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Original Article

A Cross-Sectional Study on Prevalence of Cervical Spine Dysfunction Among Practicing Dentists

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ABSTRACT

Background: Dentistry requires prolonged static posture, sustained cervical flexion, repetitive upper-limb activity, and restricted working positions, which may predispose practitioners to neck pain and functional disability. Local evidence from Pakistan remains limited regarding NDI-defined cervical disability among practicing dentists. Objective: To determine the prevalence and severity of neck pain and Neck Disability Index-defined cervical spine dysfunction among practicing dentists in Karachi and describe related sleep, recreational, age, and gender patterns. Methods: This cross-sectional questionnaire-based study included 150 licensed dentists aged 25-50 years practicing in clinics and hospitals across Karachi. Participants completed a structured questionnaire including demographic information, categorical pain-intensity assessment, NDI disability grading, and NDI-based sleep and recreational activity items. Data were analyzed using frequencies and percentages. Gender-wise NDI patterns were assessed descriptively, with collapsed-category chi-square analysis where appropriate. Results: Current neck pain was reported by 132 participants (88.0%), while 54 (36.0%) reported severe-to-worst pain. NDI-defined disability was present in 108 participants (72.0%), predominantly mild disability (51.3%), while moderate-to-complete disability affected 31 participants (20.7%). Sleep disturbance was reported by 60 participants (40.0%), and recreation-related pain or limitation by 70 participants (46.7%). Severe-to-complete disability was descriptively higher in males than females, but the collapsed gender-wise NDI association was not statistically significant. Conclusion: Neck pain and NDI-defined cervical disability were common among practicing dentists in Karachi, supporting the need for ergonomic education, early screening, and physiotherapy-informed preventive strategies. Keywords: Cervical spine dysfunction; neck pain; Neck Disability Index; dentists; musculoskeletal disorders; ergonomics; occupational health.

INTRODUCTION

Dentistry is a highly precision-dependent profession that requires sustained visual concentration, fine motor control, and prolonged static positioning within a restricted operative field. During routine clinical procedures, dentists commonly maintain forward head posture, cervical flexion, trunk rotation, shoulder elevation, and repetitive upper-limb movements for extended periods, all of which increase mechanical loading on the cervical spine and surrounding soft tissues (1). These occupational exposures may contribute to neck pain, stiffness, reduced functional tolerance, and activity limitation, collectively reflected in cervical spine dysfunction when measured through patient-reported pain and disability instruments (2). Among dental professionals, the cervical region is particularly vulnerable because clinical accuracy often depends on sustained proximity to the oral cavity, limited scope for postural variation, and repetitive procedures performed under visual and ergonomic constraints (3).

Work-related musculoskeletal disorders are widely recognized among dental practitioners, with neck and shoulder symptoms consistently reported as some of the most frequent complaints across clinical settings (4). International evidence suggests that dentists experience a high burden of neck pain, often associated with prolonged static posture, inadequate chair positioning, insufficient rest intervals, poor workstation design, repetitive hand movements, and cumulative occupational exposure (5). These factors may produce progressive overload of cervical and scapular stabilizing muscles, resulting in pain, fatigue, reduced endurance, and functional limitation during professional and daily activities (6). Although musculoskeletal symptoms may occur at any stage of professional practice, their impact can increase with longer exposure duration, increasing age, high patient load, and persistent ergonomic strain (7).

The functional consequences of neck-related disability extend beyond localized pain. Cervical symptoms may interfere with sleep, recreational activities, concentration, clinical performance, and overall quality of life, particularly when pain becomes recurrent or persistent (8). In dental practice, even mild-to-moderate neck disability may have occupational relevance because clinical procedures require sustained attention, stable posture, and repeated use of the upper limbs in constrained positions. Early identification of neck pain and disability among dentists is therefore important for prevention, ergonomic training, physiotherapy-based intervention, and long-term preservation of professional capacity (9).

Although studies from Pakistan and other South Asian settings have reported work-related musculoskeletal symptoms among dental professionals, many have relied primarily on general self-reported pain complaints, have used limited functional assessment, or have not adequately described the severity of neck-related disability using validated tools. Karachi, as a large metropolitan center with a diverse dental workforce across clinics and hospitals, provides an important setting for estimating the local burden of neck pain and functional disability among practicing dentists. A clearer understanding of pain intensity, NDI-defined disability, sleep disturbance, recreational limitation, and demographic variation can support more targeted ergonomic and preventive strategies in dental education and clinical practice (10).

The present study was therefore conducted to determine the prevalence and severity of neck pain and Neck Disability Index-defined cervical spine dysfunction among practicing dentists in Karachi. The study also aimed to describe the distribution of neck-related disability across age and gender groups and to examine the functional impact of neck symptoms on sleep and recreational activities.

MATERIALS AND METHODS

This study was conducted as a cross-sectional, questionnaire-based observational study to estimate the prevalence and severity of neck pain and neck-related functional disability among practicing dentists in Karachi, Pakistan. The cross-sectional design was appropriate because the objective was to measure the burden of cervical symptoms and disability at a single point in time and to examine their distribution across demographic groups without making causal or temporal inferences. Data were collected from practicing dentists working in dental clinics and hospital-based dental settings across Karachi to include participants from varied clinical practice environments.

The target population comprised licensed dentists actively engaged in clinical patient care. Participants were eligible if they were currently practicing in Karachi, aged 25–50 years, had at least one year of continuous clinical practice experience, and provided written informed consent. Dentists were excluded if they reported a previous history of cervical spine trauma or surgery, diagnosed neurological or systemic musculoskeletal disease such as rheumatoid arthritis or multiple sclerosis, current pregnancy, or ongoing treatment specifically for cervical spine dysfunction, because these conditions could independently influence neck pain, disability, or functional status. Participants were recruited through non-probability convenience sampling from accessible clinical sites. Eligible dentists were approached

at their workplace, informed about the study purpose and procedures, and invited to participate voluntarily. After consent, participants completed the study questionnaire under supervision to ensure completeness while maintaining privacy and confidentiality.

A total of 150 dentists were included, comprising 75 males and 75 females aged 25–50 years. The sample was selected to provide an equal gender distribution for descriptive comparison of disability patterns between male and female dentists. Participants were categorized into five age groups: 25–30, 31–35, 36–40, 41–45, and 46–50 years. Sociodemographic information included age group and gender. The primary outcome was neck-related disability measured using the Neck Disability Index. The NDI is a self-administered instrument consisting of 10 items that assess pain intensity and functional limitation in domains such as personal care, lifting, reading, headache, concentration, work, driving, sleep, and recreation. Each item is scored from 0 to 5, with higher scores indicating greater disability; total scores may be interpreted as no, mild, moderate, severe, or complete disability according to standard NDI severity categories (11).

Current neck pain intensity was assessed using a categorical pain intensity item based on Visual Analog Scale anchors. Responses were classified as no pain, very mild pain, moderate pain, severe pain, very severe pain, or worst imaginable pain at the time of assessment. Because the analysis used categorical pain-intensity responses rather than continuous 0–10 cm or 0–100 mm VAS measurements, pain intensity was treated as an ordinal variable in the statistical analysis (12). Functional impact was additionally assessed through NDI-based sleep and recreational activity items. Sleep disturbance was categorized from no trouble sleeping to complete sleep disturbance, while recreational limitation was categorized from full participation without neck pain to inability to perform recreational activities because of neck pain. Cervical spine dysfunction was operationally defined for this study as the presence and severity of neck pain and neck-related functional limitation as measured by the categorical pain-intensity item and NDI disability grading.

To reduce information bias, data were collected using a structured questionnaire with predefined response categories, and questionnaires were checked for completeness at the time of collection. Eligibility criteria were applied before enrollment to minimize confounding by prior cervical trauma, surgery, systemic musculoskeletal disease, neurological disorders, pregnancy, or ongoing treatment for cervical dysfunction. Because important occupational exposures such as years of practice, working hours, patient load, ergonomic training, use of magnification, physical activity level, and workstation design were not included as measured covariates, the analysis was limited to descriptive and demographic associations based on available variables.

Data were entered and analyzed using SPSS. Categorical variables were summarized as frequencies and percentages, including gender, age group, pain intensity category, NDI disability category, sleep disturbance, and recreational limitation. Continuous data were summarized as mean and standard deviation only where the underlying variable was measured on a continuous scale. The prevalence of current neck pain was calculated as the proportion of participants reporting any pain category above “no pain.” NDI disability categories were cross-tabulated by gender and age group. Associations between categorical variables, including gender and NDI disability category, were assessed using the chi-square test of independence when expected cell counts were adequate; Fisher’s exact test was planned where expected counts were small. Because age group, pain intensity, and NDI disability category were ordinal variables, ordinal associations were planned using Spearman rank correlation. Where comparison of NDI category distribution across age groups was required, chi-square test for trend or ordinal logistic regression was considered appropriate if model assumptions were satisfied. A paired samples t-test was not used because age group and NDI disability category are not paired repeated measurements of the same construct. Statistical significance was set at $p<0.05$, and all reported p-values were interpreted cautiously in view of the cross-sectional design and non-probability sampling. Missing data were checked

during data entry; cases with incomplete outcome responses were excluded from the specific analysis requiring that variable.

The study was conducted in accordance with ethical principles for human participant research, including voluntary participation, informed consent, confidentiality, and the right to withdraw without penalty. Written informed consent was obtained from all participants before data collection. No personal identifiers were recorded on the questionnaire, and data were used only for research purposes. The questionnaire-based procedure was non-invasive and posed minimal risk to participants. Data integrity was maintained through supervised questionnaire completion, completeness checks before data entry, coded data handling, and verification of entered values before statistical analysis.

RESULTS

A total of 150 practicing dentists were included in the analysis. The sample included equal numbers of male and female participants. Participants were distributed across five age groups, with the largest proportions observed in the 36–40 years and 46–50 years categories.

Table 1. Demographic Characteristics of Practicing Dentists (n = 150)

Variable	Category	n (%)
Gender	Male	75 (50.0)
	Female	75 (50.0)
Age group, years	25–30	29 (19.3)
	31–35	32 (21.3)
	36–40	33 (22.0)
	41–45	23 (15.3)
	46–50	33 (22.0)

The sample showed balanced gender representation, with 75 male dentists and 75 female dentists. Most participants were aged 40 years or younger, accounting for 94 of 150 participants. The 36–40 years and 46–50 years age groups each included 33 participants, representing the largest age categories in the sample.

Current neck pain was reported by most participants. Only 18 dentists reported no pain at the time of assessment, while the remaining participants reported pain ranging from very mild to worst imaginable intensity.

Table 2. Current Neck Pain Intensity Among Practicing Dentists (n = 150)

Pain Intensity Category	n (%)
No pain at the moment	18 (12.0)
Very mild pain at the moment	32 (21.3)
Moderate pain at the moment	46 (30.7)
Severe pain at the moment	34 (22.7)
Very severe pain at the moment	15 (10.0)
Worst pain imaginable at the moment	5 (3.3)
Any current neck pain	132 (88.0)
Severe to worst imaginable pain	54 (36.0)

Current neck pain was present in 132 of 150 dentists. Moderate pain was the most frequently reported category, affecting 46 participants. Clinically higher pain intensity, defined as severe, very severe, or worst imaginable pain, was reported by 54 participants, indicating that more than one-third of the sample had substantial current neck pain at the time of assessment.

Sleep disturbance related to neck symptoms was reported by 60 participants, while 90 participants reported no sleep difficulty.

Table 3. Sleep Disturbance Related to Neck Symptoms (n = 150)

Sleep Disturbance Category	n (%)
No trouble sleeping	90 (60.0)

Sleep Disturbance Category	n (%)
Slight disturbance, less than 1 hour sleepless	24 (16.0)
Mild disturbance, 1–2 hours sleepless	18 (12.0)
Moderate disturbance, 2–3 hours sleepless	10 (6.7)
Great disturbance, 3–5 hours sleepless	5 (3.3)
Complete disturbance, 5–7 hours sleepless	3 (2.0)
Any sleep disturbance	60 (40.0)

Sleep disturbance was present in 40.0% of dentists. Most affected participants reported slight or mild disturbance, but 18 participants reported sleep loss of two or more hours, indicating that neck symptoms extended beyond workplace discomfort and affected rest in a clinically relevant subgroup.

Recreational activity was unaffected in just over half of the sample. The remaining participants reported pain during recreation or varying degrees of restriction.

Table 4. Recreational Activity Limitation Related to Neck Symptoms (n = 150)

Recreational Activity Category	n (%)
Able to engage in all recreational activities with no neck pain	80 (53.3)
Able to engage in all recreational activities with some neck pain	39 (26.0)
Able to engage in most, but not all, usual recreational activities	11 (7.3)
Able to engage in only a few usual recreational activities	10 (6.7)
Can hardly do any recreational activities	8 (5.3)
Cannot do any recreational activities	2 (1.3)
Any pain or limitation during recreation	70 (46.7)

Pain or limitation during recreational activity was reported by 70 participants. Although 39 dentists remained able to perform all recreational activities with some neck pain, 31 participants reported partial to severe restriction, showing that neck-related symptoms affected non-occupational functioning in a considerable proportion of the sample.

NDI-based disability was common. No disability was reported by 42 participants, while 108 participants had some degree of neck-related disability.

Table 5. Neck Disability Index Categories Among Practicing Dentists (n = 150)

NDI Category	n (%)
No disability	42 (28.0)
Mild disability	77 (51.3)
Moderate disability	19 (12.7)
Severe disability	9 (6.0)
Complete disability	3 (2.0)
Any NDI-defined disability	108 (72.0)
Moderate to complete disability	31 (20.7)
Severe or complete disability	12 (8.0)

NDI-defined disability was observed in 72.0% of participants. Mild disability was the dominant category, affecting 77 dentists. Moderate to complete disability was present in 31 participants, while severe or complete disability was reported by 12 participants. These findings indicate that although most disability was mild, a smaller subgroup experienced functionally important neck-related impairment.

Gender-wise distribution of NDI categories showed similar proportions of no disability in male and female dentists, but the distribution of higher disability categories differed descriptively.

Table 6. Gender-Wise Distribution of Neck Disability Index Categories (n = 150)

NDI Category	Male, n (%)	Female, n (%)	Total, n (%)
No disability	21 (28.0)	21 (28.0)	42 (28.0)
Mild disability	35 (46.7)	42 (56.0)	77 (51.3)
Moderate disability	9 (12.0)	10 (13.3)	19 (12.7)
Severe disability	8 (10.7)	1 (1.3)	9 (6.0)
Complete disability	2 (2.7)	1 (1.3)	3 (2.0)
Total	75 (100.0)	75 (100.0)	150 (100.0)

Percentages are column percentages for male and female groups and total-sample percentages for the total column.

No disability was observed in 28.0% of both male and female dentists. Mild disability was more frequent among female dentists, affecting 56.0% compared with 46.7% of male dentists. Severe or complete disability was more frequent among male dentists, affecting 13.3% compared with 2.7% of female dentists. These findings show descriptive gender variation in disability severity, although the original five-category distribution included sparse cells in severe disability categories.

For inferential assessment, severe and complete disability categories were combined to reduce sparse-cell instability. The association between gender and collapsed NDI category was then examined using the chi-square test of independence.

Table 7. Association Between Gender and Collapsed NDI Category (n = 150)

NDI Category	Male, n (%)	Female, n (%)	Total, n (%)
No disability	21 (28.0)	21 (28.0)	42 (28.0)
Mild disability	35 (46.7)	42 (56.0)	77 (51.3)
Moderate disability	9 (12.0)	10 (13.3)	19 (12.7)
Severe/complete disability	10 (13.3)	2 (2.7)	12 (8.0)
Total	75 (100.0)	75 (100.0)	150 (100.0)
χ^2			6.02
df			3
p-value			0.111
Cramer's V			0.20

Percentages are column percentages for male and female groups and total-sample percentages for the total column. χ^2, chi-square test of independence.

After collapsing severe and complete disability categories, the gender-wise distribution of NDI disability did not reach statistical significance. The chi-square test produced $\chi^2 = 6.02$ with 3 degrees of freedom and $p = 0.111$. The Cramer's V value of 0.20 suggested a small association between gender and NDI category. Therefore, the gender findings should be interpreted as descriptive differences rather than statistically confirmed group differences.

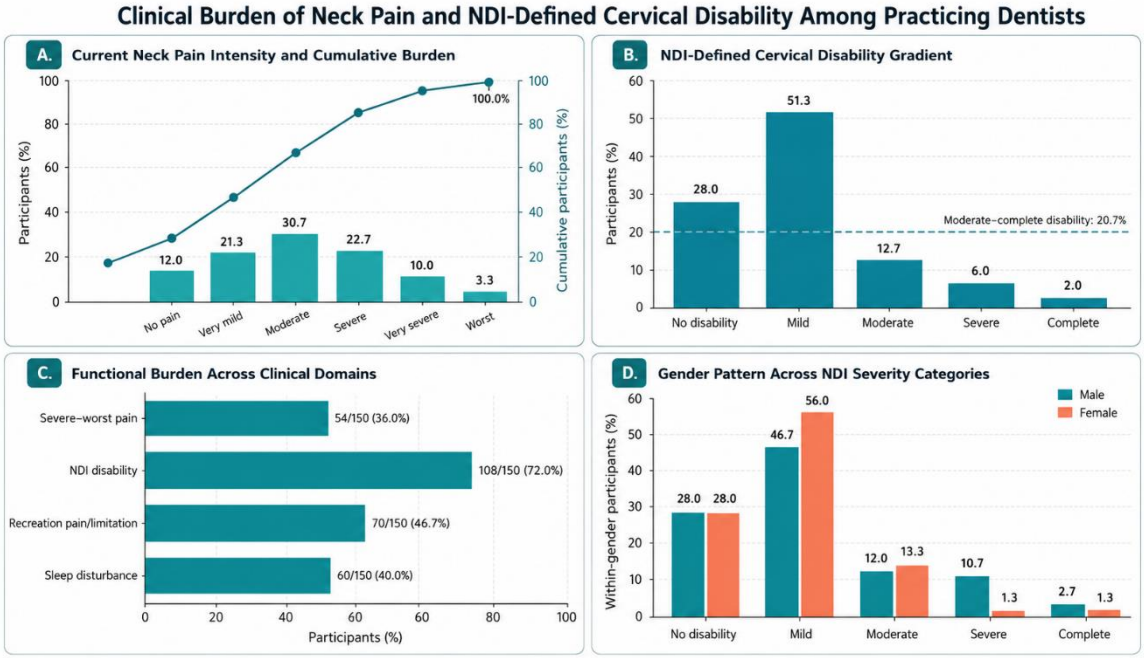

Figure 1 Clinical Burden of Neck Pain and NDI-Defined Cervical Disability Among Practicing Dentists

The panelled figure demonstrates a high clinical burden of cervical symptoms among practicing dentists. Current neck pain was reported by 132 of 150 participants (88.0%), with moderate pain

representing the largest pain category at 30.7% and severe-to-worst pain reported by 36.0%. NDI-defined disability was present in 72.0% of participants, predominantly mild disability (51.3%), while moderate-to-complete disability affected 20.7% and severe-to-complete disability affected 8.0%. Functional burden extended beyond pain intensity, with sleep disturbance reported by 40.0%, recreation-related pain or limitation by 46.7%, and any NDI-defined disability by 72.0%. Gender-stratified patterns showed equal no-disability proportions in males and females (28.0% each), higher mild disability among females (56.0% vs. 46.7%), and higher severe-to-complete disability among males (13.3% vs. 2.7%), indicating clinically relevant descriptive variation in severity distribution without confirming statistical significance.

Age-group frequencies were available; however, age group-specific NDI distributions were not provided in the supplied data. Therefore, inferential testing between age group and NDI category was not reported in this revised Results section. The previously reported paired samples t-test was not retained because age group and NDI category are ordinal variables and do not represent paired repeated measurements of the same construct. A valid age-related analysis would require an age group × NDI category table or participant-level data to perform chi-square test for trend, Spearman rank correlation, or ordinal logistic regression.

DISCUSSION

This cross-sectional study identified a high burden of current neck pain and NDI-defined cervical disability among practicing dentists in Karachi. Current neck pain was reported by 88.0% of participants, while 72.0% had some degree of neck-related disability on the NDI. The dominant disability category was mild disability, observed in 51.3% of the total sample, whereas moderate-to-complete disability was present in 20.7% and severe-to-complete disability in 8.0%. These findings indicate that cervical symptoms among dentists are not limited to transient discomfort but are accompanied by measurable functional limitation in a substantial proportion of practitioners. The observed pattern is consistent with previous evidence showing that dental professionals are at increased risk of musculoskeletal disorders because of prolonged static posture, sustained cervical flexion, repetitive upper-limb activity, and restricted ergonomic working positions (13).

The high prevalence of neck pain in this sample aligns with systematic and observational literature reporting neck and shoulder symptoms as common occupational problems in dentistry. Hayes et al. reported that musculoskeletal disorders are frequent among dental professionals, with neck pain being one of the most consistently reported regions of discomfort (14). Similarly, studies on occupational posture in dentistry have shown that sustained forward head position, shoulder elevation, trunk inclination, and repetitive procedural demands can increase cervical and scapular muscle loading, contributing to pain and functional limitation over time (15). The present findings support this occupational pattern in a Karachi-based dental population, where 36.0% of participants reported severe-to-worst current neck pain, suggesting that the burden extends beyond low-grade discomfort in a clinically relevant subgroup.

The predominance of mild disability may reflect an early or moderate stage of occupational cervical dysfunction in many participants. This has important preventive implications because mild NDI-defined disability may still be responsive to ergonomic correction, postural education, active rest breaks, strengthening of cervical and scapular stabilizers, and early physiotherapy intervention. Previous ergonomic literature emphasizes that workstation organization, operator positioning, patient-chair adjustment, magnification, lighting, and procedural breaks are important modifiable factors in reducing cumulative musculoskeletal load among dentists (16). Therefore, the present findings suggest an opportunity for early intervention before mild disability progresses into more persistent or severe functional impairment.

The functional impact of neck symptoms was also evident beyond pain intensity and NDI category. Sleep disturbance was reported by 40.0% of participants, and recreation-related pain or limitation was reported by 46.7%. These findings are important because sleep and recreation are not direct occupational tasks, yet both were affected by symptoms that likely originated or worsened within occupational postural demands. Prior studies have highlighted that work-related neck pain may influence recovery, fatigue, functional capacity, and quality of life, particularly when symptoms persist or interfere with daily routines outside the workplace (17). In this study, the presence of sleep disturbance and recreational limitation supports the interpretation that cervical symptoms among dentists may affect broader health and wellbeing, not only clinical work tolerance.

Gender-wise analysis showed equal proportions of no disability among male and female dentists, but descriptive variation was observed across higher disability categories. Mild disability was more frequent among females, whereas severe-to-complete disability was more frequent among males. However, after collapsing sparse severe and complete categories, the association between gender and NDI category did not reach statistical significance. This finding should therefore be interpreted cautiously as a descriptive pattern rather than evidence of a confirmed gender-based association. Previous gender-specific analyses in dental and occupational populations have reported variable findings, with some studies showing higher symptom reporting among women and others suggesting differences in severity patterns according to workload, reporting behavior, physical capacity, or ergonomic exposure (18). The present study adds local descriptive data but does not establish a statistically significant gender difference.

Age-related interpretation was also handled cautiously in the revised analysis. Although the original manuscript suggested an association between age group and NDI score, the previously reported paired t-test was not retained because age group and NDI category are ordinal variables and do not represent paired repeated measurements of the same construct. In the absence of age group-specific NDI counts or participant-level data, valid age-related inference could not be performed in the revised Results section. Future analyses should examine age and occupational exposure using appropriate methods such as chi-square test for trend, Spearman rank correlation, or ordinal logistic regression, depending on the available data structure and model assumptions. Such analysis would be particularly useful because cumulative years of practice, daily working hours, patient load, and prolonged static exposure are biologically and ergonomically plausible contributors to cervical dysfunction (19).

The findings are consistent with broader literature from dental populations in different countries, where musculoskeletal symptoms have been associated with repetitive work, inadequate posture, prolonged sitting, insufficient rest, and poor ergonomic awareness (20). Studies from South Asian and Pakistani settings have similarly reported a high burden of work-related musculoskeletal symptoms among dentists, although many have focused on general pain prevalence rather than structured disability measurement (21). By using NDI categories and pain-intensity grading, the present study provides clinically interpretable information on both symptom severity and functional impact. This is particularly relevant for dental education and practice in Pakistan, where structured ergonomic training and preventive musculoskeletal screening may not be consistently integrated into undergraduate, postgraduate, or continuing professional development programs.

From a clinical and occupational health perspective, these results support the need for practical preventive strategies in dental settings. Ergonomic interventions should include correct operator seating, neutral neck positioning, appropriate patient-chair height, use of indirect vision where feasible, optimized lighting, magnification when indicated, scheduled microbreaks, stretching routines, and strengthening exercises targeting cervical and scapulothoracic stabilizers (22). Preventive programs should be introduced early in dental training because posture habits are often established during undergraduate clinical years and may persist into professional practice (23). Regular screening using brief validated tools such as the NDI may also help identify dentists with early functional limitation before symptoms become disabling.

The study has several strengths. It included a sample of 150 practicing dentists with equal male and female representation, allowing balanced descriptive comparison by gender. It used structured assessment through NDI-based disability categories and categorical pain-intensity grading, which provided more clinically meaningful information than unstructured symptom reporting alone. The inclusion of sleep and recreational activity items further strengthened the functional interpretation of cervical symptoms. These elements improve the relevance of the findings for physiotherapy, ergonomics, occupational health, and dental practice.

Several limitations must be acknowledged. The cross-sectional design does not allow causal inference, and the findings should not be interpreted as evidence that dental work caused cervical dysfunction. Convenience sampling may have introduced selection bias, and the absence of response-rate information limits assessment of non-response bias. The study relied on self-reported questionnaire data, which may be influenced by recall bias, perception of pain, and individual reporting behavior. Important occupational and clinical variables, including years of practice, daily working hours, number of patients treated per day, specialty, ergonomic training, use of loupes, workstation design, physical activity level, body mass index, psychosocial stress, prior neck pain, and objective cervical examination, were not included. These unmeasured factors may have influenced the observed disability patterns. In addition, age-related inferential analysis could not be validly reported because age group-specific NDI distributions were not available in the supplied aggregate data.

Despite these limitations, the study provides locally relevant evidence that neck pain and NDI-defined cervical disability are common among practicing dentists in Karachi. The findings highlight the importance of moving beyond simple pain prevalence estimates toward functional assessment, early screening, and preventive ergonomic action. Future studies should use probability-based or multicenter sampling, collect detailed occupational exposure data, include objective postural or clinical assessment, and apply multivariable models to evaluate independent predictors of cervical disability. Longitudinal research would also be valuable to determine whether early ergonomic training and physiotherapy-based preventive programs reduce the progression of neck pain and disability among dental professionals.

CONCLUSION

Neck pain and NDI-defined cervical disability were common among practicing dentists in Karachi, with 88.0% reporting current neck pain and 72.0% demonstrating some level of neck-related disability. Most disability was mild, but one-fifth of participants had moderate-to-complete disability and 8.0% had severe-to-complete disability, indicating clinically relevant functional impairment in a smaller but important subgroup. Neck symptoms also affected non-occupational functioning, with 40.0% reporting sleep disturbance and 46.7% reporting pain or limitation during recreational activities. Gender-wise differences were observed descriptively, but the revised analysis did not confirm a statistically significant association between gender and NDI category, and age-related inference could not be validly reported without age group-specific disability data. These findings support the need for routine ergonomic education, early musculoskeletal screening, postural correction, active rest strategies, and physiotherapy-informed preventive programs within dental training and clinical practice to reduce the burden of cervical dysfunction among dental professionals.

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