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ORIGINAL RESEARCH **PAIN MANAGEMENT**

Text neck syndrome: a rising concern among medical students in Northern Saudi Arabia

Majed Gorayan Alrowaili [1] . Pakeeza Shafiq [2] , Yasir Mehmood [3] , Haider Osman Elmisbah [4] , Muhammad Omer Afzal Bhatti [5] , Malik Azhar Hussain [6] , Muhammad Ayoob Jatt [7]

Authors affiliations:

1. Majed Gorayan Alrowaili, Associate Professor, Department of Surgery (Orthopedic Division), Faculty of Medicine, Northern Border University, Arar, Saudi Arabia; Email: malrowaili@nbu.edu.sa
2. Pakeeza Shafiq, Assistant Professor, Department of Surgery (Radiology Division), Faculty of Medicine, Northern Border University, Arar, Saudi Arabia; Email: Dr.pakeezashafiq@gmail.com
3. Yasir Mehmood. Assistant Professor, Department of Surgery, Faculty of Medicine, Northern Border University, Arar, Saudi Arabia; Email: Dr.yasir@live.co.uk
4. Haider Osman Elmisbah. Assistant Professor, Department of Surgery, Faculty of Medicine, Northern Border University, Arar, Saudi Arabia; Email: Haidermisbah2002@yahoo.com
5. Muhammad Omer Afzal Bhatti, Lecturer Radiology, Department of Surgery, Faculty of Medicine, Northern Border University, Arar, Saudi Arabia; Email: Muhammad.Afzal@nbu.edu.sa
6. Malik Azhar Hussain, Assistant Professor, Department of Surgery, Faculty of Medicine, Northern Border University, Arar, Saudi Arabia; Email: drmalikazhar@yahoo.com
7. Muhammad Ayoob Jatt, Assistant Professor, Department of Surgery, Faculty of Medicine, Northern Border University, Arar, Saudi Arabia; Email: Dr.ayubjat@yahoo.com

Correspondence: Dr. Pakeeza Shafiq, **Email:** Dr.pakeezashafiq@gmail.com

ABSTRACT

Background & **objectives:** Text neck syndrome (TNS) is a modern health concern characterized by neck pain and discomfort resulting from prolonged forward head posture while using mobile devices. This condition arises from the repetitive strain on the cervical spine caused by looking down at screens, leading to potential long-term musculoskeletal issues. We aimed to study and document the prevalence and awareness of TNS among medical students in Northern Border University, Arar, Saudi Arabia.

Methodology: A cross-sectional study was conducted among 150 medical students enrolled at Northern Border University, Arar, using a structured questionnaire. Data collection included demographic information, gadget use, symptoms, lifestyle choices, and awareness. Statistical analysis was performed using the chi-square test, conducted using SPSS version 22.

Results: Among the participants, 68.6% reported experiencing neck pain in the past month, with 36.6% describing it as mild. For 68% of students, daily smartphone use exceeded two hours; 70% of them blamed gadget use for their discomfort. 81% of respondents reported poor or fair posture; only 26% engaged in neck or posture exercises. 54% of respondents were aware of TNS; only 18.6% received preventive education. Neck discomfort and characteristics such as smartphone usage, posture, stiffness, TNS awareness, and ergonomic changes ($P < 0.05$) exhibited statistically significant correlations.

Conclusion: This study highlights a significant prevalence of neck pain and its associated symptoms among medical students in Northern Saudi Arabia, emphasizing the importance of targeted health education campaigns and ergonomic interventions to mitigate the adverse effects of TNS on the health, academic performance, and overall well-being of medical students.

Keywords: Text Neck Syndrome; Medical Students; Smartphone; Posture; Musculoskeletal Pain

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1. INTRODUCTION

Text Neck Syndrome (TNS), a musculoskeletal condition resulting from excessive use of mobile phones, computers, and digital devices, is characterized by pain and discomfort in the neck, shoulders, and upper back.[1,2] The digital age poses increased risks to the younger generation, especially students, who spend extended periods using gadgets for academic and leisure activities.[3] Text Neck Syndrome, a global issue affecting all ages, has become particularly prevalent among university students due to their intense study schedules and excessive screen time.[4]

Medical students face unique challenges due to their demanding academic workload, which involves prolonged sitting and engaging with digital devices.[5] This poor posture and musculoskeletal issues, such as TNS, not only affect their physical health but also their cognitive abilities and academic performance.[6,7] Reduced productivity, increased stress, and finally a drop in general well-being can result from symptoms like neck stiffness, headaches, and trouble focusing.[8]

According to Sirajudeen et al. study, neck and shoulder discomfort among university students, particularly those who regularly use computers and cellphones for academic activities, has increased.[9] Alhumaidan et al. also showed that 54.3% of Saudi Arabia's university students experienced musculoskeletal pain, the most common sites being lower back and neck.[10] Particularly in the 18-25 age range, Hawamdeh et al. (2023) also underlined that the main cause of neck discomfort among university students was their use of digital devices.[11] These findings emphasize the growing concern about TNS, especially among student populations who spend more time on digital devices for leisure and study.

TNS not only affects physical aspects but also cognitive ability and academic achievement. Students experiencing neck pain reported trouble focusing and a drop in academic performance brought on by discomfort. According to Gao et al., Bottaro et al. (2022) also revealed that students with musculoskeletal diseases like TNS experience greater stress and lower quality of life.[12,13] These findings suggest that students in Saudi Arabia face a substantial risk of TNS, necessitating specialized research to assess the awareness of TNS among medical students in Northern Saudi Arabia

This survey-based study aims to assess the prevalence and awareness of TNS among medical students fourth, fifth, and last years of the College of Medicine in Northern Saudi Arabia.

2. METHODOLOGY

This study was a cross-sectional design conducted at the College of Medicine, Northern Border University (NBU), Arar, Saudi Arabia. Students enrolled in the fourth, fifth, and final years of the College of Medicine, NBU, Arar, who provided informed consent to participate in the study, met the inclusion criteria for the study. Students who failed to finish the questionnaire and those without informed consent were excluded. Ethical approval was granted by the University Institutional Committee of Bioethics, via decision number (33/25/H).

Sample size was calculated using a 90% confidence level, a 6% margin of error, and an estimated prevalence of neck discomfort among medical students of 68.1%. The sample size for the study came out to be 150 students. This sample size guaranteed sufficient strength to evaluate the knowledge of TNS among the target group.

Data Collection

Data collection involved the collection of demographic information, gadget use, symptoms, lifestyle choices, and awareness using a standardized questionnaire. The qualifying students received the online Google Form version of the questionnaire. Students were expected to freely answer the questionnaire, therefore guaranteeing their anonymity. Before anyone participated, informed permission was acquired.

Statistical Analysis

SPSS version 22 was used to enter and examine the data. Whereas quantitative factors were shown as means and standard deviations, descriptive statistics such as frequencies and percentages were employed to depict qualitative variables. Comparisons of qualitative variable proportions were accomplished with chi-square testing. A p-value of at least 0.05 was considered statistically significant.

3. RESULTS

Out of the 150 participants, 56.67% were male, with 34% from the 4th year, 38% from the 5th year, 28% from the 6th year. Of the participants, 32% utilized their cellphones for less than two hours daily, while 68% exceeded this duration. Notably, 81.33% employed laptops, and 64.6% utilized tablets. However, every student possessed a smartphone. The primary objectives were education (78%) and social media (86%). Remarkably, about one-third (35.33%) of participants used their cellphones lying in bed, while 18.6% consistently refrained from doing so. (Table 1)

Table 3: Lifestyle habits (n = 150)

Variables		n (%)
Hours Spent Sitting (per day)	2-4 h	18 (12.00)
	4-6 h	56 (37.33)
	6-8 h	59 (39.33)
	> 8 h	17 (11.33)
Regular Physical Exercise	Daily Exercise	33 (22.00)
	3-5 days/week	29 (19.33)
	1-2 days/week	53 (35.33)
	Occasionally	24 (16.00)
	No Exercise	11 (7.33)
Neck/Posture Exercises	Yes	39 (26.00)
	No	111 (74.00)
Posture While Using Devices	Good	28 (18.66)
	Fair	57 (38.00)
	Poor	65 (43.33)
Measures to Maintain Healthy Posture	Yes	63 (42.00)
	No	87 (58.00)

Table 1: Smart device usage patterns (n = 150)

Variables		n (%)
Smartphone usage (h/day)	< 2 hours	48 (32.00)
	>2 hours	102 (68.00)
Digital devices used	Smartphone	150 (100)
	Tablet	97 (64.60)
	Laptop	122 (81.33)
	Desktop	57 (38.00)
Primary smartphone use	Education	117 (78.00)
	Social media	129 (86.00)
	Gaming	47 (31.33)
	Other	23 (15.33)
Smartphone use while lying in bed	Yes, mostly	53 (35.330
	Yes, sometimes	42 (28.00)
	Yes, rarely	27 (18.00)
	No	28 (18.66)

Table 4: Awareness and prevention of TNS (n = 150)

Variable		n (%)
Awareness of TNS and causes		81 (54.00)
Received education on TNS prevention		28 (18.66)
Prolonged smartphone use affecting posture	Yes	102 (68.00)
	No	27 (18.00)
	Maybe	21 (14.00)
Apps or Tools to monitor usage		43 (28.67)
Ergonomic adjustments for neck pain		51 (34.00)

Table 2: Symptoms and diagnosis of TNS (n = 150)

Variable		n (%)
Neck pain last month	Yes	103 (68.66)
	No	47 (31.33)
Severity of neck pain	Mild	55 (36.66)
	Moderate	35 (23.33)
	Severe	13 (8.67)
	No Neck Pain	47 (31.33)
Headaches associated with neck pain	Yes	71(47.33)
	No	79 (28.66)
TNS diagnosis	Yes	19 (12.66)
	No	131(87.330
Neck stiffness and mobility	Yes	92 (61.33)
	No	58 (38.66)
Association with device usage	Yes	105 (70.00)
	No	20 (13.33)
	Maybe	17 (11.33)
	Never Experienced	8 (5.33)

Of the students who reported neck discomfort in the past month, a significant 36.6% described it as mild, 23.3% as moderate, and 8.6% as severe. Among those with severe discomfort, over half (47.33%) experienced neck-related headaches. Notably, only 12.6% had an official TNS diagnosis. Additionally, 61.33% of respondents complained of neck stiffness, while 70% believed gadget use was a contributing factor to their symptoms. (Table 2)

While 35.33% of students engaged in moderate exercise, comprising one to two days per week, the majority (39.3%) spent six to eight hours daily sitting. Notably, 74% of students neglected any neck or postural exercises. Furthermore, the majority (38%) perceived posture assessment while using gadgets as fair, while 43.3% considered it poor. Consequently, 58% failed to take any proactive measures to maintain good posture (Table 3).

Although more than half (54%) of the respondents were aware of TNS, only 18.6% had any knowledge of its prevention. While 28.67% of respondents utilized applications to track device usage, two-thirds (68%) recognized that extended smartphone use negatively impacted posture. One-third (34%) implemented ergonomic adjustments to alleviate neck discomfort, while the remaining 66% did not (Table 4).

Most of the respondents (68.67%) indicated that online learning negatively impacted neck health, and a significant majority (81.3%) believed that study hours are associated with neck discomfort. The most frequently used devices were either exclusively for academic purposes (31.3%) or primarily for academic reasons (39.3%). There was a high demand for ergonomic seminars; 66% of respondents expressed a strong desire to attend (Table 5).

Neck discomfort and characteristics such as smartphone usage (P = 0.001), poor posture (P = 0.001), stiffness (P = 0.014), TNS awareness (P = 0.001), and ergonomic changes (P = 0.026) showed statistically significant correlations (Table 6).

4. DISCUSSION

This study investigated the prevalence and knowledge of TNS among medical students in Northern Saudi Arabia. The findings revealed a substantial prevalence of symptoms associated with the use of digital devices. Notably, 68.6% of students reported experiencing neck discomfort within the past month, with 36.6% describing it as mild and 23.33% as moderate. These results align with previous research indicating that a significant proportion of Saudi university students experience musculoskeletal pain, particularly in the neck and shoulders.[14]

Table 5: Additional observations

Variable		n (%)
Correlation Between Study Hours and Neck	Yes	122 (81.330)
	No	19 (12.66)
	Maybe	9 (6.00)
Online Learning Affecting Neck Health	No	34 (22.66)
	Maybe	13 (8.66)
Device Usage for Academic vs. Leisure Activities	Only for Academic Purposes	47 (31.33)
	Mostly for Academic Purposes	27 (18)
	Mostly for Leisure Activities	7 (4.6)
	Equal for Both	59 (39.33)
	None	7 (4.66)
Workshops on Ergonomics	No	22 (14.66)
	Maybe	29 (19.33)

Table 6: Chi-square test results comparing proportions of qualitative variables

Variable	Categories	Neck Pain	No neck pain	P-value
Smartphone Usage (hours/day)	< 2 hours	20 (13.3)	28 (18.6)	0.001
	> 2 hours	83 (55.3)	19 (12.6)	
Posture While Using Devices	Good	15 (10)	13 (8.6)	0.001
	Fair	30 (30)	27 (18)	
	Poor	58 (38.6)	7 (4.6)	
Neck Stiffness	Yes	70 (46.6)	22 (14.6)	0.014
	No	33 (22)	25(16.6)	
Awareness of TNS	Yes	65 (43.3)	16 (10.6)	0.001
	No	38 (25.3)	31 (20.6)	
Ergonomic Adjustments for Neck Pain	Yes	41 (30)	14 (9.33)	0.026
	No	62 (55.3)	37 (12.6)	

Data presented as n (%); P < 0.05 considered as significant

Almutairi et al. (2024) conducted a study to investigate the prevalence of musculoskeletal pain among Saudi students. The findings revealed that among individuals with excessive screen time, neck discomfort emerged as the most frequently reported complaint.[15] Our higher prevalence may be attributed to the additional academic and clinical stress experienced by medical students.

One important contributing reason turned out to be device usage. 70% of the participants in this study admitted a clear correlation between their neck discomfort and extended smartphone use. 32% utilized their cellphones for less than two hours daily, while 68% exceeded this duration. Furthermore, 81.3% of participants reported that their neck discomfort corresponded to their study schedule, providing evidence that academic obligations contribute to physical stress. These trends reflect earlier research showing that among university students, neck discomfort was significantly predicted by higher screen time, especially over 4 hours/day.[16] Maayah et al. (2023) noted in the context of medical students a noteworthy correlation between the occurrence of musculoskeletal diseases among them and extended gadget use.[17]

Despite the prevalence of symptoms, TNS remains poorly understood. Only 18.6% of students received formal education on prevention, while only 54% were aware of the illness. This finding aligns with previous research indicating that while many students experience musculoskeletal pain, their understanding of TNS and ergonomic techniques is inadequate.[18,19] Moreover, compared to the 66% of students who did not use ergonomic techniques, only 34% of our students implemented ergonomic changes, underscoring the significant disparity in preventative health education.

Furthermore, postural habits played a crucial role in the development of symptoms. 81.3% of our students assessed their posture using electronic devices, categorizing it as either fair or poor. This finding corroborates previous studies that poor posture, particularly when using digital devices, significantly increases the incidence of neck and upper back discomfort among medical students.[20] Additionally, only 26% of students engaged in neck and posture exercises, suggesting a lack of self-care practices.

The statistical significance of these correlations was confirmed through a chi-square test. Neck discomfort was significantly associated with factors such as smartphone usage duration (P = 0.001), poor posture (P = 0.001), and ergonomic awareness (P = 0.026). These findings align with previous research that highlighted the influence of study habits and device posture on musculoskeletal issues among medical students.[21]

By promoting improved posture and device usage, Wang et al. (2025) recommended that ergonomic awareness and educational interventions may significantly reduce

the frequency of TNS.[22] Preventing TNS risks can be achieved through ergonomic workstation modifications, frequent breaks, and posture correction activities. Soheili et al. (2024) highlighted the lack of student awareness regarding musculoskeletal diseases and their preventability in Saudi Arabia, underscoring the necessity of targeted health education initiatives.[23]

5. Study Strengths

One of the main strengths of this study is its focused analysis of medical students, a population segment especially prone to TNS, because of extended academic screen usage and substantial mental burden. By use of a well-organized and thorough questionnaire, it was possible to gather full information about device usage patterns, symptoms, lifestyle choices, and the level of awareness. Additionally, the application of chi-square statistical analysis enabled the identification of significant correlations.

6. LIMITATIONS

The study limitations are acknowledged. Firstly, its cross-sectional approach limits causal links between TNS symptoms and gadget usage. Second, particularly in relation to posture and physical exercise, self-reported data might be prone to underreporting or recollection bias. Lastly, the study was carried out at one university, which may restrict the generalizability of the results to other areas or student populations in Saudi Arabia.

7. CONCLUSION

This study highlights a significant prevalence of neck pain and its associated symptoms among medical students in Northern Saudi Arabia. A staggering 68.6% of respondents reported experiencing neck discomfort, and these symptoms were strongly correlated with prolonged smartphone usage, poor posture, and inadequate ergonomic practices. While the burden of TNS on society is evident, awareness and preventive measures remain inadequate. Notably, only 54% of students are aware of the disorder, and only 18.6% receive instruction on its prevention. These findings emphasize the paramount importance of targeted health education campaigns and ergonomic interventions to mitigate the adverse effects of TNS on the health, academic performance, and overall well-being of medical students.

7. Data availability

The numerical data generated during this research is available with the authors.

8. Conflict of interest

All authors declare that there was no conflict of interest.

9. Funding

The study utilized the hospital resources only, and no external or industry funding was involved.

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11. Authors’ contribution

MA, PS: Concept, Literature search, and Manuscript editing.

YM: Concept, statistical analysis, and Manuscript editing

HE, OB, AH, MA: Literature search, Data collection, and statistical analysis

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