

Original Research Article

Prevalence of text neck syndrome among junior college students in Sangli, India: a cross-sectional study

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ABSTRACT

Background: Prolonged smartphone usage and sustained forward head posture can lead to text neck syndrome (TNS), a repetitive stress condition associated with neck pain and functional disability. Adolescents and students are particularly vulnerable because of increased screen exposure for educational and recreational purposes. This study determines the prevalence of text neck syndrome among junior college students and identifies the association with neck disability.

Methods: A cross-sectional study was conducted among 260 junior college students aged 16-19 years in Sangli, Maharashtra, India. Participants were selected using convenience sampling. Data were collected using a structured questionnaire, the Text Neck Questionnaire (TNQ), and the Neck Disability Index (NDI). Statistical analysis was performed using descriptive statistics, chi-square tests, and correlation analysis.

Results: Among the participants, 153 (59.1%) were females and 107 (40.9%) were males. Based on NDI scores, 72 (27.7%) had no disability, 80 (30.8%) had mild disability, 58 (22.3%) had moderate disability, 34 (13.1%) had severe disability, and 16 (6.1%) had complete disability. The prevalence of text neck syndrome based on the Neck Disability Index (NDI ≥ 5) was 72.3% (188/260; 95% CI: 66.6%-77.4%). A statistically significant association was observed between prolonged smartphone usage duration and neck disability ($p < 0.001$). Higher TNQ scores were significantly associated with worsening neck disability ($p < 0.001$).

Conclusions: The text neck syndrome is highly prevalent among junior college students. Poor posture, prolonged smartphone usage, and lack of ergonomic awareness contributed significantly to neck disability. Awareness programs and ergonomic interventions are recommended to reduce long-term musculoskeletal complications.

Keywords: Forward head posture, Junior college students, Neck disability index, Prevalence, Smartphone, Text neck syndrome

INTRODUCTION

The widespread use of smartphones and electronic gadgets has increased considerably among adolescents and young adults.¹ Globally, mobile phone usage has been reported among 87% of adolescents aged 14-18 years and 79% of children aged 12-15 years.² Prolonged usage of mobile devices with sustained neck flexion can lead to repetitive stress injuries commonly referred to as

text neck syndrome (TNS).³ Text neck syndrome is characterized by neck pain, stiffness, muscular imbalance, postural abnormalities, and functional limitations caused by poor ergonomics during smartphone use.⁴ The prevalence of text neck syndrome in India ranges from 25% to around 47%.⁵

The cervical spine is designed to support the head in a neutral posture. However, sustained forward head posture increases the mechanical load on cervical structures,

including muscles, ligaments, facet joints, and intervertebral discs.⁶ Chronic exposure to abnormal cervical loading may result in muscular fatigue, degenerative changes, headaches, shoulder pain, and decreased functional capacity.⁷

Students are among the highest users of smartphones because of academic activities, social networking, and recreational use.⁸⁻¹⁰ Increasing screen time and poor postural habits may negatively affect musculoskeletal health and quality of life.^{11,12} Although several studies have reported the prevalence of TNS among college students, limited evidence is available among junior college students specifically in Sangli, Maharashtra.¹³⁻¹⁵ Therefore, this study aimed to determine the prevalence of text neck syndrome and assess its association with neck disability among junior college students.

METHODS

Study design

A cross-sectional observational study was conducted among junior college students aged 16-19 years in Sangli, Maharashtra, India, over a duration of six months from August 2025 to February 2026. Ethical approval was obtained from the Institutional Ethics Committee of Bharati Vidyapeeth Medical College and Hospital, Sangli, Maharashtra, India. Written informed consent was obtained from all participants and their parents or guardians before data collection.

Inclusion criteria

Students who were willing to participate and able to understand and fill the questionnaire in English were included. Both males and females between the ages of 16 and 19 years were considered eligible. Participants were required to have a duration of smartphone use of at least one hour per day and to have been using smartphones, tablets, or laptops for a period of six months or more.

Exclusion criteria

Exclusion criteria included individuals with pre-existing medical conditions known to cause neck and shoulder pain, such as cervical radiculopathies, congenital cervical dysfunctions, and traumatic or pathological cervical problems, as well as those with a history of acute traumatic brain or spinal cord injuries.

Data collection instruments

The Neck Disability Index (NDI) is a validated 10-item self-report questionnaire designed to assess functional disability related to neck pain¹⁶. Each item is scored from 0 to 5, yielding a total score of 0–50. Scores are interpreted as follows: 0-4 points = no disability, 5-14 points = mild disability, 15-24 points = moderate disability, 35-50 points = complete disability. Written

permission was obtained from the original authors prior to use.

The Text Neck Questionnaire (TNQ) is a validated instrument used to evaluate smartphone usage patterns, posture awareness, and symptoms related to text neck syndrome¹⁷. Based on existing literature, a text neck questionnaire was utilized to gather information regarding the duration and pattern of smartphone use, associated symptoms, and factors that alleviate pain. Written permission was obtained from the original authors prior to use.

A structured sociodemographic questionnaire was additionally used to capture participant age, gender, and daily smartphone usage duration.

Sample size and sampling

A total of 260 students were included using convenience sampling. The sample size was calculated using Cochran's formula for prevalence studies:

$$n = Z^2P(1-P)/E^2$$

where; $Z=1.96$ (at 95% confidence interval), $p=0.47$ (expected prevalence of 47% from previous literature), and $E=0.06$ (margin of error of 6%).⁵ This yielded a minimum required sample of 266; and 260 students were rounded for feasibility.

Statistical analysis

Data were entered into Microsoft Excel and analyzed using IBM SPSS Statistics version 26 (IBM Corp., Armonk, New York, United States). Descriptive statistics, including frequencies and percentages, were used to summarize participant characteristics. Chi-square tests were applied to assess associations between categorical variables (TNQ score ranges and NDI categories; neck grade and mobile usage duration). Pearson's and Spearman's correlation coefficients were calculated to assess the relationship between gender and scores on the NDI and TNQ. Statistical significance was set at $p<0.05$. The chi-square test was considered appropriate as all expected cell frequencies exceeded the minimum threshold of 5, and independence of observations was assumed.

RESULTS

A total of 260 junior college students participated in this study. The majority of participants were aged 17 years (196; 75.7%), followed by 16 years (36; 13.9%), 18 years (22; 8.5%), and 19 years (6; 1.9%), indicating that most respondents belonged to the mid-adolescent age group. Among the participants, females constituted 153 (59.1%) and males accounted for 107 (40.9%). Demographic distribution is shown in Table 1.

Based on the NDI, 72 (27.7%) participants had no disability, 80 (30.8%) had mild disability, and 58 (22.3%) had moderate disability, 34 (13.1%) had severe disability and 16 (6.1%) had complete disability. TNQ score distribution showed that 94 (36.2%) had mild symptoms (0-10), 131 (50.4%) had moderate symptoms (11-20), and 35 (13.5%) had severe symptoms (21-40). These distributions are summarized in Table 2.

Table 1: Frequency and percentage distribution of age and gender (n=260).

Characteristic	Frequency (N)	Percentage (%)
Age (years)		
16	36	13.9
17	196	75.7
18	22	8.5
19	6	1.9
Total	260	100
Gender		
Female	153	59.1
Male	107	40.9
Total	260	100

Table 2: Distribution of neck disability index and text neck questionnaire scores (n=260).

Category	Frequency (N)	Percentage (%)
Neck Disability Index (NDI)		
No disability (0-4)	72	27.7
Mild disability (5-14)	80	30.8
Moderate disability (15-24)	58	22.3
Severe disability (25-34)	34	13.1
Complete disability (>35)	16	6.1
Total	260	100
TNQ score		
Mild (0-10)	94	36.2
Moderate (11-20)	131	50.4
Severe (21-40)	35	13.5
Total	260	100

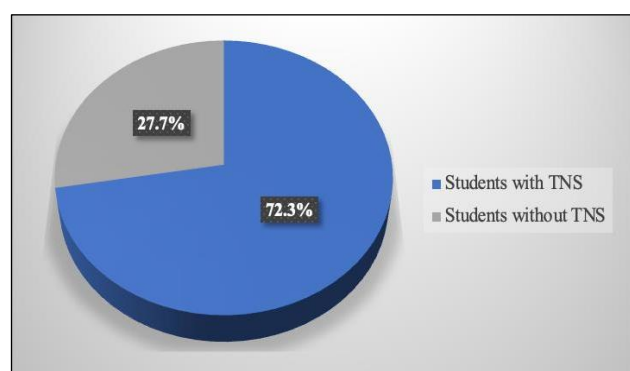


Figure 1: Prevalence of text neck syndrome.

Based on the Neck Disability Index (NDI), the prevalence of text neck syndrome was determined as the proportion of participants with any degree of neck disability (NDI score ≥ 5). A total of 188 out of 260 participants (72.3%; 95% CI: 66.6%-77.4%) were classified as TNS positive, indicating the presence of neck disability attributable to smartphone-related postural stress. The remaining 72 participants (27.7%) had no disability (NDI 0-4) and were classified as TNS negative. Among the TNS-positive participants, 80 (42.6%) had mild disability, 58 (30.9%) had moderate disability, 34 (18.1%) had severe disability, and 16 (8.5%) had complete disability. The prevalence distribution is summarized in Table 3 and illustrated in Figure 1.

Correlation analysis between gender and the NDI demonstrated a statistically significant but weak positive correlation (Table 3). Pearson's coefficient was $r=0.189$ ($p=0.001$) and Spearman's rho was 0.214 ($p=0.001$), indicating a slight tendency for one gender to report higher neck disability scores. A statistically significant association was also observed between gender and TNQ scores: Pearson's $r=0.245$ ($p=0.031$) and Spearman's rho = 0.203 ($p=0.014$), reflecting a weak positive correlation (Table 4).

Table 3: Prevalence of text neck syndrome using NDI.

NDI category	Frequency (N)	Percentage (%)
No disability (0-4)	72	27.7
Mild disability (5-14)	80	30.8
Moderate disability (15-24)	58	22.3
Severe disability (25-34)	34	13.1
Complete disability (>35)	16	6.1
TNS positive total	188	72.3
Total	260	100
95% Confidence Interval for TNS Prevalence: 66.6%-77.4%		

Table 4: Correlation of gender with neck disability index and text neck questionnaire scores.

Outcome	Correlation type	r value	P value	Interpretation
Gender vs NDI	Pearson's R	0.189	0.001*	Weak positive
	Spearman's rho	0.214	0.001*	Weak positive
Gender vs TNQ	Pearson's R	0.245	0.031*	Weak positive
	Spearman's rho	0.203	0.014*	Weak positive

Cross-tabulation analysis was performed to assess the association between TNQ score ranges and NDI categories (Table 5). Participants with mild TNQ scores (0-

10) were predominantly classified under the no disability category (52; 55.3%), whereas those with severe TNQ scores (21-40) showed markedly increased proportions of severe and complete disability (42.9% and 34.3%, respectively). The chi-square test confirmed a statistically significant association between TNQ scores and neck disability ($\chi^2=142.596$, $p<0.001$), indicating that

increasing TNQ scores were significantly associated with worsening neck disability. The chi-square test was applied to the overall cross-tabulation; all expected cell frequencies exceeded 5, satisfying the assumption for valid chi-square analysis. The asterisk (*) denotes statistical significance at $p<0.05$.

Table 5: Association between text neck questionnaire score and neck disability index score.

TNQ score	No disability (0-4), N (%)	Mild disability (5-14), N (%)	Moderate disability (15-24), N (%)	Severe disability (25-34), N (%)	Complete disability (>35), N (%)	Total	Chi-square (p value)
Mild (0-10)	52 (55.3)	25 (26.6)	13 (13.8)	4 (4.3)	0 (0.0)	94	$\chi^2=142.596^*$
Moderate (11-20)	20 (15.3)	51 (38.9)	41 (31.3)	15 (11.5)	4 (3.1)	131	$p = 0.001$
Severe (21-40)	0 (0.0)	4 (11.4)	4 (11.4)	15 (42.9)	12 (34.3)	35	
Total	72	80	58	34	16	260	

* $p<0.05$ denotes statistical significance; χ^2 = Pearson chi-square statistic; NDI = Neck Disability Index

Table 6: Association between neck grade (TNQ) and mobile phone usage duration (n=260).

Neck grade	0-2 hours, N (%)	% within grade	2-4 hours, N (%)	% within grade	4-6 hours, N (%)	Total	Chi-square (p value)
Mild (0-10)	90	95.7	3	3.2	1	94	$\chi^2 =122.576^*$
Moderate (11-20)	49	37.4	75	57.3	7	131	$p = 0.001$
Severe (21-40)	2	5.7	25	71.4	8	35	
Total	141	54.2	103	39.6	16	260	

* $p<0.05$ denotes statistical significance; χ^2 = Pearson chi-square statistic; TNQ = Text Neck Questionnaire

An association between neck grade severity and duration of mobile phone usage was also observed (Table 6). Participants with mild neck grade predominantly used mobile devices for 0-2 hours daily (90; 95.7%), whereas students with moderate neck grade showed longer usage durations, with 25 (71.4%) using mobile devices for 2-4 hours and 8 (22.9%) using them for 4-6 hours daily. Chi-square analysis demonstrated a statistically significant association between neck grade and mobile usage duration ($\chi^2=122.576$, $p<0.001$), suggesting that prolonged smartphone use was significantly associated with increased severity of text neck symptoms.

DISCUSSION

The prevalence of text neck syndrome among junior college students in the present study was high at 72.3%, with more than half of the participants meeting the TNQ threshold for text neck syndrome. This finding indicates that excessive smartphone usage and poor postural habits are leading to musculoskeletal health concerns among adolescents. Similar findings have been reported in previous studies conducted among medical, university, and physiotherapy students.^{13-15,18} A study conducted among medical and dental students at Aljouf University reported that 71.2% of students complained of cervical pain associated with smartphone use.¹³ Another study conducted in India reported that 42.5% of participants had neck disability related to smartphone usage.¹⁴ Likewise, a study among physiotherapy students in India found a prevalence of text neck syndrome of 32%, while a Korean

study among university students reported that 34% of participants experienced neck disability.¹⁵ These similarities suggest that prolonged smartphone use and sustained forward head posture are common contributors to neck pain and disability across different educational settings.

In the present study, many participants reported mild-to-moderate symptoms associated with neck disability. Similar observations have been reported in previous studies, where most students experiencing neck pain demonstrated only mild disability.¹⁶⁻¹⁸ This may indicate that although symptoms are common among young smartphone users, early-stage musculoskeletal dysfunction predominates and may worsen over time if preventive measures are not implemented. The high prevalence observed in this study may be explained by the increasing dependence on smartphones among junior college students for academic activities, social networking, entertainment, and online learning.^{8,9} Adolescents frequently spend prolonged periods looking downward at mobile screens, which increases cervical flexion and biomechanical stress on the cervical spine and surrounding musculature.¹¹ In recent years, increased digital learning and screen exposure have further contributed to prolonged device usage among students.¹

The present study also demonstrated a significant association between TNQ scores and neck disability, suggesting that worsening postural habits and excessive device usage contribute directly to musculoskeletal

dysfunction. Similar findings have been reported in previous literature, where increased duration of smartphone use was associated with greater severity and duration of neck pain.¹⁹ Studies have shown that students using smartphones for prolonged durations, particularly more than four hours per day, are more likely to develop neck pain and upper extremity musculoskeletal symptoms.¹⁸ Poor neck posture during smartphone use may also contribute substantially to text neck syndrome. Previous studies have demonstrated that forward head posture and increased cervical flexion are associated with greater neck pain and disability.²⁰ Increased cervical flexion during smartphone use places excessive mechanical stress on cervical muscles, ligaments, and intervertebral structures, thereby increasing the risk of pain and functional impairment.^{6,20}

The findings of the present study emphasize the importance of early awareness programs, ergonomic education, posture correction strategies, and physiotherapy-based interventions among students. Preventive approaches such as limiting screen time, maintaining proper posture during smartphone use, taking frequent breaks, performing neck stretching and strengthening exercises, and encouraging ergonomic modifications may help reduce the risk of long-term cervical musculoskeletal disorders among adolescents.^{21,22}

The present study has certain limitations. The study was conducted in a single geographic location, which may limit the generalizability of the findings to other populations. The cross-sectional design prevents establishment of a causal relationship between smartphone use and neck disability. In addition, the use of self-reported questionnaires may introduce recall bias. Furthermore, educational and recreational screen time were not analyzed separately, which may influence the interpretation of smartphone usage patterns and associated symptoms.

CONCLUSION

Text neck syndrome is highly prevalent among junior college students in Sangli, Maharashtra, with more than half of the study participants meeting the validated diagnostic threshold. Prolonged smartphone usage, sustained forward head posture, and poor ergonomic habits were significantly associated with neck pain and functional disability.

These findings highlight the importance of early preventive strategies, awareness programs, ergonomic interventions, and physiotherapy management to reduce the burden of text neck syndrome among adolescents and prevent long-term musculoskeletal complications.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee of Bharati Vidyapeeth Medical College and Hospital, Sangli, Maharashtra, India (BD(DU)MC&H/Sangli/IEC/Phy-16/25)

REFERENCES

1. Samkange-Zeeb F, Blettner M. Emerging aspects of mobile phone use. *Emerg Health Threats J*. 2009;2(1):7082.
2. Candussi CJ, Kabir R, Sivasubramanian M. Problematic smartphone usage, prevalence and patterns among university students: a systematic review. *J Affect Disord Rep*. 2023;14:100643.
3. David D, Giannini C, Chiarelli F, Mohn A. Text neck syndrome in children and adolescents. *Int J Environ Res Public Health*. 2021;18(4):1565.
4. Neupane S, Ali U, Mathew A. Text neck syndrome - systematic review. *Imp J Interdiscip Res*. 2017;3(7):141-148.
5. Sathya P, Tamboli SA. Prevalence of text neck syndrome in young-adult population. *Int J Med Exerc Sci*. 2020;6(4):749-59.
6. Mahmoud NF, Hassan KA, Abdelmajeed SF, Moustafa IM, Silva AG. The relationship between forward head posture and neck pain: a systematic review and meta-analysis. *Curr Rev Musculoskelet Med*. 2019;12(4):562-77.
7. Gonzalez HE, Manns A. Forward head posture: its structural and functional influence on the stomatognathic system, a conceptual study. *Cranio*. 1996;14(1):71-80.
8. Gumusgul O. Investigation of smartphone addiction effect on recreational and physical activity and educational success. *World J Educ*. 2018;8(4):11-17.
9. Akgul BM. The reflections of smartphone use and recreational use of internet by high school students to leisure boredom and academic achievement. *Eur J Phys Educ Sport Sci*. 2016;2:12-23.
10. Abbasi GA, Jagaveeran M, Goh YN, Tariq B. The impact of type of content use on smartphone addiction and academic performance: physical activity as moderator. *Technol Soc*. 2021;64:101521.
11. do Nascimento GL, Cardoso AS, Claudino GV, et al. Excessive screen time on posture, musculoskeletal pain, and quality of life in generation Z adolescents: a cross-sectional study with comparison between the sexes. *Int J Adolesc Med Health*. 2022;34:11-19.
12. Silva AG, Couto PS, Queiros A, Neto M, Rocha NP. Musculoskeletal multisite pain and patterns of association after adjusting for sleep, physical activity, and screen time in adolescents. *Spine*. 2018;43(20):1432-7.
13. AlZarea BK, Patil SR. Mobile phone head and neck pain syndrome: proposal of a new entity. *Headache*. 2015;55(9):1266-9.

14. Shah PP, Sheth MS. Correlation of smartphone use addiction with text neck syndrome and SMS thumb in physiotherapy students. *Int J Community Med Public Health*. 2018;5(8):2969-73.
15. Lee JI, Song HS. The correlation analysis between hours of smartphone use and neck pain in Gachon University students. *J Korean Soc Phys Med*. 2014;9(3):321-8.
16. Vernon H, Mior S. The Neck Disability Index: a study of reliability and validity. *J Manipulative Physiol Ther*. 1991;14(7):409-415.
17. Ahmed S, Akter R, Pokhrel N, Samuel AJ. Prevalence of text neck syndrome and SMS thumb among smartphone users in college-going students: a cross-sectional survey study. *J Public Health (Berl)*. 2021;29(2):411-6.
18. Alsiwed KT, Alsarwani RM, Alshaikh SA, Howaidi RA, Aljahdali AJ, Bassi MM, et al. The prevalence of text neck syndrome and its association with smartphone use among medical students in Jeddah, Saudi Arabia. *J Musculoskelet Surg Res*. 2021;5(4):176-82.
19. Maayah MF, Nawasreh ZH, Gaowgzeh RA, Neamatallah Z, Alfawaz SS, Alabasi UM. Neck pain associated with smartphone usage among university students. *PLoS One*. 2023;18(6):e0285451.
20. Ruivo RM, Pezarat-Correia P, Carita AI. Cervical and shoulder postural assessment of adolescents between 15 and 17 years old and association with upper quadrant pain. *Braz J Phys Ther*. 2014;18(4):364-371.
21. Shridhar S. Effectiveness of neck stretching and modified cervical exercises with neck stretching and postural modifications in smartphone users with forward head posture: a comparative study. *J Clin Diagn Res*. 2021;15:YC01-5.
22. Piruta J, Kulak W. Physiotherapy in text neck syndrome: a scoping review of current evidence and future directions. *J Clin Med*. 2025;14(4):1386.

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