INSIGHTS-JOURNAL OF
HEALTH AND REHABILITATION

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

PREVALENCE OF MUSCULOSKELETAL PAIN AMONG UNIVERSITY TEACHERS OF ISLAMABAD

Original Research

Marium Khalid[1]*, Aqsa Butt[2], Maria Barket[2], Saima Iqbal[3], Abdul Moiz Khan[4], Muhammad Usman Ali[5], Manahil Shahid[6]

[1]Assistant Professor, Department of Physical Therapy, Ibadat International University, Islamabad, Pakistan.
[2]Physiotherapist, University of Lahore, Islamabad Campus, Pakistan.
[3]Clinical Physiotherapist, Al Moeed Hospital, Wah Cantt, Pakistan,
[4]Consultant Physiotherapist, PhysioMax and Physio First Rehabilitation Center, Pakistan.
[5]Department of Physical Therapy, Ibadat International University, Islamabad, Pakistan.
[6]Lecturer, Foundation University Islamabad, Islamabad, Pakistan.

Corresponding Author: Marium Khalid, Assistant Professor, Department of Physical Therapy, Ibadat International University, Islamabad, Pakistan, marium.khalid@uipt.iiui.edu.pk

Acknowledgement: The authors acknowledge the cooperation of all university teachers who participated in this study.

Conflict of Interest: None

Grant Support & Financial Support: None

ABSTRACT

Background: Musculoskeletal (MSK) disorders are among the leading occupational health issues globally, particularly affecting professionals who maintain static postures or repetitive movements. University teachers, due to prolonged standing, poor ergonomics, and academic workload, are at elevated risk for MSK pain. This condition not only reduces work efficiency but also compromises quality of life. Investigating the prevalence and severity of MSK pain in this population is crucial to guiding preventive strategies and improving workplace ergonomics.

Objective: To determine the prevalence and severity of musculoskeletal pain among university teachers in Islamabad.

Methods: A descriptive cross-sectional study was conducted from October 2022 to February 2023 among university teachers from private-sector institutions in Islamabad. A total of 123 participants were recruited using convenience sampling, following screening of 188 individuals based on defined inclusion and exclusion criteria. Data were collected through a semi-structured questionnaire incorporating a modified Nordic Musculoskeletal Questionnaire (NMQ) to assess pain over the past 12 months and 7 days, and the Numerical Pain Rating Scale (NPRS) to determine pain intensity. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were calculated using SPSS version 25.

Results: The overall prevalence of musculoskeletal pain was 81.3%. The most commonly affected site was the neck (50.4%), followed by the lower back (46.3%), upper back (31.7%), shoulders (30.9%), knees (17.1%), and hips/thighs (15.4%). Most participants reported pain of mild to moderate intensity, particularly in spinal regions.

Conclusion: Musculoskeletal pain is highly prevalent among university educators in Islamabad, with the neck being the most frequently affected region. The findings highlight the need for ergonomic interventions and preventive strategies to reduce the occupational burden of MSK disorders in academic settings.

Keywords: back pain, ergonomics, musculoskeletal pain, neck pain, occupational health, pain severity, teachers.

INSIGHTS-JOURNAL OF
HEALTH AND REHABILITATION

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH
AND REHABILITATION

INTRODUCTION

Musculoskeletal (MSK) pain is a prevalent form of discomfort that typically affects muscles, tendons, ligaments, joints, and cartilage, especially in the context of inflammatory and degenerative conditions (1). Among working individuals, MSK pain is a common subjective complaint, often impacting their productivity and overall quality of life. Notably, individuals engaged in professions requiring prolonged standing, repetitive movements, or awkward postures—such as teaching—are particularly susceptible. University teachers, in particular, face extended hours of lecturing, computer usage, and grading, all of which contribute to static and strained postures. This often leads to pain in the neck, shoulders, lower back, and upper limbs, which are among the most frequently reported regions of discomfort in this occupational group (2). Epidemiological evidence shows that MSK pain varies in prevalence across different body parts. For instance, neck pain alone had a global prevalence rate of 27.0 per 1000 people in 2019 (3). Beyond the personal discomfort, musculoskeletal disorders pose a significant burden on healthcare systems, leading to disability, economic loss, and reduced workforce efficiency (4). Chronic back and joint pain have even been described as a modern epidemic due to their rising global incidence and impact (5). Persistent MSK pain is closely associated with functional limitations, fatigue, sleep disturbances, and psychological distress, ultimately deteriorating an individual's quality of life and social and financial autonomy (6).

The clinical presentation of MSK pain includes localized swelling, tenderness, muscle spasms, tingling sensations, and joint immobility. Audible "crackling" may be present when inflamed tendons are compressed (7). Repetitive mechanical stress, prolonged static postures, compression, ischemia, and overexertion are common physiological triggers (8). In academic settings, ergonomic risk factors such as long hours of standing or sitting, improper laptop and screen placement, and poor workspace design significantly increase the likelihood of developing MSK conditions among educators (9). Moreover, variables such as age, gender, physical inactivity, manual labor, repetitive or awkward movements, and poor posture further contribute to the risk (10,11). A Brazilian study underscored a strong association between poor sleep quality and MSK pain, highlighting the multidimensional nature of its burden (12). Accurate assessment of MSK pain relies on specific clinical tests tailored to the affected region. For instance, the Yergason's and Speed tests are used to evaluate shoulder pain, while the Mills and Tinel's tests assess elbow disorders. The Straight Leg Raise (SLR) test is critical in diagnosing low back pain, and specialized assessments like the Thomas and Apley's tests help identify hip and knee pathologies, respectively. For wrist and hand issues, Phalen's and carpal compression tests are commonly employed (13).

In cases where pharmacological treatment is inadequate, the role of interventional pain therapies and complementary strategies becomes essential for effective MSK pain management (10). Several pharmacological agents, including hyaluronic acid, avocado-soybean unsaponifiables, oxaceprol, and diacerein, have shown benefits in targeted applications (14). However, broad-spectrum or chronic pain often responds poorly to traditional analgesics, underscoring the need for integrated approaches (15). Physical therapy interventions, such as aerobic conditioning, isometric exercises, mobility training, and targeted muscle re-education, form a core part of non-pharmacological management (16). Importantly, ergonomic modifications—ranging from workstation adjustments to risk factor analysis—have shown significant potential in reducing employee discomfort and enhancing outcomes when combined with physical therapy (17). Nonetheless, improperly designed stretching or exercise regimens may inadvertently cause further injury, emphasizing the importance of professional guidance (18). Despite the existing knowledge, limited data is available on the burden of musculoskeletal pain specifically among university faculty members in Pakistan. Given the demanding occupational environment and lack of ergonomic support in many higher education institutions, there is a critical need to explore this issue. Therefore, the objective of this study is to determine the prevalence and severity of musculoskeletal pain among university teachers in Islamabad.

METHODS

A descriptive cross-sectional study was conducted to assess the prevalence and severity of musculoskeletal (MSK) pain among university teachers in Islamabad over a five-month period from October 2022 to February 2023. Ethical clearance for the study was granted by the institutional review board under reference number DPT/1022-1306. The study population included both male and female university faculty members aged between 25 and 50 years, employed for more than 12 months, and willing to participate. Participants were required to have no history of bone fractures in the past six months. Exclusion criteria comprised pregnant women and individuals diagnosed

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

with any neurological or musculoskeletal conditions such as osteoarthritis, rheumatoid arthritis, or septic arthritis. Additionally, participants with chronic illnesses including diabetes, hypertension, or a known history of cancer were excluded to minimize potential confounding factors. The sampling strategy employed was convenience sampling, through which data were collected from faculty members working in various private universities across Islamabad. The sample size was calculated using the online Raosoft sample size calculator. Assuming a target population of 180 individuals, with a 95% confidence interval and a 5% margin of error, the estimated sample size was determined to be 123. Prior to participation, all individuals provided written informed consent.

Data collection was carried out using a semi-structured questionnaire comprising three sections. The first section addressed demographic details and screening criteria to confirm eligibility. The second section utilized the standardized Nordic Musculoskeletal Questionnaire (NMQ), which is widely employed in occupational health research to assess MSK pain prevalence across nine specific body regions—namely the neck, shoulders, elbows, wrists/hands, upper back, lower back, hips/thighs, knees, and ankles/feet—over the past 12 months and the previous seven days. The third section involved the Numerical Pain Rating Scale (NPRS), an 11-point scale ranging from 0 ("no pain") to 10 ("worst imaginable pain"), to quantify pain intensity. Pain was then categorized into mild (1–3), moderate (4–6), and severe (7–10) levels for analysis. Data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 25. Quantitative variables such as age were expressed as mean ± standard deviation, while categorical variables such as gender, affected body regions, and pain intensity levels were summarized using frequencies and percentages.

RESULTS

Out of a total of 188 participants initially considered for the study, 65 individuals were excluded based on predetermined exclusion criteria, and 123 participants were included after fulfilling the inclusion criteria. The mean age of participants was 33 ± 4.78 years. Among the included participants, the largest age group was 25–30 years, comprising 46 individuals (37.4%), followed by 44 individuals (35.8%) aged 31–35 years, 25 individuals (20.3%) aged 36–40 years, 7 individuals (5.7%) aged 41–45 years, and 1 participant (0.8%) aged 46–50 years. With regard to occupational activity, 29 participants (23.6%) reported standing for less than 4 hours per day, 68 participants (55.3%) stood for 4–5 hours, while 26 participants (21.1%) reported standing for 5 hours or more per day. Weekly standing duration revealed that 29 participants (23.6%) stood for fewer than 10 hours, 50 participants (40.7%) reported standing 10–15 hours, and 44 participants (35.8%) reported standing more than or equal to 15 hours per week. The most frequently reported area of musculoskeletal pain in the past 12 months was the neck (50.4%), followed by the lower back (46.3%), upper back (31.7%), and right shoulder (30.9%). Pain in the left shoulder was reported by 28.5%, both shoulders by 24.4%, and one or both knees by 17.1% of participants. Elbow and wrist pain were less prevalent, with right elbow discomfort reported by 5.7% and right wrist/hand pain by 12.2% of participants. Pain in the hips/thighs and ankles/feet was noted by 15.4% and 9.8%, respectively.

In the past 7 days, the highest prevalence of MSK pain was again observed in the neck (18.7%) and lower back (18.7%), followed by the shoulder region (17.9%) and upper back (9.8%). Functional limitations in normal work activities due to MSK pain over the last 12 months were reported most commonly in the neck (23.6%) and lower back (22%), followed by the shoulder (18.7%) and upper back (14.6%). Pain intensity ratings indicated that moderate pain was more commonly reported in the neck (28.5%), lower back (22.8%), and upper back (15.4%). Severe pain was particularly prominent in the lower back (15.4%), followed by the neck (9.8%) and upper back (6.5%). Mild pain was reported more evenly across various regions, with the neck (12.2%), right and left shoulders (12.2% and 10.5%, respectively), and upper back (9.8%) being the most common. Further analysis revealed detailed variation in musculoskeletal pain intensity across key anatomical regions. Moderate pain was the most prevalent intensity level in the neck (28.5%), followed by the lower back (22.8%) and upper back (15.4%). Severe pain was also notably higher in the lower back (15.4%), suggesting a higher burden of discomfort in that region. Mild pain was more evenly distributed, with the neck (12.2%) and right shoulder (12.2%) showing slightly elevated rates. When the relationship between weekly standing duration and pain prevalence was assessed, a noticeable trend emerged. Participants standing for ≥15 hours per week reported higher rates of neck (32%) and lower back pain (25%) compared to those standing <10 hours per week, among whom only 10% and 12% reported pain in these regions, respectively. Similarly, upper back pain prevalence increased from 5% in the lowest standing category to 22% in the highest. These findings suggest a possible dose-response relationship between prolonged standing and increased MSK pain burden, especially in spinal regions. However, this association should be further validated through multivariate analysis controlling for additional occupational and individual risk factors.

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

Table 1: Prevalence of MSK Pain (Past 12 months)

Body region	(Yes) N (%)	(No) N (%)
Neck	62(50.4%)	61(49.6%)
Right Shoulder	38(30.9%)	85(69.1%)
Left Shoulder	35(28.5%)	88(71.5%)
Both Shoulders	30(24.4%)	93(75.6%)
Right Elbow	7(5.7%)	116(94.4%)
Left Elbow	6(4.9%)	117(95.1%)
Both Elbows	3(2.4%)	120(97.6%)
Right Wrist/hand	15(12.2%)	108(87.8%)
Left Wrist/Hand	7(5.7%)	116(94.3%)
Both Wrists/Hands	3(2.4%)	120(97.6%)
Upper Back	39(31.7%)	84(68.3%)
Lower Back	57(46.3%)	66(53.7%)
One or both hips/thighs	19(15.4%)	104(84.6%)
One or both knees	21(17.1%)	102(82.9%)
One or both ankles/feet	12(9.8%)	111(90.2%)

Table 2: Limitation from doing normal work at any time during last 12Months and Prevalence of MSK Pain last 7 days

Body Region	Work limitation past 12 months		Prevalence of MSK Pain last 7 days	
	Yes	No	Yes	No
Neck	29(23.6%)	94(76.4%)	23 (18.7%)	100(81.3%)
Shoulder	23(18.7%)	100(81.3%)	22 (17.9%)	101(82.1%)
Elbow	5(4.1%)	118(95.9%)	4 (3.3%)	119(96.7%)
Wrist	5(4.1%)	118(95.9%)	6 (4.9%)	117(95.1%)
Upper Back	18(14.6%)	105(85.4%)	12 (9.8%)	111(90.2%)
Lower Back	27(-22%)	96(78%)	23 (18.7%)	100(81.3%)
One or Both Hips	8(6.5%)	115(93.5%)	8 (6.5%)	115(93.5%)
One or both knees	7(5.7%)	116(94.3%)	9 (7.3%)	114(92.7%)
One or both ankles/feet	7(5.7%)	116(94.3%)	7 (5.7%)	116(94.3%)

Table 3: Intensity of MSK pain

Body region	No pain N (%)	Mild N (%)	Moderate N (%)	Severe N (%)
Neck	61(49.6%)	15(12.2%)	35(28.5%)	12(9.8%)
Right Shoulder	85(69.1%)	15(12.2%)	16(13%)	7(5.7%)
Left Shoulder	88(71.5%)	13(10.5%)	15(12.2%)	7(5.7%)
Right Elbow	116(94.3%)	3(2.4%)	3(2.4%)	1(0.8%)
Left Elbow	117(95.1%)	4(3.3%)	1(0.8%)	1(0.8%)
Right Wrist/hand	108(87.8%)	6(4.9%)	6(4.9%)	3(2.4%)
Left Wrist/Hand	116(94.3%)	2(1.6%)	3(2.4%)	2(1.6%)
Upper Back	84(69.9%)	12(9.8%)	19(15.4%)	8(6.5%)
Lower Back	66(53.7%)	10(8.1%)	28(22.8%)	19(15.4%)
hips/thighs R	108(87.8%)	7(5.7%)	6(4.9%)	2(1.6%)
hips/thighs L	106(86.2%)	7(5.7%)	6(4.9%)	4(3.3%)
Knee R	108(87.8%)	4(3.3%)	6(4.9%)	5(4.1%)
Knee L	104(84.6%)	4(3.3%)	10(8.1%)	5(4.1%)
ankles/feet R	115(93.5%)	1(0.8%)	4(3.3%)	3(2.4%)
ankles/feet L	111(90.3%)	2(0.6%)	7(5.7%)	3(2.4%)

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

Table 4: Pain Severity by Region (in %)

Body Region	Mild (%)	Moderate (%)	Severe (%)
Neck	12.2	28.5	9.8
Right Shoulder	12.2	13.0	5.7
Left Shoulder	10.5	12.2	5.7
Upper Back	9.8	15.4	6.5
Lower Back	8.1	22.8	15.4

Table 5: Prevalence of MSK Pain vs. Standing Duration (Number of Cases)

Standing Duration	Neck	Lower Back	Upper Back
<10 hrs/week	10	12	5
10–15 hrs/week	20	20	12
≥15 hrs/week	32	25	22

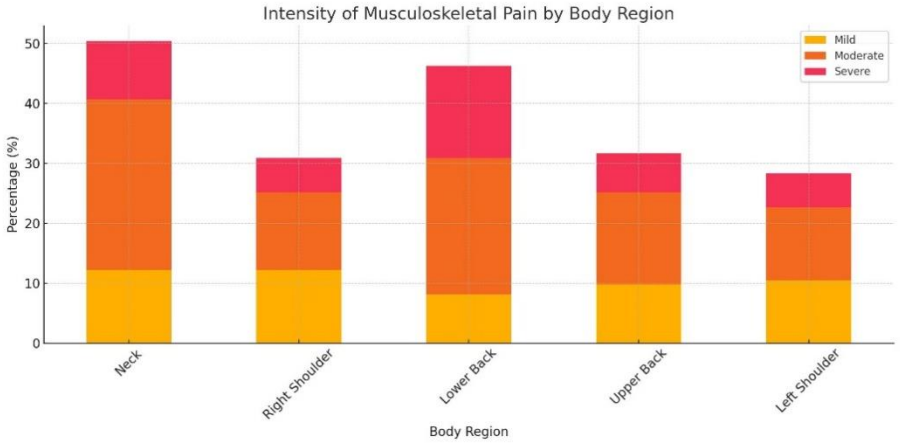

Figure 1Intensity of Musculoskeletal Pain by Body Region

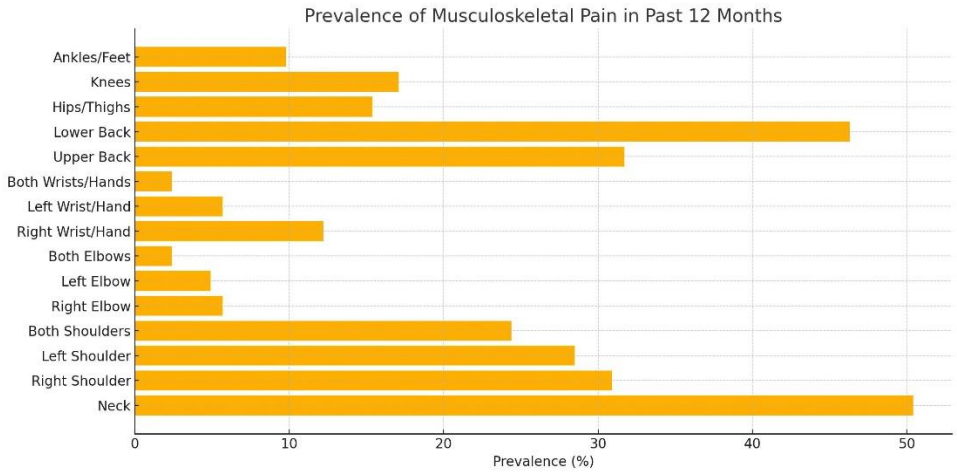

Figure 2 Prevalence of Musculoskeletal Pain in Past 12 Months

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

DISCUSSION

The findings of this study revealed that musculoskeletal (MSK) pain was most frequently reported in the neck (50.4%), followed closely by the lower back (46.3%), with the least prevalence observed in the elbow regions. These results align with existing literature highlighting spinal regions as the most vulnerable to occupational strain among academic professionals. In a cross-sectional study conducted at a university in Ethiopia, 65.2% of participants reported MSK discomfort over the past year, with 29% experiencing pain in the past seven days. Although the overall prevalence in that study was higher, the distribution of pain, particularly in the neck region, was comparable, with a reported prevalence of 41.5%, supporting the current study's findings. However, demographic variations—such as a higher proportion of male participants (72%) in the Ethiopian sample compared to only 37% males in this study—may have influenced the variation in prevalence rates (19). Another investigation conducted among teachers at a federal institution documented that the most commonly affected regions were the lower back (60%), neck (56%), and shoulders (48%). These figures are consistent with the anatomical distribution observed in the current study, reinforcing the occupational relevance of spinal discomfort among teaching staff. Similarly, a study among educators reported an alarmingly high prevalence rate of 91% for MSK pain, indicating a widespread occupational health issue among teachers across varying geographical and cultural contexts (20). A study also supported this trend, where 55% of faculty members reported MSK disorders, and neck pain emerged as the most dominant complaint with a prevalence of 53.4%, closely paralleling the present study's findings of 50.4% (21).

The variation in reported prevalence rates across studies may be attributed to differing ergonomic practices, work environments, population demographics, and methodological tools used to assess pain. While the use of the Nordic Musculoskeletal Questionnaire and Numerical Pain Rating Scale in this study ensured a standardized approach to data collection, the reliance on self-reported data may have introduced recall bias (22). Nevertheless, the strong alignment of neck and back pain prevalence with multiple international studies strengthens the external validity of the current findings. One of the key strengths of this study lies in its targeted focus on university educators, a population often underrepresented in occupational health research despite being at high risk due to static postures and prolonged teaching durations. The study also used validated assessment tools, ensuring reliability in symptom quantification and anatomical pain mapping. However, the study faced certain limitations. It was geographically limited to private universities in Islamabad, which may reduce the generalizability of the findings to broader academic populations. Furthermore, the study employed convenience sampling, which may have introduced selection bias. The modest sample size also limits the statistical power to detect more nuanced associations between risk factors and MSK pain.

Another limitation is that the study focused solely on the association between prolonged standing and MSK pain. Other potential ergonomic stressors—such as prolonged sitting, repetitive hand movements, or psychosocial stress—were not assessed. Additionally, no multivariate analysis was conducted to control for confounding variables such as age, gender, BMI, or workload intensity, which could have enriched the analytical depth of the findings. Future research should aim to include a larger and more diverse sample from multiple institutions, including public universities, to enhance representativeness. Incorporating longitudinal designs could help establish causal relationships between occupational risk factors and MSK pain. Furthermore, integrating objective assessments such as physical evaluations, observational ergonomic audits, and biomechanical analysis would provide a more comprehensive understanding of the occupational burden of musculoskeletal disorders among educators. Overall, the study contributes valuable evidence to the growing body of literature on occupational health in academia, emphasizing the critical need for ergonomic interventions and preventive strategies to reduce the risk and burden of MSK disorders among university faculty.

CONCLUSION

The study concluded that musculoskeletal discomfort is a common occupational health issue among university teachers, with the neck region being the most frequently affected area, followed by the lower back. Most participants experienced pain of mild to moderate intensity, highlighting the persistent yet manageable nature of the condition. These findings underscore the need for proactive ergonomic interventions and workplace health strategies aimed at reducing physical strain in academic environments. Addressing these concerns through targeted prevention and early management can play a pivotal role in improving the quality of life and functional capacity of educators.

AUTHOR CONTRIBUTION

Author	Contribution
Marium Khalid*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Aqsa Butt	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Maria Barket	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Saima Iqbal	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Abdul Moiz Khan	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Muhammad Usman Ali	Substantial Contribution to study design and Data Analysis Has given Final Approval of the version to be published
Manahil Shahid	Contributed to study concept and Data collection Has given Final Approval of the version to be published

REFERENCES

1. Global pattern, trend, and cross-country inequality of early musculoskeletal disorders from 1990 to 2019, with projection from 2020 to 2050. Med. 2024;5(8):943-62.e6.
2. Salari N, Mohammadi A, Hemmati M, Hasheminezhad R, Kani S, Shohaimi S, et al. The global prevalence of low back pain in pregnancy: a comprehensive systematic review and meta-analysis. BMC Pregnancy Childbirth. 2023;23(1):830.
3. Wall J, Meehan WP, 3rd, Trompeter K, Gissane C, Mockler D, van Dyk N, et al. Incidence, prevalence and risk factors for low back pain in adolescent athletes: a systematic review and meta-analysis. Br J Sports Med. 2022;56(22):1299-306.
4. Rodríguez-Gude C, Taboada-Iglesias Y, Pino-Juste M. Musculoskeletal pain in musicians: prevalence and risk factors - a systematic review. Int J Occup Saf Ergon. 2023;29(2):883-901.
5. Moen U, Magnussen LH, Wilhelmsen KT, Goplen FK, Nordahl SHG, Meldrum D, et al. Prevalence and distribution of musculoskeletal pain in patients with dizziness-A systematic review. Physiother Res Int. 2022;27(2):e1941.
6. Ren S, Jiang X, Wang S, Wong AYL, Bi X, Wang X. The prevalence and factors associated with neck and low back pain in patients with stroke: insights from the CHARLS. BMC Public Health. 2024;24(1):2362.
7. King JA, Nelson LD, Cheever K, Brett B, Gliedt J, Szabo A, et al. The Prevalence and Influence of New or Worsened Neck Pain After a Sport-Related Concussion in Collegiate Athletes: A Study From the CARE Consortium. Am J Sports Med. 2024;52(7):1845-54.
8. Chambers CT, Dol J, Tutelman PR, Langley CL, Parker JA, Cormier BT, et al. The prevalence of chronic pain in children and adolescents: a systematic review update and meta-analysis. Pain. 2024;165(10):2215-34.
9. Shetty GM, Jain S, Thakur H, Khanna K. Prevalence of low back pain in India: A systematic review and meta-analysis. Work. 2022;73(2):429-52.
10. Al-Khazali HM, Younis S, Al-Sayegh Z, Ashina S, Ashina M, Schytz HW. Prevalence of neck pain in migraine: A systematic review and meta-analysis. Cephalalgia. 2022;42(7):663-73.
11. Wong CK, Mak RY, Kwok TS, Tsang JS, Leung MY, Funabashi M, et al. Prevalence, Incidence, and Factors Associated With Non-Specific Chronic Low Back Pain in Community-Dwelling Older Adults Aged 60 Years and Older: A Systematic Review and Meta-Analysis. J Pain. 2022;23(4):509-34.
12. Lo J, Chan L, Flynn S. A Systematic Review of the Incidence, Prevalence, Costs, and Activity and Work Limitations of Amputation, Osteoarthritis, Rheumatoid Arthritis, Back Pain, Multiple Sclerosis, Spinal Cord Injury, Stroke, and Traumatic Brain Injury in the United States: A 2019 Update. Arch Phys Med Rehabil. 2021;102(1):115-31.

13. Kazeminasab S, Nejadghaderi SA, Amiri P, Pourfathi H, Araj-Khodaei M, Sullman MJ, et al. Neck pain: global epidemiology, trends and risk factors. BMC musculoskeletal disorders. 2022; 23:1-13.
14. Meaza H, Temesgen MH, Redae G, Hailemariam TT, Alamer A. Prevalence of musculoskeletal pain among academic staff of Mekelle University, Ethiopia. Clinical Medicine Insights: Arthritis and Musculoskeletal Disorders. 2020; 13:1179544120974671.
15. Shaikh S, Siddiqui AA, Alshammary F, Amin J, Agwan MAS. Musculoskeletal disorders among healthcare workers: prevalence and risk factors in the Arab World. Handbook of Healthcare in the Arab World. 2021:2899-937.
16. Alias AN, Karuppiah K, How V, Perumal V. Prevalence of musculoskeletal disorders (MSDS) among primary school female teachers in Terengganu, Malaysia. International Journal of Industrial Ergonomics. 2020; 77:102957.
17. AlMaghlouth MK, Alserhani NM, Aldossary FA, Alabdulqader MA, Al-Dhafer BA. Prevalence, patterns, and risk factors of work-related musculoskeletal diseases among teachers in the Eastern Province, Saudi Arabia: a community-based retrospective cross-sectional survey. Cureus. 2022;14(12).
18. El-Tallawy SN, Nalamasu R, Salem GI, LeQuang JAK, Pergolizzi JV, Christo PJ. Management of musculoskeletal pain: an update with emphasis on chronic musculoskeletal pain. Pain and therapy. 2021; 10:181-209.
19. Arshad H, Hgul K, Anwar K, Bilal H. Prevalence, pattern of musculoskeletal pain disorders and related factors among female school teachers. children. 2021; 15:1923-6.
20. De Souza JM, Pinto RZ, Tebar WR, Gil FC, Delfino LD, Morelhão PK, et al. Association of musculoskeletal pain with poor sleep quality in public school teachers. Work. 2020;65(3):599- 606.
21. Kraemer K, Moreira MF, Guimarães B. Musculoskeletal pain and ergonomic risks in teachers of a federal institution. Revista Brasileira de Medicina do Trabalho. 2021;18(3):343.
22. Aldukhayel A, Almeathem FK, Aldughayyim AA, Almeshal RA, Almeshal EA, Alsaud JS, et al. Musculoskeletal pain among school teachers in Qassim, Saudi Arabia: prevalence, pattern, and its risk factors. Cureus. 2021;13(8).