

# Workplace evaluation of computer users of the medical university; an ergonomic perspective

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## ABSTRACT

**Background:** Computer usage in the workplace had started in 1950 for commercial purposes. The study of environmental factors in the people's workplace is known as ergonomics. It is used to adjust the working stations of people using standard protocol to reduce the stress that affects people physically while spending many hours a day in front of the computer at workplace.

**Objective:** To ergonomically evaluate workplace environment of computer users of the medical university.

**Methods:** A cross-sectional study was conducted on computer users at Dr. Ziauddin University Karachi. The sample size was 100 and the sampling technique used was convenient. Ergonomic Workplace Evaluation questionnaire consisting of questions from an ergonomics perspective was used. The study duration was 6 months (from March 2019 to August 2019). Data was analyzed with aid from SPSS version 21.

**Results:** Results showed that out of 100, 60% participants had problems with physical conditions at workplace with the environment, 69% had a problem with noise, (31% had problems with light due to letting it in during the day, 19% suffered due to equipment. Other 34% stated the cause to be the building number and 13% was due to room. Regarding postural problems, 66% had problems with working stations. The reason of absenteeism was 32% due to working posture, 30% was due to repetitive work, 21% was attributed to Lifting, and 17% was due to other reasons regarding this perspective. In addition, 86% participants responded that their physical work environment contributes to absence due to illness.

**Conclusion:** There is a significant effect of the workplace environment on the performance of computer users at the medical university.

**Keywords:** Career engagement, ergonomics assessment, physical ergonomics, posture, workstation.

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## Introduction:

The study of environmental factors in the workplace of people is known as ergonomics.(1) Ergonomics is characterized as the use of human organic sciences which is used to accomplish the ideal and equally shared division of work for individuals, the advantages measured as far as human productivity and prosperity is concerned.(2) Workstation Ergonomics fits the work environment of specialists by adjusting or updating the job, workstation, apparatus, or

environment. Workstation outlines can have a major effect on office workers' well-being and prosperity.(3) The most commonly diagnosed musculoskeletal conditions are related to neck, shoulders, and back in people at workplace. Moreover, eyes and ears are also affected by the improper lighting and noise effects in the environment of the same.(4) Perhaps, certain normal attributes have been recognized and connected to the prevention of musculoskeletal problems. These incorporate: outline of the workstation, nature of the assignment, requirement of the employment, level of postural requirement, work pace, work/rest timetables, and individual traits of specialists.(5) As far as workplace evaluation of computer user's workstations is concerned, it can cause certain risk and musculoskeletal issues.(6)

Some improper routines of office workers at their offices are sitting in one position for a long time, sitting on a non-flexible seat using of desktop closer than 18" with eye level, seeing the screen in a sufficiently bright

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room, setting useful things out of range, working without occasional breaks, and using a tablet as one's essential PC.(7) According to the study, there is a lack of knowledge and consequently, practices of ergonomics measures is seen in computer users at workplace.(8) Even the individuals who had the information were not ready to deliberately apply this for the avoidance of body pain and disabilities.(9) As reported in the research, the applications of ergonomics are used for the comfort of employees in the working environment are to reduce the potential for injuries, reduce the potential for harm and sick well-being and enhance the execution and efficiency of a safe working environment. These majors can decrease the chances of injury at the workplace.(10)

Ergonomics can prevent and minimize the risk of injury and body pain at work, for example, strain, sprain, and damage to the wrists, shoulders, back, and another office work-related musculoskeletal disorders.(11) Some typical' ergonomic problems found in the workplace are the design of working stations, manual handling of the worker, workstation layout, and daily workload.(12) A study was done which revealed that office ergonomics can reduce lower back and neck aches. The study showed that the application of a participatory ergonomically environment can be a fruitful technique to create and organize ergonomic measures to delay LBP and neck pain.(13) In spite of many workshops done by experts and awareness programs related to ergonomics, the execution of the organized ergonomic measures was lower than expected.(14) Another study was done on the Effect of Setup Configurations of Split Computer Keyboards on Wrist Angle. The study showed that the consequences of this exploration gives physical advisors and ergonomists an arrangement of designs of a split console that they can prescribe to their patients or customers.(15)

The greater need for ergonomics setup is due to the repetitive use of the mouse which can cause an improper wrist position, which hypothetically would diminish the work-related muscular disorders, for example, tenosynovitis in the wrist and carpal passage disorder.(16) Another study was done on workplace ergonomics and it was found that there was a major role of ergonomics for the prevention of workplace musculoskeletal or visual issues.(17) Objective of the study was to evaluate the workplace environment of computer users of Dr. Ziauddin medical university. This study will be helpful in improving the working

environment of computer users which can reduce hazards, and improve the productivity of an employee which results in increased turnover of an organization in the future.

### **Methods:**

This is a cross-sectional study, descriptive in nature, which was conducted on computer users of Dr. Ziauddin Medical University Karachi. The sample size was calculated by using openepi.com software version 3.0 from a prevalence population of 50%. Statistical conditions were a 95% confidence interval and a 5% margin of error. This software estimated a sample size of 100 participants. The sampling technique used was convenient. Ethical approval was obtained from Dr. Ziauddin Medical University, Karachi (BASAR/No. 045541/physio). A consent form from all participants was taken before filling out the questionnaire. The study duration was six months after the approval of the ethical committee from March 2019 to August 2019. Inclusion criteria was computer users working for more than 6 hours a day for 5 days a week as well as health status, as physically stable and exclusion criteria were computer users with diagnosed musculoskeletal disorders, and also surgery, where users who refused to participate in this study were excluded from this study. Problems with physical conditions concerning the working environment included noise and lighting. In this study, a validated questionnaire titled as Ergonomic Workplace Evaluation was used in which questions related to standard ergonomics requirements at the workplace are asked from the participants.(18) The secrecy of participants was maintained. Data were analyzed by Statistical Package for Social Sciences (SPSS) version 21.

### **Results:**

In this study, we considered the working conditions of physically healthy individuals who used computers during their working hours five days a week for more than 6 hours a day. The results showed that 60% of research participants had problems with physical conditions concerned their workplace environment out of 100 respondents and 40% had no issue regarding this as shown in Table no 1.

Out of 100 computer operators, 69% of participants stated that there was a problem with physical conditions concerned with noise while 31% stated there was no issue regarding it as shown in Table 1.

In response to a question regarding lighting problems, 100 computer operators who were study

participants responded that their problem with lighting was caused by letting in daylight at 31%, equipment lighting at 19%, room lighting at 31%, state at 13%. Other 34% is shown in graphical form in figure no. 1.

Regarding the ergonomics conditions of computer users, 66% of participants responded that they had problems with workstation conditions and 34% responded they had no issue with it.

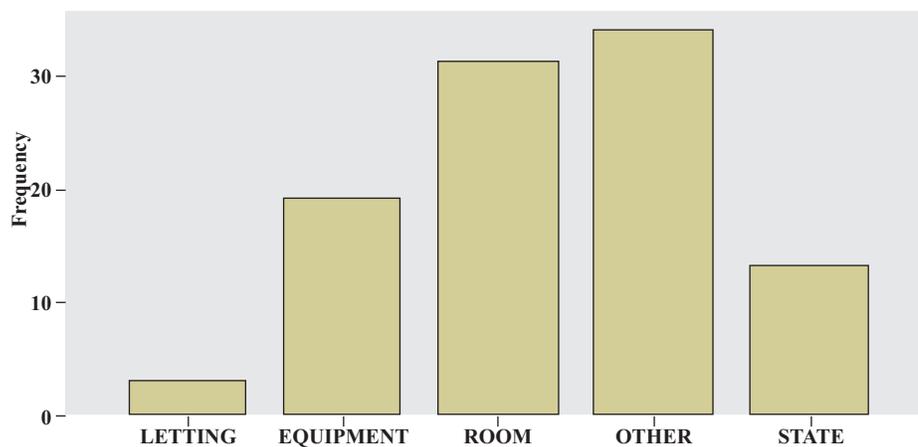
Moreover, for the reason for the absenteeism of the

research, out of 100 computer operators, participants' response was that 32% was due to working posture, 30% was due to repetitive work, 21% was due to lifting, 17% was for other reasons as shown in figure no. 2.

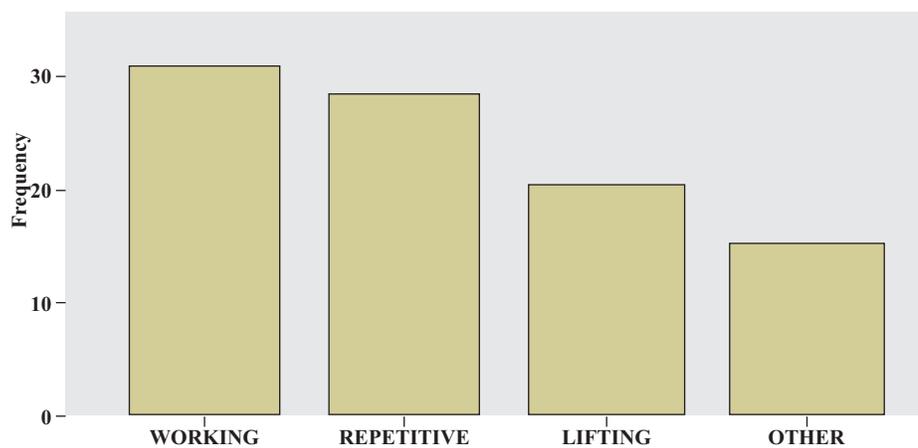
Out of 100 computer operators, 86% of participants responded that their physical work environment contributes to absence due to illness and 14% responded that they had no issue with it.

**Table 1: Response of participants to ergonomic problems**

Variable		Frequency (Percent)
<b>Problems with physical conditions concerned with workplace</b>	Yes	60 (60%)
	No	40 (40%)
<b>Problem with physical conditions concerned with noise</b>	Yes	69.0 (69%)
	No	31.0 (31%)



**Figure 1: Problem with lighting of workplace**



**Figure 2: Causes of problems at the workplace**

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**Discussion:**

A safe and healthy environment at the workplace is very important for the workers because these factors contribute to the performance and motivation of an employee. Pakistan is a developing country, but the safety measures for the promotion of a healthy working environment at the workplace are neglected by employers and employees as well. The increase use of computer also causes harm to users due to prolonged use of desktop screen.

In our study, physical conditions concerned with the workplace caused problems for computer users. In the previous study, Rakhshaan et al demonstrated that a large portion of the respondents was not aware of the standards behind safe working conditions. Furthermore, those workers who had knowledge regarding the ergonomics measure were not ready to apply and follow that can prevent future injury and musculoskeletal problems. In this study, 64% of computer users said that they had an ergonomics problem.(6)

In this study, we showed ergonomic conditions that affects the working conditions of computer users. As reported in the randomized controlled trial study, the most commonly diagnosed physical pains and accidental musculoskeletal issues were seen among computer users.(19)

According to the study, office noise is categorized into four categories: the noise of conversation and speech, equipment, the noise came from the background and installations.(20) Another research revealed that out of four categories of noise, speech has been proven to be the most irritating and divertive. In our study, 69% of computer users stated that had noise problems.(21)

Another study revealed that giving expansive lower arm support with the ergonomically prepared office chair is a powerful measure to prevent abdominal area musculoskeletal issues and reduce abdominal area injury connected with PC work among call center workers.(22) In our study, 60% of computer users had problems with ergonomic conditions at their workplace and a direct effect of job pressure and working environment was seen on the physical health status of an employee. The early stage of musculoskeletal injuries is pain and increase muscle tension which can be caused by the physical, personal, and psychosocial pressures of workers.(23)

Prolonged time duration in front of a computer is also the main cause of improper posture which can also

cause injury to the back. So in this domain, a study reported that the use of a non-ergonomically made chair for a prolonged period is strongly related to low back pain.(24) In the present study, 40% of computer users said that they have encountered MSK problems due to an incorrect ergonomic environment. The workplace should have ergonomically designed working stations in which keyboard height and mouse location allows the wrist to move with the elbow line. The main cause of musculoskeletal disorders is unknown but the multiple factors suggested by the studies can increase the risk, e.g., repetitive activity, improper posture, and prolonged use of computing.(25) In our study, 86% of computer use of stated that they have issues in physical work environments that contribute to their absence of work due to illness.

Awareness sessions should be held in an organization to provide knowledge of ergonomics measures to the employers and employees. In addition, there is a need for ergonomics training at school level to promote a healthy and disease-free environment. Limitations of the study are psychological elements, family background, and household lifestyles of people working in the workplace. These have not been viewed to be the section of this study because they might be contributing element segments to cause any musculoskeletal issue and illness with respect to the job of people in future. So, researchers can work in this domain of a worker that will have an effect on improving the working conditions of an employee according to their needs.

**Conclusion:**

It is concluded that environmental factors including lighting, equipment, rooms, noise, etc. had direct effects on the performance of employees, and ergonomically designed working stations can reduce work-related musculoskeletal problems as compared to non-ergonomically designed workstations.

**Disclaimer:** None to declare.

**Conflict of Interest:** Signatory of ethical approval is also one of the co-authors of study.

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**Author contribution:**

**Jamil K:** Study concept, design and result interpretation

**Baqir SR:** Collection of data, analysis and research writing

**Badar S:** Study concept and result interpretation

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