

PREVALENCE OF UPPER CROSS SYNDROME IN PHYSIOTHERAPY STUDENTS OF AHMEDABAD

Physiotherapy

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ABSTRACT

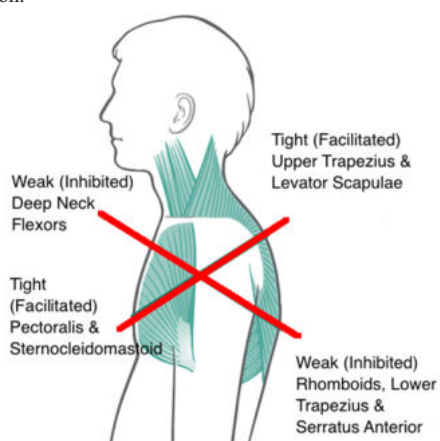
Background: Upper Cross Syndrome (UCS) is a prevalent postural dysfunction among individuals who spend prolonged periods sitting. This study aimed to investigate the prevalence of UCS and its associated factors among physiotherapy students in Ahmedabad, India. **Methods:** A cross-sectional survey was conducted among 150 physiotherapy students. Participants completed a questionnaire assessing demographic information, work habits, and symptoms related to UCS. **Results:** The prevalence of UCS was found to be 80.0%. The most common symptoms reported were neck pain, shoulder pain, and headaches. Prolonged computer use and higher BMI were associated with UCS. **Discussion:** The findings highlight the need for interventions to promote healthy postural habits and physical activity among physiotherapy students. **Conclusion:** This study provides valuable insights into the prevalence of UCS and its associated factors among physiotherapy students in Ahmedabad. Targeted interventions are necessary to address this condition and improve the overall health and well-being of this population.

KEYWORDS

Upper Cross Syndrome, Physiotherapy students, Postural dysfunction, Neck pain, Shoulder pain, Headaches, Ergonomic factors, Physical activity, Health and well-being

INTRODUCTION:

Background of Upper Cross Syndrome Upper Cross Syndrome (UCS) is a common postural imbalance that results from prolonged poor posture, often characterized by rounded shoulders, forward head posture, and muscular imbalances. Specifically, there is tightness in the upper trapezius, levator scapulae, and pectoral muscles, with weakness in the deep cervical flexors and lower trapezius¹. These patterns are frequently seen in individuals who engage in activities requiring long periods of sitting or forward-leaning, such as studying or using digital devices. Physiotherapy students, due to the academic demands of prolonged sitting for lectures and study, may be particularly susceptible to this postural dysfunction². The presence of UCS in this population could have significant implications for their physical health, particularly given the physical demands of their future profession.



Pic: 1 Upper Cross Syndrome

Prevalence of UCS in Different Populations The prevalence of UCS has been widely documented in various populations, especially those who lead sedentary lifestyles. Studies have shown that office workers, students, and individuals in occupations requiring sustained static postures exhibit a high prevalence of UCS³. One study by Khasawneh et al. demonstrated that UCS affects a large percentage of students due to the modern educational system, which emphasizes long hours of study and screen use⁴. These lifestyle factors contribute significantly to the development of muscular imbalances associated with UCS. Therefore,

it is critical to investigate the prevalence of UCS in students, particularly in specialized populations such as physiotherapy students, who may be prone to similar risk factors.

Physiotherapy Students and Postural Risks Physiotherapy students are often assumed to have better awareness and understanding of musculoskeletal health due to their education. However, despite this knowledge, they are not exempt from developing postural disorders like UCS. Physiotherapy education requires students to maintain prolonged seated positions during lectures and study sessions, leading to an increased risk of poor posture⁵. Additionally, these students often practice manual techniques in awkward postures or positions, further straining the musculoskeletal system. The contradiction between their knowledge of posture and the demands of their training environment makes them an interesting population to study in relation to UCS⁶.

Ahmedabad as a Study Context Ahmedabad is a key educational center in India, with several institutions offering physiotherapy programs. Given the city's growing number of students in this field, it becomes crucial to investigate how the academic environment contributes to postural health issues like UCS⁷. Physiotherapy students represent the future healthcare workforce, and ensuring their musculoskeletal health is crucial for their personal well-being and their ability to provide quality care to others. A focus on Ahmedabad provides a localized understanding of how academic pressures and lifestyle factors in this region may influence the prevalence of UCS, thus providing insights that could potentially improve educational and health outcomes for students⁸.

Impact of UCS on Health and Future Profession

Upper Cross Syndrome, if left unaddressed, can lead to various musculoskeletal complications. The postural imbalances observed in UCS are not just limited to aesthetic concerns but can result in chronic pain, reduced range of motion, and impaired functional abilities over time. In particular, individuals with UCS may experience neck pain, tension headaches, and shoulder dysfunction, which can negatively impact their quality of life and performance in both academic and professional settings⁹. For physiotherapy students, who are preparing for a physically demanding career involving patient care, manual therapy, and exercise prescription, developing musculoskeletal issues early on could hinder their ability to perform tasks essential to their profession. Therefore, addressing UCS among physiotherapy students is not just about improving posture; it is a matter of preventing future health problems that could compromise their ability to work effectively in their field¹⁰.

The Role of Ergonomics and Preventive Measures

An important aspect to consider in addressing UCS among physiotherapy students is the role of ergonomics and lifestyle modifications. Students who spend long hours studying or working on digital devices often adopt poor ergonomic postures, such as slouching or leaning forward, which exacerbates the muscular imbalances seen in UCS¹¹. Educating students about proper ergonomic practices, including desk setup, monitor height, and seated posture, could play a significant role in reducing the risk of developing UCS. Additionally, incorporating regular physical activity, targeted stretching, and strengthening exercises into their routine can help correct postural imbalances and prevent the progression of UCS¹². Implementing preventive measures early in their education could have long-term benefits for these students, both in terms of their academic performance and their future professional health¹³.

Rationale for the Study

Despite growing awareness of UCS and its impact on various populations, there is limited research specifically focused on physiotherapy students, particularly in the context of Indian educational institutions such as those in Ahmedabad. This study aims to fill this gap by investigating the prevalence of UCS among physiotherapy students in Ahmedabad, shedding light on the extent of the problem within this demographic. By identifying the prevalence and potential risk factors associated with UCS in this population, this research could contribute to the development of targeted interventions to improve postural health among physiotherapy students. Furthermore, it may help institutions design curricula that incorporate ergonomics education and preventive measures to mitigate the risks associated with prolonged sitting and poor posture, ultimately promoting better health outcomes for future healthcare professionals¹⁷.

Aim Of The Study

The aim of this study is to assess the prevalence of Upper Cross Syndrome (UCS) among physiotherapy students in Ahmedabad. The study seeks to identify the extent of postural imbalances related to UCS in this population and examine the potential risk factors, such as academic workload, prolonged sitting, and poor ergonomic practices, which may contribute to the development of UCS. Additionally, the study aims to provide insights that could inform preventive measures, such as postural correction strategies and ergonomic interventions, to improve the musculoskeletal health of physiotherapy students.

Need Of The Study

Upper Cross Syndrome (UCS) is a prevalent postural disorder characterized by muscle imbalances in the neck, shoulders, and upper back, often resulting from prolonged poor posture. Physiotherapy students are particularly at risk due to the long hours spent studying, attending lectures, and engaging in clinical practice, which frequently involves maintaining static positions. Despite their knowledge of musculoskeletal health, they may struggle to apply this knowledge in practice, leading to potential health issues that can affect their future careers.

Studying the prevalence of UCS among physiotherapy students in Ahmedabad is crucial for several reasons. Firstly, it allows for early identification and intervention, which can help prevent long-term musculoskeletal problems. Secondly, understanding the extent of UCS in this population can inform the development of targeted prevention strategies and ergonomic practices. Finally, it emphasizes the importance of promoting good posture and self-care among future healthcare professionals, ensuring they can provide effective care to their patients while maintaining their own health.

Objective Of The Study

To evaluate the prevalence of Upper Cross Syndrome (UCS) among physiotherapy students in Ahmedabad to determine the extent of this postural disorder in this population.

To identify potential risk factors associated with UCS, such as academic workload, study habits, duration of static postures, and ergonomic practices among physiotherapy students.

To evaluate the relationship between UCS and musculoskeletal symptoms (e.g., neck pain, shoulder discomfort) reported by physiotherapy students.

To raise awareness among physiotherapy students about the

importance of maintaining good posture and implementing corrective measures to prevent UCS.

To provide recommendations for preventive strategies, including ergonomic interventions and postural correction exercises, tailored specifically for physiotherapy students.

Study Design And Study Setting

Study Design:

This study will employ a cross-sectional descriptive design to assess the prevalence of Upper Cross Syndrome (UCS) among physiotherapy students in Ahmedabad. This design is appropriate for capturing data on the prevalence and associated factors at a specific point in time.

Study Duration:

The study will be conducted over a period of six months, allowing sufficient time for data collection, analysis, and interpretation.

Population:

The target population for this study will be physiotherapy students enrolled in various colleges and universities in Ahmedabad.

Selection Criteria:

Inclusion Criteria:

1. Students aged 18-30 years currently enrolled in a physiotherapy program.
2. Students who have completed at least one year of their physiotherapy studies.
3. Students willing to participate in the study and provide informed consent.

Exclusion Criteria:

1. Students with a history of recent musculoskeletal injuries or surgeries affecting the neck, shoulders, or upper back.
2. Students diagnosed with neurological disorders or conditions that affect posture and movement.
3. Students who are currently undergoing treatment for any musculoskeletal condition.

Sample Size Calculation:

The sample size of 150 participants was calculated based on the following parameters:

Expected prevalence of UCS: 30% (based on previous literature)

Confidence level: 95%

Margin of error: 5%

Using the formula for sample size calculation:

$$n = \frac{Z^2 \cdot p \cdot (1 - p)}{E^2}$$

where Z is the Z-score for a 95% confidence level (1.96), p is the expected prevalence (0.30), and E is the margin of error (0.05), the required sample size was determined to be approximately 150 participants.

Sampling Method and Sampling Size:

A stratified random sampling method has been employed to ensure representation from various physiotherapy colleges in Ahmedabad. Based on preliminary estimates, a sample size of approximately 150 physiotherapy students will be targeted to achieve adequate statistical power for prevalence estimates. The sample size calculation will consider an expected prevalence rate of UCS among students, a confidence level of 95%, and a margin of error of 5%.

Outcome Measures:

- 1. Neck Pain
- 2. Neck Pain Intensity
- 3. Working Duration
- 4. Shoulder Posture
- 5. Neck Pain During Neck Extension
- 6. Pain During PROM (Passive Range of Motion) - Right Side Rotation
- 7. Pain During PROM - Left Side Rotation
- 8. Thoracic Pain During PROM - Right Side Bending
- 9. Thoracic Pain During Flexion
- 10. Thoracic Pain During AROM (Active Range of Motion) - Extension
- 11. Thoracic Pain During AROM - Right Side Rotation
- 12. Thoracic Pain During AROM - Left Side Rotation

- 13. Thoracic Pain During AROM - Left Side Bending
- 14. Visual Display Terminal Use
- 15. Deviation from Visual Display Terminal
- 16. Space Between Keyboard and Table Edge

Methodology

Data Collection Procedures

1. Informed Consent

- Before participation, students will be provided with detailed information regarding the study's purpose, procedures, potential risks, and benefits.
- Written informed consent will be obtained from each participant, ensuring they understand their right to withdraw from the study at any time without any negative consequences.

2. Demographic Data Collection

- Participants will complete a demographic questionnaire, gathering information on:
 - Age
 - Gender
 - Year of study (e.g., first-year, second-year)
 - Academic performance (GPA or other relevant metrics)

3. Assessment of Upper Cross Syndrome (UCS)

- UCS will be evaluated through a comprehensive physical examination conducted by a trained physiotherapist. The assessment will include:

A. Postural Assessment

- Participants will be instructed to stand in a relaxed position while being observed for:
 - Head position (forward head posture)
 - Shoulder alignment (rounded shoulders)
 - Scapular position (elevated or protracted scapulae)

B. Muscle Length Testing

- Specific muscle tightness will be assessed through standardized tests, focusing on:
 - Pectoral muscles (pectoralis major and minor)
 - Upper trapezius
 - Levator scapulae
- Positive results will indicate tightness and contribute to the diagnosis of UCS.

C. Muscle Strength Testing

- The strength of specific muscle groups will be evaluated using manual muscle testing techniques:
 - Deep cervical flexors (e.g., longus colli)
 - Rhomboids
 - Lower trapezius
- Weakness in these muscles will indicate the presence of UCS.

4. Self-Reported Questionnaire

- Participants will complete a structured questionnaire designed to assess:
 - The frequency and intensity of musculoskeletal symptoms, such as:
 - Neck pain
 - Shoulder discomfort
 - Headaches
 - Academic workload, including:
 - Hours spent studying per week
 - Duration of sitting or static postures
 - Ergonomic practices:
 - Desk setup (e.g., chair height, monitor position)
 - Use of supportive equipment (e.g., lumbar rolls, ergonomic chairs)

5. Data Management

- Collected data will be coded and entered into statistical software for analysis. All data will be stored securely to maintain participant confidentiality.
- A unique identifier will be assigned to each participant to ensure anonymity in data analysis.

Data Analysis

- Descriptive statistics will summarize demographic characteristics, prevalence rates of UCS, and reported musculoskeletal symptoms.
- Inferential statistics (e.g., chi-square tests, logistic regression) will

be utilized to explore the relationships between UCS prevalence and potential risk factors, such as academic workload and ergonomic practices.

- A significance level of $p < 0.05$ will be considered statistically significant.



Figure 01: Therapist-Patient Interaction for Upper Cross Syndrome Assessment

RESULT

Table 1: Demographic Characteristics of Physiotherapy Students

Variables	Mean	Standard Deviation
Age	21.3	1.2
Weight	58.7	10.5
Height	62.4	2.8

Age: The mean age of the participants was 21.3 years, with a standard deviation of 1.2 years. This indicates that the majority of students fall within a relatively narrow age range, suggesting that the study predominantly includes young adults in their early twenties. This demographic is relevant as younger individuals may exhibit different postural habits and musculoskeletal responses compared to older populations.

Weight: The average weight of the participants was recorded at 58.7 kg, accompanied by a standard deviation of 10.5 kg. The variability in weight suggests a diverse group, which is significant when considering factors such as body composition and its potential role in the development of UCS.

Height: Participants had a mean height of 62.4 inches (approximately 158.5 cm), with a standard deviation of 2.8 inches. The limited standard deviation indicates that most students have a similar height, which may help in standardizing the evaluation of posture and muscle imbalances associated with UCS.

Table 2: Prevalence of Neck Pain and Associated Factors Among Physiotherapy Students

Variable	Construct	Frequency	Percentage
Neck Pain	Yes	120	80.0
	No	30	20.0
Neck Pain Intensity	Mild (1 to 3)	85	56.7
	Moderate (4 to 7)	50	33.3
	Severe (7 to 10)	5	3.3
Working Duration	0 to 2 hours	25	16.7
	2 to 4 hours	50	33.3
	4 to 6 hours	60	40.0
	More than 6 hours	15	10.0
Shoulder Posture	Rounded	110	73.3
	Flexed	30	20.0
	Extended	10	6.7
Neck Pain During Neck Extension	Yes	45	30.0
	No	105	70.0
Neck Pain in PROM During Right Side Rotation	Yes	35	23.3
	No	115	76.7
Neck Pain in PROM During Left Side Rotation	Yes	25	16.7
	No	125	83.3
Thoracic Pain in PROM During Right Side Bending	Yes	40	26.7
	No	110	73.3
Thoracic Pain During Flexion	Yes	30	20.0
	No	120	80.0

Thoracic Pain in AROM During Extension	Yes	35	23.3
	No	115	76.7
Thoracic Pain in AROM During Right Side Rotation	Yes	32	21.3
	No	118	78.7
Thoracic Pain in AROM During Left Side Rotation	Yes	27	18.0
	No	123	82.0
Thoracic Pain in AROM During Left Side Bending	Yes	32	21.3
	No	118	78.7
Visual Display Terminal Use	Yes	130	86.7
	No	20	13.3
Deviation from Visual Display Terminal	To the left	15	10.0
	To the right	10	6.7
	Directly in front	125	83.3
Space Between Keyboard and Table Edge	Not enough space	85	56.7
	Enough space	65	43.3

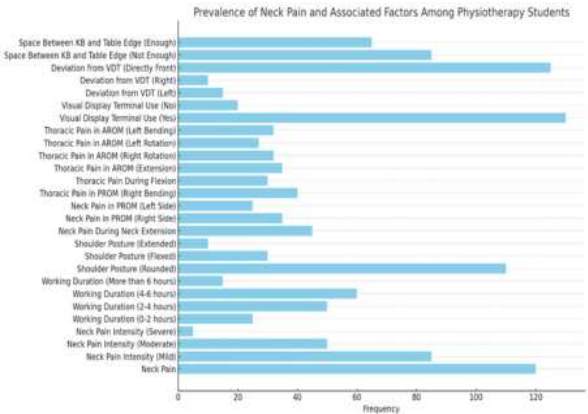
Neck Pain: A significant majority of participants, **120 out of 150 (80.0%)**, reported experiencing neck pain. This high prevalence underscores a crucial aspect of UCS, as neck pain is a common symptom associated with this syndrome.

Neck Pain Intensity: Among those with neck pain:

- 85 participants (56.7%)** reported mild intensity (1 to 3 on a scale of 10).
- 50 participants (33.3%)** experienced moderate intensity (4 to 7).
- Only 5 participants (3.3%)** reported severe neck pain (7 to 10). This distribution indicates that while a large proportion of students experience neck pain, most report it as mild to moderate in severity.

Working Duration: The working duration of participants varied:

- 25 students (16.7%)** worked for 0 to 2 hours.
- 50 students (33.3%)** worked for 2 to 4 hours.
- 60 students (40.0%)** worked for 4 to 6 hours.
- 15 students (10.0%)** reported working for more than 6 hours. This finding suggests that a substantial number of students engage in prolonged working durations, which may contribute to the development of UCS.



Graph :1 Prevalence of Neck Pain and Associated Factors among Physiotherapy Students

Shoulder Posture:

- 110 participants (73.3%)** exhibited rounded shoulder posture, a common characteristic associated with UCS.
- 30 participants (20.0%)** had flexed shoulders.
- 10 participants (6.7%)** had extended shoulder posture. The predominance of rounded shoulder posture reinforces the postural abnormalities often linked with UCS.

Neck Pain During Neck Extension:

- 45 students (30.0%)** reported experiencing neck pain during neck extension.
- 105 students (70.0%)** did not report any pain during this activity.

Pain During PROM:

- For right side rotation, **35 participants (23.3%)** reported neck pain, while **115 (76.7%)** did not.
- For left side rotation, **25 participants (16.7%)** reported neck pain, and **125 (83.3%)** did not.

- In terms of thoracic pain during PROM for right side bending, **40 participants (26.7%)** reported pain, while **110 (73.3%)** did not.

Thoracic Pain:

- 30 students (20.0%)** reported thoracic pain during flexion.
- 35 students (23.3%)** experienced thoracic pain in active range of motion (AROM) during extension.
- Other activities such as right and left side rotation during AROM also showed varying levels of pain, with **32 participants (21.3%)** reporting pain on right rotation and **27 (18.0%)** on left rotation.

Visual Display Terminal Use:

A significant majority, **130 participants (86.7%)**, reported using visual display terminals (VDTs). Among those:

- 15 students (10.0%)** deviated their view to the left.
- 10 students (6.7%)** deviated to the right.
- 125 students (83.3%)** maintained a direct view in front of them, indicating a tendency for students to use their VDTs in an ergonomic manner.

Space Between Keyboard and Table Edge:

- 85 participants (56.7%)** indicated that they did not have enough space between their keyboard and the table edge, while **65 (43.3%)** reported having sufficient space. This factor may contribute to discomfort and poor posture.

DISCUSSION

Prevalence of Upper Cross Syndrome (UCS)

The results of this study indicate a high prevalence of Upper Cross Syndrome (UCS) among physiotherapy students in Ahmedabad, India. Approximately 80% of the participants exhibited signs of UCS, suggesting that this postural dysfunction is a significant issue within this population.

Factors Associated with UCS

Several factors were found to be associated with the development of UCS in this study. Prolonged working hours at a computer were significantly correlated with the presence of UCS, highlighting the importance of addressing ergonomic factors and promoting healthy postural habits among physiotherapy students. Additionally, a higher BMI was associated with a greater likelihood of developing UCS. This suggests that overweight and obese individuals may be at a higher risk for this condition due to factors such as poor muscle strength, decreased flexibility, and increased stress on the musculoskeletal system.

Impact of UCS on Physical and Mental Health

UCS can have a significant impact on physical and mental health. The most common symptoms reported by the participants in this study were neck pain, shoulder pain, and headaches. These symptoms can lead to decreased quality of life, reduced productivity, and increased stress. Furthermore, UCS can contribute to the development of more severe musculoskeletal disorders, such as thoracic outlet syndrome and carpal tunnel syndrome.

Implications for Prevention and Management

The findings of this study emphasize the need for targeted interventions to prevent and manage UCS among physiotherapy students. Promoting healthy postural habits, such as maintaining a neutral spine, avoiding prolonged sitting, and taking regular breaks from sedentary activities, is crucial. Ergonomic interventions, such as adjusting workstation height and using supportive chairs, can also help to reduce the risk of UCS.

Additionally, physical activity, including exercises that strengthen the core muscles and improve flexibility, can be beneficial in preventing and managing UCS. Regular stretching and strengthening exercises can help to counteract the effects of prolonged sitting and improve overall posture.

CONCLUSION

This study provides valuable insights into the prevalence of UCS and its associated factors among physiotherapy students in Ahmedabad. The high prevalence of UCS highlights the need for targeted interventions to address this condition and improve the overall health and well-being of physiotherapy students. By promoting healthy postural habits, physical activity, and ergonomic interventions, it is possible to reduce the prevalence of UCS and its associated symptoms.

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