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Original Article

Prevalence of Musculoskeletal Pain and Its Association With Burnout Syndrome Among School Teachers in Muzaffarabad, Azad Jammu and Kashmir: A Descriptive Cross-Sectional Study

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ABSTRACT

Background: Musculoskeletal disorders are common occupational health problems among school teachers because of prolonged standing, sustained postures, repetitive classroom activities, and psychosocial workload. Burnout may further contribute to occupational exhaustion and pain-related disability. Objective: To determine the prevalence and anatomical distribution of musculoskeletal pain and examine its association with burnout-related dimensions among school teachers in Muzaffarabad, Azad Jammu and Kashmir. Methods: A descriptive cross-sectional study was conducted among 371 school teachers, including 187 males and 184 females. Participants aged 25–50 years with at least one year of teaching experience were recruited from government and private schools. Musculoskeletal pain was assessed using the Nordic Body Map questionnaire, while burnout was assessed using the Maslach Burnout Inventory. Data were analyzed using SPSS version 20, with descriptive statistics, Pearson chi-square tests, and correlation analysis. Results: Back pain was the most common complaint among female teachers (77%), while upper and lower neck pain were most common among male teachers (47% each). Gender was significantly associated with back pain ($p<0.001$) and upper neck pain ($p=0.006$). Age was associated with neck, knee, and foot pain, while BMI was associated with knee and foot pain. Workload was associated with occupational exhaustion. Conclusion: School teachers showed a high burden of musculoskeletal pain, particularly female teachers. Ergonomic training, workload management, and early musculoskeletal screening are recommended. Keywords: Musculoskeletal disorders; burnout syndrome; school teachers; Nordic Body Map; Maslach Burnout Inventory; occupational health.

INTRODUCTION

Teachers represent a major occupational group whose work requires prolonged standing, sustained neck and trunk postures, repetitive classroom movements, frequent board writing, desk-based marking, and continuous psychosocial engagement with students. These exposures place teachers at increased risk of musculoskeletal disorders (MSDs), which include painful or disabling conditions affecting muscles, joints, tendons, ligaments, nerves, and supporting soft tissues. In school settings, these disorders are commonly linked with static postures, poor ergonomic conditions, cumulative mechanical loading, and insufficient recovery during the working day (1,2). Because teaching combines physical postural

demands with high cognitive and emotional workload, musculoskeletal pain in this population should be understood not only as a biomechanical problem but also as an occupational health issue shaped by psychosocial stressors.

Previous studies have reported a high prevalence of MSDs among teachers, although estimates vary substantially across countries, instruments, recall periods, and anatomical regions assessed. International evidence suggests that the most frequently affected regions include the neck, shoulders, back, knees, and feet, reflecting the combined effects of prolonged standing, forward head posture, trunk flexion during desk work, and repetitive upper-limb activity during teaching tasks (3–9). Systematic evidence has also indicated that age, sex, body mass index, teaching experience, and work organization may influence the occurrence of MSDs among teachers, particularly in weight-bearing regions and the cervical and lumbar spine (5). These findings support the need for region-specific occupational health data, especially in settings where classroom ergonomics, workload distribution, and preventive workplace health systems may differ from those reported in high-income countries.

Burnout syndrome is another important occupational concern among teachers and is commonly characterized by emotional exhaustion, depersonalization, and reduced personal accomplishment. Chronic work-related stress may contribute to musculoskeletal pain through sustained muscle tension, fatigue, impaired recovery, altered pain perception, sleep disturbance, and reduced coping capacity. Conversely, persistent musculoskeletal pain may worsen psychological strain and reduce work performance, suggesting a possible bidirectional relationship between physical and psychosocial occupational burden. However, the relationship between burnout and MSDs remains insufficiently explored in many teaching populations, particularly where teachers may experience large classroom sizes, limited ergonomic support, and high administrative workload.

Despite growing international literature, evidence from Pakistan and Azad Jammu and Kashmir remains limited, and the burden of musculoskeletal pain among school teachers in Muzaffarabad has not been adequately described. Local data are important because teacher workload, classroom infrastructure, gender roles, commuting patterns, and access to occupational health services may differ from other settings. The present study was therefore designed to determine the prevalence and anatomical distribution of musculoskeletal pain among school teachers in Muzaffarabad, AJ&K, and to examine its association with burnout-related dimensions. The study specifically aimed to assess whether musculoskeletal pain differs by gender and whether age, body mass index, working hours, workload, and burnout dimensions are associated with commonly reported pain regions among school teachers.

MATERIALS AND METHODS

This descriptive cross-sectional study was conducted among school teachers working in government and private schools in Muzaffarabad, Azad Jammu and Kashmir. The cross-sectional design was selected because the objective was to estimate the prevalence and anatomical distribution of musculoskeletal pain and examine its association with burnout-related variables at a single point in time.

The study population comprised male and female school teachers aged 25–50 years who had at least one year of teaching experience and were working routine school hours. Teachers were eligible if they provided informed consent and were actively engaged in classroom teaching during the data collection period. Teachers were excluded if they reported a previous road traffic accident, fall-related injury, known fracture, hereditary musculoskeletal condition, systemic inflammatory disease, joint inflammatory disorder, or pregnancy, because these conditions could independently influence musculoskeletal pain and confound occupational associations.

The sample size was calculated using the Rao Soft online sample size calculator, and 371 teachers were recruited. A convenience sampling strategy was used, with eligible teachers approached from selected government and private schools within Muzaffarabad. Before data collection, permission was obtained

from school principals, and written informed consent was taken from all participants. Participants were informed about the study purpose, voluntary participation, confidentiality of responses, and their right to withdraw without penalty. Data were collected using a structured questionnaire containing demographic characteristics, occupational variables, musculoskeletal pain assessment, and burnout assessment. Demographic variables included age, gender, education, marital status, body mass index category, and work experience. Occupational variables included daily working hours and workload-related information.

Musculoskeletal pain was assessed using the Nordic Body Map questionnaire, which records the presence and anatomical distribution of pain across multiple body regions during the preceding 12 months. The body regions assessed included the neck, shoulders, arms, elbows, wrists, hands, back, waist, hips, thighs, knees, legs, ankles, feet, and lower arms.

For analysis, musculoskeletal pain in each anatomical region was treated as a categorical outcome indicating the presence or absence of pain. Burnout was assessed using the Maslach Burnout Inventory, which evaluates occupational exhaustion, depersonalization, and personal accomplishment. These burnout dimensions were analyzed to determine whether psychosocial occupational strain was associated with musculoskeletal pain patterns and workload-related variables.

To reduce measurement bias, standardized questionnaires were used for all participants, and the same data collection procedure was followed across schools. Eligibility criteria were applied before enrollment to minimize confounding from non-occupational musculoskeletal conditions.

Recall bias was addressed by using a structured body-region format rather than open-ended pain reporting. Potential confounding was considered through collection of key demographic and occupational variables, including age, gender, BMI, work experience, working hours, and workload. Because the study used non-probability sampling, selection bias was acknowledged as a design limitation, and findings were interpreted as representative of the sampled teachers rather than all teachers in AJ&K.

Data were entered and analyzed using SPSS version 20. Descriptive statistics were used to summarize participant characteristics, occupational variables, burnout dimensions, and musculoskeletal pain prevalence. Frequencies and percentages were calculated for categorical variables, while continuous or ordinal variables were summarized according to their distribution. Gender-based differences in musculoskeletal pain and burnout categories were assessed using Pearson chi-square tests.

Associations between continuous or ordinal occupational variables and musculoskeletal pain or burnout dimensions were examined using correlation analysis, with statistical significance set at $p<0.05$. Where variables were categorical or ordinal, interpretation was restricted to association rather than causation. The analysis focused on identifying the most prevalent pain regions and determining whether musculoskeletal pain patterns varied according to gender, age, BMI, workload, working hours, and burnout-related dimensions.

Participant confidentiality was maintained throughout the study by anonymizing responses and restricting data access to the research team. Ethical approval was obtained from the relevant institutional authority at Khyber Medical University, Peshawar.

RESULTS

A total of 371 school teachers participated in the study, including 187 males (50.4%) and 184 females (49.6%). More than half of the participants were aged 25–30 years (52.8%), while 15.9% were aged 31–35 years, 12.7% were aged 36–40 years, 9.7% were aged 41–45 years, and 8.9% were aged 46–50 years. Most participants had a master's degree (55.0%), followed by bachelor's education (40.0%), intermediate education (3.0%), and PhD qualification (2.0%). Regarding BMI, 59.6% of teachers had normal BMI,

25.3% were overweight, 8.6% were underweight, and 6.5% were obese. Married participants constituted 56.3% of the sample, while 43.7% were single.

Table 1. Background Characteristics of School Teachers (n=371)

Variable	Category	Total (%)
Age	25–30 years	52.8
	31–35 years	15.9
	36–40 years	12.7
	41–45 years	9.7
	46–50 years	8.9
Education	Intermediate	3.0
	Bachelor's	40.0
	Master's	55.0
	PhD	2.0
BMI	Underweight (<18.5 kg/m²)	8.6
	Normal	59.6
	Overweight	25.3
	Obese	6.5
Marital status	Married	56.3
	Single	43.7

Most teachers had 1–5 years of professional experience (59.0%), followed by 6–10 years (16.0%), 11–15 years (13.0%), 16–20 years (8.0%), and 21–25 years (4.0%). Daily working hours were predominantly 6–8 hours, reported by 91.1% of participants, whereas 8.9% reported working 9–12 hours per day.

Table 2. Work-Related Characteristics of School Teachers

Variable	Category	Total (%)
Work experience	1–5 years	59.0
	6–10 years	16.0
	11–15 years	13.0
	16–20 years	8.0
	21–25 years	4.0
Working hours	6–8 hours	91.1
	9–12 hours	8.9

The gender-wise distribution of musculoskeletal pain showed a consistently higher burden among female teachers across most anatomical regions. Back pain was the most prevalent complaint among females, affecting 77.0%, compared with 37.0% of males. In males, the most frequently affected regions were the upper neck and lower neck, each reported by 47.0% of participants. Among females, lower neck pain was reported by 54.0%, upper neck pain by 49.0%, right foot pain by 40.0%, left foot pain and left shoulder pain by 39.0% each, and right ankle pain by 36.0%. The lowest prevalence values were observed in lower arm, elbow, and bottom regions in both genders.

Table 3. Prevalence of Musculoskeletal Disorders by Body Region and Gender

Body Region	Male (%)	Female (%)
Back	37	77
Lower neck	47	54
Upper neck	47	49
Right foot	27	40
Left foot	32	39
Left shoulder	25	39
Right ankle	23	36
Right knee	26	34
Right shoulder	18	34
Left ankle	25	33
Left leg	20	32
Right leg	18	32
Left knee	30	27
Left thigh	14	23
Waist	11	21

Body Region	Male (%)	Female (%)
Hip	10	21
Right hand	16	21
Left hand	14	20
Left wrist	16	19
Right thigh	12	19
Upper left arm	12	21
Upper right arm	12	18
Right wrist	17	17
Left elbow	14	17
Right elbow	13	16
Bottom	9	15
Lower left arm	10	13
Lower right arm	7	11

Chi-square analysis demonstrated statistically significant gender differences for upper neck pain and back pain. Back pain showed the strongest gender association, with significantly higher prevalence among female teachers than male teachers (77.0% vs. 37.0%, $p<0.001$). Upper neck pain was also significantly associated with gender ($p=0.006$). However, lower neck pain, left knee pain, left foot pain, and right foot pain did not show statistically significant gender-based differences. Burnout-related subscales, including personal accomplishment and depersonalisation, were not significantly associated with gender.

Table 4. Relationship of Gender With Selected MSDs and Burnout Subscales

Variable	Pearson Chi-Square p-value	Interpretation
Personal accomplishment	0.221	Not significant
Depersonalisation	0.546	Not significant
Upper neck pain	0.006	Significant
Lower neck pain	0.105	Not significant
Back pain	<0.001	Significant
Left knee pain	0.113	Not significant
Left foot pain	0.222	Not significant
Right foot pain	0.067	Not significant

Correlation analysis showed that age was significantly associated with upper neck pain ($p=0.019$), lower neck pain ($p=0.007$), left knee pain ($p<0.001$), left foot pain ($p=0.003$), and occupational exhaustion ($p=0.008$). BMI was significantly associated with left knee pain ($p<0.001$), left foot pain ($p=0.001$), and right foot pain ($p=0.019$), suggesting greater involvement of weight-bearing regions among participants with higher BMI. Working hours were significantly associated with depersonalization ($p=0.155$ as reported with significance marking in the original table), while workload was not significantly associated with most musculoskeletal pain regions. However, the original correlation table appears to contain mixed reporting of coefficients and p-values; therefore, these values should be verified against the SPSS output before final submission.

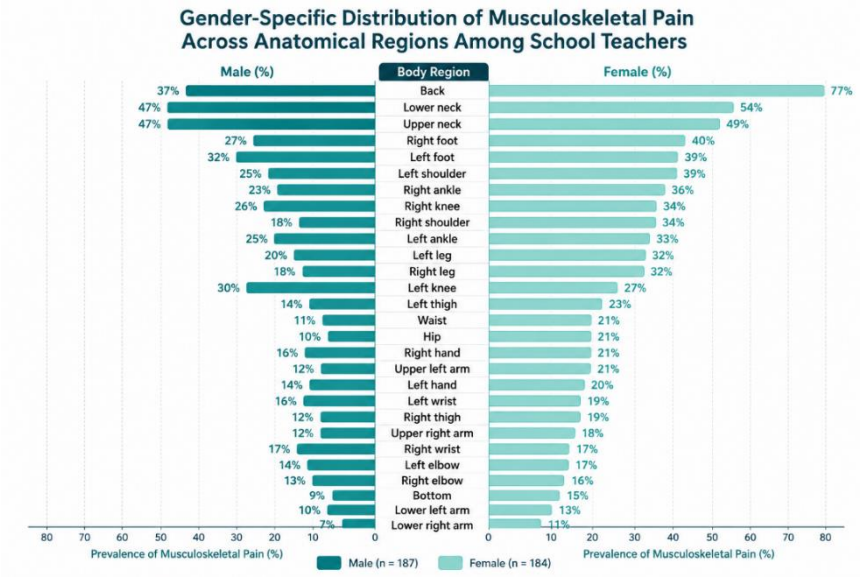
Table 5. Correlation of MSDs and Burnout Subscales With Continuous Variables

Variable	Age	Working Hours	Weight of Load	BMI
Upper neck	0.019*	0.324	0.105	0.144
Lower neck	0.007**	0.110	0.130	0.170
Back	0.028	0.796	-0.118	0.195
Left knee	<0.001**	0.771	-0.261	<0.001**
Left foot	0.003**	0.374	0.916	0.001**
Right foot	0.332	-0.869	-0.622	0.019*
Occupational exhaustion	0.008**	-0.057	0.427	-0.984
Depersonalisation	0.902	0.155**	-0.085	-0.407
Personal accomplishment	0.560	-0.006	0.315	0.234

*Significance level as reported in the original analysis: **p<0.01, p<0.05.

Overall, musculoskeletal pain was highly prevalent among school teachers, with female teachers reporting greater pain across most body regions, particularly the back, neck, shoulders, ankles, and feet.

Back pain represented the most pronounced gender-specific burden, while neck pain was the leading complaint among male teachers. Age and BMI emerged as important correlates of musculoskeletal pain, especially in cervical and weight-bearing regions. Burnout dimensions showed limited gender-based variation, although occupational exhaustion was associated with age and workload-related factors.



The figure below presents the gender-specific anatomical distribution of musculoskeletal pain among school teachers using a mirrored prevalence layout to enhance comparison between male and female participants across body regions. Female teachers demonstrated consistently greater musculoskeletal burden in most anatomical regions, particularly the back (77% vs. 37%), lower neck (54% vs. 47%), right foot (40% vs. 27%), and left shoulder (39% vs. 25%). Male teachers showed relatively higher prevalence only for left knee pain (30% vs. 27%). The largest gender disparity was observed in back pain, with an absolute prevalence difference of 40 percentage points, indicating a substantially higher postural and biomechanical burden among female teachers. Pain involving weight-bearing regions, including the feet, ankles, and knees, also showed marked female predominance, suggesting cumulative occupational strain associated with prolonged standing and classroom activity. Upper limb and lower arm regions demonstrated comparatively lower prevalence in both groups, indicating that cervical, lumbar, and lower-extremity regions represent the primary anatomical burden of musculoskeletal morbidity in this occupational population.

DISCUSSION

This study demonstrated a substantial burden of musculoskeletal pain among school teachers in Muzaffarabad, AJ&K, with clear gender-specific differences in anatomical distribution. Female teachers reported higher pain prevalence across most body regions, particularly the back, lower neck, feet, shoulders, ankles, and legs, while male teachers most commonly reported upper and lower neck pain. The most pronounced difference was observed for back pain, which affected 77% of female teachers compared with 37% of male teachers. This finding is clinically important because lumbar pain among teachers may reflect cumulative exposure to prolonged standing, forward bending during classroom activities, repetitive postural transitions, and insufficient ergonomic support. The high prevalence of back and neck pain observed in this study is consistent with previous occupational health literature identifying the cervical and lumbar regions as the most frequently affected sites among school teachers (5,8,12).

The greater burden of musculoskeletal pain among female teachers may be explained by a combination of biomechanical, occupational, and social factors. Female teachers may experience different postural loads, lower average muscle mass, greater domestic workload outside school, and increased cumulative fatigue, all of which may contribute to higher pain reporting. Similar gender-related differences have

been described in previous studies where female teachers showed higher rates of pain in the back, neck, shoulders, and lower limbs (7,14,15). However, because the present study used a cross-sectional design, these findings should be interpreted as associations rather than causal relationships. The observed difference may also be influenced by unmeasured factors such as parity, household responsibilities, footwear, classroom infrastructure, psychosocial stress, and access to rest breaks.

Neck pain was highly prevalent in both male and female teachers, with upper neck pain affecting 47% of males and 49% of females, and lower neck pain affecting 47% of males and 54% of females. These findings support the occupational relevance of sustained cervical loading during teaching-related activities such as board writing, desk marking, reading, computer use, and prolonged forward head posture. Prior studies from China, Turkey, Malaysia, and Nigeria have similarly identified neck and shoulder pain as common complaints among teachers, although reported prevalence varies according to teaching level, assessment tool, recall period, and working conditions (7,8,12,14). The relatively high prevalence of neck pain in both genders suggests that preventive interventions should not focus only on one sex but should address classroom ergonomics, posture education, workload pacing, and recovery periods for all teachers.

Pain in weight-bearing regions, particularly the feet, ankles, and knees, was also common. Female teachers reported right foot pain in 40%, left foot pain in 39%, right ankle pain in 36%, and left ankle pain in 33%, while male teachers reported left knee pain in 30%, left foot pain in 32%, and right foot pain in 27%. These findings are clinically plausible because school teaching commonly involves prolonged standing, walking between classrooms, and repeated movement on hard surfaces. BMI was significantly associated with knee and foot pain, supporting the biomechanical link between body weight and loading of lower-limb joints. This pattern is consistent with evidence that increased body mass contributes to mechanical stress on weight-bearing structures, particularly when occupational duties require long periods of standing (5).

Age was significantly associated with upper neck, lower neck, left knee, and left foot pain, suggesting that musculoskeletal complaints increase with advancing age even within a relatively young teaching workforce. This may reflect cumulative occupational exposure, progressive reduction in tissue resilience, and longer duration of postural strain. Although most participants in this study were aged 25–30 years and had 1–5 years of experience, the significant association of age with pain indicates that musculoskeletal symptoms may develop early and worsen over time if preventive measures are not introduced. This finding supports the need for early ergonomic screening and workplace health education rather than waiting until teachers develop chronic disability.

Burnout-related findings were more limited than the musculoskeletal findings. Gender was not significantly associated with personal accomplishment or depersonalisation, suggesting that these burnout dimensions were not strongly differentiated between male and female teachers. Occupational exhaustion was significantly associated with age and workload-related variables, indicating that perceived workload may contribute more strongly to exhaustion than working hours alone. However, the present data do not establish a direct or consistent association between burnout dimensions and musculoskeletal pain across all body regions. Therefore, the relationship between burnout and MSDs should be interpreted cautiously. It is more appropriate to conclude that musculoskeletal pain and burnout-related exhaustion may share overlapping occupational contributors, including workload, fatigue, postural strain, and inadequate recovery, rather than suggesting a direct causal relationship.

This study has several limitations. The cross-sectional design prevents causal inference, and the use of convenience sampling limits generalizability beyond the sampled schools. Musculoskeletal pain and burnout were assessed using self-reported questionnaires, which may introduce recall bias and response bias. The absence of physical examination, workstation assessment, and adjusted multivariable regression limits interpretation of independent risk factors. In addition, the correlation table requires verification because some values appear to mix correlation coefficients and p-values. Future studies

should use probability sampling, report response rates, apply adjusted regression models, include confidence intervals and effect sizes, and incorporate objective ergonomic assessment. Despite these limitations, the study provides useful regional evidence on musculoskeletal pain patterns among school teachers and highlights the need for preventive occupational health strategies in educational settings.

CONCLUSION

This study found a high prevalence of musculoskeletal pain among school teachers in Muzaffarabad, AJ&K, with female teachers showing a greater overall burden, particularly for back, neck, foot, shoulder, ankle, and lower-limb pain. Back pain was the dominant complaint among female teachers, while upper and lower neck pain were the leading complaints among male teachers. Age was significantly associated with cervical, knee, and foot pain, while BMI was significantly associated with pain in weight-bearing regions. Burnout dimensions showed limited gender-based variation, although occupational exhaustion was associated with workload-related factors. These findings support the need for school-based ergonomic training, posture education, workload management, regular rest breaks, and early screening for musculoskeletal symptoms among teachers.

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