

# *“Text neck” pain and excessive smartphone usage among students* \_\_\_\_\_

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## **Abstract**

**Introduction:** *The use of a mobile phone is almost an essential activity for seven billion individuals in the world who currently own these devices. With an average daily usage time of seven hours there is a risk for mobile phone addiction with individuals having a persistent desire and craving to use mobile phones which causes social and functional impairment.*

**Purpose:** *The purpose of this study was to find a correlation between excessive smartphone usage and neck pain among university students in the European University of Tirana.*

**Methodology:** *This is a cross sectional study. The study was conducted during a period of 1 month, from January 2023 till February 2023 and the data was collected from the third-year students of the Bachelor programs in the European University of Tirana. The subjects were selected based on their response to participating in the study and 138 participants (n=138) volunteered to participate.*

**Results:** A weak correlation between phone time and neck pain was found with a Pearson correlation coefficient of 0.073, this correlation was not significant (sig value 0.197). Although there was a significant correlation (sig 0.001) between neck flexion angle and neck pain with a Pearson correlation value of 0.303. Non parametric test analysis showed that we have differences on neck pain value across the two groups with female students experiencing higher level of pain than male students.

**Conclusions:** As we are advancing towards digitalizing most of our daily activities smartphones have become an extended part of human beings. Regular neck posture correction and advice on how to properly position the neck while using smartphones should be taken into the account.

**Key words:** Smart phones, pain, neck pain, back pain, students.

## Introduction

The use of a mobile phone is almost an essential activity for seven billion individuals in the world who currently own these devices. Mobile phones are convenient to use and provide many facilities such as communication, services, leisure and being updated on current events around the globe. All these services have made it easier for the globalization of society and every year we develop newer technologies to further improve them and benefit from the positive aspects of mobile phones.

Although with great positive traits mobile phones also come with negative impacts on society. With an average daily usage time of seven hours there is a risk for mobile phone addiction with individuals having a persistent desire and craving to use mobile phones which causes social and functional impairment (Chen et al., 2022). Besides social and mental issues that smartphone addiction causes there are also biological and structural effects noticed on the human body from the excessive use of smartphones (Jung et al., 2016). There are evident changes on the bone and joint structures of the fifth phalanges due to repeated pressure applied from holding the devices (Fuentes-Ramírez et al., 2020). In the last three years there has been a rise on the average phone screen time attributed to the Covid-19 pandemic as due to isolation many turned to mobile phones to pass time at home and follow work or school, especially children. During this time, it also become more evident that several children and individuals suffered from eye related issues caused by over exposure to mobile phone screen.

Smartphone usage has been linked to changes in neck posture among students (Ahmed et al., 2022). This can put significant strain on the neck and upper back muscles, leading to discomfort and pain. Studies have shown that spending extended periods of time using smartphones can exacerbate these issues, as users often hold

their devices at a low angle and look down for extended periods (Sirajudeen et al., 2022). As a result, students who use smartphones frequently may be at a higher risk of developing neck pain and other related conditions. The most evident issues with prolonged smartphone usage are progressive postural and structural changes that are installed due to changes on the cervical head biomechanics. While using smartphones the tendency is to make a neck flexion and look down to watch the screen, this requires the flexor muscles to shorten and the neck extensors to lengthen (Alshahrani et al., 2021). As this function is repeated several times during the day and over a long period of time flexor muscles have the tendency to remain shorten and the extensors to remain lengthened and weaken. This causes the head to shift in an anterior position compared to the shoulder position. This posture is known as Forward Head Posture (FHP) or commonly known as “Text Neck” (Balthillaya et al., 2022). FHP is characterized by various symptoms such as:

1. Anterior displacement of the head.
2. Increase in cervical flexion and capital extension.
3. Addition of thoracic kyphosis.
4. Crossing syndrome:
  - Muscular shortening of the cervical flexors and lengthening of the extensors.
  - Muscular shortening of the capital extensors and lengthening of the flexors. (Moore, 2004).
5. Pain (Kim et al., 2018).
6. Discomfort and dysfunction.
7. Nausea and Vertigo (Lee and Lee, 2019).

Neck pain is the most common symptom of complaint among individuals that use smartphones or other similar technologies (Derakhshanrad et al., 2021).

## **Methodology**

### *Purpose*

The purpose of this study was to find a correlation between excessive smartphone usage and neck pain among university students in the European University of Tirana.

### *Research design*

This is study is a Cross-sectional study, investigating the relationship between subject's neck pain, the angel of neck flexion while using smartphones and the period of time using smartphones.



### *Population and sample*

The study was conducted during a period of one month, from January of 2023 till February 2023 and the data was collected from the third-year students of the Bachelor programs in the European University of Tirana. The subjects were selected based on their response to participating in the study and 138 participants (n=138) volunteered to participate. The subjects were part of various departments such as Nursing (n=44), Physiotherapy (n=23), Imaging (n=27), Engineering (n=24) and Economy (n =20). The criteria to be included in the study was to own a mobile phone without taking into account the model or year of production. There were also no exclusion criteria regarding gender and age.

### *Instruments and data collection*

Each subject filled a questionnaire which was distributed via Google Forms in order to facilitate the data collection process. The questionnaire was based on collecting data through self-reporting and included 4 questions which subjects were instructed shortly. The questionnaire required participants to:

1. Declare their gender.
2. The average daily phone usage time in hours was to be reported by study participants. This made it possible to get precise numerical data, which made statistical analysis and interpretation easier. The reported values were self-assessed by the students, adding a subjective component to the data, which is significant to note.
3. Visual Analogue Scale was used to determine the level of neck pain. Students reported the level of neck pain from 0 to 10. The value 0 is interpreted as “no pain”, values from 1-4 as “mild pain”, values from “4-6” as “moderate pain”, values from “5-9” as “severe pain” and value 10 as “extreme pain”.
4. Participants’ awareness of their head and neck alignment during smartphone usage was evaluated using self-report measures that measure postural awareness. Students selected the posture they assumed while using smartphones selecting postures were the neck angle was: 0 degrees, 15 degrees ,30 degrees, 45 degrees and 60 degrees.

**FIGURE 1.** Visual graphic used for neck angel self reporting.



## Data analysis

Method used for analyzing data was Linear Regression Analysis, Descriptive analysis and non-parametric tests through IBM SPSS Statistics 26 program.

## Results

**TABLE 1.** Gender distribution of subjects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	80	58.0	58.0	58.0
	Male	58	42.0	42.0	100.0
	Total	138	100.0	100.0	

From the analyzed data of 138 subjects 58% of them were female (n=80) and 42% male (n=58).

The mean time spent using mobile phones was 5.6 hours (Std.D 2.39 hours) with a maximum value of 15 hours a day to a minimum of 1 hour a day.

The mean neck pain level reported was 4.12 (Std.D 2.6), with the minimum value reported at 1 and the maximum value at 10. The mean neck pain level reported was a “moderate pain”.

**TABLE 2.** Statistics for variables: “Phone time” “Neck Pain” “Neck Angle”

	N	Minimum	Maximum	Mean	Std. Deviation
Phone Time	138	1.00	15.00	5.5986	2.39920
Neck Pain	138	1	10	4.12	2.677
Neck Angle	138	15	60	31.96	12.402
Valid N (list wise)	138				

The mean neck angle while using smartphones was 32 degrees (Std.D 12 degrees) with the maximum value being 60 degrees and minimum value 15 degrees.

**TABLE 3.** Correlations of Neck Pain with Phone Time, Neck Angle and Gender

		Neck Pain	Phone time	Neck Angle	Gender
Pearson Correlation	Neck Pain	1.000	.073	.303	.263
	Phone Time	.073	1.000	.006	-.075
	Neck Angle	.303	.006	1.000	.224
	Gender	.263	-.075	.224	1.000
Sig. (1-tailed)	Neck Pain	.	.197	.000	.001
	Phone Time	.197	.	.474	.190
	Neck Angle	.000	.474	.	.004
	Gender	.001	.190	.004	.
N	Neck Pain	138	138	138	138
	Phone Time	138	138	138	138
	Neck Angle	138	138	138	138
	Gender	138	138	138	138

To study the relationship between neck pain, time using smartphones and neck angle Pearson Correlation was used. From the analyzed data it results that there is a weak but positive correlation between time spent using smartphones and neck pain with a value of 0.73, although this correlation is not statistically significant with value of significance (P=0.197).

Neck angle and neck pain have a stronger relationship with a moderate positive correlation value of 0.303 and this correlation is statistically significant with a significance value of (P=0.001). Gender and neck pain have a weak and positive correlation with Pearson value of 0.263 and with a significance value of (P=0.001).

**TABLE 8.** Tests of Normality for the data distribution of "Neck Pain" across gender groups.

	Gender	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Neck Pain	Male	.246	58	.000	.807	58	.000
	Female	.130	80	.002	.936	80	.001
a. Lilliefors Significance Correction							

In this study, a normality test was performed to evaluate the data's normalcy. The Shapiro-Wilk and Kolmogorov-Smirnov test was used in this investigation to

assess the data's assumed normality. As the p value of both tests is smaller than 0.05 the data is not normally distributed, therefore a non parametric test was used to compare the level of neck pain between genders.

Non parametric test Mann-Whitney U test was used. According to the results the level of neck pain is not the same across the two groups of genders (P =0001). Female students experience higher level of neck pain compared to male students.

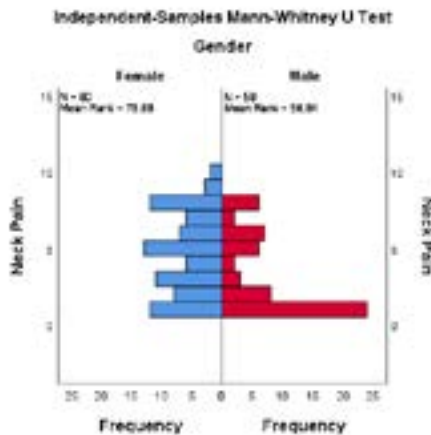
**TABLE 9** Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Neck Pain is the same across categories of Gender.	Independent-Samples Mann-Whitney U Test	.001	Reject the null hypothesis.
Asymptotic significances are displayed. The significance level is .050.				

**TABLE 10** Independent-Samples Mann-Whitney U Test Summary

Total N	138
Mann-Whitney U	3054.000
Wilcoxon W	6294.000
Test Statistic	3054.000
Standard Error	228.731
Standardized Test Statistic	3.209
Asymptotic Sig.(2-sided test)	.001

**GRAPHIC 1.** The independent samples Mann-Whitney U test. Female subjects have a higher Mean Rank (78.88) than male subjects (56.84)



## Discussion

This study found no significant relation between neck pain and excessive use of smartphones. This could be due to a small sample and not taking other factors that can influence neck pain. Despite not finding a correlation in this study neck pain is still high among smartphone users as a study in the University of Qassim in Saudi Arabia suggests. The study concluded that the prevalence of students with neck pain associated with smartphone usage was 60.8%, the prevalence was higher in students who were also addicted with smartphones (Alsalameh et al., 2019). This study had a larger sample size compared to ours but in another cross-sectional study with a similar sample size to ours was found a significant association between neck pain and smartphones (Mustafaoglu et al., 2021). The neck pain was caused as a secondary effect due to postural changes of the cervical spine and crossing muscular syndrome of the neck muscles. Another study from Saudi Arabia which involved 313 students also found a correlation between smartphones and neck pain due to the “Text neck” or the Forward Head Posture phenomenon (Sirajudeen et al., 2022). Our study did not take into the account the activities performed using smartphones, but other studies suggest that not taking breaks, playing video games and switching periodically between various electronic devices rises the risk to neck pain (Ayhuallem et al., 2021). Other studies suggest the same findings as our study. A study conducted in a Turkish University among nursing students had low levels of smartphone addiction and the neck pain was associated with different factors (Özdil et al., 2022). Similarly, another study conducted with medical and surgery students found no relationship between neck pain and smartphone usage even though half of the subjects had experienced neck pain (Bertozzi et al., 2021).

Besides finding no correlation between neck pain and time using smartphones our study found a significant correlation between neck pain and the angle of the neck flexion while using smartphones. There is evidence of higher levels of pain associated with higher degrees of neck flexion while using smartphones (Szeto et al., 2020). These results support the association between neck pain and neck flexion when using a smartphone and are consistent with earlier studies. For instance, a study observed a positive link between neck pain and the amount of neck flexion during smartphone use in a cross-sectional study with 432 participants (Al-Hadidi et al., 2019). Similar findings were made by another study, who investigated a bigger sample of 779 students. They discovered that neck pain was connected to greater levels of neck flexion. These studies, as well as our own, highlight the significance of taking neck posture when using a smartphone into account as a possible risk factor for neck pain (Namwongsa et al., 2018).



Further research has clarified the effects of smartphone use and neck flexion on musculoskeletal health. When comparing muscle activity in those with and without chronic neck-shoulder discomfort, it was discovered that using a touchscreen smartphone enhanced muscular activity in the neck-shoulder region (Xie et al., 2016).

## Conclusions

Smartphones have become an essential part of our daily lives as society embraces digitization more and more. It is important to be aware of the possibility of developing bad postures as a result of chronic smartphone use, even if our study did not discover a significant association between neck pain and the amount of time spent using a smartphone. According to the results of our study, neck pain has been linked to the posture used while using smartphones, which is crucial. Therefore, it is essential to stress the significance of routinely correcting neck posture and offer instructions on how to position the neck properly while using a smartphone.

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