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Prevalence of Back Pain Among Madrassah Teachers in Karachi: An Occupational Health Concern

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ABSTRACT

Background: Musculoskeletal disorders (MSDs) are among the most prevalent occupational health problems globally and a leading cause of disability and reduced productivity. Teachers are at particular risk due to prolonged sitting, awkward postures, and limited ergonomic awareness. Madrassah teachers in Pakistan often conduct classes in floor-sitting positions without proper ergonomic support, predisposing them to musculoskeletal strain, yet this occupational group remains understudied. **Objective:** To determine the prevalence, characteristics, and associated risk factors of back pain and other musculoskeletal disorders among madrassah teachers in Karachi.

Methods: A cross-sectional survey was conducted among 109 male madrassah teachers with at least one year of teaching experience. Data were collected using a structured self-administered questionnaire assessing demographics, body mass index (BMI), teaching practices, pain characteristics, and intensity measured using a Visual Analogue Scale (VAS). Descriptive statistics, chi-square tests, and odds ratios were calculated to examine associations between musculoskeletal pain and demographic or occupational factors. **Results:** Musculoskeletal discomfort related to teaching was reported by 58.7% of participants, with back pain being the most prevalent symptom (33.9%), followed by shoulder (32.1%) and knee pain (24.8%). Most participants (79%) reported symptom onset during teaching, and 81.7% described the pain as slow and persistent. Moderate pain severity (VAS 2–7) was reported by 73.4% of participants. A positive but non-significant association was observed between elevated BMI and musculoskeletal pain (OR = 2.00; 95% CI: 0.88–4.55; $p = 0.146$). Teaching hours were not significantly associated with pain prevalence ($p = 0.765$). **Conclusion:** Back pain and other MSDs are highly prevalent among madrassah teachers in Karachi, primarily associated with prolonged static postures, floor-sitting positions, and elevated BMI. These findings underscore the need for ergonomic interventions, posture education, and weight management strategies to reduce musculoskeletal burden and improve occupational health in this population.

Keywords

Musculoskeletal disorders; Back pain; Occupational health; Ergonomics; Body mass index; Teachers; Pakistan; Madrassah education.

INTRODUCTION

Musculoskeletal disorders (MSDs) represent one of the most frequent occupational health problems worldwide and remain a leading cause of disability, work absenteeism, and reduced productivity among working populations (1). Among these, back pain—particularly low back pain (LBP)—is the most common manifestation, affecting up to 80% of individuals at some point in their lifetime (2). Occupational exposure to static postures, repetitive activities, and ergonomically suboptimal work environments significantly contributes to the development and persistence of back pain (3). Teachers, in particular, are recognized as a high-risk occupational group due to prolonged sitting, awkward postures during teaching, extended working hours, and insufficient ergonomic awareness (4,5).

While the burden of MSDs among teachers in conventional educational settings has been widely documented, certain subgroups such as madrassah teachers remain underexplored. In Pakistan, madrassahs constitute an important component of the educational landscape, employing thousands of teachers nationwide (6). Unlike typical classroom environments where teaching is performed from standing or mixed postures, madrassah instruction is often delivered from a seated position on the floor, frequently without ergonomic furniture or supportive infrastructure (7). Such teaching practices can lead to increased spinal load, muscle strain, and postural imbalance, elevating the risk of chronic back pain and related musculoskeletal conditions (8).

Obesity further compounds this risk, as elevated body mass index (BMI) is independently associated with increased mechanical stress on the spine and a higher prevalence of back pain (9). Additionally, limited access to occupational health education and preventive measures may exacerbate the problem, resulting in unaddressed discomfort that can impair teaching performance and quality of life over time (10). Despite these occupational exposures, there is a paucity of research focusing on the prevalence, risk factors, and patterns of back pain among madrassah teachers in Pakistan.

This study aims to address this gap by investigating the prevalence and characteristics of back pain among madrassah teachers in Karachi. By examining the association of back pain with demographic factors, BMI, and work-related characteristics, this study seeks to provide evidence that can inform ergonomic interventions, occupational health policies, and targeted preventive strategies for this underserved workforce.

MATERIALS AND METHODS

This cross-sectional survey was conducted to investigate the prevalence and characteristics of back pain among madrassah teachers in Karachi, Pakistan. The study was carried out between [insert month and year, if available], targeting male teachers employed in various madrassahs across the city. Inclusion criteria required participants to be actively teaching for a minimum of one year to ensure adequate occupational exposure. Individuals with a known history of spinal trauma, musculoskeletal surgery, or systemic musculoskeletal disorders were excluded to minimize confounding factors. Ethical approval was obtained from the institutional review board of [insert institution name], and all participants provided informed consent prior to participation.

A structured, self-administered questionnaire was used as the primary data collection tool. The questionnaire was designed based on previous occupational health studies and adapted to the context of madrassah teaching to capture relevant demographic, occupational, and health-related information. It consisted of sections addressing demographic characteristics (age, teaching experience, employment status, and daily teaching hours), anthropometric data including body mass index (BMI), and work-related variables such as teaching posture and duration. The presence, anatomical location, and onset of musculoskeletal pain were assessed, with a particular focus on the lumbar spine, shoulders, knees, and heels. Pain intensity was measured using a 10-point Visual Analogue Scale (VAS), where a score of 0 indicated no pain and 10 represented the most severe pain. Participants were also asked about the nature of their pain (acute or chronic, intermittent or persistent) and whether symptoms were present prior to teaching activities or developed during occupational tasks.

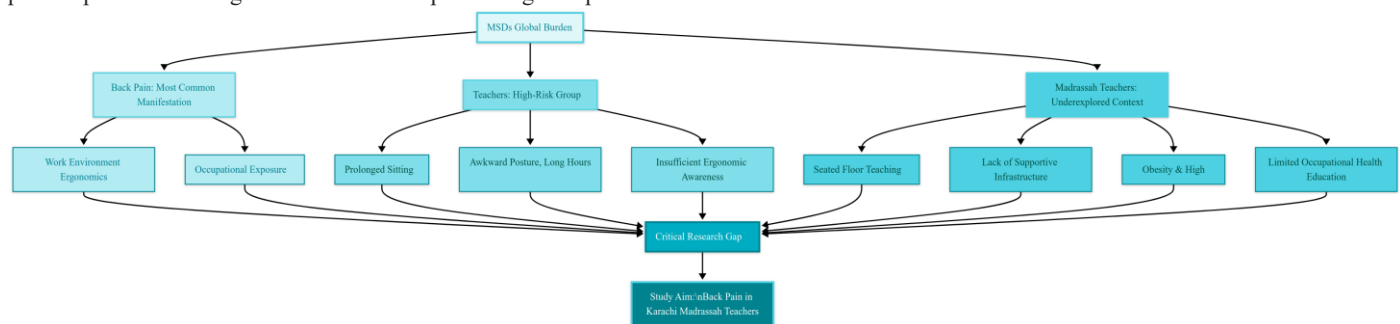


Figure 1 Study Schematic Flowchart

Data were collected anonymously to encourage accurate reporting and were entered into IBM SPSS Statistics version 20 for analysis. Descriptive statistics were used to summarize participant characteristics and pain-related variables, including frequency distributions, percentages, means, and standard deviations. Cross-tabulations were performed to explore associations between pain prevalence and demographic or occupational variables such as age, BMI, and daily teaching duration. Although the study primarily relied on descriptive analysis, exploratory statistical comparisons were also conducted where appropriate to identify potential associations between BMI categories and the presence, location, or severity of pain. A p-value of <0.05 was considered indicative of statistical significance.

RESULTS

A total of 109 male madrassah teachers participated in the study, all meeting the inclusion criteria. The majority (73.4%) were employed full-time, while 26.6% worked part-time. Most teachers (54.1%) reported teaching between five and eight hours daily, with the remainder teaching less than five hours (27.5%) or more than eight hours (18.4%). Analysis of anthropometric data showed that 69.2% of participants had a body mass index (BMI) greater than 25 kg/m², classifying them as overweight or obese (Table 1).

Table 1. Participant characteristics (n = 109)

Characteristic	n (%)
Employment status: Full-time	80 (73.4%)
Employment status: Part-time	29 (26.6%)
Teaching hours: <5 h	30 (27.5%)
Teaching hours: 5–8 h	59 (54.1%)
Teaching hours: >8 h	20 (18.4%)
BMI: ≤25 (Normal)	34 (31.2%)
BMI: >25 (Overweight/Obese)	75 (69.2%)

Overall, 58.7% (n=64) of madrassah teachers reported musculoskeletal discomfort related to their teaching activities. The lumbar spine was the most commonly affected region, with 33.9% (n=37) reporting back pain. Shoulder pain was reported by 32.1% (n=35), followed by knee pain in 24.8% (n=27), and heel pain in 3.7% (n=4). Multiple pain sites were reported by a subset of participants (Table 2).

Among those reporting pain (n=64), 79% indicated that symptoms developed during teaching sessions, while 21% experienced pain prior to classroom activities. Most participants (81.7%) described their pain as slow and persistent rather than acute or intermittent. Regarding severity, 73.4% reported moderate pain intensity (VAS 2–7), 8.3% described severe pain (VAS 8–10), and 18.8% reported mild pain (VAS 1–2) (Table 3). BMI showed a positive but statistically non-significant association with musculoskeletal pain. Among participants with BMI >25 kg/m², 64.0% reported pain, compared to 47.1% of those with a normal BMI. The crude odds ratio indicated that overweight or obese teachers were twice as likely to experience musculoskeletal pain compared to those with normal BMI (OR = 2.00; 95% CI: 0.88–4.55; $\chi^2(1)=2.12$, p=0.146) (Table 4).

Table 2. Prevalence of musculoskeletal pain by anatomical region (n = 109)

Region	n	% of total
Back	37	33.9%
Shoulder	35	32.1%
Knee	27	24.8%
Heel	4	3.7%

Table 3. Characteristics of pain among affected participants (n = 64)

Subgroup	n	%
Onset: During teaching	51	79.0%
Onset: Before class	13	21.0%
Nature: Slow/persistent	52	81.7%
Nature: Other	12	18.3%
Severity: Mild (VAS 1–2)	12	18.8%
Severity: Moderate (VAS 2–7)	47	73.4%
Severity: Severe (VAS 8–10)	5	8.3%

Table 4. Association between BMI and musculoskeletal pain

BMI category	Pain: n/N (%)
≤25 (Normal)	16/34 (47.1%)
>25 (Overweight/Obese)	48/75 (64.0%)

Test	Value	df / 95% CI	p-value
Chi-square	2.12	1	0.1459
Odds Ratio (High vs Normal)	2.00	0.88 – 4.55	—

Teaching hours were not significantly associated with the presence of musculoskeletal pain ($\chi^2(2)=0.53$, $p=0.765$). Pain prevalence was highest among those teaching more than eight hours daily (65.0%), followed by those teaching fewer than five hours (60.0%), and lowest among those teaching between five and eight hours (55.9%) (Table 5).

Table 5. Association between teaching hours and musculoskeletal pain

Teaching hours	No pain (n)	Any pain (n)	Total (n)	Any pain %
<5 h	12	18	30	60.0%
5–8 h	26	33	59	55.9%
>8 h	7	13	20	65.0%

Test	Value	df	p-value
Chi-square (3×2)	0.53	2	0.7654

The findings demonstrate a high prevalence of back pain and related musculoskeletal symptoms among madrassah teachers in Karachi, with nearly 60% reporting occupationally associated discomfort. The lumbar spine was the most commonly affected region, and symptoms were predominantly slow and persistent. Although high BMI was associated with a greater likelihood of pain, the relationship did not reach statistical significance in this sample. Teaching duration also showed no significant association, suggesting that posture, ergonomic conditions, and body composition may be stronger determinants of musculoskeletal risk than teaching hours alone.

DISCUSSION

This study investigated the prevalence, characteristics, and associated risk factors of musculoskeletal pain among madrassah teachers in Karachi, an occupational group that has remained largely underrepresented in ergonomic and occupational health literature. The findings reveal a high burden of musculoskeletal discomfort, with nearly 60% of teachers reporting pain related to their teaching activities. The lumbar spine was the most commonly affected region, followed by the shoulders and knees. Most participants described their pain as slow and persistent, indicating a chronic or repetitive strain pattern rather than acute injury. These results underscore the significant occupational health risks faced by madrassah teachers and highlight the need for targeted interventions in this unique educational setting.

The prevalence of back pain observed in this study (33.9%) aligns closely with global data, where musculoskeletal disorders among teachers have been reported in the range of 30–60% (1,2). Similar prevalence patterns have been documented among primary and secondary school teachers, often attributed to prolonged sitting, awkward postures, and inadequate ergonomic environments (3,4). However, madrassah teachers face additional occupational challenges. The cultural norm of floor-based teaching without ergonomic furniture results in prolonged static postures with significant spinal loading. Such positions increase intradiscal pressure and muscle strain, contributing to the development of chronic low back pain (5). The absence of back support and adjustable work surfaces may further exacerbate biomechanical stress, especially during extended teaching sessions.

An important finding of this study is the association between elevated BMI and musculoskeletal pain. Teachers with a BMI greater than 25 kg/m² were twice as likely to report pain compared to those with normal BMI, although this relationship did not reach statistical significance. This trend is consistent with previous research demonstrating that excess body weight increases axial loading on the spine and alters postural mechanics, thereby elevating the risk of low back pain and other musculoskeletal complaints (6,7). Obesity is also associated with systemic inflammation, which may contribute to musculoskeletal pain sensitization and chronicity (8). These findings suggest that interventions targeting weight

management, alongside ergonomic improvements, could have a significant impact on reducing the burden of occupational musculoskeletal disorders in this population.

Interestingly, teaching hours did not show a statistically significant association with pain prevalence. This finding suggests that the duration of teaching alone may not be a primary determinant of musculoskeletal risk in madrassah teachers. Instead, factors such as posture, body composition, and the lack of ergonomic support may play more critical roles. This observation is supported by occupational health literature, which emphasizes that static posture, repetitive movements, and poor workstation design often outweigh exposure duration as predictors of musculoskeletal strain (9,10).

The high prevalence of slow, persistent pain reported by most participants is noteworthy. Chronic musculoskeletal pain is known to impair occupational performance, reduce quality of life, and increase the likelihood of absenteeism and early retirement (11). In the context of madrassah teachers, persistent pain could have implications not only for their physical well-being but also for educational quality and continuity. Despite these risks, ergonomic awareness remains low in many religious educational institutions, and preventive strategies such as posture training, stretching exercises, or workspace modifications are rarely implemented.

The present findings highlight several practical implications. First, occupational health interventions in madrassahs should prioritize ergonomic improvements, including the introduction of supportive seating, adjustable teaching environments, and posture modification training. Second, regular screening and educational workshops could improve awareness of musculoskeletal risk factors among teachers. Finally, integrating lifestyle interventions such as weight management and physical activity promotion may offer additional benefits in reducing pain prevalence and improving overall health.

This study has several limitations that should be considered when interpreting the results. The cross-sectional design precludes causal inferences, and the reliance on self-reported data introduces the possibility of recall and reporting bias. Additionally, the sample was limited to male teachers from Karachi, which may limit the generalizability of the findings to female teachers or those in other regions. Future research should employ longitudinal designs, incorporate objective measures of posture and ergonomic risk, and evaluate the effectiveness of targeted interventions in reducing musculoskeletal burden among madrassah educators.

In conclusion, this study demonstrates that back pain and other musculoskeletal disorders are highly prevalent among madrassah teachers in Karachi, with ergonomic factors and elevated BMI playing key contributory roles. Although teaching duration did not show a significant relationship with pain prevalence, the findings underscore the multifactorial nature of occupational musculoskeletal health. Addressing these issues through ergonomic modifications, preventive health strategies, and awareness programs could significantly reduce the burden of musculoskeletal disorders and improve occupational well-being in this underserved workforce.

CONCLUSION

This study demonstrates that musculoskeletal disorders, particularly low back pain, are highly prevalent among madrassah teachers in Karachi, largely attributable to prolonged floor-sitting postures, inadequate ergonomic support, and elevated body mass index. The predominance of slow, persistent pain and its association with excess weight highlight the multifactorial nature of occupational musculoskeletal risk in this population. While teaching duration did not significantly influence pain prevalence, the findings underscore the urgent need for targeted interventions, including ergonomic modifications, posture education, and weight management strategies, to reduce musculoskeletal burden, improve occupational health, and enhance the quality of life and teaching performance among madrassah educators.

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