

Postural Awareness, Postural Habits, and Clinical Practice of Upper Crossed Syndrome in Physiotherapy Students

Preeti T. Gayakwad¹, Dr.Aishwarya Kanhere²

¹Student, Department of Physiotherapy, Tilak Maharashtra Vidyapeeth, Indutai Tilak College of Physiotherapy, Pune

²Associate Professor and Guide, Department of Physiotherapy, Tilak Maharashtra Vidyapeeth's Indutai Tilak College of Physiotherapy, Pune

Abstract

Upper Crossed Syndrome (UCS) is a pattern of musculoskeletal imbalance characterised by tightness of the upper trapezius, levator scapulae and pectoral muscles together with weakness of the deep neck flexors, lower trapezius and serratus anterior. Physiotherapy students are exposed to prolonged sitting, extensive digital-device use and academic and clinical workload, all of which are recognised risk factors for UCS, yet it is unclear whether their professional knowledge of posture translates into personal postural habits and structured clinical practice. A cross-sectional survey was conducted among 100 physiotherapy students (3rd year, 4th year and interns) in Pune city using a self-made, expert-validated questionnaire comprising a 12-item Postural Awareness scale (1-7 Likert format), 8 dichotomous items on postural habits, and 8 dichotomous items on clinical practice related to UCS. The composite Postural Awareness score (mean 41.49 out of 84; Cronbach's alpha = 0.872) indicated moderate self-awareness. A majority of students reported unfavourable habits, including forward head posture while studying (76%), habitual slouching (68%) and carrying bags on one shoulder (65%). While 84% of students had clinically encountered forward head posture or rounded shoulders, only 30% had specifically assessed a patient for UCS and only 50% felt confident managing it. One-way ANOVA showed that Clinical Practice scores increased significantly with academic seniority ($F = 7.404, p = 0.001$), whereas Postural Awareness ($p = 0.885$) and Postural Habits ($p = 0.321$) did not differ across year groups. It is concluded that physiotherapy students possess only moderate postural self-awareness and a persistent gap between general clinical exposure and structured, confident management of UCS, and that this gap is not resolved by curriculum progression alone. Dedicated postural-ergonomic education and standardised UCS-screening protocols are recommended from the early years of physiotherapy training.

Keywords: Upper Crossed Syndrome, Postural Awareness, Postural Habits, Physiotherapy Students, Clinical Practice

1. Introduction

Upper Crossed Syndrome is a postural dysfunction originally described by Vladimir Janda and is defined by muscular imbalance in the upper quadrant of the body, in which the upper trapezius, levator scapulae and pectoral muscles become tight while the deep neck flexors, lower trapezius and serratus anterior

become weak. Excessive sitting, poor ergonomics, smartphone and computer use, and low physical activity have been identified in the literature as major contributors to postural dysfunction among young adults and students, and a high prevalence of upper-crossed postural patterns has been reported among student populations in association with screen exposure.

Physiotherapy students undertake academic sessions, clinical placements, documentation duties and extensive digital-device use as part of their training, and their education includes formal instruction in posture assessment, musculoskeletal rehabilitation and ergonomics. Because these students are expected to become rehabilitation specialists, it is considered important to examine whether their postural awareness, personal habits and clinical practice are consistent with their professional knowledge, since any shortcoming in the translation of theory into practice has implications both for their own musculoskeletal health and for their future credibility as postural educators for their patients.

Sustained forward head posture increases the anterior weight-bearing load transmitted through the cervical spine and can compress thoracic outlet structures and restrict rib-cage expansion, potentially reducing respiratory efficiency and contributing to fatigue that may be mistakenly attributed to workload rather than posture. The increasing reliance on e-modules, recorded lectures and mobile clinical-reference applications has also blurred the distinction between academic and recreational screen exposure, making postural correction and ergonomic adaptation during unavoidable screen-based activity more relevant than screen-time reduction alone. Physiotherapists are frequently the first point of contact for patients with neck pain, shoulder dysfunction and postural complaints, so the extent to which physiotherapy students translate their theoretical postural knowledge into personal practice has implications for the broader professional standards of the discipline.

Most previous studies on UCS have focused on prevalence and treatment, and comparatively little research has examined postural awareness, habits and clinical practice together within a single physiotherapy-student sample. The present study was therefore undertaken to address this gap and to inform preventive strategies within physiotherapy education.

2. Aim and Objectives

The aim of the study was to examine postural awareness, postural habits, and clinical practice related to Upper Crossed Syndrome among physiotherapy students. The objectives were as follows.

1. To study postural awareness among physiotherapy students by using Postural Awareness scale .
2. To study postural habits among physiotherapy students related to Upper Crossed Syndrome.
3. To study clinical practices related to identification and management of Upper Crossed Syndrome among physiotherapy students by using self made questionnaire

3. Review of Literature

de-la-Iglesia et al. (2023) examined the prevalence of UCS and its determinants among 45 adolescents in Spain using postural analysis and questionnaires, and reported that 37.8% of participants displayed features of UCS, with a significant association between sitting time, screen time and forward head posture. Tomar et al. (2025) studied 246 middle-school children and found a 10.97% prevalence of UCS, attributing it to prolonged poor posture during study and device use. Chang et al. (2023) reviewed the causes, clinical manifestations and treatment of UCS and identified excessive computer and phone use together with poor posture as the most frequent risk factors, emphasising early prevention. Sepehri et al.

(2024), in a systematic review and meta-analysis, found that therapeutic exercises positively affect forward head posture, rounded shoulder posture and thoracic posture.

Hassan et al. (2023) reported that prolonged phone use among university students was strongly associated with forward head position, kyphosis and upper-back pain, while Kim et al. (2015) found that prolonged smartphone use altered cervical posture and impaired respiratory function in healthy individuals. Khan et al. (2022) found a high incidence of neck and shoulder discomfort among healthcare students who sat for long periods. Elkheshbehi et al. (2026) conducted a cross-sectional study of 126 physiotherapy students at the University of Tripoli using clinical assessments (neck range of motion, wall-and-ruler test, thumb test) and found UCS to be highly prevalent, calling for postural education to be strengthened within physiotherapy training itself.

Mubeen et al. (2016) found, among 384 medical students at the University of Lahore, that 48.7% reported neck pain and 66.8% demonstrated poor studying posture using the Reedco posture scale and wall push-up test. Chithra and Vishwanath (2022) reported lower trapezius weakness in 59% of 100 college-going students and a mean Neck Disability Index score of 36.66 (SD 30.89), indicating that scapular-stabiliser weakness, and not only anterior chest tightness, contributes substantially to the syndrome. A 2026 Indian multi-centre synthesis cited within a telerehabilitation study protocol reported UCS prevalence of approximately 30.43% among physiotherapy students and 31.76% among office workers in India, with higher prevalence among females, remote workers and individuals working more than 12 hours a day, reinforcing that occupational and academic screen exposure is consistently associated with elevated UCS prevalence across diverse Indian groups.

4. Materials and Methods

4.1 Study Design and Setting

A cross-sectional, survey-based study was conducted over a period of six months in clinics and physiotherapy rehabilitation centres in Pune city.

4.2 Participants

A total of 100 physiotherapy students (3rd year, 4th year, and BPTH interns) were recruited using convenience sampling. Both male and female students who were willing to participate were included. Students with incomplete questionnaire responses and those with known musculoskeletal or neurological conditions affecting posture were excluded.

4.3 Materials

A written consent form and a self-made questionnaire were used. The questionnaire, validated by experienced physiotherapists for relevance, clarity, sequence and concept, consisted of three sections: a validated 12-item Postural Awareness scale rated on a 1-7 Likert format, an self made 8-item Postural Habits section, and an 8-item Clinical Practice section, the latter two scored as Yes/No responses.

4.4 Procedure

Ethical clearance was obtained from the Institutional Ethical Committee of TMV's Indutai Tilak College of Physiotherapy. The aims and objectives of the study were explained to participants, and those satisfying the inclusion criteria were enrolled after providing informed consent. The questionnaire was distributed electronically through WhatsApp, and participants were requested to forward it to other eligible physiotherapy students and physiotherapists. Data were collected, cleaned, and statistically analysed.

4.5 Outcome Measures

Postural awareness was evaluated using a Postural Awareness scale adapted from the Body Awareness

Rating Scale (BARS) format. Postural habits and clinical practice related to UCS were evaluated using the self-made questionnaire described above.

4.6 Statistical Analysis

Descriptive statistics (mean, standard deviation, median, frequency, percentage) were computed for all variables. Internal consistency of the Postural Awareness scale was assessed using Cronbach's alpha. Group comparisons across the three academic-year groups were performed using one-way ANOVA. A significance threshold of $\alpha = 0.05$ was used throughout.

5. Results

5.1 Demographic Profile

The sample consisted of 100 physiotherapy students with a mean age of 22.38 years (SD = 1.19; range 20-25 years). The sample was predominantly female (81%) and was fairly evenly distributed across academic-year groups, with the fewest respondents among interns.

Table 1: Demographic Profile of Respondents

Variable	Category	n	%
Gender	Female	81	81.0
	Male	19	19.0
Academic Year	3rd Year	40	40.0
	4th Year	38	38.0
	Interns	22	22.0

5.2 Postural Awareness

Item-wise means for the 12-item Postural Awareness scale ranged from 3.03 to 3.93 on the 1-7 scale, indicating a moderate level of self-reported awareness across items.

Table 2: Item-Wise Postural Awareness Scores (1-7 Scale)

Item	Mean	SD	Median
I need to concentrate very much in order to become aware of my body posture.	3.18	1.71	3.0
When I assume a poor body posture, I often do not notice it until I develop pain.	3.15	1.82	3.0
When sitting, I often slump without being aware of it.	3.93	1.85	4.0
When concentrating on a specific activity, I often assume a certain body posture without knowing it.	3.87	1.95	4.0
It is difficult for me to consciously assume a specific body posture.	3.18	1.77	3.0
While working, I regularly check my body posture.	3.66	1.90	3.5

Item	Mean	SD	Median
Through my body posture, I can actively influence the impression I make on others.	3.62	1.77	4.0
Throughout the day, I am continually aware of how I am sitting or standing.	3.34	1.87	3.0
I often call into my awareness how I am currently sitting or standing.	3.55	1.69	4.0
Even during focused work, I am continually aware of my body posture.	3.27	1.77	3.0
Through my body posture, I can consciously control my mood.	3.03	1.60	3.0
I notice whether my body posture is good only when I concentrate on it.	3.71	1.81	4.0

The composite Postural Awareness score (possible range 12-84) had a mean of 41.49 (SD = 13.89; observed range 12-71), close to but below the theoretical midpoint of 48, indicating a moderate, somewhat below-average level of self-reported postural awareness. Internal consistency of the 12-item scale, assessed with Cronbach's alpha, was 0.872, indicating good internal reliability.

5.3 Postural Habits

A majority of students reported behaviours consistent with the development of UCS. Table 3 presents the percentage of students responding 'Yes' to each habit item.

Table 3: Postural Habits Among Physiotherapy Students

Item	n	%
Maintains forward head posture while studying or reading	76	76.0
Habitually sits with a slouched posture	68	68.0
Keeps shoulders rounded forward while sitting or standing	56	56.0
Sits with back supported for prolonged periods	83	83.0
Sits continuously for more than 30 minutes without changing posture	59	59.0
Carries college or clinical bag on one shoulder	65	65.0
Consciously corrects head, neck or shoulder posture during the day	83	83.0
Performs stretching or posture-correction exercises during prolonged work	70	70.0

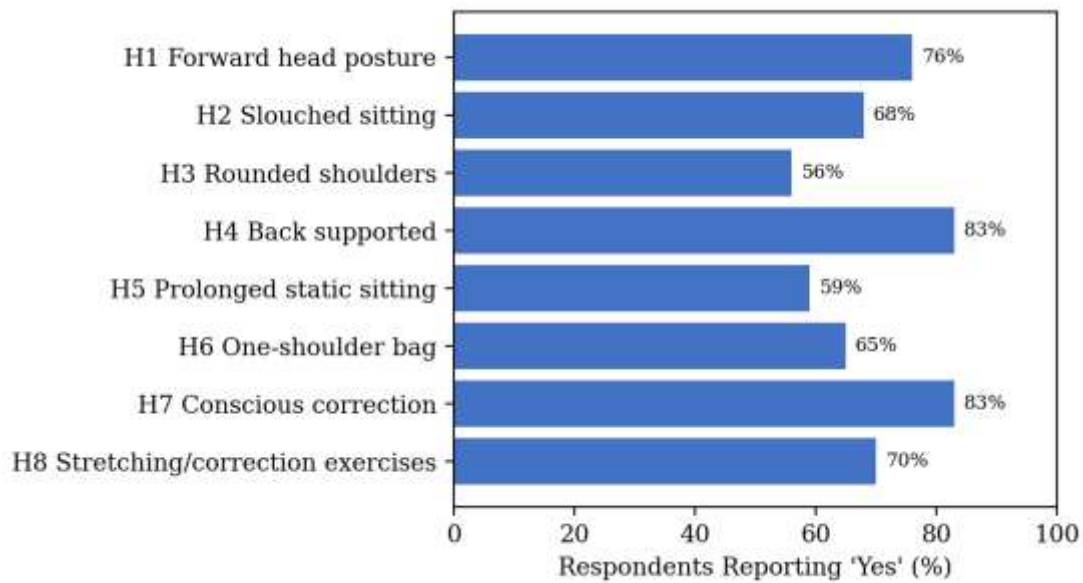


Figure 1: Percentage of Respondents Reporting 'Yes' for Each Postural Habit Item

Back support (83%) and conscious correction (83%) reflect protective habits, whereas the remaining items largely reflect habits associated with poor posture, such as forward head posture, slouching, prolonged static sitting and one-shoulder bag carriage.

5.4 Clinical Practice of Upper Crossed Syndrome

Clinical practice and awareness relating to UCS were assessed with 8 Yes/No items covering assessment behaviour, theoretical awareness and management confidence, presented in Table 4.

Table 4: Clinical Practice of Upper Crossed Syndrome

Item	n	%
Assessed a patient with forward head posture or rounded shoulders during clinical postings	84	84.0
Specifically assessed a patient for Upper Crossed Syndrome	30	30.0
Aware of assessment methods used to identify Upper Crossed Syndrome	48	48.0
Aware of stretching exercises for tight muscles in Upper Crossed Syndrome	60	60.0
Aware of strengthening exercises for weak muscles in Upper Crossed Syndrome	61	61.0
Provides ergonomic or posture-correction advice to patients with Upper Crossed Syndrome	68	68.0
Feels confident managing a patient with Upper Crossed Syndrome during clinical practice	50	50.0
Aware of Egoscue exercises for postural correction	33	33.0

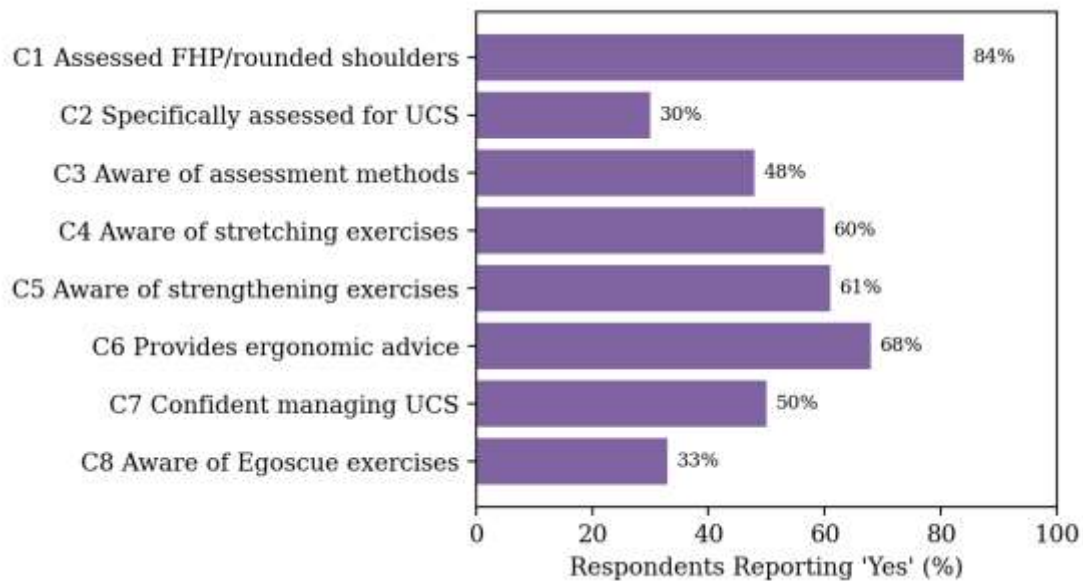


Figure 2: Percentage of Respondents Reporting 'Yes' for Each Clinical-Practice Item

A large gap is evident between general clinical exposure to postural deviations (84%) and specific, structured assessment for Upper Crossed Syndrome (30%), and between passive theoretical awareness of exercise principles (60-61%) and active clinical application, including confidence in management (50%) and awareness of Egoscue exercises (33%).

5.5 Comparison by Academic Year

One-way ANOVA was used to compare composite scores across the three academic-year groups. Clinical Practice scores increased significantly with academic year, rising from a mean of 3.20 in 3rd-year students to 4.95 in 4th-year students and 5.36 among interns ($F = 7.404$, $p = 0.001$). Neither Postural Awareness ($F = 0.122$, $p = 0.885$) nor Postural Habits ($F = 1.151$, $p = 0.321$) differed significantly across year groups.

Table 5: Comparison of Composite Scores Across Academic-Year Groups (One-Way ANOVA)

Composite Score	3rd Year (n=40)	4th Year (n=38)	Interns (n=22)	F	p
Postural Awareness (12-84)	42.00	40.61	42.09	0.122	0.885
Postural Habits (0-8)	5.35	5.87	5.59	1.151	0.321
Clinical Practice of UCS (0-8)	3.20	4.95	5.36	7.404	0.001

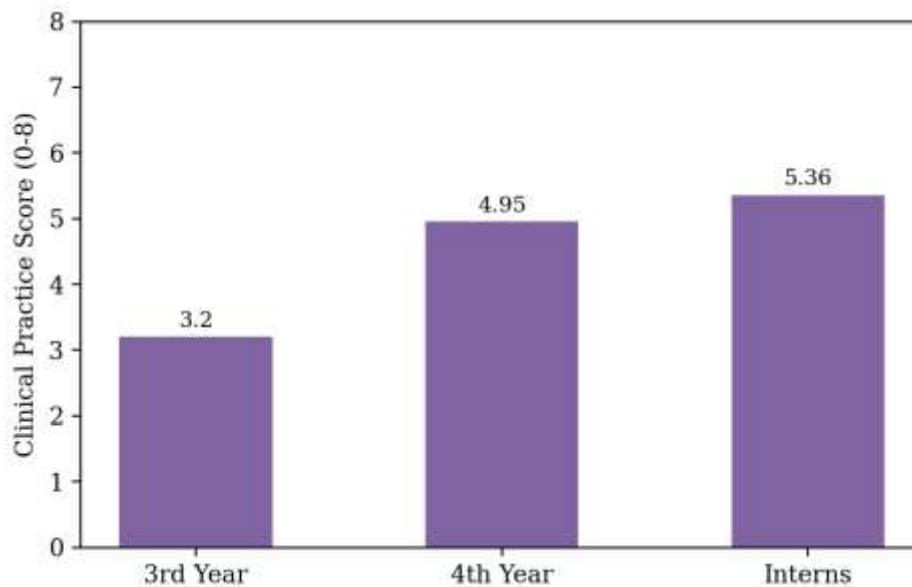


Figure 3: Clinical Practice of Upper Crossed Syndrome Score by Academic Year (Mean)

6. Discussion

The present study examined three interlinked constructs, postural awareness, postural habits and clinical practice, related to UCS among 100 physiotherapy students in Pune. The findings indicate that physiotherapy students possess only moderate self-reported postural awareness, continue to practise several ergonomically unfavourable habits despite their professional training, and show a marked gap between passive theoretical knowledge of UCS and its active, structured application in clinical settings. The composite Postural Awareness score of 41.5 out of 84, together with good internal reliability ($\alpha = 0.872$), indicates that students' self-monitoring of posture is inconsistent rather than absent, as many reported becoming aware of poor posture only when consciously concentrating on it or only after pain had already developed. This pattern is consistent with de-la-Iglesia et al. (2023), who linked forward head and forward shoulder posture in adolescents to unfavourable technology-use habits rather than to a lack of theoretical knowledge, and who reported a 37.8% prevalence of UCS in their sample.

A majority of students in the present study reported behaviours known to predispose to UCS, including forward head posture while studying (76%), habitual slouching (68%), and carrying bags on a single shoulder (65%). These figures are consistent with, and in some respects higher than, those reported in comparable populations; Mubeen et al. (2016) found that 66.8% of medical students demonstrated poor studying posture, a proportion closely comparable to the slouching rate observed here, while Chithra and Vishwanath (2022) reported lower trapezius weakness in 59% of college students, a figure aligning with the 59% of the present sample who reported sitting continuously for more than 30 minutes without a postural change. Encouragingly, 83% of students reported consciously attempting to correct their posture during the day, suggesting that corrective intent exists alongside unfavourable habits, even though this intent has not been sufficient to prevent the habits from persisting.

The most notable finding of the present study is the disparity within the Clinical Practice domain. While 84% of students had assessed a patient with forward head posture or rounded shoulders during clinical postings, only 30% had specifically assessed a patient for UCS as a defined clinical entity, and only 48% were aware of the specific assessment methods used to identify it. This indicates that students frequently

encounter the clinical signs of UCS but do not consistently recognise or label them within a structured diagnostic framework. This finding is consistent with Elkheshbi et al. (2026), who reported high UCS prevalence among physiotherapy students at the University of Tripoli despite their professional background and called for strengthened postural education within physiotherapy curricula, and it parallels Indian data reporting 30.43% UCS prevalence among physiotherapy students, reinforcing that this is a recurring, cross-institutional phenomenon.

Confidence in managing UCS clinically was reported by only half of the students, and awareness of specific corrective approaches such as Egoscue exercises was lower still (33%), despite comparatively higher general awareness of stretching (60%) and strengthening (61%) principles. This suggests that broad exercise-science knowledge is reasonably well retained, but its translation into a specific, named clinical protocol for UCS remains underdeveloped.

Clinical Practice scores increased significantly with academic seniority ($F = 7.404, p = 0.001$), rising from a mean of 3.20 in 3rd-year students to 4.95 in 4th-year students and 5.36 among interns, suggesting that clinical competence relating to UCS improves cumulatively through repeated clinical exposure rather than through classroom teaching alone. In contrast, neither Postural Awareness ($p = 0.885$) nor Postural Habits ($p = 0.321$) differed significantly across academic-year groups, indicating that simply advancing through the physiotherapy programme does not, by itself, improve a student's own postural self-awareness or personal postural behaviour. This dissociation suggests that personal postural habits and applied clinical skill are governed by different mechanisms and may require distinct, targeted interventions. The overall pattern is consistent with the wider literature on UCS in student and young-adult populations, which places prevalence estimates broadly between 28% and 67% depending on population and assessment method and consistently identifies prolonged sitting, poor ergonomics and heavy device use as principal modifiable risk factors.

7. Limitations

The study is limited by its cross-sectional design, which precludes causal inference; its reliance on self-reported, dichotomous items for habits and clinical practice, which may be subject to social-desirability bias; its use of convenience sampling from a single city, which limits generalisability; and the absence of an objective, clinician-administered postural assessment, such as photogrammetry or goniometry, to corroborate self-reported postural habits against actual UCS status.

8. Future Scope

Future studies could adopt a longitudinal design following the same cohort of physiotherapy students from the 3rd year through to internship, allowing determination of whether postural awareness and habits genuinely remain static over time or are masked by cohort variation, and allowing the effect of an early educational or ergonomic intervention to be tested causally. Combining the self-reported questionnaire approach with objective, clinician-administered postural-assessment tools, such as photogrammetry, the Reedco posture scale, goniometric measurement of the craniovertebral angle, or standardised tests for pectoralis minor tightness and lower trapezius strength, would help determine how accurately students' self-perception of posture matches their actual musculoskeletal status. Expanding the sample beyond a single city, and to allied-health disciplines beyond physiotherapy, such as occupational therapy, nursing and dentistry, would further improve generalisability. From an educational standpoint, the gap identified between general clinical exposure and structured, confident UCS-specific assessment points to an

opportunity to design and evaluate a dedicated postural-ergonomics module, incorporating self-postural-correction training, standardised UCS-screening protocols, and structured exposure to corrective approaches such as Egoscue exercises.

9. Conclusion

Physiotherapy students demonstrate only moderate postural self-awareness and continue to exhibit several postural habits known to predispose to Upper Crossed Syndrome, despite their professional training in musculoskeletal health. A clear gap exists between general clinical exposure to postural deviations and structured, confident, UCS-specific clinical assessment and management. While clinical-practice competency improves significantly with academic seniority and cumulative clinical exposure, personal postural awareness and habits do not improve merely with advancement through the curriculum, indicating that these require dedicated, targeted intervention rather than being an incidental by-product of clinical training. These findings support the incorporation of structured ergonomic and postural self-care modules, along with standardised UCS-screening protocols, into physiotherapy curricula from the earliest years of training, both to protect the musculoskeletal health of future physiotherapists themselves and to ensure that they are equipped to model good postural behaviour and to identify and manage Upper Crossed Syndrome confidently and consistently in their patients.

Acknowledgement

The authors thank Dr. Mahendra Shende (PT), Principal, TMV's Indutai Tilak College of Physiotherapy, and all the physiotherapy students who participated in this study.

References

1. Janda V, Muscle Function Testing, Butterworth-Heinemann, London.
2. de-la-Iglesia L, Bravo C, Rubi-Carnacea F, Upper crossed syndrome in secondary school students: a mixed-method study, Journal of Taibah University Medical Sciences, 2023, 18 (4), 894-907.
3. Chang M.C., et al., Upper Crossed Syndrome: clinical features, pathophysiology, and treatment approaches, 2023.
4. Tomar A., et al., Prevalence of upper cross syndrome in middle school students: a cross-sectional study, Bulletin of Faculty of Physical Therapy, 2025.
5. Sepehri S., et al., Effectiveness of exercise interventions in Upper Crossed Syndrome: systematic review and meta-analysis, 2024.
6. Development and validation of the Postural Habits and Awareness Scale (PHAS), reliability and validity study, 2022.
7. Development and validation of an assessment tool for Upper Crossed Syndrome, Journal of Clinical and Diagnostic Research, 2024.
8. Kim K., et al., Effects of smartphone use on cervical posture and respiratory function, 2015.
9. Yoo W.G., et al., Effects of prolonged computer work on upper body posture in college students, 2014.
10. Hassan S., et al., Association of smartphone use with postural changes and musculoskeletal discomfort among university students, 2023.
11. Khan N., et al., Questionnaire-based study on musculoskeletal problems and posture among healthcare students, 2022.

12. Elkheshebi A.H., Zewa N.A.S., Alkilani M.N., Suleiman L., Prevalence and associated factors of Upper Cross Syndrome among physiotherapy students at the University of Tripoli, Academic Journal of Basic and Applied Sciences, 2026, 7 (2).
13. Mubeen I., Malik S., Akhtar W., Iqbal M., Asif M., Arshad A., et al., Prevalence of upper cross syndrome among the medical students of University of Lahore, International Journal of Physiotherapy, 2016, 3 (3), 381-384.
14. Chithra P.V., Vishwanath S., Prevalence of upper-cross syndrome in college going students, a cross sectional study, International Journal of Research in Medical Sciences, 2022.
15. Dhage P., Anap D., Prevalence of an Upper Crossed Syndrome in physiotherapy college students, a cross-sectional study, VIMS Health Science Journal, 2019, 6 (1), 10-13.
16. Recent Indian prevalence data on Upper Crossed Syndrome among physiotherapy students and office workers, as synthesised in: Effectiveness of telerehabilitation in individuals with Upper Crossed Syndrome across diverse age demographics, study protocol for a randomized controlled trial, 2026.