RESEARCH PAPER

The Association Between Screen Time and Text Neck Syndrome Among Adolescence: A Cross-Sectional Study

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Abstract

Introduction: Text Neck Syndrome, coined by Dr. Dean L. Fishman (2008), is a modern musculoskeletal disorder caused by prolonged forward neck flexion during smartphone and device use. This posture increases cervical strain, leading to pain, stiffness, and postural deformities.

Preventive strategies include ergonomic awareness, posture correction, and strengthening of neck muscles.

Objective: To investigate the correlation between daily screen time and the severity of Text Neck Syndrome among Indian adolescents and to investigate the correlation between daily screen time and the disability of the neck

Method: A cross-sectional observational study was conducted among 123 adolescents (aged 16–18 years) from selected schools and colleges in Bengaluru, India, using stratified random sampling.

Ethical approval and informed consent were obtained. Data included demographic details, screen time screenshots, and responses to two validated tools: the Neck Disability Index (NDI) and Smartphone Addiction Scale–Short Version (SAS-SV). NDI assessed neck-related functional disability, while SAS-SV measured smartphone addiction levels. Participants were categorized into three screen time groups: 0–5, 5.1–10, and >10 hours per day. Data were analyzed using SPSS version 23.0 to examine associations between screen time, text neck symptoms, and neck disability. Results: Means and standard deviations summarized continuous variables; frequencies and percentages described categorical data. Independent t-tests and ANOVA assessed relationships between screen time, smartphone addiction (SAS), and neck disability (NDI). Results showed no statistically significant association ($p > 0.05$) between screen time, addiction, and neck disability.

Discussion: This study investigated the association between screen time, smartphone addiction (SAS), and neck disability (NDI) in adolescents. Although prior research demonstrates that prolonged smartphone use increases neck pain and musculoskeletal risk, our findings showed no significant relationship between total screen time and neck disability. However, longer screen exposure was associated with higher smartphone addiction scores, indicating behavioral dependency. Biomechanical strain from sustained forward head posture and poor ergonomics may contribute to musculoskeletal issues over time. These results highlight the importance of combining ergonomic education, postural awareness, and behavioral interventions to reduce smartphone addiction and mitigate potential long-term physical and psychosocial health risks.

Keywords: Textneck syndrome, adolescents, screen time, prevalence

How to cite this article: Pradhan M, Chakraborty A, Koshy SM, Nashra S, Warunkar ZA. The Association Between Screen Time and Text Neck Syndrome Among Adolescence: A Cross-Sectional Study. Int J Drug Deliv Technol. 2026;16(71s): 38-54. DOI: 10.25258/ijddt.16.71s.6

Introduction

The term "Text Neck Syndrome" was first introduced by Dr. Dean L. Fishman in 2008, and it is also commonly referred to as "Turtle Neck Posture"1. This condition describes a repetitive stress injury caused by the prolonged forward flexion of the neck, a posture frequently adopted while using handheld electronic devices such as smartphones, tablets, and even laptops. With the increasing dependence on digital technology in daily life, individuals often spend extended periods looking down at their screens, unknowingly placing excessive strain on the cervical spine.

The sustained downward head posture leads to an imbalance in the normal curvature of the neck and places abnormal mechanical stress on the cervical vertebrae, muscles, and supporting ligaments. Over time, this repetitive strain can result in neck pain, stiffness, muscle fatigue, and even radiating shoulder or upper back discomfort. If unaddressed, these biomechanical stresses may contribute to early cervical spinal degeneration, disc compression, and postural deformities such as forward head posture and rounded shoulders2.

Ultimately, Text Neck Syndrome has emerged as a modern musculoskeletal problem associated with the digital era, emphasizing the need for postural awareness, ergonomic education, and preventive physiotherapy interventions to reduce its long-term impact on spinal health.

Recent surveys indicate that nearly 97% of adolescents are active on social media platforms such as WhatsApp, Instagram, and Facebook3, (This widespread digital

engagement results in prolonged use of handheld devices, leading to sustained forward-neck posture. Over time, this repetitive posture increases the mechanical load on cervical structures and contributes to symptoms such as stiffness, neck pain, and upper back discomfort, all features commonly associated with text neck syndrome.

Several studies have shown that adolescents spend an average of 5–7 hours daily using electronic screens5. Following the COVID-19 pandemic, screen exposure has significantly increased due to the integration of online education, entertainment, and social interaction into daily life. This extended screen time has heightened the risk of musculoskeletal strain and posture-related disorders among teenagers6.

The prevalence of text neck symptoms among adolescents has increased by approximately 16% following the pandemic, with recent studies reporting rates as high as 69%7.

Pathophysiology:

Text Neck Syndrome develops primarily due to repetitive and sustained forward flexion of the cervical spine, a posture that significantly alters the natural biomechanics of the neck. The cervical spine is designed to support the head in an upright, neutral position, maintaining a gentle lordotic curvature that distributes mechanical loads evenly across the vertebral bodies, intervertebral discs, and surrounding musculature. However, when the neck is flexed forward as is common during prolonged smartphone or tablet use the center of gravity of the head shifts anteriorly relative to the body's vertical axis. This positional change dramatically increases the moment arm and thus the torque acting on the cervical spine, leading to excessive mechanical stress on the musculoskeletal and ligamentous structures of the neck.

When the head is maintained in a neutral posture (0° flexion), the cervical spine supports approximately 5 kilograms, corresponding to the average weight of the human head. However, as the degree of neck flexion increases, the effective load transmitted to the cervical spine rises exponentially:

At 15°, the load increases to about 12 kilograms, At 30°, to approximately 18 kilograms,

At 45°, to around 22 kilograms, and

At 60°, the cervical spine experiences an estimated 27 kilograms of compressive force.

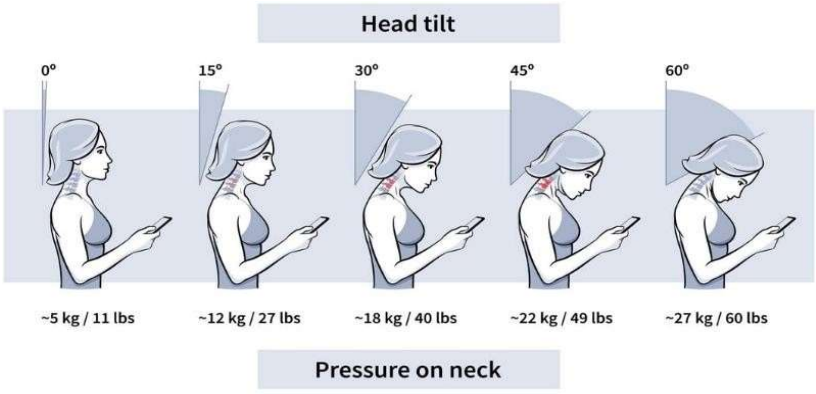


Figure 1: Weight load on the cervical spine at varying degree

This progressive increase in mechanical demand results in overloading of the cervical vertebrae, intervertebral discs, facet joints, and associated soft tissues, including the trapezius, levator scapulae, sternocleidomastoid, and deep cervical flexor muscles. Over time, such repetitive stress can cause microtrauma to these structures, initiating a cascade of degenerative changes such as disc dehydration, annular tears, early osteophytic formations, and joint dysfunction.

From a musculoskeletal perspective, this sustained forward head posture leads to muscle imbalance between the anterior and posterior neck musculature. The deep cervical flexors become lengthened and weakened, while the upper trapezius, levator scapulae, and suboccipital muscles become shortened and overactive, leading to myofascial trigger points and chronic tension. This imbalance disturbs the normal kinematic chain of the cervical and thoracic regions, further promoting loss of the natural cervical lordosis and contributing to postural deformities such as rounded shoulders and a forward head posture. Clinically, individuals with Text Neck Syndrome often present with neck and shoulder pain, stiffness, reduced cervical range of motion, occipital headaches, and sometimes radiating pain or paresthesia due to irritation or compression of the cervical nerve roots. Prolonged exposure to these mechanical stresses may also impair proprioceptive control and postural stability, affecting functional movements and overall spinal health.

Ultimately, the pathophysiology of Text Neck Syndrome illustrates how modern lifestyle habits, especially the pervasive use of digital devices can disrupt the delicate balance of the cervical spine. The condition underscores the importance of ergonomic education, postural correction, strengthening of deep neck flexors, and regular movement breaks as essential preventive strategies to mitigate the long-term consequences of this growing musculoskeletal concern

Need Of Study

While several international studies have examined the relationship between mobile device use and neck pain, research in the Indian context remains limited, particularly among adolescents aged 16–18 years. This population is especially vulnerable due to frequent digital engagement for academic and recreational activities. Despite India's high rate of smartphone use, there is a lack of data assessing the impact of screen habits on adolescent musculoskeletal health.

Post-pandemic lifestyle changes have further increased screen exposure, contributing to a rise in TNS cases. Global studies report a 45–70% prevalence of TNS among youth, but there are limited studies which tell us about the importance of screen time and the severity of text neck syndrome or the disability of the neck. Hence, the need of the study is to find out the correlation of screen time and the severity of text neck syndrome and neck disability.

Objectives

1.To investigate the correlation between daily screen time and the severity of Text Neck Syndrome among Indian adolescents.

2.To investigate the correlation between daily screen time and the disability of the neck

Methodology And Procedure

Study Design: A cross-sectional observational design was employed to evaluate the association between screen time and text neck syndrome and screen time and neck disability among adolescents.

Study Setting:The study was conducted in selected schools and colleges in Bengaluru, India Sampling Method and Sample Size: Sample size was calculated using Cochran's formula for cross-sectional studies (Cochran, 1977). A total of 123 participants were recruited using stratified random sampling.

The formula for calculating the required sample size is given by:

$$n = \frac{Z_{\alpha/2}^2 p\, q}{d^2}$$

where:

α = Level of Significance = 0.05 (5%)

$Z_{\alpha/2} = 1.96$ (Taken from Z-table)

p = Assumed proportion = 0.5 (50%)

$q = 1 - p$

d = Desired precision = 0.1 (10%)

Substituting the values:

$$n = \frac{(1.96)^2 \times 0.5 \times 0.5}{(0.1)^2} = 96$$

Adding 10% Non-Response Error:

$$\text{Net Sample Size} = n + 0.1n = 96 + 9.6 = 106$$

Rounded off to:

110

Participants:

Inclusion criteria:

- Subjects who are willing to participate in the study.
- Age group between 16-18
- Both Genders were included.

Exclusion criteria:

- Unwillingness to participate.
- Participants with recent surgery or any kind of trauma to the head & neck.

Outcome Measures

Two standardized outcome measures were used in this study:

1. Neck Disability Index (NDI)
2. Smartphone Addiction Scale – Short Version (SAS-SV)

1.Neck Disability Index (NDI):

The Neck Disability Index (NDI) is a widely used self-report questionnaire that assesses the impact of neck pain on an individual's daily activities8

Purpose:

It quantifies how much neck pain interferes with functional activities such as personal care, lifting, reading, work, driving, and recreation.

Structure:

The NDI consists of 10 items; each scored from 0 (no disability) to 5 (complete disability). Scoring:

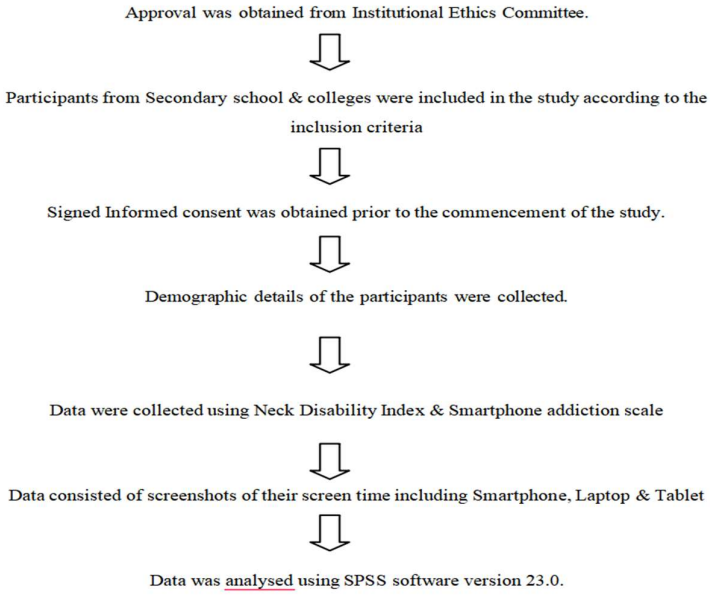
Total scores range from 0 to 50, with higher scores indicating greater disability. The score can be expressed as a percentage to facilitate interpretation.

Interpretation:
• 0–4: No disability
• 5–14: Mild disability
• 15–24: Moderate disability
• 25–34: Severe disability
• 35–50: Complete disability
The NDI has demonstrated excellent reliability (ICC = 0.89–0.94) and validity across multiple populations 8,9.

3. Smartphone Addiction Scale – Short Version (SAS-SV)
The Smartphone Addiction Scale – Short Version (SAS-SV) is a validated screening instrument developed to measure smartphone addiction levels among adolescents and adults 10.
Purpose:
The SAS-SV helps identify individuals at risk for problematic smartphone use, often referred to as "smartphone addiction."
Structure: It consists of 10 items rated on a 6-point Likert scale (1 = Strongly Disagree to 6 = Strongly Agree). Total scores range from 10 to 60, with higher scores representing a higher degree of smartphone dependence.
Cut-off Scores:
•Males: ≥ 31 indicates high risk
•Females: ≥ 33 indicates high risk

The SAS-SV shows strong internal consistency (Cronbach's α = 0.91) and excellent test–retest reliability (ICC = 0.83) 10

Measurement of Screen Time
Participants were asked to submit screenshots of their screen time obtained from their device settings (smartphones, laptops, or tablets) which was divided into the number of days and the average of 1 day was taken
We had divided the categories of screen time in 3 groups
Category 1: 0-5 hours per day
Category 2: 5.1- 10 hours per day
Category 3: >10 hours per day



Results
Statistical Analysis
Statistical analysis was performed using SPSS version 23.0. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequency and percentage. An independent t-test was used to assess whether neck disability index (NDI) scores differed based on addiction status. A p-value of <0.05 was considered statistically significant.

Table 1: Distribution based on age

		Frequency	Percent
Age	17years	50	40.7
	18years	73	59.3
	Total	123	100.0

The table shows the age distribution of the participants. Out of a total of 123 subjects, 50 (40.7%) were 17 years old, while the majority, 73 (59.3%), were 18 years old.

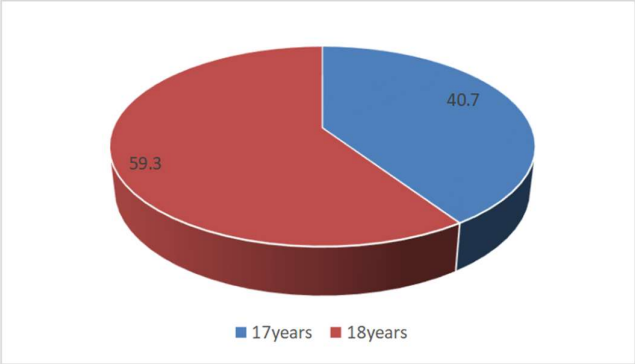


Figure 2: Representation based on age

Table 2: Distribution based on gender

		Frequency	Percent
Gender	Female	49	39.8
	Male	74	60.2
	Total	123	100.0

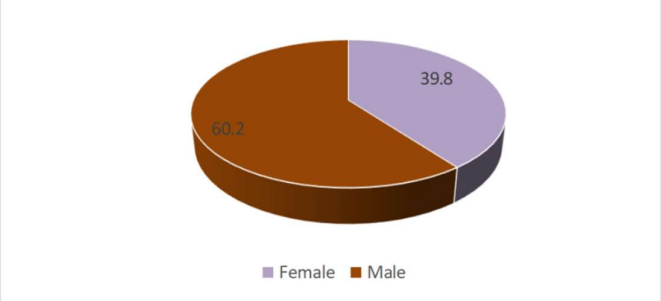


Figure 3: Representation based on gender

Table 3: Distribution based on screen time

		Frequency	Percent
Screen time	(0-5 Hours)	29	23.6
	(5.1-10 hours)	79	64.2
	>10hours	15	12.2
	Total	123	100.0

The table describes the distribution of participants based on their screen time. Among the 123 subjects, 29 (23.6%) reported screen time between 0–5 hours, the majority 79 (64.2%) had screen time between 5.1–10 hours, and 15 (12.2%) reported more than 10 hours of screen time.

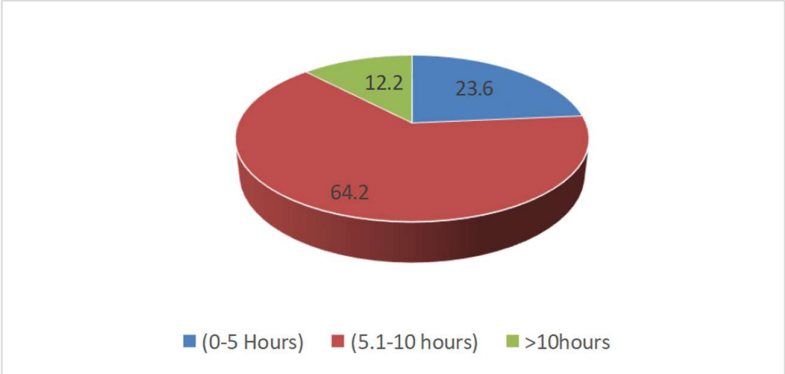


Figure 4: Representation based on screen time

Table 4: Distribution based on screen addiction

		Frequency	Percent
SAS Score	Addictive	116	94.3
	Non addictive	7	5.7
	Total	123	100.0

The table shows the classification of participants based on SAS scores. Out of 123 subjects, 116 (94.3%) were categorized as addictive, while only 7 (5.7%) were classified as non-addictive. This indicates that the majority of participants fell into the addictive group.

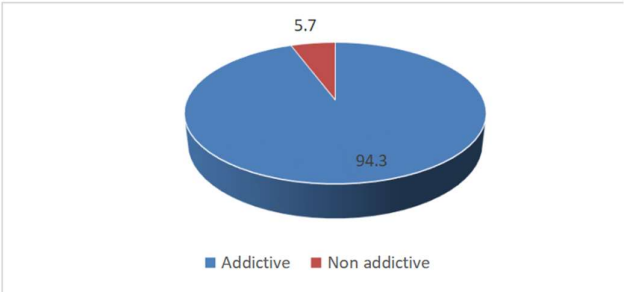
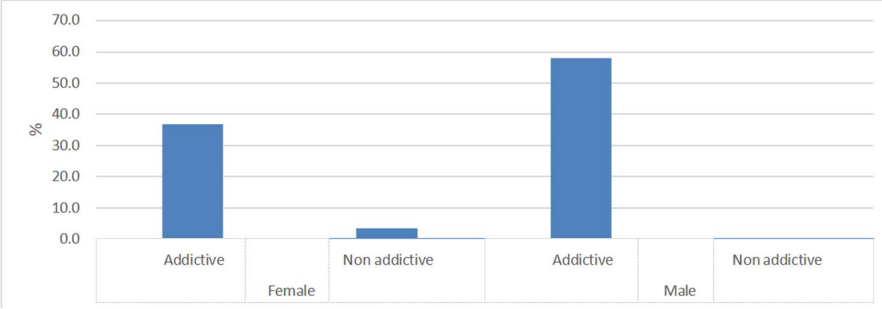


Figure 5: Representation based on screen addiction

Table 5: Distribution based on screen addiction in males and females

SAS Score		Frequency	Percent
Female	Addictive	45	36.6
	Non addictive	4	3.3
Male	Addictive	71	57.7
	Non addictive	3	2.4

Among females, 45 (36.6%) were classified as addictive and 4 (3.3%) as non-addictive. Among males, 71 (57.7%) were found to be addictive, while 3 (2.4%) were non-addictive. This shows that addictive behaviour was more prevalent in both genders, with a higher proportion among males.

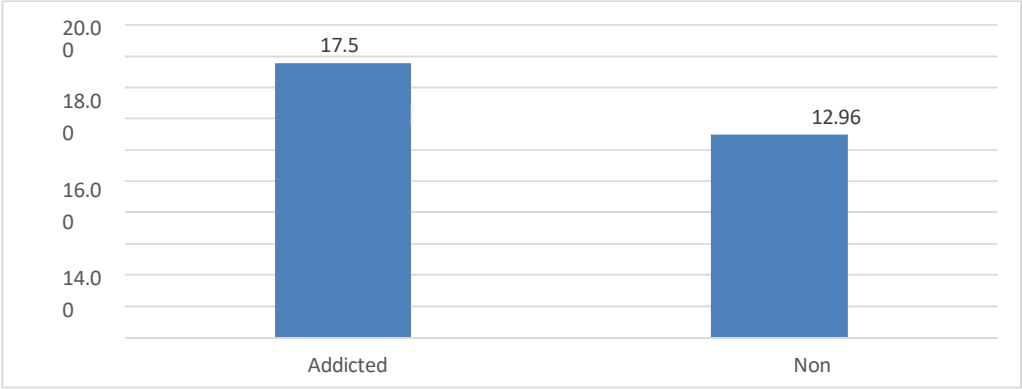


Graph 1: Representation based on screen addiction in males and females

Table 6: Comparison of NDI based on screen addiction.

	N	Mean	Std. Deviation	t value	p value
Addicted	116	17.56	14.343	0.782	
Non addicted	6	12.96	3.561		0.436

The table compares the mean scores between addicted and non-addicted participants. Out of 122 subjects analyzed, the addicted group (n = 116) had a mean score of 17.56 ± 14.34, whereas the non-addicted group (n = 6) had a lower mean score of 12.96 ± 3.56. The difference between the two groups was not statistically significant (t = 0.782, p = 0.436). The result does not provide evidence of an association between addiction and neck disability

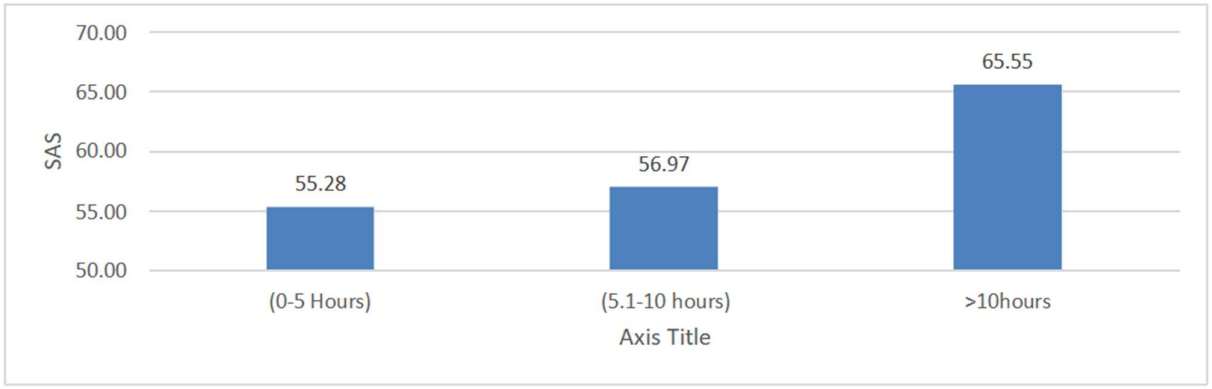


Graph 2: Representation of NDI between screen addicted and non-addicted category

Table 7: Screen time and SAS

Screen time	N	Mean (SAS)	Std. Deviation	F value	p value
(0-5 Hours)	29	55.28	12.957		
(5.1-10 hours)	77	56.97	16.966	2.179	0.118
>10hours	15	65.55	17.179		

When Screen Addiction Scores (SAS) were compared across different categories of screen time, participants with 0–5 hours of screen time had a mean SAS of 55.28 ± 12.96, those with 5.1–10 hours had a slightly higher mean of 56.97 ± 16.97, while participants with more than 10 hours of screen exposure recorded the highest mean SAS of 65.55 ± 17.18. Although the mean SAS tended to increase with longer screen time, the difference among the groups was not statistically significant (F = 2.179, p = 0.118)

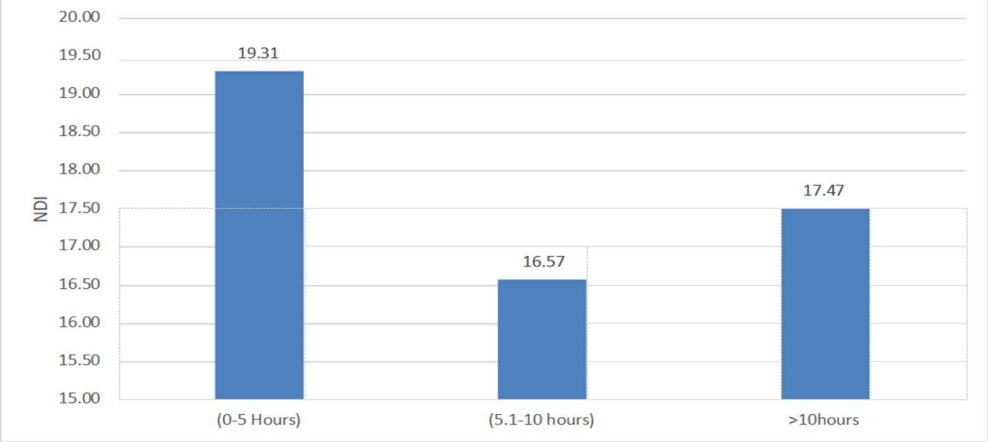


Graph 3: Screen Time and SAS

Table 8: Screen time and NDI

Screen time	N	Mean (NDI)	Std.Deviation	F value	p value
(0-5 Hours)	29	19.31	17.686	0.399	0.673
(5.1-10 hours)	78	16.57	13.214		
>10hours	15	17.47	10.286		

When Neck Disability Index (NDI) scores were compared across different screen time categories, participants with 0–5 hours of screen time had a mean NDI of 19.31 ± 17.69, those with 5.1–10 hours showed a slightly lower mean of 16.57 ± 13.21, and participants with more than 10 hours of screen exposure recorded a mean of 17.47 ± 10.29. The differences between the groups were not statistically significant (F = 0.399, p = 0.673), indicating that screen time duration was not associated with NDI scores in this study.



Graph 4: Screen time and SAS

Discussion

This study examined the association between screen time, smartphone addiction (SAS), and neck disability (NDI) among adolescents. With the growing reliance on digital devices, musculoskeletal disorders linked to prolonged smartphone use have emerged as a major health concern, especially in young populations. Several studies worldwide have consistently demonstrated a positive correlation between excessive smartphone use and increased neck pain or disability.

A systematic review and meta-analysis conducted by 17, which included over 10,000 participants, found that individuals who overused smartphones had approximately 2.34 times higher odds of developing neck pain compared to those with limited usage. Similarly2, reported that among Indian university students aged 18–26 years, those who used smartphones for more than

three hours daily and scored higher on the Smartphone Addiction Scale had an 85% prevalence of neck pain, compared to much lower rates among low-usage groups. These findings support a dose-response relationship between screen exposure and neck pain prevalence.

Consistent evidence has also been found among younger populations. A meta-analysis on sedentary behavior and neck pain in children and adolescents revealed that prolonged mobile phone use was significantly associated with neck pain (OR = 1.36). A prospective cohort study by18 further demonstrated that poor neck posture observed at approximately 17 years of age predicted persistent neck pain at age 22, suggesting that early postural habits associated with mobile device use can contribute to long-term musculoskeletal issues.

Beyond physical discomfort, excessive smartphone use has also been linked to behavioral and functional impairments. A study by 4 found that individuals with higher smartphone use experienced not only greater musculoskeletal pain but also difficulties in academic focus and sleep regulation. Similarly19 reported that adolescents with greater daily screen exposure exhibited poorer concentration and increased fatigue. Another longitudinal study conducted by 20 among school-aged children (10–15 years) found that baseline screen time predicted a higher incidence of neck and shoulder pain after one year, even after adjusting for confounding variables such as gender, BMI, and sleep duration.

Biomechanically, tilting the head forward while viewing a screen increases the load on the cervical spine exponentially 13 demonstrated that at a 60-degree head tilt, the cervical spine endures approximately 27 kg of force. Prolonged maintenance of this posture results in muscle fatigue and increased strain on cervical structures. Sedentary behavior exacerbates this risk. A meta-analysis in BMC Public Health by 21 found that sitting for more than four hours per day without posture change increased the risk of neck pain by around 45%, and more than six hours raised it by nearly 88%. Poor ergonomic setup such as low device positioning, lack of neck support, and insufficient breaks further worsens outcomes 22.

Evidence from intervention-based studies indicates that ergonomic education and physical activity can significantly reduce musculoskeletal risk. For instance,23 conducted a postural education and stretching intervention among Korean high-school students and observed a reduction in neck and shoulder pain prevalence from 82.5% to 66.4% within three months. Similarly, randomized trials among adults demonstrated that incorporating posture shifts and active breaks significantly reduced the risk of neck and lower back pain 24 . These findings highlight that simple ergonomic and behavioral strategies can have meaningful protective effects.

However, in contrast to many of these findings, our study did not reveal a statistically significant relationship between total screen time and the outcome measures (NDI and SAS scores). This indicates that, within our study population, the total duration of screen exposure may not directly predict the degree of neck pain or disability. This lack of association may be due to variations in posture, physical activity, or ergonomic awareness among participants, as well as possible adaptation or resilience factors that mitigate the physical strain of prolonged use.

Despite this, our study found a clear trend of increased smartphone addiction with longer screen time, consistent with previous research describing behavioral dependency patterns in excessive digital users. 10 and 25 both found that extended screen exposure was positively correlated with higher smartphone addiction scores, regardless of the presence or absence of physical symptoms. This suggests that while musculoskeletal outcomes may vary across individuals, psychological and behavioral dependence develops more predictably with greater screen use.

The increased addiction associated with longer screen time raises concerns about the long-term psychosocial and health implications of digital overuse. Addiction can lead to reduced physical activity, disrupted sleep, and poor posture, indirectly increasing the risk of musculoskeletal problems over time. Therefore, it is possible that the relationship between screen time and physical outcomes is indirectly mediated by behavioral addiction, lifestyle habits, and psychosocial stress rather than by screen exposure alone.

This emphasizes the need for comprehensive interventions that combine behavioral regulation with ergonomic awareness. Merely limiting screen duration may not be sufficient to prevent adverse health outcomes. Instead, educational programs focusing on healthy posture, regular physical activity, self-regulation of device use, and digital well-being are likely to be more effective in addressing both addiction and musculoskeletal health.

Conclusion

This study explored the relationship between screen time, smartphone addiction, and neck disability among adolescents and young adults. While existing literature strongly supports the link between prolonged digital device use and musculoskeletal complaints, our findings present a nuanced perspective. No statistically significant association was observed between total screen time and outcome measures such as the Neck Disability Index (NDI) and Smartphone Addiction Scale (SAS) scores. This suggests that screen duration alone may not directly predict physical discomfort or functional impairment in this population. Factors such as individual posture, ergonomic awareness, physical activity, and behavioral adaptations may mitigate the physical impact of prolonged device use.

However, our study highlighted that smartphone addiction increased proportionally with higher screen time, reinforcing the notion that prolonged device exposure promotes behavioral dependency even in the absence of immediate physical symptoms. This is particularly important because addiction may indirectly contribute to musculoskeletal issues over time through sedentary behavior, poor posture, reduced physical activity, disrupted sleep, and impaired focus. Therefore, while short-term physical outcomes may not show significant changes, the psychological and behavioral consequences of prolonged screen use warrant attention.

These findings emphasize the importance of adopting a multifaceted approach to digital wellness. Interventions should not solely focus on reducing screen time but also incorporate postural education, ergonomic awareness, scheduled micro-breaks, and strategies for responsible device use. Such comprehensive measures are likely to prevent the development of smartphone addiction while reducing long-term risks for neck and musculoskeletal disorders.

In conclusion, our study contributes to the understanding of the complex relationship between screen exposure, addiction, and musculoskeletal health. It underscores that behavioral dependency may develop independently of immediate physical discomfort, highlighting the need for proactive interventions targeting both mental and physical health. Future longitudinal research should explore the temporal dynamics of screen use, addiction, and musculoskeletal outcomes to design evidence-based strategies that promote holistic well-being among adolescents and young adults.

Limitations:

1. Although statistically adequate, the sample size may not have been large enough to detect subtle associations or represent the broader adolescent population.

2. Responses to the Neck Disability Index (NDI) and Smartphone Addiction Scale–Short Version (SAS-SV) were self-reported, making them susceptible to recall bias and social desirability bias.

3. Data were collected at one point in time, preventing assessment of changes in smartphone usage patterns, posture, or neck symptoms over time.

4. Factors such as physical activity level, ergonomic practices, sitting posture, duration of uninterrupted smartphone use, academic workload, sleep quality, stress, body mass index (BMI), and previous musculoskeletal conditions were not evaluated and may have influenced the results.

Although screen time was recorded, the study did not assess the posture adopted during device use, neck flexion angle, frequency of breaks, or the type of device used, all of which may influence cervical spine loading.

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ANNEXURE- I

INSTITUTIONAL ETHICS COMMITTEE
ACHARYA'S NR
INSTITUTE OF PHYSIOTHERAPY
(Affiliated to Rajiv Gandhi University of Health Sciences, Karnataka, Recognised by Indian Association of Physiotherapists and Approved by Government of Karnataka)

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Ph-9591029838

Ref. No. IEC/ANRIPT/27/2/2025 Date: 04/04/2025

This is to certify that the research protocol titled "The Association between Screen Time and Text Neck Syndrome among Adoloscents: A Cross Sectional Study" submitted by Principal Investigator Anurag Chakraborty, Syeda Nashra, Zahid Warunkar Abid and SnithaMariam Koshy and Co-investigator Ms Meghna Pradhan has been reviewed by the Institutional Ethics Committee of Acharya's N R Institute of Physiotherapy, Bengaluru. India.

The proposal has been reviewed by the chairperson, membersecretary, and members of Institutional Ethics Committee. Inaccordance with the ethical guidelines issued by the Indian Council of Medical Research (ICMR), the IEC, on the 25th March , 2025, hereby accords approval to carry out this research work.

The investigator shall notify the IEC of any changes intended to bemade during the course of the research work.

Dr. Prem Kumar B N
Chairperson

Dr. Mallikarjunaiah H S
Member Secretary

Acharya's NR Institute of Physiotherapy

Acharya Dr. Sarvepalli Radhakrishnan Road, Soladevanahalli, Acharya P.O., Bengaluru 560 107, Karnataka, India
acharya.ac.in +91 80 225 555 55 principalaip@acharya.ac.in

ANNEXURE- II

ASSENT FORM

(To be completed by the Participant)

Purpose of the Study:
This research aims to determine the relationship between the amount of screen time and the occurrence and severity of Text Neck Syndrome in adolescents, and to examine the effects of different types of screen use on its development.

Procedures:
If I agree to participate, I will:

1. Answer a questionnaire about my daily screen use (mobile, laptop and/tablet combined) and any neck discomfort.
2. This will take about 5–10 minutes.

Risks and Benefits:

- There are no expected risks from participating as it is just filling up the form
- There may be no direct benefits to me, but the study could help in preventing neck problems caused by screen use.

Confidentiality:
Name, age gender or any personal information will not be used in any report, and answers will be kept private and only used for this research.

Voluntary Participation:
I understand that taking part is my choice. I can say no, or I can stop at any time without anything bad happening.

Assent Declaration:
I have read or had read to me the information about this study. I understand it, and I agree to participate.

Full Name of Participant: _____
Signature of Participant: _____
Date: _____

Full Name of Researcher: _____
Signature of Researcher: _____
Date: _____

INFORMED CONSENT FORM

(To be completed by the Parent/Guardian/Coach)

I, Mr./Ms. _____, father/mother/elder sibling of _____ (age: ____ years), have been informed thoroughly about the above-mentioned study. I understand that my ward's participation is voluntary.

I am aware that there are no harmful or invasive procedures involved in this study and that there may be no direct or immediate benefits. The purpose of the study is to:

1. Investigate the correlation between the amount of screen time and the occurrence and severity of Text Neck Syndrome (TNS).
2. Examine the impact of different types of screen use (e.g., smartphones, tablets, laptops) on the development of TNS.

I consent to provide relevant information to the research team if required, with the understanding that such information will remain confidential and will not be used to identify my ward.

I understand that my ward is free to withdraw from the study at any time without any consequences.

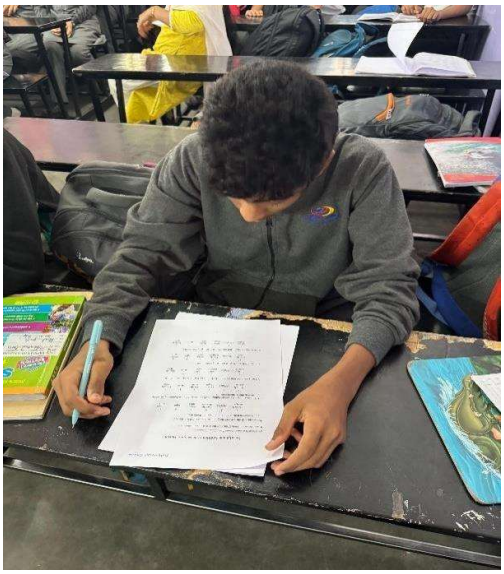
Full Name of the Participant: _____
Full Name of Guardian/Elder Sibling:_____
Full Postal Address: _____
Contact Number: _____
Email: _____

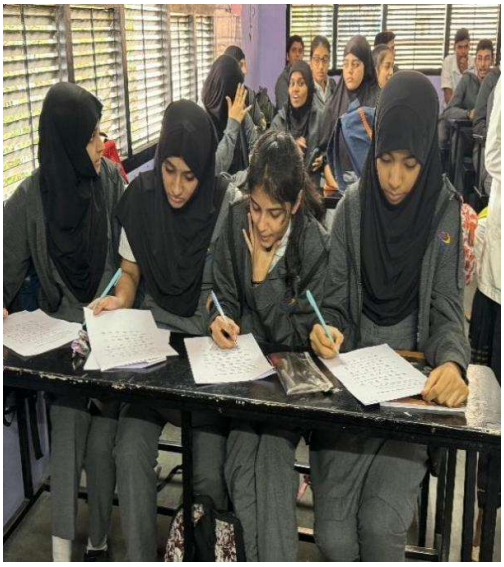
Date: _____
Signature/Thumb Impression of Respondent: _____

Date: _____
Signature/Thumb Impression of Witness: _____

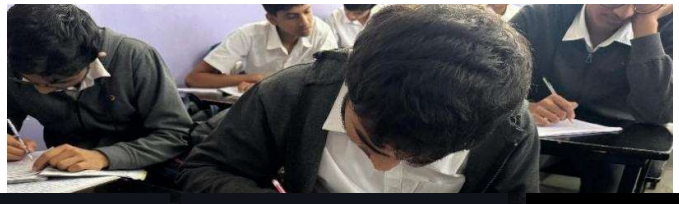
Date: _____
Signature of the Researcher: _____

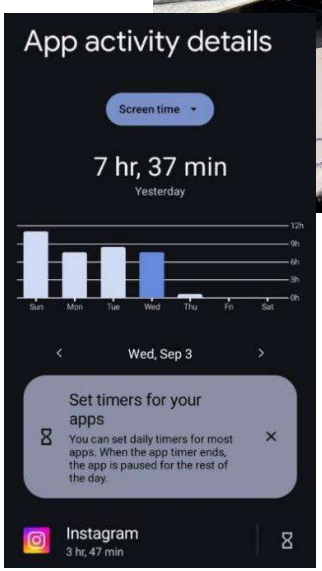
ANNEXURE- III

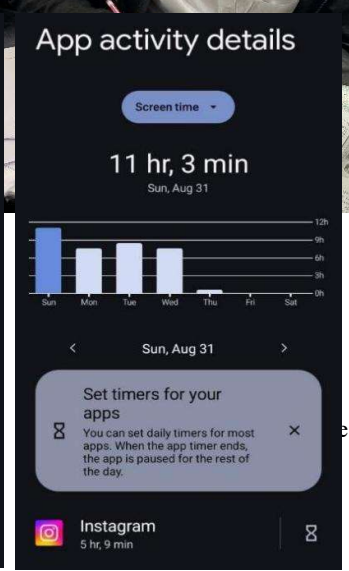




ANNEXURE-IV




App activity details
Screen time
7 hr, 37 min
Yesterday
Wed, Sep 3
Set timers for your apps
You can set daily timers for most apps. When the app timer ends, the app is paused for the rest of the day.
Instagram
3 hr, 47 min


App activity details
Screen time
11 hr, 3 min
Sun, Aug 31
Sun, Aug 31
Set timers for your apps
You can set daily timers for most apps. When the app timer ends, the app is paused for the rest of the day.
Instagram
5 hr, 9 min


SCREEN TIME
SHOW TODAY
Saturday, 30 August
9h 17m
Social
4h 50m
Creativity
1h 54m
Productivity & Finance
23m
Updated today at 10:30 AM
MOST USED
SHOW CATEGORIES
Instagram
Photos
Snapchat


SCREEN TIME
SHOW TODAY
Yesterday, 3 September
3h 58m
Social
1h 44m
Creativity
27m
Productivity & Finance
15m
Updated today at 10:30 AM
MOST USED
SHOW CATEGORIES
Instagram
Photos
Snapchat

4. I wouldn't be able to stand not having a smartphone.

1	2	3	4	5	6
Strongly disagree	Disagree	Weakly disagree	Weakly agree	Agree	Strongly agree

5. I feel impatient and fretful when I am not holding my smartphone.

1	2	3	4	5	6
Strongly disagree	Disagree	Weakly disagree	Weakly agree	Agree	Strongly agree

NEXURE-V

1

6. I have my smartphone on my mind even when I am not using it.

1	2	3	4	5	6
Strongly disagree	Disagree	Weakly disagree	Weakly agree	Agree	Strongly agree

7. I would never give up using my smartphone even if my daily life were greatly affected by it.

8. I consta people

9. I use m

10. People

Neck Disability Index

This questionnaire has been designed to give us information as to how your neck pain has affected your ability to manage in everyday life. Please answer every section and **mark in each section only the one box that applies to you**. We realise you may consider that two or more statements in any one section relate to you, but please just mark the box that most closely describes your problem.

Office Use Only

Name _____

Date _____

Section 1: Pain Intensity

- ☐ I have no pain at the moment
- ☐ The pain is very mild at the moment
- ☐ The pain is moderate at the moment
- ☐ The pain is fairly severe at the moment
- ☐ The pain is very severe at the moment
- ☐ The pain is the worst imaginable at the moment

Section 2: Personal Care (Washing, Dressing, etc.)

- ☐ I can look after myself normally without causing extra pain
- ☐ I can look after myself normally but it causes extra pain
- ☐ It is painful to look after myself and I am slow and careful
- ☐ I need some help but can manage most of my personal care
- ☐ I need help every day in most aspects of self care
- ☐ I do not get dressed, I wash with difficulty and stay in bed

Section 3: Lifting

- ☐ I can lift heavy weights without extra pain
- ☐ I can lift heavy weights but it gives extra pain
- ☐ Pain prevents me lifting heavy weights off the floor, but I can manage if they are conveniently placed, for example on a table
- ☐ Pain prevents me from lifting heavy weights but I can manage light to medium weights if they are conveniently positioned
- ☐ I can only lift very light weights
- ☐ I cannot lift or carry anything

Section 4: Reading

- ☐ I can read as much as I want to with no pain in my neck
- ☐ I can read as much as I want to with slight pain in my neck
- ☐ I can read as much as I want with moderate pain in my neck
- ☐ I can't read as much as I want because of moderate pain in my neck
- ☐ I can hardly read at all because of severe pain in my neck
- ☐ I cannot read at all

Section 5: Headaches

- ☐ I have no headaches at all
- ☐ I have slight headaches, which come infrequently
- ☐ I have moderate headaches, which come infrequently
- ☐ I have moderate headaches, which come frequently
- ☐ I have severe headaches, which come frequently
- ☐ I have headaches almost all the time

Section 6: Concentration

- ☐ I can concentrate fully when I want to with no difficulty
- ☐ I can concentrate fully when I want to with slight difficulty
- ☐ I have a fair degree of difficulty in concentrating when I want to
- ☐ I have a lot of difficulty in concentrating when I want to
- ☐ I have a great deal of difficulty in concentrating when I want to
- ☐ I cannot concentrate at all

Section 7: Work

- ☐ I can do as much work as I want to
- ☐ I can only do my usual work, but no more
- ☐ I can do most of my usual work, but no more
- ☐ I cannot do my usual work
- ☐ I can hardly do any work at all
- ☐ I can't do any work at all

Section 8: Driving

- ☐ I can drive my car without any neck pain
- ☐ I can drive my car as long as I want with slight pain in my neck
- ☐ I can drive my car as long as I want with moderate pain in my neck
- ☐ I can't drive my car as long as I want because of moderate pain in my neck
- ☐ I can hardly drive at all because of severe pain in my neck
- ☐ I can't drive my car at all

Section 9: Sleeping

- ☐ I have no trouble sleeping
- ☐ My sleep is slightly disturbed (less than 1 hr sleepless)
- ☐ My sleep is mildly disturbed (1-2 hrs sleepless)
- ☐ My sleep is moderately disturbed (2-3 hrs sleepless)
- ☐ My sleep is greatly disturbed (3-5 hrs sleepless)
- ☐ My sleep is completely disturbed (5-7 hrs sleepless)

Section 10: Recreation

- ☐ I am able to engage in all my recreation activities with no neck pain at all
- ☐ I am able to engage in all my recreation activities, with some pain in my neck
- ☐ I am able to engage in most, but not all of my usual recreation activities because of pain in my neck
- ☐ I am able to engage in a few of my usual recreation activities because of pain in my neck
- ☐ I can hardly do any recreation activities because of pain in my neck
- ☐ I can't do any recreation activities at all

Score: ___/50 **Transform to percentage score x 100 = %points**

Scoring: For each section the total possible score is 5: if the first statement is marked the section score = 0, if the last statement is marked it = 5. If all ten sections are completed the score is calculated as follows:

Example: 16 (total scored)

50 (total possible score) x 100 = 32%

If one section is missed or not applicable the score is calculated:

16 (total scored)

45 (total possible score) x 100 = 35.5%

Minimum Detectable Change (90% confidence): 5 points or 10 %points

NDI developed by: Vernon, H. & Mior, S. (1991). The Neck Disability Index: A study of reliability and validity. Journal of Manipulative and Physiological Therapeutics, 14, 409-415

ANNEXURE-VI

DrillBit

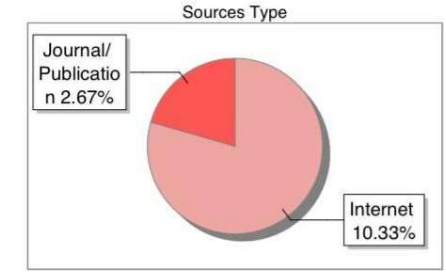
The Report is Generated by DrillBit Plagiarism Detection Software

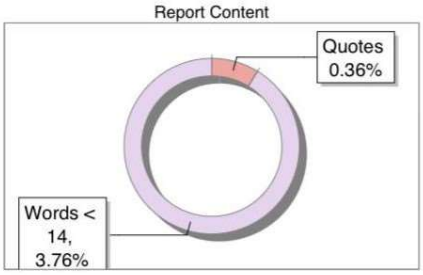
Submission Information

Author Name	Anurag Chakraborty
Title	The association between screen time and text neck syndrome in adolescence: a cross sectional study
Paper/Submission ID	4518952
Submitted by	siddamma3050@acharya.ac.in
Submission Date	2025-10-13 13:00:32
Total Pages, Total Words	3, 825
Document type	Project Work

Result Information

Similarity **13 %**





Exclude Information

Quotes	Not Excluded
References/Bibliography	Not Excluded
Source: Excluded < 14 Words	Not Excluded
Excluded Source	**0 %**
Excluded Phrases	Not Excluded

Database Selection

Language	English
Student Papers	Yes
Journals & publishers	Yes
Internet or Web	Yes
Institution Repository	Yes

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