



## **Neck Pain among Medical Students during COVID-19 Pandemic: A Questionnaire Based Study**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Aims:** To determine the relationship between distant learning and neck pain during COVID-19 pandemic especially among medical students, thus we aim to assess prevalence of neck pain for specific Group and time.

**Study Design:** An observational cross-sectional study.

**Place and Duration of Study:** Conducted in Saudi Arabia, between July 2020 and October 2021.

**Methodology:** This is a cross-sectional observational descriptive study that started in July 2020.

Our target population include all medical students either male or female suffering from neck pain in Kingdom of Saudi Arabia during the period of distant learning due to the Covid-19 pandemic.

Sample size: Total Number of medical students in KSA (26126), Confidence level 95% and margin of error 5%. The sample size 379 was estimated using the Qualtrics calculator.

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**Results:** A total of 2071 participants were a part of study. Most of them are female n=1509(72.9%) and least of them are male n=562(27.1%). The minimum age of participant was 18 years old n=61(2.9%), And the maximum age was 30 years old n=10(0.5%). Most of medical students noticed increase of neck pain during the period of pandemic. Most of them had noticed exacerbation of neck pain during COVID-19 pandemic n=1002(72.3%), where n=384(27.7%) had same pain before and during pandemic. Majority of them were completely relying on electronic devices for their education.

**Conclusion:** A high Pervasiveness of neck pain in the medical students during COVID-19 pandemic has been observed. Most of medical students noticed increase of neck pain during the period of pandemic. Majority of them were completely relying on electronic devices for their education.

*Keywords: Neck pain; COVID-19; medical students; neck position.*

## 1. INTRODUCTION

Neck pain (NP) is a musculoskeletal condition that has the potential to become the cause of significant impairment and disability.[1] Neck pain or discomfort has a postural or mechanical origin and affects roughly 2-3rd of people at some point in their lives, particularly in middle age.[2] The neck is neurologically and biomechanically linked to the limbs of upper side, until now little is known about the mechanisms by which the altered "sensory feedback" from the neck because of fatigue, pain, or other factors affect the upper limbs.[3] Neck pain also has significant health and economic consequences, as it is the leading cause of disability all over the world.[4] It is seemed to be linked to a number of workplace factors, including work-related psychosocial and organizational factors as well as physical job demands.[5] Classification of Neck pain: Neck pain is divided into 4 classes by the "Bone and Joint Decade Task Force" on Neck Pain and the "Global Spine Care Initiative".[6] A review of study which was conducted on office workers present 42%-69% Suffering with neck pain and 34%-49% are those who developed new onset of neck pain every year.[7]. It is estimated in another study and showed that 20% - 70% of population have neck pain.[8] Another study results showed Neck pain with mean results of 7.6%-point pervasiveness (having range of 5.9–38.7%), annual prevalence is 37% (range, 16.7–75), and lifetime prevalence is 48.5% (range, 14.2–71%).[9] Following the spread of Corona virus, which began in Wuhan on December 31, 2019.[10] The world has turned to relying heavily on technology in all fields, and one of the most important field that is making extensive use of technology is education field. The kingdom of Saudi Arabia decided to make education completely distant learning during covid-19 pandemic. And because there is no study

conducted at Saudi Arabia to determine the relationship between distant learning and neck pain during covid-19 pandemic especially among medical students, thus we aim to assess prevalence of neck pain for specific Group and time.

## 2. MATERIALS AND METHODS

### 2.1 Study Design

This will be a study based on observations with cross-sectional sample conducted in Saudi Arabia on medical students. The data will be collected through online questionnaire.

### 2.2 Subject

Participants, recruitment and sampling procedure. Our target population include all medical students either male or female suffering from neck pain in Kingdom of Saudi Arabia during the period of distant learning due to the Covid-19 pandemic. Sample size: Total Number of medical students in KSA (26126) , Confidence level 95% and margin of error 5%. The sample size 379 was estimated using the Qualtrics calculator. Inclusion criteria: Medical students in kingdom of Saudi Arabia who were suffering from neck pain either male or female. Exclusion criteria: non-medical students, medical students without neck pain, medical students who refuse to participate.

### 2.3 Data Collection

Data collection was done in the form of the participants' responses to the questions. The questionnaire included demographic features such as age, gender, and academic year. The participants were asked about neck pain during

the period of Covid-19 pandemic and asked their impression about bad effects of excessive usage of technology on their life. Medical students had the information using online questionnaire

## 2.4 Statistical Analyses and Sample Size Calculation

Data was added in computer with the use of "Microsoft Office Excel Software" program (2016) for windows. Data was then shifted to the Statistical Package of "Science Software (SPSS) program", "version 20 (IBM SPSS Statistics for Windows", "Version 20.0. Armonk", "NY: IBM Corp.)" to be statistically analysed.

## 3. RESULTS AND DISCUSSION

A total of 2071 participants were a part of study. Most of them are female  $n=1509(72.9\%)$  and least of them are male  $n=562(27.1\%)$ . The minimum age of participant was 18 years old  $n=61(2.9\%)$ , 19 years old  $n=210(10.1)$ , 20 years old  $n=393(19\%)$ , 21 years old  $n=454(21.9\%)$ , 22 years old  $n=345(16.7\%)$ , 23 years old  $n=320(15.5\%)$ , 24 years old  $n=156(7.5\%)$ , 25 years old  $n=78(3.8\%)$ , 26 years old  $n=24(1.2\%)$ , 27 years old  $n=11(0.5\%)$ , 28 years old  $n=5(0.2\%)$ , 29 years old  $n=4(0.2\%)$ , And the maximum age was 30 years old  $n=10(0.5\%)$ , Mean age was (21.54). According to academic years classification, First year students  $n=126(6.1\%)$ , second year  $n=357(17.2\%)$ , third year  $n=499(24.1\%)$ , fourth year  $n=444(21.4\%)$ , fifth year  $n=324(15.6\%)$ , sixth year  $n=321(15.5\%)$ . The majority of participant had suffered from neck pain  $n=1386(66.9\%)$  whose included in our study. Most of them had noticed exacerbation of neck pain during COVID-19 pandemic  $n=1002(72.3\%)$ , where  $n=384(27.7\%)$  had same pain before and during pandemic. [Table 1].

Most of neck pain cases occurred with third year students  $n=325(23.4)$ , and second common cases occurred with fourth year students  $n=302(21.8\%)$ , and the least common cases of neck pain occurred with first year students  $n=87(6.3\%)$ . The percentage of those whose think that neck pain is caused by use of electronic devices was  $n=1140(82.3\%)$ . The electronic devices used by medical students

were arranged from most used to least used, Tablet  $n=593(42.8\%)$ , Mobile phone  $n=442(31.9\%)$ , Laptop  $n=318(22.9\%)$ , Desktop  $n=33(2.4\%)$ . Most of medical students were completely relying on electronic devices by (100%)  $n=649(46.8\%)$ , and  $n=388(28\%)$  were relying on electronic devices by (70% to 90%), and  $n=234(16.8\%)$  were relying by (40% to 60%),  $n=95(6.9\%)$  relying by (1% to 30%), and a number of students who did not rely on electronic devices were  $n=20(1.4\%)$ . Most of the academic years had been affected by electronic devices on lowering their educational levels: Third- and fourth-years students by  $n=627(45.2\%)$  of total academic years. The most common neck position among medical students while using the devices was (30 degree) by  $n=510(36.8\%)$  of total students, and second common position was (45 degree) by  $n=423(30.5\%)$ , and (15 degree)  $n=290(20.9\%)$ , and (60 degree)  $n=137(9.9\%)$ , least common neck position was (0 degree) by  $n=26(1.9\%)$  of total medical students. [Table 2].

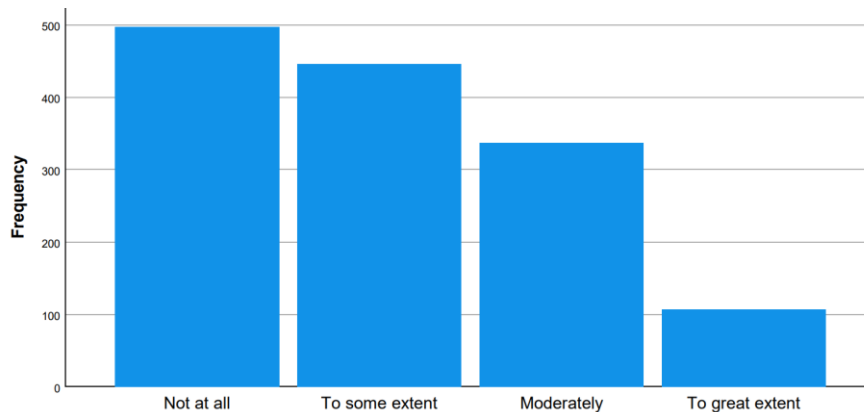
When we asked the participants about how many hours perday they spend on using electronic devices for activity other than study majority of them  $n=997(72\%)$  using electronic devices from one hour to five hours daily. Non educational activity showed variety from student to another students, but most of them  $n=291(21\%)$  use electronic devices for Shopping and social media and also for watching movie and playing video games. The methods used to get rid of pain showed variety, most of students used rest to get rid of neck pain  $n=879(63.4\%)$ , and  $n=239(17.2\%)$  used physical therapy,  $n=175(12.6\%)$  used medication, and least way used get rid of pain was compresses  $n=93(6.7\%)$ . The majority of participants have noticed change in their lifestyle to some extent  $n=610(44\%)$ , a small percentage  $n=63(4.5\%)$  had neck pain to great extent effect, while  $n=290(20\%)$  of students had a moderate effect,  $n=423(30.5\%)$  they said there's no effect of neck pain on their lifestyle. As a result of our question about the emotional impact of neck pain, for example in the form of experiencing sadness, frustration or anger, the answer of the participants was show different variables: the highest variable has no effect on neck pain and the other variables come in order from least effect on neck pain to highest. [Fig. 1].

**Table 1. Have you noticed the exacerbation (increase)of neck pain during the COVID-19 pandemic?**

		YES	NO	Total	P value
Gender	Male	219(64.8%)	119(35.2%)	338(100%)	>.001
	Female	783 (74.7%)	265(25.3%)	1048(100%)	
Academic year	1	58(66.7%)	29(33.3%)	87(100%)	>.001
	2	187(77.3%)	55(22.7%)	242(100%)	
	3	243(74.8%)	82(25.2%)	325(100%)	
	4	233(77.2%)	69(22.8%)	302(100%)	
	5	131(61.8%)	81(38.2%)	212(100%)	
	6	150(68.8%)	68(31.2%)	218(100%)	
Type of device	Mobil phone	262(59.3%)	180(40.7%)	442(100%)	>.001
	tablet	483(81.5%)	110(18.5%)	593(100%)	
	laptop	241(75.8%)	77(24.2%)	318(100%)	
	desktop	16(48.5%)	17(51.5%)	33(100%)	
Proper way to get rid of pain	medication	132(75.4%)	43(24.6%)	175(100%)	.501
	Physical therapy	177(74.1%)	62(25.9%)	239(100%)	
	compresses	63(67.7%)	30(32.3%)	93(100%)	
	Rest	630(71.7%)	249(28.3%)	879(100%)	

**Table 2. The most common neck position among medical students while using the devices**

Degree of curvature of the neck	Yes	No	Total	P value
0 degree	19(73.1%)	7(26.9%)	26(100%)	.003
15 degrees	183(63.1%)	107(36.9%)	290(100%)	
30 degrees	380(74.5)	130(25.5%)	510(100%)	
45 degrees	315(74.5%)	108(25.5%)	423(100%)	
60 degrees	105(76.6%)	32(23.4%)	137(100%)	



**Fig. 1. Do your neck problems have an emotional effect on you, for example in the form of experiencing sadness, frustration or anger?**

**4. DISCUSSION**

The objective of this study was to evaluate the Pervasiveness of neck pain in the medical students during Corona Virus pandemic and also the bad impact of technology on medical students' life. It aims to assess a relationship between the harm of electronic devices and the increase in neck pain for "medical students".

Although researchers have explored numerous features of musculoskeletal pain and it's etiology, neck pain among medical students was poorly addressed in the literatures. Complaint for the pervasiveness of neck pain was relatively high in our study population. In our study, the prevalence of neck pain was 66.9%, which is higher than to study was done in Sri Lanka (56.9%) [11], and those which were made in

United States (4.4%) [12]. These variations in prevalence rates may be related to many contributing factors (time of study conducted, specialty, work of participants and their educational level). Addressing to gender consider as a high importance and it is necessary to compare previous research in this aspect, as it is possible to find a relationship between gender and neck pain in various fields, cultures and people, some of which support our research and others contradict it. The majority of participants in our study are female (72.9%) and male (27.1%) which was in line with prior report (59.7%) for female and (40.3%) for male [13], but differs from other studies that reveal female percent (54%) while male (56%).[14]

As we mentioned before about the importance of gender in our research related to neck pain, age is no less important in that, especially since increasing age is an important factor in increasing the problems of the neck in particular and the spine in general, but our focus was on medical students and their age groups, and the result was as follows: Mostly in our study the minimum age was 18 years old and maximum age was 30 years old, neck pain was commonly affected age 20-23 years old (72%), we suspect a low correlation between age and severity of neck pain because the students age (20-23) were most participants in our study. However, neck pain is not a new problem and it's widely distributed among all population especially medical students. The causes are showing variety. Electronic devices are at the top of the list of causes of neck pain, as this was reflected in the results of our study and its comparison with previous studies. We found (82.3%) of participants who think that the neck pain was caused by the use of electronic devices, which is higher than percent (72%) that previously reported. [15] The difference in the electronic devices used for study in our research and previous research gave different results and indications between the time and place of the study. The type of device used by participants in many researches showing variety, the most common type of device selected in our study were Tablets (42.8%), and least common were Desktops (2.4%) which contradicts with other study that showed Desktop (76%).[16] In Islamabad Pakistan, there is high prevalence of neck pain in those used Laptops(69.6%).[17] As we mentioned previously, electronic devices have a large and important role in neck pain, especially at this time, with the great reliance on them during the spread of the Covid-19

pandemic and distant learning. And we find in our research, compared to previous research, a direct relationship between the increase in the number of hours of work and study by relying on electronic devices with an increase in the chances of neck pain, with a difference between the number of hours as we will explain shortly, Number of hours of daily electronic device use, we found in our study (69.9%) of students spend 6-12 hours, while in different study (58%) spend 5-6 hours. [18]The ways to get rid of neck pain differ in general, but they are summarized in some ways, such as rest, compresses, physiotherapy, pain relievers, but the largest share was in the appropriate way to get rid of neck pain and return to work and study in our research is rest as shown below the most proper way to get rid of pain in our selected sample was Rest (63.4%), while showed in other study (58%).[19]

## 5. CONCLUSION

A high Pervasiveness of neck pain in the medical students during COVID-19 pandemic has been observed. Most of medical students noticed increase of neck pain during the period of pandemic. Majority of them were completely relying on electronic devices for their education. The increasing prevalence of neck pain is making students to develop high risk to many diseases in the future. Thus, it should be mandatory to make 10 minutes break for each 50 minutes of study or 5 minutes for each 25 minutes in order to change neck and body position, for the purpose of preventing the neck pain.

## CONSENT AND ETHICAL APPROVAL

This study was approved by Health Services Department for Armed forces, Scientific Research Centre and Research Ethics Committee with IRB No.H-02-T-078. Written consent was received from all participants, after the brief demonstration about the objectives of the study and also the contents of this Questionnaire. The raw data and identity of the patients were kept confidential which include personal information.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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