



Association between Sleep Disturbance and Cervical Radicular Pain in Karachi, Pakistan: A Cross-Sectional Study

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A B S T R A C T

Background: The neurological condition known as cervical radiculopathy, rather prevalent. When nerves from cervical spine compressed it causes radiculopathy and pain in neck. Good sleep quality has been acknowledged as a crucial factor in both physical and mental health and well-being, making it an essential physical requirement for a healthy life.

Objective: To find out the association between sleep disturbance and cervical radicular pain.

Methodology: A cross-sectional study was conducted over 6 months in Karachi, Pakistan, involving 377 male and female patients (aged 30–50 years) diagnosed with acute or sub-acute cervical radicular pain. Data were collected from various public and private hospitals and clinics using non-probability convenience sampling. The study assessed sleep disturbances in these patients through bio-data questionnaires, the Neck Disability Index (NDI), and the Pittsburgh Sleep Quality Index (PSQI). Statistical analysis was performed using SPSS 23.0 to evaluate the relationship between cervical radicular pain, disability levels, and sleep quality

Result: Among 377 participants with cervical radicular pain, a significant association was observed between sleep disturbance and neck disability ($p = 0.010$), age ($p = 0.025$), and working duration ($p = 0.007$) among patients with cervical radicular pain. Moderate disability was most prevalent (35.5%), followed by mild (27.9%) and severe (22.8%) disability. Sleep disturbances were common, with 41.1% reporting moderate and 33.2% severe difficulty. Females and participants aged 30–40 years exhibited higher sleep disturbance levels. Prolonged working hours showed a significant association with poorer sleep quality ($p = 0.007$).

Conclusion: Cervical radicular pain is significantly associated with neck disability and sleep disruption, predominantly affecting female individuals aged 30–40 years. Prolonged working hours and postural stress were major contributing factors.

Keywords: Disability, Pinched Nerve, PSQI, Radiculopathy, Sleep Disturbance.

Introduction

Cervical radicular pain is one of the most common neurological conditions that cause tingling, pain or weakness in neck and upper limb, frequently known as a "pinched nerve," inflammation of cervical nerve roots considered as a main cause.¹ Cervical radiculopathy condition greatly affects everyday activities such as work, self-care, and sleep, frequently resulting in a diminished quality of life.² Neck pain is considered one of the leading causes of disability worldwide, affecting approximately 30–50% of adults at some

point in their lives and contributing substantially to functional limitation and reduced quality of life.³ Chronic cervical radicular pain is a major issue for many adults which requires proper management. Contrasting nonspecific neck pain, cervical radicular pain involves nerve root compression that frequently results in radiating pain, sensory disturbances, and increased symptom severity. These neurological symptoms may significantly disrupt sleep due to persistent pain, night-time discomfort, and altered posture during rest. Consequently, examining sleep disturbance specifically in

patients with cervical radicular pain is clinically important, as sleep impairment may further aggravate disability and delay recovery.⁴

Most common but often ignored issue along with cervical radicular pain is low sleep quality. Increase in pain intensity, delayed healing is associated with poor sleep. may lead to Low sleep quality.^{2,5} One of the recent study stated that insomnia is been observed in more than half of individuals with chronic neck pain.⁶ Association between sleep and cervical radicular pain is still ignored when treating cervical radicular pain patients.⁷

Team work of Healthcare professionals, are highly appreciated while treating cervical radicular pain.⁸ Non pharmacological treatment options to improve sleep is still under looked while treating patients.⁹

Additionally, cultural and socioeconomic aspects in areas such as Karachi may affect pain is reported and sleep habits, but there is a scarcity of local data on this matter.¹⁰

Our study aimed to find out the relationship between sleep disturbance and cervical radicular pain.

Although several international studies have investigated the relationship between neck pain and sleep disturbance, limited evidence is available from Pakistan and other South Asian populations. Differences in occupational exposure, lifestyle patterns, and healthcare access may influence both pain perception and sleep quality. Therefore, this study aims to provide region-specific evidence from Karachi, Pakistan.

Methodology

A multi centered cross-sectional study was conducted to assess the relationship between sleep disturbance and cervical radicular pain. Ethical approval was granted by the Bahria University College of Physical Therapy (**WFRC-DPT-06-2022**), confidentiality of each participant, each subject was voluntarily participated in study. Ethical approval and informed consent procedures were conducted in accordance with institutional research guidelines and ethical standards.

The study included adult participants aged between 30 and 50 years and above diagnosed with acute or sub-acute cervical radicular pain. Sample size was calculated 377 through OpenEpi software, based on a 95% confidence interval, a 5% margin of error, and an expected prevalence of 57.1% for sleep disturbances among patients with cervical discomfort.

The participants were recruited through non-probability convenience sampling from different healthcare institutions from November 2022 to June 2023. Participants who are diagnosed with cervical radiculopathy for less than 12 weeks were included in the study. Any individuals with recent spinal surgery, with any psychological or neurological disorders, or insomnia unrelated to neck pain were excluded.

The Neck Disability Index (NDI) and the Pittsburgh Sleep Quality Index (PSQI) used as a data collection tools. The neck disability was assessed by NDI which have 10 items, each rated from 0 (no disability) to 5 (total disability). Sleep quality was assessed through the PSQI over the past month using 19 items that evaluate components such as sleep latency, duration, and disturbances. A global PSQI score greater than five was considered indicative of poor sleep quality. Written informed consent was provided to each participant in Urdu and English both languages, each participant was explained the purpose of research by the researcher as per there preferred language either Urdu or English before starting the questionnaire. The surveys were also available in English or Urdu by trained researchers to ensure clarity and comprehension. Data was analyzed through SPSS version 23.0. Descriptive statistics, including frequencies and percentages, were used to summarize demographic variables. Associations between categorical variables, including Neck Disability Index (NDI), Pittsburgh Sleep Quality Index (PSQI), age group, gender, and working duration, were analyzed using Pearson's Chi-square test. Assumptions of the chi-square test, including independence of observations and minimum expected cell counts greater than five, were assessed before analysis. A p-value of <0.05 was considered statistically significant.

Results

A total of 377 patients, who have been diagnosed with cervical radicular pain, took part in the study across public and private hospitals and clinics in Karachi. The demographic details of the participants are presented in Figure 1. Most participants were male (54. 6%), within the age range of 30 to 40 years (62. 6%) and had been employed for over two years (72. 9%).

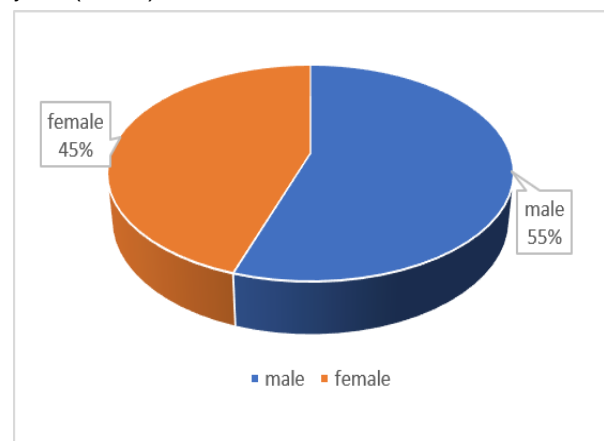


Figure 1: Pie chart of Demographic Characteristics of Participant

As indicated by the Neck Disability Index scoring and interpretation illustrated in the graph below, 134 (35. 5%) patients experience moderate disability because of neck pain, 105 (27. 9%) participants report mild disability due to neck pain, and 86 (22. 8%) patients suffer from severe disability, which prevents them from carrying out daily activities effectively. Furthermore, 45 (11. 9%) participants are completely disabled, while 6 (1. 6%) exhibit no disability. (Figure 2)

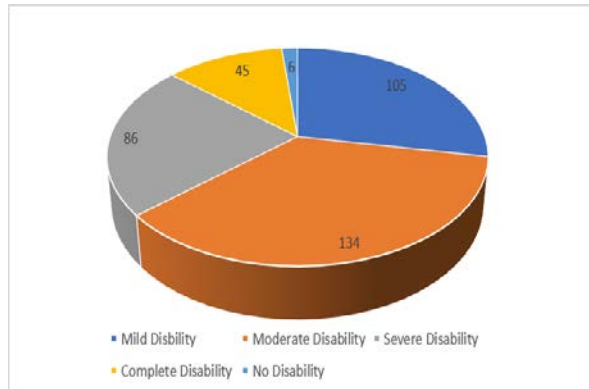


Figure 2: Pie chart of Neck Disability Index Interpretation

According to PSQI results, moderate sleep difficulty was seen in 155 (41.1%) participants, severe sleep disturbance in 125 (33.2%), mild sleep difficulty in 96 (25.2%), and no sleep disturbance in 2 (0.5%) participants. Among females, 39.1% had severe and 36.7% moderate sleep difficulty, while among males, 45.1% had moderate and 28.2% severe sleep difficulty ($p = 0.350$). Age-wise analysis revealed statistically significant association ($p = 0.025$), with moderate sleep difficulty most common among participants aged 30–40 years (39.8%). Working duration also showed significant association ($p = 0.007$), with prolonged working hours linked to increased sleep difficulty. (Table 1)

Among the age 30-40 years the 4 patients have no disability, 64 patients have mild disability, 79 patients have moderate disability, 56 have severe disability and 32 patients have complete disability. Among the age of 40-50 years 1 patient has no disability, 38 patients have mild disability, 49 patients have moderate disability, 23 patients have severe and 11 patients have complete disability. In patients above 50 years of age, 1 patient has no disability, 3 patients have mild disability, 6 patients have moderate disability, 7 patients have severe and 2 patients have complete disability. (Table 1).

According to the Pittsburgh Sleep Quality Index (PSQI) questionnaire, among participants working for different durations, out of 38 individuals with one year of work experience, 11 (28.9%) reported mild sleep disturbance, 21 (55.3%) had moderate difficulty in sleep, and 6 (15.8%) experienced severe sleep difficulty. Of the 64 participants who had been working for two years, 1 (1.6%) reported no

sleep deprivation, 22 (34.4%) had mild disturbance, 29 (45.3%) had moderate difficulty, and 12 (18.8%) had severe sleep difficulty. Among 275 participants working for more than two years, 5 (1.8%) reported mild sleep disturbance, 3 (1.1%) had moderate difficulty, and 11 (4%) experienced severe sleep disturbance. Moderate sleep disturbance was reported in 41.1% of participants, while severe sleep disturbance was observed in 33.2%. A statistically significant association was found between sleep disturbance and age group ($p = 0.025$) as well as working duration ($p = 0.007$). No significant association was observed between sleep disturbance and gender ($p = 0.350$). Age-wise, out of 236 participants aged 30–40 years, 59 (25%) reported mild sleep disturbance, 94 (39.8%) had moderate difficulty, and 83 (35.2%) had severe sleep disturbance. Among 122 participants aged 40–50 years, 2 (1.6%) had no sleep deprivation, 31 (25.4%) experienced mild disturbance, 58 (47.5%) had moderate difficulty, and 31 (25.4%) had severe sleep disturbance. Of 19 participants aged above 50 years, 5 (26.3%) had mild sleep disturbance, 3 (15.8%) had moderate difficulty, and 11 (57.9%) experienced severe sleep disturbance. Overall, the findings indicate that sleep disturbances were more prevalent among participants aged 30–40 years, females, and those with longer working durations, reflecting a consistent trend of increasing sleep difficulty with age, gender, and work exposure. (Table 2)

According to our collected data, after the cross tabulation between NDI and PSQI the results we got are:

- 4(6.7%) participants have mild difficulty in sleep with no disability, and 2(33.3%) participants have moderate difficulty in sleep with no disability.
- 1(0.9%) participants have no sleep difference with mild disability, 29(27.4%) participants have mild difficulty in sleep with mild disability, 49(46.2%) have moderate difficulty in sleep with mild disability and 27(25.5%) have severe difficulty in sleep with mild disability.
- With moderate disability, 1(0.7%) participant has no sleep difference, 43(32.1%) participants have mild difficulty in sleep, 49(36.6%) have moderate difficulty in sleep and 41(30.6%) have severe difficulty in sleep.
- With severe disability, 16(18.6%) participants have mild difficulty in sleep, 33(38.4%) have moderate difficulty in sleep and 37(30.6%) have severe difficulty in sleep.
- With complete disability, 3(6.7%) participants have mild difficulty in sleep, 22(48.9%) have moderate difficulty in sleep and 20(44.4%) have severe difficulty in sleep. (Table 3)

Table 1: Neck disability index interpretation * Age, Gender, and Working durations of patient Cross tabulation						
Variable Combination	Description of Relationship	χ^2 / F-value	p-value			
NDI $\times$ Age	Distribution of disability levels across age groups (30–40, 40–50, >50 years)	$\chi^2 = 3.10$	0.375			
NDI $\times$ Gender	Comparison of disability levels between males and females	$\chi^2 = 2.46$	0.473			
NDI $\times$ Working Duration	Association between work duration and disability level	$\chi^2 = 3.28$	0.355			
Table 2: Neck disability index interpretation * Age, Gender, and Working durations of patient Cross tabulation						
Variable Combination	Description of Relationship	χ^2 / F-value	p-value			
PSQI $\times$ Age	Association between sleep disturbance and age	$\chi^2 = 7.39$	0.025			
PSQI $\times$ Working Duration	Association between sleep quality and years of work	$\chi^2 = 9.82$	0.007			
PSQI $\times$ Gender	Comparison of sleep disturbance between males and females	$\chi^2 = 3.28$	0.350			
PSQI $\times$ NDI	Relationship between neck disability and sleep disturbance	$\chi^2 = 11.49$	0.010			
Table 3: Pittsburg sleep quality index interpretation * neck disability index interpretation Cross tabulation						
PSQI Difficulty Level	No Disability	Mild Disability	Moderate Disability	Severe Disability	Complete Disability	Total (%)
Mild Difficulty in Sleep	66.7%	27.4%	32.1%	18.6%	6.7%	25.2%
Moderate Difficulty in Sleep	33.3%	46.2%	36.6%	38.4%	48.9%	41.1%
Severe Difficulty in Sleep	0.0%	25.5%	30.6%	43.0%	44.4%	33.2%
p-value	0.010					

Discussion

This research examined the relationship between cervical radicular pain and sleep issues among patients in Karachi, Pakistan. The results showed a notable connection between the severity of neck disability and problems with sleep. Specifically, 35. 5% of participants reported moderate disability (NDI score: 15– 24), while 41. 1% experienced moderate sleep issues (PSQI score >10). These findings are consistent with previous studies that emphasize the two-way connection between chronic pain and low-quality sleep.^{11,12} A study from 2022 indicated that 57% of patients with chronic neck pain experienced significant sleep issues, supporting our finding that serious cervical problems frequently happen alongside severe sleep difficulties.¹³

The occurrence of sleep disturbance in our group (74. 3% with moderate to severe PSQI scores) is higher than the figures reported in international research, including the study by Artner et al. In a study conducted in 2013, it was found that 42. 2% of patients suffering from chronic neck pain experienced difficulties with sleep[5] . This difference may arise from cultural or job-related reasons in Karachi, where extended work hours (72. 9% of respondents worked for more than 2 years) and restricted access to ergonomic tools

worsen both discomfort and sleep quality.¹⁴ Moreover, we concluded that 43% of patients with severe disabilities experienced significant sleep problems aligns with the findings of Kovacs et al. According to the findings from 2015, individuals suffering from neck pain experience delayed recovery due to inadequate sleep quality.¹⁵

Age-related differences detected in the present study which may be associated with increasing occupational exposure, prolonged postural stress, and degenerative cervical spine changes commonly seen in middle-aged women. These may cause increased nerve root irritation and pain severity, subsequently leading to disturbed sleep patterns. The biological and psychological factor may play an important role in increased association of females. Schwank, A., et al reported in their study that women tend to report higher pain sensitivity and may experience hormonal influences affecting sleep regulation.¹⁶

The cross-sectional design does not allow for conclusions about causality, and using convenience sampling may restrict the applicability of the findings. Additionally, factors such as stress or additional health conditions (for example, obesity) were not taken into account, which may have exaggerated the relationship between pain and sleep.¹⁷ Future long-term studies should investigate

whether early sleep treatments can lower the lasting nature of cervical pain, especially in high-risk populations such as manual workers or individuals who use smartphones for extended periods.¹⁸

Limitation and Recommendation: Primarily the current study leads to participate in regional epidemiological evidence by examining sleep disturbance among patients with cervical radicular pain in a Pakistani population, although such data remain limited. Health care providers might find these results as a tool to understand population-specific factors in effecting disability and sleep quality.

Conclusion

Cervical radicular pain is significantly associated with neck disability and sleep disruption, predominantly affecting female individuals aged 30–40 years. Prolonged working hours and postural stress were major contributing factors.

Conflict of Interest: None

Funding Sources: None

Data Availability Statement: *The datasets generated and/or analysed during the current study are not publicly available due to ethical, legal, and participant confidentiality considerations but may be available from the corresponding author upon reasonable request, subject to institutional approval where applicable.*

Disclaimer: *We as authors want to declare that we used AI-assistant tools in this article for improving language. We authors are fully responsible for the accuracy, originality, integrity, and scientific validity of this article.*

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Author's contribution: ¹⁻³ Substantial contributions to the conception or design of the work for the acquisition, analysis or interpretation of data for the work. ²⁻⁵ Drafting the work or reviewing it critically for important intellectual content, ¹⁻⁵ Final approval of the version to be published, agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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