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Factors causing low back pain in undergraduate medical students; A cross-sectional study

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ABSTRACT

BACKGROUND & OBJECTIVE: Low back pain is a serious health issue among medical students, particularly due to the taxing, rigorous nature of the course curriculum. The study aims to explore the causes and factors responsible for the ailment, with a focus on preventing low back pain, to provide valuable professional input by medical graduates in the future.
METHODOLOGY: A cross-sectional study was conducted among the undergraduate students of ABWA Medical College, Faisalabad, Pakistan, from March 2024 to Aug 2024 using a probability sampling technique (simple random). A self-administered questionnaire was distributed to explore the factors responsible for low back pain among undergraduate medical students. The data was collected and analyzed in SPSS 26 using the chi-square test.
RESULT: Of 240 participants, 154 (77%) reported low back pain. Prolonged sitting (>3 hours), lack of exercise, stressful conditions, and the hectic routines of medical students were identified as potential causes of low back pain among medical students, with P values of 0.03, 0.008, and 0.008, respectively. The stressful conditions, with increased study hours and long lecture hours, have been shown to be statistically significant (p-value < 0.05).
CONCLUSION: The prevalence of low back pain has increased to an alarming extent. Students should adopt a healthy lifestyle to cope with the stressful life in medical college.
KEY WORDS: Low Back Ache, Low BackPain, Postural, Medical Students.

INTRODUCTION

One of the most common health issues among undergraduate medical students and working-age people is low back pain, and its prevalence is increasing to an alarming extent. According to a recent report, the leading cause of disability worldwide is low back pain, accounting for 7.3% of the total [1]. A 2019 survey documented a prevalence of low back pain ranging from 1.4% to 20% in Canada [2]. A systematic review in Saudi Arabia suggests the prevalence of low back pain ranges from 64% to 89% among various professions [3].

In addition to health care professionals, medical students report a very high percentage of low back pain prevalence caused by a sedentary lifestyle and poor dietary and sleeping habits. A study reports a prevalence of low back pain among Belgrade medical students of approximately 75.8% [4]. A notably high demand for doctors has been noted globally, especially in Pakistan. Students spend hours sitting and studying, making the arduous task possible. Prolonged sitting in an abnormal posture can cause lower back and neck pain, which are widespread health problems among medical students.

Studies report that approximately 80% of adults have various musculoskeletal disorders, especially low back and neck pain. Such ailments precipitate disability with profound negative impacts on the individual's quality of life, productivity, creativity, and mental well-being [5].

Due to their curriculum's arduous and demanding nature, medical students are at high risk for developing low back pain and neck pain. They spend countless hours studying, sitting, standing, performing repetitive motions, and in awkward body positions while attending their clinical rotations [6]. Studies reported an approximation of 30% to 75% prevalence and an increasing academic progression. Moreover, as per the reports of the Global Burden of Disease (GBD) published in 2017, musculoskeletal conditions are the second-highest contributors to global disability [7]. These significant numbers indicate impaired quality of life and major causes of discomfort and disability among the affected population. Students with low back pain can experience reduced cognitive ability, reduced concentration, poor quality of life, and poor sleep quality that can lead to distressful results on their academic performance and increased stress levels [8].

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The easy availability and rapid development of technology gadgets like laptops, tablets, and smartphones have also been reported to potentially impact the quality of life. However, in countries with low to medium resources, conventional methods are used for teaching, causing an increased prevalence of low back pain due to a sedentary lifestyle and extensive burden of studies[9]. Given the possible effect of low back pain on medical studies, there is a need to recognize risk factors and powerful interventions for preventing and treating the condition in this population. No significant work has been done in Pakistan to carry out interventions to reduce the prevalence of low back pain.

Our study aims to investigate the prevalence and causes of low back pain among medical students, with the aim of providing evidence to enhance the quality of education and awareness of modifiable risk factors.

METHODOLOGY

A cross-sectional study using a probability sampling technique was conducted at Abwa Medical College, Khurrianwala, Punjab, Pakistan, from March 2024 to August 2024, with ethical approval from the institutional ethical committee (reference ABWA/mc/DME/838/2023). Undergraduate medical students in 2nd, 3rd, and 4th years of the MBBS program were included in the study. The study excluded all the faculty members, staff, and administrative members. Those students with serious low back pain on medical grounds were excluded from the study.

A self-administered electronic questionnaire comprising demographic details and a set of other symptoms was recorded. A self-administered electronic questionnaire was designed and distributed via email to 240 medical students. The response rate was 90%. Informed consent was taken from the students before enrolling them in the study. Data was collected and kept confidential, and only made public for publication purposes. The data collected via Google Forms were analyzed in SPSS 26 on Windows 11. Categorical data were presented as frequencies and percentages, while continuous variables were presented as means and standard deviations. A chi-square test was used to determine the association. The significance level used for all the tests was $p < 0.05$.

RESULTS

Table-I: Frequency distribution of respondents concerning demographic data (age, gender, BMI, and class).

Variables	Categories	n(%)
Age (years)	<= 21 Y	86(43.0)
	22 Y	69(34.5)
	> 23 Y	45(22.5)
Gender	Male	98(49.0)
	Female	102(51.0)
BMI	Underweight	16(8.0)
	Normal weight	106(53.0)
	Overweight	68(34.0)
	Obese	10(5.0)
Class	2nd year	40(20.0)
	3rd year	109(54.5)
	4th year	51(25.5)
	Total	200(100)

Table-II: Relationship between low back pain and response of respondents against different factors.

Statement		Have low back pain			Chi-Square
		Yes n(%)	No n(%)	Total n(%)	(P-value)
Prolonged sitting in hours > 3 hours	No effect	14(9.1)	1(2.2)	15(7.5)	13.87** (0.008)
	Small effect	41(26.6)	3(6.5)	44(22.0)	
	Moderate effect	44(28.6)	18(39.1)	62(31.0)	
	Strongly effect	43(27.9)	16(34.8)	59(29.5)	
	Extremely strongly effect	12(7.8)	8(17.4)	20(10.0)	
Prolonged study hours > 3 hours	No effect	7(4.5)	2(4.3)	9(4.5)	4.837 (0.304)
	Small effect	30(19.5)	15(32.6)	45(22.5)	
	Moderate effect	58(37.7)	11(23.9)	69(34.5)	
	Strongly effect	43(27.9)	14(30.4)	57(28.5)	
	Extremely strongly effect	16(10.4)	4(8.7)	20(10.0)	
Lack of exercise	No effect	11(7.1)	9(19.6)	20(10.0)	15.76** (0.003)
	Small effect	32(20.8)	7(15.2)	39(19.5)	
	Moderate effect	50(32.5)	7(15.2)	57(28.5)	
	Strongly effect	42(27.3)	10(21.7)	52(26.0)	
	Extremely strongly effect	19(12.3)	13(28.3)	32(16.0)	
Strenuous/hard exercise	No effect	15(9.7)	9(19.6)	24(12.0)	20.56** (0.000)
	Small effect	43(27.9)	2(4.3)	45(22.5)	
	Moderate effect	44(28.6)	11(23.9)	55(27.5)	
	Strongly effect	37(24.0)	11(23.9)	48(24)	
	Extremely strongly effect	15(9.7	13(28.3)	28(14)	
	Total	154(100)	46(100)	200(100)	

Table-III: Association in low back pain between improper posture, hard seats and stress full conditions along with prolonged use of mobile phones .

Statement		Have low back pain			Chi-Square
		Yes n(%)	No n(%)	Total n(%)	(P-value)
Improper posture	No effect	9(5.8)	9(19.6)	18(9.0)	10.84* (0.028)
	Small effect	37(24.0)	5(10.9)	42(21.0)	
	Moderate effect	35(22.7	11(23.9)	46(23.0)	
	Strongly effect	51(33.1)	13(28.3)	64(32.0)	
	Extremely strongly effect	22(14.3)	8(17.4)	30(15.0)	
Hard Seats	No effect	16(10.4)	2(4.3)	18(9.0)	5.013* (0.286)
	Small effect	33(21.4)	6(13.0)	39(19.5)	
	Moderate effect	46(29.9)	13(28.3)	59(29.5)	
	Strongly effect	31(20.1)	14(30.4)	45(22.5)	
	Extremely strongly effect	28(18.2)	11(23.9)	39(19.5)	
Stress full conditions	No effect	8(5.2)	6(13.0)	14(7.0)	13.87** (0.008)
	Small effect	14(9.1)	2(4.3)	16(8.0)	
	Moderate effect	28(18.2)	0(0.0)	28(14.0)	
	Strongly effect	54(35.1)	18(39.1)	72(36.0)	
	Extremely strongly effect	50(32.5)	20(43.5)	70(35.0)	
Prolonged mobile usage	No effect	19(12.3)	2(4.3)	21(10.5)	2.840NS (0.585)
	Small effect	18(11.7)	6(13.0)	24(12.0)	
	Moderate effect	24(15.6)	6(13.0)	30(15.0)	
	Strongly effect	47(30.5)	16(34.8)	63(31.5)	
	Extremely strongly effect	46(29.9)	16(34.8)	62(31.0)	
	Total	154(100.0)	46(100.0)	200(100.0)	

NS = Non-significant (P>0.05); * = Significant (P<0.05); ** = Highly significant (P<0.01).

A total of 214 participants filled out the form. After exclusion due to unfilled forms, 200 forms were analyzed. The mean age was calculated as 21 years. Most participants were females (n=102, 51%) aged less than 21 years and in the 3rd year of MBBS (n=109, 54.5%). Table-I represents the demographic profile of the patients.

Responses were collected by assessing the lifestyle and habits of the participants on Likert scale. Most of the participants enrolled in the study were non-smokers (n=182, 91%) while only 49 participants (24.5%) reported engaging in regular exercise. 154 participants (77%) recorded a response in favor of having low back pain starting months ago and still persisting.

Table-II depicts the relationship between gender and responses of the respondents against different etiological reason assessed on Likert scale. Prolonged sitting of more than 3 hours, lack of exercise and strenuous work are the leading causes of high prevalence of low back pain among the respondents with a P value less than 0.05 considered as statistically significant.

Table-III depicts the association between improper posture, hard seats and stressful conditions along with prolonged use of mobile phones with the chronic low back pain among medical students. The relationship between gender and responses of respondents to various etiological factors was assessed by applying the chi-square test, which revealed that stressful conditions had a statistically significant P-value of 0.008. 33.1% participants reported a strong effect of improper posture among those experiencing low back pain and 50% participants responded in favor of a strong association between low back pain and stress full conditions. Contrary to these, the prolonged use of mobile phone and use of hard seats was identified as the non-significant risk factor with a P value of 0.585 and 0.286 respectively.

DISCUSSION

The prevalence of low back pain among medical students has been increasing to an alarming extent. A variety of studies report high prevalence and frequency of low back pain among medical students. Our study aimed to explore the prevalence and the etiological factors behind them. In our study, 154 (77%) of 200 participants reported low back pain, while only 46 (23%) reported no low back pain. This high prevalence of low back pain among medical students is consistent with the literature, and prolonged sitting for more than 3 hours was identified as a potential cause. The burdensome and laborious curriculum compels them to study for prolonged hours [10].

In the present study, the statistical value recorded for prolonged sitting (<3 hours) was P value = 0.008 (Highly significant). A study exploring subjective and objective

outcomes found that prolonged sitting is a potential and key precipitant of low back pain among medical students [11]. Regular intervals, exercise, and other strategies should be implemented to reduce the occurrence of low back pain. A study conducted in Malaysia noted a high prevalence rate of musculoskeletal pain among the medical students. One of the key reasons was prolonged sitting and the use of computers and electronic media [12].

One of the key factors identified in our study for the increasing prevalence of low back pain among medical students was a lack of exercise and reduced physical activity. The arduous task of completing the curriculum to secure good marks, along with long hours of lectures and tutorials, often leaves students sitting for prolonged periods in abnormal postures, which can precipitate low back pain [13].

The results of our study are consistent with previous findings reporting a significant association between prolonged sitting and low back pain among medical students [14]. Another study reported that prolonged sitting in an improper posture is a leading cause of low back pain among medical students, with a statistically significant P-value of 0.005 [4].

In the present study, the use of hard seats and stressful academic conditions are also one of the potential causes for the low back pain among medical students. The P-value calculated in our study was 0.0286 for using hard seats. While the P-value for stressful conditions were recorded as 0.008 , which is statistically highly significant. The poor layout of the curriculum for medical students and conventional methods of classroom teaching makes them more difficult to cope up with this problem. A study conducted at Khyber Medical University identified lack of exercise, prolonged and abnormal sitting as the risk factors contributing to lower back pain [15]. A multivariate analysis with a logistic regression model suggests that daily exercise and walking for at least 20 minutes can significantly improve low back pain among medical students.

Digital health solutions have an emerging role in promoting preventive healthcare and healthy lifestyle practices among medical students. The integration of digital platforms for health education, ergonomic awareness, and stress management may help reduce sedentary behavior and associated musculoskeletal problems, including low back pain [16].

LIMITATIONS

It is important to consider limitations when interpreting the study's results, despite its valuable findings. This study had a cross-sectional design, which limits the ability to draw causal conclusions. The study was conducted at a single center and self-reported by medical students; hence, there is self-reporting and recall bias. There may be memory lapses that may affect results. Moreover, causative factors, the cross-sectional design is unable to determine causality between them and low back pain.

CONCLUSION

The prevalence of low back pain has increased to an alarming extent. The medical curriculum for medical graduates must be revised, and policies must be put in place to alleviate the burden on medical students. Students should adopt a healthy lifestyle to cope with the stress of medical college life. Factors such as female gender, low physical activity, short sleep duration, incorrect posture while using a mobile phone, hard seats & and a hectic study routine were significantly correlated with low back pain. Students suffering from low back pain can have long-term deteriorating health effects, which can be determined in the future.

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Authors Contributions:

Uzma Kausar: Substantial contributions to the conception and design of the work.

Muhammad Sohail Anjum Noor : The acquisition, analysis, and interpretation of data for the work.

Amir Ahmad : Drafting the work.

Muhammad Usama Sohail: Reviewing it critically for important intellectual content.

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