting and lack of activities with long hours of lockdown and closed sports facilities for social distancing, (3) more stress about the news of Covid-19, as well as the dramatic changes in teaching and evaluation systems, to be conducted via online exams and assignments.

Conclusion: Students of health care faculties are more prone to LBP due to various causes. In addition, healthcare workers are internationally known to be vulnerable to LBP. Thus early proper awareness among these students and future healthcare staff

can markedly minimize the size of the problem and improve their quality of lives with less absence and suffering in the future.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

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