

Research Article	Pak-Euro Journal of Medical and Life Sciences	
DOI: 10.31580/pjmls.v7i2.3037	Copyright © All rights are reserved by Corresponding Author	
Vol. 7 No. 2, 2024: pp. 299-306		
www.readersinsight.net/pjmls	Revised: June 27, 2024	Accepted: June 29, 2024
Submission: April 13, 2024	Published Online: June 30, 2024	

THE IGNORANCE OF ERGONOMICS; DIGITAL LIFESTYLE IN COVID-19 PANDEMIC AMONG UNIVERSITY STUDENTS IN PAKISTAN



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Abstract

The emergence of the COVID-19 pandemic has catalyzed a global paradigm shift towards digital-centric lifestyles, precipitating a myriad of discomforts and health challenges among students attributed to aberrant body postures. This phenomenon is particularly pronounced in developing nations such as Pakistan, where the widespread adoption of electronic devices was not previously ingrained. The present study endeavors to ascertain the prevalence of back and shoulder pain and related maladies stemming from digital lifestyle adaptations during the COVID-19 era among a cohort of 500 university students in Pakistan. The findings underscore a conspicuous absence of adherence to ergonomics principles in digital device usage, correlating strongly with discomfort and suboptimal handling practices. Consequently, the present study elucidates a heightened susceptibility among students to develop neck and back pain, predisposing them to cervical complications. It is pertinent to note, however, that while online learning and living (OLL) during the pandemic serves as a significant contributor to these health hazards, other factors may also play contributory roles. Further investigations are warranted to comprehensively delineate these multifaceted influences on student well-being in the digital age. The outcome revealed the conclusion of zero following of ergonomics observed as responsible factor for discomfort and unhealthy way of digital handling and therefore outcome of study showed high jeopardy of students suffering from neck and back pain leading to cervical complication.

Keywords: Back Pain, COVID-19, Digital Lifestyle, Ergonomics, Laptops, Shoulder pain

INTRODUCTION

Being declared as a Global Pandemic on in 2020 (1), the novel COVID-19 took the planet with terror as scientists and physicians worked day and night to find a potential cure. As a necessary measure, the governments throughout the world imposed lockdowns and reduced public exposure (2). Accordingly, most, if not all, of the activities around the world were switched to digital platforms (3) and people began working from their homes, effectively shielding themselves and their families from the raging disease. Among these industries, educational activities were also moved to networking platforms, and classes, exams, and symposiums were held worldwide via telecommunications. Many people, primarily those over the age of forty, found it challenging to assimilate to the world's new digital lifestyle (4).

The Covid-19 pandemic has caused a crisis that had impacted lifestyles regardless of age, racial, or socio-economic variables. With many states closing schools for the remainder of the academic year, students and their families have entered into a new, uncharted territory of digital/remote learning and that was a rapid implementation with little preparatory experience for both the students and educational workforce. In addition, there is great variability in how this teaching and learning was occurring across the nation. Some institute and universities were conducting multiple daily classes via video conferencing, while others were using a more asynchronous approach with posting of assignments with little direct teacher-student contact. Consequently the emergency implementation of OLL came out with unidentified hurdle as like internet



service issues, lack or zero experience of online resources and after sometime the neck, shoulder pain and cervical issues were observed among the population observing OLL due to not following the ergonomic rules. Therefore, it was found necessary to have a comprehensive study to investigate this health hazard, while constant usage of IT gadget usage among university students during the pandemic. And at that period, a simple guideline of good ergonomics practice was essentially needed to develop as a tool to increase the students' knowledge on the importance of maintaining good posture while using IT gadgets to prevent them from any posture-related pain or injury in the future. Whereas, during the pandemic, increasing COVID-19 cases a psychological element of fear, anxiety, depression and overexposure of negative information stopped the instinct for self-protection of getting infected has indirectly confined students to stay in-house and spend more time on the computer or their smart phones. On the other hand, the unintended use of technology, such as longer screen time with improper ergonomics posture, caused negative health impacts. The present study was focused to lack of ergonomics knowledge and awareness among students, as to figure out the facts and figure that how COVID-19 has influenced the digital lifestyle pattern among university students and its relationship with ergonomics.

This research aimed to recognize the level of concern that university students have towards the ergonomics of digital devices and their usage. This is because it is perceived that a large number of students are not taking the usage of digital devices seriously in terms of considering their health and safety. This can be seen through the usage of improper and non-ergonomic furniture and poor posture of the user while operating the device.

This research focuses on identifying the digital lifestyle of university students, in terms of device usage and its ergonomics consideration. Therefore, the scope of this research covers university students, from age 18 to 25 years old, who are currently pursuing their studies in the university. The reason for choosing this age group is because it is believed that the level of maturity and responsibility regarding the usage of digital devices of these students is quite significant compared to younger ages.

In a third world country like Pakistan, use of digital telecommunication devices and networking for day-to-day activities was not prevalent before COVID-19 hit the country in January 2020. The penetration of Internet to a common man has increased in the past decade (5) but its widespread use for routine, academic, or office work from home was not prevalent. Keeping with the regulations of WHO and other global bodies, Pakistan also imposed lockdowns and transferred its workforce to the digital lifestyle. While the adults, who were used to working on such devices in their offices and institutions, may adjust quickly to the change, the younger generation found it difficult to engage in classroom and assignment activities online over the Internet as the Education system in Pakistan is still largely manual (6).

Resultantly, it was not beyond comprehension that such population would experience health problems due to over usage of electronic devices. As proper equipment and space were not available to use for the pupils, they surrendered to use the devices in their own ways on beds and sofas, while lying down or bending over, requiring them to maintain improper posture, extending their shoulders and backs at inappropriate angles, slouching, and harmful distance between the glowing screens and their eyes. Unusual body posture is specifically characterized by non-neutral shoulders, elbows, wrists, and pronounced neck extension; such practices are related with musculoskeletal pain (7, 8). Prolonged use of these gadgets and shifting of whole curriculum online also increased the time they would spend on such devices, thus disturbing the sleep schedules too, as they were not allowed outside for any physical activities and mingling either. One study (9) found mental and physical exhaustion to be prevalent in people working from home due to COVID-19, attributing it to the fact that such people had no work-life balance as they were confined to their homes and families. The study by Radulovic reported musculoskeletal pain in two-thirds of their study's participants, following digital life style, with pain in the neck and lower pain being the most prevalent (10). Furthermore, a significant reduction in physical activity in people working from home was reported in a study by Argus & Pääsuke 2021 (11). Because sedentary behavior has an impact on cognition, musculoskeletal hazards are also concerned with cognition and may have an impact on performance. According to Hasegawa longer task times during prolonged sitting of 1.5 hours, are substantially

responsible for lower work performance (12). When compared to other employment situations, extended sitting is associated with higher levels of mental tiredness (13). Higher levels of physical activity, like those experienced during exercise, may have a short-term impact on brain function through an acute physiological response that includes alterations in heart rate, oxygen intake, respiration, and blood flow, including cerebral blood flow. Higher levels of habitual physical activity have been linked, over the long term, to higher levels of cognitive function (14, 15). As a result, prolonged sitting has the potential to impair cognitive function.

METHODS

The cross-sectional investigation for the present research was conducted among undergraduate students of different universities of Pakistani. The participants were asked to complete the provided questionnaire after taking their consensus. They were assured about the privacy of their answers and personal information. The present work was conducted by following the Declaration of Helsinki (16)

STUDY TOOL

The data was collected through the questionnaire designed by considering various studies about the ergonomics. The questionnaire consisted of initial demographic information of the participants covering the following areas: gender, age, education, marital status and current employment status and second part consist of eleven items that include problems and hurdles for handling gadgets during online learning and experiences of pain and discomforts.

SAMPLE SIZE

To determine the factors involve in online learning and the problems in gadgets handling without following the ergonomics guidelines. A questionnaire was created in both Urdu and English. Among total of six hundred participants were agree to fill the questionnaire but only 500 completed the forms. An appropriate time for the filling of questionnaire was given to the participants.

EXCLUSION & INCLUSION CRITERIA

The present target population for the study were male and female both undergraduate students. However, the school, college and postgraduate students were excluded from the study.

STUDY PERIOD

In present study, total 600 questionnaire surveys were distributed; among them 500 forms after subsiding of COVID-19 from June to October 2022. However, the school and college students were exempted from the study.

STATISTICAL ANALYSIS

Data were analyzed using the IBM SPSS Statistics Version 26. The different perceptions regarding posture discomfort due to online learning were calculated through Pearson's Chi-square and the threshold of significance was set at 0.05 for all analyses. The correlation between various factors (gender and age) and the replies was calculated using Chi-squared (χ^2) test.

RESULTS AND DISCUSSION

The study was aimed to investigate the issues regarding physical posture including shoulder pain, backache, sleeping disorders, eye itching complains etc. among university students during online learning in the period of pandemic. The study period was after subsiding of COVID-19 from June to October 2022. The study was cross-sectional and the collected data were analyzed through descriptive analysis.

The study population comprised undergraduate students of different Universities of Pakistan. In this study, 500 survey forms with consent pro forma were distributed among the students using different sources. 500 students participated in this study comprising seven -items (Table I) questionnaire, designed to assess the after effects of OLL.



Table I. Experiences during the online classes in OLL

Items	Pearson Chi Square	Asymp. Sig. (2-sided)
Did you use computer/laptop/mobile/tab or other electronic gadget for online classes on a daily basis?	64.217 ^a	0.000
Do you have a proper setup for the use of your electronic devices? (e.g. Study Table, Posture-Supportive Chair, etc.)	1.216 ^a	0.27
Did you find the use of electronic devices during lockdown period fairly greater than you normally do?	5.390 ^a	0.02
Did you notice behavioral & social change after or during using electronic devices during lockdown period?	153.646 ^a	0.047
Were the devices s difficult to handle	4.586 ^a	0.333
Did the use of electronic devices during lockdown have on your sleep patterns	.087 ^a	0.768
Do you think your use of electronic devices during lockdown period has affected your posture	.951 ^a	0.33
Do you think that during using of electronic devices during lockdown period, your posture was improper or imbalanced (Did you follow Ergonomics?)	6.730 ^a	0.035
Did you take any remedial measures for your pain and stiffness	.626 ^a	0.429
Did you take Physiotherapy for the pain	127.854 ^a	0.656
Did you have to change your medicine to get the desired analgesic effect?	90.280 ^a	0.009

A background study emanates from extensive observations and a thorough literature review on how ergonomics are impacting certain students in the digital lifestyle. The shift of education system into online has pushed individuals to increase understanding of gadgets and software handling along with essential knowledge about ergonomics for efficient working. In order to keep up with recent technological trends and the easy availability of electronic gadgets, students are successful candidates to use them as means to ease their work. A widespread use of information and communication technology during COVID-19 among university students made them to take as our subjects for the present study.

The COVID-19 pandemic was spreading alarmingly quickly throughout the entire planet, and conditions were rapidly deteriorating. Numerous economic, social, cultural, and educational spheres have been significantly impacted by this pandemic. The pandemic opened the door for e-teaching and e-learning to become required, even if ICT (Information and communication technology) tools are widely used in higher education and schools. E-learning was adopted the sole type of education available as a result of the closing of schools and institutions. Interestingly, the COVID-19 epidemic catalysed advances in educational systems around the world. There were several issues with the learning process as a result of the rapid transition from face-to-face to online learning without enough time to plan and prepare teachers and students as well as the necessary hardware and software. Due to the availability of practical training, medical students experienced these issues more frequently than other students. The ability of institutions to retain and attract students as well as the continuation and maintenance of universities are both thought to be significantly influenced by student satisfaction. Student satisfaction is influenced by unique circumstances, elements in complicated structures, students' mental health, and resources that are available (17).

Though there are many positive aspects of technology integration into work, there are still many negative effects that users have not realized.

As much as students realize ergonomics, they always associate the term with the workplace or industrial ergonomics. Not many realize that students to form a considerable section of users who are in desperate need of ergonomics. Ergonomics is actually a customizing technology and task to the user so as to maximize performance and minimize discomfort. Steps taken to improve posture, ability to read and write, manipulating the stuff and the overall environment, and adaptation of the work are some of the ways how the task can be done for a user. When we look at university students, there are essentially not many different ways compared to industrial ergonomics. Steps taken to improve posture and activity when using a

computer are very similar to industrial ergonomics. Task adaptation for students is still improving in ways to do their work to meet present-day technology and ease the work for today's students.

The objective of the study was to conduct and gather data to further understand the impact of COVID-19 on the digital lifestyle of university students in Pakistan, relating to ergonomics. This includes identifying problems faced by students with the increase in screen time, recognizing changes in furniture usage, and relating to the increase in musculoskeletal problems. This research will allow a comprehensive evaluation for understanding the negative changes which were faced, related to ergonomics and how it affected the students. By identifying and understanding these changes, we can better educate people in the future on the dos and don'ts, bringing awareness to any preventative measures, which will reduce the impact of musculoskeletal problems on a large population.

The COVID-19 pandemic is a global crisis which has affected everyone, including university students, who were among the first in Pakistan to be affected. With the majority of the educational systems deciding to continue online courses for the coming years, this study will help identify, understand, and recognize the ergonomic problems which students are facing due to excessive screen time and poor furniture posture, which has led to an increase in musculoskeletal problems.

Despite the fact that e-learning has many educational advantages, however the students' health was observed at high risk specifically, musculoskeletal and nervous system were at high exposures. 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. For the majority of them, technology was their only source of education. Students are becoming more susceptible to a wide range of ailments as a result of the rising incidence of neck pain (18).

In present study, 40 % students experienced some MSD (musculo-skeletal disease) symptoms, since the commencement of online learning in the head, eye, neck, left shoulder, left upper arm, left elbow, left lower arm, left wrist, left-hand fingers, right shoulder, right upper arm, right elbow, right lower arm, right wrist and right-hand fingers. This is the cause of concern as regards the long-term health of the student (19). Thus, educational institutions should provide ergonomic guidelines for the student for using the handheld or laptop device for the online learning process. This should incorporate standard operating procedures (SOP) for different genders.

To cope with the eye strain, the students might be entering into awkward body postures such as bending towards the screen which further aggravates MSD symptoms in other body parts such as the head, neck and right elbow.

Almost all bodily physiologic processes are influenced by posture, which can either have a favorable or bad impact on one's strength, function, performance, and level of total energy. We will experience less weariness and more energy when our bones and joints are properly aligned, which enables the muscles to be used as they were designed to be. In other words, the muscles don't have to exert themselves as much to perform their intended function (20).

Human postural habits have anatomical and physiological limitations, but there are a great many choices, the determinants for which appear to be mostly habitual. This study aims to deal in a back and shoulder pain due to the digital lifestyle in COVID-19 among University students

Through this study we intended to analyze the effects of COVID-19 pandemic lockdown on relative changes in postural habits of individuals, correlating it with the increased technology use and a reduction in levels of physical activity (table-1). Results of the study revealed that during home confinement majority of the university students adopted a sit-down culture with awkward, non-ergonomic positions and experienced various musculoskeletal and other health problems.

A change in the lifestyles of young people during the lockdown may be linked to poor postural habits. Additionally, we were able to explore different exposure-response relationships to draw inferences from technology or screen use and physical inactivity to postural problems and general health (21).

Corona pandemic was an experimental time to explore the effect of postural habits in the home environment. To the best of our knowledge, this is the only study which has explored the postural changes

that have come our way due to long sitting hours during the corona pandemic and its effects on our bodies (22).

In present study, the populations of undergraduate students from different universities were addressed about the experiences regarding digital and online learning. With the onset of COVID-19, almost all the academic institutes switched towards the digital mood and majority opted online learning on purpose.

No doubt the option chosen at that time worked positive and in an excellent way to stop the uncontrolled spread of corona virus and do a vital role in keeping the learning alive. As the hurdles and barriers go along with all the system, similarly the drawbacks were observed with the online, digital learning system as well. However the acceptance for anything matters a lot as the population was not habitual of the system; therefore they found it difficult to opt. During the study outcome, it was analyzed that majority used the digital source for online learning during the pandemic, however, with no proper setup according the ergonomic rules and not all the day and night. This would be fair to say that the frequent use gadgets during the pandemic was not new for the population as the use was common for more recreational purpose and little learning purpose. The present study showed that the majority of the students have inefficient posture patterns and inadequate postural habits. Inappropriate (no ergonomic) behaviors are prevalent among young people. The high frequency of poor postural habits in young people may be linked to a lack of education or insufficient education about ergonomics. In the current context of using digital devices at home, proper ergonomic

Without consistent practice of sitting with appropriate ergonomics for studying in a classroom context, as well as a comfortable home environment with a limited selection of ergonomic support, it may be difficult for students to adopt healthy postural practices during lockdown. The reason behind the scenario is the hypothesis that many of the students' postural habits contributed to the abnormal strain on the musculoskeletal system. All the problems faced by the addressing population, "Students", cannot be underestimated regarding eye irritation, musculoskeletal problems, sleep pattern, frequent use of analgesics to minimize the pain and interestingly the one reason of the entire problem was postural and sitting behavior with zero care and ergonomics.

There is growing evidence that long periods of sitting could be unhealthy. Moreover, there may be a higher chance of musculoskeletal pain and neuro-degeneration. The purpose of the current study was to assess pain and two cognitive function domains after two hours of extended sitting. It was anticipated that throughout this time, discomfort would worsen and cognitive function would decline. There may have been distinct effects on lower vs higher order cognitive function, therefore sustained attention and the more sophisticated cognitive function of problem solving were chosen as cognitive skills expected to be significant for knowledge-based office work. To investigate potential mechanisms driving these projected changes, additional parameters such as muscular fatigue, low back angle, pelvic movement, and mental state were evaluated.

CONCLUSION

The study demonstrated that the participants, showed their negligence about ergonomics when utilizing digital gadgets during online classes. The current study aimed to examine discomfort faced by the students like neck and shoulder pain, muscular stiffness. Additional factors of muscle fatigue, low back angle, pelvis movement and mental state were also measured to explore potential mechanisms underlying these anticipated changes. As it was expected that discomfort may affect cognitive function the correlation between these variables was also explored. The study outcomes concluded with the real fact that ergonomics holds great promise for benefiting all students and enabling them to reach their full potential. This is particularly relevant to meeting the needs of diverse learners and facilitating access to an excellent online education system.

Conflict of Interest:

Authors have no conflict of interest.

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