Computer Injuries and its Prevention in Scientific Ways

HM Arun Kumar*

CEO Supersonic Ergonomics and Typing Research Institute, Researcher in Computer Injury Prevention techniques and Expert Committee Member in Bureau of Indian Standards, Ergonomics Section, Government of India, Bangalore, Karnataka, India.

Corresponding Author: HM Arun Kumar, CEO Supersonic Ergonomics and Typing Research Institute, Researcher in Computer Injury Prevention techniques and Expert Committee Member in Bureau of Indian Standards, Ergonomics Section, Government of India, Bangalore, Karnataka, India.*

E-mail: worldrecordholderarunkumar@yahoo.com

Abstract

Computers are one of the greatest scientific invention to the world. Safety at any workplace cannot be ignored either computers are used in offices, schools or at homes and full time or as part time. This study was taken to study the root cause of computer related injuries among the desktop and laptop users including children. It was studied among the children and adults. A personal survey and a TV LIVE programs was carried out among computer users including children. Hundreds of calls were attended from various media channels and those were invited to the computer injury prevention research centre for studying their pains and to know their style of working. The main findings from the present work showed symptoms such as eye strain, neck pain, back pain, shoulder pain, headaches and pain in the carpal tunnel region were common among computer users including children, even though children used hardly for an hour or two. The pain increased while working on computers to those, who worked for long hours who had unscientifically placed computers and worked with wrong typing techniques without their knowledge.

Materials and Methods: Cross sectional study was conducted among the computer users like software professionals, Government officers of various departments like Police, Income Tax, Commercial Tax and were interacted through a LIVE tv programme and were asked several questions to know the strains while working with computers, they were also invited to the research center for further study and guided them towards safety. A video of every participant was recorded for 30 seconds for evaluating their posture, typing techniques and even eye blinks were counted.

Results: The prevalence of the computer related occupational injuries were reported by morethan 90% of the callers on LIVE tv show in our study. Association of the duration of the computer use, typing techniques while using them and the furniture used was also noted and video recorded. Very few were aware of the seriousness of computer related injuries. Symptoms were with more in people who were not working on 10 fingers with touch typing technique, who worked with wrongly placed computers and with poor sitting posture.

Conclusions: Visual strains, physical strains and mental strain constitute an important part of computer related injuries in the present generation. This shows the seriousness of the issue to be taken by Governments and computer manufacturers in educating the computer users towards prevention, as prevention is better than cure. This unique study has also brought to consider various unknown factors for its contribution, which none has researched till today. An effective way of awareness is required in a multidirectional approach of guiding towards right furnitures and the right technique of typing should be ensured to the user before making them to work on them.

Keywords: Eye Strain; Neck Pain; Headaches; Back Pain; Carpal Tunnel Syndrome; Computer Vision Syndrome; Repetitive Strain Injury; Ergonomics; Typing; Musculoskeletal Disorders And Mental Strain

Introduction

Computers have become one of the greatest scientific invention of the present generation. Every office, educational institutions, software companies, and even houses are equipped with this wonderful machine 'the computer'. Instead of making us to use easier and faster, the work has become harder and strainful, because after the invention, research was not much done on these aspects: a) Placement of the monitor, b) Placement of the keyboard, c) Placement of the mouse, d) Placement of the cpu, e) How to use this machine, f) How should be the furniture including chair. People

started to place them according to their own convenience, availability of space and also started to use it in their own way. Even at schools children have started to learn and use them at a very early age without having any knowledge of how to use them safely. Computer Vision Syndrome is defined by the Author as a stress and strain on the eyes because of the unscientific style of working with them, as there is no course on how to use them. The Author explains (RSI) Repetitive Strain Injury as the injury which occurs when one repeats and continues to work on computers even when they experience strain, thus leading to injury. Author himself was experiencing the strain and hence, started to find the root cause for the stress and strain and could succeed to work without any stress and strain. Since, Author is a World Record Holder by using the same computer which others use, has taken this initiative in bringing an awareness of the same. Prolonged work on computers in unscientific methods leads to dry eyes, burning sensation, redness, headaches and so on. If the working style is correct, any long hours with short breaks should not harm. Non-ocular symptoms occur due to improper placements of the monitor, keyboard, mouse, chair and unscientific way of typing. Apart from these, if a child is working on an adult desk, they are forced to get into non-ocular problems. Vision related problems are the first one to be experienced among the unscientific computer users followed by neck pain, back pain and ofcourse with mental stress. Globally millions are already have become victim of CVS and several millions are in the que, because every year millions are getting introduced at schools and colleges to this machine and made to use without any sort of scientific approach. Children at a very young age are forced to learn without undergoing any sort of safety lessons. Hence, immediate attention is required from education departments and computer manufacturers in including a lesson on computer safety as they have road safety, fire safety and food safety chapters. Since, computers have become one of the essential machine to everybody and is used extensively by all age groups, its now the right time to start an initiative towards safety. Computer Related Injuries will continue to grow unless and until they are not educated about the right furnitures and right working techniques.

The condition is associated by continuous pain and includes swelling, weakness, numbness or restricted movement around the carpal tunnel region. The carpal tunnel gets compressed, when they have either mouse or keyboard on the desk. As such, for people experiencing stress and strain may also face some kind of difficulties in carrying out with normal tasks from their hands. Thus affecting quality of ones life very severely and permanently. According to the published News article in Times of India, Bangalore edition on April 2nd, 2014, there were over 1000 young IT professionals have found themselves unable to independently eat, dress, drive, open doors or hold a tea cup. According to another news article published in Bangalore Mirror, January 23rd, 2008 –

children as young as 5 year old are becoming victim of RSI and loosing the strengths in their hands and are unable to even hold a pencil or a pen, as in many schools the mouse is placed on the desk and they are forced to compress their carpal tunnel. Dr. Deepak Sharan had also mentioned that he was seeing an average of 15 cases in 2008. The furnitures are made in educational institutions without their knowledge about computer injury and now its the time to the Government to bring into their notice and request to modify to save them.

The upgradation at the offices, schools and homes with the modern technology machines 'the computer' without knowing much about the right furniture and any sort of safety training is one of the serious thing to be thought of. Almost every job requires computer at their work. The use of computers in an unscientific manner worldwide is leading to great potential health issues to a major population including children.

The Figure 1 and 2 Shows the strain on the Carpal Tunnel of children because of the mouse placed on the desk.

Figure 1

Figure 2

In the study, a lot of factors have been identified for its development and increase in computer related injuries like congested office space as seen in Figure 3. The Computer Related Injuries can also be caused by the user who has keyboard and mouse on the desk, where they have to lift their elbows to type and thus straining their shoulders. We have found computer users especially in Banks have placed the monitors without their knowledge to one corner and thus keep their neck stressed and twisted for extended hours, resulting with severe neck and shoulder pain to be felt end of the day. Different unscientific styles are leading to different and serious pains. This revolving chair causes lower back pain due to the movement of the chair several times in a day without ones knowledge. At some schools, children are made to sit on stools, which do not have any kind of back to support their backs and hence, end up at the lab with back pain. Coming to the style of typing, if one types just with one finger as seen in figure 4 by at a speed of 40 to 50 characters per minute by looking into the keyboard. They have to move their eye ball from 80 to 100 times and during this time, they have to keep their eyes wide open, getting their eyes completely dried and thus the blinking of eye lids are very less. Whoever, types by looking into the monitor with a correct technique of typing with all ten fingers, their blinking rate is normal and they will not be experiencing any eye strain, neck pain and back pain as seen in Figure 5.

Figure 3: Here, in this type of office, workstation setup is designed unscientifically and is very much congested. Everyday they would be experiencing stress and strain.

Figure 4: Children working on computers in unscientifically designed computer labs and with wrong typing techniques.
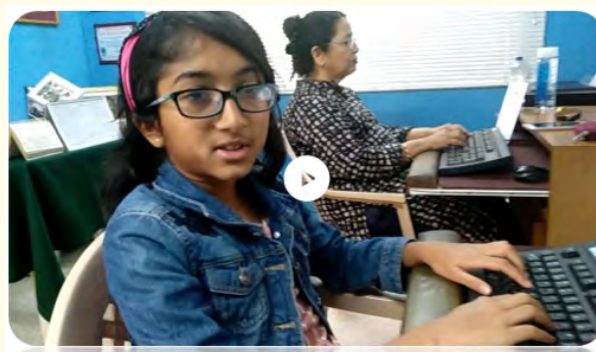

Figure 5

Perfect picture of posture, hands relaxed and resting on a cushion bar. Sitting on a fixed chair by resting their back. Even the typing techniques are perfect and they are typing by looking into the monitor. Keyboard and mouse are placed at the elbow level.

Although different management strategies have been developed to assist workers and supervisors to control such factors contributing to computer related injuries, recent data indicate that the problem still persists. The major findings concluded that the design of the workstation, where the placement of the keyboard and mouse on the desk, long hours of computer use, and unscientific methods of typing increased the risk of computer related injuries. Studies have shown that children and women become victim of computer related injury very soon, as the body is more delicate compared to men. Guiding them the right way towards the prevention should be a priority. Comparing all the existing jobs in the world, it's the computer users who blame that their job is highly stressed one. According to the Author's view its the easiest jobs on earth.

As can be summarised, computer related injuries is associated with a variety of occupations including receptionists, data entry operators, telecommunication workers, software professionals, engineers, doctors, advocates, scientists, writers, as well as school children.

Worldwide several developments have been made to reduce the computer related injury in the IT sector. This is widely seen among software engineers, call centers, bank workers and the number of computer users are increasing drastically and the injury is also expected to increase further in the coming years, if not much awareness and safety training course not taught to them.

Materials and Methods

Participants

Highly placed Government officials like Judges, Police Officers, Film Stars, Scientists, Doctors, Managers and Students including children as young as 3rd grade who used computers at their workplace, schools or at their homes constituted the study population. Participants who were using computers – Desktops and Laptops at their office or homes, who were not having any kind of muscu-

lar pain before they started to work on them were included in the study. The participants were first asked to perform their present style of typing and were asked about the existing furniture at their place. There was a mixture of Desktop and Laptop users among the participants. A 30 seconds of their video was recorded to evaluate their style of working with computers.

Almost, all the participants were experiencing some sort of pain while working on computers within a short span of time. The highest prevalence was eye strain, headaches, neck pain, and lower back pain. Participants were asked to mention about the severe pains end of the day. Majority of the participants complained of eye strain, headaches, back pain, and carpal tunnel pain. A few of the computer users were taking medical leave atleast once in a week. It is worth to note that poor posture caused severe pain at the backs and one could feel only end of the day.

Tingling pain in the wrist was also reported by the participants. This is Carpal Tunnel Syndrome and caused because of resting the wrist on the edge of the desk either while keying or for mousing for long hours. This when ignored, one has to undergo carpal tunnel surgery. This can be solved by placing both the keyboard and mouse in keyboard drawer and attaching a cushion bar in the drawer to rest their hands while working and not while resting.

Many studies also have been blamed that working on computers is injurious to health. A warning message also can be found behind the keyboard. Studies have also included that working on Laptops are much more injurious to health. According to the Author's view its not. In this study, it was found that most of the participants took breaks to stretch and even then, they were experiencing the pain and was because of unscientific styles of working and un-ergonomic furniture. It has been found that a majority of computer users are unaware of any safety tips and are also have no knowledge of scientific way of typing. It was also found that the majority of the participants were not aware of any health and safety precautions on computer use in general and were not aware of any such policies at their current workplace too. This shows the importance of bringing an awareness and educating the computer users including children to work safe and prevent computer injury.

Report of symptoms of computer injury was higher among female participants. The severity may vary from person to person depending on the placement of the computer, furniture and the style of working. In the initial stage of RSI, the pain goes off after they have stopped working. It's only in the advanced stage of RSI the pain to reduce takes more time. Permanent damage may occur to a computer user, if they have not taken any kind of initiative to correct their furniture and adopt right typing techniques which is

missing greatly with majority of the users. The serious sufferer may have difficulties performing other simple activities such as unable to independently eat, bathe, dress, drive, open doors, or hold a tea cup, having developed reflex sympathetic dystrophy as a result of inadequately managed RSI.

Author recommends a tested and proved furniture to be adopted and moreover a feedback of stress and strain from the user everyday at workplace should be recorded and addressed. Such improvement in the working environment involve the need to provide comfortable seating options (fixed chairs), wrist rests, lowered tray for keyboard and mouse to ones elbow level, copy holders, use of laptop stands for placing laptops, users trained with touch typing skill, thus ensuring good working habits to beat the stress and enjoy the work in a smart way with the wonderful SMART machine "the computer".

Results

Different age groups were included in the study from India and abroad. Out of them, even children aged 10 years of age were also included. Among all the participants the eldest person was of 70 years. Almost all the parcipants were experiencing eye strain, headaches, neck pain, back pain and pain in carpal tunnel region. The participants were taught about the right posture of sitting, informed about the ergonomically placing the workstation including laptop. Participants were also trained on10 finger touch typing technique. Thus ensuring everyone to work stress and strainfree. Feedback was also taken from participants and were also informed to report if they experience any sort of stress ands strain in future. Laptop users were made to place the Laptops on the laptop stand. The users were made to use a fixed chair instead of revolving one to feel more comfortable. A 30 seconds video was also taken after the training to ensure each participant were working safe.

Discussion

This major study was taken as Author himself was working in pain and after finding the rootcause, he has started to bring in an awareness and motivate the users to lead a Zero stress and Zero injury at work, as it is possible now.

According to our study we found that people who were using revolving chairs and stools were suffering from back ache and those with the fixed chair were not. In the similar way, the users working by wrong typing technique that is who did by looking into the keys were suffering from eye strain, neck pain and those with touch typing skill, who typed without looking into the keys were not.

The difference in the prevalence rate of computer related injuries in various studies depend upon factors like knowledge and

awareness levels, workstation setup, sitting postures, computer ergonomic factors with the occurrence of symptoms of computer vision syndrome.

Computers are really a wonderful machine to work with and one needs to adopt a scientific approach to ENJOY or END-JOY while using them [1,2].

Conclusion

Computers has now become a part and parcel of our lives and will continue in future. Working at a computer or Laptops, one should be free from any sort of eye strain, tired eyes, burning sensation, dry eyes, blurred vision, and even from non-ocular complaints like neck, shoulder, back pain and carpal tunnel syndrome. Which is caused by multiple factors which include ergonomic factors, individual responses and the time spent by individuals on computer. It has also been mentioned in some journals that the problem of CVS is very new to medical science and is under investigation to explain the mechanism of disease and to find a solution.

Bibliography

1. Blehm C., *et al*. "Computer Vision Syndrome: a review". *Survey of ophthalmology* 50 (2005): 253-262.

2. Shantakumari N., *et al*. "Computer Use and Vision. Related Problems Among University Students In Ajman, United Arab Emirate". *Annals of Medical and Health Sciences Research* 4 (2014): 258-263.

Volume 2 Issue 5 May 2019