

## ORIGINAL ARTICLE

**PREVALENCE OF NECK PAIN DUE TO PROLONG USE OF SMART PHONE  
AMONG UNIVERSITY STUDENTS OF FAISALABAD**Nosheen Manzoor<sup>1</sup>, Hina Manzoor<sup>2</sup>, Fizza Naeem<sup>3</sup>, Iram Azam<sup>4</sup>**ABSTRACT**

**Introduction:** All around the world, prolong use of electronic devices results in increase prevalence of musculoskeletal disorders (MSD) of hand, wrist, forearm, arm and neck has been increasing. Neck pain is a fourth leading seed with disability. Neck pain may occur due to broad range of differential diagnosis like trauma, infection, malignancy which are life threatening diseases. There negative impact on physical and mental health is found to be associated with use of smart devices like mobile phones, laptops and computer. Mobile phone users adopt forward head posture while using smart phone for extended period of time, which may lead to neck pain.

**Material & Methods:** A total of 3000 students between 18-45 years of age using mobile phone for the duration  $\geq 1$  hour per day from different universities of Faisalabad gave response to questionnaires Confidential Smart Phone Usage and Neck Pain and Neck Disability Index. Students with neck pain due to any other medical condition excluded from study. Data was entered and analyzed through SPSS version 21 and Chi-square ( $\chi^2$ ) test was applied to find out the association between pain and disability.

**Results:** This study showed that most of the participants (85.3%) experience neck pain. Playing games and texting was used more than calling and positively associated with neck pain. Majority of participants were used mobile phone for  $>4$  hours and presents with moderate pain. In addition, a vast proportion 1377(45.9) of students with moderate disability had weekly pain.

**Conclusion:** The result showed that there is a high prevalence of neck pain among mobile phone users. Moreover, prolonged use of mobile phone is strongly associated with neck pain and neck disability.

**Key Words:** Electronic devices, Neck pain, Phone, Prolong duration, Smart

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**INTRODUCTION**

Electronic devices such as mobile phone and computers have been widely used in many countries.<sup>1</sup> It is useful for sending and receiving calls, with advancement in technology its usage leads to maximum facilities like camera and internet.<sup>2</sup> Due to its

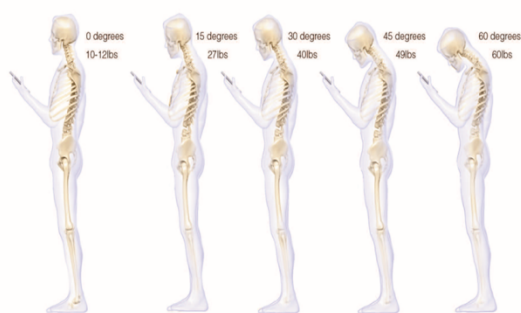
wide range of applications, people use smartphones worldwide especially college and university students.<sup>3</sup> Study done in America in 2017 reported that 77% of American population were using mobile phone, which is a dramatic increase from 33% that was

reported in 2011.<sup>4</sup> A recent study showed that, almost all day 79% people are using their cell phones at the age of 18-44 with only 2 hours spend without their cell phone in hand.<sup>5</sup>

Since the use of smartphones has been increased recently, prolong use of electronic devices results in increase prevalence of musculoskeletal disorders (MSD) of hand, wrist, forearm, arm and neck has been increasing.<sup>6</sup> Neck pain may cause due to broad range of differential diagnosis like trauma, infection, malignancy which are life threatening diseases. There negative impact on physical and mental health is found to be associated with use of smart devices like mobile phones, laptops and computer.

Mobile phone use for longer duration involves postural changes. Mobile phone users adopt forward head posture while using smart phone for extended period of time, which may lead to neck pain.<sup>7</sup>

Neck pain is caused by forward bending of the neck in result of irregular posture of neck due to static positioning for the extended time period. Prolong positioning of neck in abnormal posture such as forward bending of neck cause neck pain.<sup>8</sup> As moving the head forward at some degree, the load supported by spine intensely rises. In neutral position a grown-up's head weight is around 10 to 12 pounds.



### ***Stress on cervical spine during forward bending***

While stretching the posterior neck at changing degree the weight perceived by the spine rises. If the head moves forward the force on the cervical spine at 15 degrees is 27 pounds, at 30 degrees is 40 pounds, at 45 degrees is 49 pounds, and at 60 degrees is 60 pounds. The result was not assessable at 90 degree.<sup>8,9</sup>

Neck pain due to continued usage of mobile phone occurs most commonly in adults and is responsible for the demand of medical facilities and financial load which lead to

absence from their duty. Another study showed that the frequency of neck pain among university students about 34% and 59% with a higher prevalence among operators of electrical devices.<sup>10</sup> The most common problem seen is neck pain in adults and its ratio is about 30% and 50%.<sup>11</sup>

Prevalence rate of neck pain is higher in rural instead of urban areas. The portion of mobile phone in electronic market rising every day, it has been increased from 13.8% in 2009 to 24.9% in 2014.<sup>12,13</sup> In another study, Korea has 30 million cellphone users and 91% university students are using the mobile phone.<sup>14,15</sup> Mobile phone dependence was found to be 31.33% among secondary school adolescents resulting in negative impact on physical and mental health.<sup>16</sup>

There has been an increasing trend of use of mobile phones among students. Data has now started emerging with respect to the negative physical and psychological consequences of excessive use of mobile phones. The current study to find prevalence of neck pain among university students and the level of disability associated with it.

### **MATERIAL AND METHODS**

A cross sectional survey was conducted to collect data from students of Riphah International University Faisalabad RIU Fsd, Government college university Faisalabad GCUF and University of Agriculture Faisalabad UAF were recruited for data collection. The data was collected from March 2019 to August 2019 through non probability convenience sampling technique. Sample selection was done on the basis of following inclusion and exclusion criteria. 3000 students including both male and female with age between 18- 45 years using mobile phone for the duration of  $\geq 1$  hour per day were included. Sample selection was done on the basis of following inclusion and exclusion criteria. Exclusion criteria were neck pain due to any other medical condition or systemic problem and cervical symptoms appear due to musculoskeletal trauma or spinal cord injury. In addition, neck pain occurs due to neurological symptoms and any congenital abnormalities in either the cervical or the lumbar spine were also excluded.<sup>17</sup> The questionnaire were circulated which consisted of 3 parts including, 1) Demographics (age, gender, socioeconomic status, lifestyle,

employment status and average time spend on exercising in a week and hours of mobile usage per day 2) Confidential smart phone usage and neck pain to measure self-reported addiction to smartphone use and neck pain, 3) Neck Disability Index (NDI) for assessing level of disability. SPSS window software, version 21 was used for the analysis of data. SPSS is a kind of software which is used for the entry of data and summary of measurement of study group represented by frequency tables, pie charts, and bar charts. Statistical significance were set at  $P=0.05$ .

## RESULTS

Results illustrates that 2249 (75%) students had age 18-25 years, however; 450 (15%) students had age 26-30 years and 175 (6%) respondents had age 31-35 years and 126 (4%) of respondents belong to >35 years of age. The majority 1748(58.3%) of respondent were males and 1252(47.7%) were females. 1020 (34%) of participants from GCUF FSD and 1000 (33%) from RIU, however 980 (32%) from UAF.

Study showed that 233(7.8%) participants used mobile phone for duration of >1-2 hours, 263(8.8%) participants used mobile phone for duration of >2-4 hours and 2504(83.5%) participants used mobile phone for duration of >4 hours. (Table 1)

Out of 3000 recruited participants, a vast proportion of participants 1500(50%) reported weekly pain, 510(17%) participants reported monthly pain, 194(6.5%) participants reported yearly pain, 355(11.8%) participants reported daily pain and 441(14.7%) participants reported no pain at all. (Table 2) (Figure 1)

Results showed mild to severe disability among mobile phone users. Majority of the students 1377(45.9%) were belong to moderate disability, 534(17.8%) belong to mild disability, 434(14.5%) belong to severe disability, 96(3.2%) belong to complete disability and 556(18.6%) were show no disability. (Table 3) (Figure 2)

Results showed that 534(17.8%) participants with mild disability, 203(33.1%) had mild pain, majority 282(20.8%) had moderate pain and 49(8.3%) had severe pain. There were 1337(45.9%) respondents who represents the moderate disability, 332(54.2%) had mild pain, majority of the respondents 675(49.9%) had moderate pain and 370(62.5%) had severe pain. There were 434(14.5%) participants with

severe disability, among these 35(5.7%) had mild pain, 278(20.5%) had moderate pain and 121(20.4%) had severe pain. In addition, only 96(3.2%) respondents were show severe disability in which 4(0.7%) had mild pain, 47(3.5%) shows moderate pain and 45(17.6%) shows the severe pain. Results indicate that as peak frequency of pain increases as disability level increases. (Table 4)

## DISCUSSION

The aim of the present study was to evaluate health effects of mobile phone usage amongst the university students of Faisalabad. The most common symptom observed in this study was cervical pain, which was reported from 85.3% of subjects on weekly, monthly and yearly basis. The use of mobile phone affects the normal mechanics of the body producing muscle imbalance around the area neck, shoulder, upper back and arm along with whole body resulting in bad posture. Forward head posture caused by overstraining of muscle around joints and shortening of muscle fibers of Atlantic occipital joints around its articulation point, perhaps chronic neck pain occurs. People spend a usual of 2-4 hours daily with their head bending forward during texting and reading on their smartphone. Accumulative, the pressure seen on cervical spine per year is around 700 to 1400 hours. Hence it imagines that university scholars spend a further 5,000 hours in bad posture. Similar results have been found in another study that forward head posture alters the spine mechanics resulting in increased load on spine while bend forward at different degrees. This causes increase mechanical stress towards cervical spine causing neck pain.<sup>9</sup>

According to this study, the prevalence of mobile phone usage was found to be 85.3%. Another study done in Kenya showed 85% prevalence of mobile phone use among study participants.<sup>18</sup> In contrast, study held in Iran was described 31.4% prevalence.<sup>19</sup> The alteration in prevalence might be because the survey conducted among high school students and majority of them had not operated mobile phone. Although, our research was done on students and most of them owned a mobile phone.

In this study, the students aged between 18-45 years were taken according to inclusion criteria. The aim of electing this age group was that most of the university students fall in

this category and on the other hand to calculate the prevalence of neck pain among university students due to mobile phone use. Majority of students from our target population belong to age group of 18-25 years. Furthermore, another study conducted in India to assess mobile phone usage and its effect on health, and the large number of participants included had age 18-30 years.<sup>2</sup>

The duration of mobile phone use plays a crucial role in determining the duration of neck pain. Majority of students were use mobile phone for >4 hours and risk of pain increases as duration increases. So, there are significant association between smart phone usage duration and risk of pain ( $p < .001$ ). A study conducted in Shanghai by Zhi Shan among adolescents to identify the correlation of neck pain with the use of digital products. The results of this study showed that using e-devices for a prolonged duration cause neck pain.<sup>20</sup> Moreover, other study also presented neck pain and its association with use of electronic devices for prolonged duration.<sup>21</sup>

This study indicates that majority of students used mobile phone most commonly for playing games, secondly, they use mobile phone for texting and thirdly for calling. In contrast to our study, a study done in semi urban area of southern India reported that the participants most commonly use mobile phone for calling as compared to playing games and texting.<sup>2</sup>

This study demonstrated that 3000 students within age 18-45 years operated their own mobile phone. Moreover, confidential smart phone usage and neck pain showed an addiction to smartphone use and moderate pain, although the NDI scores showing moderate disability. Hence, the results indicate moderate pain and its relationship with moderate disability ( $p < .001$ ). Another study done in India among physiotherapy students indicated that addiction of smartphone leads to moderate disability level.<sup>17</sup>

This study has several limitations; the utilization of different gadgets (for example PCs) or book reading posture was not considered which may also be the cause of neck pain. Moreover, the study included participants of particular age group and is not able to evaluate the prevalence of pain due to mobile phone use among different age groups.

## CONCLUSION

The study revealed that the university students of Faisalabad suffer from moderate neck pain due to prolonged use of mobile phone (>4 hours) and found associated with the duration of mobile phone usage. The problem of neck pain in students arise due to “forward head posture” when using mobile phone for long duration (>4 hours) that ultimately affecting their daily life and recreation as well.

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Table 1: Statistics about duration of smartphone use.

	N	%
Estimate how much time you operated your smartphone daily?		
>1-2 hours	233	7.8
>2-4 hours	263	8.8
>4 hours	2504	83.5

Table 2: Statistics about pain experience in different occasions

	N	%
How often have you experienced neck pain?		
Not at all	441	14.7
Daily	355	11.8
Weekly	1500	50.0
Monthly	510	17.0
Yearly	194	6.5

Table 3: Level of disability on neck disability index

Level of disability	n	%
No disability (0-4)	556	18.6
Mild (5-14)	534	17.8
Moderate (15-24)	1377	45.9
Severe (25-34)	434	14.5
Complete disability (>34)	96	3.2

Table 4: Association between severity of pain and neck disability index

Neck disability index	No Pain		Mild		Moderate		Severe		Total	
	N	%	n	%	n	%	n	%	N	%
No disability (0-4)	441	100.0	39	6.4	72	5.3	7	1.2	559	18.6
Mild (5-14)	0	0	203	33.1	282	20.8	49	8.3	534	17.8
Moderate (15-24)	0	0	332	54.2	675	49.9	370	62.5	1377	45.9
Severe (25-34)	0	0	35	5.7	278	20.5	121	20.4	434	14.5
Complete disability (>34)	0	0	4	0.7	47	3.5	45	17.6	96	3.2
Total	441	100.0	613	100.0	1354.0	100.0	592	100.0	3000	100.0

P=<.001

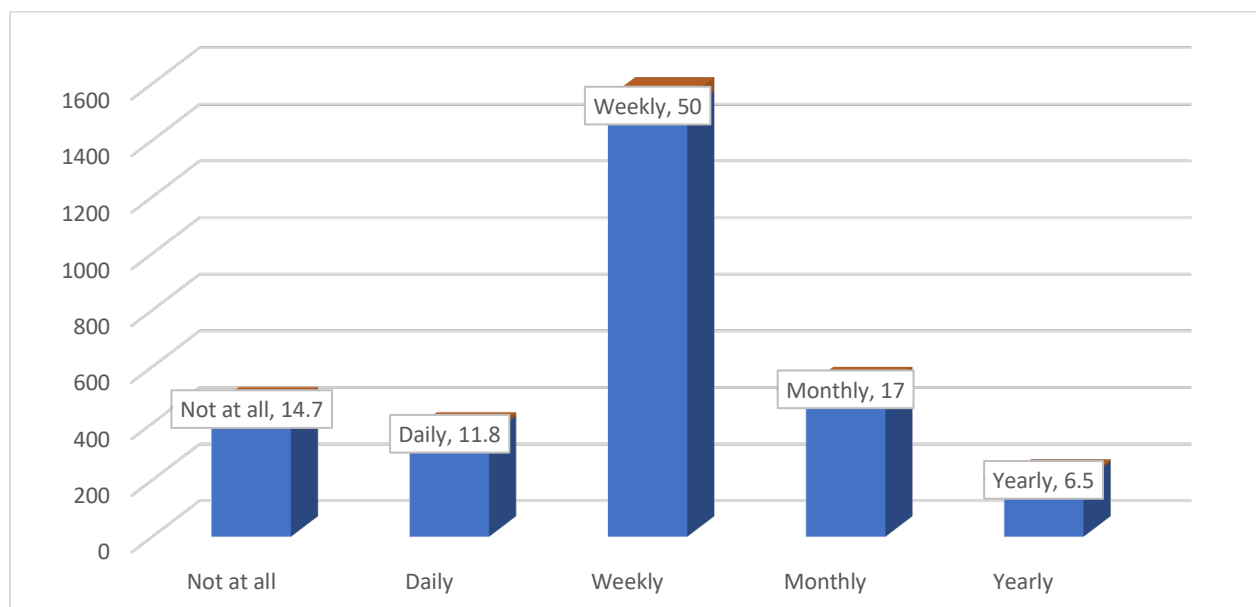


Figure 1: Daily, weekly, monthly & yearly prevalence of Pain

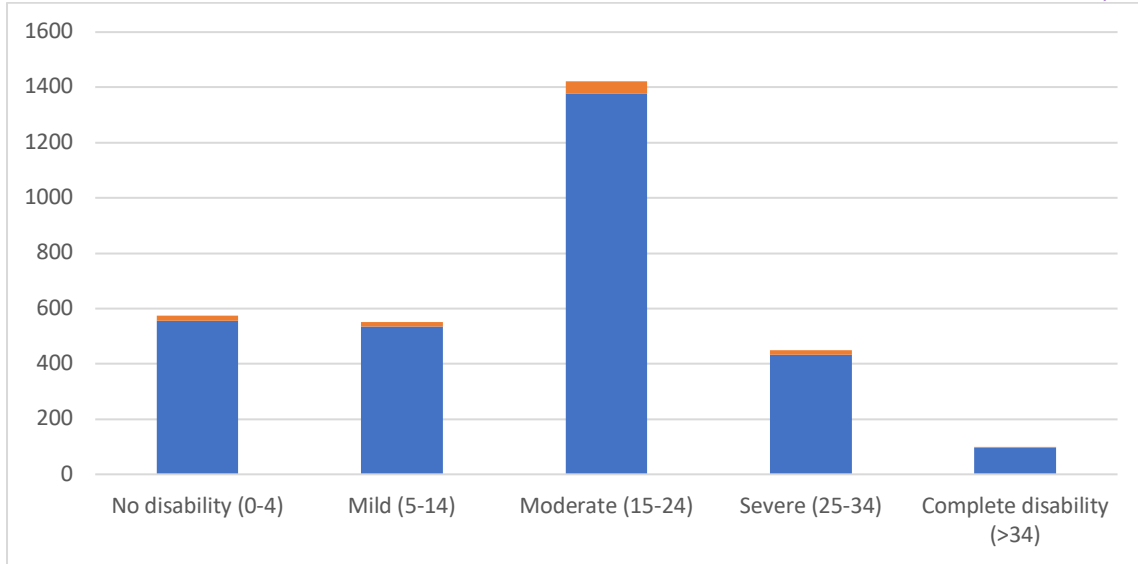


Figure 2: Distribution of participants via level of disability