



Frequency of musculoskeletal disorder among practicing Dentists of Lahore

Samrana Tariq¹, Dr. Muhammad Umar², Dr Aziz Subhani³, Dr. Muhammad Asghar⁴, Dr. Sarwat Nazir⁵

¹Doctor of Physical Therapy Program, Azra Naheed Medical College, Superior University, Lahore, Pakistan.

²HOD, Department of Physical Therapy, Lahore College of Pharmaceutical Sciences

³Green International University

⁴Lahore College of Pharmaceutical Sciences

⁵Assistant Professor, Department of Pharmacy, Minhaj University Lahore

***Corresponding Author:** Dr. Muhammad Umar, <https://orcid.org/0009-0007-7027-7899>, HOD, Department of Physical Therapy, Lahore College of Pharmaceutical Sciences
Email: drum0001@gmail.com



CONFLICT OF INTEREST

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ABSTRACT

Background: Dental practice commonly requires prolonged static or asymmetrical postures, precise repetitive upper-limb activity and sustained visual concentration, creating a substantial occupational musculoskeletal burden.

Objective: To determine the frequency and anatomical distribution of musculoskeletal symptoms among practicing dentists in Lahore, Pakistan.

Methods: A descriptive cross-sectional study was conducted over three months after synopsis approval in dental departments of government and private hospitals in Lahore. Using convenience sampling, 285 practicing dentists with at least one year of experience and a minimum clinical duty duration of six hours per day were included. Musculoskeletal symptoms were assessed with a paper-based Nordic Musculoskeletal Questionnaire. Data were analyzed in SPSS version 21 using frequencies and percentages; 95% confidence intervals were calculated from the reported counts for article presentation.

Results: Among 285 dentists, the most frequently reported anatomical sites for ache, pain or discomfort were the neck (155/285, 54.4%), low back (124/285, 43.5%) and wrist/hand (109/285, 38.2%), followed by the shoulder (80/285, 28.1%) and elbow (67/285, 23.5%). For the past-month symptom item, the highest frequencies were in the neck (27.4%), low back (17.5%) and wrist/hand (15.1%). Symptoms were reported to affect job or duty most often for the neck (31.6%), low back (28.1%) and wrist/hand (19.6%).

Conclusion: Musculoskeletal symptoms were frequent among practicing dentists in Lahore, with the neck, low back and wrist/hand carrying the greatest reported burden. The findings support occupational strategies emphasizing ergonomics, posture variation, work-rest organization and early recognition of musculoskeletal symptoms.

Keywords

Cross-Sectional Studies; Dentists; Ergonomics; Musculoskeletal Diseases; Occupational Diseases; Prevalence; Surveys and Questionnaires.

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Tariq S et al. Short Title

Musculoskeletal Disorders among Dentists in Lahore



INTRODUCTION

Musculoskeletal disorders and related pain are a major occupational concern in dentistry. Dental procedures often combine visual precision with constrained working space, repetitive hand activity and prolonged static postures. A recent systematic review and meta-analysis estimated a high pooled prevalence of musculoskeletal disorders among dental healthcare providers, while a systematic review of occupational ergonomics similarly identified the neck, back, shoulders and upper limbs as recurrent sites of symptoms in dental practice (1,2). These disorders can affect comfort, endurance, work participation and professional longevity.

Contemporary studies continue to demonstrate a substantial burden among dentists in diverse settings. In Pakistan, a multicenter cross-sectional study reported work-related musculoskeletal complaints in a large proportion of dental practitioners, with the lower back, neck/upper back and shoulders among commonly affected regions (3). A 2024 study of dentists in teaching hospitals in Islamabad also reported a high overall occurrence of work-related musculoskeletal disorders (4). Internationally, pooled data from Western dental professionals have shown prominent neck, lower-back, shoulder and upper-back symptoms (5). Differences among studies reflect variation in case definitions, recall periods, professional groups, work organization and sampling methods.

Although occupational musculoskeletal problems in dentistry have been described internationally and elsewhere in Pakistan, locally specific evidence is useful for service planning and ergonomic education because clinical workload, workplace organization and preventive practices can differ by setting. The present study was therefore undertaken to determine the frequency of musculoskeletal symptoms among practicing dentists in Lahore and to describe the anatomical regions most commonly affected.

MATERIALS AND METHODS

Study design and reporting framework

This was a descriptive cross-sectional study. The manuscript is structured in accordance with the principles of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement for cross-sectional research (6).

Setting and duration

Data collection was conducted in dental departments of hospitals across Lahore, Pakistan, including government and private-sector settings. The study duration was three months after synopsis approval.

Participants and eligibility

Practicing dentists were eligible if they had at least one year of professional practice experience, were actively working, and performed a minimum of six hours of duty per day. Dentists with a systemic disease specified in the thesis eligibility criteria or with a previous musculoskeletal injury or accident were excluded.

Sample size and sampling

The study sample comprised 285 dentists. The thesis specified a finite population of 20,000, a 95% confidence level, an assumed response distribution of 75%, and a 5% margin of error. Recalculation with these parameters yields a required sample of approximately 284 participants; the study used 285. Convenience sampling was employed.

Outcome measure and operational definition

Musculoskeletal symptoms were assessed using a paper-based Nordic Musculoskeletal Questionnaire, an established instrument for standardized assessment of musculoskeletal symptoms in occupational populations (7). For this article, a musculoskeletal symptom was operationalized as self-reported ache, pain or discomfort in one or more of nine anatomical regions: neck, shoulders, elbows, upper back, wrists/hands, low back, hips/thighs, knees, and ankles/feet. The thesis reported three symptom dimensions: any reported ache/pain/discomfort by body region, symptoms during the past-month item, and symptoms that affected job or duty.

Data collection procedure

Questionnaires were distributed individually in paper form to eligible dentists in participating dental departments. The study materials stated that responses were coded to protect participant identity and that participation was voluntary.

Statistical analysis

Data were analyzed using SPSS version 21. Descriptive statistics were reported as frequencies and percentages. Because the thesis dataset presented aggregate categorical counts without participant-level covariates, the article does not introduce unsupported inferential comparisons. For precision of the reported proportions, 95% Wilson confidence intervals were calculated directly from each reported numerator and the total sample size of 285.



Ethical considerations

Administrative permission was obtained through the participating hospital administrations and dental departments. Participants received information concerning confidentiality, voluntary participation and the right to withdraw, and informed consent was obtained before questionnaire completion. Study responses were coded to protect participant identity.

RESULTS

A total of 285 practicing dentists were included in the analysis. Across the nine anatomical regions, the neck was the most frequently reported site of ache, pain or discomfort (54.4%), followed by the low back (43.5%) and wrist/hand (38.2%). Shoulder and elbow symptoms were reported by 28.1% and 23.5%, respectively. Upper-back, ankle/feet, knee and hip/thigh symptoms were less frequent (Table 1; Figure 1).

Table 1. Frequency of reported ache, pain or discomfort by anatomical region among practicing dentists (N=285)

Anatomical region	n/N	%	95% CI (%)
Neck	155/285	54.4	48.6–60.1
Shoulder	80/285	28.1	23.2–33.6
Elbow	67/285	23.5	19.0–28.8
Upper back	51/285	17.9	13.9–22.8
Wrist/hand	109/285	38.2	32.8–44.0
Low back	124/285	43.5	37.9–49.3
Hips/thighs	15/285	5.3	3.2–8.5
Knee	34/285	11.9	8.7–16.2
Ankle/feet	39/285	13.7	10.2–18.2

Note. Confidence intervals were calculated from the reported counts using the Wilson method; N=285.

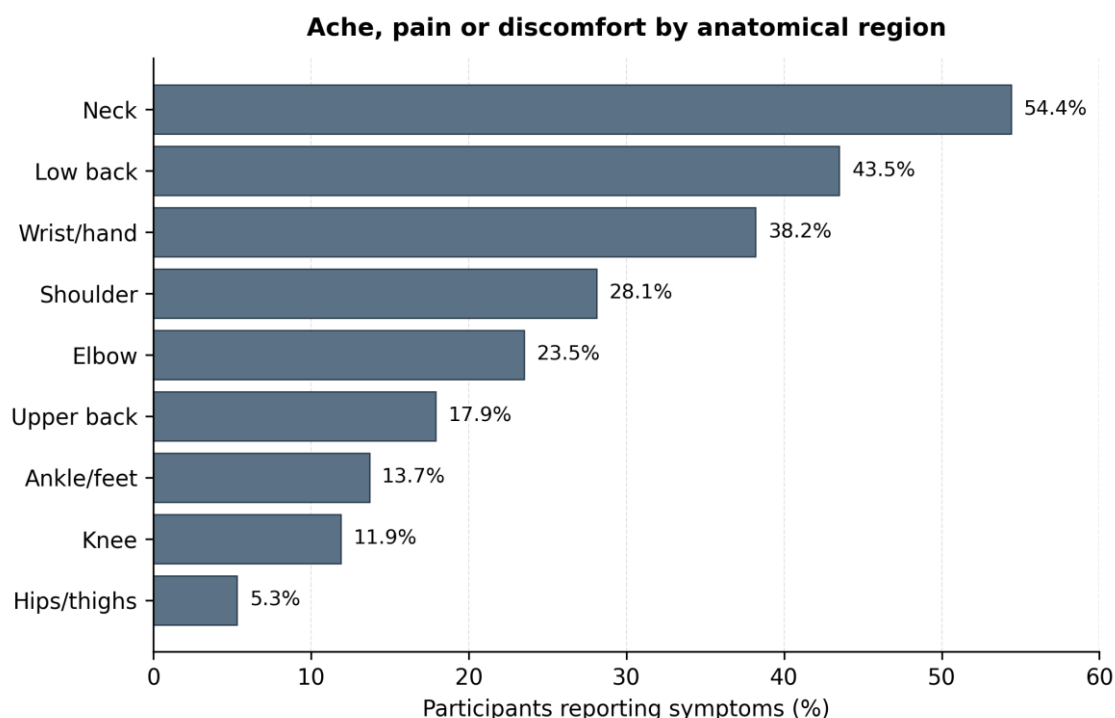


Figure 1. Distribution of reported ache, pain or discomfort by anatomical region among practicing dentists (N=285).

For the past-month symptom item, the neck remained the leading affected site (27.4%), followed by the low back (17.5%) and wrist/hand (15.1%). All other regions were reported by fewer than 7% of participants (Table 2; Figure 2).



Table 2. Frequency of past-month musculoskeletal symptoms by anatomical region among practicing dentists (N=285)

Anatomical region	n/N	%	95% CI (%)
Neck	78/285	27.4	22.5–32.8
Shoulder	18/285	6.3	4.0–9.8
Elbow	14/285	4.9	2.9–8.1
Upper back	12/285	4.2	2.4–7.2
Wrist/hand	43/285	15.1	11.4–19.7
Low back	50/285	17.5	13.6–22.4
Hips/thighs	3/285	1.1	0.4–3.0
Knee	16/285	5.6	3.5–8.9
Ankle/feet	16/285	5.6	3.5–8.9

Note. Confidence intervals were calculated from the reported counts using the Wilson method; N=285.

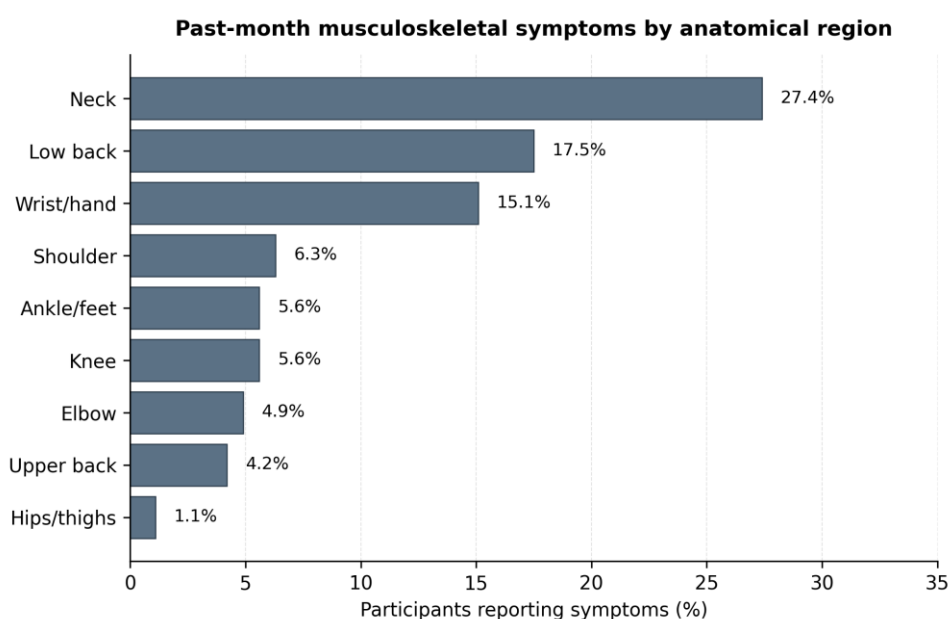


Figure 2. Distribution of past-month musculoskeletal symptoms by anatomical region among practicing dentists (N=285).

The anatomical regions most often associated with an effect on job or duty were the neck (31.6%), low back (28.1%) and wrist/hand (19.6%). Shoulder symptoms affected job or duty in 15.8% of participants and elbow symptoms in 13.7% (Table 3; Figure 3).

Table 3. Frequency of musculoskeletal symptoms reported to affect job or duty (N=285)

Anatomical region	n/N	%	95% CI (%)
Neck	90/285	31.6	26.5–37.2
Shoulder	45/285	15.8	12.0–20.5
Elbow	39/285	13.7	10.2–18.2
Upper back	22/285	7.7	5.2–11.4
Wrist/hand	56/285	19.6	15.5–24.7
Low back	80/285	28.1	23.2–33.6
Hips/thighs	9/285	3.2	1.7–5.9
Knee	18/285	6.3	4.0–9.8
Ankle/feet	26/285	9.1	6.3–13.0

Note. Confidence intervals were calculated from the reported counts using the Wilson method; N=285.



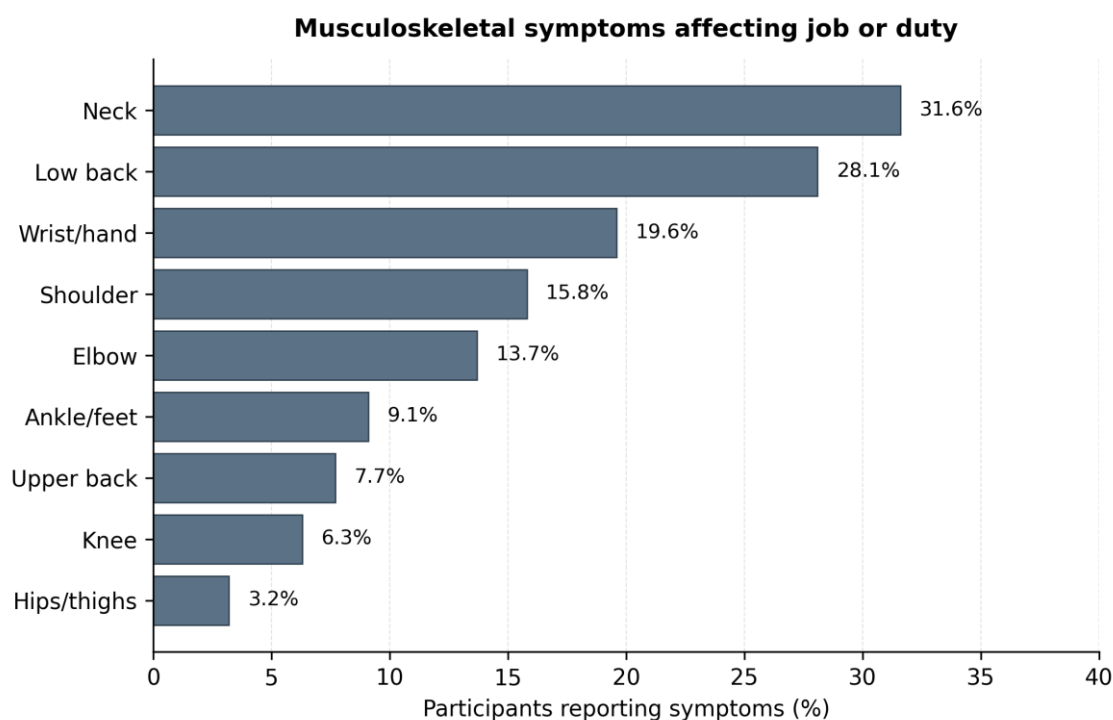


Figure 3. Distribution of musculoskeletal symptoms reported to affect job or duty among practicing dentists (N=285).

DISCUSSION

The principal finding was a substantial regional burden of musculoskeletal symptoms among practicing dentists in Lahore. Neck symptoms were most common (54.4%), followed by low-back (43.5%) and wrist/hand symptoms (38.2%). The same three regions also dominated the past-month and job-impact outcomes. This consistency across symptom dimensions suggests that cervical, lumbar and distal upper-limb complaints were the clinically most relevant musculoskeletal problems represented in this sample.

The anatomical pattern is broadly compatible with more recent dental literature, although absolute frequencies vary. Thacker and colleagues reported a high prevalence of work-related musculoskeletal disorders among Indian dentists, with the neck among the most frequently affected regions (8). A 2024 study from Kerala likewise identified the neck as a prominent symptom site (9). Studies from the United Arab Emirates, Italy/Peru and Italy have also documented substantial neck, back and upper-limb complaints in dental professionals (10–12). Variation between the present estimates and those studies is expected because recall windows, questionnaires, professional mix, case definitions, and sampling strategies differ. In particular, overall prevalence estimates from other studies should not be interpreted as directly equivalent to the region-specific frequencies reported here.

The pattern is also consistent with Pakistani evidence. Younis et al. described a high burden of work-related musculoskeletal disorders among Pakistani dental practitioners, with lower-back and cervical/upper-back symptoms prominent (3), while a more recent study in teaching hospitals in Islamabad found a high overall occurrence of musculoskeletal disorders (4). The present Lahore data add a city-specific description and show that symptom burden extended beyond the spine to the wrist/hand, an important region in a profession characterized by fine, repetitive manual work.

Several occupational mechanisms can plausibly contribute to this distribution. Dental procedures may require sustained neck flexion, trunk asymmetry, prolonged seated or standing postures, repetitive gripping and precise instrument handling. These mechanisms are supported by the wider ergonomics literature, but the current study did not quantify posture, working technique or psychosocial exposure and therefore cannot establish that any specific work factor caused the reported symptoms. The cross-sectional design similarly precludes temporal or causal inference.

Symptoms that affected job or duty were reported most often for the neck (31.6%), low back (28.1%) and wrist/hand (19.6%). This is occupationally important because musculoskeletal pain in dentists has been associated elsewhere with poorer work ability, reduced productivity, absence from work and economic consequences (13–15). The present results do not measure productivity loss directly, but they indicate that musculoskeletal complaints were not merely present; a meaningful proportion of respondents perceived an effect on their professional duties.

Prevention should therefore focus on feasible ergonomic and work-organization measures rather than on symptom treatment alone. Research has examined magnification systems, posture training, equipment modification, microbreaks, exercise and other physical or cognitive ergonomic strategies (16–21). Systematic reviews generally support the potential value of ergonomic interventions, while also noting heterogeneity and variable quality of evidence (17–21). Recent evidence also continues to emphasize physical activity and ergonomic knowledge/practice as relevant components of occupational musculoskeletal health in dentists (22,23). A practical



prevention program in dental workplaces could combine ergonomic education, posture variation, appropriate patient/operator positioning, regular brief recovery periods, instrument and workstation optimization, and timely assessment of persistent symptoms. This study has several strengths. It included 285 actively practicing dentists from government and private hospital settings in Lahore, used a recognized Nordic musculoskeletal framework, and reported symptoms across nine anatomical regions as well as recent-period and job-impact outcomes. The presentation of regional counts together with confidence intervals improves interpretability of the observed frequencies.

The findings should also be interpreted in light of the study limitations. Convenience sampling may limit representativeness and introduce selection bias. The cross-sectional, self-reported design is susceptible to recall and reporting bias and cannot establish causality. The analysis was limited to the aggregate regional symptom frequencies reported in the thesis, so adjusted analyses and subgroup comparisons were beyond the scope of this article. The hospital-based Lahore setting also limits generalization to all dentists in Pakistan, particularly those practicing exclusively in independent clinics. Finally, comparisons with other studies should account for differences in recall period and symptom definitions.

Future research should use probability-based or multicenter sampling, retain participant-level occupational and demographic variables, quantify ergonomic exposures, and prospectively evaluate work ability and symptom trajectories. Intervention studies in Pakistani dental settings could test structured ergonomic training, workstation optimization, planned microbreaks and exercise programs using validated outcomes.

CONCLUSION

Musculoskeletal symptoms were frequent among practicing dentists in Lahore. The neck, low back and wrist/hand were the most consistently affected regions across overall symptom, past-month and job-impact measures. These findings support systematic attention to dental ergonomics, posture variation, work-rest organization and early musculoskeletal symptom management. Because the study was descriptive and cross-sectional, the observed pattern should be interpreted as a burden estimate rather than evidence that specific occupational exposures caused the symptoms.

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