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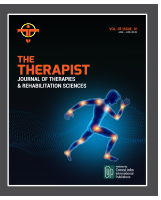

Original Article

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Prevalence of Cervicalgia and Its Association with Gender, Years of Practice and BMI Among Dentists: A Cross-Sectional Study

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ABSTRACT

Cervicalgia, is a common occupational hazard in dentistry due to the prolonged, stooped posture maintained during clinical procedures. **Objective:** To determine the prevalence of cervicalgia among dentists and explore its association. With gender, Body Mass Index (BMI), and years of clinical practice. **Methods:** This cross-sectional study was conducted using the Neck Disability Index (NDI) questionnaire. A sample of 147 dentists was selected through convenience sampling, with data collected from Pakistan Institute of Medical Sciences (PIMS), School of Dentistry (SOD), and Islamabad Dental Hospital (IDH). Data were analyzed using SPSS version 25.0, applying the chi-square test to evaluate associations between NDI scores and the study variables. **Results:** Out of 147 participants, 82 (55.8%) reported experiencing neck pain, while 65 (44.2%) did not. Statistical analysis revealed significant associations between the total NDI score and BMI, years of clinical practice, and presence of neck pain ($p<0.05$). **Conclusions:** Cervicalgia is highly prevalent (55.8%) among dental professionals and is significantly associated with higher BMI and clinical experience. It poses a substantial impact on daily functioning, underscoring the urgent need for ergonomic interventions and preventive strategies such as regular physical activity and posture correction to reduce its onset.

INTRODUCTION

Cervicalgia can be defined as pain and discomfort of the neck or the cervix of the spine that is experienced by approximately two-thirds of the population at some point in their lives [1]. It is the fourth major cause of disability in the world after low back pain, depression, and joint disorders [2]. This is usually caused by injury, degenerative disorders like cervical spondylosis, herniated discs, compressions of the nerves, and tension of the muscles because of improper posture and stress [3]. The symptoms usually involve the neck and upper back pain, muscle stiffness, low joint movement, and shoulder and upper back pain. It may cause muscle imbalances, decreased mobility and headaches in chronic cases [4]. Cervicalgia is a condition that is affected by physical and psychological factors and it significantly affects quality of life, activities that people have to perform, and healthcare expenses especially in areas such as Nordic countries [5]. Medical workers are at the highest risk of musculoskeletal disorders (MSD) because of the working long hours and physical loads. The incidence of MSD is 6070 percent among surgeons, 4558 percent among nurses, 4268 percent among physiotherapists, and 50 percent to 80 percent in dentists

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[6]. Cervicalgia presents high risks in dentists because of the long periods of inactivity, repetitive nature, and visual requirements. They tend to stoop forward in order to ensure that they are visible and this puts a strain on the cervical muscles making them fatigued and straining the spine [7]. The burden is further augmented by repetitive arm movements of the dental procedure, increasing the risk of chronic neck pain and decreasing the quality of life [8]. In the Modified-Dental Operator Posture Assessment (M-DOPAI) score system, neck positions may be categorized as harmful (exceeding 45 o neck flexion), compromised (20 o-45 o neck flexion), and ideal (below 20 o neck flexion) [9]. The most typical postural problem is forward head posture (about 60% of dentists display it), which is illustrated by a 15 20 forward tilt, which interrupts the cervical position and results in muscle imbalance and chronic pain [10]. It is allegedly reported that neck pain is reduced among seated dentists than standing workers [11]. One of the major causes of cervical discomfort is prolonged inappropriate positioning. It is important to note that 88.7 percent of dentists who work more than 40 hours per week complain of neck pain [12]. The musculoskeletal pain is common annually, with more prevalence in the case of female dentists indicating the differences in susceptibility by gender [13]. Moreover, experience years are also associated with the degree of neck disability positively, suggesting that more experience can result in more strain. [14]. The prevention methods involve ergonomic changes, changing lifestyle, and specific exercises. Tension can be relieved through regular neck stretches and strengthening exercises such as chin tucks and shoulder rolls [15].

This study aimed to determine the occurrence of cervical pain in dentists and to determine how factors including, Body Mass Index (BMI) and years of clinical practice affect their health and job performance. Although additional variables such as height were taken into consideration during the first conceptualization, the BMI and clinical experience were used as the dominant variables in the analysis. Since these variables are major causes of musculoskeletal disorders, especially neck pain, which may impede day-to-day operations. Low mobility and uncomfortable work postures are typical causes of cervical muscle stiffness and the height and BMI further complicate bodily stress. Such shortcomings not only lessen the quality of life of dentist, but also have the potential of undermining patient care due to lack of focus, longer procedural time, and higher probability of treatment errors.

METHODS

An analytical cross-sectional survey was conducted using the Neck Disability Index (NDI) questionnaire as the primary data collection tool. The study was carried out at the School of Dentistry (SOD), Pakistan Institute of Medical Sciences (PIMS), and Islamabad Dental Hospital (IDH). The study was conducted over a period six-month from May 2024 to October 2024) following. The target population consisted of dentists. The study included graduated dentists, House Officers, internees, postgraduate students (PGs), and dental consultants, within the age range of 25 to 45 years, irrespective of gender and BMI. Exclusion criteria included individuals with symptoms of vertebrobasilar insufficiency, any pathological conditions involving the cervical spine (e.g., acute or chronic inflammatory conditions, ankylosing spondylitis), fractures or dislocations of the cervical spine, recent cervical spine surgeries, or those diagnosed with tumors, cancers, or malignancies. The required sample size was calculated to be 147 using the WHO sample size calculator (24). with an expected prevalence of cervicalgia set at 55.8% based on prior literature, a margin of error of 8%, and a 95% confidence level A non-probability convenience sampling technique was employed for participant selection Data were collected after obtaining written informed consent from all participants, in accordance with the ethical principles outlined in the Declaration of Helsinki. The validated Neck Disability Index (NDI) questionnaire was used to collect data to determine the occurrence and level of cervicalgia among dentists. The interpretation of the total NDI score (by a score of 0-50) was based on the calculated categories: No disability, 52-14 = Mild disability, 15-24 = Moderate disability, 25-34 = Severe disability, and 35-50 = Complete disability. The questionnaire assessed the presence of neck pain and the condition affecting the daily activities. Standard World Health Organization (WHO) classifications of BMI were used to categorize as follows; underweight (<18.5 kg/m 2), normal weight (18.524.9 kg/m 2), overweight (25 29.9 kg/m 2), and obese (30 kg/m 2 and above). The data were analysed with the help of IBM SPSS Statistics (version 25.0). Mean and standard deviation were determined in case of continuous variables like the age. To categorize BMI, the standard World Health Organization Classification Years of clinical practice were divided into 3-year periods (1-3, 4-6, 7-9 years, etc.) to represent progressive stages of clinical experience and to guarantee sufficient numbers of cells to be working on statistics. The frequencies and percentages were presented in the case of categorical variables like BMI and years of practice. The relationships between categorical variables were assessed with the chi-square test.

RESULTS

The cross-sectional survey investigated the frequency of cervicalgia among dentists aged 24-45 years, including graduates, house officers, internees, postgraduates, and

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consultants. A total of 147 participants were selected using non-probability convenient sampling. The Neck Disability Index (NDI) questionnaire measured the frequency and impact of neck pain on ADLs and IADL. The data were analyzed with SPSS (version 25), descriptive statistics for continuous variables (mean, standard deviation), and frequencies and percentages for categorical data. Chi-square tests examine relationships between categorical variables. Mean (SD) of the age of the enrolled participants of the current study is observed to be 27.14 (2.859). Out of 147 sample sizes, 64 (43.5%) were males (blue) and 83 (56.5%) were females (orange) (Figure 1).

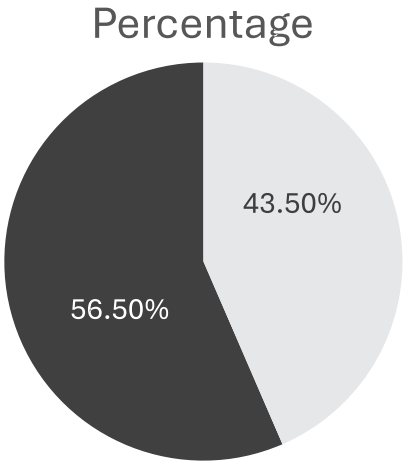

Figure 1: Frequency (Percentage) of Gender of the Enrolled Participants

Out of 147 sample size, 14 (9.5%) were underweight (blue), 103 (70.1%) were normal weight (orange), 27 (18.4%) were overweight and 3 (2%) were obese (Figure 2).

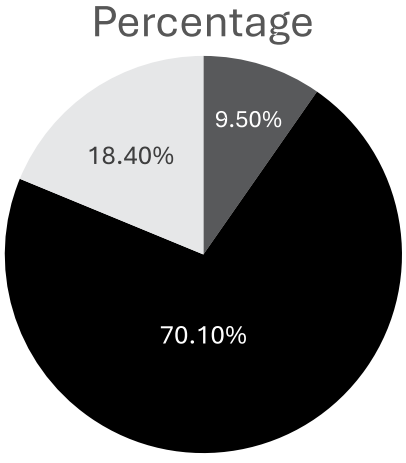

Figure 2: Frequency (Percentage) of BMI of the Enrolled Participants

Out of the total sample size of 147 participants, the majority had 1–3 years of professional experience. More than half of the participants reported the presence of neck pain, while the remaining participants did not experience neck pain. Regarding neck disability, most participants fell into the no-disability category, followed by mild and moderate disability, with only a small proportion exhibiting severe disability (Table 1).

Table 1: Demographic Characteristics, Neck Pain Status, and Neck Disability Index (NDI) Scores of the Enrolled Participants (N = 147)

Variables	Categories	Frequency (%)
Years of Practice	1–3 years	92 (62.6)
	4–6 years	34 (23.1)
	7–9 years	14 (9.5)
	10–12 years	6 (4.1)
	13–15 years	1 (0.7)
	Total	147 (100)
Neck Pain Status	Yes	82 (55.8)
	No	65 (44.2)
	Total	147 (100)
Neck Disability Index (NDI)	No disability (0–4)	78 (53.1)
	Mild disability (5–14)	38 (25.9)
	Moderate disability (15–24)	30 (20.4)
	Severe disability (25–34)	1 (0.7)
	Total	147 (100.0)

Chi-square statistical test was run between the variables gender and total score of NDI and result revealed non-significant relation or outcome. (p value is 0.811) (Table 2).

Table 2: Gender and Total score of NDI

Gender	(0-4) No disability	(5-14) Mild disability	(15-24) Moderate disability	(25-34) Severe disability	Total	p-value
Male	33	17	14	0	64	0.811
Female	45	21	16	1	83	
Total	78	38	30	1	147	

The underweight and obese categories showed a higher proportion of participants in the moderate disability range compared to other groups. In contrast, the overweight category had the highest percentage of individuals reporting mild disability. Chi-square statistical test was run between the variables BMI and total score of NDI and result revealed significant relation or outcome. (p value is 0.005) (Table 3).

Table 3: BMI and Total score of NDI

BMI	(0-4) No disability	(5-14) Mild disability	(15-24) Moderate disability	(25-34) Severe disability	Total	p-value
Underweight	8	1	4	1	14	0.005
Normal weight	58	22	23	0	103	
Overweight	11	14	2	0	27	
Obese	1	1	1	0	3	
Total	78	38	30	1	147	

Chi-square statistical test was run between the variables years of practice and total score of NDI and result revealed significant relation or outcome. (p value is 0.044). Dentists with 4-6 years of experience had the highest proportion of

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individuals (35.3%) falling into the moderate disability category. Furthermore, a shift was observed where those with 10 or more years of practice were primarily concentrated in the no-to-mild disability ranges (Table 4).

Table 4: Years of Practice and Total score of NDI

Year of Practice	(0-4) No disability	(5-14) Mild disability	(15-24) Moderate disability	(25-34) Severe disability	Total	p-value
1-3 years	57	20	14	1	92	0.044
4-6 years	14	8	12	0	34	
7-9 years	5	5	4	0	14	
10-12 years	1	5	0	0	6	
13-15 years	1	0	0	0	1	
Total	78	38	30	1	147	

The association between self-reported neck pain and NDI categories was analyzed to validate the NDI in our sample. Chi-square statistical test was run between the variables neck pain and total score of NDI and result revealed highly significant correlation or outcome. ($p < 0.001$), which was expected given the overlapping constructs of neck pain and neck disability measured by the NDI (Table 5).

Table 5: Neck pain and Total score of NDI

Do you have Neck Pain	(0-4) No disability	(5-14) Mild disability	(15-24) Moderate disability	(25-34) Severe disability	Total	p-value
Yes	13	38	30	1	82	0.00
No	65	0	0	0	65	
Total	78	38	30	1	147	

DISCUSSION

The findings of the current study align with the available literature on work-related musculoskeletal disorders (WMSDs) in dentists. Meisha *et al.* (2019) have mentioned a prevalence rate of 70% in WMSDs, where the back (85) and neck (84.6) were the most affected [16]. The present study determined the prevalence of cervical pain and the effect of BMI and clinical experience, which are some of the limiting factors in the daily functioning. Sustained immobile positions cause cervical stiffness which diminishes the quality of life of a dentist and may negatively affect the care delivery by hampering the concentration and highest number of errors in the procedure. The Neck Disability Index (NDI) scores showed a functional impairment range. Although a recent study showed largely mild (44.7%) and moderate (33.8%) disability, our study showed a better representation of no disability (53.1%), and mild disability (25.9%). The translation of these scores, Mild Disability (NDI: 514) may imply the end of the day pain involved in the precision and require breaks. Moderate Disability (NDI: 1524) is a hugely disruptive factor in holding postures during complex procedures, which may decrease patient loads and disorganize daily life. Even with a mild condition (NDI: 25 -34), Severe Disability might compel fewer working hours or even early retirement, making it extremely imperative to implement preventative ergonomics at lower levels of disability. The supporting literature consists of Almeida *et al.* (2023) regarding the altered cervical muscles mechanics [17], Holzgreve *et al.* (2022) regarding the advantages of resistance training [18], and Saccucci *et al.* (2022) stating 91% prevalence of MSD in hygienists [19]. The prevalence of neck pain was found to be high in relation to posture and duration of the work [20, 21] in Sezer *et al.* and Younis *et al.* Rickert *et al.* (2021) reported that 65.1% of dentists had neck problems with female gender being a risk factor [22] and neck pain associated with poor posture was identified by 66% (Kashif *et al.* 2021) [23]. The results of our findings are consistent and contradictory to earlier studies. Our sample size was lower (n=147 vs. 600) and younger (mean 27.1 vs. 35.3 years) than that of Younis *et al.* [21]. We had a greater prevalence of female neck pain (56.5%), compared to Younis *et al.* who had a small male prevalence (52%); gender was not found significant in both studies. BMI (p=0.005) and years of experience (p=0.044) were significantly related to our findings which conforms to the finding by Younis *et al.* as age and weight are predictors. The specific cervicalgia prevalence of us was 55.8 versus the general MSD prevalence of 21.3 by Younis *et al.* Gandolfi *et al.* [12] indicated a more prevalence of overall MSD (84.9%), neck being the most affected (60%), and gender and experience were significant unlike in our case with gender. Our research is similar to that of Kashif *et al.* [23] in the fact that gender does not hold significance but different in that BMI is one of the factors that are important. The research has several limitations: The sample size of the study is small (n=147), the convenience method is employed, the authors do not attempt to compare ergonomic factors, the sample is uneven in the number of men and women, and the study is region-specific (Islamabad), which restricts the possibility of generalization. Subsequent studies ought to use longitudinal or multi-centered studies using bigger and balanced samples. It must also use objective ergonomic data, psychosocial variables and intervention trials in assessing preventive measures such as ergonomic equipment and exercise interventions of neck disability prevention.

CONCLUSIONS

This study concludes that cervicalgia is an issue in dentists, with more than half of the respondents (55.8) reporting neck pain. Neck pain was highly dependent on such factors as BMI and years of practice, but gender did not correlate strongly. These results highlight the importance of specific ergonomic interventions, frequent checks of the posture, frequent breaks, and prevention measures to lessen cervical strain. It demonstrates the

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need to take preventative actions that can ultimately improve the health productivity and standards of care that can be delivered by dentists.

Authors Contribution

Conceptualization: JF
Methodology: MB
Formal analysis: HA[1], HA[2]
Writing and drafting: AS
Review and editing: UB

All authors approved the final manuscript and take responsibility for the integrity of the work.

Conflicts of Interest

All the authors declare no conflict of interest.

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