



Original Article



Association of Sitting Posture with Low Back Pain Among University Students

Arisha Zubair¹, Sundas Sohail¹, Samia Sarmad¹, Sana Toqueer^{1*} and Taimoor Ahmad¹¹University Institute of Physical Therapy, The University of Lahore, Lahore, Pakistan

ARTICLE INFO

Keywords:

Sitting Posture, Low Back Pain, University Students, Body Awareness and Postural Habits among Young Adults questionnaire

How to Cite:

Zubair, A., Sohail, S., Sarmad, S., Toqueer, S., & Ahmad, T. (2024). Association of Sitting Posture with Low Back Pain Among University Students: Sitting Posture and Back Pain. *THE THERAPIST (Journal of Therapies & Rehabilitation Sciences)*, 5(03), 07-11. <https://doi.org/10.54393/tt.v5i03.253>

***Corresponding Author:**

Sana Toqueer
University Institute of Physical Therapy, The University of Lahore, Lahore, Pakistan
sana.toqueer@uip.t.uol.edu.pk

Received Date: 10th August, 2024Acceptance Date: 26th September, 2024Published Date: 30th September, 2024

ABSTRACT

Prolonged sitting and rising back pain among students have been linked to reduced motivation toward career-oriented opportunities. **Objective:** To find an association of sitting posture with low back pain among university students. **Methods:** This cross-sectional observational study was conducted of 6-month period at the University of Lahore, using a non-probability convenience sampling technique. A total of 189 university students aged 18–25 years were recruited based on defined inclusion and exclusion criteria. Data were collected through a self-structured questionnaire comprising three sections: demographics, postural habits (using a validated postural awareness questionnaire), and low back pain assessment (using a validated adolescent LBP questionnaire). Statistical analysis was performed using SPSS version 27.0. **Results:** In this observational study of university students aged 18–25, 39% were between 18–21 years old and 60% were 22–25 years. The sample comprised 34% males and 65% females. Most students were enrolled in the English Department (38%), Allied Health Sciences (34%), or Information Technology (27%). Regarding sedentary time, 45% reported sitting for about five hours daily, while 54% sat for five to ten hours. Ergonomic seating was limited only 32% used chairs with back and arm support, while 67% sat on chairs without such features. Postural analysis showed that over half (52%) adopted kyphotic or hyper-lordotic postures, 21% slouched, and just 24% maintained a neutral spine. Overall, 66% displayed poor posture during classes and this rose to 76% at home. **Conclusion:** This study concluded that sitting posture was significantly associated with low back pain.

INTRODUCTION

Low back pain was typically characterized as discomfort localized between the costal margin and the inferior gluteal folds [1]. Discomfort originating in the lumbar region was predominantly identified as lower back pain. Anatomically, the lumbar spine comprised the segment of the vertebral column extending from the twelfth thoracic vertebra (T12) to the first sacral vertebra (S1), forming the lower portion of the spinal axis [2]. Low back pain had historically been classified according to its etiological origins. While most cases were deemed non-specific in nature, a definitive pathological cause was identified in approximately 5 to 10 percent of instances. These specific cases encompassed a range of conditions, including degenerative and inflammatory disorders, infections, neoplasms, metabolic bone diseases, referred visceral pain, psychogenic factors, traumatic injuries, and congenital anomalies. Non-specific

low back pain referred to discomfort arising in the absence of any clearly identifiable underlying pathology [3]. The prevalence of low back pain in Pakistan is varied in different studies. Among medical doctors it was calculated as 68% in 3 years [4]. Low back pain had been categorized into acute, sub-acute, or chronic classifications, depending upon its duration and intensity. Owing to its high prevalence, it constituted one of the most common complaints prompting individuals to seek medical attention [5]. Low back pain had represented the foremost contributor to disability within the United States, accounting each year for approximately 4.3 million years lived with disability nearly double the impact attributed to any other medical condition. On a broader scale, an estimated 13 percent of the adult population had endured chronic manifestations of low back pain [6]. Multiple risk factors, a sedentary



lifestyle, including prolonged sitting, extended driving durations, and occupational screen exposure, significantly elevated the likelihood of LBP. Additional contributors included excess body weight and tobacco use, extended periods of television viewing, video gaming, and the use of mobile or computer devices had similarly been associated with increased LBP prevalence [7]. The incidence of low back pain remained markedly higher among individuals seated without lumbar support compared to those utilizing ergonomically designed chairs with appropriate backrests [8]. University students had been particularly susceptible to low back pain, largely due to the academic demands that fostered prolonged sedentary behavior. Factors such as postural deviations, intense academic schedules, insufficient sleep, extended periods of study, and protracted classroom attendance had all contributed to musculoskeletal strain [9]. When students adopted non-neutral seated postures, asymmetrical mechanical loading had been exerted upon the spinal column, whereby abnormal tensile and compressive forces acted inappropriately upon spinal structures. This often resulted in deleterious muscular tension and pathological stress across spinal articulations [10]. Therefore, the present study had been conducted to examine the association between sitting posture and the incidence of low back pain among university students. It specifically observed students' sitting patterns, including whether they sat with or without back support.

The rationale behind this investigation lies not only in advancing academic understanding but also in contributing to societal well-being by promoting ergonomic awareness and encouraging preventative strategies to reduce musculoskeletal issues among adults.

METHODS

This study employed an observational cross-sectional design to examine the association between sitting posture and low back pain among university students. The study was conducted from February 2024– July 2024 at University of Lahore. A sample of 189 participants was calculated by using the Raosoft Online Sample Size Calculator with 95% confidence level. Non-probability convenience sampling technique was used. Data were collected using previously validated "Body Awareness and Postural Habits Among Young Adults" questionnaire (score ranged from 0–50. (0–19 scores considered as poor posture and 20–50 scores considered as good posture) and "Modified Nordic Questionnaire (Score ranged 0–5 (No back pain), 6–12 (Mild pain) and 13–18 (Moderate pain) [11, 12]. Inclusion criteria were participants aged 18–25 years, both male and female, with no back pain or injury [13]. Exclusion criteria were students with history of trauma or fracture, Ongoing LBP therapy, under 18 years [14, 15]. SPSS version

27.0 was used for statistical analysis. Categorical variables described as absolute frequencies (n) and relative frequencies (%); continuous variables described as mean $\pm$ standard deviation (parametric distributions) or as median and percentiles (nonparametric distributions). The Chi-square test was performed between sitting posture and non-specific low back pain.

RESULTS

This observational study recruited university students aged between 18 and 25 years. Among the participants, 39% were within the 18–21 age brackets, while 60% were between 22 and 25 years of age. Of the total sample, 34% were male and 65% were female. The largest proportion of students (38%) was enrolled in the Department of English, followed by 34% from the Department of Allied Health Sciences and 27% from the Department of Information Technology. Regarding sedentary behavior, 45% of the students reported spending approximately five hours sitting per day, whereas 54% indicated sitting for between five to ten hours daily. In terms of seating arrangements, 32% of the participants used chairs equipped with both back support and armrests, while the remaining 67% sat on chairs lacking such ergonomic features. When evaluating sitting posture, 52% of the students were observed to adopt kyphotic or hyper-lordotic postures, 21% exhibited a slouched posture, and only 24% maintained a neutral spine alignment. Postural assessment revealed that 66% of students demonstrated poor posture while seated in class, whereas 33% maintained a proper sitting posture. At home, the prevalence of poor posture increased, with 76% exhibiting suboptimal postural habits and merely 20% adopting correct sitting posture. Concerning musculoskeletal discomfort, 36% of students reported no back pain, 56% experienced mild back pain, and 24% suffered from moderate levels of discomfort. Statistical analysis revealed a significant association between sitting posture in class and the incidence of back pain, with the severity of back pain increasing as postural quality deteriorated. A similar significant association was observed between sitting posture at home and the prevalence of back pain. Pearson correlation analysis demonstrated a weak negative linear relationship between type of sitting posture and back pain ($r = -0.049$), suggesting that as postural quality declined, the likelihood of experiencing back pain slightly increased.

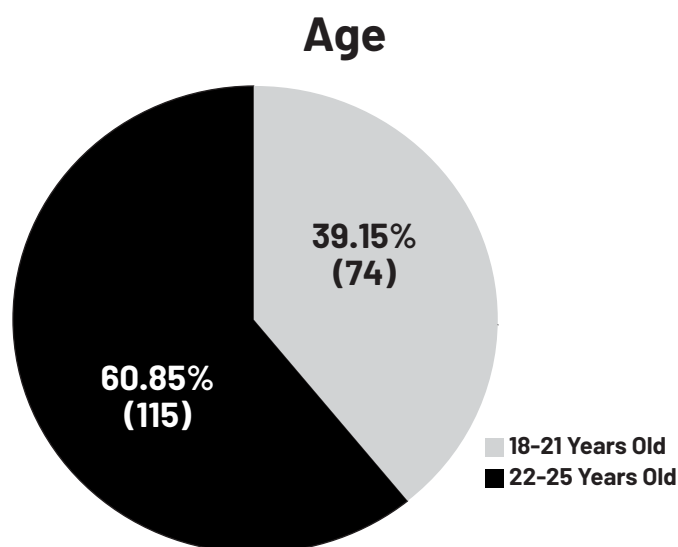


Figure 1: Age Distribution of Study Participants

Table 1 described that 124 out of 189 were female students participated, and 65 male students were participated in this study.

Table 1: Gender Distribution of Participants

Variables	Frequency (%)
Female	124 (65.61)
Male	65 (34.39)
Total	189 (100)

Table 2 described 66% who had poor posture while sitting in class, and 33% adopted good sitting posture in class.

Table 2: Sitting Posture Assessment in Class

Sitting Posture In Class	Frequency (%)
Good	64 (33.9)
Poor	125 (66.5)
Total	189 (100)

Table 3 elucidates 36% reported no back pain, 56% reported back pain but at mild level and 24% reported back pain at moderate level.

Table 3: Non-Specific Low Back Pain

Non-Specific Low Back Pain	Frequency (%)
No	36 (19.05)
Yes, had pain but mild	106 (56.06)
Yes, had pain but moderate	47 (24.87)
Total	189

Table 4 presents the cross-tabulation between students' sitting posture during class and the incidence of reported back pain. There was a statistically significant association between sitting posture at class and back pain, with back pain increasing as posture quality decreased.

Table 4: For Cross-Tabulation (Sitting Posture During Class*Back Pain)

Variables	Back pain			Total	P-Value
	No pain	Yes, had pain but moderate	Yes, had pain but mild		
Sitting posture during class Poor posture	29	59	37	125	0.003
Good posture	7	47	10	64	
Total	36	106	47	189	

The Pearson correlation analysis revealed a weak negative linear relationship between sitting posture and back pain ($r = -0.049$), Table 5.

Table 5: Relationship between Type of Posture and Back Pain

Variables	Type of Sitting Posture	Back Pain
Pearson Correlation	1	-0.049
Significant Value	-	0.03
Number of Cases	189	189

DISCUSSION

The present study identified a high prevalence of poor sitting posture and back discomfort among university students, with 56% reporting mild and 24% reporting moderate levels of back pain, significantly linked to suboptimal posture both in classrooms and at home. In contrast, the cross-sectional research conducted by Arena Ilic et al., in 2021 among Serbian medical students revealed a lower point prevalence of low back pain at 20.8%. While both studies recognized lifestyle-related contributors, Ilic's study highlighted cigarette smoking, academic stress, poor sleeping posture, and family history as significant predictors. Smoking emerged as the most prominent risk factor (OR = 2.5) [16]. Unlike the current research, which focused primarily on postural alignment and seating ergonomics, the Serbian study emphasized behavioral and hereditary influences. Together, these findings stress the importance of targeted preventive strategies addressing posture, ergonomics, and lifestyle choices. The current study revealed a strong association between poor sitting posture and back pain among university students, with a notable 56% experiencing mild and 24% moderate discomfort, particularly linked to classroom and home seating habits. Similarly, a 2025 investigation involving Australian physiotherapy students reported high lifetime (69%) and 12-month (63%) low back pain prevalence, with increased risk emerging after the first academic year, especially in those aged 20–21. While the Australian study emphasized prolonged academic exposure, clinical practice, and sustained forward-leaning postures as key contributors, the present research highlighted poor ergonomic support and suboptimal postural alignment [17]. Both studies demonstrated that extended periods of sitting, and academic strain significantly heighten the risk

of back pain. Moreover, age appeared as a contributing factor in both contexts. In the present study, a significant proportion of university students reported mild to moderate back pain, with poor sitting posture and inadequate ergonomic support identified as key contributing factors. Similarly, a 2022 cross-sectional study at Faridpur Medical College in Bangladesh found high 6-month (46.9%) and 12-month (63.3%) prevalence rates of low back pain among medical students, often linked to prolonged sitting, poor physical activity, and substandard seating conditions. Both studies observed higher prevalence in students exposed to extended sedentary periods and insufficient ergonomic arrangements. The Bangladeshi research further identified female gender and elevated BMI as significant risk factors [18]. While the current study did not focus on BMI or gender-based analysis, both investigations emphasized modifiable behaviors as primary drivers of LBP. Hoy *et al.*, highlight the high global prevalence and burden of nonspecific low back pain, emphasizing its significant impact on daily functioning and healthcare systems. Buchbinder *et al.*, emphasize the urgent need for global action to address the rising burden of low back pain [19, 20].

CONCLUSIONS

This study demonstrated a significant association between sitting posture and low back pain among university students aged 18–25 years, who spent long hours sitting, with a majority seated on non-ergonomic chairs. Poor sitting posture was particularly common at home, with 76% of participants failing to maintain proper spinal alignment. A significant link emerged between classroom sitting posture and the severity of back pain, highlighting the need for improved posture. Additionally, an inverse relationship was noted between sitting posture quality and back pain levels. These findings underscore the importance of ergonomic interventions and awareness programs to reduce postural strain and associated musculoskeletal complaints.

Authors Contribution

Conceptualization: AZ, ST

Methodology: AZ, SS, ST, TA

Formal analysis: AZ, SS, ST, TA

Writing, review and editing: AZ, SS, ST, TA

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The authors received no financial support for the research, authorship and/or publication of this article.

REFERENCES

- [1] Chiarotto A and Koes BW. Nonspecific low back pain. *New England Journal of Medicine*. 2022 May; 386(18): 1732–40. doi: 10.1056/NEJMcp2032396.
- [2] Sassack B and Carrier JD. Anatomy, back, lumbar spine. *InStatPearls*[Internet]. 2023 Aug.
- [3] Krismer M and Van Tulder M. Low back pain (non-specific). *Best practice & research clinical rheumatology*. 2007 Feb; 21(1): 77–91. doi: 10.1016/j.berh.2006.08.004.
- [4] Javed S, Dawood MH, Memon MW, Selod IZ, Seja A. Prevalence of low back pain among medical doctors of the teaching hospitals in Karachi, Pakistan: A cross-sectional survey. *SAGE Open Medicine*. 2023 Mar; 11: 20503121231157217. doi: 10.1177/20503121231157217.
- [5] Agnus Tom A, Rajkumar E, John R, Joshua George A. Determinants of quality of life in individuals with chronic low back pain: a systematic review. *Health Psychology and Behavioral Medicine*. 2022 Dec; 10(1): 124–44. doi: 10.1080/21642850.2021.2022487.
- [6] Stevans JM, Delitto A, Khoja SS, Patterson CG, Smith CN, Schneider MJ *et al.* Risk factors associated with transition from acute to chronic low back pain in US patients seeking primary care. *JAMA network open*. 2021 Feb; 4(2): e2037371-. doi: 10.1001/jamanetworkopen.2020.37371.
- [7] Mahdavi SB, Riahi R, Vahdatpour B, Kelishadi R. Association between sedentary behavior and low back pain; A systematic review and meta-analysis. *Health Promotion Perspectives*. 2021 Dec; 11(4): 393. doi: 10.34172/hpp.2021.50.
- [8] Julian CU, Manabat RP, Moh'd Ali SB, Jesmi A, Quiambao VJ, Ruaya KR *et al.* Low Back Pain Among Freshmen Students of Tertiary Institution: Prevalence and Risk Factors.
- [9] Minghelli B. Musculoskeletal spine pain in adolescents: Epidemiology of non-specific neck and low back pain and risk factors. *Journal of Orthopaedic Science*. 2020 Sep; 25(5): 776–80. doi: 10.1016/j.jos.2019.10.008.
- [10] Caneiro JP, O'Sullivan P, Burnett A, Barach A, O'Neil D, Tveit O *et al.* The influence of different sitting postures on head/neck posture and muscle activity. *Manual Therapy*. 2010 Feb; 15(1): 54–60. doi: 10.1016/j.math.2009.06.002.
- [11] Schwertner DS, Oliveira RA, Beltrame TS, Capistrano R, Alexandre JM. Questionnaire on body awareness of postural habits in young people: construction and validation. *Fisioterapia em Movimento*. 2018; 31: e003116. doi: 10.1590/1980-5918.031.ao16.
- [12] Chiwaridzo M, Chikasha TN, Naidoo N, Dambi JM, Tadyanemhandu C, Munambah N *et al.* Content

- validity and test-retest reliability of a low back pain questionnaire in Zimbabwean adolescents. *Archives of Physiotherapy*. 2017 Feb; 7(1): 3. Doi: 10.1186/s40945-017-0031-y.
- [13] Heikkala E, Karppinen J, Mikkola I, Hagnäs M, Oura P. Association between family history of surgically treated low back pain and adolescent low back pain. *Spine*. 2022 May; 47(9): 649-55. doi: 10.1097/BRS.0000000000004345.
- [14] Fu Y, Chiarotto A, Enthoven W, Skou ST, Koes B. The influence of comorbidities on outcomes for older people with back pain: BACE-D cohort study. *Annals of Physical and Rehabilitation Medicine*. 2023 Oct; 66(7): 101754. doi: 10.1016/j.rehab.2023.101754.
- [15] Kientchockwiwat K and Tangcheewinsirikul S. Low Back Pain Prevalence and Associated Factors among Medical Students. *Vajira Medical Journal: Journal of Urban Medicine*. 2022 Oct; 66(5): 321-30. doi: 10.14456/vmj.2022.32.
- [16] Ilic I, Milicic V, Grujicic S, Macuzic IZ, Kocic S, Ilic MD. Prevalence and correlates of low back pain among undergraduate medical students in Serbia, a cross-sectional study. *PeerJ*. 2021 Mar; 9: e11055. doi: 10.7717/peerj.11055.
- [17] Nyland LJ and Grimmer KA. Is undergraduate physiotherapy study a risk factor for low back pain? A prevalence study of LBP in physiotherapy students. *BioMed Central Musculoskeletal Disorders*. 2003 Oct; 4(1): 22. doi: 10.1186/1471-2474-4-22.
- [18] Sany SA, Tanjim T, Hossain MI. Low back pain and associated risk factors among medical students in Bangladesh: a cross-sectional study. *F1000 Research*. 2022 Jul; 10: 698. doi: 10.12688/f1000research.55151.3.
- [19] Hoy D, Brooks P, Blyth F, Buchbinder R. The epidemiology of low back pain. *Best practice & research Clinical rheumatology*. 2010 Dec; 24(6): 769-81. doi: 10.1016/j.berh.2010.10.002.
- [20] Buchbinder R, van Tulder M, Öberg B, Costa LM, Woolf A, Schoene M et al. Low back pain: a call for action. *The Lancet*. 2018 Jun; 391(10137): 2384-8. doi: 10.1016/S0140-6736(18)30488-4.