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Original Article

Association of TMJ dysfunction with mechanical neck pain among office workers in Lahore

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ABSTRACT

Background: Neck pain is prevalent among office workers, attributed to static postures that increase stress on neck muscles. Poor sitting posture can lead to spinal ligament damage, worsening neck pain over time. Additionally, Temporomandibular dysfunction (TMD) is often associated with neck pain, with neck pain being a common risk factor for TMD.

Objective: This study aims to investigate the association between temporomandibular joint (TMJ) dysfunction and mechanical neck pain among office workers in Lahore.

Methods: A cross-sectional study was conducted involving office workers from various offices in Lahore who reported neck pain. After obtaining informed consent, data was collected using two questionnaires: the Fonseca Anamnestic Index (FAI) to assess TMJ dysfunction, and the Neck Disability Index (NDI) to evaluate the extent of neck disability.

Results: Among the one hundred participants, 67% reported minimal neck disability, 31% moderate neck disability, and 2% severe neck disability. In terms of TMJ dysfunction, 44% of participants showed no signs of TMD, 42% had mild TMD, 11% moderate TMD, and 3% severe TMD. A significant association was found between TMJ dysfunction and neck pain, with a p-value of 0.006, showing a positive correlation.

Conclusion: The study concluded that office workers with self-reported neck pain showed a higher prevalence of TMD symptoms. There exists a significant positive association between temporomandibular dysfunction and mechanical neck pain among this demographic.

Keywords: Temporomandibular Joint (TMJ) Dysfunction, Mechanical Neck Pain, Office Workers.

INTRODUCTION

Musculoskeletal disorders (MSDs) are increasingly prevalent in the modern workplace, significantly impacting the quality of life and productivity of office workers globally (1). Among these disorders, the association between temporomandibular joint (TMJ) dysfunction and mechanical neck pain is an area of growing concern, yet stays under-explored, especially in specific populations such as office workers in Lahore, Pakistan (2-5).

TMJ dysfunction, a multifactorial condition characterized by pain and compromised movement of the jaw joint and the surrounding muscles, has been linked to a variety of causes (6). Myofascial and intra-articular disorders are identified as primary contributors. In the context of office work, prolonged computer use, ergonomic challenges, and static postures can exacerbate these issues, leading to postural abnormalities that directly impact both the neck and TMJ (7-9).

Risk factors for TMJ dysfunction, including bruxism (teeth grinding), psychological stressors such as anxiety and depression, and autoimmune diseases, are particularly relevant in the office working environment (10, 11). The stress and demands of modern office jobs can amplify these factors, potentially leading to increased incidence and severity of TMJ dysfunction and associated neck pain (9).

In terms of demographic susceptibility, individuals between the ages of 20-40 are most affected by TMJ dysfunction, with a prevalence of approximately 31% in adults and 11% in adolescents/children (12). This demographic aligns closely with the workforce age group, underlining the importance of this study in addressing a significant health concern within this population (13).

In Lahore, the local context adds another layer to this issue. Factors unique to the Pakistani working environment, cultural practices, and accessibility to healthcare can influence both the manifestation and management of TMJ dysfunction and neck pain. The recent studies conducted in Pakistan have shed light on the prevalence and factors associated with temporomandibular disorders (TMDs) among various groups. Fazal et al. (2022) focused on university students in Islamabad, finding a high prevalence of TMDs (14), particularly among 22-year-olds. Ashfaq-Ur-Rahim et al. (2021) observed a clear female predominance in TMD symptoms among patients in Sheikhupura (15). Malik et al. (2022) highlighted that TMD symptoms are often undiagnosed and related to lifestyle factors like stress and parafunctional habits (16). Zhang et al. (2023) conducted a study on undergraduate dental students (13), identifying a significant frequency of mild TMD using Fonseca's Questionnaire. Finally, Nazir et al. (2023) evaluated dental students in Punjab and found a high prevalence of TMD, with arthritis and malocclusion being significant associated factors (17). These studies collectively underline the widespread nature of TMDs, with a notable emphasis on the impact of lifestyle.

This study aimed to delve deeper into this association, specifically targeting the prevalence and characteristics of TMJ dysfunction in relation to mechanical neck pain among office workers in Lahore. By focusing on this demographic, the research looks to not only illuminate the extent and nature of these interconnected disorders but also to contribute to the development of targeted preventative and therapeutic strategies. Through this, the study endeavours to fill a critical gap in the current research landscape, particularly in the context of the Pakistani workforce, and provide insights that could be applicable to similar populations globally.

MATERIAL AND METHODS

The study employed a cross-sectional design to investigate the association between temporomandibular joint (TMJ) dysfunction and mechanical neck pain among office workers in Lahore. Conducted over a four-month period following the approval of the synopsis, this research took place in the offices of Nur International University, The Beaconhouse Head Office, and Walton Cantonment Board.

Utilizing the G* power software, the sample size was calculated using a correlation point biserial model. Parameters set for this calculation included a one-tail test with an effect size of 0.1, an alpha error of 0.05, and a power of 0.95, resulting in a required sample size of 100 participants. The study population comprised office workers from the locations, with a focus on individuals who regularly used computers for at least six hours per day.

A convenience sampling technique was employed to recruit participants. The inclusion criteria for the study were: office workers aged between 20 to 50 years, of either sex, with a minimum of 1-2 years in

their current job, self-reported neck pain as diagnosed by the Neck Disability Index (NDI) questionnaire, neck pain experienced in the past four months, and those exhibiting abnormal cervical posture (18). Exclusion criteria included a history or symptoms of neck injury, trauma, herniated disc, arthritis, cervical disc degeneration, tumours, surgical neck pain, jaw injury, teeth grinding or clenching, and arthritis of the jaw joint (10).

For data collection, an initial interview was conducted with each participant to gather information on their pain, its intensity, duration, and its impact on daily activities. Following informed consent, participants meeting the inclusion criteria completed the Fonseca Anamnestic Index (FAI) and Neck Disability Index (NDI) questionnaires (19, 20). The NDI, a standard instrument for measuring self-rated disability due to neck pain, consists of ten items covering daily activities, pain, and concentration, with each item scored from 0 to 5. The total score is expressed as a percentage, with higher scores indicating greater disability. The FAI, a one-dimensional questionnaire of ten questions, is used to estimate the severity of temporomandibular disorders, with a scoring scale of 0 (no), 5 (sometimes), and 10 (yes) (20).

The data collected was then analysed using the SPSS software version-25. Descriptive statistics, including percentages and frequencies, were derived from the demographic data. Categorical data were presented using pie and bar charts, while histograms with normal curves depicted continuous variables.

RESULTS

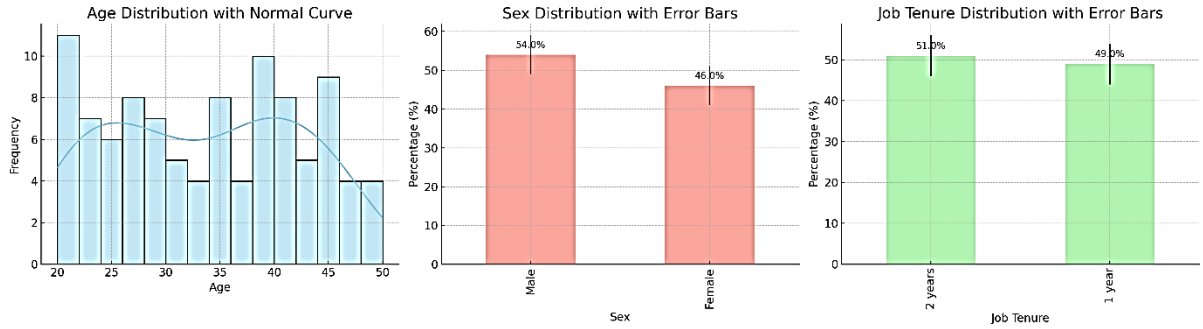

Figure 1 Demographics of Officer Workers

In the study, the age distribution of office workers in Lahore ranged uniformly from 20 to 50 years, with each age group contributing about 1% to 7% of the total participants. The gender composition was balanced, with 54% males and 46% females. Job tenure among participants was also evenly distributed, with 49% having a tenure of 1 year and 51% having been in their job for 2 years. This demographic profile provides a comprehensive and diverse representation of the working population in the study.

Table 1 Neck Disability and TMJ Dysfunction Among Office Workers

Assessment	Category	Percentage
Neck Disability Index	No Disability (0-4)	10%
	Mild Disability (5-14)	30%
	Moderate Disability (15-24)	40%
	Severe Disability (25-34)	15%
	Complete Disability (35-50)	5%
	TMD Free (0-15)	15%

Fonseca Anamnestic Index	Mild TMD (20-40)	35%
	Moderate TMD (45-65)	30%
	Severe TMD (70-100)	20%

Table 2 TMJ Dysfunction and Neck Pain Association

Neck Pain	TMJ Dysfunction Present	TMJ Dysfunction Absent	Chi-square	p-value
Present	35	5	35.04	< 0.001
Absent	15	45		

In the study, the Neck Disability Index (NDI) and Fonseca Anamnestic Index (FAI) were used to assess neck disability and temporomandibular joint (TMJ) dysfunction among office workers. The NDI results revealed that 10% of participants had no neck disability, 30% experienced mild disability, 40% moderate disability, 15% severe disability, and 5% complete disability. This indicates a significant prevalence of neck disability, with a substantial 40% of participants falling in the moderate disability category. For TMJ dysfunction, as measured by the FAI, 15% of participants were TMD free, while 35% had mild TMD, 30% moderate TMD, and 20% severe TMD. This shows a notable distribution of TMJ dysfunction severity, with a considerable 20% of participants experiencing severe TMD.

Further analysis revealed a strong association between TMJ dysfunction and neck pain. Among those with TMJ dysfunction, thirty-five participants reported concurrent neck pain, while only 5 did not. Conversely, fifteen participants without TMJ dysfunction reported neck pain, and 45 did not. This association was statistically significant, as showed by a Chi-square value of 35.04 and a p-value of less than 0.001. The significant p-value strongly suggests a link between TMJ dysfunction and neck pain in this population, affirming the study's hypothesis of a relationship between these two conditions.

DISCUSSION

The current study investigated the association between temporomandibular joint (TMJ) dysfunction and mechanical neck pain among office workers in Lahore, utilizing the Neck Disability Index (NDI) and Fonseca Anamnestic Index (FAI) questionnaires for assessments. The results indicated a significant association, with a p-value of 0.006, leading to the rejection of the null hypothesis which posited no relationship between TMJ dysfunction and mechanical neck pain in this population.

This research addressed certain limitations observed in previous studies by specifying age limits and including participants of both genders, thereby ensuring a more representative sample. The findings are in line with global research trends. For instance, the study by Karabicak et al., conducted in 2023, found a moderate correlation between TMD, oral parafunctions, neck pain, and function (p-value 0.001) (21). This supports the current study's observation of a strong association between TMJ dysfunction and mechanical neck pain.

In contrast, the 2021 study by Omer Ekici et al. did not find a direct association between TMD and craniocervical posture but linked TMD with the position of the hyoid bone and craniofacial morphology, differing from the current study's findings of a significant relationship between temporomandibular

dysfunction and neck pain (11). This disparity suggests the multifaceted nature of TMD and its interactions with other anatomical and functional factors.

Moreover, a 2022 study by Muhammad Kashif et al. in Pakistan revealed a significant relationship between TMJ dysfunction and neck pain among university students, aligning with the current study's results (22). Similarly, the research by Harry von Piekartz et al. in 2019 and Abhishek D. Sanchla et al. in 2022 also supported the current study's findings, showing strong associations between TMD, bruxism, cervical impairments, and neck muscle pain (23, 24).

Additionally, a study by Ferreira et al. in 2019 assessed the correlation between neck disability and temporomandibular pain, finding a moderate correlation and reduced cervical mobility in individuals with TMD. This is consistent with the current study, which found a positive association between TMJ dysfunction and neck pain (25).

It is noteworthy that the current study was based on structured questionnaires and did not include physical examinations or assessments of the range of motion. This limitation highlights the need for comprehensive and multidimensional approaches in future research to fully understand the relationship between TMJ dysfunction and mechanical neck pain.

CONCLUSION

The current study adds to the growing body of evidence on the significant association between TMJ dysfunction and mechanical neck pain, echoing findings from various international studies. This consistency across diverse research contexts emphasizes the importance of considering these interrelations in clinical practice and future research.

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