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ORIGINAL ARTICLE

An Occupational Hazard or Silent Burden: A Cross-sectional Exploration of Non-specific Neck Pain among Physiotherapy Practitioners

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ABSTRACT

Background: Non-specific neck pain is a prevalent musculoskeletal disorder among physiotherapists, particularly associated with prolonged static postures and manual therapy techniques.

Objectives: To assess non-specific neck pain and its correlation with cervical mobility, core strength, posture, functional performance, and scapular asymmetry in practicing physiotherapists.

Methods: In this cross-sectional study, 113 physiotherapists (100 females, 13 males) with minimum 3 years of experience and current neck pain were recruited through purposive sampling. Assessments included cervical range of motion (universal goniometer), core strength (pressure biofeedback), craniovertebral angle (MB-Ruler 5.0 Software), scapular symmetry (Lateral Scapular Slide test), pain intensity (Numerical Pain Rating Scale), and functional performance (Neck Disability Index).

Results: Significant correlations were found between pain intensity and functional disability ($r=0.385$, $p<0.001$), cervical core strength ($r=-0.219$, $p=0.020$), and right lateral flexion ($r=-0.69$, $p=-0.82$). Most participants (51.3%) reported acute episodes of chronic neck pain, predominantly intermittent (70.8%), with prolonged static positioning (56.6%) as the primary risk factor.

Conclusions: Non-specific neck pain in physiotherapists demonstrates significant associations with reduced cervical core strength and functional performance. Pain intensity negatively correlates with cervical range of motion, particularly right lateral flexion, suggesting the need for preventive strategies and postural awareness in clinical practice.

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KEYWORDS

• Neck pain • Physiotherapists • Craniovertebral Angle • Scapular asymmetry • Cross-sectional study

INTRODUCTION

Neck pain is one of the most common musculoskeletal disorders, second to low back pain.[1,2] The prevalence of neck pain in the general population is 48.5% with women more affected than men. Non-specific neck pain is a prevalent musculoskeletal disorder among healthcare professionals, particularly physiotherapists, who often engage in prolonged static postures, repetitive manual therapy techniques, and heavy patient handling tasks. This occupational exposure can lead to various sensorial and motor impairments, including proprioceptive deficits, postural control issues, and cervical muscle dysfunction.[1,3]

In the physiotherapy setting, increased risk of experiencing neck problems has been associated with treating children, performing manual techniques, sustaining positions for long periods, performing repetitive tasks, maintaining abnormal postures for longer time, taking infrequent rest breaks, treating large numbers of patients in one day and transferring heavy equipment or patients.[4] The prevalence of common work-related musculoskeletal neck pain known is around 68% in Indian Physiotherapy population.[5]

While several studies have investigated the prevalence and risk factors of neck pain in the general population, there is limited research specifically focused on the physiotherapy profession.[6,7] Understanding the biomechanical and functional correlates of neck pain in this population is crucial for developing targeted preventive strategies and improving the overall musculoskeletal health of healthcare providers.

Therefore, the primary objective of this cross-sectional study was to assess the associations between non-specific neck pain and cervical mobility, core strength, posture, functional performance, and scapular asymmetry in practicing physiotherapists.

METHODOLOGY

Study Design and Setting

Using a purposive sampling approach, 113 practicing physiotherapists with current non-specific neck pain were recruited. Sample size was calculated using G Power.[3,1,9,2] The inclusion criteria were: currently practicing physiotherapist with minimum 3 years of working experience, age below 59 years, and presence of non-specific neck pain. Participants were excluded if they had any neurological involvement, radicular pain, history of cervical vertebral fracture, cervical malignancy, inflammatory arthritis, cervical spine instability, cervical anomalies, upper limb injury, or were pregnant.

Outcome Measures

The primary outcome measures included:

1. **Cervical range of motion (ROM):** 8 Assessed using a universal goniometer with the participant in a sitting position with thoracic and lumbar spine well supported Stabilization: Shoulder girdle. Fulcrum: Flexion: External auditory meatus Extension: External auditory meatus Rotation: over centre of cranial aspect of head Side flexion: spinous process of C7.
2. **Cervical core strength:** 9 Measured using a pressure biofeedback unit, with the participant instructed to gradually increase the pressure from 20 to 30 mmHg and hold steady for 10 seconds. Muscle strength of the deep neck flexors was recorded when the subject was able to hold steady at final pressure without any deflection.
3. **Cervical posture:** 10 In order to assess Cervical Lordosis, the Craniovertebral Angle was measured. Normal craniovertebral angle is 49.9 degrees. Smaller the craniovertebral angle, more is the forward head posture. Craniovertebral angle (CVA) was

measured using the MB-Ruler 5.0 Software from a lateral view image of the participant in standing.

4. **Scapular symmetry:** 11 Evaluated using the Lateral Scapular Slide Test (LSST) in standing at 0°, 45°, and 90° of humeral abduction. A difference of 1.5 cm or more in any of the 3 positions was considered a positive result of the LSST.
5. **Pain intensity:** 12 Assessed using the Numerical Pain Rating Scale (NPRS). It is a 11 - point scale which ranges from 0-10. The respondent is asked to indicate the numeric value on the segmented scale that best describes their pain. Interpretation is as follows: 0: No pain 1-3: Mild pain 4-6: Moderate pain 7-10: severe pain.
6. **Functional performance:** 12 Measured using the Neck Disability Index (NDI). It is a reliable and valid patient completed, condition specific functional status pain questionnaire with 10 items including pain, personal care, lifting, reading, headache, concentration, work, driving, sleeping and recreation Interpretation is as follows: 0-4 points (0-8%): no disability 5-14 points (10-28%): mild disability 15-24 points (30-48%): moderate disability 25-34 points (50-64%): severe disability 35-50 points (70-100%): complete disability.

Study Procedure:

This cross-sectional study was conducted in a tertiary care hospital setting and physiotherapy outpatient department. The study was approved by the institutional ethical committee (MGM/DCH/IEC/121/2021). At the commencement of the study, patients were assessed for eligibility based on the inclusion criteria from Hospital set up and Physiotherapy clinics in Mumbai, Navi Mumbai and Thane areas. All the participants were explained about the purpose of the study and a written informed consent was obtained prior to study commencement. A total of 215 participants were screened out of which 102 were excluded and 113 were included based on the study criteria.

Baseline data that included their Demographic data and pain history in detail was collected. Occupation history which included Number of working hours in a day, No. of patients treated per day, Speciality, Treatment maneuvers causing or aggravating neck pain was noted. The participants in the study were assessed with the outcome tools mentioned above to explore the extent of their non specific neck pain.

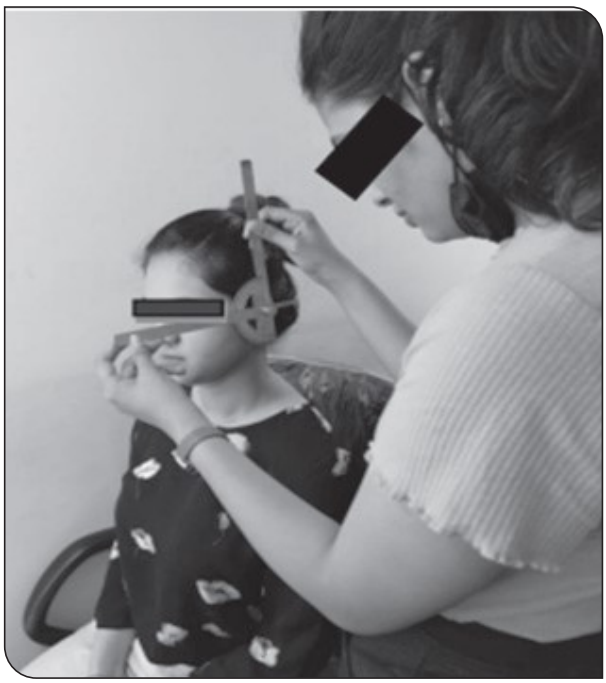

Figure 1: CervicaL ROM assessment using Universal Goniometer

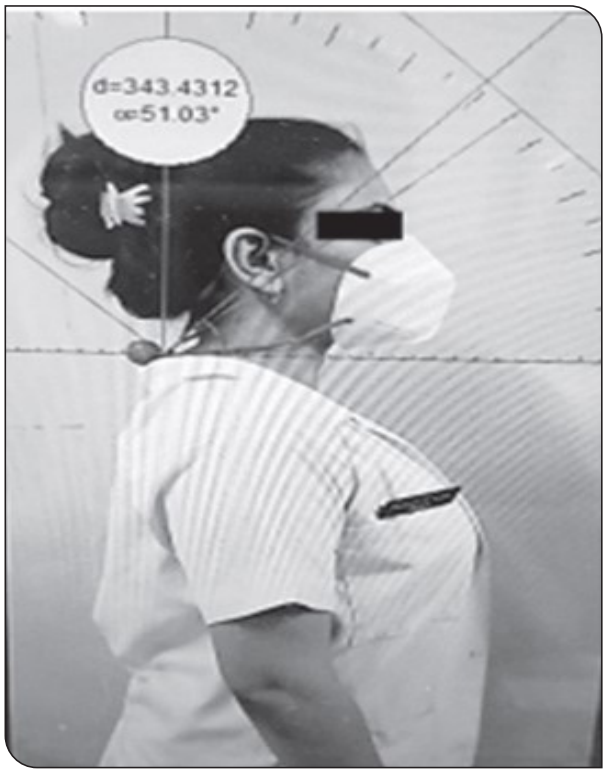

Figure 2: Craniovertebral Angle measurement

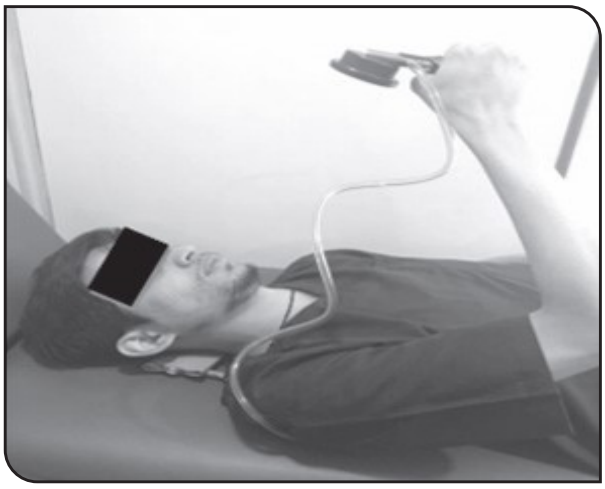

Figure 3: Cervical core strength using Pressure Biofeedback

Statistical Analysis

All statistical analyses were performed using SPSS version 24, and the significance level was set at $p < 0.05$. Median and Interquartile range of continuous variables (independent variable) i.e. Age, years of experience and outcome measures were calculated at 95% confidence interval. Frequency and percentage for the nominal data (dependent variables) i.e. Gender, No. of working hours, Speciality, Duration and frequency of neck pain and Risk factors were calculated. Normality testing was done using Kolmogorov-Smirnov Goodness of Fit Test (K-S Test).

Since the data was not normally distributed, Spearman's correlation coefficients were used to analyze the relationships between pain intensity (NPRS) and the other outcome variables.

The Spearman's correlation coefficient was interpreted as: 13

Very high positive (negative) correlation for .90 to 1.00 (-.90 to -1.00)

High positive (negative) correlation for .70 to .90 (-.70 to -.90)

Moderate positive (negative) correlation for .50 to .70 (-.50 to -.70)

Low positive (negative) correlation for .30 to .50 (-.30 to -.50)

Little if any correlation for .00 to .30 (-.00 to -.30)

RESULTS

Participant Characteristics

The study included 100 females (88.5%) and 13 males (11.5%) with a mean age of 29.8 ± 3.1 years and average experience of 5.7 ± 3.1 years. The majority of participants (54.9%) worked 6-8 hours per day, and 52.9% had a Bachelor of Physiotherapy (BPT) degree. Among the post graduates, 19.5% were associated with the field of Musculoskeletal Physiotherapy.

Table 1: Participant's pain profile

Variables	Frequency	Percent
Duration of neck pain		
Acute	17	15
Subacute	12	10.6
Acute episode on chronic	58	51.3
Chronic	26	23
Frequency of neck pain		
Constant	33	29.2
Intermittent	80	70.8
Risk factors		
Working in same position for longer hours	64	56.6
Performing manual therapy techniques	50	44.2
Not enough rest breaks	48	42.5
Lifting or transferring dependent patients	44	38.9
Working in awkward or cramped position	44	38.9
Lifting or transferring heavy apparatus	36	31.9
Bending or twisting activities	25	22.1

Table 2: depicts the descriptive statistics for the primary outcome variables

Variables	Outcome Measures	Median	Interquartile Ranges
Pain Intensity	NPRS rest	2	2–4
	NPRS activity	6	5 - 7
Cervical Rom	Flexion	40	30-45
	Extension	50	40-60
	Left Side Flexion	35	30-40
	Right Side Flexion	38	32-45
	Left Rotation	62	60-70
	Right Rotation	65	60-75
Cervical Posture	CV angle	49.2	47.1 - 52.1
Functional Performance	NDI	11.1	8 - 15.2
Cervical Strength	Cervical core strength	24	24-26
Scapula Asymmetry	LSST at 0o	1.0	0–1.0
	LSST at 45o	1.0	0.5–1.5
	LSST at 90o	1.0	0.5–1.5

Inference: The study showed that flexion and rotation ranges were restricted with functional performance showing mild disability.

Table 3: Correlation of study parameters with Pain Intensity

	Variable	r	p
Pain Intensity	Range of Motion		
	Flexion	-0.068	0.477
	Extension	-0.69	0.469
	Lateral Flexion left	-0.013	0.892
	Lateral Flexion right	-0.69	-0.082
	Rotation left	-0.030	0.750
	Rotation right	-0.029	0 .758
	Functional Disability	0.385	0.00
	Cervical core strength	-0.219	0.02
	Scapular Asymmetry - 0 degree	-0.069	0.470
	Scapular Asymmetry - 45 degree	0.056	0.554
	Scapular Asymmetry - 90 degree	0.161	0.09
	Cervical Posture	0.039	.680

Inference: The analysis revealed the following significant correlations with neck pain intensity (NPRS):

1. Right lateral flexion: Moderate negative correlation (r = -0.69, p = -0.082)
2. There was moderate negative correlation found between neck pain intensity and cervical extension ROM as p value was 0.469 and r = -0.69
3. Functional performance (NDI): Moderate positive correlation (r = 0.385, p < 0.001)
4. Cervical core strength: Moderate negative correlation (r = -0.219, p = 0.020)
5. No significant correlations were found between pain intensity and craniovertebral angle (r = 0.039, p = 0.680) or scapular symmetry (LSST at all positions, p > 0.05).

DISCUSSION

This cross-sectional study provides perceptivity into the biomechanical and functional factors associated with non-specific neck pain in practicing physiotherapists. The key findings suggest that increased neck pain intensity is associated with reduced cervical core strength, decreased right lateral flexion range of motion, and greater functional disability.

Neck pain and mobility: Haejung Lee in his study proposed that these non-specific neck pain problems result from poor posture, in terms of sustained, long-term, abnormal physiologic loads on the neck. According to their theory, these stresses impair pain-sensitive tissues, which in turn impacts the cervical spine's function and results in a musculoskeletal imbalance in the upper body.[14] We found moderate negative correlation for Lateral flexion to the Right in our study. Pain had a negative correlation with the test results, showing that pain was associated with decreased force production of the neck muscles. Similarly, Kim *et. al* found great variation in neck ROM in patients with neck pain. It has been assumed that painful conditions lead to behavioural changes aimed at avoiding strain and painful movements.[15]

In the present study pain was felt more in extension, as the extensor muscles perform more static work when maintaining the position of the head, as the head's centre of gravity is situated anterior to the cervical spine. The primary contribution to the lateral bend motion came from the motion segments between the head and C3 which was observed as pain location among the majority of participants. During dynamic movement, each cervical motion segment's contribution to head motion varies significantly. This demonstrates that segmental contributions to motion cannot be accurately characterized by restricting the analysis to single data points from the ends of the ROM.[16]

Neck pain and functional performance: We found low positive correlation between pain intensity and NDI score indicating increase in functional disability with increased neck pain. In a similar way, The degree of neck pain and handicap brought on by chronic neck pain varied significantly across the individuals, according to Ylinen *et al.* They anticipated that increased impairment, less muscle strength, and limited range of motion would result from more intense pain. Although there was no discernible relationship between pain and range of motion, they did identify a number of patients with restricted CROM. Additionally, they mentioned that it has been proposed that passive ROM is more dependable than active motion. They concluded that pain is not the cause of decreased range of motion in most directions because the only significant

connections between ROM and pain were found to be weak in extension and lateral flexion.[17]

Neck pain and cervical core strength: Pain was experienced in different directions by different participants showing that there is wide variation in the structures sensitive to strain and mechanical stress. The negative correlation between pain intensity and cervical core strength aligns with previous research, indicating that neck pain may lead to inhibition and reduced endurance of the deep cervical flexor muscles. This pain-weakness cycle likely contributes to the observed impairments in cervical mobility and functional performance.

According to numerous research, persons with neck discomfort exhibit pain-inhibiting behaviour because their deep muscles are smaller. On the other hand, it has been suggested that the superficial muscles overreact in order to make up for the decreased cervical stability. Poor function of the deep muscles to maintain the cervical spine in an ideal posture while a vicious cycle of pain and weakness is developed is the reason for lower endurance capacity in the presence of neck pain.[18,19]

Neck pain and cervical posture: The lack of association between pain intensity and craniovertebral angle suggests that postural parameters may not directly influence the severity of neck pain in this population. This finding contrasts with some earlier studies and highlights the complex interplay between biomechanical factors and pain perception. Oliveira and Silva measured the relationship between neck pain intensity and CVA in adolescence, and the results showed no significant correlation. Beside intensity, there is absence of significant correlations between pain duration and frequency in the previous week and CVA.[20]

Neck pain and Scapula Symmetry: We found no significant difference between the dominant and non dominant side when evaluating scapula position. According to Spearman correlation results of neck pain and LSST at 0 degree, 45 degree shoulder abduction shows no correlation with neck pain in Physical therapists. A study done by Akodo *et al* observed that there was no significant relationship between scapular dyskinesis and craniovertebral angle.[21]

Limitations: The cross-sectional design of this study limits the ability to determine causal relationships between the variables. Additionally, the single-center setting and underrepresentation of male participants may affect the generalizability of the findings. Potential recall bias in self-reported pain history should also be considered.

Future recommendations: The results of this study emphasize the need for regular assessment and targeted rehabilitation of cervical muscle function, particularly the deep cervical flexors, in physiotherapists with non-specific neck pain. Workplace ergonomic modifications, implementation of preventive exercise programs, and ensuring adequate rest breaks during clinical practice may also be beneficial in mitigating the occupational burden of neck pain in this healthcare profession.

CONCLUSION

Non-specific neck pain in practicing physiotherapists demonstrates significant associations with reduced cervical core strength, decreased right lateral flexion range of motion, and greater functional disability. These results highlight how crucial it is to address modifiable biomechanical and functional parameters to optimize musculoskeletal health and prevent the occupational burden of neck pain in this population.

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