

## ORIGINAL ARTICLE

**FREQUENCY OF NON-SPECIFIC NECK PAIN AND ITS RELATIONSHIP WITH PROLONGED USE OF ELECTRONIC DEVICES IN STUDENTS TAKING ONLINE CLASSES DURING COVID-19**

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**ABSTRACT**

**Introduction:** The prevalence of neck pain among students has been on the rise, attributed to the increased use of electronic devices such as cell phones and computers. This prolonged usage, often coupled with poor posture, has been found to cause damage to nerves, muscles, and tendons in the neck region, as well as in the fingers, wrist, elbow, and shoulders. The purpose of this study was to investigate the relationship between prolonged use of electronic devices and neck pain among students at the Johar Institute of Professional Studies during the COVID-19 pandemic.

**Material & Methods:** This cross-sectional observational study was conducted at the Johar Institute of Professional Studies, involving a total sample of 385 undergraduate students. The participants were selected using a non-probability purposive sampling technique. The participants used phones, laptops, or computers for more than 3 hours daily. Data collection involved the use of the Numeric Pain Rating Scale and the Neck Disability Index, with data analysis conducted using SPSS version 21.

**Results:** Of the 385 students included in the study, 187 were male and 198 were female. The findings revealed that 35 subjects reported no pain, 152 experienced mild pain, 158 reported moderate pain, and 40 suffered from severe pain. The study indicated a notable increase in the prevalence of neck pain among students due to prolonged use of electronic devices during online classes amidst the COVID-19 pandemic.

**Conclusion:** The study concluded that there is a significant incidence of neck pain associated with the use of mobile phones and laptops. Furthermore, the duration of mobile and laptop use was found to be correlated with neck pain, particularly during online classes. Notably, students who used cell phones for more than 4 hours a day were found to experience moderate neck pain. These findings underscore the need for awareness and measures to mitigate the impact of prolonged electronic device use on students' neck health.

**Key Words:** COVID-19, Neck pain, Text Neck

**Authors' Declaration:** The authors declared no conflict of interest and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All authors contributed substantially to the planning of research, question designing, data collection, data analysis and write-up of the article.

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**This article may be cited as:** Akhtar A, Aleem A, Mukhtar S, Manzoor H, Rafaqat M, Akhtaj H. Frequency of non-specific neck pain and its relationship with prolonged use of electronic devices in students taking online classes during covid-19. Rehman J Health Sci. 2023;5(2). 89-95

Submitted: Feb 16, 2022      Revisions Submitted: Dec 9, 2023      Accepted: Dec 27, 2023

## INTRODUCTION

Neck pain is defined as pain present in the posterior compartment of the neck. The International Association for Study of Pain (IASP) classified that neck pain extends from superior nuchal line to first thoracic spinous process.<sup>1</sup> According to level of severity and duration of pain, pain remains less than 7 days then it is called as acute neck pain, less than 3 months (subacute) neck pain and if pain persists for 3 months or more, it is called as chronic neck pain.<sup>2</sup>

Neck pain is the cause of pain and disability leading to discomfort and affect overall health status of individuals. This health problem increases day by day due to increasing use of mobile phones amongst young generation. Subjects actually displays more forward head posture when using mobile phones. This forward head posture puts extra load on neck joints and ligaments. This bad posture affects cervical spine and usually called text neck.<sup>3</sup> Cell phone users are at greater risk of developing repetitive strain injuries type conditions. Repetitive movement, poor posture, long term use of cell phones for texting and reading without taking rest can cause damage to nerves, ligaments, and tendons in fingers, hands, wrist, elbow, shoulders and neck causing serious injuries and if not treated can cause long term wreck. Apart from soft tissues joints can also be affected causing subluxation or arthritis in joints.<sup>4</sup>

The point prevalence of neck pain amongst developing and developed countries ranges between 20-60%. Sedentary lifestyles and long time spent fixed posture without stretching e.g., in desk bound persons using computers or mobile phones. Information and communication technology (ICT) are central and important part of our education system nowadays that's why prevalence of neck pain and headache increased greatly. Adolescents who use computers daily develop chronic neck pain and persistent headache which can greatly affect their tertiary education and participation in different daily and extracurricular activities.<sup>5</sup>

Serious health conditions can occur due to prolonged usage of electronic gadgets, lack of regular exercise can lead to obesity and other problems include lack of concentration, lethargy, memory

disturbances, eyesight issues, depression and sleep disturbance. Excessive use of mobile phones is related to increase anxiety and stress levels. Five to eight percent of individuals may show symptoms of vestibular disturbance. As this affects sleep pattern, lack of sufficient sleep leads to fatigue, lethargy and short fall of energy during morning hours. Teenagers use mobile phones excessively which may even affect overall personality and can also lead to mood swings and aggression.<sup>6</sup>

Extended smartphone use is associated with an increased likelihood of students developing enduring or chronic neck pain.<sup>7</sup> In contrast to those utilizing mobile devices for less than one hour, there is an elevated prevalence of neck pain observed among individuals engaged with mobile devices for durations more than three hours.<sup>8</sup>

According to biopsychosocial model (BPS) the biological, psychological and social including behavioural factors are all interconnected and pain is associated with all these factors rather than just single factor. Interaction between these factors and focusing on these will help to reduce pain. Behavioural factors like smoking and drugs increase chances of chronic pain likewise it is also proved that regular exercise helps to reduce neck and back pain. Surgical interventions: There are range of surgical methods which helps in the treatment of neck pain. Surgery is indicated according to severity of disease and source of pain. If the person is suffering from cervical radiculopathy, anterior cervical decompression, fusion and physiotherapy is recommended. Corpectomy and fusion, anterior cervical discectomy and fusion, laminectomy and fusion are indicated surgical interventions for cervical spondylitis myelopathy. There are two surgical methods which are anterior cervical discectomy with fusion (ACDF) and cervical disc arthroplasty (CDA) which are most commonly used in degenerative diseases of neck causing activity limitation and pain.<sup>9</sup>

Zhi et.al, directed a cross-sectional investigation in 2014 and a self-appraisal survey was given to 3600 secondary school understudies from 30 secondary schools. The reason for this investigation was to

break down the commonness of neck and shoulder torment (NSP) and its belongings among secondary school understudies in Shanghai, China. The rate of NSP in secondary school understudies in Shanghai is very high. The event of NSP is identified with a few elements including sex and school year, just as certain components identified with family, tutoring, and lifestyles.<sup>10</sup> A cross-sectional overview was conducted by Al-Hadidi et al with the aim to examine the research the relationship between neck torment and the term of gadget use, mulling over sexual orientation, age, and the most incessant situation wherein understudies utilize their gadgets. In view of a self-controlled online poll, 500 surveys were filled between February fifteenth, 2017 and March eighteenth, 2017. The examination test included solid understudies from medical services resources paying little heed to their age, sexual orientation, or handedness. This examination exhibits a critical positive relationship between the span of cell phone use and the term and seriousness of neck torment. Besides, the expanded seriousness of neck torment puts an enormous weight on the medical services system.<sup>11</sup>

Neck pain is very annoying and frustrating conditions which causes multiple disabilities, lack of concentration, difficulty in doing basic activities of daily living, headaches and overall disturb lifestyle. This problem occurs due to multiple factors and most important factor is poor posture which leads to severe neck pain starting from mild pain and leading to severe pain. Other factors are prolonged use of electronic gadgets, lack of regular exercise etc. In Pakistan, as COVID 19 happened suddenly leading to serious problems in providing basic knowledge, so higher authorities suggested that we should deliver knowledge online so that we can save precious time of students. As this is sudden severe condition so there is no much work done on this serious increasing health issue. So, the current study will help to find the prevalence of neck pain in students during online classes and explain different reasons of neck pain so that appropriate measures should be taken to overcome this condition. Objective of the study was to investigate the prevalence of neck pain and relationship

between prolonged use of electronic devices and neck pain in students of Johar institute of professional studies during online classes in the COVID 19 pandemic.

## **MATERIAL AND METHODS**

A cross sectional observational survey was conducted on 385 students of Johar Institute of professional studies Lahore from 11 September 2020 to June 2021. Estimating a population proportion with specified absolute precision; in which confidence level is 95%; anticipated population proportion 0.50, absolute precision required 0.05 sample size found to be 385. Sample size was calculated by putting values from previous study and determined by health studies (a practical manual).<sup>12,13</sup> non-probability purposive sampling technique was used. Data collection tools included NPRS (numeric pain rating scale) and NDI (neck disability index questionnaire). Students were included between 17 – 28 years of age who were using cell phones, laptop and computer for more than 3 hours a day. Both male and female were included in this study. Students were excluded who were not fulfilling the inclusion criteria. Patients with previous chronic neck pain for more than 3 months weren't included. Patients with recent history of neck surgery, history of fall or injury were also excluded from the study. Pain was measured by NPRS (numeric pain rating scale) and NDI (Neck Disability Index). NPRS is valid and reliable scale. This scale starts with 0 which describes no pain, 1 to 3 describes mild pain, 4 to 6 describes moderate pain and further 7 to 10 describes severe pain.<sup>14</sup> The NDI (neck disability index) is a valid and reliable questionnaire and has basically 10 items, 7 are related to activities of daily living, two of them are related to pain and one is related to concentration.<sup>15</sup>

The study included collection of the relevant information and data from the students of Johar institute of professional studies (Jips), Lahore. Permission was taken from the Jips Authorities. Consent form was signed by each participant prior to filling up the questionnaire. Questionnaire was filled up by students. Each questionnaire was reviewed and make sure that no data was missed. Data was collected with the help of NPRS and NDI questionnaire. For the purpose of analysis and coding of data,

statistical package for social sciences (SPSS), 21 version was used. Statistical significance was set at 5%. Frequency tables, bar chart was used for calculation of quantitative variables.

## RESULTS

A total of 385 participants were included in the current study. Their mean age was 22.24 and standard deviation was  $\pm 1.767$ . Participant's minimum age was 17 and maximum age was 28. There were 187 (48.6%) Males and Females 198(51.4%) enrolled in the study. Out of 385 participants, 20 participants used computer, 175 subjects used laptop and 190 used mobiles for online classes. The results showed that 9.09% subjects were with no pain. The 39.48% experienced mild pain, 41.04% experienced moderate pain while 10.39% have severe pain.

### Descriptive statistics:

**Figure 1: Frequency of gender:** The Bar chart shows that there were 48.57% Males and 51.43% Females.

**Figure 2: Departments:** Out of 385 participants 120 were from the department of DPT (Doctor of Physical Therapy), 130 subjects were from PHARM-D (Doctor of Pharmacy), 65 Students were from MLT (Medical Lab Technicians), and 70 participants were from the department of BSCS (Bachelor of Science in Computer Science).

**Figure 3: Electronics:** This bar chart shows that 20 participants used computer, 175 subjects used laptop and 190 used mobile for online classes.

Table 1: Number of hours of daily computer use

Table 2: Association between neck pain and computer use

Table 3: Number of hours of daily Laptop use

Table 4: Association between neck pain and Laptop use

Table 5: Number of hours of daily Mobile use

Table 6: Association between neck pain and Mobile use

Table 7: Frequency of pain: Numeric pain rating scale, table 7 revealed that there were 35 subjects were no pain, 152 were mild pain, 158 subjects were moderate and 40 were suffering from severe pain.

Table 8: Frequency of NDI, table 8 shows that there were 72 subjects were no disability, 205 were mild and 108 were suffering from moderate disability.

## DISCUSSION

The main purpose of this study was to find out the prevalence of neck pain due to online classes. A total of 385 participants were included in current study, out of which 187 (48.57%) were males and 198 (51.43%) were females. The result in research shows that 35 (9.1%) were suffering from no pain, 152 (39.5%) were suffering from mild pain, 158 (41.0%) were suffering from moderate pain, and 40 (10.4%) were suffering from severe pain. It was also found that the major reason of this neck pain was online classes in the period of lockdown from 14th March 2020 to 15th September 2020.

After having a detailed analysis of the subjects suffering from neck pain, it was found out that the neck pain was significantly associated with two factors; age of the subject, and the duration of use of device/mobile phones for attending the online classes. Among these two factors, the mostly affecting factor was the duration of usage of device/mobile phones for attending the online classes. Among the subjects, two groups were formed; one group was having less severe pain and the other one having greater pain severity. Of these, about 75% were those suffering from less severe pain, while about 25% were those suffering from greater pain severity. Among these two groups, the ones having severe pain used analgesics more than the ones having less severe pain.

G. G. Waleslassie did research on neck pain among Students related to medical field in 2020. In this study, a questionnaire was given to 422 participants. When the questionnaire was completed, they find out that in 49.2% students, neck pain was present. In our research, about 39.5% subjects were found suffering from mild neck pain, 41.0% suffering from moderate neck pain and about 10.4% subjects were found suffering from severe neck pain and this neck pain was found to be significantly associated with online classes. The lack of breaks while attending online classes contributed to the neck pain as well.<sup>16</sup> In the study conducted by Lloyd Long Yu Chang researched a prevalence of neck pain and its



associated risk factors in 2020. A total of 5195 invitation emails were sent. Of 1002 participants respondents, out of which 22.3% reported current neck pain. Physiotherapy students 26.5% and nursing students 26.1% had significantly higher prevalence of neck pain as compared to business students 13.2%. The neck pain was related with the taller stature of the students and prolonged use of smartphones as well. In our study, it was found that the neck pain was also accompanied with the longer duration of classes and the sitting posture while attending the online classes. The wrong posture while attending classes resulted in lower back pain too along with the neck pain. The neck pain was found out to be associated with age factor as well. The students of senior year studies were found having neck pain more commonly. The lack of breaks while attending online classes, lack of physical activity, and more sedentary lifestyle during the period of lockdown added more to the neck pain. The wrong position of laptops while attending online classes and remaining fixed to a position significantly caused neck pain issues. In our study, it was found that people had lack of awareness of the harms of the wrong angle of laptop/mobile phone screens during the long study hours of online classes.<sup>17</sup> Another study conducted in 2009 from 1073 participants by Smith et al revealed that neck pain and headaches were also related to the high school of computing for school students, as well as inappropriate postures while using computers. They found a concerning association between neck pain and high hours of computing for school students and have confirmed the need to educate new computer users about appropriate ergonomics and postural health. In our studies, we collected the similar results because the neck pain was largely associated with sedentary states of body, and watching the screens of computers/mobile phones for longer periods.<sup>18</sup> The previous studies show the occurrence of neck pain due to excessive mobile use and other diseases such as meningitis, diabetes, and disc problems. But in our study, we focus on neck pain due to online classes. The results of our study tell us about the excessive use of mobile phones due to online classes has many noticeable

health related problems out of which more problems were related to head and neck region. The main object of my study is to find out that, to which extent online classes cause neck pain so that I can provide awareness, acknowledgement and guideline related to the prevention of neck pain due to online classes.

## CONCLUSION

It is concluded from current study that incidence of neck pain is very high with mobile and laptop use. Duration of mobile and laptop use are associated with neck pain during online classes. Moderate neck pain was found in students who use mobile phone for more than 4 hours a day.

Further research is needed to be carried out on large scale and should involve other areas of Pakistan to see whether there are any similarities in the findings. The sample size should be large so that more significant results can be found.

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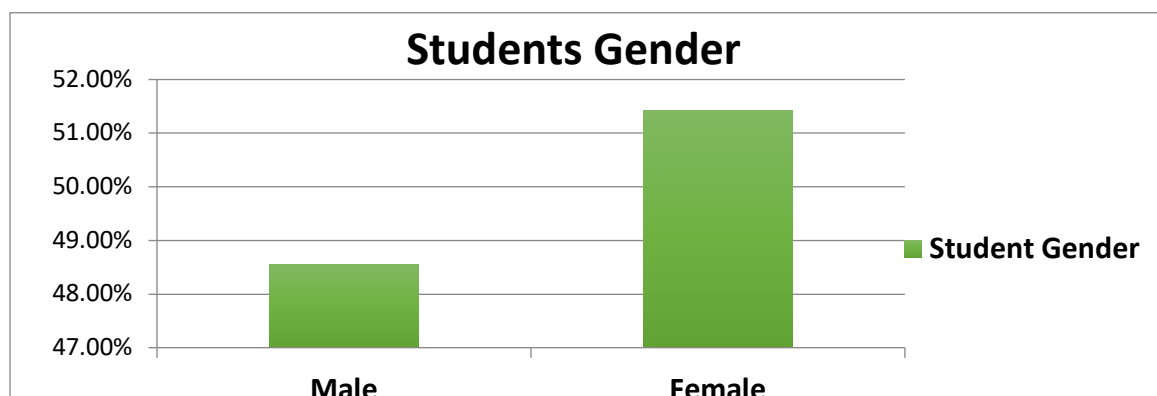


Figure 1: Frequency of gender

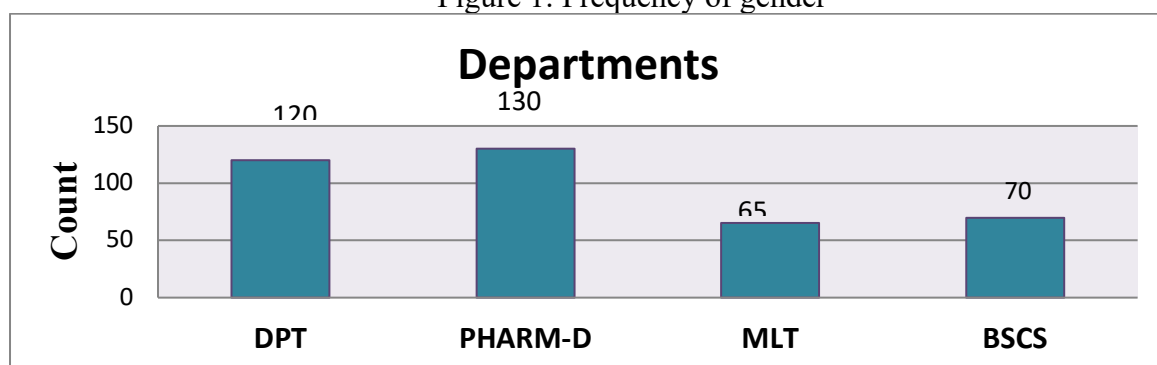


Figure 2: Departments

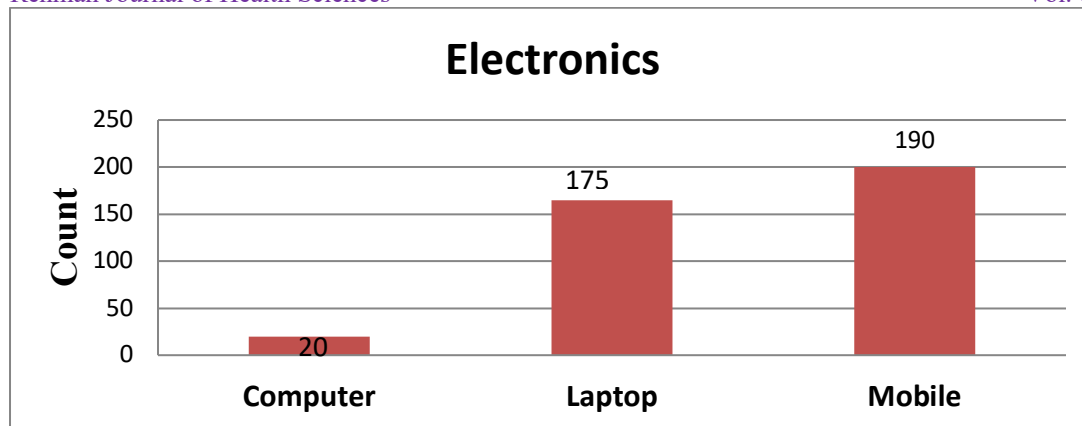


Figure 3: Electronics

Table 1: Number of hours of daily computer use

Number of Hours of Daily Computer Use	Frequency	Percentage
3-4	5	25%
4-5	10	50%
5-6	5	25%

Table 2: Association between neck pain and computer use

Number of Hours of Daily Computer Use	Pain (Yes)	Pain (No)
3-4	2	3
4-5	7	3
5-6	3	2

Table 3: Number of hours of daily Laptop use

Laptop Use in hours	Frequency	Percentage
3-4	30	17.1%
4-5	80	46%
5-6	65	37.1%

Table 4: Association between neck pain and Laptop use

Daily Laptop Use (hours)	Pain (Yes)	Pain (No)	
3-4	17	13	30
4-5	50	30	80
5-6	45	20	65
Total	112	63	175

Table 5: Number of hours of daily Mobile use

Daily Mobile Use in hours	Frequency	Percentage
3-4	40	21%
4-5	100	53%
5-6	50	21%

Table 6: Association between neck pain and Mobile use

Daily Mobile Use in hours	Pain (Yes)	Pain (No)
3-4	24	16
4-5	80	20
5-6	30	20

Table 7: Frequency of pain: Numeric pain rating scale

	Frequency	Percent	Valid Percent	Cumulative Percent
No pain	35	9.1	9.1	9.1
Mild pain	152	39.5	39.5	48.6
Moderate pain	158	41.0	41.0	89.6
Severe	40	10.4	10.4	100.0

Table 8: Frequency of NDI

	Frequency	Percent	Valid Percent	Cumulative Percent
No disability	72	18.7	18.7	18.7
mild disability	205	53.2	53.2	71.9
Moderate disability	108	28.1	28.1	100.0