



ASSOCIATION BETWEEN TEXT NECK PAIN AND LEVEL OF NECK DISABILITY IN RELATION TO DURATION OF DIGITAL GADGETS USAGE AMONG UNIVERSITY STUDENTS

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ABSTRACT

Objective: To study the association between text neck pain and level of neck disability in relation to duration of digital gadgets usage among university students.

Study Design: cross-sectional study

Material and Methods: This study was conducted on university students with ages 18 and above. The data was collected from University of Child Health Sciences, Children's Hospital Lahore (UCHS) and Pakistan Society for Rehabilitation of Differently Abled (PSRD). 382 students participated in this study. Questionnaire was provided to students who met inclusion criteria after informed consent.

Results: Out of 382 students, 82.5% were female and 17.5% were male. The majority of the participants were first year students (39.3%). More than half (50.5%) used digital gadgets an average of 4-6 hours a day, and 23.3% used them an average of 7-9 hours a day. Most people (55.5%) took a moderately flexed position with their necks, while only 1.3% assumed a neutral position. For neck disability, 51.6% had mild, 26.7% had no, 17.3% had moderate and 4.4% had severe disability. A quarter of the previous year (25.4%) had neck problems for 8-30 days during the past year. There were significant correlations between neck disability severity and the duration of neck trouble, and between the duration of using digital gadgets and the severity of neck disability and the duration of neck trouble ($p < 0.001$).

Conclusion: It was concluded that the excessive usage of digital gadgets significantly impacts the duration of neck trouble and level of neck disability.

Keywords: Text Neck Pain, Neck Disability, Duration of Digital Gadgets Usage, Screen Time, University Students.

INTRODUCTION

Digital technology has changed the way students communicate, learn and interact. Smartphones, tablets, laptops etc. are essential devices in the academic and social arena.

In particular, university students use these devices for a significant amount of time in educational activities, social networking, entertainment and communication. Leveraging digital gadgets has a lot of advantages, but its overuse has caused various concerns about the effect of the digital gadgets on physical health particularly musculoskeletal health¹.

After extended use of digital devices, users are likely to be in forward head posture and neck flexion for long periods of time. The postures place additional mechanical strain on the cervical spine and surrounding muscles, which results in discomfort,



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pain and functional limitations. The term “text neck syndrome” was coined to refer to repetitive stress injuries and neck pain that can occur from using handheld electronic devices for long periods of time in a flexed neck position². The study results have shown that the load on the cervical spine increases significantly with increased neck flexion angle, which makes people more susceptible to musculoskeletal disorders and postural abnormalities³.

Smartphone usage has dramatically risen over the last ten years, so has the rate at which people experience neck pain. Researchers have reported the prevalence of musculoskeletal symptoms in 8.2-90% of digital device users, and the neck is the most commonly reported body region⁴. Forward head posture, rounded shoulders, muscle imbalance, decreased cervical ROM and poor quality of life have also been associated with excessive screen time. University students are especially at risk due to extended time spent on screens in school and at leisure⁵.

Neck disability is the functional effects of neck pain and musculoskeletal impairment. It impacts daily functioning, attention span, sleep and overall health⁶. Although previous studies have shown that there is a strong association between duration of smartphone usage and neck pain severity, there is limited information available on the link between the duration of digital gadget usage and the extent of neck disability among university students in developing countries^{7,8}.

Since the onset of the COVID-19 pandemic, the use of online learning and digital communication has brought about a further growth of students' reliance on digital gadgets⁹. Thus, the effects of extended gadget use on neck health is an important public health issue. Identification of risk factors in early school years could lead to the prevention of chronic musculoskeletal problems and improve students' ergonomic behaviors. As the use of digital gadgets increased, students have been exposed to prolonged screens and poor neck postures, which can be a potential risk for neck pain and disability. While there are previous studies which have investigated text neck syndrome and musculoskeletal symptoms related to smartphone usage, there is little evidence on the association between hours spent on digital devices and severity of neck disability among university students. Thus, the purpose of this study is to offer evidence to help design preventive measures, ergonomics awareness programs and preventative interventions that will help to decrease neck disability among this population. The aim of this study is to find the association between duration of use of digital gadgets and neck disability of university students.

METHODOLOGY

This cross-sectional study was conducted from November 2025 to April 2026. Data collection was done from university students with ages 18 and above from different departments of School of Allied Health Sciences, Children's Hospital Lahore and Pakistan Society for Rehabilitation of Differently Abled (PSRD) Lahore. Non-probability convenient sampling method was used to collect data. Sample size for this study was calculated by using formula:

$$n = \frac{(Z_{\alpha/2})^2 \cdot p \cdot (1-p)}{e^2}$$

n = sample size

$Z_{\alpha/2}$ = Z score using 95% confidence interval (1.96)

P = expected prevalence which was 0.46

e = margin of error which was taken as 5% (0.05)

$$n = \frac{(1.96)^2 (0.46)(1-0.46)}{(0.05)^2}$$
$$n = 381.70 \approx 382$$

The sample size taken was 382 Students⁵.

Students including both genders who were enrolled in any department of university with minimum age limit as 18, who owned a smartphone for at least 12 months and were using it for more than one hour continuously every day, experiencing neck pain symptoms within last 12 months and giving informed consent were included in the study. While students who had a prior history of traumatic cervical spine injury or any surgery, with congenital deformities (torticollis, scoliosis, etc.) or pathological conditions that might be a factor to neck pain and use digital gadgets for less than an hour were excluded from the study. Data is collected using Standardized Nordic Musculoskeletal Questionnaire (SNMQ) for text neck pain, Neck Disability Index (NDI) for level of neck disability and self-perception method^{5,10,11}

After getting approval from IRB, first, the questionnaire was given to the supervisor to ensure that all questions are related to the objectives. Participants who were fulfilling inclusion criteria were inducted and briefed about the study. Students were provided with the questionnaires to fill it out for data collection after the informed consent. Self-validated questions were asked regarding the duration of digital gadgets usage and their purpose of use. Self-perception method was used by making participants mark a posture out of five options shown to them. Those who marked C or D were considered as to have habitual text neck posture. Test and retests had shown 91.1% agreement with k coefficient (k = 0.74 with confidence interval of 95%, 0.54-0.86)⁵. Text neck pain was recorded using neck portion of Nordic Questionnaire. Study revealed nearly 100% validity and specificity and the reliability was given by value of Cronbach's alpha reported 0.945 that made it a valid and reliable

tool.(10) Level of neck disability was recorded using Neck Disability Index which contained 10 questions and classified severity into no disability, mild disability, moderate disability, severe disability and complete disability according to score. It was found a reliable (ICC = 0.88) and an excellent responsiveness was observed.¹¹ Data was analyzed through SPSS 25.0 version and appropriate tools were applied for statistically significant outcomes. Descriptive analysis was done to check frequencies of different variables and to summarize data. Association between variables of interest was determined using chi-square test. Level of significance was considered less than 5% or $p < 0.05$. Ethical clearance was obtained from the ethical committee of the School of Allied Health Sciences

CH & UCHS Lahore. There was no ethical issue because it was not an experimental study.

RESULTS

A cross-sectional study was conducted at University of Child Health Sciences, Children’s Hospital Lahore (UCHS) and Pakistan Society for Rehabilitation of Differently Abled (PSRD), Lahore. This study included a total of 382 university students, most of whom were aged between 19 and 22 years, with the highest proportion belonging to the 20-year age group (20.9%), followed by 21 years (20.4%), 19 years (19.1%), and 22 years (17.8%), while participants aged 24 years and above constituted only 3.7% of the sample.

Table 1. Sociodemographic Characteristics of Participants (N = 382)

Variable	Category	n (%)
Gender	Male	67 (17.5)
	Female	315 (82.5)
Year of Study	1st Year	150 (39.3)
	2nd Year	86 (22.5)
	3rd Year	86 (22.5)
	4th Year	39 (10.2)
	5th Year	21 (5.5)

Table 2 shows that more than half of the participants (50.5%) used digital gadgets for 4–6 hours daily, while 23.3% reported usage of 7–9 hours. Social

media and entertainment were the primary reasons for gadget use (69.1%).

Table 2. Digital Gadget Usage Characteristics (N = 382)

Variable	Category	n (%)
Daily Gadget Use	1–3 hours	64 (16.8)
	4–6 hours	193 (50.5)
	7–9 hours	89 (23.3)
	>10 hours	36 (9.4)
Continuous Use	1–2 hours	270 (70.7)
	3–4 hours	91 (23.8)
	>5 hours	21 (5.5)
Purpose of Use	Study/Academics	106 (27.7)
	Social Media/Entertainment	264 (69.1)
	Gaming	12 (3.1)

In Table 3, moderate neck flexion was the most commonly reported posture (55.5%). Mild neck disability was observed in more than half of the

participants (51.6%), whereas severe disability was reported by only 4.4%.

Table 3. Self-Perceived Text Neck Posture and Neck Disability (N = 382)

Variable	Category	n (%)
Text Neck Posture	Neutral (A)	5 (1.3)
	Mild Flexion (B)	112 (29.3)
	Moderate Flexion (C)	212 (55.5)
	Maximum Flexion (D)	53 (13.9)
Neck Disability	No Disability	102 (26.7)
	Mild Disability	197 (51.6)
	Moderate Disability	66 (17.3)

	Severe Disability	17 (4.4)
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In Table 4 A high proportion of students (76.4%) reported experiencing neck pain at some point in their lives. During the previous 12 months, 25.4% experienced neck trouble for 8–30 days, while 57.3% reported neck symptoms during the last week.

Table 4. Neck Pain and Related Consequences (N = 382)

Variable	Category	n (%)
Ever Had Neck Pain	Yes	292 (76.4)
	No	90 (23.6)
Neck Trouble During Last 12 Months	0 days	94 (24.6)
	1–7 days	85 (22.3)
	8–30 days	97 (25.4)
	>30 days (not daily)	74 (19.4)
	Every day	32 (8.4)
Reduced Work Activities	Yes	153 (40.1)
	No	229 (59.9)
Reduced Leisure Activities	Yes	81 (21.2)
	No	301 (78.8)
Healthcare Consultation	Yes	55 (14.4)
	No	327 (85.6)
Neck Trouble in Last 7 Days	Yes	219 (57.3)
	No	163 (42.7)

Inferential analysis revealed statistically significant associations between the study variables. A significant association was observed between **severity of neck disability and duration of neck trouble during the last 12 months ($p < 0.001$)**, with higher disability levels observed among participants reporting longer symptom duration. Similarly, a statistically significant association was found between **severity of neck disability and total daily**

hours of digital gadget usage ($p < 0.001$), indicating increased disability with prolonged screen time. Furthermore, a significant association was identified between **total daily hours of digital gadget usage and duration of neck trouble ($p < 0.001$)**, suggesting that prolonged digital device use contributes to persistent neck pain among university students.

Table 5 Association between Severity of Neck Disability and Length of Time Neck Trouble during Last 12 Months

		What is the total length of time you have had neck trouble during the last 12 months?						p value
		0 days	1-7 days	8-30 days	more than 30 days, but not everyday	every day	Total	
Severity of neck disability	No Disability (0-4)	42	26	20	11	3	102	< 0.001
	Mild Disability (5-14)	49	49	57	35	7	197	
	Moderate Disability (15-24)	3	9	17	23	14	66	
	Severe Disability (25-34)	0	1	3	5	8	17	
	Total	94	85	97	74	32	382	

Table 6: Association between Severity of Neck Disability and Total Hours of Usage of Digital Gadgets per Day

		On average, how many hours per day do you use the digital gadgets (smartphone, laptop, tablet)					
		1-3 hours	4-6 hours	7-9 hours	more than 10 hours	Total	p value
Severity of neck disability	No Disability (0-4)	30	58	13	1	102	< 0.001
	Mild Disability (5-14)	23	107	48	19	197	
	Moderate Disability (15-24)	10	28	22	6	66	
	Severe Disability (25-34)	1	1	5	8	17	
	Total	64	194	88	36	382	

Table 7: Association between Length of Time of Neck Trouble during Last 12 Months and Total Hours of Usage of Digital Gadgets per Day

		On Average, How Many Hours Per Day Do you Use the Digital Gadgets(Smartphone, Laptop, Tablet)					
		1-3 Hours	4-6 Hours	7-9 Hours	More Than 10 Hours	Total	P Value
What is the total length of time you have had neck trouble during the last 12 months?	0 days	21	58	13	2	94	< 0.001
	1-7 days	15	43	24	3	85	
	8-30 days	11	46	28	12	97	
	more than 30 days, but not everyday	14	34	15	11	74	
	every day	3	13	8	8	32	
	Total	64	194	88	36	382	

DISCUSSION

The fast advancement of the digital gadgets has created far-reaching modifications in the way people live including the students of the university and has caused health problems, like neck pain and disability that are mostly expected to occur due to excessive screen time and improper posture. This study explores the relationship between text neck pain and the extent of neck disability and the time spent using digital gadgets among university students with emphasis on their socio-demographic factors and the implication to the musculoskeletal health.

The sample included 382 university students, most of them (82.5%) were female with the age range of 19 to 22 years. It is important to note that this gender gap is in line with other past researches, who also suggest that women have a higher prevalence of musculoskeletal complaints, which might be explained by ergonomic and biomechanical differences when working with digital devices. Most

of the participants were physical therapy majors, which is the area where understanding of posture and rehabilitation techniques might affect the levels of self-reporting of pain and disability.¹²⁻¹⁴

Statistics conducted showed that more than half (50.5%) of the participants spent between 4-6 hours on digital gadgets daily, with 23.3% using them 7-9 hours. These distributions indicate the tendency towards overuse, which the literature also supports, making excessive digital device use a cause of more musculoskeletal disorders and neck pain, in particular.¹⁵⁻¹⁷ Extended periods of gadgets use were observed to be associated with worse posture and a higher probability of experiencing text neck syndrome with forward head posture (FHP).¹⁸⁻²⁰

Prolonged sitting (1-2 hours, 70.7%) is even more dangerous, as it leads to the development of neck problems, which is consistent with the research that concluded that a static sitting position is a highly important risk factor in musculoskeletal overload,

whether these positions were considered ergonomically correct or not^{2,21} Most of the use was on the social media and entertainment, which justifies the need to raise awareness on the postural effects of using recreational devices as well^{22,23}.

The self-reported neck postures reflected that moderate flexion (55.5% Posture C) was the most common, which was also a worrying tendency towards FHP between the participants. This is in line with studies that indicate that an increase in the amount of time taking pills and smartphones will result in enhanced neck flexion, and thus the likelihood of neck pain will be raised.^{24–26} The lower rate of neutral position (1.3%) reflects the results that the best ergonomic positions are rarely attained when using the gadgets during a long period of time, leading to discomfort and disability^{27,28}

The Neck Disability Index showed that 51.6% of the participants had mild neck disability and 76.4% had experienced neck pains in the past. The latter can be aligned with the findings of the research that suggested that young adults have high rates of neck pain in the context of ergonomically inadequate habits related to the use of digital devices.^{16,29,30} Significant correlations were established between the level of disability and duration of neck pain as well as the length of gadget use using statistical analyses. In particular, the duration of the symptoms was associated with increased disability, which highlighted the nature of the discomfort that was experienced by students as chronic.^{15,31,32}

The study also found out that the neck pain led to low work/leisure activities among a significant proportion of participants (40.1% and 21.2%, respectively). This aligns with the literature that has indicated the wider socio-economic consequences of musculoskeletal pain that may hinder the academic performance and general well-being of students.³³ Interestingly, the number of people who consulted a professional with the help of their symptoms was much lower than the necessity a certain level of 14.4%, which agrees with the results indicating a lack of awareness or proactive approach to managing musculoskeletal disorders among young adults.^{14,34}

The results highlight an alarming relationship between the rise in the use of digital gadgets, especially among college learners, and the occurrence of neck pain and disability. The correlation between the number of years of use and the level of disability of the neck is a strong indicator of the pressing importance of preventive therapy, such as ergonomic training and awareness of correct posture and use practices.¹³

Further research needs to explore more on intervention measures, especially those that are specific to this population in a bid to reduce the musculoskeletal effects of overburdening digital

devices in the long run. The research is relevant to the existing literature that focuses on the necessity of active ergonomic measures to counterbalance the negative impact of the contemporary technology on young adult populations that eventually results in healthier and more beneficial digital practices and musculoskeletal health conditions

CONCLUSION

In summary, this study underscores the pervasive association between prolonged digital gadget usage and increased neck pain and disability among university students. While the majority of participants reported significant neck pain correlated with their usage patterns, the understanding of ergonomic practices is still insufficient. Future research should aim to enhance awareness and education regarding proper posture and usage habits to mitigate the health impacts associated with excessive gadget use.

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