

ORIGINAL ARTICLE

RELATION BETWEEN SMARTPHONE USAGE ADDICTION AND TEXT NECK SYNDROME IN STUDENTS OF LAHORE INSTITUTE OF SCIENCE AND TECHNOLOGY, LAHORE, PAKISTAN

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ABSTRACT

The young generation increasingly relies on handheld devices, with 79% of people aged 18-44 carrying their phones almost all the time. Text neck syndrome, caused by prolonged head movement while using handheld devices, can lead to headaches, neck pain, and shoulder and arm pain. **Objective:** To assess the relationship between smartphone addiction and neck pain in university students in Lahore. **Methods:** This correlational study was carried out at the Lahore Institute of Science and Technology, Lahore. The convenience sampling technique involved 81 students based on inclusion and exclusion criteria in the study aged 18- 25. All participants were informed about the study details and their approval was taken then they were requested to fill out a consent form along with demographic data and the questionnaires smartphone addiction scale short version (SAS-SV) and neck disability index (NDI). Statistical analysis of data was accomplished by the SPSS version 23. The Pearson correlation coefficient was used to correlate between SAS-SV and NDI. **Results:** There was a statistically significant correlation between SAS-SV and NDI with p-value <0.01 and positive r - value of 0.573 indicating a direct relation between smartphone addiction and neck pain. **Conclusion:** This study revealed that there was a direct relationship between smartphone addiction and neck disability as smartphone usage time increases the chance of neck pain or discomfort increases and vice versa

Keywords: Correlation, Handheld devices, Neck disability index, Smartphone addiction, Smartphone addiction scale short version, Text neck syndrome.

INTRODUCTION

Technology has emerged as a reliable companion as we progressed from basic forms of communication to a significant milestone: a smartphone. Smartphones have altered how we access and use information and even our daily activities. For youngsters, especially students, smartphones have become an absolute must. Daily life activities along with the educational and learning system and

experience have evolved due to the advancement of smartphone technology¹. Smartphones are becoming a crucial part of students' lives but also raising certain concerns regarding their usage time and addiction among students².

The statistics show that the global smartphone penetration rate among the population was estimated

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to be up to 68% in 2022. Smartphone subscriptions are expected to increase up to 8 billion in 2028³. Meanwhile, in Pakistan, the usage is expected to continuously increase from 2024 to 2028 by 19.4 million users. The studies show a higher prevalence of smartphone addiction among young students in Pakistan⁴. On the other hand, excessive screen time is linked with a variety of mental and physical health issues. Furthermore, prolonged and frequent use of smartphones to avoid the symptoms of mental health issues may further exacerbate the problem⁵.

Additionally, studies show that students who regularly use smartphones for non-academic purposes perform worse academically. The average smartphone usage on weekdays was recorded for up to 5 hours⁶. Smartphone addicts face various problems including difficulty in daily tasks, and self-care routines along with dealing with discomfort, anxiety, pain, and despair. Overall, young people's general health and quality of life can be negatively impacted by internet addiction⁷. An intense anxiety about not being able to use or even not being near the phone is known as nomophobia, and it can result when the addiction assumes a severe form. Those who use iPhones and are undergraduates are more likely than others to experience this condition⁸.

The excessive use of gadgets has also been linked with an increased risk of developing musculoskeletal problems. The complaint of having pain was observed in about 84% of people. The most common complaint was regarding neck and thumb pain⁹. This has given rise to a phenomenon known as "text neck," a term defined by Fishman. People tend to incline and flex their heads forward while spending an extensive amount of time using electronic devices. This forward head posture can lead to overuse syndrome, stress injuries, or recurrent strains in the neck. More people are realizing that this issue is becoming a major worldwide concern in the modern world¹⁰.

Keeping the neck in forward flexion for prolonged periods during excessive and frequent use of devices tends to make alterations, resulting in a smaller craniocervical angle and a larger thoracic

angle, which are strongly associated with neck pain and impairment¹¹. It was discovered in an experiment that forward flexion greatly increases the weight on the cervical spine. For instance, the head's weight can exceed forty pounds at a thirty-degree tilt and rise to almost fifty pounds at a forty-five-degree flexion¹².

A study conducted research to investigate whether excessive screen time with smartphones caused any neck issues, found a clear association between gadget addiction and a variety of neck problems. The emphasis of this study was to call for preventive measures and awareness among people regarding the harms of smartphones excessive usage¹³. All these concerns point towards the need for another study to confirm the relationship between smartphone addiction and neck problems. Knowing the connection between smartphone use and neck pain enables people to recognize the problem early on and modify their smartphone usage patterns, preventing the condition from getting worse. This understanding could encourage people to put their physical health first and adopt better screen time practices, which would lower their risk of chronic neck pain or impairment or associated musculoskeletal problems.

MATERIALS AND METHODS

A cross-sectional study was conducted at the Lahore Institute of Science and Technology. Convenient sampling technique was used to collect data. The study was conducted within 6 months from April to August 2023. Data was collected from Lahore Institute of Science and Technology students of all departments. We calculated the sample size using the online Epitool, sample size calculator by putting values from the previous study¹⁴. The standard normal deviation for $\alpha = Z\alpha = 1.96$. The standard normal deviate for $\beta = Z\beta = 0.8416$. $C = 0.5 * \ln [(1+r)/(1-r)] = 0.3316$. Total sample size, $N = [(Z\alpha + Z\beta)/C]^2 + 3 = 74$. We used a 10% attrition rate then the sample size was 81. 81 participants aged 18 to 25 years, Smartphone usage must be ≥ 1 hour per day for the subjects, participants must have been using a smartphone for at least 6 months, phone size of the participants should be $\geq 10\text{cm}$ ¹⁵ were included in the study based on inclusion and exclusion

criteria. This study was approved by Lahore Institute of Science and Technology research ethics committee (REC-LIST-02011).

Consent was obtained from participants before filling out the questionnaire. An electronic weight machine, ruler, measuring tape, and digital weight machine were used for the measurement of variables. A self-constructed questionnaire with a smartphone addiction short version scale and neck disability index included variables like gender, BMI, phone model, phone weight and height, hand dominance, and number of mobiles per hour per day. Several investigations into its validity and reliability have shown favorable results, demonstrating good validity and reliability^{16,17}.

Statistical Analysis

Data was analyzed by SPSS version 23.0 and Pearson's correlation was used to assess the correlation between SAS-SV and NDI, and the number of

mobiles per hour and NDI. Descriptive statistics were used for frequencies and percentages of all variables.

RESULTS

The demographic data of the study is shown in Table 1. The table shows demographic and phone usage data for two groups. Group 1, aged 18-21, mostly female, right-handed, using smaller phones (13-15 cm), primarily IOS, and spending 1-6 hours daily on their phones, with a normal BMI. Group 2, aged 21-25, has more males, right-handed, larger phones (16-18 cm), mostly Android, also spending 1-6 hours daily, with a normal BMI.

Out of all the participants, 21 people (25.9%) had the mildest disability from text neck syndrome. 16 participants (19.8%) had severe disability, and 14 individuals (17.3%) had moderate to the most severe disability as shown in Figure 1.

Table 1. Demographic Data

Variables	Group 1	Frequency (%)	Group 2	Frequency (%)
Age	18-21 years	51.85	21-25 years	48.15
Gender	Female	62.96	Male	37.04
Hand Dominance	Left	6.2	Right	93.8
Phone height	13-15 cm	7	16-18 cm	43
Phone model	IOS	7.4	Android	92.6
Phone use per day	1-6 hours daily	61.7	7-12 hours daily	38.3
BMI	Normal	46.91	Underweight	24.69

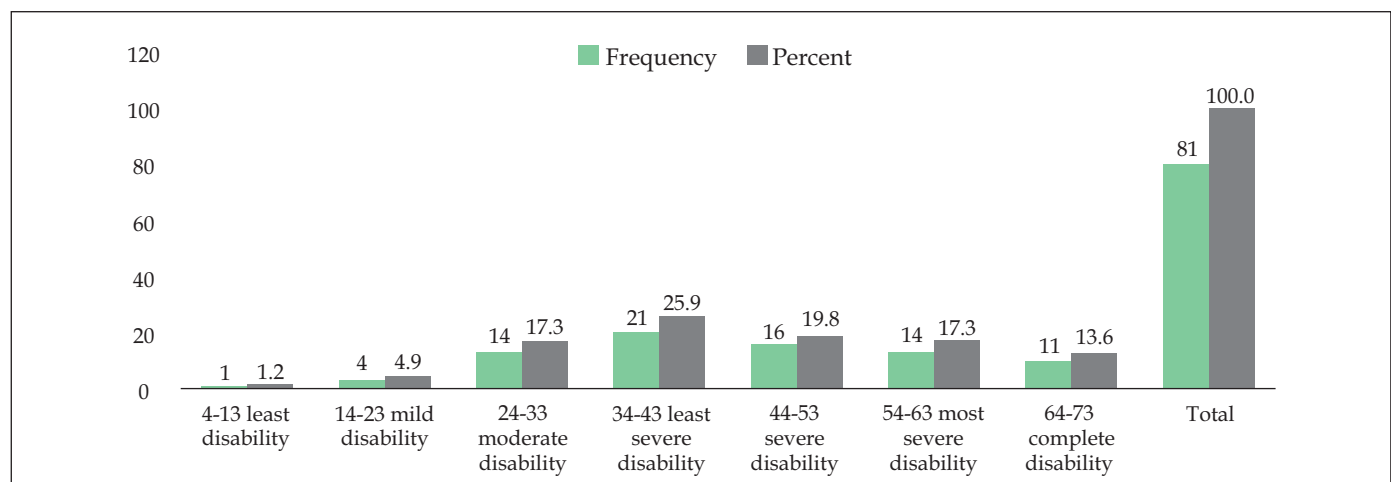


Figure 1. Variation in Neck Disability Severity from Text neck Syndrome Among Participants

Approximately 60.5% of the participants exhibited moderate addiction, while 11.11% were found to be severely addicted. Additionally, 27.3% displayed mild smartphone addiction according to the Smartphone Addiction Scale scoring as shown in Figure 2.

The mean SAS-SV scale score was 3.17, and the NDI median was 4.64. Pearson's correlation revealed a moderate positive association ($r = 0.57$, $p = 0.001$)

between the SAS-SV scale and the NDI, indicating a link between smartphone addiction and neck impairment Table 2. Similarly, a statistically significant association with a p-value less than 0.001 was found between mobile hours per day and neck disability index, demonstrating that as the number of hours spent on the phone increases, so does the level of pain and neck impairment, as shown in Table 2.

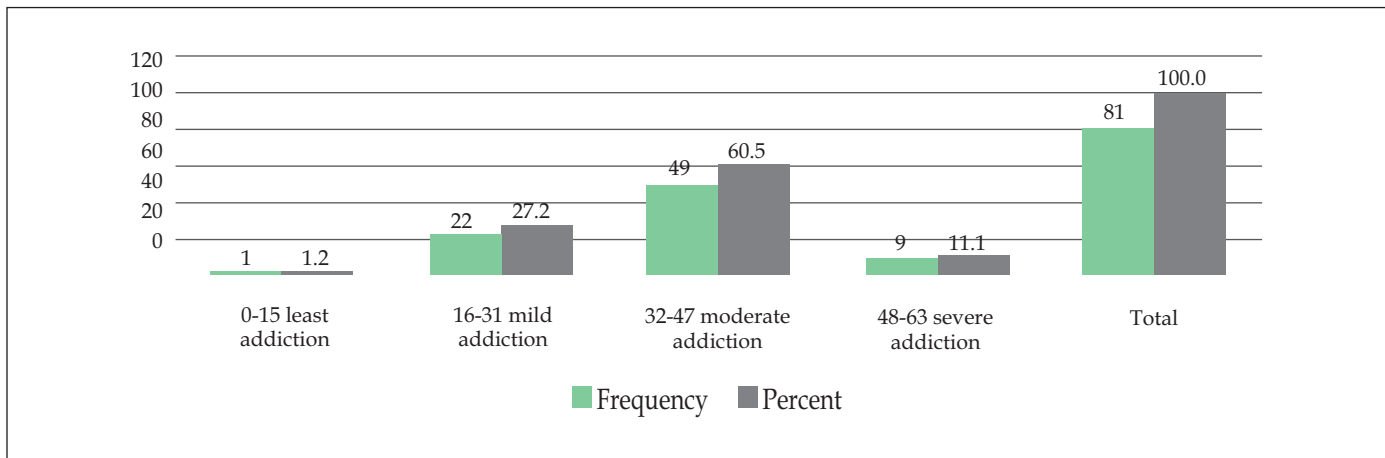


Figure 2. Prevalence of Smartphone Addiction Among Participants, as Per Smartphone Addiction Scale

Table 2. Variables and their significant correlational values

Variables	Correlation value	p-value
SAS & NDI	0.001	0.01
Phone use (Hours per day) & NDI	0.001	0.01

DISCUSSION

The purpose of the study was to assess smartphone addiction and its link with text neck syndrome in university students. In this era of advanced technology, day by day the usage of electronic devices especially smartphones or mobile devices increases enormously, and prolonged use of these devices causes neck and shoulder pain. Youngsters especially spend more time on smartphones so it's important to analyze the relationship between smartphone addiction and text neck syndrome and to take preventive measures to minimize this condition. This study found a significant smartphone addiction among 81 students, with 60.49% having moderate addiction and 11.11%

severely addicted. Text neck syndrome was prevalent at 98.76%, with disability severity increasing with smartphone addiction. A positive correlation was found between smartphone addiction and neck disability.

Kumari *et al.* (2021) with his colleagues conducted a study to determine the incidence of text neck syndrome and neck pain and the impact of neck discomfort on their busy daily lives. The prevalence of text-neck syndrome was found to be high (36.5%), and 73.4% of participants experienced mild to severe discomfort in the neck and upper back region¹⁸. While in the current study, the prevalence of text neck syndrome was found to be up to 98.76% with 17.3% of students experiencing moderate to

most severe disability. As the prior study only focused on the incidence of text neck syndrome, the cause was not discussed. Still, the current study found a significant relation between excessive smartphone usage and text neck syndrome, pointing to smartphone addiction as a major causative factor in this regard.

Another study found that 54% experienced musculoskeletal pain due to excessive smartphone use. Additionally, 92% reported a decline in academic performance due to smartphone addiction, highlighting the negative impact of nomophobia on students' well-being and academics¹⁹. A study by Selvaganapathy *et al.* (2017) suggested that forward head posture and load imbalance may cause neck disability²⁰. A previous study investigated the impact of excessive smartphone usage and found that frequent smartphone use altered cervical spine curvature and pain threshold in the neck region²¹. The present study validates these studies along with demonstrating that this issue is only worsening with time as neck pain is more prevalent (98.76%) with more smartphone addicts (71.60%).

Alzaid *et al.* (2018) involved 2435 participants and the results showed a strong correlation between smartphone usage duration and neck pain in university students. The findings suggested that smartphone addiction can lead to neck pain, affecting 70% of the population aged 15-18²². Meanwhile, the current study concludes that smartphone addiction leads to neck pain in 98% of the population. Sirajudeen *et al.* (2022) discovered a substantial positive association between smartphone addiction and NDI scores. Neck pain caused by smartphone obsession, on the other hand, had no substantial impact on persons' activities, in contrast to this study which reports a significant impact of neck pain on all of the daily life activities. However, the study concluded that if appropriate measures are not taken, neck pain due to smartphone addiction may lead to injury or disability in the future²³.

The study discovered a significant correlation between smartphone addiction and neck disability. Another element shown in this study is that when mobile usage hours per day increase, so does neck

discomfort, and there is a substantial relationship between mobile hours per day and NDI. The study has limitations, including reliance on self-reporting and lack of information about external factors. Some recommendations include considering posture, physical fitness, mental health, and workplace ergonomics in future studies, and suggesting a longitudinal approach to confirm the causal link between smartphone addiction and neck disability.

CONCLUSION

The study's findings revealed a substantial relation between smartphone addiction and neck discomfort, and it indicated that excessive smartphone usage influences the neck, causing pain or discomfort. Moreover, prolonged smartphone usage hours were found to be significantly correlated with neck pain and disability.

DECLARATION

Conflict of interest: The author declared no conflict of interest.

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REFERENCES

1. Sutisna D, Widodo A, Nursaptini N, Umar U, Sobri M, Indraswati D. An analysis of the use of smartphone in students' interaction at senior high school. In 1st Annual Conference on Education and Social Sciences (ACCESS 2019) 2020; 221-224. Atlantis Press.
2. Cha SS, Seo BK. Smartphone use and smartphone addiction in middle school students in Korea: Prevalence, social networking service, and game use. *Health Psychology Open*. 2018;5(1):2055102918755046.
3. Naveed QN, Choudhary H, Ahmad N, Alqahhtani J, Qahmash AI. Mobile Learning in Higher Education: A Systematic Literature Review. *Sustainability*. 2023;15(18):13566-13566.
4. Khalily MT, Loona MI, Bhatti MM, Ahmad I, Saleem T. Smartphone addiction and its

associated factors among students in twin cities of Pakistan. *Pakistan Journal of Medical Association*. 2020;70(8):1357-1362.

5. Panova T, Lleras A. Avoidance or boredom: Negative mental health outcomes associated with use of Information and Communication Technologies depend on users' motivations. *Computers in Human Behavior*. 2016; 58:249-258.
6. Boumosleh J, Jaalouk D. Smartphone addiction among university students and its relationship with academic performance. *Global Journal of Health Science*. 2018;10(1):48-59.
7. Tran BX, Huong LT, Hinh ND, Nguyen LH, Le BN, Nong VM, et al. A study on the influence of internet addiction and online interpersonal influences on health-related quality of life in young Vietnamese. *BMC Public health*. 2017; 17(1):1-8.
8. Sui A, Sui W, Irwin J. Exploring the prevalence of nomophobia in a Canadian university: An environmental scan. *Journal of American College Health*. 2022:1-8.
9. Berolo S, Wells RP, Amick III BC. Musculoskeletal symptoms among mobile hand-held device users and their relationship to device use: a preliminary study in a Canadian university population. *Applied Ergonomics*. 2011;42(2):371-378.
10. Shah PP, Sheth MS. Correlation of smartphone use addiction with text neck syndrome and SMS thumb in physiotherapy students. *International Journal of Community Medicine and Public Health*. 2018;5(6):2512-2516.
11. Lau KT, Cheung KY, Chan MH, Lo KY, Chiu TTW. Relationships between sagittal postures of thoracic and cervical spine, presence of neck pain, neck pain severity and disability. *Manual Therapy*. 2010;15(5):457-462.
12. David D, Giannini C, Chiarelli F, Mohn A. Text neck syndrome in children and adolescents. *International Journal of Environmental Research and Public Health*. 2021;18(4):1565-1565.
13. AlAbdulwahab SS, Kachanathu SJ, AlMotairi MS. Smartphone use addiction can cause neck disability. *Musculoskeletal Care*. 2017;15(1): 10-12.
14. 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. *Journal of Musculoskeletal Surgery and Research*. 2021;5(4):266-272.
15. Shah PP, Sheth MS. Correlation of smartphone use addiction with text neck syndrome and SMS thumb in physiotherapy students. *International Journal of Community Medicine and Public Health*. 2018;5(6):2512-2512.
16. Kwon M, Kim DJ, Cho H, Yang S. The smartphone addiction scale: development and validation of a short version for adolescents. *PloS one*. 2013;8(12):e83558-83558.
17. Young IA, Dunning J, Butts R, Mourad F, Cleland JA. Reliability, construct validity, and responsiveness of the neck disability index and numeric pain rating scale in patients with mechanical neck pain without upper extremity symptoms. *Physiotherapy Theory and Practice*. 2019;35(12):1328-1335.
18. Kumari S, Kumar R, Sharma D. Text neck syndrome: the pain of modern era. *International Journal of Health Sciences and Research*. 2021;11(11):161-165.
19. Ahmed S, Pokhrel N, Roy S, Samuel AJ. Impact of nomophobia: A nondrug addiction among students of physiotherapy course using an online cross-sectional survey. *Indian Journal of Psychiatry*. 2019;61(1):77-80.
20. Selvaganapathy K, Rajappan R, Dee TH. The effect of smartphone addiction on cranio-

- vertebral angle and depression status among university students. *International Journal of Integrative Medical Sciences*. 2017;4(5):537-542.
21. Lee M, Hong Y, Lee S, Won J, Yang J, Park S, *et al*. The effects of smartphone use on upper extremity muscle activity and pain threshold. *Journal of Physical Therapy Science*. 2015;27(6):1743-1745.
 22. Alzaid AN, Alshadokhi OA, Alnasyan AY, AlTowairqi MY, Alotaibi TM, Aldossary FH. The prevalence of neck pain and the relationship between prolonged use of electronic devices and neck pain in: a Saudi Arabia, cross-sectional study in Saudi Arabia. *The Egyptian Journal of Hospital Medicine*. 2018;70(11): 1992-1999.
 23. Sirajudeen MS, Alzhrani M, Alanazi A, Alqahtani M, Waly M, Unnikrishnan R, Muthusamy H, Alrubaia W, Alanazi N, Seyam MK, Kashoo F. 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. *PeerJ- the Journal of Life and Environmental Sciences*. 2022 Dec 15;10: e14443-14443.