

## PREVALENCE OF TEXT NECK SYNDROME AND ITS ADVERSE EFFECTS: A CROSS-SECTIONAL STUDY ON UNDERGRADUATE MEDICAL STUDENTS.

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### Abstract Background

Text Neck Syndrome (TNS) has become increasingly common due to extensive smartphone usage and poor posture, leading to musculoskeletal discomforts such as neck pain, headaches, and shoulder strain. Undergraduate medical students, frequently engaged in prolonged periods of study and digital device usage, may be particularly susceptible. This study aimed to assess the prevalence of TNS, explore associated socio-demographic factors, and identify its adverse effects on undergraduate medical students.

### Methods

A cross-sectional study was conducted among 100 undergraduate medical students comprising 56% females and 44% males, with a mean age of 21.3 years. Data were gathered using structured questionnaires covering TNS symptoms, duration and patterns of smartphone usage, posture habits during device use, awareness regarding proper posture practices, and the syndrome's effects on academic performance and sleep quality. Statistical analysis included chi-square tests and correlation assessments to explore relationships between smartphone usage duration, posture quality, and the presence of TNS symptoms.

### Results

The prevalence of TNS among participants was 75%. The primary symptoms reported included neck pain (68%), shoulder pain (54%), and headaches (40%). A significant relationship was observed between smartphone usage exceeding four hours daily and higher occurrences of neck pain ( $p < 0.05$ ) and headaches ( $p < 0.01$ ). Poor posture significantly correlated with TNS, with 55% of affected students displaying poor posture compared to 20% among unaffected peers ( $p < 0.01$ ). Furthermore, TNS adversely impacted academic performance (45%) and sleep quality (30%). Although a majority of students (70%) were aware of correct posture, only 30% actively practiced corrective measures.

### Conclusion

High TNS prevalence among medical students underscores the critical need for educational interventions emphasizing proper posture and moderated smartphone use. Recommended actions include structured posture awareness campaigns, regular corrective exercises, ergonomic guidelines, and institutional policies promoting frequent breaks to reduce TNS-related health risks.

**Keywords:** Text Neck Syndrome, smartphone usage, posture, musculoskeletal symptoms, academic performance, medical students.

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### Introduction

Text Neck Syndrome (TNS) has emerged as a significant musculoskeletal condition due to the widespread use of smartphones and other digital devices<sup>1</sup>. TNS is characterized by neck pain and other related symptoms that result from prolonged poor posture, particularly when individuals are engaged in activities such as texting, browsing, or gaming on mobile devices<sup>2</sup>. As smartphones have become an integral part of daily life, increased screen time and improper posture have led to a rising number of individuals experiencing TNS, especially among younger populations who

frequently use these devices for communication, education, and entertainment<sup>3,4</sup>.

Undergraduate medical students, who often spend long hours studying and using electronic devices, may be at particular risk for developing TNS<sup>5</sup>. The academic and clinical demands placed on these students, combined with extended periods of smartphone use, create an environment where the likelihood of adopting poor postural habits is high<sup>6</sup>. This condition not only affects the musculoskeletal system but may also have broader implications, including negatively influencing academic

performance, sleep quality, and overall quality of life<sup>7</sup>.

Despite the growing concern over TNS, there is limited research specifically focusing on its prevalence and the associated adverse effects among undergraduate medical students. Understanding the extent of TNS among this group and identifying contributing factors such as smartphone usage patterns and posture can provide valuable insights for preventive measures. This study aims to evaluate the prevalence of TNS and its associated symptoms, as well as to explore the impact of smartphone usage and posture on this condition in a cohort of undergraduate medical students.

## Methodology

### Study Design

This study was a cross-sectional survey conducted to assess the prevalence of TNS and its adverse effects among undergraduate medical students.

### Study Setting

The study was carried out at the Government Medical College, Srikakulam from February to November 2024.

### Study Population

The study population consisted of undergraduate medical students enrolled from the first to the final year at Government Medical College, Srikakulam. Students across all academic years were invited to participate voluntarily. The exclusion criteria included students with a history of musculoskeletal disorders, previous neck or back injuries, or those currently receiving treatment for related conditions. The targeted sample size of 100 participants was determined based on feasibility considerations, available resources, and alignment with similar previous studies, ensuring adequate representation and sufficient statistical power for detecting relevant associations. Initially, 120 undergraduate medical students were identified as potentially eligible for the study. Of these, 110 students underwent screening for eligibility based on the inclusion and exclusion criteria. Following this screening, 105 students were confirmed eligible. Subsequently, 100 students consented to participate in the study, reflecting a response rate of approximately 95%. Five eligible students chose not to participate due to personal reasons or lack of interest. All 100 students who consented completed the questionnaires fully and were included in the final analysis. A detailed flow diagram outlining the participant recruitment process, eligibility assessment, and final inclusion is presented in Figure 1.

### Data Collection

A structured questionnaire was designed to collect comprehensive data on smartphone usage, posture, and the presence of TNS symptoms. The

questionnaire was divided into the following sections:

### Demographic Information

Age, gender, year of study.

### Smartphone Usage

Daily usage duration, frequency of usage, and types of activities performed (e.g., social media, gaming, academic work).

### Posture

Self-reported assessment of posture while using smartphones (e.g., sitting, standing, or lying down), as well as any discomfort experienced due to posture.

### TNS Symptoms

The presence of musculoskeletal symptoms such as neck pain, shoulder pain, headaches, and back pain, along with their frequency and severity.

### Impact on Daily Activities

Questions regarding the impact of TNS symptoms on academic performance, physical activity, and sleep quality.

### Awareness and Practice of Corrective Measures

Awareness of good posture practices and whether participants actively employed corrective measures during smartphone use.

### Data Analysis

Statistical analysis was conducted using SPSS software version 25 (IBM, Armonk, NY, USA). Descriptive statistics were used to summarize demographic data, smartphone usage patterns, and the prevalence of TNS symptoms. The relationship between smartphone usage duration, posture, and the presence of TNS symptoms was analyzed using Chi-square tests for categorical variables. A p-value of  $<0.05$  was considered statistically significant. Correlation coefficients were calculated to assess the strength and direction of the relationship between smartphone usage and musculoskeletal symptoms.

### Bias

To mitigate potential biases, clear inclusion and exclusion criteria were established. Efforts included using standardized and validated questionnaires, anonymizing responses to encourage truthful reporting, and clearly instructing participants about the purpose and importance of accurate data.

### Ethical Considerations

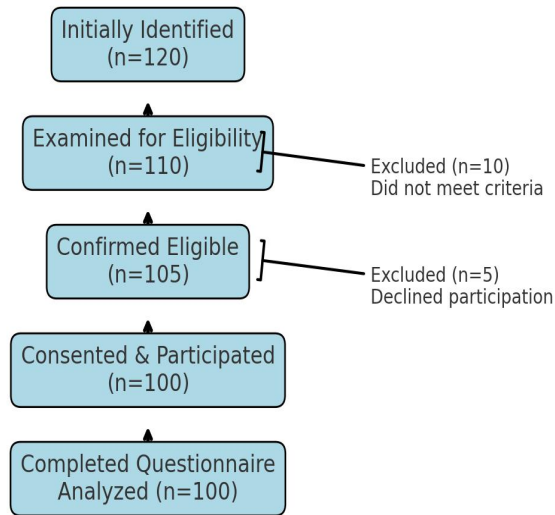
Ethical approval for the study was obtained from the Institutional Ethics Committee

(IEC25/GMC&GGH/SKLM/090124/02) of Government Medical College, Srikakulam. Informed consent was obtained from all participants before data collection. Participants were assured of confidentiality and that their participation was voluntary, with the option to withdraw at any time without any repercussions.

### Descriptive Data

The socio-demographic characteristics of the 100 participants were as follows: The mean age of the students was 21.3 years, with ages ranging from 18 to 25 years. The gender distribution comprised 56% females (n=56) and 44% males (n=44). Regarding the academic year distribution, 25% of students (n=25) were first-year students, 24% (n=24) were second-year, 26% (n=26) were third-year, and 25% (n=25) were final-year students.

### Results



**Figure 1: Flow Diagram of Participant Selection**

### Prevalence and Symptom Breakdown

A total of 100 undergraduate medical students participated in this cross-sectional study. The

prevalence of TNS was found to be 75%, with 75 students reporting at least one symptom associated with TNS. The breakdown of symptoms among the participants is presented in Table 1.

**Table No.1: Symptom Breakdown**

Symptom	Percentage (%)	Number of Students
Neck pain	68%	68
Shoulder pain	54%	54
Headaches	40%	40
Back pain	35%	35
Numbness or tingling in arms	28%	28

### Smartphone Usage and Symptom Correlation

The duration of smartphone usage was significantly associated with the occurrence of TNS symptoms. As shown in Table 2, students using smartphones

for more than 4 hours per day reported higher incidences of neck pain ( $p < 0.05$ ) and headaches ( $p < 0.01$ ). This suggests a clear correlation between extended smartphone use and the presence of TNS-related symptoms.

**Table No. 2. Smartphone Usage and Symptom Correlation**

Duration of Smartphone Use (hours/day)	Neck Pain (p-value)	Headaches (p-value)
> 4 hours	< 0.05	< 0.01

### Posture and TNS Correlation

The study also explored the relationship between posture and TNS. Table 3 illustrates that 55% of students who reported TNS symptoms exhibited poor posture while using their smartphones,

compared to only 45% of students without TNS symptoms ( $p < 0.01$ ). Conversely, 80% of students without TNS maintained good posture during smartphone use, while only 20% of those with TNS reported good posture.

**Table No. 3. Posture and TNS Correlation**

Posture Type	Percentage with TNS (%)	Percentage without TNS (%)	p-value
Poor Posture	55%	45%	< 0.01
Good Posture	20%	80%	

### Adverse Effects of TNS on Daily Activities

Text Neck Syndrome also had adverse effects on students' daily activities. Table 4 reveals that 45% of

students with TNS reported a negative impact on their academic performance, and 30% reported a deterioration in sleep quality due to their symptoms.

**Table No:4.Adverse Effects of TNS on Daily Activities**

Effect	Percentage (%)	Number of Students
Academic performance	45%	34
Sleep quality	30%	22

### Awareness and Corrective Measures

Although the majority of students (70%) were aware of the importance of maintaining good posture, only

30% reported consistently practicing corrective measures such as taking breaks or adjusting their posture during smartphone usage. This is shown in Table 5

**Table 5. Awareness and Corrective Measures**

Awareness Type	Percentage (%)
Aware of Good Posture	70%
Practice Corrective Measures	30%

### Discussion

The findings of this study reveal a high prevalence of TNS among undergraduate medical students, with 75% of participants reporting symptoms consistent with the condition. This prevalence is concerning, especially considering the significant association between prolonged smartphone usage and musculoskeletal symptoms such as neck pain, shoulder pain, and headaches. These results align with existing literature, which identifies the overuse of smartphones as a major contributor to musculoskeletal complaints, particularly in the cervical spine region<sup>8,9</sup>

Our study identified a strong correlation between the duration of smartphone use and the presence of TNS symptoms. Students who spent more than 4 hours per day on their smartphones reported significantly higher rates of neck pain and headaches. This finding is consistent with previous studies that suggest prolonged smartphone use, particularly in a forward head posture, can lead to strain on the neck muscles and result in chronic musculoskeletal symptoms<sup>10,14</sup>. The duration of smartphone use may exacerbate muscle fatigue and disrupt the alignment of the cervical spine, contributing to the development of TNS. Given the

increasing reliance on smartphones for academic purposes, social interactions, and entertainment, the duration of usage among students warrants further attention in future research<sup>11</sup>.

In addition to smartphone usage, poor posture was found to be a key factor in the development of TNS. Over half of the participants with TNS exhibited poor posture, which was significantly more common than in students without TNS. Poor posture, especially when coupled with excessive smartphone usage, can lead to misalignment of the spine, placing undue stress on the muscles, ligaments, and joints of the neck and upper back. This aligns with the concept of "texting posture," where individuals adopt a slumped or forward-head posture while engaging with their mobile devices. This posture has been linked to increased strain on the cervical spine, which may contribute to the development of TNS<sup>12</sup>.

Another notable finding in this study was the impact of TNS on academic performance and sleep quality. Almost half of the students with TNS reported that their symptoms had negatively affected their academic performance, and 30% reported poor sleep quality due to discomfort. These findings highlight the broader consequences of TNS beyond physical

health. Chronic neck pain and headaches can reduce concentration and productivity, hindering academic achievement<sup>13</sup>. Additionally, musculoskeletal discomfort can interfere with sleep, further exacerbating fatigue and reducing overall well-being. These outcomes emphasize the need for preventive measures, as TNS may have far-reaching effects on both physical and academic functioning<sup>9</sup>. Despite a high level of awareness regarding the importance of good posture (70%), only 30% of students actively practiced corrective measures during smartphone usage. This discrepancy between awareness and behavior is a common issue in health behavior research and suggests that passive awareness campaigns may not be sufficient to change habits. Educational interventions should focus on practical solutions, such as reminders for posture correction, ergonomic smartphone use, and the importance of regular breaks to reduce the risk of TNS. It is also crucial to integrate these measures into the academic environment, particularly for medical students who spend long hours studying and using smartphones<sup>8,9</sup>.

The findings of this study are primarily generalizable to populations with similar demographic characteristics, such as undergraduate medical students with comparable academic environments and smartphone usage patterns. However, the generalizability may be limited in broader contexts due to the relatively small sample size and the single-center study design.

### Conclusion

The high prevalence of TNS among undergraduate medical students highlights a growing concern linked to excessive smartphone usage and poor posture. TNS significantly affects musculoskeletal health, academic performance, and sleep quality. Despite awareness of correct posture, many students fail to implement corrective practices. It is essential to address TNS through targeted awareness programs, posture correction strategies, and regular breaks to reduce its impact on students' well-being and academic success.

### Limitations

The limitations of this study include the reliance on self-reported data, which may be subject to bias. Additionally, the cross-sectional design does not allow for the establishment of causality between smartphone usage, posture, and the development of TNS. Future longitudinal studies with objective measures of smartphone usage, posture, and musculoskeletal health would provide a more comprehensive understanding of the long-term effects of TNS.

### Recommendations

Educational interventions emphasizing proper posture, structured awareness campaigns, and regular posture correction exercises are

recommended. Institutions should encourage ergonomic smartphone use and periodic breaks during device usage. Future studies should consider longitudinal designs and larger, diverse populations to improve understanding and generalizability of Text Neck Syndrome among medical students.

### List of abbreviations

TNS: Text Neck Syndrome

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### Conflict of interest

No conflict of interest.

### Author Biography

Please provide the biography of the authors.

### Author contributions

**LRS- Concept** and design of the study, results interpretation, review of literature, and preparation of the first draft of the manuscript. Statistical analysis and interpretation, revision of the manuscript. **SN- Concept** and design of the study, results interpretation, review of the literature and preparing the first draft of the manuscript, revision of the manuscript. **YRS-Review** of literature and preparing the first draft of the manuscript. Statistical analysis and interpretation. **HRV- Concept** and design of the study, results interpretation, review of literature, and preparation of the first draft of the manuscript. Statistical analysis and interpretation, revision of the manuscript.

### Data availability

Data Available

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