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PREVALENCE OF UPPER TRAPEZIUS TIGHTNESS ASSOCIATED WITH CHRONIC NECK PAIN AND POOR POSTURE IN UNIVERSITY STUDENTS

Original Research

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ABSTRACT

Background: Neck pain is a prevalent musculoskeletal condition, especially in populations engaged in prolonged sedentary activity. Among university students, poor posture, extended screen time, and repetitive study-related tasks often contribute to upper trapezius muscle tightness. This condition leads to discomfort, restricted range of motion, headaches, and reduced academic focus. Despite its growing prevalence, awareness and early preventive strategies remain limited in younger populations, particularly in developing regions. This study aimed to address this gap through clinical assessment and evaluation.

Objective: To assess the prevalence and severity of upper trapezius muscle tightness and its association with neck disability and poor posture among university students.

Methods: An analytical cross-sectional study was conducted over six months at four academic institutions in Karachi, including Indus University, Ziauddin University, Dow University, and Jinnah Postgraduate Medical Centre (JPMC). A total of 273 undergraduate physiotherapy students were recruited through non-probability convenience sampling. Participants completed a structured questionnaire covering demographics, pain patterns, posture habits, and management practices. Standardized tools included the Visual Analog Scale (VAS), Neck Disability Index (NDI), and Upper Trapezius Muscle Length Test. Statistical analysis was performed using SPSS version 26, with Chi-square tests assessing associations between muscle tightness, posture, and disability.

Results: Out of 273 participants, the majority were female (76.6%), and most fell within the 20–22 year age group (54.2%). Assessment using the Neck Disability Index (NDI) revealed that 55.7% of participants had mild disability, 19.0% had moderate disability, and 2.6% experienced severe disability, while 22.7% reported no disability. Evaluation of upper trapezius muscle length showed that 46.9% of participants had some degree of tightness: 41.0% had mild, 4.8% moderate, and 1.1% severe tightness. A significant association was observed between upper trapezius tightness and poor posture ($p = 0.007$), as well as between muscle tightness and neck disability ($p = 0.001$), indicating that increased muscle tightness is linked to both postural deviations and functional neck impairment

Conclusion: Upper trapezius tightness and related neck pain are highly prevalent among physiotherapy students, significantly impacting posture and functional health. These findings underscore the need for early ergonomic education and implementation of preventive interventions such as postural training and therapeutic exercises.

Keywords: Trapezius Muscle, Muscle Tightness, Neck Pain, Poor Posture, University Students.

INTRODUCTION

Neck pain, particularly in the upper trapezius muscle, has emerged as a common musculoskeletal complaint affecting a substantial proportion of the population globally. It is estimated that nearly two-thirds of individuals experience this condition at some point in their lives, with a notable rise among middle-aged adults and a higher prevalence observed in women compared to men (1). The increasing trend in reported cases has drawn attention from health professionals, especially as aging further intensifies the condition's visibility (2). The upper trapezius, frequently strained due to poor posture, psychological stress, awkward sleeping positions, and repetitive overuse, becomes a primary site of discomfort and functional limitation. These stressors cause individuals to maintain static neck and shoulder positions for prolonged periods, resulting in chronic muscle tension, spasms, and stiffness that impede daily functioning (3). One significant consequence of persistent upper trapezius strain is muscle imbalance, where overuse of this muscle leads to weakening of the middle and lower trapezius segments. This imbalance exacerbates poor postural alignment, contributing further to pain and dysfunction (4). Individuals often report symptoms such as restricted cervical mobility, fatigue, reduced range of motion, and increased sensitivity in the neck region. The condition not only compromises musculoskeletal health but also adversely impacts quality of life through associated symptoms such as headaches, difficulty lifting objects, visual discomfort during reading, concentration issues, and disturbed sleep patterns (5). Regional studies underscore the global burden of this issue, with prevalence rates of upper trapezius tightness reported at 27.0% in Asia, 38.9% and 34.9% in Europe, and between 13–19% in Malaysia (6-8). A study conducted in Pakistan revealed that 74.2% of individuals with chronic neck pain experienced headaches, 60.3% had sleep disturbances, and over half had difficulties performing daily tasks such as lifting or reading, despite some maintaining routine activities like driving (9).

These figures suggest a widespread functional limitation resulting from untreated or poorly managed upper trapezius dysfunction. Management strategies vary from pharmacological to physical interventions. Non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen, ketoprofen, and naproxen are commonly used to control inflammation and pain, with relatively favorable safety profiles (10). Botulinum toxin A (BTxA) has also demonstrated efficacy in reducing muscle hypertrophy and improving pain outcomes in chronic cases with bilateral trapezius enlargement (11). However, physical therapy remains the cornerstone of long-term management. Myofascial release, in particular, has shown superior effectiveness compared to cold therapy and standard exercise in relieving muscle spasms and enhancing functional capacity (12). Despite the growing attention to upper trapezius tightness, evidence regarding the comparative effectiveness of different therapeutic modalities in improving neck function, alleviating pain, and correcting postural deficiencies remains limited, especially among younger populations like university students who are increasingly affected due to prolonged screen time and sedentary habits. Therefore, the present study aims to assess and compare the effects of various physical therapy techniques on improving range of motion, restoring neck function, and reducing pain in individuals with upper trapezius tightness, with a particular focus on university students experiencing chronic neck pain and poor posture.

METHODS

This analytical cross-sectional study was conducted over a six-month period among undergraduate physiotherapy students enrolled in Indus University, Ziauddin University, Dow University, and Jinnah Postgraduate Medical Centre (JPMC), located in Karachi, Pakistan. The objective was to explore the prevalence of upper trapezius muscle tightness and its association with poor posture and neck disability in young adult students. A non-probability convenience sampling technique was employed to recruit participants who met the eligibility criteria. The sample size was calculated using the OpenEpi, incorporating a 95% confidence interval and 5% margin of error, resulting in a required minimum of 273 participants. Participants included male and female university students aged 18 to 25 years who provided informed written consent and agreed to participate in the physical assessment procedures. Those with a history of traumatic neck injury, diagnosed neurological or rheumatological disorders, congenital musculoskeletal deformities, or those currently undergoing physical therapy or musculoskeletal treatment for neck issues were excluded. Incomplete assessments or withdrawal from participation at any stage also served as exclusion criteria. Data collection commenced following ethical approval and synopsis clearance from the relevant institutional review board (IRB). Participants were approached in their classroom and clinical environments, where they were briefed on the study's objectives, assured of confidentiality, and informed of their right to decline or withdraw without penalty. Written informed consent was obtained from all individuals before participation.

All research activities adhered strictly to ethical principles. Participants' privacy and data confidentiality were maintained throughout the study, with anonymized data used solely for research purposes. Each participant completed a structured, self-administered questionnaire that collected demographic data and information on posture-related habits. Standardized outcome measures were employed, including the Neck Disability Index (NDI) to quantify functional limitations due to neck pain, the Visual Analog Scale (VAS) to assess pain intensity, and the Upper Trapezius Muscle Length Test to evaluate muscle tightness (13, 14). Physical assessments were conducted by licensed and trained physiotherapists to ensure procedural accuracy and inter-rater reliability. Both verbal and written instructions were provided to the participants to support their understanding and ensure accurate completion of all instruments. Data were entered and analyzed using the Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics, including means, frequencies, and percentages, were calculated to summarize demographic variables, the prevalence of neck pain, upper trapezius tightness, postural abnormalities, and disability scores. Inferential analysis was conducted using the Chi-square test to examine associations between upper trapezius tightness and key categorical variables such as posture and neck disability, with statistical significance determined at a p-value threshold of <0.05.

RESULTS

Out of the total 273 participants, the majority were female, accounting for 76.6% of the sample, while males represented 23.4%. This gender distribution aligns with typical enrollment trends observed in physiotherapy programs at the participating institutions. Regarding age, most participants were between 20–22 years (54.2%), followed by 23–25 years (35.9%), and a smaller proportion (9.9%) were aged 18–19 years, reflecting the standard age range of undergraduate health sciences students. Assessment of functional neck disability using the Neck Disability Index (NDI) revealed that 55.7% (n = 152) of participants experienced mild disability, 19.0% (n = 52) had moderate disability, and 2.6% (n = 7) exhibited severe disability. Only 22.7% (n = 62) reported no disability. In total, 77.3% of participants demonstrated some level of neck-related functional impairment. Evaluation of upper trapezius muscle tightness showed that 53.1% (n = 145) had no tightness, while 41.0% (n = 112) exhibited mild tightness. Moderate tightness was found in 4.8% (n = 13), and only 1.1% (n = 3) showed severe tightness. Overall, 46.9% of participants presented with varying degrees of upper trapezius muscle shortening, which may be associated with prolonged sitting and posture-related stress due to academic routines.

Chi-square analysis revealed a statistically significant association between upper trapezius tightness and poor posture (χ^2 (4) = 14.196, p = 0.007), suggesting that participants with muscle tightness were more likely to exhibit postural deviations. Furthermore, a significant association was also observed between upper trapezius tightness and neck disability as assessed by the NDI (χ^2 (3) = 17.138, p = 0.001), indicating that increased muscle tightness was associated with greater functional impairment.

Table 1: Distribution of Neck Disability Index (NDI) Scores among participants

NDI Score Category	Frequency	Percentage
No Disability	62	22.7%
Mild Disability	152	55.7%
Moderate Disability	52	19.0%
Severe Disability	7	2.6%

Table 2: Distribution of Upper Trapezius Tightness severity among participants

Variables	Frequency	percent	Valid Percent	Cumulative Percent
No tightness	145	53.1	53.1	53.1
Mild tightness	112	41.0	41.0	94.1
Moderate tightness	13	4.8	4.8	98.9
Severe tightness	3	1.1	1.1	100.0
Total	273	100.0	100.0	

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Table 3: Chi-Square Association between Upper Trapezius Tightness, Poor Posture, and Neck Disability

Association tested	Chi-Square value (x2)	df	P-value
Upper Trapezius Tightness X Poor posture	14.196a	4	.007
Upper Trapezius X Neck Disability	17.138a	3	.001

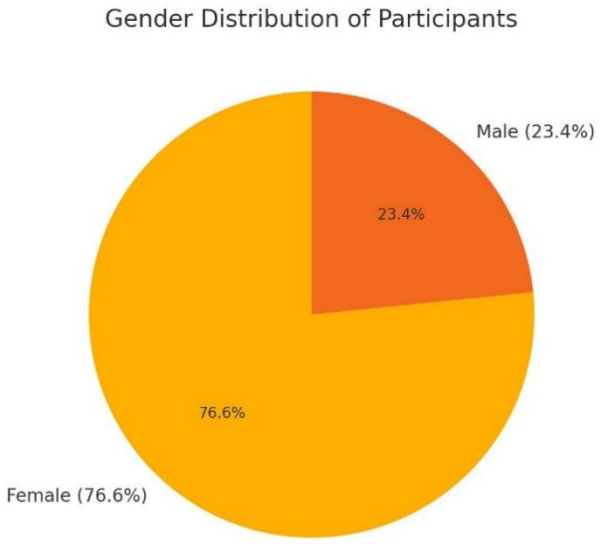

Figure 2 Gender Distribution of Participants

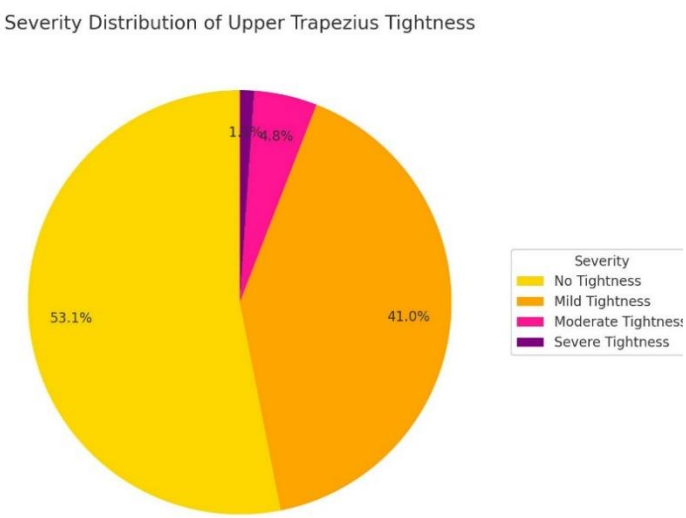

Figure 1 Severity Distribution of Upper Trapezius Tightness

DISCUSSION

The present study aimed to assess the prevalence of upper trapezius muscle tightness and its association with neck disability and poor posture among university students. The findings revealed that a significant proportion (77.3%) of the participants experienced some level of neck-related functional impairment, with mild disability being the most commonly reported category (55.7%). These results highlight the growing concern regarding musculoskeletal health among university students, potentially linked to prolonged sitting, excessive device use, and academic stress.

Nearly half (46.9%) of the students exhibited upper trapezius tightness, ranging from mild to severe levels. While a majority (53.1%) had no observable tightness, the presence of mild tightness in 41.0% and moderate to severe tightness in 5.9% suggests a substantial burden of muscle shortening. This may be attributed to sustained static postures, forward head posture, or poor ergonomic habits during academic activities such as studying or using digital devices.

The statistically significant association between upper trapezius tightness and poor posture (χ^2 (4) = 14.196, p = 0.007) reinforces the biomechanical link between muscular tension and postural alignment. Participants exhibiting muscle tightness were more likely to demonstrate deviations in posture, supporting the hypothesis that upper trapezius shortening could result from or contribute to poor postural habits.

Additionally, the strong association between upper trapezius tightness and neck disability (χ^2 (3) = 17.138, p = 0.001) confirms that increased muscle tightness correlates with higher levels of functional impairment in the neck. These findings are consistent with prior literature, which suggests that tightness in the upper trapezius limits cervical mobility and increases discomfort, thereby reducing the individual's functional capacity.

The gender distribution, with a higher representation of females (76.6%), reflects the current enrollment patterns in physiotherapy programs and may influence the generalizability of the results. Moreover, the majority of participants fell within the 20–22-year age group, which corresponds to the academic stage where students experience high workloads, potentially contributing to physical strain.

These findings underscore the importance of early intervention, education on ergonomics, and the promotion of physical activity to prevent musculoskeletal dysfunction. Regular postural assessments and stretching routines could help reduce muscle tightness and improve neck function in this vulnerable population.

CONCLUSION

This study highlights a high prevalence of neck-related functional impairment and upper trapezius muscle tightness among university students, particularly in those with poor postural habits. The significant associations between upper trapezius tightness, poor posture, and neck disability underscore the impact of musculoskeletal strain caused by sedentary academic routines and improper ergonomics. These findings emphasize the need for targeted preventive strategies such as posture education, ergonomic modifications, and regular stretching exercises to reduce muscle tightness and improve neck health in young adults. Early identification and management can help mitigate long-term functional limitations and enhance the overall well-being of students.

AUTHOR CONTRIBUTION

Author	Contribution
Kalsoom Umrani*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Khadija Usman	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Okasha Anjum	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published

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