



**To Study The Impact Of Using Appropriate Posture and Ergonomics In Minimizing
The Muscular Fatigue Felt By Computer Users**

By Sangeeta Malhotra,

Asst Professor in Home Science

Shanti Devi Arya Mahila College ,Dinanagar

Abstract:

Students start using computer at a very tender age of their life i.e. in the age group of 5 to 6 years. They start playing computerized games, searching and surfing on computers, watching animations etc. The vigorous use of computers starts when they enter in higher classes and where they have to make assignments and projects on computers. They were typing on computers for regular 2-3 hours and may be for much more time. The Present study was undertaken to find out the muscular fatigue felt by students and guide them to minimize the fatigue caused by rigorous use of computer for typing . They were using computer for two to three hours regularly. The posture used by them was sitting on ordinary (nonadjustable) as well as on adjustable chair and table while working on computer. Muscular fatigue was estimated by the stress felt during the activity by the students in areas of upper back, neck and upper arms with the help of rating scale. After taking readings by sitting on non-adjustable chair and table, the students were given knowledge about work ergonomics. They were made acquainted with the maintenance of right posture during the work done on computer. Some exercises and Yoga tips were given to them. They were guided to maintain accurate sitting posture when using computers and maintain certain distance from the computer screen which helped them in minimizing muscular fatigue. Students were suggested to use adjustable chair and computer table for working accurately to avoid stress on their upper back, shoulders, neck and upper arm.

Keywords: Computer, Ergonomics, Muscular, Fatigue, Stress, Posture

Introduction:

Work related musculoskeletal disorders (WMSD) are common in computer professionals. Literature says that the occupation which is at the higher risk of neck-shoulder pain is the use of computers. Intensive use of computers in the work station is the major well known factor for the development of work related musculoskeletal disorders, effect on eyesight, blood pressure and heart rate (Dinesh J. Bhandari et al,2007,JasbantaSethi et al 2011). The prevalence of musculoskeletal disorders amongst keyboard users has been reported to be as high as 81% (Garde A.H.et al 2002) Studies have shown that awkward posture is strongly associated with the development of musculoskeletal disorders, effect on grip strength, effect on heart rate and blood pressure (Hjortskovn, Rissen. D et al 2004).

The IT professionals normally sit in table and chair arrangement and the work involves upper limb. Published estimates have indicated that almost 75% of work in industrial Countries are performed while seated, a proportion which strongly suggests a certain degree of importance in studying the science of sitting (Treaster and Marras, 1987). Comparatively, while working on computers one has to adopt an erect sitting posture for developing concentration on monitor and side by side one has to play with mouse and keyboard also. According to Metheny (1952), there is no single best posture for all individuals. The best posture is that in which the body segments are balanced in the position of least ligamentous strain and minimum muscular fatigue. In all manners, the computer users are ignorant about the maintenance of posture while operating computers. Most of the persons are using ordinary (non-adjustable) chairs and tables while working on computers, as it has been observed in IT sector, MNC's , govt. offices and banks. In schools and colleges also, adjustable chair and tables are not provided. Studies have shown that 56% of people use computers in job and 62% persons own a computer at home. Typing on computers, being one of the most necessary, required, time consuming and sometimes disliked activity, if carried for a long time, may demand high physiological costs and danger to health and safety of the worker. The good posture during work does not impair the body and in turn reduces the energy consumption and fatigue to the minimum. A conscious use of energy and posture during work by adopting best suitable posture to their body would spare them to participate in all other activities efficiently and also help them to have sound health and longer life span without any muscular fatigue. The present study was, therefore, undertaken to find out the muscular fatigue felt by students while working on computers, especially during typing, which requires minimum efforts and causes less fatigue to the body.

Specifically, the objectives for the present study were planned as under:

- 1 To measure the muscular fatigue while operating on keyboard and mouse for longer duration of time.
- 2 To see the effect of ergonomics interventions to minimize the muscular fatigue.
- 3 To recommend the posture that causes minimum muscular fatigue.

Material & Methods:

For the present study 100 students were selected. Personal Interview method was adopted to get the information from students who were using computer for typing their projects of course work. They were using computer for two to three hours regularly. The posture used by them was sitting on ordinary (nonadjustable) as well as on adjustable chair and table while working on computer. Muscular fatigue of arms was also judged by the stress felt during the activity by the students in areas of upper back, neck and upper arms with the help of rating scale. After taking readings by sitting on non-adjustable chair and table, the students were given knowledge about work ergonomics. They were made acquainted with the maintenance of right posture during the work done on computer. Some exercises and Yoga tips were given to them. They were guided to maintain accurate sitting posture when using computers and maintain certain distance from the computer screen. Students were suggested to use adjustable chair and computer table for working accurately to avoid stress on their upper back, shoulders, neck and upper arms. Again, after the knowledge of ergonomics students were asked to repeat the typing activity on computer while using adjustable chair and computer table.

Results & Discussion:

Muscular fatigue of arm was noted by asking subjects, that how much stress they were feeling after three hours of working. They were asked about three level of stress and pain felt in upper arm, neck and shoulders i.e. maximum stress, medium stress and minimum stress. A rating scale was made for the stress felt by all students. Smith and Smith (1962) also reported that fatigue from static work is three to six times as great as from lifting. The stress and static contraction of grip muscles is considerably low when the person is working in a convenient posture which reduces the grip fatigue. Decrease in arm's muscular strength was also reported by students when they did the activity of typing on computer while sitting on nonadjustable chair. They felt stress on upper arms, upper back and neck region. Muscular fatigue was also complained by all the students while doing the activity on nonadjustable chair, it also lowered their speed of typing in the last 30 minutes. When students experienced

ergonomics classes and yoga exercises they reported high relief from stress during working on computers. Mary Rudakwych et al (2001) also proved that ergonomic interventions helped a lot in decreasing Muscular fatigue of office workers. Stretching in between the activity, moving their arms and neck in up and down position and in circles relieved them from so much stress caused due to muscular fatigue. They were highly satisfied and relieved when they were working on nonadjustable chair and table. They felt less stress while working on computers. The muscular fatigue was also reported low as compared to nonadjustable chair

Rating Scale of Arm's Muscular fatigue

Postures	Maximum Exertion A	Medium exertion B	Minimum Exertion C
Sitting on non-adjustable Chair	83%	17%	-----
Sitting on adjustable chair	5%	70%	25%

The comparative evaluation of both the body postures was done on the basis of physiological conditions of body including arms and grip muscular fatigue in order to find out a posture that causes least fatigue during the typing activity when using computers. Results indicate that typing on computers while sitting in adjustable chair and table averaged significantly lower values for arm's muscular fatigue for right and left hand when compared with sitting on nonadjustable chair. On the basis of results working on adjustable chair was found to be best posture among both the postures because it has lower values for muscular fatigue of the body.

Conclusion:

From the foregoing results, it can thus be concluded that using adjustable chair while working on computers is the least fatiguing posture and causes minimum stress on neck, upper arms, upper back and shoulders during typing on computer. Ergonomic intervention also played a positive role in minimizing the muscular fatigue. Changing posture in between working hours and movement of arms and shoulder releases stress caused due to static position of body.

References:

- Dinesh J Bhandari, MD, Sushil Kumar Choudhary, MD, and Vikas G Sodhi MSc, 2007, "the prevalence of asthenopia among computer operators and its associations with

various epidemiological factors” The Indian Journal of ophthalmology, Jan-Feb 2008 Vol. 56/Issue No. 1, Page 1-91.

- Dinesh J Bhandari, SK Choudhary, Lata Parmar and Vikas G Joshi (2007)- conducted a “study of occurrence of muscular skeletal discomfort in computer operators” The Indian Journal of ophthalmology, Jan-Feb 2008 Vol. 56/Issue No. 1, Page 1-91.

- Benjamin Amick III (2004) use of Ergonomic Chair, accessed from, <https://www.1wh.on.ca/benjamin-c-ami> , <https://sph.uth.edu/cv/amich.pdf> at 4:30pm 8th Nov, 2017

- Hjortskov, N. Rissen. D. et. al 2004 cardio vascular and subjective stress response to a combined physical and mental work load and effects of rest, accessed from at www.researchgate.net/09e41510677, www.ncbi.nlm.nih.gov/pubmed/14991326 at 4PM 1st Dec, 2017.

- James, G and Scott, P.A (2006) “affects of a standard workstation, designed for ‘average users’, on an anthropometrically diverse sample of computer operators” accessed from [pdfessajournal.com/2006 Vol 18 No. 1/Aug content pro. Seals .ac.za Research article](http://pdfessajournal.com/2006-Vol-18-No-1-Aug-content-pro-Seals.ac.za-Research-article) at 4:30 pm, November 2017

- Jasabanta Sethi, Jaspal Singh Sandhu et al 2011 effect of body mass index on work related musculoskeletal discomfort and occupational stress of computer worker, accessed from www.researchgate.net/scholar.google.co.in at 8PM 3rd Dec, 2017.

- Mary Rudakewych et al (2001) effect of an ergonomic intervention in office worker, accessed from [ergo.human.cornell.edu/NJHFE stalk 2\(PDF\)](http://ergo.human.cornell.edu/NJHFE_stalk_2(PDF)) at 9:30PM 27th Nov, 2017