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Research Article

Prevalence of Upper Cross Syndrome and Associated Neck Pain in Lecturers of Private Sector Universities in Peshawar, Pakistan

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Abstract

Upper cross syndrome (UCS) is significantly increased in today's population, especially in lecturers. The condition presents as a posture difficulty caused by hyperactive pectoralis and upper trapezius muscles. The purpose of this study is to determine the prevalence and related risk factors of upper cross syndrome, as well as its relationship with neck discomfort in the lecturers of private sector universities of Peshawar, Pakistan. A cross-sectional descriptive study was conducted on lecturers of private universities in Peshawar, Pakistan. Lecturers having experience of one year or more, both male and female, willing to give informed consent, and lecturers having ages ranging from 25-to 60 years were included. Lecturers having a history of upper body trauma, a history of postural structure deformity, and occupational computer users were excluded. A total of 131 participants were included in the study, 90 participants (68%) were male and 41 (31%) were female. In 56 (42.7%) participants had UCS and the remaining 75 (57.3%) were normal. On the basis of discomfort or pain 57 (43.5%) participants reported having minor neck pain, 53 (40.5%) reported having mild neck pain and 21 (16%) reported severe pain. In conclusion, this study highlights the significant prevalence of UCS among university lecturers in Peshawar's private sector universities, approximately half of the participants were affected by the UCS. P-Value 0.817 shows that there is a weak correlation between UCS and neck discomfort, as evidenced by 43.5% of participants reporting minor neck discomfort and 40.5% experiencing mild neck pain. These results show that postural issues related to UCS are a considerable concern within this population.

Keywords: Pectoralis musculature, Postural Disorder, Neck Disability Index, Upper crossed syndrome, Reedco postural Assessment, Upper trapezius musculature

1. Introduction

Upper Cross Syndrome (UCS), a term coined by the renowned Czech neurologist Dr. Vladimir Janda in the late 20th century, represents a condition characterized by an imbalance in the musculature of the upper body, particularly affecting the neck, shoulders, and thoracic spine. It manifests through a pattern of alternating tight and weak muscles that form a "cross" shape across the body, hence the name. In individuals with UCS, typically, the upper trapezius and levator scapulae muscles are overly tight and strong, while the opposing muscles, such as the deep cervical flexors and the lower trapezius, are weak and underused. This imbalance leads to a forward head posture and increased kyphosis of the upper back, common postural deviations observed in today's increasingly sedentary society (Gillani, Rehman, and Masood 2020).

The prevalence of UCS extends beyond the general population, particularly impacting professions involving prolonged periods of sitting, standing, or repetitive motions (Roshani et al. 2019). Lecturers, who often spend extensive periods preparing and

delivering lectures, grading, and performing research, are at a heightened risk of developing this condition due to their static postures and the demands of their profession. The transition to digital modes of teaching and increased screen time has further exacerbated this risk, making the study of UCS in this population both pertinent and urgent (Sukwika and Harjanto 2024).

In addition to personal health implications, UCS in lecturers has broader institutional ramifications. It can lead to increased absenteeism, reduced productivity, and potentially influence the quality of education delivered. Understanding the prevalence and impact of UCS among lecturers is crucial for developing targeted interventions to mitigate these effects (Naser and Almursheidi 2016).

Patients with UCS often report a constellation of symptoms, including persistent neck and shoulder pain, which may be exacerbated by prolonged sitting or standing in poor postures (Kim et al. 2015). Additionally, the altered scapular mechanics and shoulder alignment can predispose individuals to shoulder impingement symptoms, manifesting as pain or discomfort during arm elevation or overhead activities (Mubeen et al. 2016).

The reduced range of motion in the neck and shoulders, along with the noticeable postural changes, can significantly impact daily activities and quality of life (Bagg and Forrest 1986, Naser and Almursheidi 2016). This involves a comprehensive approach combining postural reeducation, targeted strengthening, and flexibility exercises to correct the underlying muscle imbalances and promote optimal musculoskeletal health (Mujawar and Sagar 2019).

Muscular Imbalance is caused by chronic tightness in the pectoralis and upper trapezius muscles pulls the shoulders forward and elevates the scapulae, while weakness in the lower trapezius and serrates anterior fails to stabilize and retract the scapulae (Kang et al. 2012). Altered biomechanics caused by the forward head posture increases the load on the cervical spine, leading to increased cervical lordosis and potentially contributing to cervical spine pathology over time (Page 2011a).

Conversely, the antagonistic muscles, such as the deep cervical flexors, rhomboids, serrates anterior and lower trapezius, become underactive and weakened. This imbalance compromises scapular stabilization and neck alignment, leading to altered neuromuscular control and joint mechanics (Verma et al. 2018). The altered biomechanics in UCS predispose individuals to a cascade of secondary issues, such as tension headaches, shoulder impingement, and reduced functional capacity of the neck and shoulders (Page 2011b) .

The rise in screen time, from smartphones to tablets, encourages a forward head posture, one of the hallmarks of UCS. Leisure activities that do not promote physical activity or entail prolonged sitting or slouching contribute to the risk factors. Conversely, an active lifestyle that includes exercises promoting muscle balance can serve as a preventive measure against UCS (Heneghan et al. 2018).

Chronic stress can lead to constant muscle tension, predisposing individuals to UCS. Age is another factor, as aging can lead to decreased muscle elasticity and strength, making older adults more susceptible to UCS if they have a history of poor posture or lack of physical activity. However, it's essential to note that UCS is not exclusive to any age group and can affect individuals based on their habits and occupational demands (Tao et al. 2020).

Furthermore, changes in alignment are produced by changes in muscle length and strength, and more substantial changes in muscle neuromuscular variables, such as muscle recruitment (Afridi et al. 2023). In actuality, the presence of dysfunction may induce the motor control unit to change its muscle activation strategy for temporary stability (Hides et al. 2007). The aim and objective of the study were to

Table 1 : Age of the participants.

Participants Age:	
Range:	25-60 years
Mean Age ± Std. Deviation	38.89 ± 9.817 years

Table 2: Investigation of participants for UCS

Response of participants based on REEDCO:	
Range:	Frequency (%)
Yes	56 (42.7)
No	75 (57.3)
Total	131 (100)

determine the prevalence of upper cross syndrome and the association of neck pain with the UCS in lecturers of private sector universities of Peshawar.

2. Methods & Materials

This cross-sectional study was conducted over six months from December 2023 to May 2024 after approval of the Institutional Review Board of City University of Science and Information Technology (CUSIT) Peshawar, Pakistan. The sample size was 131, and sample size (n) is calculated according to the formula: n = [z2 * p* (1 - p) / e2] / [1 + (z2 *p* (1 - p)/ (e2 * N))]. Where: z 1.96 for a confidence level (a) of 95%, p = proportion (expressed as a decimal), N = population size, e = margin of error because of undefined and unknown population of lecturers in Peshawar. Participants were recruited using a convenient sampling technique. Lecturers from private universities in Peshawar, including Sarhad University, Iqra University, Cecos University, Abasyn University, Qurtuba University, and City University, both male and female, aged between 25 and 60, who were willing to provide informed consent, were included in the study. Exclusion criteria included a history of upper body trauma such as recent fractures to related joints and a history of postural structure deformity such as congenital shoulder deformities. After the ethical clearance from the Ethical Review Committee of City University, Peshawar the concerned university was approached for data collection approval. Participants were selected from the universities. The participants were interviewed in staffrooms and offices. Participants were screened keeping the selection criterion in mind. The questionnaire was administered by face-to-face interview individually. Participants were assessed and data was collected through a modified REEDCO posture assessment scale and numeric pain rating scale. Modified REEDCO Posture Score (RPS) is a posture assessment and is graded in coronal and sagittal view in head-to-foot and it is administered by visual inspection of 10 postural traits viewed laterally (sagittal view including neck, upper back, trunk, abdomen, and lower back) or from behind (coronal view including head, shoulder, spine, hips, and ankles. A combined score of 10 or lesst on the REEDCO scale for the region of the upper back, neck, and trunk was considered positive for UCS. The scores are marked as follows: a value of 0 equals poor posture or severe deviation, 5 equal'equals posture or minimal to moderate deviation, and a value of 10 equals good posture. The numeric pain rating scale (NPRS) is a subjective measure in which individuals rate their pain on an eleven-point

Table 3: Numeric Pain Rating Scale and the response of the participants

How severe is your pain on the numerical pain rating scale (NPRS)	
Range:	Frequency (%)
Low Pain 0-3	57 (43.5)
Moderate Pain 4-6	53 (40.5)
High Pain 7-10	21 (16.0)
Total	131 (100)

numerical scale. The scale is composed of 0 (no pain at all) to 10 (worst imaginable pain). Before data collection, verbal and written consent was taken from participants. All the data was confidential. Statistical analyses were done using the software IBM SPSS version 23. The quantitative data were expressed in frequency and percentages and continuous data was expressed as mean and standard deviations. The relationship between two or more categorical variables was analyzed by the Chi-square Test. The level of significance was set at $p<0.05$ for all statistical tests, indicating a statistically significant association between variables if the p-value was less than 0.05.

3. Result

Data from 131 lecturers has been taken among which 90(68.7%) participants were male, and 41(31.3%) participants were female with a mean age of 38.89 years and standard deviation of 9.817 years. Among 131 participants 56 (42.7%) lecturers had UCS and 75(57.3%) were normal. A combined score of 10 or less on the REEDCO scale for the region of the upper back, neck, and trunk was considered positive for the UCS (table 2). In participants (26.0%) people reported having neck marked forward, chin marked out. Around (54.2%) of people reported having their neck slightly forward and chin slightly out. About (19.8%) of people reported their neck erect and chin in the head in balance directly above the shoulders. Among 131 participants (18.3%) people reported having the upper back marked rounded. Around (54.2%) of people reported having their upper back slightly more rounded/flattened. 27.5% of reported having the upper back normally rounded. Around (18.3%) of people reported having a trunk inclined to the rear markedly. In (64.1%) of people trunks inclined to the rear slightly and (17.6%) of people reported an erect trunk. Among 131 participants, 57(43.5%) participants reported mild neck pain, 53(40.5%) participants reported moderate neck pain, while 21(16%) participants reported severe pain. To find out the association between UCS and neck pain, we applied the Chi-square test. The result is not significant due to the P value being greater than 0.05, indicating no significant association between UCS and pain intensity.

4. Discussion

The descriptive cross-sectional study was conducted at several universities in Peshawar. The primary purpose of this study is to determine the incidence of upper cross syndrome and its relationship to neck discomfort among Peshawar instructors in private sector institutions. Only participants who provided consent were included in our research. In this study, we employed the Modified REEDCO posture assessment scale and the numeric pain rating scale (NPRS). (Shahid, Tanveer, and Dustgir 2016) did a study in Pakistan on the prevalence and risk factors for developing Upper-Crossed Syndrome. They chose 244 undergraduate physiotherapists aged 17 to 25 for their research. In their study, 30 to 40 responders reported neck discomfort, flexed

Table 4: Investigation of the association between neck pain and UCS

UCS	*Numeric Pain Rating Scale*				*P-Value*	*Chi-Square*
	Mild	*Moderate*	*Severe*	*Total*	*0.817*	*0.818*
Yes	26	21	9	56		
No	31	32	12	75		
Total	57	53	21	131		

posture, rounded shoulders, and significant thoracic pain (Shahid, Tanveer, and Dustgir 2016). We picked 131 persons for our study, and the results indicated that 42.7% of them had the upper cross syndrome.

Javed et al. (2022) in Pakistan investigated the prevalence of UCS among students. They picked 305 people aged 18 to 25 years. The study's findings revealed that 72.13% of participants had neck stiffness, while 36.07% reported discomfort from overuse (Javed, Fatima, and Jadoon 2022). Our study comprised the lecturers. In our study, 57 out of 131 individuals (43.5%) felt minor neck discomfort. 53 individuals (40.5%) experienced moderate neck discomfort. 21 subjects (16%) felt severe pain. As a result, participants in both experiments reported neck discomfort. As a result, this study provided support for our findings. (Fatima et al. 2022) carried out a study in Pakistan on the prevalence of upper cross syndrome and accompanying postural abnormalities. In their study, they chose both genders aged 25-50 years who are prone to excessive computer use. Their study found that 66.04% of computer users reported upper back discomfort and 73.72% had neck pain (Fatima et al. 2022). However, in our study, we also looked at the prevalence of upper cross syndrome. Our study found that 16% of participants experienced significant neck discomfort. Consequently, individuals in both experiments had neck discomfort. As a result, this study provided support for our findings. (Murali 2021) in India investigated the prevalence of UCS among software workers. They chose 106 patients between the ages of 20 to 40 years who could work for at least three hours. The study's findings revealed a frequency of 55.6% among participants (Vijayakumar, Varatharajan, and Paul 2020). In this study, we focused on the prevalence of upper cross syndrome among lecturers. Our survey found that 42.7% of lecturers suffered from upper cross syndrome. As a result, this investigation validated our findings. Adeela Asad et al. (2021) did a study in Pakistan on the association between upper crossed syndrome and posture in the general population suffering from neck discomfort in Islamabad. They chose both male and female volunteers with neck discomfort for their study. The study's findings revealed that upper cross syndrome affected 24.1% of participants (Asad et al. 2021). In our study, we also looked into upper cross syndrome in lecturers, and the results revealed that 56 (42.7%) of them suffered from it. As a result, this study provided support for our findings.

The findings of our study are corroborated by other studies as well. Yang and Cho investigated musculoskeletal complaints and related risk factors among office workers who worked long hours on computers in China (Yang and Cho 2012). A total of 254 respondents returned the questionnaire, and 203 satisfied the inclusion criteria. The findings revealed that computer users experienced musculoskeletal complaints in the shoulder (73%), neck (71%), and upper back (60%) regions. In our study, we looked at neck discomfort among lecturers as well as upper cross syndrome. Our study found that 56 (42.7%) of the 131 lecturers had the UCS, whereas 75 (57.3%) were normal. Of the 131 individuals, 57 (43.5%) experienced minor neck discomfort. 53 individuals (40.5%) experienced

moderate neck discomfort. 21 subjects (16%) felt severe pain. Therefore, our study results are consistent with similar studies conducted in the region in the past.

This study has a few limitations. The study was conducted in only a few universities in Peshawar, which may not represent the entire lecturer population in the area. Therefore, caution should be exercised in generalizing the findings to a broader context. The study did not account for certain confounding factors that might have influenced postural deviations and associated outcomes, such as individual physical fitness levels, job demands, and ergonomic factors. The omission of these factors may limit the accuracy of the findings. The statistical analysis primarily relied on chi-squared tests, which may not capture the full complexity of the relationships between variables. Additional statistical techniques could have provided a more comprehensive analysis of the data.

5. Conclusion

We concluded that the association between UCS and neck pain was not significant. However, these findings reveal that UCS is a prevalent condition within this demographic. A significant proportion of participants were found moderately or severely affected though almost all of the lecturers presented with some kind of neck pain.

Conflict of Interest

All the authors declare no conflicts of interest.

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Study Approval

This study was approved by the Institutional Review Board of the City University of Science and Information Technology (CUSIT) Peshawar, Pakistan.

Consent Forms

Every participant signed a consent form before participating in the research.

Authors Contributions

BMA, NT, and MZ conceptualized the study and wrote the initial manuscript, AZ, SS, and IN helped with the literature search, analysis, and writing the first draft, QH, and NT did the data collection and review of the studies, and BMA supervised the whole project and wrote the final manuscript.

Data Availability

All the data relevant to this study is with the authors.

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