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RESEARCH ARTICLE

Frequency and severity of neck pain among undergraduate students using screen devices

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ABSTRACT

Background: Screen use time has been on the rise among the students, which has detrimental effects on their health. One of the most frequent complaints from users is neck pain that predisposes individuals to functional limitations and persistent pain, which may result in poor academic performance.

Objective: To determine the frequency and severity of neck pain among undergraduate students using screen devices.

Methods: A descriptive cross-sectional study was conducted at Bashir Institute of Health Sciences from June to October 2022. A sample of 80 students was selected using the non-probability convenient sampling technique to evaluate the relationship between screen device usage and neck pain. The participants were the undergraduate students, both male and female with age ranging from 18 to 25 years. Data was collected using a self-structured questionnaire and Numeric Pain Rating Scale and was analyzed by SPSS version 25.

Results: The findings showed that a substantial proportion of participants, specifically 71 (88.75%) reported experiencing neck pain at least once during or after device use. Moreover, the frequency of neck pain was found to be 73.8% annually, 43.8% within the last month, and 22.5% at the time of assessment. Moderate pain intensity was reported by 41 (51.3%) participants, while 22 (27.5%) reported mild pain on the Numeric Pain Rating Scale.

Conclusion: The study concluded that neck pain is frequently reported in students using screen devices with the majority having moderate level of pain severity.

Key words: Musculoskeletal Pain, Neck Pain, Students, Undergraduate.

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Introduction:

The number of people who own handheld gadgets and devices is rapidly increasing.(1) Over the past few years, the progress of technology has significantly improved and empowered individuals' ability to use digital screens, resulting in a faster pace of global transformation. These innovative technologies are present in every facet of our lives, providing improved opportunities for entertainment, education, and work, thus raising overall living standards.(2-4) Pakistan, a nation boasting a substantial count of internet and mobile data consumers, has likewise observed this pattern, with more than 64 million individuals utilizing the internet and 62 million subscribers to mobile data services.(5) Earlier research has indicated that the typical duration of screen exposure per day is below 2 hours; however, this has dramatically increased over the past decade.(6) In recent years, the growing utilization of electronic devices with screens has emerged as a source of worry, as it is connected to adverse health effects. This not only gives rise to ocular issues like eye fatigue, blurred vision, dryness, and redness but is also associated with musculoskeletal problems.(7-9) Musculoskeletal pain poses a significant challenge for millions of individuals in both developed and developing countries, causing considerable impairment and hardships. This type of pain can affect people of all age groups, significantly impeding their ability to function, perform tasks, and achieve productivity.(10) Neck pain, low back pain, and shoulder pain has increased noticeably in occurrence over the past few years.(11) Neck, shoulder, and upper limb pain has been linked to reduced educational achievements and higher rates of absence from university classes.(12) Musculoskeletal issues are prevalent among

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undergraduate students, primarily caused by the continual and repetitive movements involved in internet usage, social networking, studying, and documents making.

Neck pain refers to any sensation of pain, soreness, or discomfort experienced within the region extending from the occiput to the first thoracic vertebra, occurring within the past 12 months.(13) A hypothesized explanation is that prolonged screen time activities produce continuous muscle tension, which can lead to musculoskeletal pain if not addressed in time.(14) Forward head posture while using electronic devices has been recognized as a risk factor in studies.(9)

Subjecting the cervical spine to different degrees of forward flexion imposes considerable stress on it, potentially resulting in early wear and tear, degeneration.(15) The user's static motion decreases blood circulation, stops nutrients from reaching muscles, and causes mild weariness and soreness. Previous cross-sectional research studies have shown that device usage patterns, such as length, break frequency, and activity categories, have an impact on symptoms. But no study has provided the evidence related to both the frequency and severity of neck pain among undergraduate students using screen devices. So, this study aimed to determine the frequency of neck pain along with its severity associated with usage of screen devices among undergraduate students.

Methods:

A cross-sectional study was conducted at Bashir Institute of Health Sciences from June 2022 till October 2022, Open Epi sample size calculator was used and a sample of 80 undergraduate students was selected through non-probability convenient sampling technique based on inclusion (both Genders, age ranging from 18 to 25) and exclusion (history of neck surgery, discogenic pain, use of pain medications) criteria. The study was reviewed and approved by the Institutional Review Board and Ethical Committee for Clinical Research of Bashir Institute of Health Sciences (Letter reference No. B1-86/DPT-2022). Informed consent and confidentiality agreement was signed prior to enrollment of participants in the study.

Data was collected from students by using self-administered questionnaire adapted from Nordic Musculoskeletal questionnaire which included demographics, screen usage questions, pain prevalence questions including lifetime prevalence, annual prevalence, last month prevalence and point prevalence.(16) To assess the severity of the pain, Numerical pain rating scale was administered. Questionnaires were distributed among students and the responses were collected by hand. For descriptive analysis frequency and percentages, data was analyzed through Statistical Package for Social Sciences (SPSS version 25).

Results:

The demographic data showed that out of total 80 participants 36 were males and 44 were females with a mean age of 21 years. (Figure 1). Out of total 80 participants, 71(88.75%) had pain in their neck once in lifetime after screen device use, while 9(11.25%) reported no pain ever. The lifetime frequency of neck pain was found in 88.75% participants. Out of 71 participants who showed positive response regarding neck pain after screen use once in lifetime, 59(73.80%) reported pain in the past 12 months. Annual neck pain frequency was found in 73.8% participants. 35 out of 59(43.80%) participants who reported pain in previous 12 months also had pain in the last month during or after screen device use. 18 participants also reported pain at the time of assessment which shows point occurrence of 22.5%. (Figure 2)

Severity of neck pain assessed through Numeric Pain Rating Scale of 0-10, where 0 depicts no pain and 10 being the worst pain. Results showed that out of 80 participants,9 had no pain, 22 had mild, 41 had moderate and 8 had severe pain ($M=1.60 \pm 0.821$). (Figure 3)

Results also showed that majority of the participants, i.e., 90% reported mobile phone as their most commonly used screen device followed by laptop and tablet users. Analysis of the screen usage patterns revealed that 48.8% of the participants reported a daily usage exceeding 5 hours. The predominant purpose for which the device was used was leisure reported by 45% participants. Furthermore, the most adopted posture during the screen device usage reported by 48.8% participants was lying, followed by sitting, walking, and standing. 37.5% of the participants also reported that they change their posture every 10 minutes while using the screen devices. (Table 1)

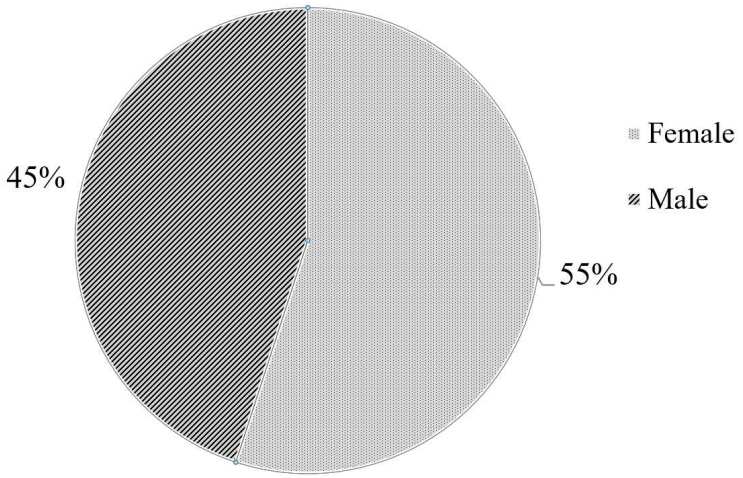

Figure 1. Pie chart showing gender distribution of participants

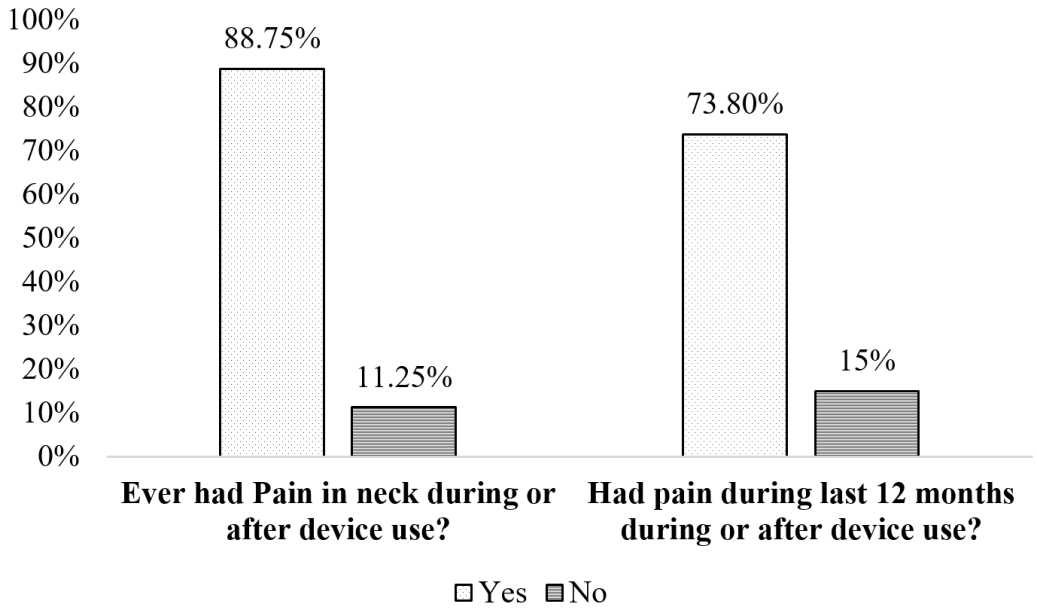

Figure 2. Bar Chart Showing Lifetime & Annual Occurrence of Neck Pain among Screen Device Users

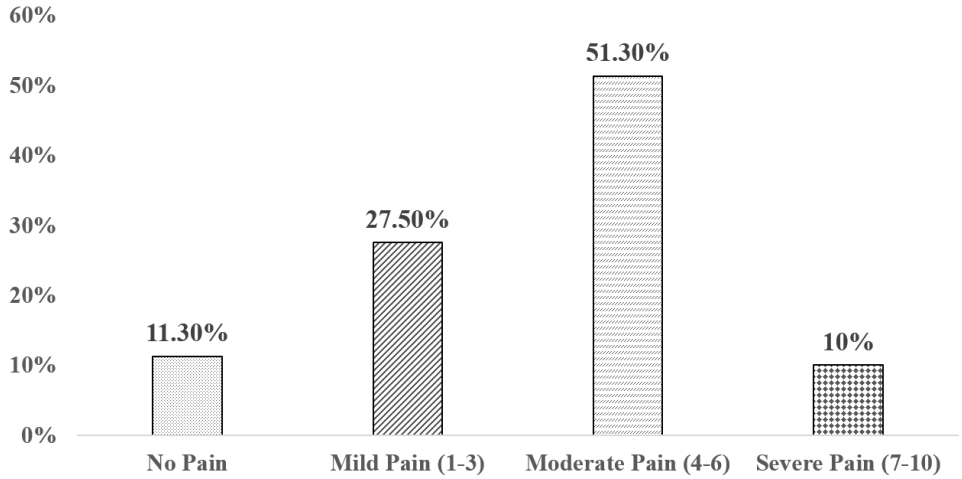

Figure 3. Bar Chart Showing Neck Pain Severity among Screen Device Users

Table 1: Frequency and Percentage of Participants in Relation to Type of Screen Device, Purpose, Duration, & Posture.

Variable		Frequency	Percentage
Most used screen	Laptop	7	8.8%
	Tablets	1	1.3%
	Mobile phones	72	90.0%
Duration of device usage (per day)	1-2 hours	4	5.0%
	2-3 hours	4	5.0%
	3-4 hours	16	20.0%
	4-5 hours	17	21.3%
	>5 hours	39	48.8%
Purpose of device use	Work	6	7.5%
	Education	21	26.3%
	Leisure	36	45.0%
	Others	17	21.3%
Posture during screen use	Sitting	30	37.5%
	Standing	3	3.8%
	Lying	39	48.8%
	Moving around	8	10.0%

Discussion:

The results of the current study showed that neck pain is frequent among undergraduate students using screen devices and 48.8% of subjects have screen device usage of more than 5 hours a day. The pain severity for most of the participants falls under moderate level followed by mild level on numeric pain rating scale.

In 2019, a cross-sectional study was carried out by Sileshi Ayhualem et al at the University of Gondar in Ethiopia, focusing on individuals who use smartphones. A self-administered questionnaire based on a modified version of the Nordic Musculoskeletal Questionnaire was used to collect data from university students. The findings of the study indicated that approximately half of the participants reported experiencing neck pain within the previous 12 months, and the majority of students used smartphones for more than six hours daily.(16) Although the study has larger sample size but no evidence was provided regarding the severity of pain, The current study was aimed to find the frequency of neck pain as well as it's severity among all screen device users, including same age group students, and data was collected through a self-structured questionnaire and Numerical Pain Rating Scale. Result showed that more than half of students had neck pain after screen device usage and screen usage of 48.8% participants was > 5 hours a day.

Siao Hui Toh et al conducted a cross-sectional survey on the association between the use of touch screen devices and musculoskeletal symptoms and visual health. Adults who completed an online survey were enrolled in the study. Using a modified Nordic musculoskeletal questionnaire, participants reported pain or discomfort in the neck/shoulder, upper and lower back, and wrist/hand areas.. The questionnaire also inquired about symptom prevalence in the past month. The study findings revealed that the highest occurrence of symptoms was observed in the neck/shoulder region, with a prevalence rate of 42.4% in the previous month. Among the participants, mobile phones were the most frequently used device, with a maximum usage time of 12 hours per day.(17) The current study also showed that mobile phones were the most frequently used screen and overall usage was more than 5 hours per day and 43.8% students had neck pain in the last month.

In 2015, Betina Blair et al conducted a cross-sectional study at the University of Nevada Las Vegas with the aim of determining the occurrence and factors contributing to musculoskeletal symptoms in the neck and shoulder among individuals who use touch-screen tablet computers. The study included a varied range of participants, including university students, staff,

teachers, and alumni. The data of participants was gathered via an online survey. The findings revealed that the prevalence of symptoms experienced during tablet use was 67.9%. The majority of symptoms were reported in the neck region (84.6%), with 42.5% reporting aching or pain. The severity of discomfort was primarily categorized as moderate (rated between 4 and 6 on a pain scale), accounting for 55.4% of cases.(18) While our study only focused on undergraduate students as study participants and showed results where neck pain was frequently reported in the undergraduates and 51.3% participants had moderate level pain.

Helle K. Falkenberg et al conducted a research project examining the effects of tablet and mobile phone usage on eye strain, headaches, and musculoskeletal symptoms in a group of healthy teenagers. The study involved visually assessing participants and administering a questionnaire to identify musculoskeletal symptoms. The findings revealed that the most frequently reported symptoms included fatigue in the eyes, discomfort in the neck, and a general feeling of unease. A considerable number of participants experienced neck pain linked to the use of electronic devices.(19) Our study also showed that most of the participants had neck pain after screen device usage.

The findings of study emphasize the need for reduction in screen device usage, postural education and teaching of proper ergonomics. Furthermore, the study also provides an insight to physiotherapists and orthopedists regarding risk factors and the population susceptible to neck pain.

This study was conducted on a small sample size exclusively taken from a single educational institution which constrains the generalizability of the findings. A cross-sectional study design captured data at a single point in time, which makes it challenging to establish causal relationships between screen device use and neck pain. Conducting longitudinal studies in future is suggested that would provide more insight into how changes in device use over time correlate with changes in neck pain. Various confounding factors that contribute to neck pain among undergraduate students, such as ergonomics, physical activity, sleep quality, and stress levels were not taken into account in this study. The data in the study relied upon self-reported information, therefore individual biases cannot be ruled out.

Conclusion:

Neck pain is frequently reported among undergraduate students using screen devices. Pain severity was found to be of moderate level followed by mild level on Numeric Pain Rating Scale.

Disclaimer: Article is a part of undergraduate thesis of DPT degree program.

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Khan HM: Conception of idea, collection of data and data analysis
Javed A: Conception of idea, writing of manuscript, interpretation of data, editing and revision
Tariq S: Data analysis, writing, interpretation and results, drafting of tables, draft editing with critical revision until final
Naeem M: Revision of manuscript
Naveed Z: Data collection and entry
Saleem S: Data collection
Hamza A: Data collection