

Prevalence of Musculoskeletal Pain Among University Students: a Systematic Review

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ABSTRACT

The objective of this review was to summarize the evidence of musculoskeletal pain (MSP) among university students. PubMed, Scopus, CINAHL, Clinical Key, ProQuest, Research Gate and Science Direct were scanned to identify relevant studies. MeSH terms (prevalence, musculoskeletal, back pain, neck pain, posture, university students, and online education) and Boolean operators (OR and AND) were also used for search strategy. Only cross-sectional studies published between 2021 and 2025 were included in this review. The extracted data included author's name, year of publication, country of origin, sample size, field of study, tool for MSDs, affected body parts, and prevalence period. A total of 2254 records were identified, out of which 2232 were excluded, and only 22 were included for analysis. All included studies reported that the prevalence of MSP was consistently high among university students. The most common sites of pain were the neck, shoulder, and lower back. Musculoskeletal pain is highly prevalent among university students, which clearly indicates that there is an immediate requirement for specific preventive measures and ergonomic awareness programs for this population.

Keywords: Low Back Pain, Musculoskeletal Pain, Neck Pain, Posture, University Students.

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INTRODUCTION

Musculoskeletal Pain is a significant and growing global public health concern among young adults. University students were found to be especially vulnerable in this regard due to the unique demands of academic life.¹ MSP not only reduces the quality of life but also has adverse effects on physical functioning and academic performance.²

Recent studies show that the prevalence of musculoskeletal pain (MSP) is very high in students worldwide. In Thailand, 80.8% of students experienced MSP within last six months.³ A study from Jordan reported that 75.9% of medical students experienced MSP, especially in the shoulder and neck region.⁴ More than 90% of architecture undergraduate students in Saudi Arabia experienced musculoskeletal pain in the past 1 year.⁵

The COVID-19 pandemic played a huge role in shifting the education system towards new online learning, which is strongly associated with MSP.⁴ One study reported that students used the smartphone for an average of 6 hours 53 minutes a day, and the longer duration was associated with an increase in neck, shoulder and back pain.⁶ A meta-analysis confirmed that along with spending more time on devices, poor posture and prolonged sitting is firmly associated with

MSK complaints.⁷

University students sit an average of 5–8 hours a day.⁸ One study reported that sitting for only one hour increases the risk of spinal stiffness. Long sitting is associated with a higher risk of spinal and back muscle stiffness, decreased thoracic and lumbar mobility, and causes spinopelvic imbalances, causing pain.⁹

Academic stress also plays a major role in causing musculoskeletal problems in university students. Environmental and academic requirements, along with psychological stressors, increase the MSK discomfort during online education.¹⁰

The overall impact of MSP is concerning, and a comprehensive analysis is needed to better understand prevalence, risk factors, and potential prevention strategies.

Therefore, the purpose of this systematic review is to comprehensively analyze the prevalence of musculoskeletal pain and its risk factors and the most affected body parts by focusing specifically on the role of online learning, sedentary lifestyle, screen time and posture in musculoskeletal pain among university students.

METHODOLOGY

Protocol and Registration

This systematic review was done according to guidelines of Preferred Reporting Items for Systematic

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Reviews and Meta-analyses (PRISMA).¹¹ The study protocol was registered in the PROSPERO and the Registration number is CRD420251143087.

Search strategy

We searched various electronic databases including PubMed, Scopus, CINAHL, Clinical Key, ProQuest, web of science and Science Direct. In search strategy was developed by using MeSH terms such as prevalence, musculoskeletal, low back pain, neck pain, posture, university student, and online Education. Boolean operators (OR and AND) are also used in search strategy. The following Boolean search string was used: ("Musculoskeletal Pain" OR "Musculoskeletal Symptoms" OR "neck pain" OR "back pain" OR "shoulder pain") AND ("Students" OR "university students" OR "undergraduate") AND ("prevalence"). Gray literature was searched using Google Scholar, OpenGrey, ProQuest Dissertations and Theses, and institutional repositories.

Inclusion Criteria: Cross-sectional studies with the target population being university students, published between 2021–2025 were included.

Exclusion Criteria: Studies that did not report the prevalence of MSDs among university students and those that were not in English were excluded.

Figure-1 shows selection of studies. This systematic review was conducted under the PICO Framework. Both male and female university students were included in the population (P). Exposure (I) included factors related to posture, prolonged sitting, sedentary lifestyle and use of electronic devices. This review focused on the prevalence obtained from observational studies thus no comparator (C) was included. The outcome (O) was the prevalence of musculoskeletal pain among university students.

Study Selection and Data Extraction

Two reviewers separately screened studies initially based on titles and abstracts. Full text manuscript of all relevant titles and abstracts were obtained, and the full text of potentially eligible records was independently reviewed by the same two reviewers. The inter rater reliability was calculated using Cohen's Kappa coefficient to assess the reliability of the process, indicating a high level of interrater agreement ($k=0.80$). Any discrepancies were resolved through the discussion with a third reviewer. The following data were extracted for further analysis: author, year of publication, country of origin, sample

size, field of study, tool form MSDs, and prevalence/frequency.

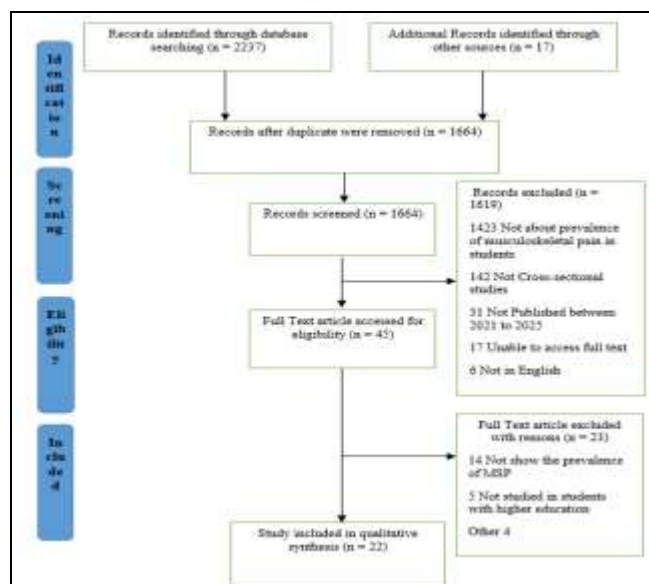


Figure: Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Flow Chart(n=22)

Quality Assessment

The quality of all included studies was assessed by using the AXIS tool (Appraisal Tool for Cross-Sectional Studies).¹² This tool includes 20 questions and each positive answer is given one point. The studies are divided into the following categories according to the score: low risk of bias (≥ 16 points), moderate risk of bias (12–15 points), and high risk of bias (< 12 points) procedures. Thus, a high total score shows a lower risk of bias. Two reviewers independently assessed quality and all discrepancies were resolved through discussion. Sensitivity analysis was done by excluding the high risk of bias studies and the overall results remained unchanged.

RESULTS

Search Results

Searches identified a total of 2254 records. After the removal of the duplicates, 1664 articles remained. We excluded 1619 of these because they were not about the prevalence of musculoskeletal pain in students, were not cross-sectional studies, not published between 2021 and 2025, unable to access full text, and not in English. Among the remaining 45 articles, 23 were excluded after full reading because either they did not show the prevalence of MSP among students or were not on higher education

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students. Twenty-two articles were finally included in the present review.

Study Characteristics

The characteristics of the study population are shown in Table-I. High heterogeneity was found among the studies in measurement tools (e.g., NMQ,

SNQ, SS-CMSQ, NBM), recall periods (7-day, 3 months, yearly), variation in academic disciplines, study environments (online learning vs campus-based), therefore a meta-analysis was not performed.

Musculoskeletal Pain

One study reported that the 12-month prevalence

Table-I: Study Characteristics (n=22)

Authors	Year	Country	Sample Size (n)	Context	Tool for MSDs	Prevalence (%) of MSDs
Alanazi et al.	2025	Saudi Arabia	Students from different faculties (n=257 , 62 males and 195 female)	No specific setting	Arabic version of Standardized Nordic Musculoskeletal Questionnaire (NMQ)	Prevalence: 12-month MSP: 87.5%
Aljouhar et al.	2024	Kuwait	Undergraduate engineering students (n=373, 64 males and 309 female)	No specific setting	Student-Specific Cornell Musculoskeletal Discomfort Questionnaire (SS-CMSQ)	Neck 80.7%, Lower back 71.3%, Upper back 64.6%
Imamuzzaman et al.	2024	Kyrgyzstan	Foreign medical students (n=360, 199 males and 161 female)	No specific setting	Face-to-Face interviews	59.2% had musculoskeletal pain (last week)
Zainudin et al.	2024	Malaysia	110 University students (n=110, 48 males and 62 female)	No specific setting	Nordic Musculoskeletal Questionnaire (NMQ)	Lower back pain: 33.6% (week), 46.4% (year), Shoulder pain: 32.7% (week), 40.9% (year), Neck pain: 19.1% (week), 38.2% (year)
Kandasamy et al.	2024	Saudi Arabia	Undergraduate students (n=536 , 199 males and 337 female)	No specific setting	Standardized Nordic Questionnaire (SNQ)	Prevalence of MSD (history): 41.60%
Shafi et al.	2022	Pakistan	Health Sciences student (n=249 , 50 males and 199 female)	Online learning	Nordic Musculoskeletal Questionnaire (NMQ)	Musculoskeletal prevalence: 91.2%
Aljohani et al.	2023	Saudi Arabia	Undergraduate Medical students (n=451 , 144 males and 307 female)	No specific setting	Online Self-report questionnaires	Prevalence of low back pain (LBP): 26.8%
Torbey et al.	2023	Syria	Medical students (n=2009 , 941 males and 1068 female)	No specific setting	Modified Standardized Nordic Questionnaire (SNQ)	Prevalence of MSP: 54% (past week), 82% (past year)
Parto et al.	2023	Canada	University students(n=678, 207 males and 471 females)	No specific setting	Modified NMQ Questionnaire	Neck/lower back pain: 59–67% (past year), 43–49% (past week)
Hafeez et al.	2022	Pakistan	University students (n=120, 0 males and 120 females)	No specific setting	Nordic Musculoskeletal Questionnaire (NMQ)	Musculoskeletal pain: 79%
Ahmed et al.	2022	Bangladesh and India	Physiotherapy students (n=326, 167 males and 159 females)	Smartphone addiction	NDI, SPADI, OES, CHDQ	Neck pain: 43.3%, Shoulder pain: 42.9%, Elbow pain: 27.9%, Hand discomfort: ~23.6% to ~37.7%
Elsiddig et al.	2022	Saudi Arabia	University students (n=516, 60 males and 456 female)	Use of smartphones and computer	Arabic self-administered questionnaire	Neck or shoulder pain: 59.1%
Agatha et al.	2022	Indonesia	Physical therapy students. (n=196, 44 males and 152 female)	No specific setting	Nordic Body Map (NBM) questionnaire	MSD during lectures: 90.3%
Lin et al.	2022	China	Medical and dental students (n=1178 , 553 males and 625 female)	No specific setting	Online self-report questionnaire	Neck pain 44.4%, Low back pain 30.6%, Joint pain 15.4%
Hanphitakphong et al.	2021	Thailand	University students(n=2027 , 860 males and 1167 female)	Smartphone addiction	Self-report questionnaires	Upper-body musculoskeletal symptoms: 30.0%
Boszczowski et al.	2021	Brazil	Medical students (n=200 , 59 males and 141 female)	No specific setting	Self-reported lumbar pain question	Prevalence of lumbar pain: 58%
Morais et al.	2021	Brazil	Health sciences undergraduates (n=792)	With Perceived Stress	Brazilian version of Standardized Nordic Questionnaire (SNQ)	Vertebral column pain: 74.9% Upper limbs: 54.1% Lower limbs: 43.6%
Ogunlana et al.	2021	South Africa	Undergraduate Occupational Therapy and Physiotherapy students(n=145 , 30 males and 115 female)	No specific setting	Standardized Nordic Questionnaire (SNQ)	MSP: 89.7% (12 months)
Senarath et al.	2021	Sri Lanka	Undergraduate Allied Health Sciences students (n=231 , 83 males and 148 female)	No specific setting	Modified version of Standardized Nordic Questionnaire (SNQ)	Reported MSDs: 73.6% (12 months)
Felemban et al.	2021	Saudi Arabia	377 Undergraduate dental students (n=377 , 145 males and 232 female)	No specific setting	English version of the validated Nordic Back Pain Questionnaire	MSD pain: 91.2% (12 months)
Ilić et al.	2021	Serbia	Undergraduate medical students (n=499 , 161 males and 338 female)	No specific setting	Self-reported questionnaire	Point prevalence of lower back pain: 20.8%
Raghad et al.	2021	United Arab Emirates	Dental students (n=202, 152 female and 50 males)	No specific setting	Modified Standardized Nordic Questionnaire (SNQ)	MSP: 48.5% (past week), 68.3% (past year)

*MSD: Musculoskeletal Disorders, MSP: Musculoskeletal Pain

of Musculoskeletal pain (MSP) in at least one body region was 87.5% among students, with the most affected areas being the lower back 119(46.3%) and the neck 113(44.0%). Females (90.3%) showed a significantly higher prevalence of pain compared to males (79.0%, $p=0.035$).² Another record studied the prevalence of musculoskeletal pain in the previous 7 days among engineering students in Kuwait (neck 80.7%, lower back 71.3%, upper back 64.6%).¹³ One study found that 59.2% of foreign medical students in Kyrgyzstan experienced muscle pain in the past 7 days.¹⁴

Another study reported a high prevalence of pain in lower back and shoulders in past 12 months and past 7 days among students who use smartphones and computers more, and female students reported more MSP than males.¹⁵ A record studied that 41.60% students in Saudi university had a history of MSP (neck, shoulder, or lower back).¹ A study from Pakistan showed that 91.2% of students reported one or more symptoms of MSP pain while learning online, with the most affected body parts (in the past 12 months) being the neck 56.2%, lower back 50.6%, and shoulders 49.0%.¹⁶ A record found that 26.83% of undergraduate medical students reported low back pain (LBP) in the last three months.¹⁷

A record shows that the prevalence of MSP in at least one site was 54% in the previous week and 82% in the previous 12 months, males were less likely than females to report MSP in both timelines.¹⁸ A multi-year cross-sectional survey found that the prevalence of neck/low back pain in the past 12 months was 59–67% and the prevalence of neck/low back pain in the past week was 43–49% among university students.¹⁹ One study reported that the prevalence of musculoskeletal pain in the past 12 months in females was 79%.²⁰ Another study reported that the prevalence of musculoskeletal symptoms in the neck, shoulder, elbow, and hand among university students due to prolonged smartphone use was 43.3%, 42.9%, 27.9%, 23.6% to 37.7%, respectively.²¹

Over 59% of university students complained of neck or shoulder pain while using electronic devices.²² One study found that 90.3% reported Musculoskeletal Disorders (MSDs) during lectures among physical therapy students.²³ One study found a high prevalence of musculoskeletal pain among Chinese medical and dental students.²⁴ A Thai study found that the prevalence of upper body musculoskeletal symptoms was 30.0% among students due to smartphone use,

and females reported a significantly higher prevalence of upper body musculoskeletal symptoms compared to males.²⁵ A record found that 58% of medical students in Brazil reported lumbar pain.²⁶

One study found that the prevalence of vertebral column pain, upper limb pain, and lower limb pain in the previous 7 days was 74.9%, 54.1% and 43.6% respectively.²⁷ The 12-month prevalence of MSP among South African university students was 89.7%.²⁸ Over 73.5% of undergraduate Allied Health Sciences students were affected by MSDs in the past 12 months.²⁹ One study found that 91.2% of undergraduate dental students experienced musculoskeletal discomfort in one or more parts of the body during the past 12 months, and females were more likely than men to experience MSK pain.³⁰

It was found that 20.8% of medical students in Serbia had lower back pain (LBP).³¹ The prevalence of MSP among dental students was 48.5% over the past week, and 68.3% over the past year.³²

Instruments used to Measure Musculoskeletal Pain

One study used the Student-Specific Cornell Musculoskeletal Discomfort Questionnaire (SS-CMSQ).¹³ One conducted face-to-face interviews for MSP.¹⁴ Three records used the Nordic Musculoskeletal Questionnaire (NMQ).^{15,16,20} Two used the Standardized Nordic Questionnaire.^{1,28} The online self-report questionnaire was used to collect data in two studies.^{17,24} Three studies used a modified version of the Standardized Nordic Questionnaire (SNQ).^{18,29,32} One used a modified Nordic Musculoskeletal Questionnaire NMQ, while another used the NDI, SPADI, OES, CHDQ.^{19,21} One used the translated Arabic self-administered questionnaire.²² One used Nordic Body Map (NBM) questionnaire.²³ Two used self-reported questionnaires.^{25,31} A self-made questionnaire about lumbar pain was used in one research.²⁶ One used Brazilian version of the (SNQ) Standardized Nordic Questionnaire, and one used the English version of the validated Nordic Back Pain Questionnaire.^{27,30}

Population Studied

One study recruited university students from different faculties.² One had undergraduate engineering students as participants.¹³ One involved foreign medical students.¹⁴ Five involved university students.^{15,19,20,22,25} One involved undergraduate students.¹ Two studies involved undergraduate allied health sciences.^{27,29} Two involved undergraduate medical students.^{17,31} Two records involved medical

students.^{18,26} Two involved physical therapy students.^{21,23} One involved both medical and dental students.²⁴ One involved health sciences students.¹⁶ One involved undergraduate occupational therapy and physiotherapy students.²⁸ One involved undergraduate dental students.³⁰ One involved dental students.³²

Musculoskeletal Pain Prevalence by Body Part

Musculoskeletal pain prevalence by body part (neck, upper back, lower back, shoulders, elbows, wrists/hands, hips/thighs, knees, and ankles/feet) was reported is shown in Table-II.

America are included in this systematic review. All the analyses constantly reported the presence of MSP among university students. The neck, the lower back, and the shoulder were the most affected areas, a pattern that echoes the results of the initial study of muscular health on adolescents and young adults. These results suggest that MSP is not just a problem in older groups but starts during university days and can lead to serious disabilities if it is not addressed.

Studies included in this review illustrate that higher rates of MSP among university students are directly linked to academic habits, such as longer

Table-II: Musculoskeletal Disorder Prevalence by Body Part in each Study where Applicable (n=19)

Author	Prevalence	Main Body Parts								
		Neck	Upper Back	Lower Back	Shoulders	Elbows	Wrists/Hands	Hips/Thighs	Knees	Ankles/Feet
Alanazi et al.	12 Months	44.0%	19.8%	46.3%	25.3% (L) 32.7% (R)	3.1%	14.4%	15.6%	13.6%	17.5%
	7 Days	7.4%	2.3%	3.9%	5.1% (L) 7.4% (R)	1.6%	3.5%	3.1%	3.1%	5.4%
Aljouhar et al.	7 Days	80.7 %	64.6%	71.3%	-	-	-	-	-	-
Imamuzzaman et al.	7 days	32.4%	-	47.4%	12.7%	-	-	-	-	-
Zainudin et al.	12 Months	38.2%	26.4%	46.4%	40.9%	10.9%	19.1%	6.4%	21.8%	20.0%
	7 Days	19.1%	21.8%	33.6%	32.7%	6.4%	10.9%	4.5%	15.5%	16.4%
Kandasamy et al.	12 Months	42.54%	-	44.59	46.27%	-	-	-	-	-
	7 Days	66.04%	-	61.01%	57.28%	-	-	-	-	-
Shafi M. et al.	12 Months	56.2%	37.3%	50.6%	49.0%	8.0%	24.5%	18.5%	19.3%	7.6%
	7 Days	36.5%	25.7%	29.3%	28.5%	6.8%	11.6%	12.9%	11.6%	5.2%
Alijohani et al.	3 Months	-	-	26.8%	-	-	-	-	-	-
Torbey et al.	12 Months	63.0%	-	59.0%	33.0% (R) 30.0% (L)	-	-	-	-	-
	7 Days	33.0%	-	31.0%	17.0% (R) 15.0% (L)	-	-	-	-	-
Parto et al.	12 Months	59.0-67.0%	-	59.0-67.0%	-	-	-	-	-	-
	7 Days	43.0-49.0%	-	43.0-49.0%	-	-	-	-	-	-
Hafeez et al.	12 Months	54.2%	49.2%	42.5%	53.3%	7.5%	20.8%	25.0%	15%	22.5%
	7 Days	30.8%	26.7%	22.5%	20.8%	5.8%	10.8%	10.0%	10.8%	7.5%
Ahmed et al.	Not specified	43.3%	-	-	42.9%	27.9%	23.6 - 37.7%	-	-	-
Elsiddig et al.	Not specified	59.1%	-	-	59.1%	-	-	-	-	-
Lin Y et al.	No specified	44.4%	-	30.6%	9.3%	3.2%	5.4%	3.2%	67.0%	9.3%
Boszcowski et al.	No specified	-	-	58.0%	-	-	-	-	-	-
Ogunlana et al.	12 Months	66.2%	-	64.4%	-	-	-	-	-	-
Senarath et al.	12 Months	41.6%	18.9%	39.4%	29.6%	26.3%	10.2%	24.2%	32.6%	34.7%
	7 Days	20.3%	9.4%	19.6%	16.8%	16.4%	4.7%	8.9%	13.9%	19.9%
Felemban et al.	12 Months	69.2%	46.9%	65.0%	67.1%	18.3%	45.4%	19.9%	28.4%	31.0%
	7 Days	37.1%	26.8%	36.6%	36.9%	8.2%	18.8%	7.7%	12.2%	14.3%
Ilić et al.	Not specified	-	-	20.8%	-	-	-	-	-	-
Hashim et al.	12 Months	52.5%	-	61.4%	44.1%	-	-	-	-	-
	7 Days	28.7%	-	38.6%	23.3%	-	-	-	-	-

Note: R = right side; L = left side. Three studies were not included in this table because they did not provide separate details of the rate of pain depending on different parts of the body. However, an excluded study reported pain in lower neck, upper neck, back, buttocks, waist and lowest left leg were 53.6%, 47.4%, 59.0%, 44.4%, 61.7% and 5.6% respectively.²³ A second study reported upper limbs pain 54.1%, vertebral column pain 74.9% and lower limbs pain 43.6% in last 7 days.² A third study reported 30.0% upper body symptoms.²⁵

Record appraisal

Out of 22 included studies, 12 studies were rated as low risk of bias (total axis points ≥ 16) and 10 were rated as moderate risk of bias (total axis points 12-15). The summary of the record appraisal is shown in Table-III & IV.

DISCUSSION

Musculoskeletal disorders (MSD) and musculoskeletal pain (MSP) are seen as a major health problem in university students. Twenty-two cross-sectional studies from Asia, Europe, Africa and North

sitting and greater screen use. For example, a study reported that more than 90% of health students in Pakistan complained of pain in the shoulder and lower back of the neck while learning online.¹⁶ One study reported 26.8% MSP among students in Tabuk, Saudi Arabia experience MSP.¹⁶ Another Saudi study reported a very high prevalence of MSP (87.5%) among university students.² The prevalence of neck pain and low back pain among dental and medical students in China was 44.4% and 30.6% respectively.²⁴ One Canadian study reported high prevalence of neck and lower back pain among student.¹⁹ In Indonesia,

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Table-III: Risk of Bias Assessment (n=22)

Authors	Aims/ objectives clear	Study design appropriate for the aims	Sample size justified	Target population defined	Sample appropriate to represent the target population	Selection process of participants likely to represent the target population	Measures undertaken to address non responders	Risk factors and outcome variables measured appropriately to the aims	Risk factor or outcome measured using validated instrument	Clear statistical significance defined
Alanazi et al.	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Aljouhar et al.	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Imamuzzaman et al.	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes
Zainudin et al.	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Kandasamy et al.	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Shafi M. et al.	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Aljohani et al.	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Torbey et al.	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Parto et al.	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Hafeez et al.	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes
Ahmed et al.	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Elsiddig et al.	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Unclear	Yes
Agatha et al.	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Lin et al.	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Hanphitakphong et al.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Boszczowski et al.	Yes	Yes	No	Yes	Yes	Unclear	No	Yes	Yes	Yes
Morais et al.	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Ogunlana et al.	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Senarath et al.	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Unclear
Felemban et al.	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Ilic et al.	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Hashim et al.	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes

Table-IV: Risk of Bias Assessment - Continuation (n=22)

Methods described sufficiently to be repeated	Basic data described	Response rate described	Appropriate information about non responders described	Results internally consistent	Presence of results for the analyses described	Discussion and conclusions justified	Limitations discussed	Funding or conflict of interests that could affect results	Ethical approval Or informed consent attained
Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	No	No	Yes	Yes	Yes	No	Unclear	Yes
Yes	Yes	No	No	Yes	Yes	Yes	No	Unclear	Yes
Unclear	Yes	No	No	Yes	Yes	Yes	No	No	Yes
Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes
Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes
Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	No	No	Yes	Yes	Yes	No	No	No
Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes
Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes
Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes
Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes
Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Unclear	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes
Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes

90.3% of students complained of muscular discomfort during lectures.²³

Gender is an important factor in determining MSP rates among university students. Several studies in this review show that females report significantly higher rates of MSP than males. One study found that 79% of female students in Pakistan experienced MSP.²⁰ Another study reported that women experienced more LBP in Brazil than men.²⁶ Similarly another study found that females reported more MSP than males.² This difference can also be associated with biological variations, such as muscle strength differences and hormonal effects.

The field of study also had an impact on risk. In our review, all studies involving dental students reported that they are at greater risk of MSP. For example, one Saudi study reported that dental students, whose training requires static postures for long periods of time, complain of more MSP.³⁰

Majority of health science students reported musculoskeletal pain in Pakistan.¹⁶ Occupational and physiotherapists have more chances of experiencing pain in the lower limbs.²⁷

Sitting for long periods in a flexed posture while using laptops or in classrooms increases load on the spine and muscles. Sitting statically for long periods of time reduces muscle perfusion and oxygenation, which promotes metabolic fatigue and leads to muscle pain. Previous evidence shown that only 40 minutes of sedentary sitting cause trapezius and latissimus dorsi muscle fatigue. Poor ergonomic sitting posture also is associated with lower back pain.²³

In addition to poor sitting posture, the posture during prolonged use of smartphones and laptops has also been found to be linked to MSP. The repeated forward head flexion while using a mobile phone puts many times more pressure on the cervical spine and neck muscles than the weight of the head, which is

associated with neck pain.¹ One study reported that using a smartphone in abnormal posture for longer periods significantly increases the rate of upper-body musculoskeletal symptoms.²⁵

Academic stress, sleep disturbances and lack of physical activity further exacerbate the MSP. One study reported that poorer mental health and academic pressures, as well as lack of sleep, were significantly associated with MSP.¹⁹ Another study reported that there is correlation between perceived stress and musculoskeletal pain among students, and students with a high stress level experienced more musculoskeletal pain in the vertebral column region, upper limbs and lower limbs.²⁷

The role of physical activity is also very important in understanding the prevalence MSP among students. Sedentary lifestyle and low physical activity levels have been significantly associated with the high rates of musculoskeletal disorders. One study reported that students who exercise on day basis are 9.47 times less likely to present with MSP.²⁸ On the other hand, regular physical activity is effective in reducing pain and enhancing the functionality of the musculoskeletal system.¹

Preventive strategies are needed to prevent MSP, including promoting ergonomic education, posture training and regular physical activity. Evidence suggests that simple interventions such as stretching between breaks when sitting for long periods of time and sitting in an ergonomic position during classes can reduce MSP.²³ Universities should include ergonomic principles in the classroom and online teaching environment, including restricting long lectures, and encourage students to adopt movements during their studies. Extensive health campaigns should recognize university students as a population who is at risk of MSP rather than focusing on occupational groups.

A major strength of this systematic review is that it covers the latest research from 2021 to 2025 on musculoskeletal pain among university students. All the studies included in the analysis were conducted in different countries and included analysis of affected body parts from a variety of subpopulations (medical students, dental students, and general students) meaning that this is a broad trend that is not specific to just one population or setting.

LIMITATIONS OF STUDY

An important limitation of this review is the lack of a meta-analysis. Due to heterogeneity in the measurement

tools, mixed subpopulations, different settings, and recall periods used across studies, made pooled prevalence meta-analysis was not suitable for this review. Another limitation of this review only includes cross-sectional studies. This review only includes articles published in the English language may exclude significant evidence from non-English speaking countries. Most studies mainly used Self-reported Questionnaires, which can lead to recall bias and over or underestimation in pain prevalence.

CONCLUSION

This systematic review shows that musculoskeletal pain is very common among university students around the world, and the most affected sites are the neck, shoulders and back. It is a multifactorial problem in which factors such as ergonomic conditions, long sitting and posture during the use of the device, gender variations, academic pressure, and low physical activity combine to form risk. Ergonomic education, promotion of physical activity, and gender sensitive interventions are safety strategies that should be adopted in university environments. This review finally highlights the fact that MSP is not a temporary issue among students but a significant public health challenge that, if it is not paid attention to, can lead to early onset of chronic diseases in the future.

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Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

AM & AM: Conception, study design, drafting the manuscript, approval of the final version to be published.

MAK & HUD: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

MA 7 MAS: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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