

Postural Habits and Their Association with Text Neck Syndrome among Medical Students – A Cross Sectional Study**Abhirami V. S.¹, Sweety L. M.², Jebamalar J.³, Praveen Arya V. S.⁴**¹Phase III MBBS student Kanyakumari Government Medical College, Kanyakumari, Tamil Nadu, India²Assistant Professor, Department of Physiology, Kanyakumari Government Medical College, Kanyakumari, Tamil Nadu, India³Associate Medical data review manager, IQVIA RDS, Bangalore, Karnataka, India⁴Second year Post Graduate, Department of Paediatrics, Kanyakumari Government Medical College, Kanyakumari, Tamil Nadu, India

Received: 01-07-2025 / Revised: 15-08-2025 / Accepted: 21-09-2025

Corresponding author: Dr. Sweety L. M.

Conflict of interest: Nil

Abstract**Background:** Text neck syndrome also known as turtle neck syndrome is a prevalent health problem among students. Smart phone addiction and abnormal study posture are the major risk factors for its development.**Objectives:** This study assess the level of smartphone addiction and prevalence of text neck syndrome among medical students.**Methods:** It is an observational cross-sectional study which was conducted among 480 medical students in Kanyakumari government medical college Tamil Nadu, within the age group 18 to 25 years. Study was approved by institutional ethical committee. A structured questionnaire containing four sections was used for the study. Questionnaire includes: Section A: Questions regarding posture while studying and mobile phone usage, Section B: Numeric pain rating scale, Section C: Assessing Neck disability index, Section D: Smart phone addiction scale. The results were tabulated and statistical analysis was done using chi square and spearman correlation.**Results:** About 52% of participants are under risk of addiction to smart phones. 46% of mild degree of neck pain and 62% of students had mild degree of neck disability while using mobile phone and studying. There was a significant (p value < 0.05) association between NPRS and smart phone addiction, and NDI and smart phone addiction. The association between study posture and neck pain rating scale was also significant (p value < 0.05)**Conclusion:** The text neck syndrome is an alarming health issue among medical students because of increased smart phone addiction and abnormal posture while studying and using mobile phones. This indicates a need to reduce the addiction and to use an appropriate study posture to prevent the text neck syndrome.**Keywords:** Text Neck Syndrome, Smartphone Addiction.

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Text neck syndrome also called turtle neck syndrome is described by strain injuries and pain caused by prolonged texting and continuous usage of handheld devices [1]. Text neck, a term first introduced by U.S. chiropractor Dr. Dean L. Fishman, is increasingly recognized as a significant modern health issue [2].

The “text neck” is the result of prolonged neck flexion while hunched over modern electronic devices, especially smartphones [3]. It is an emerging health hazard impacting many people of all ages, which could potentially harm millions of people. Text neck syndrome has now become an alarming health problem that can affect many people around the world [4]. The usage of mobile

phones has been increased and is more increasing in the upcoming generation. Over last ten years, technology has advanced significantly and more people throughout the world have access to smart phones [5]. From games to academics, students are leading more sedentary life styles by depending on smartphones [5].

When individuals operate smart phone for prolonged duration, it causes defects in posture and associated pain [6]. Use of mobile phones can be linked to health issues like wrist and neck discomfort and cause musculoskeletal disorders [7]. Prolonged duration of studying in head forward position might lead to musculoskeletal problems like text neck syndrome. Lack of usage of tables

while studying is also one of the reason behind text neck syndrome. The major cause for text neck syndrome is forward head posture [3].

Neck pain, stiffness, and soreness are the most typical symptoms of text neck[3]. Radiating discomfort, upper back pain, shoulder pain, headache, sleeplessness, tingling, numbness in the hands, and muscular weakness of the shoulder muscles are some of the additional symptoms [3] Bad head and neck posture is associated with upper back and cervical spine pain, muscular tension and spasms [2].

Therefore prolonged mobile phone usage and abnormal posture during studying can be major cause for text neck syndrome among students. This study assesses the level of smart phone addiction among medical students. Since the smartphone addiction and abnormal posture can results in text neck syndrome. This study will help to gain insight into these and will estimate the prevalence of text neck syndrome among medical students and hence create awareness on text neck syndrome.

Materials and Methods

The study was approved by Institutional Ethics Committee, Kanyakumari government medical college, Asaripallam (F-003/2025) and was conducted during June 2025 to August 2025

Sampling Method

The sampling method used was convenient sampling. Sample size was calculated. (Based on the reference study, considering prevalence as 57%) using the formula:

$p=57$ $q=100-p=43$ $l=5\%$ $z=1.96$ (95% confidence interval)

$$n = \frac{z^2 pq}{l^2} = \frac{(1.96)^2 (57)(43)}{5^2} = 376$$

Including 10% non-responsive rate= $376+37=413$

The sample size is rounded off to 420

The study questionnaire was circulated among 600 medical students of Kanyakumari medical college, Asaripallam, Tamil Nadu out of which 480 students

participated in this study. Informed consent of all participants was obtained through the google form.

Inclusion Criteria: This study included medical students of age group 18 to 25years—both males and females who gave consent.

Those with congenital cervical problems, traumatic, pathological cervical problem, neurological problems, cerebral ataxia and syringomyelia were excluded from this study.

Questionnaire with four sections were circulated among the participants as google form.

Questionnaire includes:

1. Section A: Questions regarding posture while studying and mobile phone usage
2. Section B: Numeric pain rating scale [10].
3. Section C: Assessing Neck disability index [9].
4. Section D: Smart phone addiction scale [11].

Numerical pain rating scale [10] is a validated and reliable scale to measure pain intensity using 0 to 10 scale, with zero rated as “no pain” and 10 rated as “the worst pain”.

Neck disability index9 is a validated tool which has been designed to provide information on how neck pain has affected management of daily life activities .Scoring: Questions are scored on a vertical scale of 0-5. Total scores multiply by 2. Divide by number of sections answered multiplied by 10. A score of 22% or more is considered significant activities of daily living disability [9].

Smartphone addiction scale [11] is used to assess the smartphone addiction among medical students. It is a validated scale containing 10 questions related to the usage and addiction of smartphones. It grades the addiction from strongly disagree (grade1) to strongly agree (grade6).

Data was entered in MS Excel and analyzed using SPSS Version 26. The results were tabulated and statistical analysis was done using chi square test and spearman correlation. P value of less than 0.05 was considered statistically significant.

Result

Table 1: Demographic data

Profile of the study participants (n=480)		
Parameter	n	%
Gender		
Female	267	56%
Male	213	44%
	Male	Female
Mean age (Years)	20.1	20.4

This table depicts the demographic data of this study, out of 480 participants, 56% were females and 44% were males. The mean age of participants among females were 20.4 and among males were 20.1.

Table 2: Mobile phone use patterns

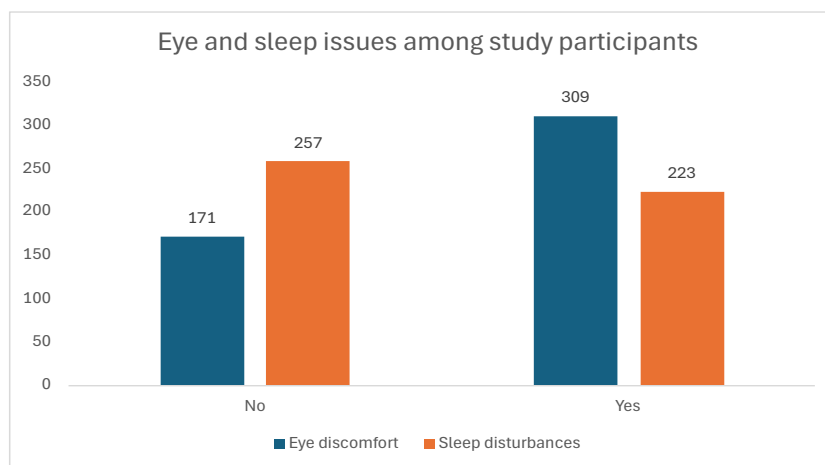
Mobile use patterns		
	n	%
Since when have you been using a mobile phone?		
5 to 10 years	175	36%
Less than 5 years	284	59%
More than 10 years	21	4%
Hours of daily mobile phone usage		
More than 3 hours	212	44.17%
1 to 3 hours	215	44.79%
30 minutes to 1 hour	45	9.38%
Less than 30 minutes	8	1.67%

Table 2 shows that 59% of participants uses mobile phones for less than 5 years duration and 36% uses for 5 to 10 years duration. We can also see that 44.79% of the participants use mobile phones for 1 to 3 hours and 44.17% of participants uses mobile phone for more than 3 hours.

Table 3: Risk of addiction of smart phone usage

Risk of addiction	n			%		
	Female	Male	Total	Female	Male	Total
No	145	86	231	54%	40%	48%
Yes	122	127	249	46%	60%	52%

Table 3 shows that out of 480(267 female students and 213 male students) participants, 52% of participants (both male and female) are under the risk of smartphone addiction.

**Figure 1: Eye and sleep issues among study participants**

The above figure shows that out of 480 participants, 309 participants are suffering eye discomfort and 223 are suffering sleep disturbances.

Table 4: Posture while using mobile phone

Common posture while using mobile phone		n	%
Lying down		232	48.33%
Sitting forward head position		137	28.54%
Sitting upright		111	23.13%
How do you typically hold your mobile phone while using it?		n	%
Holding above eye level (looking up)		31	6.46%
Holding at eye level		111	23.13%
Holding below eye level (looking down)		338	70.42%

From table 4, it shows that 48.33% of students uses mobile phone in lying down posture. 28.54% participants use mobile phone in head forward position. We can also see that 70.42% of participants uses mobile phone by holding below eye level and 23.13% of students uses mobile phones by holding at eye level.

Table 5: Posture while Studying

Common posture while studying	n	%
Lying down	34	7%
Sitting in head forward position without a desk	167	35%
Sitting upright with the help of a desk	279	58%

Table 5 shows that 58% of students uses desk while studying, while 35% of the students are studying in head forward position without a desk.

Table 6: Association between postures of studying with NPRS

NPRS rating	None	Mild	Moderate	Severe	Total
Lying down	1 (3%)	18(53%)	15 (44%)	0 (0%)	34
Sitting in head forward position without a desk	24 (14%)	66(40%)	58 (35%)	18 (11%)	166
Sitting upright with the help of a desk	54 (19%)	136 (49%)	73 (26%)	16 (6%)	279

P value: 0.011*

Table 6 shows the association of posture while studying with NPRS (neck pain rating scale) and the number of participants with posture variation during studying.

We can see that out of 480 participants, 279 participants study posture is sitting upright with the

help of desk. Association of posture with NPRS shows that participants with head forward posture without desk shows higher moderate (58 participants) /severe (18 participants) counts, possibly indicating poor ergonomics aggravates severity (p value : 0.011*).

Table 7: Degree of neck pain (Numeric pain rating scale) while using mobile phones and studying

NPRS rating	n			%		
	Female	Male	Total	Female	Male	Total
Mild	129	91	220	48%	43%	46%
Moderate	82	64	146	31%	30%	30%
Severe	21	13	34	8%	6%	7%
None	35	44	79	13%	21%	16%

Table 7 depicts that 46% of total participants suffer from mild neck pain and 30% of participants suffer from moderate neck pain while using mobile phones and studying.

Table 8: Degree of neck disability index while using mobile phones and studying

NDI severity	n			%		
	Female	Male	Total	Female	Male	Total
No Disability	34	22	56	13%	10%	12%
Mild	169	129	298	63%	61%	62%
Moderate	55	43	98	21%	20%	20%
Severe	9	17	26	3%	8%	5%
Complete	0	1	1	0%	0%	0%

Table 8 clearly depicts that 62% participants have mild disability and 20% participants have moderate disability.

Table 9: Association between the levels of neck disability index with risk of smartphone addiction

Risk of addiction vs NDI Severity		No			%		
		No	Yes	Total	No	Yes	Total
NDI Severity	No Disability	43	13	56	18.7%	5.2%	11.7%
	Mild	147	151	298	63.9%	60.6%	62.2%
	Moderate	37	61	98	16.1%	24.5%	20.5%
	Complete	0	1	1	0.0%	0.4%	0.2%
	Severe	3	23	26	1.3%	9.2%	5.4%
Chi-square test		p-value = 0.0000*					

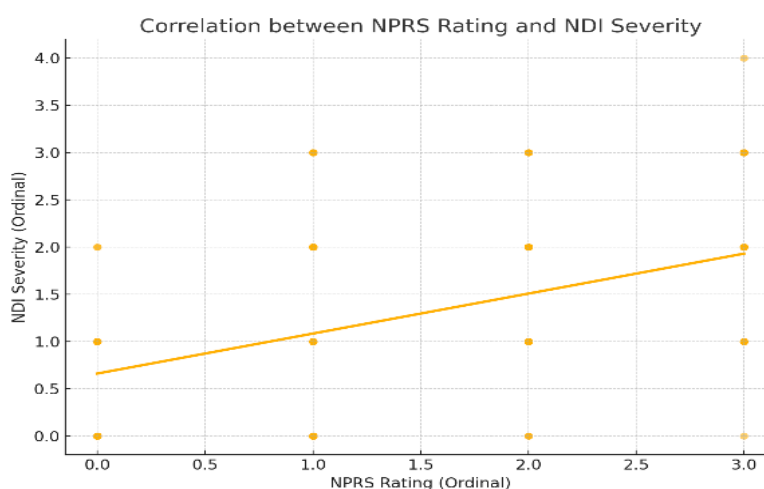
Table 9 shows the association between the levels of neck disability with risk of smartphone addiction among participants. Chi-square test was computed to find the association between the level of neck disability with risk of smartphone addiction, which was significant ($p < 0.05$). It reveals that the disability was more common (62.2%) among those participants who were more addicted to the smartphone.

Table 10: Association between numerical pain rating scale and smart phone addiction

Risk of addiction vs NPRS rating		No			%		
		No	Yes	Total	No	Yes	Total
NPRS rating	None	61	18	79	26.5%	7.2%	16.5%
	Mild	114	106	220	49.6%	42.6%	45.9%
	Moderate	46	100	146	20.0%	40.2%	30.5%
	Severe	9	25	34	3.9%	10.0%	7.1%
Chi-square test		p-value = 0.0000*					

Table 10 shows that there was a significant (p value < 0.05) association between smartphone addiction and neck pain. From this we can understand that 45.9% of participants were

suffering from mild neck pain. The reported prevalence of moderate and severe neck pain was significantly higher among students with smartphone addiction compared to those without.

**Figure 2: Correlation between NPRS and NDI**

From the above figure 2, we can understand that there is a positive correlation between NDI and NPRS.

Discussion

The present cross sectional study was done among 480 medical students of age group 18 to 25, out of which 56% were females and 44% males. Table 2 shows that 59% of participants were using mobile phones in less than 5 years and 44.17% of the participants are using for more than 3 hours per day. The study infers that 52% of total participants are having risk of addiction to mobile phone. The smart phone addiction has now become an alarming risk for various disorders because of its use from very young age.

In the study done by Dinesh J Bhandari et al [15], the authors have concluded that, a high rate of smartphone addiction among adolescents warrants effective intervention strategies at local, state, and national level to address this growing health problem in this population. From this study, (figure 1) we have found that, 309 participants reported eye discomfort and 223 reported sleep disturbances after using mobile phone. From the above data, this study emphasizes that more number of medical students are becoming addicted to mobile phones

and also suffer from the consequences associated with the increased usage of mobile phone. Nikolic A, Bukurov B et al [13] study sheds light on the prevalence of smartphone addiction among medical students, with spending excessive time on smartphones and higher levels of depression standing out as significant factors.

Our study has analysed that 28.54% (table 4) of participants are using mobile phone in head forward position and 70.42% (table 4) of the total participants are holding mobile phone at below the eye level. This means, almost one third of the total participants are using mobile phone in incorrect posture. Thus they are at risk of developing text neck syndrome. On assessing the posture while studying (table 5), majority (58%) of the participants are using desk while studying. But some (35%) of them are studying in forward head posture without using desk, which can even lead to neck pain and discomfort. The analysis of association between head forward posture while studying and NPRS is significant (table 6) in this study which indicates that the abnormal study posture can leads to text neck syndrome. This is also proved by the study done by David D, Giannini C, et al [14], which concludes that the postural hygiene (knowledge and posture habits)

plays an important role in musculoskeletal cervical pain, leading to text neck syndrome. When the head is sustained in the flexed position like in the case of text neck posture, the weight of the head transmitted through the cervical spine raises exponentially resulting in degenerative changes [17]. Moreover, this faulty posture may lead to alterations in the length of the muscles acting in the cervical region resulting in inefficiency due to a compromise in the length-tension relationship [17].

According to table 7, this study infers that 46% participants are having mild neck pain and 30% of them are having moderate neck pain and 7% with severe neck pain which was assessed by NPRS. Therefore neck pain, which is one of the important symptom of text neck syndrome is present in 83% of total participants. The prevalence of text neck syndrome was also assessed among medical students in relation with varying posture in the study done by Alsiwed K.T, et al [16], according to this study, more than half of medical students had text neck syndrome.

The level of NDI (table 8) among the students are mostly mild (62%), and only 20% is moderate and 5% severe. The neck disability among medical students with text neck syndrome was also analysed in the study done by Muna A Salameh et al [12] which concluded that, more than a quarter of medical students had text neck syndrome, and most of them had a mild neck disability. Text Neck Syndrome was linked to an increased number of gadgets used, low exercise, and more time spent in a sitting position. [12]

The weight of the head on the spine is dramatically increased when it is flexed forward, and the effects and amount of weight are strongly and progressively enhanced by varying the degrees [14]. In fact, the frequent forward flexion can change the cervical spine, curvature, supporting ligaments, tendons musculature, the bony segments, commonly causing postural change and pain on the neck and associated areas [14].

The frequent forward flexion can change the cervical spine, curvature, supporting ligaments, tendons, musculature, the bony segments, commonly causing postural change and pain on the neck [14]. It is estimated that children and adolescents spend a medium of 5 to 7 h a day on their smartphones and handheld devices with their heads flexed forward to read and text. It has been reported that the cumulative effects of this exposure reach alarming results of an excess stress on the cervical spine area. [14] The association (table 9 and 10) between the level of neck disability and numerical pain rating scale with risk of addiction is significant in this study. This indicates that smart phone addiction is quite common among the students. Thus this might enhance the risk for

text neck syndrome. This is in par with the study done by Bharal s, Mr Rizvi et al [3]. This study also analysed the relation between NPRS and NDI (figure 2). The graph shows a positive relation between them since the slope is steep. This infers that neck pain can leads to neck disability if the participants continues to be in forward head posture while studying and using mobile phone.

Conclusion

The present study emphasises that excessive mobile phone use is common among medical students which in-turn results in addiction and is associated with a high prevalence of neck pain, eye discomfort, and sleep disturbances. While neck disability was comparatively less frequent, there was a significant association between smartphone addiction and increased neck pain severity, indicating its role as a risk factor for text neck syndrome. These findings highlight the importance of policies and programs for healthy smartphone usage habits, proper posture and awareness of the musculoskeletal risks associated with prolonged device use. This would help in reducing the likelihood of developing text neck syndrome and its complications.

References

1. Neupane S, Ali UI, Mathew A. Text Neck “Syndrome-Systematic Review”. Imperial Journal of Interdisciplinary Research. 2017; 3(7):141-148.
2. Subhalaxmi Nayak, Dr. Uppu Praveen, & Neha Karn. “Text Neck Syndrome: A Modern Era Health Concern. Revista Electronica De Veterinaria. 2024; 25(1S):1547-1552.
3. Bharal, S, MR Rizvi, M.M Alqahtani, R.A. Alajam, A. Sharma, I. Ahmad, M.L. AL-Otaibi, M.M. Alshehri, M.M Ahmad, M.A Shaphe, I. Ahmad, F. Ahmad, M. Miraj, M. Alzhirani, A.D. Alanazi, G.M. Shawaky. “Effectiveness of Neck Stabilization and Contrology Training in Comparison to Conventional Therapy amongst Individuals with TextNeck Syndrome.” European Review for Medical and Pharmacological Sciences. 2023; 27(18):8340– 8349.
4. Vate U Lan P. Text Neck Epidemic: A Growing Problem for Smart Phone Users in Thailand.IJCIM.2015;23(3):1-5.
5. Fahad Tanveer. The Effects of Smartphones on Child Health. THE THERAPIST (Journal of Therapies & Amp: Rehabilitation Sciences). 2023;4(04):01
6. Tsantili AR, Chrysikos D, Troupis T. Text Neck Syndrome: Disentangling a New Epidemic. Acta Medica Academica.2022; 51(2): 123-127.
7. Bashir U, Noor R, Shoukat H, Ali ML, Javed MT, Hassan Z. Correlation of mobile phone

- usage on grip strength, disabilities and posture in young adults. *The Rehabil.J.*2022; 07(01):495-498.
8. Zarea BK, Patil SR. Mobile Phone Head and Neck Pain Syndrome: Proposal of a New Entity. *OHDM Headache.*2015; 14(5):313-317.
 9. Senthil Kumar B, Kouser Banu Khaleeluddin., et al. Prevalence and awareness of text neck syndrome and text thumb syndrome in young adult population.2024;12(1):22-28.
 10. McCaffery, M., Beebe, A., et al. *Pain: Clinical manual for nursing practice.*1994; 9(11):55.
 11. Min Kwon, Dai-Jin Kim, Hyundai Cho and Soo Yang. The smartphone addiction scale: Development and validation of a short version for adolescents. *PLOS One.*2013;8(12): e83558
 12. Salameh MA, Boyajian SD, Amaireh EA, Jamal B, Alrfooh H, AbuKhalaf K, Alzu'bi OM, Al-Tanbouz HD, Alzyoud K. Prevalence of text neck syndrome, its impact on neck dysfunction, and its associated factors among medical students: A cross-sectional study. *Work.* 2024; 79(3):1111-1119.
 13. Nikolic A, Bukurov B, Kocic I, Vukovic M, Ladjevic N, Vrhovac M, Pavlović Z, Grujicic J, Kisic D, Sipetic S. Smartphone addiction, sleep quality, depression, anxiety, and stress among medical students. *Front Public Health.* 2023; 11:1252371.
 14. David D, Giannini C, Chiarelli F, Mohn A. Text Neck Syndrome in Children and Adolescents. *Int J Environ Res Public Health.* 2021;18(4):1-14
 15. Bhandari DJ, Pandya YP, Sharma DB. Smartphone Use and Its Addiction among Adolescents in the Age Group of 16-19 Years. *Indian J Community Med.* 2021;46(1):88-92.
 16. 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 Musculoskelet Surg Res* 2021; 5:266-272.
 17. Sirajudeen MS, Alzhrani M, Alanazi A, Alqahtani M, Waly M, Unnikrishnan R, Muthusamy H, Alrubaia W, Alanazi N, Seyam MK, Kashoo F, Miraj M, Channmgere Govindappa S, Alghamdi KA, Al-Hussinan NM. 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. *Peer J.* 2022 Dec; 10:e14443. DOI 10.7717/peerj.14443.