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Original Article

Prevalence of Laptop-Related Neck and Shoulder Pain Among Female Academic Staff in Private Universities of Lahore

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ABSTRACT

Background: Prolonged computer-based academic work may expose university educators to sustained cervical flexion, non-neutral shoulder positioning, and other ergonomic demands associated with musculoskeletal discomfort. Objective: To determine the prevalence of neck and shoulder discomfort among female university educators who use laptops in selected private universities of Lahore. Methods: A descriptive cross-sectional study included 109 female educators from the University of Lahore and the University of South Asia. Participants were recruited using convenience sampling and completed a modified female Cornell Musculoskeletal Discomfort Questionnaire focused on neck and shoulder symptoms during the preceding seven days. Continuous variables were summarized as mean ± standard deviation and symptom prevalence as n (%) with 95% confidence intervals. Results: Participants had a mean age of 36.16 ± 7.40 years and mean laptop-use duration of 6.12 ± 2.98 years. Neck discomfort was reported by 88 participants, giving a prevalence of 80.7% (95% CI: 72.3%–87.0%). Shoulder discomfort was reported by 63 participants, corresponding to 57.8% (95% CI: 48.4%–66.6%). Conclusion: Neck and shoulder discomfort were common among female university educators, with neck symptoms affecting approximately four-fifths of the sample. Ergonomic and occupational-health strategies warrant consideration, while longitudinal studies are required to clarify exposure–outcome relationships. Keywords: neck pain; shoulder pain; laptop use; ergonomics; university teachers; musculoskeletal discomfort; occupational health.

INTRODUCTION

Neck and shoulder pain represent an important component of the global burden of musculoskeletal disorders and can adversely affect physical function, work performance, sleep, psychological well-being, and quality of life. Neck pain encompasses discomfort, stiffness, or pain arising from the cervical region and is frequently influenced by a combination of mechanical, occupational, behavioral, and psychosocial factors. Sustained non-neutral cervical postures, repetitive activity, prolonged static loading, and psychological distress can contribute to the development or persistence of symptoms (1). Shoulder pain similarly has a multifactorial basis and may involve muscular, tendinous, joint, postural, and psychosocial mechanisms. Psychological factors such as emotional distress, anxiety, fear of movement, and maladaptive pain responses have also been associated with persistent shoulder symptoms and disability (2,3). These observations support a biopsychosocial rather than exclusively structural understanding of occupational neck and shoulder discomfort.

Increasing dependence on portable computers has introduced additional ergonomic challenges because the screen and keyboard of a laptop are mechanically coupled. Unlike a conventional desktop workstation, elevation of the laptop screen to an optimal visual height simultaneously raises the keyboard, whereas positioning the keyboard appropriately commonly places the screen below eye level. Consequently, prolonged laptop use may encourage forward-head posture, sustained cervical flexion, trunk flexion, elevated or protracted shoulders, and unsupported upper-limb positions. Comparative research among computer users has demonstrated differences in neck and shoulder musculoskeletal complaints associated with laptop and desktop use (4). Experimental assessment of laptop use at low tables, sofas, and beds has further demonstrated unfavorable neck and shoulder postures and altered muscular activity under informal working conditions (5). Three-dimensional motion analysis also indicates meaningful differences in upper-body posture during computerized device use among individuals with and without chronic neck pain (6).

The physical surface and workstation on which a laptop is used can further modify biomechanical loading. Informal environments such as beds, sofas, dining tables, or inadequately adjusted desks may require greater cervical flexion and altered shoulder positioning than ergonomically configured workstations. Motion-capture research comparing home-office environments with ergonomic workstations has demonstrated increased postural risk when work is performed using less suitable furniture and workstation configurations (7). Reviews of remote-working populations similarly identify poor workstation design, inadequate lumbar and upper-limb support, prolonged sitting, limited postural variation, and insufficient ergonomic awareness as recurrent contributors to musculoskeletal complaints (8,9). These factors are particularly relevant to occupations characterized by prolonged computer-based documentation, communication, teaching, and administrative work.

University academic staff constitute a potentially vulnerable occupational group because their work commonly combines teaching, preparation of educational material, assessment, research, electronic communication, student supervision, and administrative responsibilities. The transition toward digitally mediated teaching and remote work further increased reliance on laptops and improvised workstations. Research among university staff during remote working has documented a high burden of computer-related musculoskeletal symptoms, including neck and shoulder complaints (10). Similar ergonomic challenges and musculoskeletal pain have been identified among academic staff working remotely in university environments, emphasizing the interaction between workstation characteristics, sustained computer exposure, and occupational demands (11).

Evidence also suggests that musculoskeletal symptoms associated with digital-device use may differ according to sex and other individual characteristics. A recent study among Chinese college students reported a considerable burden of neck and shoulder pain associated with digital-device use and identified differences according to participant and usage characteristics (12). Among university students in Saudi Arabia, frequent use of smartphones and computers has likewise been associated with substantial neck and shoulder symptom prevalence, particularly in the presence of poor posture and prolonged device exposure (13). Although findings from student populations cannot be directly extrapolated to academic employees, they demonstrate that intensive digital-device exposure is relevant across educational environments.

Teachers are independently recognized as an occupational group with a considerable burden of work-related musculoskeletal disorders. Studies among schoolteachers in Egypt and Saudi Arabia have documented high frequencies of neck, shoulder, back, and other musculoskeletal complaints and have identified factors including prolonged awkward posture, workload, body mass index, sex, repetitive occupational activity, and insufficient ergonomic support (14–16). A systematic review and meta-analysis of musculoskeletal disorders among teachers further supports the substantial occupational burden of these conditions and the need for preventive strategies directed toward work organization and ergonomics (17). The convergence of teaching responsibilities with increasing laptop exposure may therefore place university faculty at particular risk.

The problem is also relevant within Pakistan, where ergonomic resources, occupational-health services, and workstation standardization may vary considerably between institutions. Research among schoolteachers in Lahore has reported musculoskeletal pain associated with occupational risk factors (18). Studies among university students in Pakistan have similarly documented neck and shoulder complaints associated with video-display-terminal and computer use (19,20). Comparable investigations of university computer workstations in other South Asian settings have identified deficiencies in workstation design and associations with reported musculoskeletal

symptoms, reinforcing the importance of context-specific ergonomic assessment (21). Nevertheless, evidence specifically addressing female university educators who routinely use laptops in Lahore remains limited.

Female academic staff may experience a distinctive combination of occupational computer exposure, teaching responsibilities, prolonged sitting, repetitive administrative work, and additional non-occupational physical demands. Identifying the burden of neck and shoulder symptoms in this population is therefore relevant to occupational health, workplace ergonomics, faculty well-being, and institutional productivity. The present study aimed to determine the prevalence of neck and shoulder pain among female university educators who use laptops in selected private universities of Lahore and to examine the relationship of laptop-use exposure with neck and shoulder pain.

MATERIALS AND METHODS

A descriptive cross-sectional study was conducted among female university educators at the University of Lahore and the University of South Asia, two private universities located in Lahore, Punjab, Pakistan. Data collection was completed over a four-month period following approval of the research synopsis. The target population comprised female academic staff working at the participating universities. Convenience sampling was used to recruit eligible participants.

The required sample size was 109 participants. The calculation was based on a source population of 150, a 95% confidence level, a 5% margin of error, and a 50% response distribution. Female university educators aged 25–65 years who regularly used a laptop for at least two hours per day and were willing to provide informed consent were eligible for participation. Participants with diagnosed cardiovascular disease, neuromuscular disorders, or musculoskeletal disorders affecting the neck or shoulder were excluded. Additional exclusion criteria included pregnancy, laptop use of less than two hours per day, recent injury or trauma involving the neck, shoulder, or upper back during the preceding six months, and medical conditions that could independently contribute to neck or shoulder symptoms, including fibromyalgia, systemic inflammatory disease, or malignancy. Data were collected using a modified female version of the Cornell Musculoskeletal Discomfort Questionnaire (CMDQ), with the assessment focused on the neck and shoulder regions. Demographic and occupational information included age, designation, department, daily duration of laptop-related work, working hours per day, and years of laptop use. Musculoskeletal discomfort was assessed using a seven-day recall period. For each anatomical region, participants reported the frequency of discomfort on a five-category scale comprising never, one to two times per week, three to four times per week, once per day, or several times per day. The intensity of discomfort was rated as slight, moderate, or severe, and interference with work was categorized as no interference, slight interference, or substantial interference.

For prevalence analysis, neck and shoulder symptoms were coded dichotomously as absence of discomfort or presence of discomfort. This binary classification was used to avoid incorrectly categorizing all symptomatic participants as having severe pain. Participants were informed about the purpose and nature of the research before data collection. Written informed consent was obtained from eligible individuals who agreed to participate. The investigator met participants individually, explained how to complete the questionnaire, and provided an opportunity to seek clarification. Participation was voluntary, and participants could withdraw without consequences to their professional status. Each questionnaire required approximately 15 minutes to complete and was administered during a single encounter. Data were analysed using IBM SPSS Statistics version 26.0. Categorical variables were summarized using frequencies and percentages, while continuous variables were summarized using means and standard deviations. Neck and shoulder discomfort prevalence was calculated using the number of participants reporting any discomfort divided by the total sample of 109 participants. For the revised statistical presentation, 95% confidence intervals for prevalence estimates were calculated from the reported numerators and denominators using the Wilson method. Statistical reporting was based only on analyses that could be verified from the supplied study data and output.

RESULTS

A total of 109 female university educators were included in the analysis. The mean age of participants was 36.16 ± 7.40 years. Participants reported a mean working duration of 6.12 ± 2.14 hours per day, while the mean duration of laptop use was 6.12 ± 2.98 years.

Table 1. Demographic and Occupational Characteristics of Participants (N = 109)

Characteristic	Mean ± SD
Age, years	36.16 ± 7.40
Working hours per day, hours	6.12 ± 2.14
Duration of laptop use, years	6.12 ± 2.98

SD: standard deviation.

Neck discomfort was reported by 88 of the 109 participants, corresponding to a 7-day prevalence of 80.7% (95% CI: 72.3%–87.0%). Only 21 participants (19.3%) reported no neck discomfort. Shoulder discomfort was reported by 63 participants, corresponding to a prevalence of 57.8% (95% CI: 48.4%–66.6%), while 46 participants (42.2%) reported no shoulder discomfort.

Table 2. Seven-Day Prevalence of Neck and Shoulder Discomfort Among Female University Educators (N = 109)

Anatomical region	No discomfort, n (%)	Discomfort present, n (%)	Prevalence, % (95% CI)
Neck	21 (19.3)	88 (80.7)	80.7 (72.3–87.0)
Shoulder	46 (42.2)	63 (57.8)	57.8 (48.4–66.6)

CI: confidence interval. Prevalence represents self-reported discomfort during the preceding seven days.

Neck discomfort was therefore the more frequently reported symptom, affecting approximately four-fifths of the sample, whereas shoulder discomfort affected more than half of participants. The confidence intervals also indicate that both symptoms were common within the sampled female academic population. The available descriptive results demonstrate a substantial burden of upper-quarter musculoskeletal discomfort but do not establish a causal effect of laptop use or determine the independent contribution of duration of laptop exposure.

DISCUSSION

The present study identified a substantial burden of self-reported neck and shoulder discomfort among female university educators using laptops in two private universities in Lahore. During the seven-day recall period, 80.7% of participants reported neck discomfort and 57.8% reported shoulder discomfort. Neck symptoms were therefore particularly frequent, although shoulder symptoms also affected more than half of the sample. These findings indicate that upper-quarter musculoskeletal discomfort is an important occupational-health concern within the studied academic population. Because the study was cross-sectional, however, the observed prevalence should be interpreted as a description of symptom burden rather than evidence that laptop use caused the reported symptoms.

The high prevalence of neck discomfort is biologically and ergonomically plausible in the context of prolonged computer-based academic work. Laptop design tends to position the visual display below eye level when the keyboard is placed at a comfortable height, thereby encouraging cervical flexion and forward-head posture. Comparative investigations of laptop and desktop users have identified differences in neck and shoulder musculoskeletal complaints associated with computer configuration (4). Experimental work has also shown that laptop use at low tables, sofas, and beds can increase unfavorable neck flexion and modify shoulder posture and muscle activity (5). In individuals with chronic neck pain, altered upper-body posture during computerized-device use has similarly been demonstrated using three-dimensional motion analysis (6). These findings provide a plausible biomechanical context for the high prevalence observed in the present academic population, although posture was not directly quantified in this study.

The observed neck symptom prevalence appears higher than values reported in several previously studied teaching and educational populations, although direct numerical comparison requires caution because studies differ substantially in symptom definitions, recall periods, age distributions, settings, and measurement instruments. Among teachers, previous investigations have consistently identified the neck as one of the most frequently affected anatomical regions (14–17). A systematic review and meta-analysis has likewise demonstrated a considerable overall burden of musculoskeletal disorders among teachers (17). The comparatively high neck symptom frequency in the present study may therefore reflect the particular combination of computer exposure and academic work encountered by university educators, but differences in study methodology must be considered before concluding that female university teachers in Lahore experience a genuinely higher underlying risk.

Research involving digital-device users in educational settings provides additional context. Wang et al. reported substantial neck and shoulder pain among college students using digital devices and identified associations with device-use characteristics and individual factors (12). Elsiddig et al. similarly documented neck and shoulder symptoms among Saudi university students using smartphones and computers (13). Pakistani studies involving university students have also reported neck and shoulder problems in association with video-display-terminal and computer use (19,20). Although university students differ from academic employees in age, workload, exposure pattern, and occupational responsibilities, the consistency of upper-quarter symptoms across these populations suggests that prolonged digital-device use warrants ergonomic attention throughout the academic environment.

Shoulder discomfort was reported by 57.8% of participants, demonstrating that symptoms were not confined to the cervical region. Shoulder discomfort during laptop work may be influenced by sustained shoulder elevation, unsupported upper limbs, repetitive mouse or keyboard activity, altered scapular positioning, and prolonged static muscle activation. Argus and Pääsuke identified shoulder-region musculoskeletal complaints among computer workers and differences related to laptop versus desktop computer use (4). Intolo et al. demonstrated changes in shoulder posture and muscular activity when laptops were used at low-height tables, sofas, and beds (5). Accordingly, the shoulder prevalence observed in the present study is compatible with known ergonomic demands of portable-computer work, although the current data cannot identify which specific postural or workstation factors were responsible.

The occupational characteristics of teaching may amplify these exposures. Academic work does not consist solely of classroom teaching; it commonly includes lesson preparation, research, manuscript and report writing, student assessment, electronic correspondence, learning-management systems, administrative documentation, and supervision. These activities can result in extended periods of sitting and screen exposure with limited postural variation. Research among university staff during remote working documented high levels of computer-related musculoskeletal symptoms, including neck and shoulder complaints (10). More recent evidence among academic staff working remotely has also emphasized the importance of workstation ergonomics and musculoskeletal pain (11). These findings are particularly relevant because the widespread adoption of flexible and home-based academic work may extend computer exposure beyond the formal university workstation.

Workstation configuration represents an important potential contributor. Ergonomic reviews of teleworking environments have repeatedly identified inadequate furniture, unsuitable screen height, poor lumbar and arm support, prolonged sitting, and insufficient postural variation as modifiable occupational risk factors (8,9). Motion-capture assessment has shown greater ergonomic risk when computer work is performed at a dining table compared with a more appropriately configured workstation (7). Similar ergonomic deficiencies have been reported in university computer workstations in South Asian settings, with associations between workstation characteristics and musculoskeletal complaints (21). Together, these observations indicate that assessment of workstation design should be considered in future research involving university teachers in Lahore.

The study's exclusive focus on female academic staff also deserves consideration. Several studies of digital-device and teaching populations have reported differences in musculoskeletal symptom burden according to sex (12,14–17). Such differences may reflect a complex interaction of anthropometry, workstation dimensions, muscle capacity, pain perception, occupational tasks, psychosocial exposures, and responsibilities outside paid employment rather than a single biological mechanism. The present study was not designed to compare female and male teachers, and therefore it cannot determine whether female university educators experience a greater risk than their male counterparts. Nevertheless, the high symptom frequency observed within this female sample supports the need for occupational-health strategies specifically responsive to the working conditions encountered by women in academic settings.

Psychosocial influences may also contribute to symptom persistence and perceived severity. Chronic musculoskeletal pain is increasingly understood within a biopsychosocial framework, and systematic-review evidence indicates that psychological factors can contribute to the persistence of shoulder pain and disability (2). Emotional distress has also been prospectively associated with persistent shoulder pain following physiotherapy (3). Academic staff may experience workload pressure, administrative demands, research expectations, teaching responsibilities, and work–life conflicts that coexist with biomechanical exposure. The present study did not directly quantify stress, anxiety, depression, or occupational psychosocial factors; consequently, these

mechanisms remain plausible contextual explanations rather than demonstrated determinants of the reported symptoms.

The local findings are also broadly compatible with Pakistani evidence showing musculoskeletal complaints among teachers and computer users. Research involving schoolteachers in Lahore has documented musculoskeletal pain and occupational risk factors within the teaching profession (18), while studies involving Pakistani university students have highlighted neck and shoulder symptoms associated with computer or video-display-terminal use (19,20). The present study extends this local evidence by focusing specifically on female university educators in private universities. However, because recruitment was restricted to two institutions and used convenience sampling, the observed prevalence should not be interpreted as a population estimate for all female university faculty in Lahore or Pakistan.

The findings have practical implications for university occupational health. Ergonomic interventions should prioritize appropriate screen height, external keyboards or input devices when laptops are used for prolonged periods, adequate seating and upper-limb support, and workstation dimensions suited to the individual user. Interventions among university students have demonstrated that ergonomic modification can improve musculoskeletal symptoms and fatigue during information and communication technology tasks (22). Institutions may therefore consider ergonomic assessment, staff education, scheduled opportunities for postural variation, and promotion of regular movement during prolonged computer work. Such strategies are reasonable preventive approaches, although the effectiveness of specific interventions in female university educators in Lahore should be evaluated prospectively rather than assumed from the current cross-sectional findings.

Regular interruption of sustained computer work may also be relevant. Prolonged static posture can increase localized muscle fatigue and discomfort, while brief posture changes and movement provide opportunities to redistribute mechanical loading. From an institutional perspective, ergonomic education should extend beyond advice to “sit correctly” and should address workstation configuration, laptop-screen elevation, use of external input devices, chair adjustment, task variation, and practical incorporation of movement within academic schedules (7–9,22). Universities could additionally consider access to occupational health or physiotherapy services for early identification and management of persistent symptoms.

Several methodological strengths support interpretation of the study. The research addressed a defined occupational population, recruited the planned sample of 109 female educators, and assessed neck and shoulder symptoms using a standardized musculoskeletal questionnaire framework. The study also reported both demographic/occupational characteristics and anatomically specific symptom prevalence. Restricting the analysis to a seven-day recall period may reduce some of the recall problems associated with substantially longer retrospective symptom periods, although short recall periods may capture transient symptoms and should not be interpreted as annual or chronic prevalence.

The study also has important limitations. Its cross-sectional design prevents determination of temporal sequence or causality between laptop exposure and musculoskeletal discomfort. Convenience sampling from only two private universities may introduce selection bias and limits external validity. Self-reported symptoms are subject to recall and reporting bias, and no clinical examination was used to establish specific musculoskeletal diagnoses. The modified assessment focused principally on the neck and shoulders, thereby limiting evaluation of symptoms in other body regions. Furthermore, workstation configuration, posture, frequency of breaks, physical activity, body mass index, psychosocial stress, domestic workload, and other potential confounders were not incorporated into the verified analysis presented here. These variables may account for some of the observed symptom burden and should be included in future studies.

An additional limitation concerns the assessment of exposure–outcome relationships. Although duration of laptop use was recorded, valid estimates of the association between laptop exposure and binary neck or shoulder discomfort were not available from the verified analysis presented in this revision. Consequently, the study can reliably establish the prevalence of self-reported symptoms in the sampled population but cannot quantify whether each additional year or hour of laptop exposure independently changes the odds of neck or shoulder discomfort. Future analyses should use statistical models appropriate to the scale of the outcome, such as logistic regression for dichotomous pain status, while considering relevant confounders and reporting effect estimates with 95% confidence intervals.

Future research should therefore use larger, probability-based or multicenter samples encompassing public and private universities and should include both female and male academic staff where comparative questions are of interest. Longitudinal designs would be particularly valuable for establishing temporal relationships between computer exposure and symptom development. Objective or observational ergonomic assessments, including screen height, sitting posture, workstation dimensions, duration of uninterrupted computer work, and frequency of movement breaks, could complement self-reported data. Inclusion of psychosocial variables, physical activity, sleep, anthropometry, and domestic workload would further support multivariable analysis of the interacting factors associated with musculoskeletal health among academic staff.

Overall, the present findings identify a substantial burden of neck and shoulder discomfort among female university educators in the participating institutions. The predominance of neck symptoms is consistent with the biomechanical demands associated with sustained computer and laptop work described in previous research (4–9), while the broader literature on teachers and academic populations indicates that musculoskeletal symptoms arise within a multifactorial occupational context (10,11,14–17). These findings justify greater institutional attention to ergonomic conditions and occupational musculoskeletal health while also emphasizing the need for analytically stronger longitudinal and multivariable studies.

CONCLUSION

Female university educators in the two participating private universities demonstrated a high seven-day prevalence of neck and shoulder discomfort, with neck discomfort reported by 80.7% and shoulder discomfort by 57.8% of participants. These findings indicate a substantial burden of upper-quarter musculoskeletal symptoms within the sampled academic population. Because of the cross-sectional design and the absence of a valid exposure–outcome model in the verified analysis, the findings should not be interpreted as evidence that laptop use caused the reported discomfort. The results support increased attention to ergonomic working conditions and occupational musculoskeletal health among university faculty and provide a basis for future longitudinal and appropriately adjusted analytical research.

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