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Original Research Article

Low back pain prevalence and risk factors among MBBS students in Lahore: a cross-sectional study

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ABSTRACT

Background: Low back pain (LBP) is a leading cause of disability worldwide, yet little is known about its burden among Pakistani medical students. We aimed to estimate the prevalence of LBP in MBBS students at SIMS Lahore and identify associated factors.

Methods: In this cross-sectional study (June–September 2021), a total of 1000 MBBS students were invited to participate in the survey with response rate of 93%. After IRB approval (IRB/2020/628/SIMS), participants completed an online survey including a modified Oswestry Disability Questionnaire (validated in a 30-student pilot; Cronbach's α=0.82). Statistical significance was set at $p<0.05$.

Results: Mean age was 20±2 years; 52.5% female. Overall LBP prevalence was 43% (342 minimal, 58 moderate disability) with 95% CI (39.8%–46.2%). Significant associations with LBP included gender ($p=0.042$), BMI ($p=0.049$), place of study (room vs. library; $p=0.012$), backpack use in clinical rotations ($p=0.005$), and family history ($p<0.001$). No association was observed for academic year, exercise habits, chair type, sitting posture, or study hours.

Conclusions: Nearly half of MBBS students report LBP, with identifiable risk factors amenable to early intervention—especially ergonomics education and backpack-weight management. Future multicentre studies and multivariate analyses are needed to confirm these associations and explore causality.

Keywords: Low back pain, Prevalence, Risk factors, Medical students, Cross-sectional study

INTRODUCTION

Low back pain, also known as lumbar back pain, is pain in the back from the lowest rib to the gluteal fold, which may radiate into the legs.[1] It is the most common musculoskeletal condition (MSD) in people worldwide. Subjects report pain in their back, below the twelfth rib and above the inferior gluteal fold. Nerve roots, muscles, fasciae, bones, joints, intervertebral discs, and organs in the abdominal cavity are all possible anatomical sources of symptoms. LBP is not a disease or a diagnosable condition. It refers to pain of variable durations in a section of the anatomy that has become a response to how people react to external and internal stimuli.[2]

Back pain affects 15% to 30% of the population, and most adults experience it at some point in their lives. Low back pain is the most frequent form, accounting for 84% of all back pain cases during a lifetime.[3] In 2020, over 500 million people worldwide experienced low back discomfort. By 2050, this figure is expected to rise to over 800 million. Although age-standardized rates have fallen marginally over the past 30 years, the number of cases continues to climb due to population expansion and

ageing, especially in Asia and Africa. Worldwide, low back pain is the largest cause of disability. The prevalence and duration of impairment due to low back pain rises with age, culminating at 85 years, threatening healthy aging.[4] LBP equally affects young working class of society as 'it is no longer considered a disease of old.[5] Individuals with back pain experienced much larger production losses when compared to those without back pain.[3]

LBP is frequently related to the nature of a person's employment or occupation. Healthcare personnel are more likely to experience it due to the nature of their work. Medical students, like doctors and healthcare workers, have high rates of low back pain, which can be caused by smoking, stress, bad sleeping posture, and family history.[6] A previous study found that medical students with a family history of musculoskeletal pain, trauma, or clinical experience had a higher prevalence of musculoskeletal pain. Medical students' sedentary lifestyles may increase their risk of low back discomfort due to the demanding curriculum at medical colleges. Low back discomfort was much more common among medical students in their last year compared to first-year students.[7] Prolonged static sitting at work is regarded as one of the primary dangers for the development of musculoskeletal diseases (MSDs) and negative health consequences. Poor posture and prolonged sitting are thought to be a cause of disorders such as lumbar discomfort and lower back pain (LBP), even if the scientific explanation of this association is still unclear and creates disagreements in the scientific community.[8] The study shows that suffering LBP during clinical rotations has a significant impact on medical trainees' career choices in practice.[9] Variety of exercises including aerobics from low to moderate degree, high intensity aerobic exercises, techniques for stabilization of core, yoga for flexibility and exercises for posture maintenance are available for LBP.[10]

Despite LBP being so common in medical students with many predisposing factors, little attention has been paid to its prevalence among medical students in Pakistan, their attitude towards treating it and how it is affecting their life and concerned authorities. Although low back pain has been well studied in nurses, dental and physiotherapy students, and even practicing physicians, its prevalence, associated factors, and preventive attitudes remain under-explored in MBBS undergraduates. This study therefore aims to determine the prevalence of low back pain, identify its associated factors, and explore student perceptions at SIMS, Lahore.

METHODS

Study was conducted in cross-sectional design among medical students enrolled in public medical college of Lahore. Data was collected during the period of June to September 2021 after obtaining ethical approval from our Institutional Review Board (IRB) with reference number IRB/2020/628/SIMS. Initially Printed forms were used but later discontinued due to accessibility restrictions because of Corona pandemic so participants were provided with online Google Form which was self-administered questionnaire in the English language. Participants were recruited using convenience sampling. Students were invited via email and provided with a link to an online Google Form questionnaire. Participation was voluntary and anonymous. All responses were kept confidential and used solely for research purposes. LBP was defined as self-reported pain in the lumbar region during the past 12 months. Participants reporting such pain were classified as having LBP, and severity was assessed using the modified Oswestry Disability Index (ODI). A total of 1000 MBBS students from the official college roll list were invited to complete the online survey with a response rate of 93%. Prior to data collection, we pilot tested the instrument on 30 students to assess clarity and reliability; Cronbach's alpha for the disability scale was 0.82, indicating good internal consistency. Questionnaire was the modified version of Oswestry Low Back Pain Disability Questionnaire (20). We used this questionnaire to measure the student's functional disability due to low back pain. Questionnaire consisted of questions related to sociodemographic details, factors that could have significant relation with prevalence of low back pain which includes gender, BMI, mode of transport, daily travelling time, nicotine consumption, physical sports/exercise, hours of study per day, place of study, method of study, use of therapy tools for low back pain, daytime sleepiness during study, sleeping position, type of chair used, sitting position during studying, type of mattress used, standing time in wards/OT/Emergency and family history of low back pain and specific questions to assess the level of low back pain from minimal disability to crippled. Students were contacted via email and provided with a link to a form on google drive (docs.google.com) along with cover message explaining the purpose of the study, consent, surety of their anonymity and necessary instruction on how to fill the form correctly.

MBBS students from first to final year were included in the study. The first and second years were categorized as pre-clinical, while the third to final years were considered clinical. All participants completed the Oswestry Disability Index questionnaire to assess the impact of low back pain on their ability to perform daily activities. Each option in every section was given a point from 0 to 5. The total ODI percentage was calculated as (sum of item scores) ÷ (maximum possible score given 10 items×5 =50)×100. All the points were added and percentage was taken to divide the students in given sections: no pain, minimal disability, moderate disability, severe disability or crippled. We categorized disability as 0–20% minimal, 21–40% moderate and 41–60% severe disability. This cross-sectional observational study was conducted and reported in accordance with the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines. All statistical analyses were performed using

SPSS statistical software version 26 (IBM corp., Armonk, NY, USA). Categorical variables are presented as frequencies and percentages. Numeric variables are presented as mean with standard deviation. Chi square test was applied to compare categorical variables. Statistical significance was based on p-value less than 0.05. We calculated 95% confidence intervals (CIs) for prevalence estimates.

RESULTS

Total of 930 students filled the form. Response rate was 93%. Mean age was 20 years±2 years ranging from 18 years to 24 years. There were 443 (47.6%) males and 487 (52.4%) females. Students in pre-clinical years were 465 (50.0%) and in clinical year were 465 (50.0%). Mean BMI was 21.93 kg/m^2±3.48 kg/m^2 ranging from 14.86 kg/m^2 to 38.75 kg/m^2. 344 (37%) students were day scholar while the remaining 586 (63%) students were hosteller. Table 1 presents the demographic characteristics of all survey participants.

Table 1: Demographic characteristics.

Characteristic	N (%)
Gender	
Male	443 (47.6)
Female	487 (52.4)
Academic year	
Pre-clinical year	465 (50.0)
Clinical year	465 (50.0)
Residence	
Day scholar	344 (37)
Hosteller	586 (63)

Prevalence of low back pain

The prevalence of LBP among 930 participants was 43.0% (400/930; 95% CI 39.8%–46.2%). Among those with LBP(n=400), 85.5% (n=342) had minimal disability, 14.5% (n=58) had moderate disability and no participant severe disability, while 57% (n=530) of participants out of 930 reported no back pain.

Of total of 400 participants with LBP, 175 (43.8%) participants perform exercise on regular basis while 225 (56.3%) participants do not. Hours of study for 174 (43.5%) students were 1-2 hours, 2-4 hours for 151 (37.8%) students, 4-6 hours for 55 (13.8%) students and 20 (5.0%) students spent more than 6 hours daily. Most of the students (n=322, 80.5%) study in their room while 78 (19.5%) students opted for library as a place of study. In their study setting or normal daily life, 212 (53.0%) participants use chair with straight hard back, 86 (21.5%) participants use wooden standard classroom chair and only 102 (25.5%) participants have ergonomic chair. While studying, 51 (12.8%) students said that they sit straight, 214 (53.5%) said that they lean forward and 135 (33.8%) students said that they lean backward most of the time.

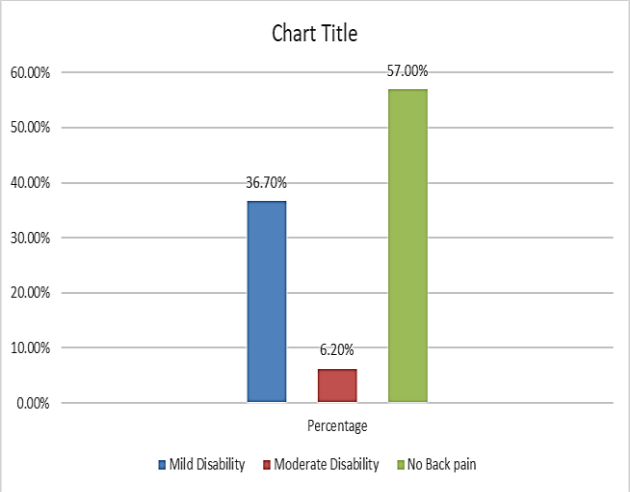

Figure 1: Prevalence of low back pain in medical students.

Table 2: Factors affecting lower back pain.

	N (%)	P value
Physical exercise/sports		0.076
Yes	175(43.8)	
No	225(56.3)	
Hours of study		0.522
1-2 h	174(43.5)	
2-4 h	151(37.8)	
4-6 h	55(13.8)	
More than 6 h	20(5.0)	
Place of study		0.012*
Room	322(80.5)	
Library	78(19.5)	
Type of chair used		0.848
Straight back	212(53.0)	
Classroom chair	86(21.5)	
Spine chair	102(25.5)	
Sitting position		0.060
Straight	51(12.8)	
Lean forward	214(53.5)	
Lean backward	135(33.8)	
Carry backpack to college/ward		0.005*
Yes	304(76)	
No	96(24)	
Family history of back pain		0.000*
Yes	108(27.0)	
No	292(73.0)	

*p value<0.05 so they are statistically significant.

Out of the students with LBP, 206 (51.5%) students spent 1 hour, 132 (33%) spent 2 hours, 46 (11.5%) spent 3

hours and 16 (4%) spent 4 hours daily in ward, operation theatre or emergency room doing clinical work. About 152 (38.0%) students carry their bags on their back in wards, operation theatres and emergency rooms along with them. Among the participants with LBP, 108 (27.0%) participants have family history of low back pain while 292 (73.0%) do not have any previous family history.

Significance of factors associated with low back pain (LBP)

Overall prevalence of low back pain is significantly associated with gender (p=0.042). There was no significant association between the prevalence of low back pain and academic year i.e., clinical year or pre-clinical year (p=0.968). BMI was significantly associated with low back pain prevalence (p=0.049). Low back pain was not significantly associated with whether the participants were day scholars or hostellers (p=0.099). Physical exercise/sports were not significantly associated with LBP (p=0.076). Prevalence of LBP was not significantly associated with daily hours of study (p=0.522) but significantly associated with place of study, whether it is the participant's own room or library (p=0.012). LBP was not significantly associated with type of chair used (p= 0.848), sitting position while studying (p=0.060) and the time students of clinical years spent in wards standing (p=0.606). Prevalence of low back pain is significantly associated with carrying backpack to the wards/ER/OT by the students of clinical years (p=0.005). LBP is significantly associated with family history of low back pain (p<0.001).

DISCUSSION

The study shows the prevalence of back pain is high with 43% of participants suffering from back pain with either minimal 85.5% (n=342), or moderate disability 14.5% (n=58). This result is in range of previous studies that show significant high prevalence of back pain.[5,11,12] This high prevalence of back pain in young students has significant implications on their quality of life, concentration and academic performance. The study shows that there is significant association between back pain and gender (p=0.042). This result is consistent with previous studies. Women frequently report a higher incidence of musculoskeletal issues, which may be attributed to hormonal variations, reduced muscle mass, or heightened pain sensitivity. Furthermore, psychosocial stressors and variations in reporting behaviours could also play a role in this phenomenon. Back pain is significantly associated with family history of back pain(p<0.001) and the results are in consistent with studies by Alshayhan and Alshagga.[5-13]

The reason might be a combination of genetic and environmental factors. The students might inherit some traits like spinal misalignment, low sensitivity to pain, intervertebral disc issues. Some families may share sedentary habits including physical inactivity, dietary habits and poor posture while sleeping and sitting. Carrying backpacks to ER/WARD/OT is associated with back pain (p=0.005) as found by Alshayhan.[5] The reason for this observation may be that carrying bags puts increased strain on para spinal muscle, muscle fatigue and spinal compression which eventually results in back pain. Improper backpack positioning, such as carrying a bag on one shoulder, may also contribute to imbalanced loading and long-term discomfort. The study showed that BMI was significantly associated with low back pain prevalence (p=0.049) and these results are in consistent with the study conducted in Bangladesh 14 where increased BMI is associated with increased prevalence of back pain. This might be due to the increased load on the spine especially the lower back with other factor involved like decreased physical activity due to higher BMI, inflammation due to obesity

There is no relation between physical activity and back pain. This result is in contrast to the previous studies by Taha.[15] This difference may stem from variations in the definitions or measurements of physical activity—our subjects might have participated in light or inconsistent activities that were inadequate to influence back health. Additionally, it is plausible that other elements, such as exercise posture or existing health conditions, had a more substantial impact than the level of activity by itself. Finally, some participants might have inaccurately reported their activity levels due to recall bias. There is no significant association between back pain and clinical years. This result is in consistent with previous study by Taha YA in which being in pre-clinical years or clinical years did not affect the prevalence of back pain. There was no association between type of chair, sitting position and daily hours of study. These results are in contrast to the previous studies by Alshayhan, Taha YA in which prolonged sitting, using chair without spine rest and sitting position were all associated with increased incidence of back pain.[5,15]

The lack of these associations can be attributed to multiple factors, like variations in sample characteristics such as age, physical activity levels, or even how individuals perceive or report pain. Cultural differences and improved ergonomics in the study environment could also play a role. Additionally, some participants might have underreported discomfort either due to recall bias or simply considering mild back pain as a normal part of student life. It's also possible that other unmeasured factors, such as stress or sleep quality, influenced the presence of back pain. Due to sample size constraints for some subgroups, we restricted analysis to bivariate tests; future studies should use logistic regression to adjust for confounders. The study being of a cross-sectional design limits causal interpretation. Data was collected by self-reported questionnaires therefore introducing potential recall and reporting biases in the responses. As data was collected from single institute so it reduces generalizability to broader populations. Additionally, unmeasured confounders such as stress, sleep quality, and

prior musculoskeletal conditions may have influenced the results.

Limitations

This study's cross-sectional design prevents any causal inferences between identified factors and low back pain, and its single-centre setting at SIMS Lahore may limit applicability to other institutions. There is potential for self-selection bias, students experiencing discomfort could have been more inclined to participate, while reliance on self-reported measures introduces recall and reporting biases. Although we collected data on a variety of demographic and behavioural variables, important influences such as stress levels, sleep quality, prior musculoskeletal disorders, and formal ergonomic training were not assessed. Finally, the analysis was limited to bivariate comparisons, and the absence of multivariable analysis (e.g., logistic regression) limited the ability to adjust for confounding and identify independent predictors.

CONCLUSION

LBP is common in almost half of MBBS students in this cross sectional, with the majority reporting minimal to moderate disability. Associations with gender, BMI, study setting, backpack use in clinical rotations, and family history suggest multiple contributing influences. Interventions focused on ergonomics and load-management deserve consideration. Future multicentre studies using multivariable analyses are needed to confirm independent predictors and improve generalizability.

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