

# MOST COMMON TENDER MUSCLE AND ITS ASSOCIATED DISABILITY IN NONSPECIFIC NECK PAIN AMONG TEACHERS

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## ABSTRACT:

The International Association for the Study of Pain (IASP) characterizes pain as a subjective and individualized encounter, encompassing both unpleasant sensory and emotional sensations, which can be linked to real or potential tissue damage, or described in connection to such harm. The majority of neck pain cases lack a precise and identifiable cause, leading to the use of the term "non-specific neck pain." This term excludes neck pain resulting from trauma, cervical radiculopathy, or any specific patho-anatomic origin in the neck region. This study aims to find out the prevalence of most common tender muscle and its corresponding disability in non-specific neck pain in teachers. A descriptive cross sectional study was conducted in different schools and colleges. Data was collected through 21 items survey questionnaire from schools and colleges, which was then analyzed by SPSS version 2022. In this survey study 21 items questionnaire and 377 respondents were included to find the frequency and tenderness of most painful neck muscle. Muscles were palpated manually which resulted that most specific tender neck muscle is right occipital border 284(75.3%). We also used NDI (neck disability index) which suggested that 148(39.3%) were mild(5-14) disable followed by 95(25.2%) no disability(0-4),91(24.1%) moderate disability (15-24),29(7.7%) complete disability(35-higher) and 14(3.7%)severe disability(25-34).

**Key words**

Prevalence, neck pain, tenderness, disability, pain intensity.

**INTRODUCTION:**

According to IASP (International Association for the Study of Pain), pain is an experience that is subjective and unique. It includes both unpleasant sensory and emotional feelings that can be connected to or defined in relation to actual and potential tissue damage. (1)The majority of neck pain cases lack a precise and identifiable cause, leading to the use of the term "non-specific neck pain." This term excludes neck pain resulting from trauma, cervical radiculopathy, or any specific patho-anatomic origin in the neck region. (2)Sometimes, the term "idiopathic neck pain" is employed to indicate that the pain in the neck has no apparent or obvious origin or cause. Most people at some point in their lives suffer from at least one bout of neck pain. (3)More than half of people who have experienced neck discomfort in the past are likely to report having it again in the next one to five years. (4)When comparing the amount of years lived with disability, neck pain comes in fourth place globally. When looking at the overall burden of 291 investigated disorders, it comes in 21st place.(5)The occurrence of neck pain rises with age, reaching its peak during middle age, and then stabilizes or decreases, following a similar pattern as observed with musculoskeletal pain. (6)

Neck pain is widely recognized as the most prevalent health issue related to occupation and a leading cause of work-related morbidity and disability among schoolteachers globally. Schoolteachers belong to an occupational group that frequently experiences prevalent neck pain attributed to the demands and nature of their daily work tasks. (7)Their work tasks frequently involve extended periods of a head-down posture, including frequent reading, marking assignments, and making presentations. Prolonged stress on the cervical muscles can lead to deficiencies in their coordination, activation, and support on cervical structures, resulting in postural disorders, neck pain, and disability. (8)Numerous studies have shown a strong positive link between extended standing, prolonged sitting, incorrect postures, and static postures and the higher incidence of neck pain among educators. (9)According to a different study, a variety of variables, including the kind of school, weight, age, number of kids, and years of teaching experience, were linked to an increase in neck pain. (10)

Women report a higher incidence of neck and musculoskeletal discomfort than men do, suggesting that sex/gender is an individual risk factor for neck pain associated to work. (6)Differences in anatomical and physiological structures are thought to play a role in the

increased incidence of neck pain in women. (11) However, it is important to consider that variations in working conditions and exposure to different risk factors exist between men and women. (12, 13)

The ICF (International Classification of Functioning) Disability and Health has established a core set specifically for back pain but has not yet developed a core set for neck pain. The back pain core set is enhanced with a self-reported checklist to gain deeper insights into the patient's perspective. (14) In the context of Neck Disability Index (NDI), neck pain, a self-estimated questionnaire, demonstrated a strong alignment with the ICF model. A study linking self-rated functional problems with the ICF found that the NDI provided a good fit within the framework. (15) Ehsani et al. (2018) A prevalent problem in many occupations, including teaching, is neck pain (NP). Studies on the incidence of NP and its risk factors, particularly among Iranian school teachers, are scarce, nonetheless. To answer this, 586 randomly chosen primary and high school teachers in Tehran, Iran participated in a cross-sectional study. (16)

Saltychev et al. (2018) in clinical and research contexts, the Neck Disability Index (NDI) is frequently utilized to evaluate persistent neck discomfort. Nevertheless, extensive validity testing is absent from the initial version of this tool, particularly with regard to Item Response Theory. According to the findings, the NDI performed well in differentiating individuals with varying degrees of reported disability, had strong internal consistency, and displayed unidimensional features among patients with chronic neck pain. This study offers insightful information about the validity and reliability of the NDI's original version in evaluating chronic neck pain in a wide range of people. (17)

## **METHODOLOGY**

### **Materials and methods**

- **Study design:** Descriptive cross-sectional study
- **Study settings:** Women institute of rehabilitation sciences
- **Sampling technique:** Convenience sampling technique
- **Sample size:** Sample size was calculated to be 377 through Raosoft software
- **Study duration:** 6 months
- **Inclusion criteria:** Teachers above 25 years of age and with neck pain more than 3 months .
- **Exclusion criteria:** Teachers with CVA(cerebrovascular accident), CVS(cardio vascular system), rheumatoid arthritis, cervical disc, and whiplash injury.

### **Data Collection Procedure**

The approval of presented research proposal was taken from institutional review board with reference number (Ref. No. 1880). The data was collected from schools and colleges fulfilling the eligibility criteria for a study. Before collecting data the study was explained to each participant and consent was taken. The self-administered questionnaire was provided to each participant which they filled themselves. The data was collected from Women medical college Abbottabad, Army burnhall school and college Abbottabad, Modernage public school and college Abbottabad, F.G girls high school Abbottabad, Tameer-i-wattan school and college Abbottabad, beaconhouse school Abbottabad, frontier medical college Abbottabad and Ayub medical college, Abbottabad.

### **Data Analysis procedure**

Data was analyzed through SPSS version 20 after collection. The collected data was coded manually, organized, categorized into percentages and frequency. The descriptive statistical approach was used to find out disability variable. Association was found through NDI (neck disability index).

## **STATISTICAL ANALYSIS:**

### **Demographics:**

A total 377 teachers were included in this study out of which 270(71.6%) were females and 107(28.4%) were males, which shows majority of participants were females.

### **Current level of pain:**

Fig no.1 shows that most frequent current level of pain is mild 198(52.5%), followed by moderate to severe 98(26.0%), very severe 43(11.4%), no pain 23 (6.1%) and worst pain 15 (4.0%).

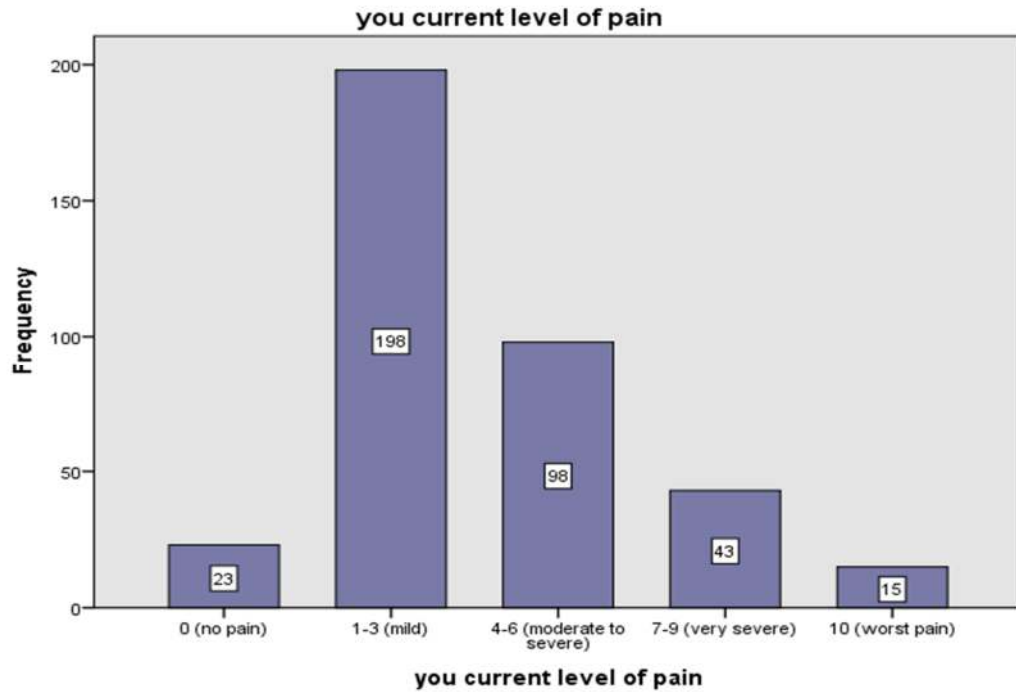


Fig.1: Current level of pain

**Neck pain intensity in previous 3 months:**

Table no 1. Shows that intensity of pain in previous three month 187(49.6%) participants had mild followed by 116(30.8%) moderate,52(13.8%) severe and 22(5.8%) no pain.

**Table no.1: Neck pain intensity in previous 3 months**

	Frequency	Percent	Valid Percent	Cumulative Percent
(no pain)	22	5.8	5.8	5.8
1-3 (mild)	187	49.6	49.6	55.4
4-7 (moderate)	116	30.8	30.8	86.2
8-10(severe)	52	13.8	13.8	100.0
Total	377	100.0	100.0	

**Working hours per day**

Table no.2 shows that 158(41.9%) teachers worked for 6-8 hours followed by 97(25.7%) 4-6 hours, 94(24.9%) more than 8 hours and 28(7.4%) 2-4 hours.

**Table no.2: Working hours per day**

	Frequency	Percent	Valid Percent	Cumulative Percent
2-4 hours	28	7.4	7.4	7.4
4-6 hours	97	25.7	25.7	33.2
6-8 hours	158	41.9	41.9	75.1
more than 8 hours	94	24.9	24.9	100.0
Total	377	100.0	100.0	

**.Intensity of neck tenderness**

Table no.3 tells about intensity of neck tenderness most frequent 197(52.3%) mild followed by 102(27.1%) moderate 52(13.8%) severe and 26(6.9%) no pain

**Table no.3: Intensity of neck tenderness**

	Frequency	Percent	Valid Percent	Cumulative Percent
No	26	6.9	6.9	6.9
Mild	197	52.3	52.3	59.2
moderate	102	27.1	27.1	86.2
severe	52	13.8	13.8	100.0
Total	377	100.0	100.0	

**Frequencies of specific neck muscle tenderness**

Table no.4 shows that most specific tender neck muscle is right occipital order 284(75.3%).

**Table no.4: Frequency table showing specific neck muscle tenderness**

Muscles	Tenderness(Yes)	Tenderness(No)
Right occipital border	284(75.3%)	93(24.7%)
Left occipital border	239(63.4%)	138(36.6%)
Right upper trapezius	250(66.3%)	127(33.7%)
Left upper trapezius	218(57.8%)	159(42.2%)
Right levator scapulae	140(37.1%)	237(62.9%)
Left levator scapulae	126(33.4%)	251(66.6%)
Right neck extensor	166(44.0%)	211(56.0%)
Left neck extensor	114(38.2%)	233(61.8%)
Right supraspinatus	114(30.2%)	263(69.8%)

Left supraspinatus	104(27.6%)	273(72.4%)
Right infraspinatus	87(23.1%)	290(76.9%)
Left infraspinatus	82(21.8%)	295(78.2%)

**Frequency of neck pain**

Table no.5 shows that frequency of neck pain occurs 136(36.1%) occasionally(2-3 times a month) followed by 97(25.7%) rarely(once a month or less),97(25.7%)frequently (1-2 times a week) and 47(12.5%) daily.

**Table no.5: Frequency of neck pain**

	Frequency	Percent	Valid Percent	Cumulative Percent
rarely (once a month or less)	97	25.7	25.7	25.7
occasionally (2-3 times a month)	136	36.1	36.1	61.8
frequently (1-2 times a week)	97	25.7	25.7	87.5
Daily	47	12.5	12.5	100.0
Total	377	100.0	100.0	

**Any treatment for neck pain**

Fig no.2 shows that out of 377 teachers, 252(66.8%) took treatment and 125(33.2%) were untreated.

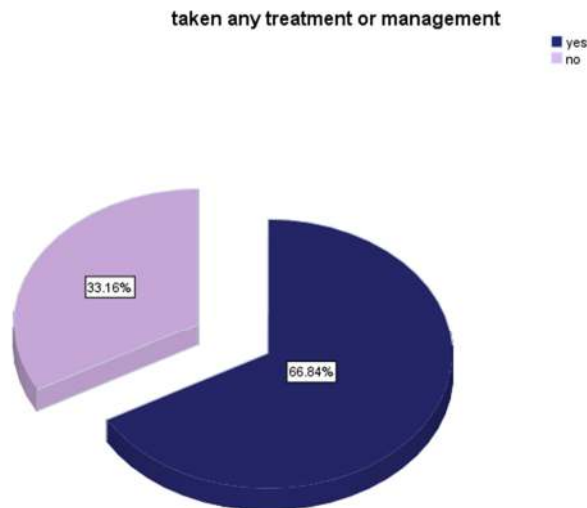


Fig no.2: taken any treatment for neck pain

**Neck Disability Index**

In Table no.6, 148(39.3%) were mild(5-14) disable followed by 95(25.2%) no disability(0-4), 91(24.1%) moderate disability (15-24),29(7.7%) complete disability(35-higher) and 14(3.7%) severe disability(25-34).

**Table no 6: neck disability index**

	Frequency	Percent	Valid Percent	Cumulative Percent
no disability(0-4)	95	25.2	25.2	25.2
mild disability(5-14)	148	39.3	39.3	64.5
moderate disability(15-24)	91	24.1	24.1	88.6
severe disability(25-34)	14	3.7	3.7	92.3
complete disability (35+)	29	7.7	7.7	100.0
Total	377	100.0	100.0	

**Associations**

Table no.7 shows significant correlation between neck pain intensity and neck disability index in concerned population.

**Table no 7: Associations**

		neck pain intensity in previous 3 months	Neck Disability Index
neck pain intensity in previous 3 months	Pearson Correlation	1	.574**
	Sig. (2-tailed)		.000
	N	377	377
Neck Disability Index	Pearson Correlation	.574**	1
	Sig. (2-tailed)	.000	
	N	377	377

**DISCUSSION**

The state of neck discomfort is complicated and impacted by various factors. Both modifiable and non-modifiable risk factors for neck pain have been the subject of numerous general population studies. These factors include advanced age, gender (with a higher frequency among females), a lack of social support, and a history of neck or lower back pain. (1, 2).Given the propensity for neck ache to develop



into a chronic problem, it is crucial to determine its prevalence to facilitate preventive measures and early detection. (2).

Present study was conducted to ascertain the prevalence of most common tender muscle and its corresponding disability in nonspecific neck pain in teachers in Pakistan. Among 377, school teachers 270(71.6%) were females and 107(28.4%) were males. The most common current level of pain, as indicated in fig 1, accounts for 198(52.5%) individuals. This prevalence is notably higher compared to previous studies conducted in Saudi Arabia, where the range of neck discomfort prevalence was 46.1% to 79.2% (3, 4, and 5). Additionally, in Africa, the 12-month prevalence of neck pain surpassed our findings, registering at 57.3% and 64.9%, respectively. (6, 7)

Table no. 1 shows that intensity of pain in previous three month 187(49.6%) is mild followed by 116(30.8%) moderate, 52(13.8%) severe and 22(5.8%) no pain. The findings highlight that neck pain (NP) is a prevalent occupational health concern among school teachers in Pakistan. They also suggest that certain factors related to participants, their health, and working conditions may contribute to a higher prevalence rate in this group. It is noteworthy that there are not many studies on the prevalence of NP in this community. (8, 9, and 10).

It is noteworthy, therefore, that the prevalence of NP in this study is higher than that which has been reported in other nations, such as Brazil (31.6%), China (48.7%) (8), Saudi Arabia (45.2%) (11), Japan (35.4%) (12), and Saudi Arabia (45.2%) (13). There could be a number of reasons for this disparity in NP prevalence rates, such as variances in Pakistan's social, cultural, and economic context from these other nations, or discrepancies in the educational system, research methodology, and facilities and support offered to teachers at their institutions.

In Table 3, the data illustrates that the most frequent level of neck tenderness was observed in 197 individuals, constituting 52.3% of the participants. Moving to Table 5, it is evident that neck pain occurred occasionally, with 136 individuals (36.1%) experiencing it 2-3 times a month. Additionally, fig 2 reveals that a substantial number, 252 participants (66.8%), sought treatment for their neck pain. In light of previous evidence-based research, it was found that tailoring treatment based on physical tests did not demonstrate a significant advantage over non-tailored approaches, particularly in the case of women with mild to severe neck impairment and chronic, nonspecific neck pain. This conclusion holds true, at least with the current decision model and its established cut-off levels. The assessment of disability and symptom frequency in this study was conducted using measures such as Neck Disability Index (NDI) and ProFitMap-neck questionnaire (18). These instruments incorporate questions that are linked to bodily

functions and may influence physical test outcomes differently than merely evaluating pain intensity alone.

In our current study, it is noteworthy that 148 participants (39.3%) exhibited mild disability when it came to non-specific neck pain, as indicated in Table 6. According to Örebro's musculoskeletal pain score, (ÖMPQ) developed in late 1900's, a significant proportion of population, namely 80.1%, experienced disabling pain, while the remaining 19.9% had non-disabling pain. In contrast, a study by Elias et al. in (2019), focusing on primary school teachers in Kenya, found that the majority of teachers had minimal disability, with only a few experiencing moderate or severe disability attributed to low back pain (19, 20). Additionally, as shown in Table 7, our research found a favorable link between the neck disability index and the degree of neck pain. Our recent study revealed that instructors are more likely to suffer from non-specific neck pain handicap when they spend more than two hours a day in a static head-down posture performing duties including reading, paper assessments, scoring, and class preparation. This observation is consistent with research carried out in China (21), implying that extended head-down postures may put stress on neck structures, which could cause pain, discomfort, or tightness in the cervicobrachial area or muscles (22 and 23).

Additionally, our study identified that the right occipital region was the most specific tender neck muscle, with 284 participants (75.3%) reporting tenderness in this area, as indicated in our study results (Table 4). In teachers who experience neck pain, there tends to be a notable decrease in cervical core muscle strength. Specifically, those with higher scores on the neck disability index have reduced cervical muscle strength compared to those with lower scores on the index. The extended hours spent teaching are often a contributing factor to the development of neck pain. Moreover, various cervical spine pathologies can contribute to the development of neck discomfort. These risk factors can be broadly categorized into individual, physical, and psychological factors. A review of the existing literature suggests that neck disorders are frequently linked to abnormal neck postures (24). Another study conducted in Brazil found that among elementary school teachers, pain in the trapezius muscle region was prevalent, with 50.6% on the right side and 52.5% reporting discomfort on the left side.

## **CONCLUSION**

In conclusion, this study showed that NP is a common occupational-related health problem among school teachers in Pakistan. Most of the school teachers were presented with most specific tender neck muscle is right occipital order with mild intensity of neck pain and mild degree of disability when assessed on Neck Disability Index. The study analyzed the significant positive correlation between neck pain intensity and neck disability index. Results have also shown the prevalence and severity of current

level of neck pain, working hours and teaching experiences of male and female school teachers in Pakistan. Most of the teachers have taken treatment for neck pain

### **LIMITATIONS**

While considering the potential benefits of future research, it is important to acknowledge certain limitations in our study.

- Psychological factors, postural assessments, and evaluations of the home and workplace environments were not taken into account.
- These unaccounted-for variables could introduce potential variations in the assessment of the relationship between neck pain (NP) and other factors.
- Due to the cross-sectional nature of the study, we are unable to establish causality or determine cause-and-effect relationships.
- The study had a limited sample size.
- The data was collected from a specific location, which may affect the generalizability of the results.
- Nonetheless, it is important to recognize that this study represents an initial effort to provide meaningful insights into the prevalence of neck pain and tenderness among school teachers in Pakistan.

### **RECOMMENDATIONS**

- Future researches should explore psychological factors, conduct postural assessments, evaluate home and workplace conditions, and establish causal relationships among school teachers.
- There is a pressing requirement for the introduction of programs aimed at promoting a healthy lifestyle, particularly with a focused awareness plan emphasizing prevention and treatment through ergonomic education, regular physical exercise, and the reduction of work-related stress for managing neck pain and neck muscle tenderness.
- Consideration could be given to conducting this study on a larger and more diverse population.
- To assess the prolonged impact of teaching, it might be beneficial to extend the duration of the study. Correlation between neck pain, teaching experience years and working hours can be done.

- In future studies, it would be valuable to investigate the impact of posture on the development of tenderness in neck muscles while teaching.

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