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COMPARATIVE ASSOCIATION OF PAIN AND FUNCTIONAL DISABILITY BETWEEN NURSES AND PHYSIOTHERAPISTS WITH UPPER CROSS SYNDROME

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ABSTRACT:

Muscle imbalances in a particular pattern are the hallmark of Upper Cross Syndrome (UCS), a postural problem. In most cases, it includes the pectoralis major/minor, upper trapezius/levator scapulae, and deep cervical flexors and lower trapezius muscles shortening and tightening, respectively. The objective was to conduct a comparative association of pain and functional disability between nurses and physiotherapists with upper cross syndrome. A cross sectional study was held involving 304 participants; 152 physiotherapists and 152 nurses, from university of Lahore teaching hospital and Jinnah Hospital Lahore. The sample was collected by non-probability convenient sampling technique. The upper cross syndrome was evaluated using Neck disability index (NDI) and numeric pain rating scale (NPRS). The study included 88 (57.9%) physiotherapists and 85 (55.9%) nurses of age less than and equal to 25 years, and the, 79 (52%) of the physiotherapists and 55 (36.2%) nurses had no disability, 48 (31.6%) physiotherapists and 55 (36.2%) had mild disability, 18 (11.8%) physiotherapists and 31 (20.4%) nurses had moderate disability and 7 (4.6%) physiotherapists and 11 (7.2%) nurses had severe disability. The mean NPRS score of physiotherapists was 5.89 ± 1.22 and the mean NPRS score of nurses was 6.39 ± 1.41 . Nurses are more prone to develop higher intensity of neck pain and disability due to work-related Upper Cross Syndrome as compared to physiotherapists. Given that; physiotherapists get advantage from ergonomic training, it's crucial to implement similar interventions for nurses as well as compared to physiotherapists.

Keywords: Functional disability, Musculoskeletal disorders, Nurses, Physiotherapists, Pain, Upper cross syndrome

INTRODUCTION

Muscle imbalances in a particular pattern are the hallmark of Upper Cross Syndrome (UCS), a postural problem. In most cases, it includes the pectoralis major/minor, upper trapezius/levator scapulae, and deep cervical flexors and lower trapezius muscles shortening and tightening, respectively (1). This imbalance frequently results in rounded shoulders, a forward head posture, and possible pain or discomfort in the upper back, shoulders, and neck. People with the illness are typically people who work at computers or do other tasks that require them to sit forward or hunch over for extended periods of time (2, 3).

Other names for upper-crossed syndrome (UCS) include proximal or shoulder girdle crossed syndrome. In UCS, the dorsal side tightness of the levator scapula and upper trapezius intersects with the dorsal side tightness of the pectoralis major and minor. Weakness of the middle and lower trapezius crosses over with ventral weakness of the deep cervical flexors. Joint dysfunction is caused by this pattern of imbalance, especially at the glenohumeral joint, atlanto-occipital joint, cervicothoracic joint, C4-C5 segment, and T4-T5 segment. Muscle imbalance is regarded as abnormal when it affects function. Although the reason of pathological muscular imbalance may or may not be a result of an original traumatic incident, it is often accompanied with dysfunction and discomfort (4, 5).

Upper Cross Syndrome is a worldwide problem that is increasingly common in industrialized nations because of sedentary lifestyles and heavy technology use. It is typical in occupations like office work and nursing that require extended periods of sitting or forward head position. Both sexes are impacted, while some research indicates that males may be somewhat more vulnerable. Because of their heavy reliance on digital gadgets, younger people are experiencing an increasing amount of this condition, which is still noticeable in middle-aged individuals (6). High frequency since using computers and extended sitting both encourage bad posture. Both men and women are prone to UCS, yet some research indicates that males may be marginally more so because of variations in their physical and vocational responsibilities. Significant effects can also befall women, especially if they work in sedentary occupations. Changes in posture brought on by pregnancy and caring for children can potentially cause UCS (7).

The physical demands and postural constraints of their jobs make physiotherapists and nurses especially vulnerable to Upper Cross Syndrome (UCS). Scapular winging, rounded shoulders, forward head position, and hyperkyphosis are typical indications and symptoms that cause discomfort in the upper back, shoulders, and neck. Weakness in the deep cervical flexors, lower trapezius, and serratus anterior muscles corresponds to muscular imbalances that show up as tension in the pectoralis major and minor, upper trapezius, and levator scapulae muscles (8). These medical workers frequently suffer from headaches, decreased strength, and restricted range of motion. While extended shifts, patient lifting, and bedside activities put additional strain on nurses, repeated strain from manual treatment and patient handling exacerbates symptoms in physiotherapists. Ergonomic modifications, consistent exercise to stretch and strengthen

impacted muscles, posture teaching, frequent movement breaks, and stress-reduction tactics to release tense muscles are all examples of effective therapy (9).

A multidisciplinary approach is required for the assessment and diagnosis of Upper Cross Syndrome (UCS) in physiotherapists and nurses. An important part of the process is the physical examination, which involves a detailed postural analysis to detect conditions such as scapular winging, forward head position, rounded shoulders, and hyperkyphosis. Tests of range of motion (ROM) are used to assess the thoracic spine, shoulders, and cervical spine's flexibility and range of motion, highlighting any limitations (10). Methods of observation are equally vital in the diagnosis of UCS. In order to do postural observation, one must evaluate the patient's natural posture in both rest and active stages, noting any imbalances or deviations. Patients can rate the degree of discomfort they are experiencing using the Visual Analog Scale (VAS), while the Neck Disability Index (NDI) gauges the degree of disability and pain associated with neck issues. A goniometer provides accurate information on the flexibility of the cervical, thoracic, and shoulder spines by measuring joint angles and range of motion. By integrating these techniques, medical practitioners may precisely diagnose Upper Cross Syndrome, pinpoint its underlying causes, and provide specialized treatment regimens for nurses and physiotherapists who may be impacted by the illness (11).

Upper Cross Syndrome (UCS) intervention is a multimodal strategy that includes physical therapy, medication, and, in extreme circumstances, surgery. The main goals of pharmacological therapy are to reduce pain and inflammation. NSAIDs, such as ibuprofen or naproxen, are nonsteroidal anti-inflammatory medicines that are frequently recommended to treat pain and decrease inflammation. While strengthening exercises concentrate on weak muscles like the deep cervical flexors, lower trapezius, and rhomboids, stretching activities target tight muscles like the pectoralis major/minor and upper trapezius. Myofascial release and trigger point treatment are two manual therapy procedures that assist reduce muscular tension and increase flexibility. Surgical alternatives may involve decompression of nerve impingements, if present, or corrective measures for severe postural abnormalities. Through the integration of various approaches, healthcare professionals may efficiently address UCS, reduce symptoms, and enhance the quality of life for affected individuals (12, 13).

Upper Cross Syndrome (UCS) is particularly prevalent among nurses and physiotherapists due to the physical demands and postural challenges inherent in their professions. Nurses often engage in tasks that require prolonged standing, bending over patients, and lifting, leading to forward head posture, rounded shoulders, and muscle imbalances characteristic of UCS. Similarly, physiotherapists frequently perform manual therapy techniques and assist patients with movements, leading to repetitive strain and poor postural habits. Both professions are prone to developing muscle tightness in the pectoralis major and minor, upper trapezius, and levator scapulae, while experiencing weakness in the deep cervical flexors, lower trapezius, and serratus anterior. Common signs and symptoms include forward head posture, rounded shoulders, neck and upper back pain, headaches, limited range of motion, scapular winging, and myofascial trigger points (14).

Studying the comparison of work-related Upper Cross Syndrome (UCS) among nurses and physiotherapists is crucial due to the significant impact this condition has on their professional efficacy and overall health. Both professions are characterized by physically demanding tasks

that predispose them to UCS, such as prolonged standing, patient handling, repetitive movements, and maintaining awkward postures for extended periods. Understanding the prevalence and severity of UCS in these two distinct but physically intensive roles can help identify specific occupational risk factors and inform targeted interventions. By highlighting the differences and similarities in how UCS manifests among nurses and physiotherapists, this research can lead to the development of tailored preventive strategies, ergonomic solutions, and therapeutic protocols. Ultimately, this study aims to enhance the well-being of these healthcare professionals, reduce work-related injuries, and improve their ability to deliver quality care to patients, thereby addressing a critical aspect of occupational health in the healthcare sector.(15)

There is a notable gap in the literature regarding direct comparative studies between nurses and physiotherapists in relation to pain and functional disability associated with Upper Cross Syndrome (UCS). Existing research primarily focuses on evaluating prevalence of management of upper cross syndrome in individual professions or broader populations, lacking specific occupational comparisons, between physiotherapists and nurses. Addressing this gap is crucial for understanding profession-specific risk factors and developing targeted interventions to mitigate UCS-related issues effectively, thereby enhancing occupational health outcomes in these critical healthcare roles. This study aims to compare the pain and functional disability experienced by nurses and physiotherapists with Upper Cross Syndrome (UCS). By examining these associations, we seek to identify occupation-specific risk factors and impacts. Understanding these differences will inform targeted interventions and workplace ergonomics to reduce UCS-related issues and improve occupational health outcomes. The findings provide significant insights for tailored preventive strategies in these professions.

MATERIALS AND METHODS

A cross sectional study was held involving 304 participants; 152 physiotherapists and 152 nurses, from Lahore university of Lahore and sehat medical complex Lahore. The sample was collected by non-probability (convenient) sampling technique, according to the sample selection criteria. According to inclusion criteria, Both Genders (Male and female) (16), Age: 23 to 35 years (16), Participants must be currently working as registered physiotherapists or registered nurses (16), participants must have a minimum of one year of clinical experience in their respective profession (16), participants with a working duration of at least 30 hours per week, participants diagnosed with upper cross syndrome from physiotherapists, participants with neck pain rating 1 to 10, according to NPRS (17), patients with neck pain, upper back pain and stiffness from at least 3 months (18) were included in the study. According to exclusion criteria, Pregnant individuals, as pregnancy can influence posture and musculoskeletal health (16), Individuals with a recent musculoskeletal injury affecting the neck, shoulders, or upper back, as this may confound the study results (16), Individuals working in non-clinical settings such as academic institutions, research facilities, or administrative roles (16), Participants with tumor in upper extremity (19), Participants with radiating pain (20), Participants who did not provide consent to participate in the study (20) were excluded from the study.

The upper cross syndrome was evaluated by a professional physiotherapist, functional neck disability was evaluated using Neck disability index (NDI) and neck pain was evaluated using numeric pain rating scale (NPRS). Upper cross syndrome was dependent variable and occupation was independent variable.

The data was collected-physically through a self-administered-demographic-questionnaire, Neck disability index (NDI) and Numeric pain rating scale (NPRS) and then distributed and analyzed using SPSS version 26.0. The continuous-or-quantitative variables were shown using mean and standard deviation tables and graphically through a histogram, while ordinal or qualitative variables were shown using frequency tables and graphically using a bar chart. Association between occupation and different variables was evaluated using chi-square test. The significance value will be $p < 0.05$.

RESULTS

Table 1 shows that 88 (57.9%) physiotherapists and 85 (55.9%) nurses of age less than and equal to 25 years, 47 (30.9%) physiotherapists and 49 (32.22%) nurses of age 26 to 30 years, 17 (11.2%) physiotherapists and 18 (11.8%) nurses of age 31 to 35 years. 74 (48.7%) single physiotherapists, 74 (48.7%) married physiotherapists, and 4 (2.6%) divorced or widowed physiotherapists. The analysis also shows that the study included 58 (38.2%) single nurses, 90 (59.2%) married nurses and 4 (2.6%) divorced or widowed nurses. 1 (0.7%) of physiotherapist and 5 (3.3%) of nurses very severely underweight, 7 (4.6%) of physiotherapists and 8 (5.3%) nurses were severely underweight, 16 (10.5%) of physiotherapists and 8 (5.3%) nurses were underweight, 77 (50.7%) of physiotherapists and 70 (46.1%) nurses were normal, 32 (21.1%) of physiotherapists and 32 (21.1%) nurses overweight, 14 (9.2%) of physiotherapists and 19 (12.5%) nurses were obese class I, 4 (2.6%) of physiotherapists and 9 (5.9%) nurses were obese class II, and 1 (0.7%) of physiotherapist and 1 (0.7%) nurse were obese class III. 82 (53.9%) physiotherapists and 63 (41.4%) nurses had an experience of less than or equal to 5 years and 70 (46.1%) of the physiotherapists and 89 (58.6%) nurses had an experience of more than 5 years. 74 (48.7%) physiotherapists and 57 (37.5%) nurses had a working duration of less than or equal to 6 hours and 78 (51.3%) physiotherapists and 95 (62.5%) nurses had a working duration of more than 6 hours. 94 (61.8%) physiotherapists and 87 (57.2%) nurses took breaks. 79 (52%) of the physiotherapists had no disability, 48 (31.6%) physiotherapists had mild disability, 18 (11.8%) physiotherapists had moderate disability and 7 (4.6%) physiotherapists had severe disability. The analysis also shows that 55 (36.2%) nurses had no disability, 55 (36.2%) nurses had mild disability, 31 (20.4%) nurses had moderate disability and 11 (7.2%) had severe disability.

Table.1 Demographic statistics

Variable	Construct	Physiotherapists		Nurses	
		Frequency	%	Frequency	%
Age	≤ 25 years	88	57.9%	85	59.9%
	26 to 30 years	47	30.9%	49	32.2%
	31 to 35 years	17	11.2%	18	11.8%
Marital status	Single	74	48.7%	58	38.2%
	Married	74	48.7%	90	59.2%
	Divorced/widowed/seperated	4	2.6%	4	2.6%
BMI	Very Severely underweight	1	0.7	5%%	3.3
	Severely underweight	7	4.6	8%	5.3%

	underweight	16	10.5	8%	5.3%
	Normal weight	77	50.7	70%	46.1%
	Overweight	42	21.1	32%	21.1%
	Obese class I	13	9.2	19%	12.5%
	Obese class II	4	2.6	9	5.9%
	Obese class III	1	0.7	1	0.7%
Work experience	≤ 5 years	82	53.9%	63	59.0%
	> 5 years	70	41.4%	89	58.6%
Working duration	≤ 6 hours	74	48.7%	57	37.5%
	> 6 hours	78	62.5%	95	62.5%
Breaks	Yes	94	61.8%	87	57.2%
	No	58	38.2%	65	42.8%
NDI	No disability	79	52%	55	36.2%
	Mild disability	48	31.6%	55	36.2%
	Moderate disability	18	11.8%	31	20.4%
	Severe disability	7	4.6%	11	7.2%

Following figures (Fig. 1, Fig. 2) indicates descriptive statistics of neck disability index in nurses and physiotherapists. The analysis shows that 79 (52%) of the physiotherapists had no disability, 48 (31.6%) physiotherapists had mild disability, 18 (11.8%) physiotherapists had moderate disability and 7 (4.6%) physiotherapists had severe disability. The analysis also shows that 55 (36.2%) nurses had no disability, 55 (36.2%) nurses had mild disability, 31 (20.4%) nurses had moderate disability and 11 (7.2%) had severe disability.

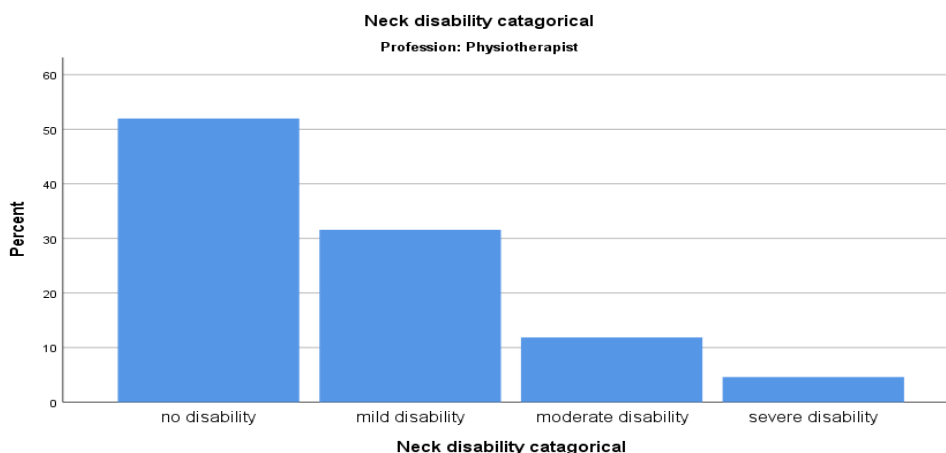


Figure.1 Bar chart showing descriptive statistics of NDI score of physiotherapists

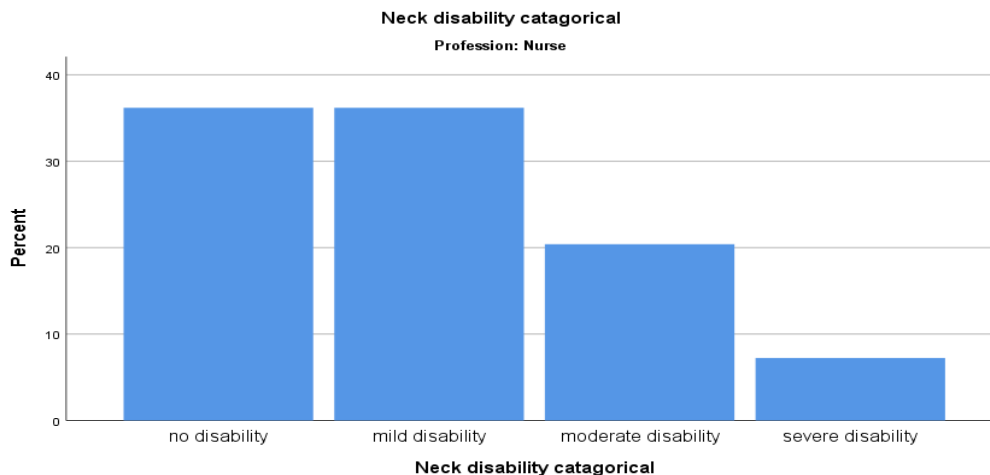


Figure 2: Bar chart showing descriptive statistics of NDI score of nurses

Table 2 shows that physiotherapists have lower average scores on both the Neck Disability Index (13.68) and the Numerical Pain Rating Scale (5.89) compared to nurses, who have higher averages (19.22 and 6.39, respectively). Additionally, there is more variability in scores among nurses, as indicated by the higher standard deviations, suggesting that their experiences of disability and pain vary more widely.

Table 2: NPRS and NDI score of physiotherapists and nurses.

Profession		Mean	Std. Deviation
Physiotherapists	Neck disability Index score	13.68	15.125
	Numerical Pain Rating Scale	5.8882	1.22095
Nurses	Neck disability Index score	19.22	17.446
	Numerical Pain Rating Scale	6.3947	1.41495

Table 3 shows the cross tabulation between work experience, working duration per day, and NDI among nurses and physiotherapists. The significance value ($p = 0.019, 0.032, 0.028$ respectively) shows that the relationship between these variables and Profession (nurses versus physiotherapists) is significant.

Table.3 Chi-square between demographic variables and occupation

Variables	Construct	Frequency		p value
		Physiotherapist	Nurses	
Work experience	≤ 5 years	82	70	0.019
	> 5 years	63	89	
	Total	152	152	
Working duration	≤ 6 hours	74	57	0.032
	> 6 hours	78	95	

	Total	152	152	
NDI	No disability	79	55	0.028
	Mild disability	48	55	
	Moderate disability	18	31	
	Severe disability	7	11	
	Total	152	152	

DISCUSSION

The findings demonstrated that 79 (52%) of the physiotherapists had no disability, 48 (31.6%) physiotherapists had mild disability, 18 (11.8%) physiotherapists had moderate disability and 7 (4.6%) physiotherapists had severe disability. The analysis also shows that 55 (36.2%) nurses had no disability, 55 (36.2%) nurses had mild disability, 31 (20.4%) nurses had moderate disability and 11 (7.2%) had severe disability. The mean NPRS score of physiotherapists was 5.89 ± 1.22 and the mean NPRS score of nurses was 6.39 ± 1.41 . This shows that nurses are more prone to develop higher intensity of neck pain and were more prone to develop neck functional disability due to upper cross syndrome.

Similar studies indicating significant prevalence of upper cross syndrome in physiotherapists were found (4, 16), including G Hussain et al conducted a study in 2023 to assess the prevalence of upper cross syndrome among female physical therapists in the workforce. The study concluded that Upper cross syndrome was shown to be very common (27% prevalence rate) among practicing physiotherapists, according to the study. The frequency was closely correlated with the number of hours and length of employment (16). Both these studies adopted NDI to evaluate disability due to upper cross syndrome, including patients ranging from 23 to 38 years. Both these studies indicated similar findings demonstrating that upper cross syndrome was associated with working duration and work experience, along with this, the present study also found that taking breaks had an insignificant association with pain and disability due to upper cross syndrome. Mariyam Mubashir et al conducted a study in 2021 to find out how common UCS is among Pakistani physiotherapists in the workforce and how UCS and WRMSDs correlate to estimate the burden of musculoskeletal diseases (MSDs). It was determined that the prevalence of UCS in practicing physiotherapists was 27%, with women and those with longer employment histories showing a higher risk of developing UCS (4). This study also employed Neck ODI for evaluation of neck disability in merely physiotherapists of both gender. Both these study demonstrated that a significant frequency of physiotherapists have upper cross syndrome, with 48% of physiotherapists having some sort of disability according to present study, and supporting the fact that work experience had significant impact on upper cross syndrome. However, this study did not evaluate the prevalence of Upper cross syndrome in nurses, this gap was fulfilled in the present study.

Similar studies indicating that nurses are also highly prone to MSK disorders were also found (21, 22), including Flavia D'Agostin et al who conducted a study in 2017 to learn more about how common musculoskeletal diseases (MSDs) are among nurses as compared to university employees. The study demonstrated that the most often reported symptom was lower back pain (61% vs 42.2%), with a substantially greater incidence in nurses. Other common

symptoms were neck pain (48.6% vs 38.4%) and shoulder discomfort (36.7% vs 25.9%). This study, in contrast to the present study, adopted radiological examinations for the evaluation of MSDs, and it did not compare the prevalence of MSK disorders with physiotherapists, nor did it find the risk factors leading to pain and functional disability in both these professions, this gap was filled in the present study, by adopting NDI and NPRS. Another study was conducted by Shu Chuan Lin et al in 2020 to examine the risk factors and occurrence of MSD in different body areas among hospital nurses. The findings indicated that the right shoulder (85.8%), left shoulder (80.9%), neck (62.4%), right wrist (62.2%), and lower back (60.4%) had the highest prevalence of MSD symptoms among the various body areas. Age, exercise routines, and department type are risk factors for shoulder pain. This study, however, did not compare the MSK prevalence with physiotherapists, moreover this study identified different risk factors leading to upper cross syndrome pain and functional disability, i.e. work experience, work duration.

Future research could benefit from employing advanced posture analysis techniques to assess postural deviations between nurses and physiotherapists during various tasks, as well as comparing workloads and task types to pinpoint activities that heighten the risk of Upper Cross Syndrome. Additionally, exploring the impact of psychosocial factors, such as stress and job satisfaction, on the development of Upper Cross Syndrome could provide valuable insights. However, there are limitations to consider: the data was collected through self-reporting questionnaires (NDI and NPRS), which can introduce bias and inaccuracies; many nurses were hesitant to participate due to concerns about job security; and variations in participants' physical fitness and overall health might affect the prevalence and severity of Upper Cross Syndrome.

CONCLUSION

Nurses are more prone to develop higher intensity of neck pain and disability due to work-related Upper Cross Syndrome as compared to physiotherapists. Given that; physiotherapists get advantage from ergonomic training, it's crucial to implement similar interventions for nurses as well. Regardless of awareness and knowledge; physiotherapists also report musculoskeletal pain and disability based on upper cross syndrome. Enhancing ergonomic education and posture awareness in nursing and physiotherapists can mitigate this risk of high disability.

DECLARATION:

Conflict of interest

None.

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