

## Prevalence Of Cervicothoracic Pain Associated with Online Classes Among Undergraduate Students of Bahria University, Karachi: A Cross-Sectional Survey

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### Abstract

**Background:** Due to the pandemic and the requirement for social separation, this virtual learning platform has fundamentally changed and innovated the way we teach and engage. Students enrolled in distance education face significant immobility for extended periods and being attentive to lectures in anti-ergonomic positions can result in grip troubles in people associated with the musculoskeletal system. **Objective:** To find out the prevalence of cervicothoracic pain due to online classes among undergraduate students of Bahria University, Karachi. **Methods:** A cross-sectional study approach was used in this research to investigate the prevalence of Cervical-thoracic pain among undergraduate students. The questionnaire was distributed among a sample size of 309 students. The questionnaire covered demographics, posture care, ergonomic, and pain-related questions. A numeric pain rating scale was used to rate the pain intensity of subjects. **Results:** Participants were involved in this study with a mean age of 21.19 years (SD=1.58). The study reported that 63.1% (n=195) of participants have suffered from cervicothoracic pain. In addition, upon analysis, there was a significant association (.034) between cervicothoracic pain intensity and participants' different positions they were attaining during online classes. **Conclusion:** This study showed a high prevalence of Cervical-thoracic pain among Bahria University undergraduate students who engage in online classes. Most of the students were suffering from neck and upper back pain due to prolonged sitting while taking online classes. Moreover, most participants knew postural care and only a few participants were practicing postural care during online classes.

**Keywords:** Cervical-thoracic pain, online classes, Prevalence, Undergraduate students.

## **Introduction**

Due to the pandemic and the need for social distancing, this E-learning platform has fundamentally changed and innovated the way we teach and engage. Distance learning is an interdisciplinary field whose objective is to remove the limitations between students, teachers, and learning resources and to use existing technology with a pragmatic approach to achieve this. During this process, students receiving distance education, additional immobility for long periods, and listening to lectures in anti-ergonomic positions can lead to musculoskeletal problems in individuals. During this shift in online education, the use of computers and cell phones as online

educational tools gained in importance than during the traditional educational system. Few studies have been found examining the effects of online courses and their effects on musculoskeletal health. Musculoskeletal complaints have a negative impact and reduce their effectiveness in engaging subjects and even affect performance in activities of daily living.<sup>4</sup>

The recent change in the academic system has increased the duration of computer exposure, which is accompanied by inadequate stool and rest areas, which leads to an overload of various musculoskeletal structures. In which they adopt a poor posture that leads to pain and various changes

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\*in the musculoskeletal area, specifically in the backbone and upper extremities.<sup>5</sup> The increase in musculoskeletal problems with increased programmed exposure to the devices affects their health and general well-being. The use of gadgets is a major health problem. The consequences they bring. Continued use of gadgets leads to many reported health issues, such as eye strain cervical spine pain, finger pain, back pain, and sleep disturbance.

Depending on the time spent on the gadget (duration and frequency), unfavorable physiological, psychological, social, and emotional effects. Social networks, video calls, and virtual conferences are widely used for a variety of purposes<sup>6</sup> During the coronavirus pandemic, many were forced to stay indoors. The effect was that young people were dependent on online courses, workshops, and seminars. Young and medium-sized people use Android, PC, and various technological devices to get more energy. In any case, neither the children nor the educators nor the teachers were aware of the problem. Although the demand for online courses and education is increasing, there are no app training programs or teaching materials to help young people identify or avoid posture problems associated with prolonged screen use.<sup>7</sup>

Blocking is an effective way to restrict the spread of the coronavirus. However, it can negatively affect a student's mental health and musculoskeletal system. Neck pain is one of the most reported musculoskeletal disorders, also a leading cause of illness, academic decline, and absenteeism. Therefore, neck pain can jeopardize the career prospects of students.<sup>8</sup> In addition to the common elements that make people prone to neck pain, students who have prolonged screen timing, this group is at a higher risk of developing neck pain due to time spent reading, writing, or using a computer or tablet.<sup>9</sup>

Although there is an increased demand for online classes and education, there are no applicable training programs or instructional materials to help youngsters recognize or avoid postural difficulties associated with prolonged screen use. Spending hours on the computer or any other electronic gadget is a well-known risk factor for neck pain in youngsters.<sup>10</sup> An ideally aligned neck has a

slight lordotic curvature. Extended computers use and sitting with rounded shoulders and incorrect neck position disrupt the normal curve of the neck, resulting in muscle imbalance and hence neck pain.<sup>11</sup> Adults become lethargic because of their usage of smartphones, neck stiffness develops because of their sedentary lifestyle in confinement and increased workload. Adults use more electronic gadgets owing to online education, office workers have more work and adults report neck and back pain due to poor posture.<sup>12</sup> Studies have shown that a sedentary lifestyle during lockdown was the major contributing factor to musculoskeletal discomfort. Diminished actual work is viewed as a significant danger factor for the advancement of constant neck, shoulder, upper, and lower back pain.

Neck and back agony can lessen personal satisfaction by incapacitating the individual in their daily activities with complete strength and potential.<sup>13</sup> Misuse of any substance has negative consequences. Smartphone technology causes pain in the neck, hands, and shoulders as well as stress. Another factor to consider is the style the person adopts when teaching online.<sup>14</sup> Using the evidence in Karachi, it is important to get a real picture of neck and upper back pain and a better understanding of its occurrence to find adequate prevention for undergraduate students while taking online courses. The study goal is to examine the association between online learning and cervicothoracic pain in medical and non-medical college students.

## Methodology

This cross-sectional survey study was conducted to assess the prevalence of cervicothoracic pain associated with online classes among undergraduate students of Bahria University, Karachi. The study was carried out at two campuses, namely Bahria University Health Sciences Campus and Bahria University Karachi Campus, over four months from September 2021 to May 2022. A total of 309 students were selected using non-probability convenience sampling. The sample size was calculated using the OpenEpi version 3, SSPropor-open calculator, considering a population size of 1,550, an expected prevalence of 50% ± 5%, and a confidence level of 95%  $n = [DEFF * Np(1-p)] / [(d^2/Z^2_{1-\alpha/2} * (N-1) + p*(1-p))]$ . Eligible participants included male and female



undergraduate students aged 18–26 years who were actively engaged in online learning during the pandemic and used electronic devices for 2–6 hours daily for academic purposes.

Students with pre-existing musculoskeletal disorders, prior spinal surgeries, or those using electronic devices for non-educational purposes were excluded. Data were collected using a self-administered questionnaire adapted from validated studies<sup>5</sup>, covering demographic information, postural habits, device usage patterns, pain characteristics, and awareness of postural care. Pain intensity was measured using the Numeric Pain Rating Scale (NPRS), an 11-point scale ranging from 0 (no pain) to 10 (worst imaginable pain), which has high reliability ( $r = 0.95$ ) for musculoskeletal pain assessment. Ethical approval was obtained from the Ethical Review Committee of Bahria University Health Sciences (WFRC-DPT-03/ERC 75/2021), and written informed consent was secured from all participants. The confidentiality and anonymity of the respondents were strictly maintained, and they were informed of their right to withdraw at any stage of the study.

### Statistical Analysis:

Data were analyzed using IBM SPSS Statistics (Version 23.0). Descriptive statistics were used to summarize continuous variables (mean, standard deviation) and categorical variables (frequency, percentage). The Chi-square test was applied to determine associations between variables, with statistical significance set at  $p \leq 0.05$ .

### Results

Undergraduate students were included in the study. Participants' ages ranged from 18 to 25 years with a mean age of 21.19 years (mean=1.58). The sample included male 21.7% and 78.3% female university students. A significant proportion of participants 63.1% reported experiencing cervico-thoracic pain, while 36.9% did not. This suggests that cervico-thoracic pain is a common issue among the study population. Among those who reported pain, the majority 50.5% experienced localized pain, whereas 12.6% had radiating pain.

To evaluate the duration of the pain our results

showed that the pain lasted for less than 20 minutes in 18.4%, 20 minutes in 16.2%, 1-2 hours 21.0%, and for whole days in 6.1% participants. The 1–2-hour pain duration being most frequent indicates activity-related strain, reinforcing the need for movement-based interventions. While stiffness is widespread, severe cases are rare as shown in Table 1.

**Table 1.** Prevalence and nature of cervico-thoracic pain

Variables	Construct	Frequency (%)
Pain	Yes	195 (63.1%)
	No	114 (36.9%)
Nature of pain	Localized	156 (50.5%)
	Radiating	39 (12.6%)

The study analyzed gadget usage, online class duration, and postural habits among participants. The majority (52.4%) used smartphones for online classes, followed by laptops (41.4%), while computers (4.9%) and tablets (1.3%) were used less frequently. Regarding class duration, most participants attended online sessions for 3–4 hours (42.7%), while 28.5% and 28.8% had classes lasting 4–5 and 5–6 hours, respectively. In terms of posture, 58.6% sat on a chair during classes, 34.3% lay on their back, and 7.1% adopted a side-lying position shown in Table 2. These findings highlight prevalent device usage and posture trends, which may have implications for musculoskeletal health.

**Table 2.** Posture attained and gadgets used during online classes

Variables	Construct	Frequency (%)
Gadgets Used	Computer	15(4.9%)
	Laptop	128(41.4%)
	Tablet	4(1.3%)
	Smartphone	162(52.4%)
Posture	Sitting on a chair	181(58.6%)
	Side-lying	22(7.1%)
	Lying on back	106(34.3%)

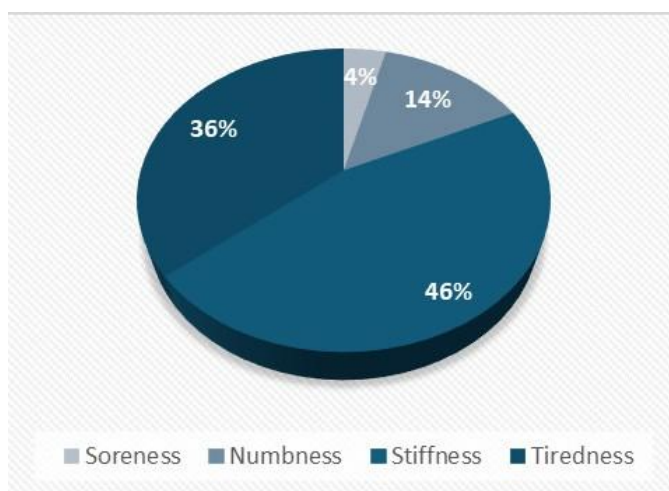
Most of the students having cervico-thoracic pain were using sitting posture during online education. Upon analysis, there was a significant association between posture attained by students for classes and the intensity

**Table 3.** Association between posture attained during online classes and intensity of pain

Position attained during online classes	Intensity of pain					Total	p-value
	No pain	Mild	Moderate	Severe	Worst possible pain		
Sitting on a chair	59	56	57	8	1	181	0.034
Side-lying	10	10	1	0	1	22	
Lying on back	49	30	22	3	2	106	

of cervicothoracic pain ( $p=0.034$ ) Table 3.

When we asked questions related to other discomforts along with pain, the most reported issue was stiffness (46%), followed by tiredness (36%). Numbness (14%) was observed in a smaller proportion of participants, while soreness (4%) was the least common. These findings suggest that prolonged online activities contribute to musculoskeletal discomfort and fatigue, with stiffness and tiredness being the predominant complaints Fig.1. It was discovered that online classes had affected the health condition of the students. Interestingly, to relieve the discomfort 6.5% of participants stopped using the computer, laptop, or smartphone, 18.4% used to perform neck stretches, 19.4% were taking painkillers, and 48.2% used to take rest after online classes as shown in figure 2.



**Figure 1.** Type of discomfort along with pain

## Discussion

Education was switched to online platforms which

increased the usage of technology and gadgets during covid-19 pandemic. This study was done to assess the cervico-thoracic pain in students while taking online classes in pandemic lockdown. Mostly students are less concerned about their posture and biomechanics when taking online education. Alshehri *et al.* (2021) researched that during online education, students were giving less importance to their posture and overall health.<sup>15</sup> Faulty posture directly affects the spine, especially the cervical spine and lumbar spine. The study was conducted to determine the prevalence of cervico-thoracic pain among undergraduate students while using electronic gadgets during a pandemic. The study's findings showed that neck and thoracic pain markedly increased during the pandemic (63.1%). People were spending 5-6 hours on electronic gadgets for education purposes and had increased incidences of neck pain and cervico-thoracic stiffness. If we go across the previous study reported that individuals were spending more of their time on smartphones and computers during the COVID-19 pandemic which had affected students' posture and resulted in musculoskeletal pain and discomfort. Also favors the study findings. For the most part individuals of this age are either students, instructors or office laborers, who need to invest over-the-top energy on PC screens, for online classes, and get ready for lectures and test papers.<sup>16</sup>

Liang Z *et al.* (2021) studied that minor posture adjustments have been shown to increase the strain on the musculoskeletal system.<sup>17</sup> As we saw in the study, most of the participants sat for lengthy periods in a chair or bed without a desk while working on a computer at home, implying that their poor posture is causing pain in the neck, upper back, or lower back region. Most of the students having neck and upper back pain were smartphone users who spent more time on phones during the pandemic. A study

reported, the issue related to increased smartphone use and neck pain among university students. This study focuses on the consequences of faulty posture on students' spine during smartphone use. Ohlendorf *et al.* (2020) reported in the study that the most widely used gadget for internet activity was smartphones during lockdown.<sup>18</sup> The result supports the finding of this study which also showed that the prevalence of neck and upper back pain was high in smartphone users. Neck discomfort prevalence and associated exposures were studied in college students which reported that with prolonged mobile usage and long static posture with the forward head of improper sitting postures, we discovered that 100% of the population was suffering from Neck Pain. A cross-sectional survey was conducted by Cheon *et al.* (2020) to obtain self-report data for this study. Neck pain was more common in female students than it was in male students.<sup>19</sup> It was also observed in this study that females were suffering more than males. During the COVID-19 pandemic students were supposed to use mobile phones and computers for education which increases screen time.

Anwar S *et al.* (2022) conducted research among school-aged children in which they used a correlation design between two variables i.e., use of gadgets and sleep quality. PSQI was used to assess sleep quality.<sup>20</sup> According to the findings of variables data analysis research, the p-value was  $0.653 > 0.05$ , indicating that it was negligible. As a result, it can be stated that there is no link between gadget use and sleep quality in student children during the COVID-19 pandemic. These results contradict the study results.

Afshari *et al.* (2021) research findings imply that musculoskeletal pain produced by remote studies is often mild, as 66.9% of participants did not require medication to alleviate their problems. Furthermore, 70.8 percent feel that if the remote teaching model is phased out, the pain will go away, reinforcing the view that pain is linked to this new way of life.<sup>21</sup> As a result, the distance learning technique has resulted in an increase in the occurrence of musculoskeletal discomfort in this specific demographic, even if just for a short time.<sup>22</sup> The current study also showed that several students

were not taking medications for pain relief and preferred rest to get relief from pain. The study was limited to online classes only; other activities were not included i.e., assignments, exams, and projects. This study is limited to undergraduate students of Bahria university of Karachi. Other universities of Karachi were not included so it is limiting study to assess the Cervico-thoracic pain characteristics among different age groups. This research includes undergraduate students, but further research can be conducted among graduated students, school based and college-based students to further explore in different age groups. It is also recommended to have posture assessment for evaluating posture to prevent Cervico-thoracic pain from getting more serious and severe. Moreover, researchers can include outcome measure such as disability ratio in students.

The study's limitations include a small sample size from Pakistan, a short 6-week follow-up, and potential bias from self-reported data. To improve, physical readiness training should be incorporated into rehabilitation, larger and longer studies are needed, and awareness should be raised through educational efforts for coaches, players, and parents.

## Conclusion

Cervical-thoracic pain was highly prevalent among Bahria University undergraduates during online classes, largely due to prolonged sitting and excessive device use. Awareness of postural care was common, but practice was limited. Regulated device use, ergonomic seating, and consistent postural care are essential to reduce such health issues.

**Ethical Statement:** The ethical approval for the study was obtained from the Ethical Review Committee of Bahria University of Health Sciences (WFRC-DPT-03/ERC 75/2021).

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

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