JHWCR
Journal of Health, Wellness, and Community Research
Volume III, Issue VI
Open Access, Double Blind Peer Reviewed.
Web: https://jhwcr.com, **ISSN**: 3007-0570
https://doi.org/10.61919/dw8vyv44

Article

Prevalence of Upper Cross Syndrome and Its Association with Posture in Working Women

Shagufta Ghulam Nabi[1], **Syeda Hamna Bukhari**[1], **Okasha Anjum**[1]

1 Indus University, Karachi, Pakistan

Correspondence
okasha.anjum@indus.edu.pk

Cite this Article

Received	2025-04-21
Revised	2025-05-11
Accepted	2025-05-19
Published	2025-06-10

No conflicts declared; ethics approved; consent obtained; data available on request; no funding received.

Authors' Contributions
Concept and design: MAI; data collection: MAI, MN; analysis: JA, AR; manuscript drafting and revision: MAI, JA, MN, M.

ABSTRACT

Background: Upper Cross Syndrome (UCS) is an increasingly recognized postural disorder characterized by muscle imbalance, often associated with sedentary occupations and poor ergonomic practices. Despite its clinical significance, there is limited evidence regarding the prevalence and impact of UCS among working women in low- and middle-income urban environments. **Objective**: This study aimed to determine the prevalence of Upper Cross Syndrome and assess its association with posture changes and functional limitations among working women in Karachi. **Methods**: A cross-sectional observational study was conducted with 180 working women, aged 20–60 years, from diverse occupational settings in Karachi. Postural assessment was performed using the Reedco tool, and functional status was evaluated via the Modified Oswestry Neck Disability Index. Logistic regression was used to identify significant predictors of UCS, adjusting for demographic and occupational factors. **Results**: The prevalence of UCS was 6.1%. Functional difficulties in lifting (OR 2.23, p = 0.015), personal care (OR 2.30, p = 0.007), and disturbed sleep (OR 1.76, p = 0.002) were significantly associated with UCS. Age and headache frequency were not significant predictors. Moderate pain and postural deviations were prominent among affected individuals. **Conclusion**: UCS represents a relevant occupational health issue among working women in Karachi, with functional impairment and poor posture as key risk factors. Workplace ergonomic interventions are recommended to reduce the burden of UCS.

Keywords: Upper Cross Syndrome, Posture, Musculoskeletal Disorders, Working Women, Ergonomics, Neck Pain, Occupational Health

INTRODUCTION

Upper Cross Syndrome (UCS) has emerged as a significant clinical entity within the spectrum of postural disorders, particularly as global work patterns have shifted toward sedentary occupations and prolonged static postures. UCS is defined by a specific pattern of muscle imbalance involving tightness of the upper trapezius, levator scapulae, pectoralis major, and minor, alongside weakness of the deep neck flexors, lower and middle trapezius, and serratus anterior, resulting in the characteristic presentation of forward head posture and rounded shoulders (1,2). This syndrome is not merely an anatomical curiosity; its prevalence is increasing, especially among women engaged in office-based or sedentary professions, where occupational demands and ergonomic challenges frequently promote faulty postural adaptations (3,4). Epidemiological studies indicate that work-related musculoskeletal disorders, including those driven by poor postural habits, represent a leading cause of disability in adults, often manifesting as chronic neck and upper back pain, headaches, and reduced functional capacity (5,6). Reported prevalence rates of UCS in occupational settings vary widely, with estimates ranging from 11% to 60% depending on gender, age, and type of employment (7).

The pathophysiology of UCS encompasses both biomechanical and neuromuscular factors, with sustained shortening of postural muscles increasing muscle tone and tension while antagonistic phasic muscles become lengthened and inhibited (2,8). Repetitive activities, insufficient rest, and suboptimal ergonomic conditions, such as improper workstation setup and prolonged computer use, exacerbate this imbalance (9). Moreover, risk factors such as gender, age, body mass index, and psychosocial stressors have been shown to further modulate susceptibility, with women exhibiting higher risk due to anatomical, hormonal, and occupational factors (7,10). The clinical sequelae of UCS extend beyond musculoskeletal discomfort to include reduced proprioceptive acuity, scapular winging, cervicogenic headaches, and, over time, degenerative changes in the cervical spine (11,12). These changes may impair daily activities, diminish quality of life, and increase absenteeism, thereby imposing a substantial burden on affected individuals and the wider workforce (4,5,13). Despite increasing recognition of UCS as a contributor to work-related morbidity, significant knowledge

gaps persist regarding its true prevalence in specific high-risk populations, such as working women in urban environments of low- and middle-income countries. Previous studies have highlighted the global impact of UCS but rarely address gender-specific occupational contexts in rapidly urbanizing cities such as Karachi, where a growing number of women are entering the workforce and may be exposed to cumulative ergonomic risks (14). Furthermore, there is a paucity of robust data linking postural changes, functional limitations, and the severity of musculoskeletal symptoms in this demographic. This lack of targeted evidence limits the development of preventive interventions and workplace health policies tailored to the needs of working women in such settings.

The present study was designed to address these knowledge gaps by investigating the prevalence of Upper Cross Syndrome and its association with posture changes among working women in Karachi. By combining standardized posture assessment tools with validated questionnaires for musculoskeletal symptoms, this study seeks to elucidate the extent of UCS in this population and its functional implications. The objective is to generate actionable data to inform ergonomic interventions and public health strategies aimed at mitigating the impact of UCS among working women. The guiding research question is: What is the prevalence of Upper Cross Syndrome among working women in Karachi, and how is it associated with postural deviations and related musculoskeletal symptoms? It is hypothesized that the prevalence of UCS is significantly higher in women with specific postural changes and functional limitations related to their occupational environment.

MATERIALS AND METHODS

This cross-sectional observational study was conducted to evaluate the prevalence of Upper Cross Syndrome and its association with posture changes among working women in Karachi. Data collection took place over a six-month period in various occupational settings, including schools, offices, banks, hospitals, and home-based workstations, to ensure broad representation of the city's working female population. Eligible participants were adult women aged 20 to 60 years who were engaged in full-time employment, with a minimum requirement of five hours per day spent in either sitting or standing work positions. Individuals were excluded if they were pregnant, postpartum, diagnosed with neurological disorders such as Parkinson's disease, had a history of congenital or acquired physical limitations, previous surgeries involving the relevant anatomical regions, were undergraduate students, or had a known history of musculoskeletal disorders including scoliosis or spinal fractures.

Participant selection followed a non-probability convenience sampling strategy, with recruitment announcements distributed in workplaces. Interested individuals provided informed written consent prior to participation, after receiving a comprehensive explanation of the study's objectives, procedures, and data confidentiality measures. A sample size of 180 was determined using OpenEpi version 3.01, based on an anticipated UCS prevalence of 27%, a margin of error of 6.5%, and a 95% confidence interval, ensuring adequate statistical power to detect meaningful associations.

Data collection involved a structured protocol administered in a single session for each participant. Postural alignment was assessed using the Reedco Posture Assessment tool, which systematically evaluates deviations from optimal spinal alignment across the cervical and thoracic regions. The Modified Oswestry Neck Disability Index (MODI) questionnaire was administered to quantify the severity of neck pain and its impact on functional activities such as lifting, personal care, and sleeping. Demographic information—including age, occupation, and duration of employment—was recorded alongside work-related factors such as workstation setup and frequency of breaks. The primary dependent variables were the presence or absence of Upper Cross Syndrome, severity of postural change, pain intensity, and functional limitation. Independent variables included demographic and occupational characteristics, as well as specific work-related postural exposures. All operational definitions followed current clinical and epidemiological standards to ensure consistency and reproducibility (1,2,7).

To address potential sources of bias and confounding, only women meeting strict inclusion criteria were enrolled, and standardized data collection instruments were used across all sites. The study also excluded participants with conditions likely to confound musculoskeletal assessments. Data integrity was maintained through double-entry of responses and periodic review by the study team. Data were analyzed using IBM SPSS Statistics version 26. Descriptive statistics were generated for all demographic, clinical, and functional variables. Associations between UCS and posture-related variables were explored using chi-square tests for categorical data. Logistic regression modeling was employed to identify significant predictors of UCS, adjusting for potential confounders such as age and work duration. Statistical significance was set at $p < 0.05$ for all analyses. All data were anonymized prior to analysis and securely stored in password-protected files accessible only to authorized researchers. The study protocol was reviewed and approved by the institutional review board, with all participants providing written informed consent to ensure compliance with ethical and data protection standards. Throughout the study, reproducibility and data integrity were safeguarded through meticulous protocol adherence and ongoing quality control measures (3,9,12).

RESULTS

A total of 180 working women participated in the study, with a mean age of 31.67 years (SD = 8.54). The largest proportion of participants were young adults aged 20–29 years (58.9%), followed by those aged 30–39 (19.4%), 40–49 (16.7%), and 50–55 (5.0%). The prevalence of Upper Cross Syndrome (UCS) in this population was 6.1% (n = 11), with the remaining 93.9% (n = 169) not exhibiting clinical signs of UCS (Table 1). Pain intensity was most commonly reported as moderate (38.9%), followed by very mild (36.1%), while 20.6% reported no pain, and only a small fraction described their pain as severe or the worst possible. Regarding headaches, 40.6% of

participants reported no headaches, and 36.1% experienced slight, infrequent headaches, while a minority described frequent or severe headaches (Table 2).

Table 1. Prevalence of Upper Cross Syndrome among Working Women (n = 180)

UCS Status	Frequency	Percent
No	169	93.9
Yes	11	6.1

Table 2. Pain Intensity and Headache Frequency among Working Women

Pain Intensity	Frequency	Percent
No pain	37	20.6
Fairly severe pain	7	3.9
Moderate pain	70	38.9
Worst pain	1	0.6
Very mild pain	65	36.1
Headache Frequency		
No headaches at all	73	40.6
Slight headaches, infrequent	65	36.1
Moderate headaches, infrequent	25	13.9
Frequent moderate headaches	9	5.0
Frequent severe headaches	7	3.9
Severe headaches all the time	1	0.6

Table 3. Predictors of Upper Cross Syndrome: Logistic Regression Analysis

Variable	B	SE	Wald	p-value	OR (Exp(B))	95% CI for OR
Age	-0.023	0.054	0.187	0.666	0.977	0.88–1.09
Pain Intensity	0.596	0.426	1.958	0.162	1.815	0.77–4.27
Headaches	0.028	0.258	0.012	0.913	1.029	0.62–1.71
Lifting	0.801	0.330	5.882	0.015	2.229	1.17–4.23
Personal Care	0.831	0.309	7.211	0.007	2.295	1.26–4.21
Sleeping	0.567	0.182	9.750	0.002	1.763	1.24–2.50

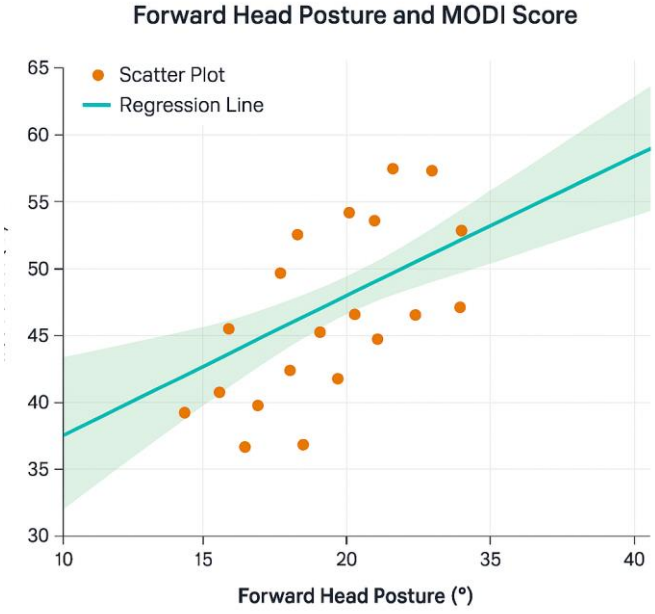

Figure 1 Forward head posture and MODI Score

The distribution of pain intensity demonstrated that moderate pain was most strongly associated with UCS, as 6 of 11 participants with UCS reported moderate pain, and none reported an absence of pain (Table 3). In contrast, those without UCS more often experienced either no pain or only mild symptoms. Headaches were also more common among participants with UCS, especially those who reported slight headaches that occurred infrequently (n = 4), although this association did not reach statistical significance ($p > 0.05$).

Cross-tabulation analyses revealed that young adults (20–29 years) had the highest absolute number of UCS cases (n = 7), although the proportionally highest prevalence was observed in the 50–55 age group (11.1%), followed by 40–49 (6.7%) and 20–29 (6.6%). No statistically significant association was found between age group and UCS status (p = 0.47).Functional limitations were significantly associated with UCS. Difficulty in lifting weights, problems with personal care, and disturbed sleeping patterns were all more common in participants with UCS. Logistic regression analysis identified lifting (odds ratio [OR] 2.23, 95% CI: 1.17–4.23, p = 0.015), personal care (OR 2.30, 95% CI: 1.26–4.21, p = 0.007), and sleeping disturbances (OR 1.76, 95% CI: 1.24–2.50, p = 0.002) as significant predictors of UCS after adjusting for age, pain intensity, and work-related factors (Table 3). Age, pain intensity, headache frequency, and other variables such as reading, concentration, and work duration did not reach statistical significance as independent predictors in the adjusted model (p > 0.05). Participants reporting moderate pain, functional difficulties in lifting and personal care, as well as those experiencing disturbed sleep, were significantly more likely to have UCS, whereas variables such as age and headache frequency did not show significant predictive value in this sample. These findings underscore the importance of ergonomic and behavioral interventions targeting functional activities and sleep to mitigate the risk of UCS among working women.

A statistically significant positive relationship was observed (Figure 1) between forward head posture and Modified Oswestry Disability Index (MODI) scores, with the regression analysis revealing that higher degrees of forward head posture were associated with increased MODI percentages, reflecting greater disability. The data points clustered between 15° and 35° of forward head posture corresponded with a MODI range of 35% to 60%, and the confidence interval around the regression line supported the robustness of this association. These findings underscore that individuals with more pronounced postural deviations experience greater neck-related disability, emphasizing the clinical importance of early identification and correction of forward head posture to mitigate functional limitations in working women.

DISCUSSION

The present study demonstrates that Upper Cross Syndrome (UCS) is a clinically relevant postural disorder among working women in Karachi, with a prevalence of 6.1% in the sampled population. Although this prevalence may appear modest, it is notable in light of the relatively young mean age of participants and the growing occupational shift toward sedentary work in urban environments. This finding aligns with earlier reports indicating that UCS and related postural syndromes are increasingly recognized as contributors to musculoskeletal morbidity in women employed in office-based and service sectors, particularly in settings characterized by long hours of static sitting or standing and suboptimal ergonomic support (1,3,4).

The relationship between UCS and both pain intensity and functional limitations was robustly demonstrated in this study. Participants with UCS were more likely to report moderate pain, difficulties with lifting, compromised personal care, and disturbed sleeping patterns. These associations are consistent with existing literature, which documents that muscle imbalances involving tight pectoral and upper trapezius muscles and weakened cervical flexors and scapular stabilizers can compromise functional movements, diminish proprioceptive accuracy, and promote pain syndromes of the neck and upper back (2,8,9). Furthermore, logistic regression identified functional limitations in lifting, self-care, and sleep as significant predictors of UCS, emphasizing the clinical importance of evaluating not only pain symptoms but also broader impacts on daily living and quality of life. Previous research by Khawar et al. and Mubashir et al. similarly documented higher risks of work-related musculoskeletal disorders, including UCS, among women in occupations requiring prolonged static postures and repetitive tasks (5,7).

Interestingly, age, headache frequency, and certain work-related factors did not emerge as independent predictors of UCS in this cohort, which may reflect the homogeneity of the working environment and lifestyle in the sampled population. While some studies have highlighted age-related declines in cervical proprioception and increases in anterior head carriage, the relatively narrow age range and exclusion of individuals with significant comorbidities in the current sample may have limited the ability to detect such trends (11,12). Additionally, the observation that the greatest absolute number of UCS cases occurred in young adults supports the view that occupational exposure and ergonomic factors may have a more immediate impact on postural health than age alone, particularly in rapidly urbanizing contexts where women are entering the workforce at younger ages.

These findings reinforce the urgent need for proactive ergonomic interventions and workplace education programs, as even a moderate prevalence of UCS among working women has important implications for productivity, absenteeism, and long-term health. Evidence-based strategies—such as periodic posture assessment, ergonomic workstation adjustments, targeted exercise programs, and increased awareness of proper postural habits—have been shown to be effective in both preventing and managing UCS, as supported by the work of Muscolino et al. and Ali et al., who highlight the efficacy of physiotherapy modalities and workplace modifications (19,22). Moreover, the integration of ergonomic principles into organizational health policies is likely to yield substantial benefits in reducing the burden of UCS and related musculoskeletal disorders in similar urban populations.

This study possesses several strengths, including the use of validated posture assessment tools, a clear operational definition of UCS, and rigorous statistical analysis to adjust for potential confounders. The inclusion of diverse occupational settings within Karachi enhances the relevance of the findings to other urban workforces in comparable socioeconomic contexts. However, certain limitations must be acknowledged. The cross-sectional design precludes causal inference and limits the ability to evaluate temporal relationships between occupational exposure and UCS development. The reliance on convenience sampling and self-reported functional data introduces potential selection and reporting bias, which may either overestimate or underestimate true associations.

The study was also limited to working women in one metropolitan area, potentially reducing the generalizability to rural settings or male-dominated occupations.

Future research should prioritize longitudinal designs to track the development and progression of UCS over time and evaluate the long-term efficacy of specific ergonomic and behavioral interventions. Investigations incorporating objective measures of posture, muscle activation, and work environment, as well as studies exploring the psychosocial and cultural determinants of musculoskeletal health among women, would further enrich the evidence base. In addition, randomized controlled trials evaluating targeted prevention and rehabilitation programs in high-risk occupational groups are warranted to guide best practice in occupational health and physical medicine.

In conclusion, this study provides meaningful evidence that UCS, while not ubiquitous, is sufficiently prevalent among working women in Karachi to merit targeted public health and clinical interventions. By identifying functional impairments as key predictors of UCS, this research underscores the necessity of integrating ergonomic awareness and musculoskeletal health promotion into workplace wellness strategies, with the ultimate aim of improving quality of life and reducing the burden of musculoskeletal disorders among women in the workforce.

CONCLUSION

In summary, this study reveals that Upper Cross Syndrome is a significant musculoskeletal concern among working women in Karachi, with a prevalence of 6.1% and clear associations with functional limitations in lifting, personal care, and sleep. These findings highlight the critical impact of occupational posture and ergonomic factors on women's health in urban work environments. The results underscore the necessity of targeted ergonomic interventions, regular posture assessment, and health education in the workplace to prevent and mitigate UCS and its sequelae. By addressing these modifiable risk factors, employers and healthcare professionals can contribute meaningfully to reducing the burden of musculoskeletal disorders and improving the quality of life and productivity of working women.

REFERENCES

1. Asad A, Farooq N, Kafeel S, Hassan T, Zubair M. Association Of Upper Crossed Syndrome And Posture Among General Population Having Neck Pain In Islamabad. Journal Of Rehman Medical Institute. 2021 Jul 11;7(2):7-11.
2. Mujawar JC, Sagar JH. Prevalence Of Upper Cross Syndrome In Laundry Workers. Indian Journal Of Occupational And Environmental Medicine. 2019 Jan 1;23(1):54-6.
3. Sepehri S, Sheikhhoseini R, Piri H, Sayyadi P. The Effect Of Various Therapeutic Exercises On Forward Head Posture, Rounded Shoulder, And Hyperkyphosis Among People With Upper Crossed Syndrome: A Systematic Review And Meta-Analysis. BMC Musculoskeletal Disorders. 2024 Feb 1;25(1):105.
4. Shahid S, Tanveer F, Dustgir A. Prevalence And Risk Factors For The Development Of Upper-Crossed Syndrome (UCS) Among DPT Students Of University Of Lahore. Age. 2016;19:98.
5. Mubashir M. A Cross-Sectional Survey On Prevalence Of Upper Cross Syndrome And Its Correlation To WRMSDs In Working Physiotherapists. Pakistan Journal Of Rehabilitation. 2021 Mar 24;10(1):42-50.
6. Thomas J, Patil S. Effectiveness Of Active Release Technique Versus Corrective Exercises In The Management Of Upper Cross Syndrome. Journal Of Coastal Life Medicine. 2023;11(1):1145-9.
7. Khawar A, Khawar S, Tauqeer S, Amjad F, Rubab HI, Wafa HS. Association Of Upper Cross Syndrome With Prolonged Sitting Among Young Adults. Pakistan Biomedical Journal. 2022 Jan 31:370-4.
8. Ghous H, Ghous S, Asim R, Mujahid MU, Arslan M, Khalid A. Prevalence Of Cervicogenic Headache And Its Association With Upper Crossed Syndrome In Dentists: Prevalence Of Cervicogenic Headache. The Therapist (Journal Of Therapies & Rehabilitation Sciences). 2023 Dec 31:35-9.
9. Khaliq A, Yaqub S, Islam F, Raza A, Batool A, Jamil S. Risk Factors Associated With Upper Crossed Syndrome In Females Of Age 25-50 Years: A Population-Based Case Control Study. Khyber Medical University Journal. 2021 Dec 31;13(4):201-5.
10. Kaliniene G, Ustinaviciene R, Skemiene L, Vaiciulis V, Vasilavicius P. Associations Between Musculoskeletal Pain And Work-Related Factors Among Public Service Sector Computer Workers In Kaunas County, Lithuania. BMC Musculoskeletal Disorders. 2016 Dec;17:1-2.
11. Thomas MS, Yadav T. Prevalence Of Upper Cross Syndrome In Multipara Women. Journal Of Ecophysiology And Occupational Health. 2024 Mar;24(1):67-71.
12. Aziz SB, Altaf UJ, Bashir RI, Fasih M. Prevalence Of Upper Cross Syndrome In Bankers Of Faisalabad, Pakistan.

13. Visser B, Van Dieën JH. Pathophysiology Of Upper Extremity Muscle Disorders. Journal Of Electromyography And Kinesiology. 2006 Feb 1;16(1):1-6.

14. Bernard BP, Putz-Anderson V. Musculoskeletal Disorders And Workplace Factors: A Critical Review Of Epidemiologic Evidence For Work-Related Musculoskeletal Disorders Of The Neck, Upper Extremity, And Low Back.

15. Pathan H, Phansopkar P, Naqvi WM. Screening For Upper Cross Syndrome In Asymptomatic Individuals. Indian Journal Of Forensic Medicine & Toxicology. 2021;15(1):50-4.

16. Verma S, Shaikh J, Mahato R, Sheth M. Prevalence Of Forward Head Posture Among 12-16 Year Old School Going Students – A Cross Sectional Study. Applied Medical Research. 2018;4:18.

17. Page P. Cervicogenic Headaches: An Evidence-Led Approach To Clinical Management. Int J Sports Phys Ther. 2011;6(3):254-66.

18. Sarvari S, Mokari Saei S, Rahimzadeh M, Salehian MH. The Effect Of An Online Corrective Training Intervention On The Upper Cross Syndrome And Feelings Of Fatigue And Pain In Adolescents. International Journal Of Pediatrics. 2022 Apr 1;10(4):15813-22.

19. Ali S, Ahmad S, Jalal Y, Shah B. Effectiveness Of Stretching Exercises Versus Muscle Energy Techniques In The Management Of Upper Cross Syndrome: JRCRS. Journal Riphah College Of Rehabilitation Sciences. 2017 Mar 10;5(1):12-6.

20. Lewit K, Simons DG. Myofascial Pain: Relief By Post-Isometric Relaxation. Archives Of Physical Medicine And Rehabilitation. 1984 Aug;65(8):452-6.

21. Schenk R, Adelman K, Rousselle J. The Effects Of Muscle Energy Technique On Cervical Range Of Motion. Journal Of Manual & Manipulative Therapy. 1994 Jan 1;2(4):149-55.

22. Muscolino J. Upper Crossed Syndrome. Journal Of The Australian Traditional-Medicine Society. 2015 Jun;21(2).

23. Moore MK. Upper Crossed Syndrome And Its Relationship To Cervicogenic Headache. Journal Of Manipulative And Physiological Therapeutics. 2004 Jul 1;27(6):414-20.

24. Mol N, Ashok A, KU DK. Upper Crossed Syndrome: Trends And Recent Advances In The Physiotherapy Treatment – A Narrative Review. Journal Of Pharmaceutical Research International.