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PREVALENCE OF UPPER CROSS SYNDROME AMONG TAILORS

Dr Aneeqa Nawaz (PT)[1], Dr. Syeda Sumaira Batool (PT)[2], Dr. Hammad bin Sajid (PT)[3], Dr. Maria Salman (PT)[4], Dr. Humra Sabir (PT)[5], Dr. Asma Sabir (PT)[6], Dr. Mamoona Waseem (PT)[7], Dr. Huma Khan (PT)[8], Dr. Inayat ullah (PT)[*9]

[1]*Doctor of Physical Therapy, Former Student, Foundation University College of Physical Therapy (Fucp), Foundation University, Islamabad*
[2]*Lecturer, Fucp, Foundation University, Islamabad*
[3,4,5,6]*Doctor of Physical Therapy, Former Student, Fucp, Foundation University, Islamabad*
[7]*Clinical Physical Therapist, Physioplus Clinic, Peshawar*
[8]*Lecturer, Sarhad University of Science and Information Technology, Peshawar*
[*9]*Assistant Professor, Sarhad University of Science and Information Technology, Peshawar*

[1]aneeqanawaz35@gmail.com, [2]sumaira.batool@fui.edu.pk , [3]hammadbinsajid274@gmail.com, [4]mariasalman657@gmail.com, [5]humrasabir@gmail.com, [6]asmasabir859@gmail.com, [7]mamoona855@gmail.com, [8]huma.siahs@suit.edu.pk, [*9]inayatullah.siahs@suit.edu.pk

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Corresponding Author: *
Dr. Inayat ullah (PT)[*9]

ABSTRACT

BACKGROUND & OBJECTIVE: *Upper Cross Syndrome (UCS) is a postural dysfunction characterized by muscular imbalance, including tightness and weakness in the muscle groups of the upper trunk, particularly around the neck, shoulders, upper back, and chest region. Tailors specifically are more likely to experience muscular imbalances due to prolonged sitting, repetitive hand movements, and forward head posture associated with their work. The objective of this study was to determine the prevalence of Upper Cross Syndrome among tailors.*

METHODOLOGY: *A cross-sectional study was conducted from July 2024 to June 2025 among Tailors of Pakistan.*

A convenience sampling technique was used, and a total of 197 participants were selected as the sample size according to inclusion and exclusion criteria, determined using the Rao-Soft sample size calculator, with a 9% margin of error. Data were collected through a self-structured demographics questionnaire. Participants were asked to fill out the Neck Disability Index (NDI) questionnaire. In addition, the Pectoralis Major Tightness Test, Pectoralis Minor Length Tests, Upper Trapezius Length Test, Levator Scapulae Length Test, Deep Neck Flexors Strength Test, and Lower Trapezius Strength Test were performed to assess muscular tightness and weakness.

RESULTS: *Results showed that out of 197 tailors, 42.1% had mild disability on the NDI scale. Upper trapezius tightness was the most commonly observed muscular tightness, found in 140 participants, while lower trapezius weakness was the most frequently reported muscle weakness, observed in 111 participants. Hence, the study showed that out of the 197 Tailors, 132 (67%) tailors were found to have Upper Cross Syndrome (UCS), whereas 65 (33%) tested negative.*

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CONCLUSION: *The findings of this study demonstrated a significant association between Upper Cross Syndrome (UCS) and occupational factors such as prolonged working hours, sustained forward head posture, and inadequate ergonomic practices. These factors appear to contribute to the development of muscular imbalances, thereby increasing the prevalence of Upper Cross Syndrome in the tailoring profession.*

INTRODUCTION

Musculoskeletal disorders (MSDs) represent a significant occupational health concern worldwide, with Upper Cross Syndrome (UCS) emerging as one of the most prevalent conditions within this group (1). UCS is defined as a postural dysfunction characterized by muscular imbalance (tightness and weakness) in the muscle groups of the upper trunk, around the neck, shoulder, upper back, and chest region of the body (2). This syndrome is particularly notable for its impact on posture and musculoskeletal health, often leading to chronic pain and functional limitations (2).

Dr. Janda's classification of muscles into two primary categories, i.e., postural and phasic, provides a basic understanding of UCS (3). Postural muscles, responsible for maintaining upright posture and muscle tone undergo tightness and hypertonicity over time (3). In contrast, phasic muscles, which make up the majority of other muscle groups, are prone to weakness and hypotonicity (3). This imbalance is especially evident in the neck and upper trunk, where overactive muscles on one side counterbalance underactive muscles on the other, creating a distinctive "X" or crossed pattern (3, 4). This phenomenon, known as reciprocal inhibition, involves the elongation of one muscle group compensating for the contraction and shortening of its antagonists (3, 4).

In UCS, specific postural muscles such as the upper trapezius, levator scapulae, pectoralis major/minor, suboccipital muscles, and sternocleidomastoid tend to become tight or shortened (5). Conversely, phasic muscles like the deep neck flexors, lower trapezius, serratus anterior, and rhomboids (major/minor) are more susceptible to weakness or inhibition, resulting in a cross-shaped pattern of imbalance both anteriorly and posteriorly (5). Individuals with UCS frequently exhibit postural abnormalities, including forward head posture, elevated and protracted shoulders, exaggerated thoracic kyphosis, scapular winging, and reduced thoracic spine mobility (5). The simultaneous presence of forward head posture and rounded shoulders is considered a hallmark of UCS (5).

The prevalence of UCS varies significantly across different occupational groups, often correlating with work-related postural demands. For example, studies have reported prevalence rates as high as 67% among IT workers (1), and 28% among laundry workers (2). Overall, research suggests that between 11% and 60% of individuals from various age groups and cultural backgrounds may experience UCS at some point in their lives (1, 2).

Work posture, particularly in occupations requiring prolonged sitting or repetitive tasks, plays a critical role in the development of musculoskeletal disorders (6). Proper ergonomic positioning enhances comfort and productivity, while poor posture is associated with neck stiffness, lower back pain, and shoulder fatigue (6). According to WHO evidence-based research from 2003, approximately 60% of occupational diseases are linked to musculoskeletal disorders (6).

Tailoring is a profession characterized by repetitive cycles of cutting, assembling, pressing, and finishing garments. These tasks require physical endurance and meticulous attention, leading to muscle fatigue and overuse injuries (7). During the sewing process, tailors frequently adopt postures such as forward neck bending, varying elbow positions, wrist flexion, and forward slouching. Over time, these postures contribute to discomfort, stiffness, pain, swelling, and, in severe cases, chronic pain that disrupts both work and sleep. Major risk factors for MSDs in tailoring include improper posture, sustained static positions, repetitive tasks, manual materials handling, tool pressure, and exposure to machine vibrations. (8) Tailors are prone to muscular imbalances due to prolonged sitting and improper postures (9). This often results in Forward Head Posture (FHP), as

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maintaining an upright, well-aligned spinal posture becomes increasingly challenging during extended work hours (10). Notably, for every inch the head moves forward, an additional 10 pounds of stress is placed on the neck, exacerbating mechanical strain and muscle imbalances (10). In such cases, agonist muscles may become tight while antagonists weaken or become inhibited, further perpetuating the cycle of dysfunction (10).

Neglecting health guidelines and workplace ergonomics can lead to a cycle of injuries, illness, and disability, with potentially long-lasting consequences for professional tailors. Therefore, this study aims to assess the prevalence of Upper Cross Syndrome among tailors to address this overlooked occupational health issue.

Methodology

This study used a cross-sectional descriptive design and was conducted between July 2024 to June 2025. Targeted population was tailors in Pakistan. Using a non-probability convenient sampling technique, a total of 197 participants were recruited based on a sample size calculated with a 9% margin of error via Raosoft software. Eligible participants included both male and female tailors aged 24 to 60 years, with at least five years of work experience, working six to seven hours daily, and experiencing neck or back pain. Individuals with a history of upper body trauma, acute musculoskeletal conditions, or congenital and structural deformities such as scoliosis or kyphosis were excluded to maintain the study's focus on work-related postural dysfunction.

Data collection was performed using a self-structured questionnaire that gathered demographic and occupational information, including age, gender, work experience, working hours, BMI, and sitting posture. Before participation, informed consent was obtained, ensuring voluntary participation and confidentiality. To assess muscle tightness and weakness associated with Upper Cross Syndrome, specific clinical tests were performed. For example, stretching the pectoralis major/minor, upper trapezius, and levator scapulae muscles, with participant feedback on pain or tightness during five seconds helped evaluating muscle tightnes of respective muscles. Similarly, muscle weakness was assessed through tests targeting the deep neck flexors and lower trapezius, observing movement patterns and resistance responses indicative of dysfunction. Additionally, the Oswestry Neck Disability Index (NDI) was used to measure self-reported functional impairments due to neck pain.

Data were analyzed using SPSS version 21.0, with categorical variables summarized through frequency and percentage tables to determine the prevalence of Upper Cross Syndrome among tailors. Cross-tabulation analyses were applied to explore associations between UCS and various demographic and occupational factors. The diagnosis of UCS was confirmed if any three of the following tests were positive: upper trapezius stretch test, lower trapezius strength test, levator scapulae stretch test, pectoralis major/minor tightness test, and deep neck flexor endurance test. This comprehensive methodology aimed to identify the frequency and contributing factors of Upper Cross Syndrome within this occupational group.

Results

A total of 197 tailors (n=197) participated t in this study, comprising 174 males (88.3%) and 23 females (11.7%). The mean duration of work experience was significantly high, with 80.7% of participants reporting more than five years in the profession. Over two-thirds (73.4%) worked more than seven hours per day. The demographics are displayed in Table 1.

In terms of anthropometric and clinical measures:

- Nearly half of participants (49.7%) had a normal Body Mass Index (BMI), with the remainder classified as underweight (16.2%), overweight (25.9%), or obese (8.1%). (Table 1)

- Assessment with the Neck Disability Index (NDI) indicated that 42.1% had mild disability, 30.5% had no disability, 18.3% reported moderate disability, 8.6% severe disability, and 0.5% complete disability. (Table 1)

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Table 1: Demographic and Work-Related Characteristics of Tailors (n=19

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	174	88.3
	Female	23	11.7
BMI	Underweight	32	16.2
	Normal	98	49.7
	Overweight	51	25.9
	Obese	16	8.1
NDI	No disability	60	30.5
	Mild disability	83	42.1
	Moderate disability	26	18.3
	Severe disability	17	8.6
	Complete disability	1	0.5
Work Experience	≤5 years	38	19.3
	>5 years	159	80.7
Working Hours/Day	≤7 hours	52	24.6
	>7 hours	145	73.4

Prevalence of Upper Cross Syndrome

The prevalence of Upper Cross Syndrome (UCS) among tailors was high: 132 participants (67%) were UCS positive, while 65 (33%) were negative (Figure 1).

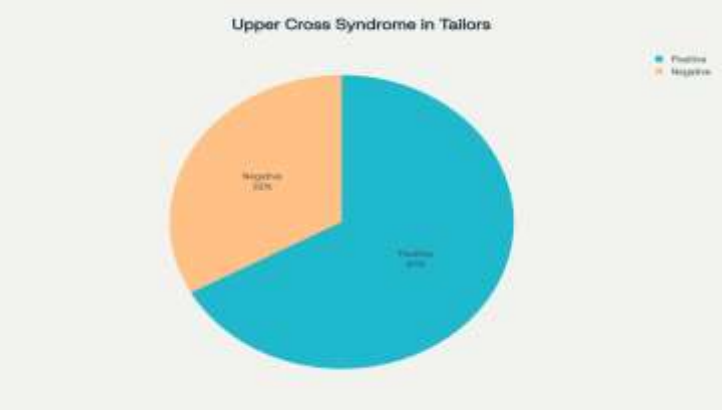

Figure 1

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UCS in Relation to Demographic and Work Variables

Work Experience & Working Hours

Among the tailors with UCS, individuals with more than 5 years of work experience were disproportionately affected (118 out of 132, 89.4%), compared to those with 5 years or less (14, 10.6%). Similarly, a greater number of UCS cases were observed in tailors who worked more than seven hours per day (97 out of 132, 73.5%) compared to those working seven hours or fewer (35, 26.5%). Statistics are displayed in Figure 2.

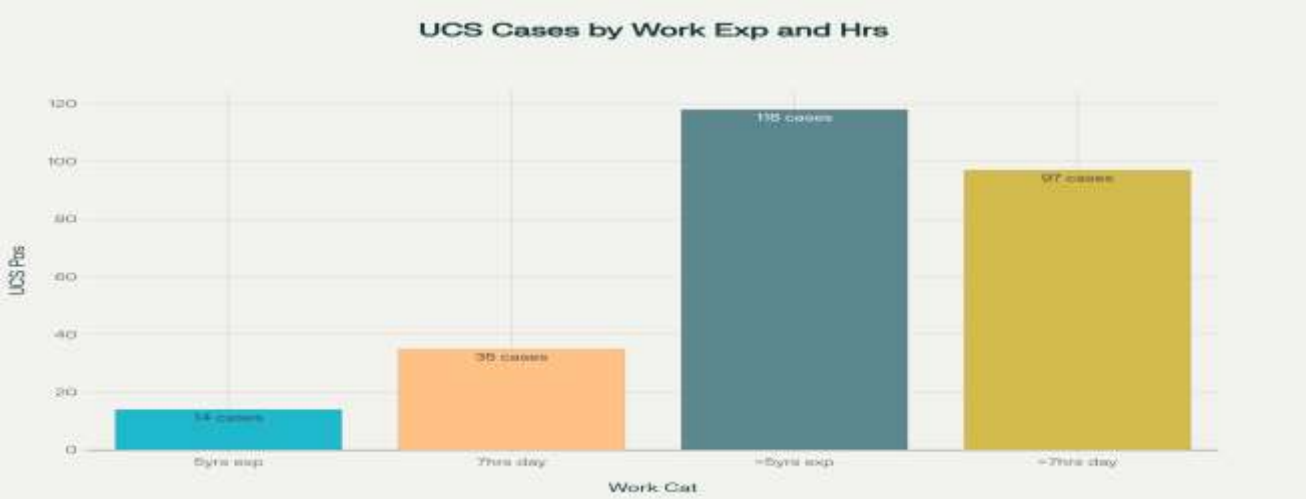

Figure 2

Neck Disability (NDI) Among UCS-Positive Tailors

Analysis of the NDI among UCS-positive tailors showed that majority were facing mild disability (69 cases), followed by no disability in 30 cases, moderate disability in 20 cases, severe disability reported by 12 affected individuals and 1 individual facing complete disability (Figure 3). This trend highlights a significant relationship between UCS and increased levels of neck-related disability.

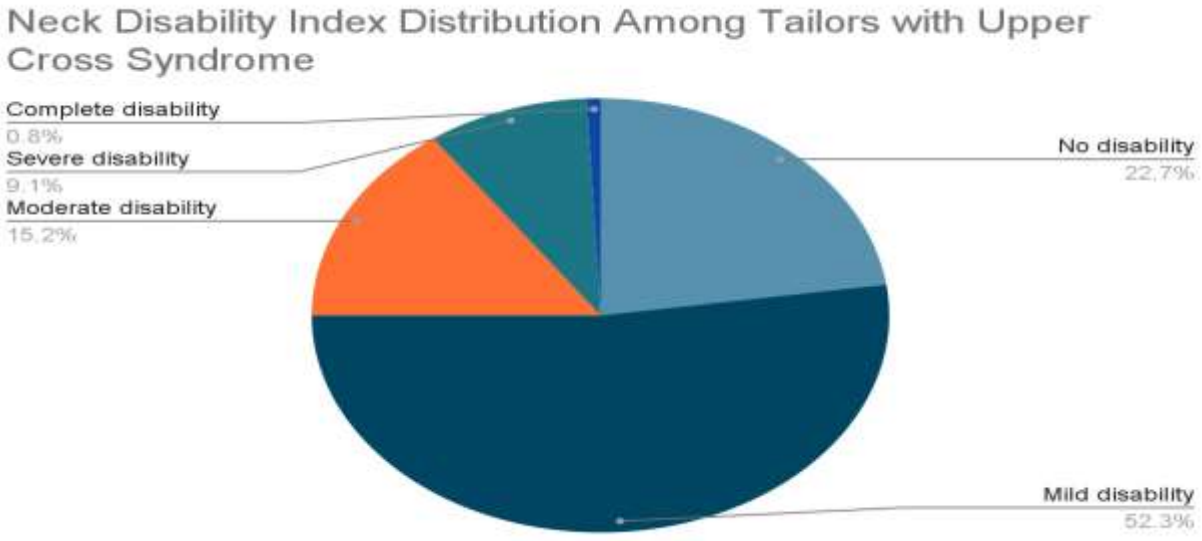

Figure 3

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BMI Among UCS-Positive Tailors

About 50.8% UCS-positive tailors reported normal BMI, while 22.7% were overweighed. 15.2% of the individuals were underweighed, and 11.4% were obese as shown in Figure 4.

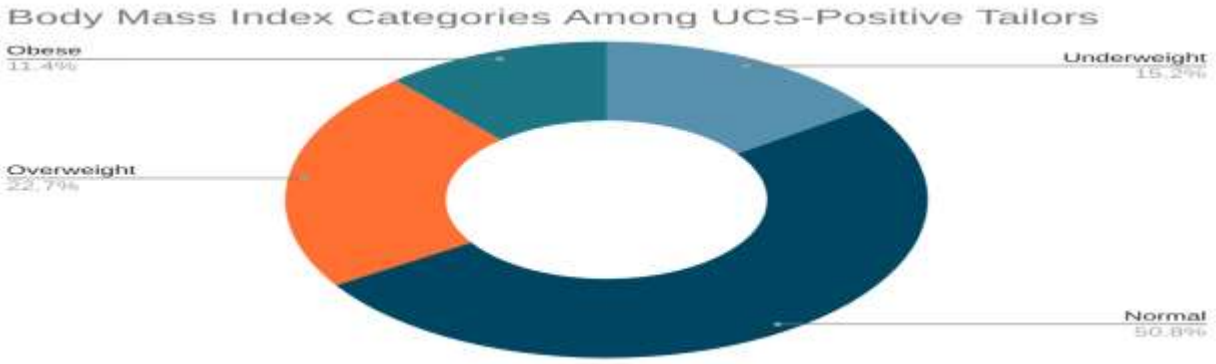

Figure 4

Sitting Position

Among UCS cases, 102 individuals (77.3%) usually sat on chairs while working, compared to 42 (22.7%) who sat on the floor. (Table 2)

Table 2: Distribution of Sitting Position Among Tailors with Upper Cross Syndrome

Sitting Position	UCS Cases (n)	% of UCS Group
Chair	102	77.3
Floor	42	22.7

Muscular Imbalance Patterns in UCS

Muscle assessments revealed that the upper trapezius muscle was most commonly tightened (140 cases, 71.1%), while the lower trapezius was the most frequently reported weakened muscle (111 cases, 56.4%) among UCS-positive tailors. (Figure 5)

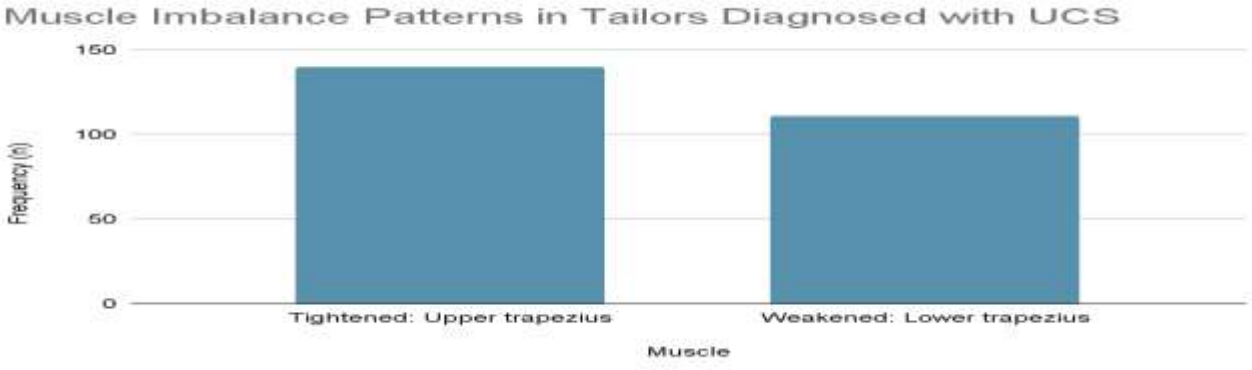

Figure 5

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These findings suggests Upper Cross Syndrome is highly prevalent among tailors, particularly among those with longer work experience, extended daily work hours, and a predominance of chair sitting. Most affected individuals displayed mild to moderate levels of neck disability and commonly reported muscular imbalances, especially in the trapezius muscles.

Discussion

This study investigated the prevalence and associated factors of Upper Cross Syndrome (UCS) among tailors working in Pakistan. The findings revealed a high prevalence of UCS (67%) among this occupational group. This rate is considerably higher than those reported in studies among office workers and other comparable populations, which typically range from 30% to 50% (11). The increased prevalence in tailors may be attributed to their prolonged static sitting postures, repetitive arm movements, and ergonomic challenges specific to the nature of tailoring work (11).

Prolonged work exposure was a significant factor supporting the hypothesis that cumulative occupational load and chronic exposure to poor posture increase the risk of developing musculoskeletal imbalances associated with UCS. The high percentage (73.5%) of UCS among those working more than seven hours daily further indicates that longer daily exposure exacerbates postural stress and the development of UCS. Regarding neck disability, the Neck Disability Index (NDI) classifications demonstrate that the burden of neck-related functional limitations is substantial. Most UCS-positive individuals reported mild (52.3%) to moderate (15.1%) disability, emphasizing the clinical relevance and negative impact on quality of life and work productivity for affected workers. Only a small proportion appeared free of perceived neck-related disability, reinforcing the subjective and objective burden of UCS in this population. These findings correlate with a cross-sectional study conducted on 223 seated sewing machine operators in Swabi District which revealed a high prevalence of forward head posture (FHP) and neck pain (10). Using the Numerical Pain Rating Scale (NPRS) and the Neck Disability Index (NDI), the study found that over 46% of participants experienced moderate to severe neck discomfort. The results also showed a reduced Craniovertebral angle (CVA), indicating poor neck posture. These findings highlight a strong association between prolonged sewing work and musculoskeletal strain, particularly affecting the neck region (10).

Interestingly, the distribution of UCS across BMI categories showed that risk is not limited to overweight or obese individuals; those with normal BMI also represented a substantial share (50.8%) of cases. This suggests that occupational postural factors may outweigh the contribution of body composition per se, contrary to some literature linking higher BMI with increased musculoskeletal complaints. A study on adolescents found that BMI was significantly higher in those with UCS, but the relationship varied by sex and may not be consistent across all populations (12). The study also noted conflicting evidence in the literature about BMI's association with posture abnormalities, highlighting the complexity of this relationship. Molina-Garcia et al., in a meta-analysis cited within the same article, argued that no clear association exists between overweight/obesity and forward head posture, although some associations with forward shoulder posture exist, implying that factors beyond BMI, such as occupational posture and activity, are important contributors (13).

Ergonomic factors were found to be significantly associated with the prevalence of Upper Cross Syndrome (UCS) among tailors in this study. Notably, a majority of UCS-positive participants (77.3%) reported working while seated on chairs, compared to only 22.7% who sat on the floor. Although conventional ergonomic guidelines generally support chair sitting as a preferred working posture to reduce musculoskeletal strain, these findings indicate that chair-based workstations, if inadequately designed or poorly adjusted, may still pose a considerable risk for the development of postural syndromes such as UCS. A study investigated musculoskeletal disorder patterns and ergonomic chair design among office employees using latent class analysis (14). This study found significant associations between ergonomic chair features, such as seat comfort and body support, with the prevalence of multi-site musculoskeletal disorders, reinforcing that suboptimal chair design, even in chair-based work, can result in increased

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musculoskeletal strain, including in the neck and shoulders (14).

The muscular assessment confirmed classic UCS findings, with frequent tightness of the upper trapezius and weakness of the lower trapezius observed in the majority of affected individuals. This aligns with the established pathophysiology of UCS, as described in previous clinical and observational studies (15), and further validates the methodology and clinical observations in this study.

Conclusion

The findings of this study demonstrated a significant association between Upper Cross Syndrome (UCS) and occupational factors such as prolonged working hours, sustained forward head posture, and inadequate ergonomic practices. These factors appear to contribute to the development of muscular imbalances, thereby increasing the prevalence of Upper Cross Syndrome in the tailoring profession

Limitations of the study

The primary limitation of this study is the insufficient sample size, which restricts the generalizability of the findings. The small number of participants makes it difficult to confidently extend the observed outcomes to a broader population, thereby limiting the external validity of the research. Furthermore, the cross-sectional design of the study presents a significant limitation. While it allowed for the identification of associations between tailoring practices and UCS, it inherently precludes the establishment of a direct causal relationship.

Recommendations

For future research, it is recommended that a larger sample size be used. Expanding the participant pool will enhance the statistical power of the study and improve the generalizability of its findings to a wider population, including those in various geographical or professional settings. Clinically, it is advisable to provide ergonomic guidance and preventive measures to tailors, emphasizing the importance of incorporating regular rest periods during work. This intervention aims to mitigate the occupational risks associated with prolonged static postures. Methodologically, to improve the precision and objectivity of postural assessments in subsequent investigations, the integration of digital posture analysis tools is strongly recommended. These tools offer a more accurate and standardized approach to detecting and quantifying Upper Cross Syndrome, thereby enhancing the reliability and validity of the measurements.

References

Selvam S, Seshan J. TO ANALYZE THE FREQUENCY OF UPPER CROSSED SYNDROME AND THE EXTENT OF NECK DISABILITY AMONG IT PROFESSIONALS. ResearchGate [Internet]. 2020 Nov 1; Available from: https://www.researchgate.net/publication/369710710_TO_ANALYZE_THE_FREQUENCY_OF_UPPER_CROSSED_SYNDROME_AND_THE_EXTENT_OF_NECK_DISABILITY_AMONG_IT_PROFESSIONALS

Mujawar J, Sagar J. Prevalence of upper cross syndrome in laundry workers. Indian Journal of Occupational and Environmental Medicine [Internet]. 2019 Jan 1;23(1):54. Available from: https://doi.org/10.4103/ijoem.ijoem_169_18

Morris CE, Bonnefin D, Darville C. The Torsional Upper Crossed Syndrome: A multi-planar update to Janda's model, with a case series introduction of the mid-pectoral fascial lesion as an associated etiological factor. Journal of Bodywork and Movement Therapies [Internet]. 2015 Aug 29;19(4):681–9. Available from: https://www.sciencedirect.com/science/article/abs/pii/S1360859215002181

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 [Internet]. 2022 Jan 31;5(1):370–4. Available from: http://www.pakistanbmj.com/journal/index.php/pbmj/article/view/218

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Piri H, Hajian M, Mirkarimpour SH, Sheikhhoseini R, Rahimi M. The Effect of 12-Week Corrective Exercises on the Postural Angles of Beautician Females with Upper Crossed Syndrome: a Clinical Trial Study. Women's Health Bulletin [Internet]. 2021 Apr 1;8(2):91–7. Available from: https://womenshealthbulletin.sums.ac.ir/article_47538_ddc06370ed939b1555c5af8010f0cd8c.pdf

Wahyuni NWSWS, Wibawa A, Tianing NW, Indrayani AW. The employee productivity associated with work position and musculoskeletal disorders among tailors in the PT. Uluwatu Garment. Bali Anatomy Journal [Internet]. 2021 Jun 30;4(1):10–3. Available from: http://balianatomyjournal.org/ojs/index.php/baj/article/download/53/36

Anwar N, Riaz H, Saeed A, Ashraf F. Frequency of work related musculoskeletal disorders and ergonomic risk assessments among tailors. Journal of the Pakistan Medical Association [Internet]. 2020 Jan 1;(0):1. Available from: https://doi.org/10.5455/jpma.24765

Jamro SA, Sheikh MA, Rajput HI, Chughtai MJB. WORK-RELATED MUSCULOSKELETAL DISORDERS AMONG TAILORS. INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCE AND HEALTH CARE [Internet]. 2018 Jan 1;2(8). Available from: https://doi.org/10.26808/rs.ph.i8v2.02

Shah NSM, Joshi NRK. Risk assessment of Work-Related musculoskeletal Disorders among tailors in Vadodara City. Indian Journal of Physiotherapy and Occupational Therapy - an International Journal [Internet]. 2024 Jan 9;18(1):90–5. Available from: https://doi.org/10.37506/p5mat887

Ahmad Z, Rakhshanda NDr, Ishtiaq NN. Evaluation of the pattern of neck pain with forward head posture (fhp) among sewing machine operators- A cross-sectional study. Liaquat Medical Research Journal [Internet]. 2023 Dec 31;5(4). Available from: https://doi.org/10.38106/lmrj.2023.5.4-06

Yaghoubitajani Z, Gheitasi M, Bayattork M, Andersen LL. Corrective exercises administered online vs at the workplace for pain and function in the office workers with upper crossed syndrome: randomized controlled trial. International Archives of Occupational and Environmental Health [Internet]. 2022 Apr 7;95(8):1703–18. Available from: https://doi.org/10.1007/s00420-022-01859-3

De-La-Iglesia L, Bravo C, Rubí-Carnacea F. Upper crossed syndrome in secondary school students: A mixed-method study. Journal of Taibah University Medical Sciences [Internet]. 2023 Jan 25;18(4):894–907. Available from: https://doi.org/10.1016/j.jtumed.2023.01.008

Molina-Garcia P, Miranda-Aparicio D, Ubago-Guisado E, Alvarez-Bueno C, Vanrenterghem J, Ortega FB. The Impact of Childhood Obesity on Joint Alignment: A Systematic Review and Meta-Analysis. Physical Therapy [Internet]. 2021 Feb 10;101(7). Available from: https://pubmed.ncbi.nlm.nih.gov/33580953/

Zeverdegani SK, Yazdi M, MollaAghaBabaee AH. Latent class-derived patterns of musculoskeletal disorders in sedentary workers and chair ergonomic design. International Journal of Occupational Safety and Ergonomics [Internet]. 2021 Apr 12;28(3):1636–41. Available from: https://pubmed.ncbi.nlm.nih.gov/33843486/

Chaudhuri S, Gupta M, Phadke V, Chawla JK. Conceptual Framework of Upper Cross Syndrome: A Delphi Study. Cureus [Internet]. 2024 Aug 26; Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC11424749/