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Case study

Prevalence of Text Neck Syndrome and Smartphone Addiction among Undergraduate Health Sciences Students: A Cross-Sectional Observational Study

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A B S T R A C T

Nanotechnology has emerged as a transformative approach in modern pharmaceutical sciences, particularly in improving drug delivery system[1,3]. Nanoparticles, due to their unique physicochemical properties, enable targeted delivery of therapeutic agents to specific sites within the body. This thesis explores the principles, types, mechanisms, advantages, limitations, and applications of nanoparticles in targeted drug delivery. Special emphasis is placed on their role in enhancing bioavailability, reducing toxicity, and improving therapeutic efficacy [7,16]. The study also highlights recent advancements and future perspectives in nanomedicine.

Keywords: Nanotechnology, Targeted Drug Delivery System, Nanoparticles

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INTRODUCTION

Smartphones have become indispensable instruments of modern academic and social life. The global proliferation of these devices has introduced a growing spectrum of musculoskeletal disorders collectively termed 'Text Neck Syndrome' (TNS)—a repetitive stress injury arising from prolonged forward head posture adopted while operating handheld digital devices (1,2).

The biomechanical basis of TNS lies in the exponential increase in cervical loading with progressive neck flexion. At neutral posture (0°), the head exerts approximately 4–5 kg on the cervical spine. This force escalates to approximately 27 kg at 60° flexion—a position routinely adopted during smartphone use. Sustained exposure to these compressive forces leads to progressive cervical muscle fatigue, ligamentous stress, accelerated intervertebral disc degeneration, and functional neck disability (2).

Young adults, particularly undergraduate students in health sciences and technology programmes, represent one of the most vulnerable cohorts. Several cross-sectional studies have documented TNS prevalence rates ranging from approximately 56% to over 85% among university students. Salameh et al. (2024) reported a TNS prevalence of 73.3% among medical students, with significant associations between daily usage hours and neck dysfunction as measured by the Neck Disability Index (NDI) (4).

Hakami et al. (2024) documented widespread neck pain among smartphone users in Jeddah, with most participants exhibiting neck flexion angles between 30° and 45° (1). In the Indian context, Aswini and Manimozhi (2025) documented a 72% prevalence of TNS among university students, confirming that prolonged downward gaze and lack of ergonomic awareness were primary contributors (3). Kamaraj et al. (2022) reported a prevalence of 65.7% among medical college undergraduates in Puducherry (8). Alsiwed et al. (2021) documented 56.8% prevalence among medical students in Jeddah (7), while Iqbal et al. (2024) established a dose-dependent relationship between daily screen time and neck pain severity (6).

Smartphone addiction has been identified as an amplifying factor for TNS. Sirajudeen et al. (2022) demonstrated that

students scoring above the Smartphone Addiction Scale (SAS) threshold exhibited significantly greater neck flexion angles and higher NDI scores (9). Zhuang et al. (2020) further showed that patients using smartphones for more than 4 hours daily had significantly higher rates of cervical disc degeneration at C5-C6 and C6-C7 levels (2). Javed et al. (2023) identified neck flexion angle, daily use duration, and break frequency as the three strongest predictors of TNS (5). Mashabi et al. (2025) specifically examined female students and found TNS prevalence of 68.4%, with sitting and lying-down usage identified as high-risk positional variables (10).

Despite these growing international reports, the Indian subcontinental literature on this subject remains sparse, particularly from Tier-2 cities and mixed-health-sciences cohorts. The current study was initiated to address this knowledge gap by quantifying the burden of TNS at CAIMS, Karimnagar, Telangana, and by characterising the behavioural, demographic, and postural predictors of neck disability.

OBJECTIVES

1. To determine the prevalence of Text Neck Syndrome and identify the most affected demographics (gender, educational background, neck posture).
2. To assess smartphone addiction levels using the Smartphone Addiction Scale (SAS) and analyse item-level addiction patterns.
3. To evaluate the association of total smartphone usage hours, purpose of use, break frequency, and warm-up habits with the development of neck disability.
4. To assess awareness of smartphone-related health risks among the study population and examine the knowledge–behaviour gap.

MATERIALS AND METHODS

Study Design and Setting

This was a cross-sectional observational study conducted at Chalmeda Anand Rao Institute of Medical Sciences (CAIMS), Karimnagar, Telangana, India. The study was conducted over two months from October to November 2025 by 6th-year PharmD interns from the Department of Clinical Pharmacy Practice, Vaageswari College of Pharmacy, Karimnagar.

Study Population and Sampling

The study enrolled undergraduate students from MBBS, BDS, PharmD, B.Pharm, B.Tech, and Life Sciences programmes. A total of 300 participants who fulfilled the inclusion criteria were included in the final analysis.

Inclusion Criteria

Undergraduate students enrolled in MBBS, BDS, PharmD, B.Pharm, B.Tech, or Allied Health Sciences programmes; willingness to participate with provision of electronic informed consent; active smartphone users.

Exclusion Criteria

History of trauma or prior cervical surgery; known congenital cervical anomalies; pre-existing medical conditions associated with chronic neck pain or spinal cord injury.

Data Collection Instruments

A validated, pre-tested questionnaire was circulated electronically via Google Forms comprising three sections:

Demographic and Postural Assessment

This section collected demographic data (age, gender, programme, year of study) and smartphone usage habits: average daily usage hours, primary purpose of use, approximate time per purpose (academic, entertainment, social media, communication), frequency of posture breaks, warm-up practices, and most common neck posture from a visual illustration depicting 0°, 15°, 30°, 45°, and 60° of cervical flexion.

Smartphone Addiction Scale (SAS)

The SAS 10-item short version was used to assess digital dependency. Each item was rated on a 6-point Likert scale (1 = Strongly disagree to 6 = Strongly agree), yielding total scores from 10 to 60. Participants scoring ≥31 were classified as being at risk of smartphone addiction (9).

Neck Disability Index (NDI)

The NDI is a validated 10-item self-report scale assessing how neck pain affects daily function, covering pain intensity, personal care, lifting, reading, headache, concentration, work, driving, sleeping, and recreation. Each item is scored 0–5 (total 0–50), categorised as: 0–4 = No disability; 5–14 = Mild; 15–24 = Moderate; 25–34 = Severe; 35–50 = Complete disability (4).

Table 1: Neck Disability Index Scoring and Classification

NDI Score	Disability Category	Percentage
0 – 4	No Disability	0 – 8%
5 – 14	Mild Disability	10 – 28%
15 – 24	Moderate Disability	30 – 48%
25 – 34	Severe Disability	50 – 64%
35 – 50	Complete Disability	70 – 100%

Statistical Analysis

Descriptive statistics (frequencies, percentages, means, standard deviations) were computed for all variables. NDI scores were calculated by summing numerical item codes. SAS scores were computed similarly. Comparative analysis of NDI mean scores across demographic and behavioural subgroups was performed. Cross-tabulations of neck pain prevalence by gender and educational background were generated.

RESULTS

Demographic Characteristics

A total of 300 undergraduate students participated. The majority were male (n = 221; 73.7%) versus female (n = 79;

26.3%). The most prevalent age group was 21–23 years (36.3%; n = 109), followed by 24–26 years (29.0%; n = 87). MBBS students formed the largest academic cohort (25.3%; n = 76), followed by B.Pharm (24.3%; n = 73) and B.Tech (22.7%; n = 68). By year of study, second-year students predominated (39.0%; n = 117).

Table 2: Demographic Characteristics of Study Participants (N = 300)

Variable	Category	n	%
Gender	Male	221	73.7
	Female	79	26.3
Age	18–20 years	38	12.7
	21–23 years	109	36.3
	24–26 years	87	29.0
	27–29 years	45	15.0
	30–32 years	19	6.3
Educational Background	MBBS	76	25.3
	B.Pharm	73	24.3
	B.Tech	68	22.7
	PharmD	41	13.7
	BDS	29	9.7
	Life Sciences	13	4.3
Year of Study	1st Year	38	12.7
	2nd Year	117	39.0
	3rd Year	88	29.3
	4th Year+	57	19.0

Smartphone Usage Patterns

The most common daily usage bracket was 4–6 hours (38.0%; n = 114), followed by 6–8 hours (33.7%; n = 101). Only 8.0% (n = 24) used smartphones fewer than 2 hours daily, while 6.0% (n = 18) used them for more than 8 hours. Social media was the primary purpose of use (38.3%; n = 115), followed by entertainment (29.0%; n = 87) and academic use (16.0%; n = 48). Regarding time per purpose, most participants spent 1–2 hours daily on academic activities (66.7%; n = 200), entertainment (66.7%; n = 200), social media (63.0%; n = 189), and communication (61.3%; n = 184).

Table 3: Average Daily Smartphone Usage (N = 300)

Average Daily Usage	n	%
Less than 2 hours	24	8.0
2 to 4 hours	38	12.7
4 to 6 hours	114	38.0
6 to 8 hours	101	33.7
More than 8 hours	18	6.0

Neck Pain Prevalence and Characteristics

Among all participants, 69.4% (n = 204) reported neck pain. Of those with neck pain, 81.9% (n = 167) experienced it daily and 91.7% (n = 187) reported worsening with smartphone use. By severity, 47.1% (n = 96) rated their pain as mild, 43.6% (n = 89) as moderate, and 13.2% (n = 27) as severe. Onset of discomfort occurred within fewer than 15 minutes in 62.0% (n = 186) of participants.

Table 4: Neck Pain Prevalence by Gender

Gender	Neck Pain (Yes)	% (Yes)	Neck Pain (No)	% (No)
Male (n = 221)	160	72.5	61	27.5
Female (n = 79)	48	60.5	31	39.5
Total (N = 300)	204	69.4	90	30.6

Table 5: Neck Pain Prevalence and NDI Scores by Educational Background

Educational Background	n	Neck Pain (%)	Mean NDI ± SD
B.Tech	68	85.1	11.54 ± 5.46
PharmD	41	76.9	9.39 ± 5.31
B.Pharm	73	65.8	8.55 ± 6.68
BDS	29	65.5	7.76 ± 5.70
MBBS	76	58.9	7.55 ± 6.18
Life Sciences	13	53.8	8.15 ± 6.74

Neck Posture and Usage Context

The most frequent neck position was 30° moderate flexion (42.3%; n = 127), followed by 45° significant flexion (29.3%; n = 88). Only 8.3% (n = 25) maintained an upright 0° posture. Collectively, 71.6% of participants habitually used their smartphone at ≥30° flexion. Regarding body position during use, 41.3% (n = 124) reported standing, 28.3% (n = 85) sitting, and 26.3% (n = 79) lying down.

Table 6: Neck Flexion Position during Smartphone Use and Associated NDI Scores

Neck Position	n	%	Mean NDI Score
0° Upright posture	25	8.3	0.96
15° Slight bend	44	14.7	1.39
30° Moderate bend	127	42.3	11.87
45° Significant bend	88	29.3	10.53
60° Extreme bend	16	5.3	11.19

Smartphone Addiction Scale (SAS) Analysis

The mean SAS total score was 38.74 ± 14.54 (range 10–60). Using the validated cutoff of ≥31, 193 participants (64.3%) were classified as being at risk of smartphone addiction (9). Item-level analysis showed the highest mean scores for 'I constantly check social media on my smartphone' (4.01), 'I use my smartphone longer than I intend' (4.01), and 'People around me tell me I use my smartphone too much' (4.00). Notably, 'I feel pain in my wrist or back of neck' scored a mean of 3.86, directly corroborating TNS symptomatology.

Table 7: Smartphone Addiction Scale Classification (N = 300)

SAS Category	n	%
At Risk / Addicted (SAS ≥ 31)	193	64.3
Not Addicted (SAS < 31)	107	35.7
Mean SAS Score ± SD	38.74 ± 14.54	—

Table 8: SAS Item-Level Mean Scores (N = 300; 1 = Strongly Disagree, 6 = Strongly Agree)

SAS Item	Mean (1–6)
I constantly check social media on my smartphone	4.01
I use my smartphone longer than I intend	4.01
People around me tell me I use my smartphone too much	4.00
I feel pain in my wrist or back of neck	3.86
I feel impatient when not holding my smartphone	3.84
I have my phone on my mind even when not using it	3.84
I have difficulty concentrating due to smartphone use	3.81
I wouldn't be able to stand not having a smartphone	3.81
I would never give up using my smartphone	3.80
I miss planned work due to smartphone usage	3.76

Neck Disability Index (NDI) Analysis

The mean NDI score was 9.00 ± 6.16 (range 0–18). Categorical distribution: no disability 29.3% (n = 88), mild disability 45.3% (n = 136), moderate disability 25.3% (n = 76). No participant reached the severe or complete disability threshold. Males had higher mean NDI scores (9.47 ± 6.12) than females (7.68 ± 6.11). By programme, B.Tech students had the highest mean NDI (11.54 ± 5.46) and MBBS students the lowest (7.55 ± 6.18).

Table 9: Neck Disability Index Score Distribution (N = 300)

NDI Category	Score Range	n	%
No Disability	0 – 4	88	29.3
Mild Disability	5 – 14	136	45.3
Moderate Disability	15 – 24	76	25.3
Severe Disability	25 – 34	0	0.0
Complete Disability	35 – 50	0	0.0
Total	—	300	100.0

Breaks, Warm-Up, and Awareness

A total of 93.0% (n = 279) of participants reported taking breaks during smartphone use; however, 28.7% (n = 80) took breaks only rarely. Mean NDI among break-takers (9.01) was essentially equivalent to non-break-takers (8.81), indicating that infrequent or unstructured breaks do not meaningfully attenuate cervical risk. Warm-up or neck stretching before smartphone use was reported by 87.0% (n = 261); the marginal NDI difference between warm-up (9.14) and non-warm-up (8.03) groups suggests self-reported warm-up may be inconsistently performed. Awareness of smartphone posture-related neck problems was high at 89.7% (n = 269); only 10.3% (n = 31) were unaware.

DISCUSSION

The present study found a neck pain prevalence of 69.4% among undergraduate health sciences students at CAIMS, consistent with published international prevalence rates of 56–85% (1,3,4,7,8,10). The NDI-based classification revealed that 70.6% of participants had at least mild neck disability (NDI ≥ 5), including 25.3% in the moderate range, indicating functional limitations affecting academic performance and daily activities.

The most striking postural finding was that 71.6% of all participants habitually used smartphones at cervical flexion angles of ≥30°. Paradoxically, the 30° moderate flexion group recorded the highest mean NDI score (11.87), rather than the 60° extreme flexion group (11.19). This may reflect the greater cumulative duration of use at 30°, corroborating the principle that sustained loading duration is as important as the angle itself (2). Zhuang et al. (2020) demonstrated structural cervical disc changes in young patients using smartphones for more than 4 hours daily (2), and the current study found that 71.7% of participants used their devices for 4 or more hours per day—placing a large proportion at risk for progressive degeneration.

Males exhibited higher neck pain prevalence (72.5% vs. 60.5%) and NDI scores (9.47 vs. 7.68) than females. This male predominance may reflect the gender composition of the cohort (73.7% male) and the higher representation of B.Tech students, who in this study bore the greatest burden of TNS. B.Tech students demonstrated the highest neck pain rate (85.1%) and mean NDI (11.54 ± 5.46), attributable to computationally intensive coursework requiring prolonged multi-screen use. PharmD students also fared poorly (76.9% neck pain), potentially reflecting the dual demand of clinical internship and academic workload. In contrast, MBBS students showed the lowest neck pain rate (58.9%), possibly due to more structured clinical rotations limiting uninterrupted device use. These findings differ from studies reporting higher female TNS rates (8,10), which may reflect population-specific differences.

The mean SAS score of 38.74 ± 14.54, with 64.3% at addiction risk, substantially exceeds the 42% reported by Sirajudeen et al. (2022) in a comparable population (9). Loss of temporal self-regulation ('I use my smartphone longer than intended', mean 4.01) and compulsive social media checking (mean 4.01) were dominant addiction dimensions. The direct overlap between the SAS item 'I feel pain in my wrist or back of neck' (mean 3.86) and TNS symptomatology confirms a mechanistic link: addiction-driven session prolongation extends cumulative cervical loading, amplifying NDI scores (9).

Despite 89.7% awareness of posture-related neck risks, 69.4% remained symptomatic—a classic knowledge–behaviour gap well documented in chronic disease prevention (4,9). Near-equivalent NDI scores between break-takers (9.01) and non-break-takers (8.81) reinforce findings by Salameh et al. (2024) and Sirajudeen et al. (2022) that unstructured breaks provide minimal cervical relief (4,9). Among reported break-takers, 28.7% did so 'rarely', precluding the decompressive benefit of postural variation. Similarly, despite 87.0% reporting warm-up practices, the marginally higher NDI in this group suggests inadequate technique or recall bias, pointing to the need for professionally guided cervical conditioning programmes (5).

From a clinical pharmacy perspective, the findings hold immediate professional relevance. PharmD graduates are uniquely positioned to screen for TNS during routine counselling, integrate ergonomic advice into digital health literacy programmes, and contribute to institution-level policies limiting compulsive device use. The dual competency in pharmacological management of cervical pain and behavioural counselling positions clinical pharmacists as key stakeholders in a multidisciplinary TNS prevention approach.

CONCLUSION

Text Neck Syndrome is highly prevalent among undergraduate health sciences students at CAIMS, with nearly 70% reporting neck pain and over 70% classified with at least mild NDI-based disability. B.Tech students and male participants are disproportionately affected. The concurrent high rate of smartphone addiction (64.3%) and predominance of ≥30° cervical flexion indicate a compounding risk cycle. Despite high awareness (89.7%), the knowledge–behaviour gap remains entrenched. A three-pronged institutional response is recommended: (1) technique-specific ergonomic training embedded in academic curricula; (2) structured digital detox programmes guided by SAS-based screening; and (3) integration of TNS screening and cervical conditioning counselling into clinical pharmacy practice competencies. Longitudinal studies assessing progression of NDI scores and radiological findings in this population are warranted.

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CONFLICTS OF INTEREST

The authors declare no personal or financial conflicts of interest in relation to the research, authorship, or publication of this article.

REFERENCES

1. Hakami I, Sherwani A, Hadadi M, Alzahrani R, Albukhari A, Omar Y, et al. Assessing the impact of smartphone use on neck pain and related symptoms among residents in Jeddah, Saudi Arabia: a cross-sectional study. Cureus. 2024;16(7):e64299. doi: 10.7759/cureus.64299.
2. Zhuang L, Wang L, Xu D, Wang Z, Liang R. Association between excessive smartphone use and cervical disc degeneration in young patients suffering from chronic neck pain. J Orthop Sci. 2020. doi: 10.1016/j.jos.2020.02.009.
3. Aswini G, Manimozhi K. Prevalence of text neck syndrome among university students. Physiother J Indian Assoc Physiother. 2025;19:44-50. doi: 10.4103/pjap.pjap_94_24.
4. Salameh MA, Boyajian SD, Amaireh EA, Jamal B, Alrfooh H, AbuKhalaf K, et al. Prevalence of text neck syndrome, its impact on neck dysfunction, and its associated factors among medical students: a

cross-sectional study. Work. 2024;79(4):1111-9. doi: 10.3233/WOR-230678.

5. Javed A, Andama G, Rehman A, Ahmed MW, Ali SH, Ahmed MA, et al. Text neck syndrome and associated risk factors: prevalence in medical students. The Therapist J Ther Rehabil Sci. 2023;4(3). doi: 10.54393/tt.v4i03.167.

6. Iqbal K, Hafeez K, Rashad A, Lodhi AA. Prevalence of neck pain and its association with smartphone use among university students. J Health Rehabil Res. 2024;4(1). doi: 10.61919/jhrr.v4i1.330.

7. Alsiwed KT, Alsarwani RM, Alshaikh SA, Howaidi RA, Aljahdali AJ, Bassi MM. The prevalence of text neck syndrome and its association with smartphone use among medical students in Jeddah, Saudi Arabia. J MusculoskeletSurg Res. 2021;5:266-72. doi: 10.25259/JMSR_99_2021.

8. Kamaraj N, Rajasekar VD, Rangasamy S. A study on prevalence of text neck syndrome among under-graduate students of a medical college in Puducherry. Int J Community Med Public Health. 2022;9(7):2919-22. doi: 10.18203/2394-6040.ijcmph20221759.

9. Sirajudeen MS, Alzhrani M, Alanazi A, Alqahtani M, Waly M, Unnikrishnan R, et al. Prevalence of text neck posture, smartphone addiction, and its association with neck disorders among university students in the Kingdom of Saudi Arabia during the COVID-19 pandemic. PeerJ. 2022;10:e14443. doi: 10.7717/peerj.14443.

10. Mashabi A, Ragab W, Alrayes G, Amoudi J, Tokhta S, Bashawri G, et al. Prevalence of text neck between different female students at Taibah University, Saudi Arabia; cross section design. Healthcare (Basel). 2025;13(5):651. doi: 10.3390/healthcare13050651.