



## RESEARCH ARTICLE

### OPEN ACCESS

#### ARTICLE INFO

Date Received:

December 20, 2022

Date Revised:

June 20, 2023

Date Published Online

June 25, 2023

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## Association Between Mobile Phone Usage and Neck Pain in Medical Students of Islamabad Pakistan: A Cross Sectional Study

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#### ABSTRACT

**Introduction:** Neck pain has become a common issue among today's students, affecting their studies and daily activities. Prolonged use of laptops and cell phones, leading to incorrect head and cervical spine posture, is considered a major contributing factor. This study aimed to determine the frequency of neck pain among medical students who use these devices and identify the specific areas of discomfort and the duration of device usage that causes pain. Additionally, the study aimed to identify risk factors associated with symptoms during device use, particularly in sitting postures, and explore the occurrence of neck and shoulder problems along with potential risk factors. **Methodology:** The study involved an observational cross-sectional design conducted on a population of medical students. A self-administered, closed-ended questionnaire was used to collect data. The questionnaire focused on variables such as duration of device usage, positions adopted while using the devices, affected areas of discomfort, and the impact of smartphone use on sleep. Convenience sampling was employed to select participants, and statistical analysis was conducted using SPSS software, presenting the results in the form of graphs and tables. **Results:** A total of 500 students participated in the study. The findings revealed that 76% of the students experienced neck, shoulder, or hand pain. Among them, 39.5% reported symptoms appearing after 3-4 hours of device use, while 56% experienced discomfort lasting less than 30 minutes. Furthermore, 65.5% stated that their discomfort did not interfere with their sleep, and 59.5% reported recurring neck pain. **Conclusion:** This study demonstrates that neck discomfort is a prevalent issue among college students, with risk factors such as poor posture and inadequate body ergonomics. Managing these risk factors through posture adjustment and avoiding behaviors that exacerbate neck pain can help alleviate the issue.

**Key words:** Neck ache, Mobile phone, Prevalence

#### INTRODUCTION

At the beginning of 2022, Pakistan had a total of 186.9 million cellular connections. However, there is little research on the effects of smartphone use on neck pain in Pakistan. Neck pain refers to discomfort occurring anywhere in the neck, ranging from the base of the skull to the upper back and shoulders [1]. The prevalence of neck pain among cell phone and laptop users is increasing every year. Common symptoms include neck discomfort and stiffness, especially when trying to turn your head from side to side. Research shows that up to 75% of adults have experienced neck and shoulder pain at some point in their lives [2]. Symptoms can vary and include local, stabbing pain, generalized pain throughout the neck, and pain radiating to the shoulders and arms

due to nerve involvement. Other symptoms can include numbness, tingling, weakness, difficulty lifting or grasping objects, and even headaches [3].

Cell phones are currently considered to be the most widely used portable electronic devices, with an estimated ownership rate of at least 77% of the world's population [4]. The main factors behind the popularity of mobile phone use worldwide are their reliability for communication and entertainment purposes [5]. Research from 2012 found that texting, or short message service (SMS), is the predominant means of communication among American college students [6]. Neck and shoulder pain has been extensively studied in the context of cell phone messaging. In addition, the user's posture while holding the phone was identified as an indicator of possible discomfort. Recommended optimal posture includes a straight back, forearm support, holding the phone with both hands, and using both thumbs to type. However, this attitude should not be maintained over a longer period of time [8].

Office or computer workers are more prone to neck pain compared to the general population, with annual prevalence ranging from 10.4% to 21.3%. Many cases exhibit a chronic, episodic pattern with recurring symptoms throughout a person's life. The Numerical Rating Scale (NRS-11) is a commonly used pain scale to assess the severity of musculoskeletal pain, ranging from no pain (score 0) to the worst pain imaginable (score 10). Establishing a cut-off for identifying significant pain remains a challenge. Hartrick et al. suggest using an NRS-11 pain severity score of 4 as a cut-off point in clinical practice. The aim of this study was to investigate the prevalence of shoulder and neck disorders among medical students in Islamabad, Pakistan. The study examined duration of device use, reasons for use, and the way students hold their devices to understand the specific causes of discomfort. In addition, the study compared pain management strategies between students who reported pain levels of four or less on the NRS-11 scale and those who reported pain levels of eleven or more.

#### METHODOLOGY

We conducted a quantitative, observational, cross-sectional study to determine the prevalence of neck pain among undergraduate students in Islamabad, Pakistan. To collect data, we developed a questionnaire tailored to our research goals. Before distributing the questionnaire, we verbally explained the purpose and details of the study. The participants gave their informed consent by voluntarily completing and returning the questionnaire. We used a convenient sampling technique to collect data from students. The study included a total of 500 respondents between the ages of 18 and 27 who reported using cell phones for at least 3-4 hours a day. We excluded students who had an underlying musculoskeletal disorder (MSK) or previous surgery. Data Collection Tool: Neck Pain Questionnaire, NRS-11 (closed end). Statistical Analysis: All data were presented as mean and percentage. Data were analyzed using SPSS (Statistical Package for Social Sciences) software and Excel and expressed in the form of charts and graphs.

#### RESULTS

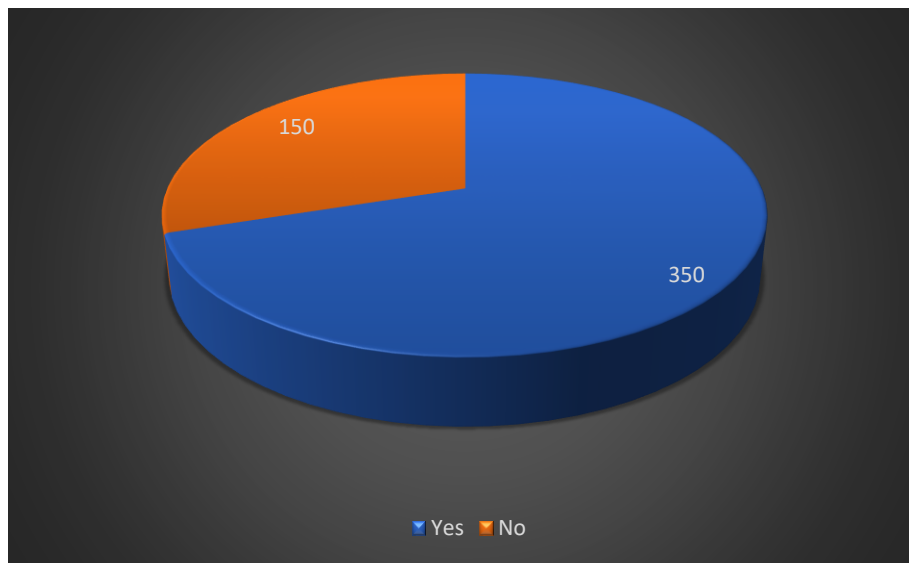
##### Demographics

The study was conducted with 500 students from Islamabad, Pakistan, who used mobile phones and laptops regularly. The majority of participants were female (77%) and aged between 18 and 27 years.

**Table 1.** Demographic distribution of samples

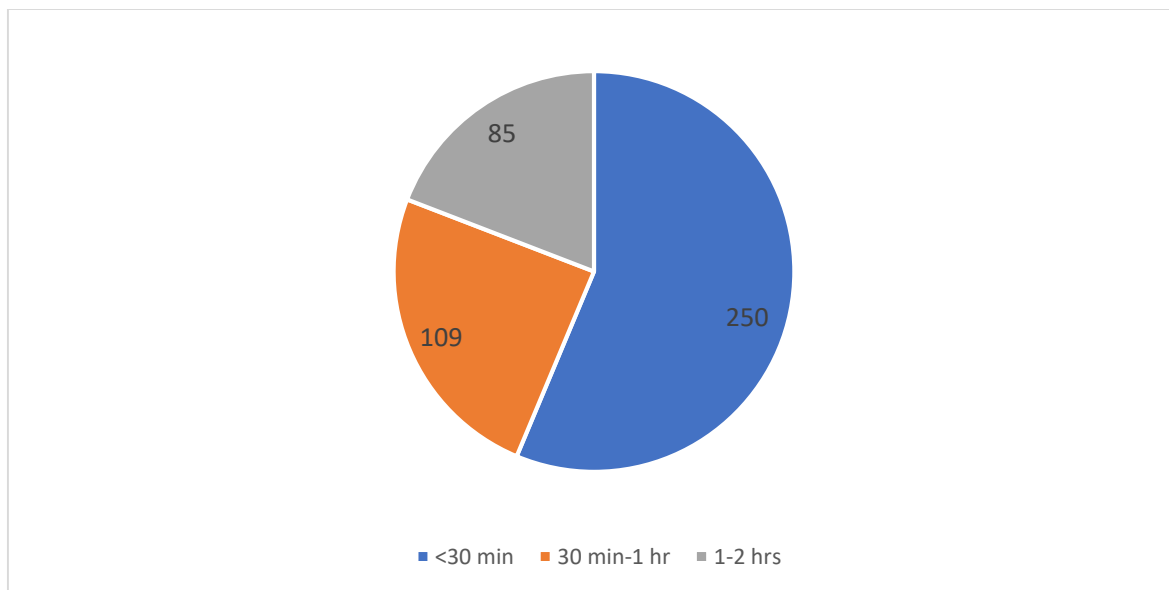
Variable	Frequency	Percent
<b>Sex</b>		
Males	156	31.2
Females	344	68.8
<b>Age</b>		
18-22	256	51.2
23-27	244	48.8
	500	

Out of 500 participants, 350 (70%) experienced discomfort while using device. Total 19 questions were asked via questionnaire; results are briefly presented as follows.



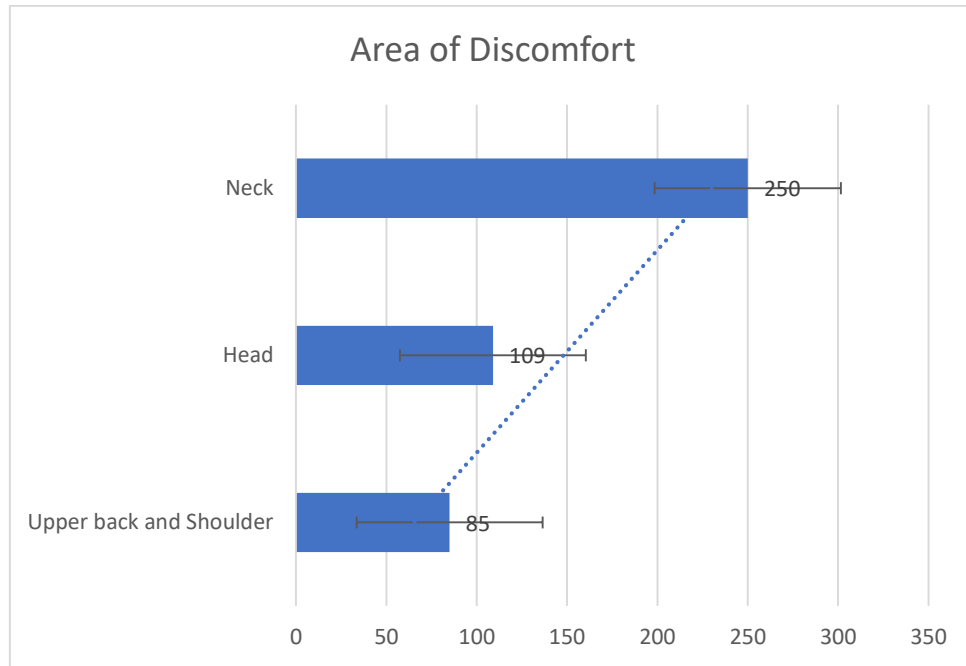
**Figure 1.** Discomfort experienced in neck, shoulder, arm, or hand during device use

Out of 500 participants, 50% had discomfort that last less than 30 minutes, 21.8% had discomfort that lasted between 30 min to 1 hour, 17% had discomfort that lasted between 1-2 hours.



**Figure 2.** Duration of discomfort during device usage

Out of 500 participants, about 50% experienced discomfort in their neck, 21.8% experienced in head, 17 % experienced in upper back and shoulder.

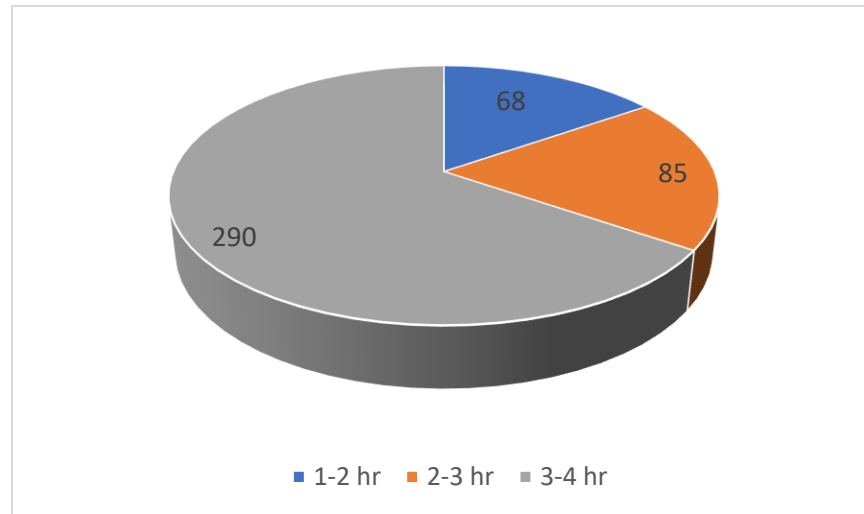


**Figure 3.** Area where discomfort is experienced

A total of 76% said that discomfort does not affect their sleep. While 24% have problem in sleep.



**Figure 4.** Effect of discomfort on sleep.



**Figure 5.** Hours of continuous usage of touch screen device that provokes symptoms.

Out of the 500 participants, 13.6% reported experiencing symptoms after 1-2 hours of device usage, 17% experienced symptoms after 2-3 hours, and 58% experienced symptoms after 3-4 hours of usage. The analysis of predictors for the intensity of neck pain revealed significant associations with age ( $p = 0.04$ ) and duration of device usage ( $p = 0.001$ ). The correlation coefficient was 0.06 for age and 0.14 for duration of use, indicating a positive relationship between these factors and neck pain severity. No other predictors showed significant associations with neck pain severity. Students who changed their position while using a mobile device had a mean pain severity level of 4.1 ( $\pm 1.5$ ), whereas students who did not change their position had a mean pain severity level of 2.6 ( $\pm 1.9$ ). Moreover, a statistically significant difference was found between the correlations of pain severity with age (0.06) and the correlation with duration of use and changing position (0.14).

**Table 2.** The difference in mobile phone use characteristic

Characteristics			Gender		Total
			Female	Males	
Position	Standing	No.	20	6	26
		%age	76.9	23.1	100
	Lying	No.	67	37	104
		%age	64.4	35.6	100
	Walking	No.	5	6	11
		%age	45.5	55.5	100
Sitting	No.	247	112	359	
	%age	68.8	31.2	100	
One Handed, Two handed		No.	71	52	123
		%age	57.7	42.2	100
	Two Handed	No.	50	34	84
		%age	59.5	40.5	100
Dominant Hand	Right handed	No.	309	146	455
		%age	67.9	32.1	100
Left Handed		No.	22	23	45
		%age	48.8	51.2	100

## DISCUSSION

The main aim of our research was to investigate the association between neck pain and college students in Islamabad, Pakistan. The aim of the study was to determine the duration of pain and the nature of the discomfort associated with the use of mobile phones and laptops, taking into account the positions and periods of use of the students. The results of the study showed that a majority of the participating students experienced neck discomfort due to the use of mobile phones and laptops. Not surprisingly, all of the students in this study owned their own smartphone. The most common posture leading to neck pain in this age group was sitting in a hunched, static position while texting on cell phones [12, 13]. This study is groundbreaking in its use of the NRS-11 Pain Severity Scale as a threshold for raising awareness of neck discomfort. In addition, this study is the first of its kind in Islamabad, Pakistan to examine the association between cell phone use and neck pain.

In the published data, it was observed that women were more likely to report neck and shoulder pain. The higher prevalence of musculoskeletal and chronic pain in women compared to men can be attributed to several factors. These include a lower pain threshold in women compared to men [14], inherent differences in somatic and visceral perception [15], lower levels of physical activity among female students in our society compared to their male counterparts, and a higher trend in females in addition, experience mental and psychological stress compared to men [16, 17]. Our study of 500 participants, 77% women and 23% men, also found that 57.7% of young people aged 18-27 reported neck pain. Additionally, 39.5% experienced a worsening of symptoms after 3-4 hours of device use. Of the 500 participants, about 59.5% reported neck discomfort, 4.5% headache, 28.5% upper back and shoulder discomfort, and about 7.5% arm and hand discomfort. A meta-analysis by Xie et al. examined nine studies that examined the association between the duration of smartphone use and musculoskeletal disorders such as shoulder, neck and low back pain. Although six of the studies included in the meta-analysis found a significant association between duration of smartphone use and these symptoms, the overall evidence was inconclusive regarding the total number of hours of smartphone use and its impact on musculoskeletal pain [18].

According to the results of our study, 76% of the students reported complaints in the neck, shoulder, arm and hand. Neck pain is often caused by poor posture and prolonged use of electronic devices. Changing daily routines and avoiding activities that worsen symptoms can help counteract the increasing prevalence of neck pain among students. Physical therapy has been shown to be effective in treating neck stiffness and spasms. Furthermore, our research found that the frequency of neck pain increases with age [3]. In our study, both age and time spent using a mobile phone were identified as the main predictors of pain severity, while only duration of use determined duration of pain itself. Several studies suggest that people who frequently use laptops and smartphones are more likely to suffer from neck pain. A study evaluating the health effects of cell phone use among college students conducted at a medical college in Saudi Arabia found that the most common complaint, reported by 71.2% of participants, was cervical pain. Although there are slight differences in prevalence rates (76% in our study and 71.2% in the Saudi Arabian study), the overall results are consistent. A comprehensive review confirms the validity and reliability of both the visual analogue scale (VAS) and the visual analogue scale (VAS) [10]. and the Numeric Rating Scale-11 (NRS-11) for assessing pain in the clinical setting. The NRS-11 in particular has good sensitivity, making it the preferred choice for patients seeking an easy-to-use pain rating scale. In addition, the NRS-11 is widely used to assess and track pain intensity in individuals with neck pain [19].

## CONCLUSION

In conclusion, smartphones have become more and more indispensable in our daily life. In order to reduce the prevalence of neck and shoulder pain in society, it is important to raise awareness of the importance of adopting a healthy sitting position and limiting the amount of time spent using mobile phones. Recommendations include keeping the device away from the head, minimizing touchscreen usage time, maintaining proper posture while using the device, and avoiding head-forward posture, which can lead to other spinal problems. These measures are aimed at reducing the occurrence of neck pain in students. For future research, it is recommended to use a large and diverse sample from different medical schools across the country. This would allow for a more comprehensive study of neck pain occurrences, gender differences in device use, and the identification of appropriate ergonomic solutions. By identifying and treating modifiable risk factors, the occurrence of neck pain can be recognized and prevented.

## Author, s Contributions

Amber Shabbir and Muhammad Kamran designed and formulated the study that led to data collection. Muhammad Imran and Naseer Ali Shah assisted in data analysis and critical reading of the manuscript. Haroon Amin, Asma Balqees and Hira Tariq performed the proofreading and correction of errors, and also performed the text and data analysis and collection.

**Conflict of Interest**

The authors have no conflict of interests.

**Funding Resources**

Not applicable

**Ethical Approval**

The study design doesn't involve any human experiment. Permission was granted from individual participants for publication of data.

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