Healthy Tips Associated To Computer Use

Sonal Devesh *sonal.devesh@majancollege.edu.om*
Lecturer in Mathematics
Majan University college
Muscat, Sultanate of Oman

Nisreen Al-Bimani *nisreen.bimani@majancollege.edu.om*
Lecturer in Information Technology, Mathematics
& Assistant Quality Assurance
Majan University college
Muscat, Sultanate of Oman

Abstract

A Cross sectional survey design was used to conduct a study, on a sample of ninety students taken from a population of both part time Postgraduate and final year graduate students of Majan College. Non Probability convenience sampling technique was used to select the samples from the population. The exclusive criteria were students with IT major. The questionnaire consists of queries regarding the health effects of computers, ergonomic postures and the precautionary measures to be taken while using the computer. The knowledge level of the students was assessed using a predesigned questionnaire. The subjects were then exposed to a Self Instruction Module (SIM).The SIM included a power point presentation with multimedia clippings of demonstration of exercises regarding ergonomics of computer use. It was mainly related to the precautionary measures and the correct postures to be maintained to reduce health issues caused by use of computer.

The results of the survey showed that the mean of the knowledge score = 7.37 and the standard deviation = 3.37. This proved the need for educating the students on the heath tips and ergonomic postures related to prolonged computer use.

The investigators felt that a practical application of this SIM would create health awareness among them and thus improving the quality of work as well as studying environment.

A similar study can be recommended on students and also employees of other organizations to educate them with the ergonomic guidelines used to prevent health related problems due to extensive use of computer .

Keywords: Self Instruction Module, Computer Ergonomics.

1. INTRODUCTION

Total worldwide computers in-use was 1.67B units in 2011 and is projected to reach 2.55B in 2016.[26] It had taken 27 years to reach 1 billion computers in use and market researchers say it will take only 5 years to reach the next billion.[2].Due to the expanding use of computers among adolescents , concerns have been expressed about their health effects. These health effects may be due to excessive fatigue, eye strain/irritation ,blurred vision, headaches, muscle pain, neck pain, arm and shoulder pain. Musculoskeletal disorders is a primary health concern related to the use of computer. They commonly affect the upper limbs like neck ,shoulders ,arms, hands/wrists, back and lower limbs like knees and hips. This may result in pain, discomfort or numbness and tingling sensations throughout the upper and lower limbs. These effects have a close association with poor body posture and static load on the muscles of the shoulders and neck. Reports of studies have suggested clearly the likelihood of pupils or staff suffering health problems linked to computer use is related to the amount of time spent using them and also lack of knowledge

related to computer ergonomics.[16] There is evidence that these health problems can be reduced through ergonomic approach and education. According to dictionary.com, "Erg-go-nomic is the applied science of equipment design intended to maximize productivity by reducing operator fatigue and discomfort". The students of today use computers for library references, contacting friends by chatting on web, submission of assignments and games during free time. There are students who are working as well as studying. They make use of VDT(Visual Display Unit) not only during their work but also for their studies. Frequent requirement of completion of work before deadlines both in college as well as work place has been the main reasons to spend long hours in front of the computer. As computer and internet use become increasingly widespread, large percentages of the population will enjoy the potential benefits and get exposed to health risks. The important question is whether there is a need for a self instruction module (SIM) on "Healthy tips associated to computer use" to improve the level of knowledge of the subjects.

2. RELEVANCE OF THE PROBLEM

Today's adolescents and children are the first generation to have the privilege to have an access to information communication technology. Increasing popularity of computers have caused concerns on computer related health complaints. As computer technology is becoming an integral part of the education curriculum, careful considerations need to be given regarding the ergonomic design of computer workstations matching with the anthropometric factors of growing children. There is scientific evidence that the computers can adversely affect different anatomical sites of the human body. Both the educators and the students need to be aware of the importance of correct working postures and appropriate work-rest ratios in using computers.[14] Since it is observed that most of the part time students are employed, they spend long period of time in front of the computers both for their studies as well as their work. The need of meeting the deadline, overshadows the thought of discomforts during computer usage. We are only at the tip of the iceberg .An ounce of prevention is worthy of a pound of cure in order to avoid the pain, aches and disorders that millions of people suffer as a result of "Computer Burnout" Hence it is very important that health and safety issues need to be addressed. Even though this is a silent global epidemic, the truth is that it is not being acknowledged. Most companies blindly follow ergonomics recommended by American or European countries, ignoring that the body stature are different across the world. Studies done by Dawood Slaiman Al-Faris regarding the development of Anthropometric data for Omani male population of age group 18 – 60 indicate that the Omani male population in statistical terms are shorter 8 cm compared to many European Industrial or Manufacturing nations. Moreover review of literature reveals that most of the studies on computer users are done in developed countries, very few are done in Oman. Therefore the present study was an attempt to fulfill this gap by making an investigation in this area in Omani context.

3. FIELDS OF APPLICATION OF THE PROPOSED RESEARCH RESULTS

The study results will help many students as well as employees of various fields to create an awareness of the basic principles of compute ergonomics, which may help in reducing the risk of computer related health disorders, thus improving the performance and creating a healthy atmosphere in their work as well as academic field.

4. REVIEW OF LITERATURE AND OTHER EXISTING INFORMATION

Adetuter Ijose(2009) shares her insight into the health issues faced by computer users everywhere having being casualty of serious life threatening complications of computer usage. [23] According to her, for decades people have been ignoring the seriousness of health effects of computer use fearing that this would reduce the use of computers. Thus causing effect on technological advancement. Increased risk of forearm pain was associated with the use of a mouse device for more than 30 hours a week and a keyboard more than 15 hours a week.[19] A study reported that people who work with computer have shown an increased output of 20 to 25% due to ergonomic improvement in workstation layout. [15] The computer workers who received screen alerts to take breaks were 13% more accurate in their work than those who did not as

reported by Hegde (2001). [5] According to Shikdar and Al-Kindi(2007)[14] , 90% of the employees used computers more than 4 hrs a day, 45% of the employees adopted bent and unsupported back postures and the major problems reported were eyestrain (58%), shoulder pain (45%), back pain (43%), arm pain (35%), wrist pain (30%), and neck pain (30%).Sheady (1999) reported that 50-90% of computer users experienced the symptoms of computer Vision Syndrome.[13] Chaffin and Anderson (1991) considered that the seat alone is insufficient for stabilization and the use of the legs , feet and back in contact with other surfaces, as well as muscular forces are necessary to produce equilibrium.[24] New York State United Teachers developed a health and safety fact sheet to decrease computer-related health hazards and measures that can be taken to reduce or eliminate, the chance of suffering from pain, discomfort or a disabling condition due to extensive computer use.[10] A participatory approach was used to create computer ergonomics workshop for college students for solving computer workstation ergonomic problems and adopting healthy computing behaviors. The results of the study justify formal controlled trials of this intervention in university students, who will become tomorrow's workers.[12] Millions of people are suffering silently without even identifying the source of their problem. Thus on the basis of comprehensive literature review, it can be concluded that computer is a marvelous tool and the only solution to the information need. However, using it for a long time has raised many health related issues like overuse syndrome, repetitive strain injuries and commutative trauma disorder. There is a need for students who are employed to be more ergonomically conscious. They have a greater risk of developing health problems in their study as well as work place. Therefore it is advisable for video terminal users to make full use of it in order to get the best from it and avoid potential health problems.

5. STATEMENT OF OBJECTIVES

i. To what extent the subjects were aware of (level of knowledge) of the potential risks associated with computers use.

ii. To associate the knowledge of the subjects and the selected demographic variables.

iii. What were the strategies adopted to deal with health issues with computer use.

6. VARIABLES

a. Gender.
b. In-service training given to staff on computer ergonomics.
c. Years of experience.
d. Number of hours spent on a computer per day.

7. STATEMENT OF RESEARCH HYPOTHESIS

H_1: There is adequate level of knowledge among the respondents.
H_2 : There is an significant association between level of knowledge and the selected demographic variables.

8. RESEARCH METHODOLOGY

A. Summary of Methodology

The study was conducted to:

i. Determine the level of knowledge of the part time students of Majan college regarding computer ergonomics
ii. Develop a structured information module on computer ergonomics.

Based on the availability of the samples, we take the

Sample Size	: 90
Sampling Technique	: Convenience Sampling
Setting	: Majan College

Exclusive Criteria : Students information technology as a major subject

B. Selection of Research Strategies

A survey design was adopted for the study.

i. Description of the tool

The study was carried out by using a structured knowledge questionnaire and the planned teaching programme. The questionnaire consisting of two parts. Tool-1 consists of demographic proforma and Tool-2 consisting of 21 questions related to knowledge, knowledge of practice on computer ergonomics and the most likely health hazards related to long term usage of computer. Each respondent was asked whether they had any information related to these issues, the period elapsed since they began operating with the computer and the time they spent on computers on daily basis. They were also asked if they were involved in little or extensive usage of computers and if they had any knowledge about breaks taken in between, wrist and arm positions while typing, maintaining user monitor distance, positioning of eyes against computer screen, changing body positions while working on computers, chairs with wheel supported legs, sitting postures. Precautionary measures to be taken related to health hazards were among the aspects of interest to the researchers.

The SIM was a power point presentation which consisted of demonstrations and multimedia clippings related to health hazards and ergonomic behaviors. It helped in motivating the staff to follow the ergonomic positions while using the computers, and practice some exercises during their breaks.

Validity

The content validity of the tool was done by experts from the department of Ergonomics, Ophthalmologist and Computer Science. The modifications and suggestions were incorporated in the final presentation of the tool.

Reliability

The reliability of the questionnaire, determined by split half technique was 90%.

Ethical Consideration

1. Permission was obtained from the Dean of Majan College.
2. The students were briefed on:
   - i. The knowledge questionnaire.
   - ii. Purpose of the study.
   - iii. Selection criteria for subjects.
   - iv. Self instruction module.

Short Description of Self instruction module(SIM)

A SIM on ergonomic behaviors was given to the students. The SIM was a power point presentation educating the users on the possible health risks associated with computer use and some respective precautionary measures against it could definitely make a difference and result in “Healthy Computing”.

Description of Data Collection

Recruitment of samples: The investigator selects subjects who work on the computer other than IT staff. The target was 100% coverage of the students satisfying the inclusive criteria. But due to various reasons the target sample could not be reached. The questionnaire was administered to 158 subjects. 90 respondents returned the completely filled questionnaire. Their knowledge was assessed by the structured knowledge questionnaire.

Analysis and Findings

A graphical representation of the samples on the basis of the demographic variables.

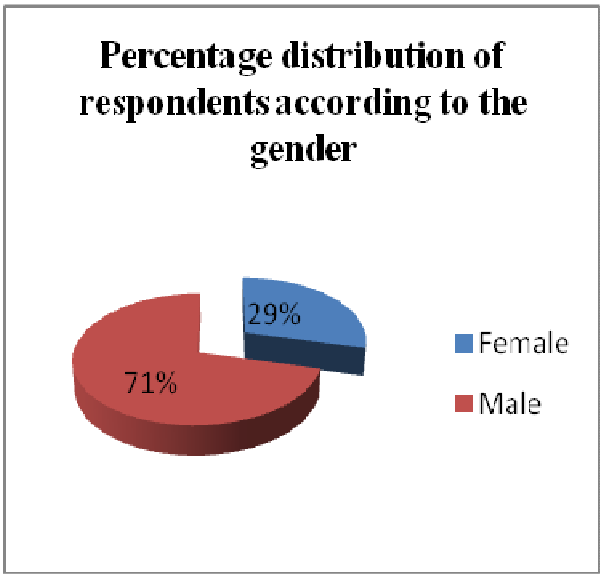

FIGURE 1

Among the respondents (71%) were males and (29%) were females.

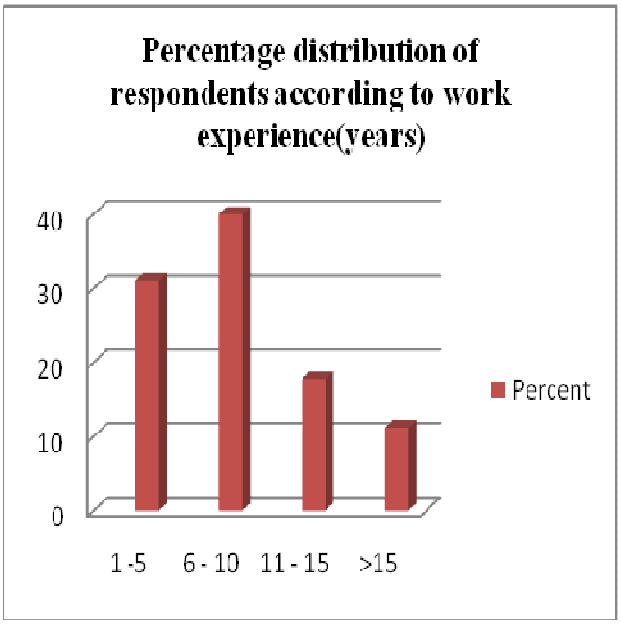

FIGURE 2

In the "Figure2", 40% of the respondents had 6 to 10 years of work experience, 31% had less than 5 years, 18% had between 11 to 15 years of experience. Whereas 11% of the respondents had more than 15 years of work experience.

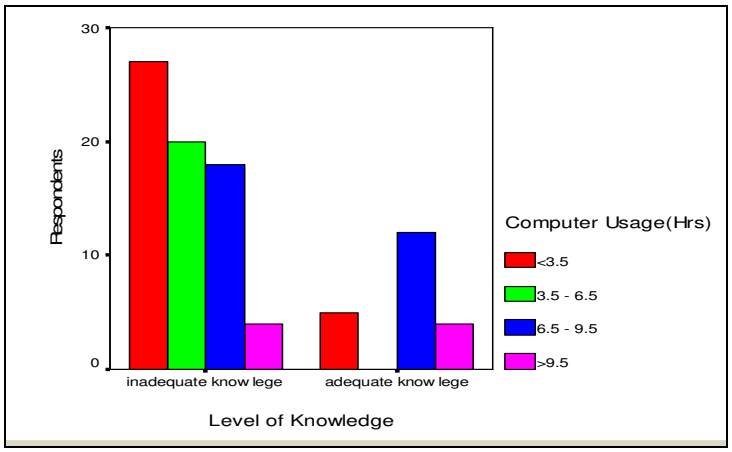

FIGURE 3: Distribution of respondents level of knowledge on the basis of computer usage

The bar chart in "Figure3" shows that all the subjects spending 3.5 to 6.5 hours on the computer on a daily basis have no adequate knowledge. Many studies have reported that people working on the computer for 3.5 hours a day are exposed to health disorders due to lack of knowledge of safe ergonomic behaviors. Although computer is used in classroom or homes or in the work place, where people can spend all day working on a computer, this study documents the inadequate level of knowledge among most of the respondents.

The total score of each respondent was calculated and their level of knowledge was interpreted as follows:

a. Inadequate knowledge $(\bar{x} - 1\sigma)$ < Total score < $\bar{x}$

b. Adequate knowledge $\bar{x} \leq$ Total score < $(\bar{x} + 1\sigma)$

The results of the survey motivated the investigators to initiate certain strategies to improve the knowledge of the respondents.

Short Description of Analysis and Interpretation of Results
Data processing was be aided by Statistical Package of Social Sciences software.

Statistical Analysis: Analysis of data was done by descriptive and inferential statistics.
Descriptive statistics of frequency and percentages were used to summarize the sample characteristics.

The increased number of computer users in Oman indicated to the researchers that there is a need to conduct this study. They decided to identify the need for an intervention in the knowledge of the visual display terminal users regarding ergonomic behaviors and precautionary measures

related to health. A self instruction module would be an effective approach to increase the level of knowledge of the students of Majan College, who are working on the computers for more than 3.5 hours a day.

Level of Knowledge	Knowledge scores	
	Frequency	%
Inadequate	69	76.7
Adequate	21	23.3

TABLE I: Knowledge scores %-Percentage

TABLE I indicates that the number of students with adequate knowledge were 76.7% and with inadequate knowledge were 21%.These observations indicate that maximum students do not have knowledge of the ergonomic principles and the health effects caused due to incorrect ergonomic behaviors'.

The level of knowledge clearly indicates a need to educate the students on the basic ergonomic issues related to the computer which supports our comprehensive literature review

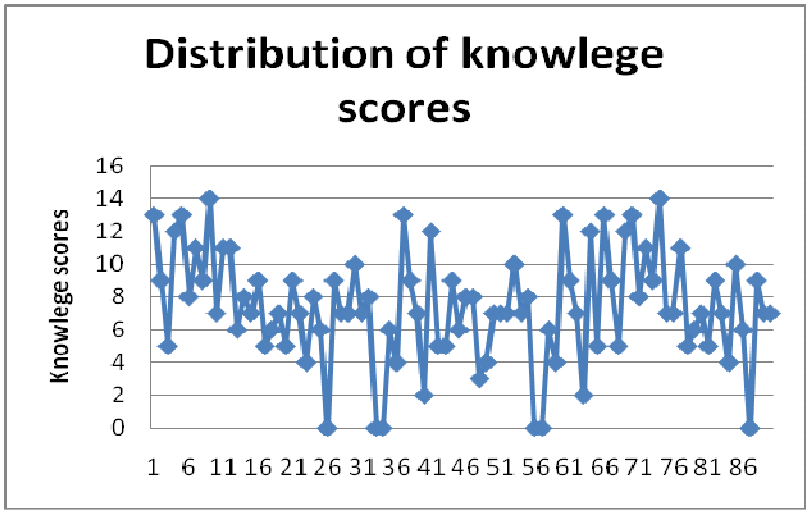

FIGURE 4: Graphical representation of the knowledge scores of the respondents

Figure 4 gives you an indication that many respondents do not have required information although most of them used computers in their work place and colleges. This was due to lack of professional development and discussion of these issues by them. Hence the researchers felt that the SIM would be an effective measure to improve the knowledge among the subjects.

Statistics	Notation	Knowledge Score
Samples	n	90
Median	M	7
Mean , Standard deviation	$\overline{X},\sigma$	7.37 , 3.37
Mode	Z	7
Minimum	Min	0
Maximum	Max	14
Quartiles	Q_1 Q_2 Q_3	5 7 9

TABLE II: Statistics of Knowledge Scores.

The TABLE II shows the mean, median, mode, minimum, maximum and the quartiles of the knowledge scores.

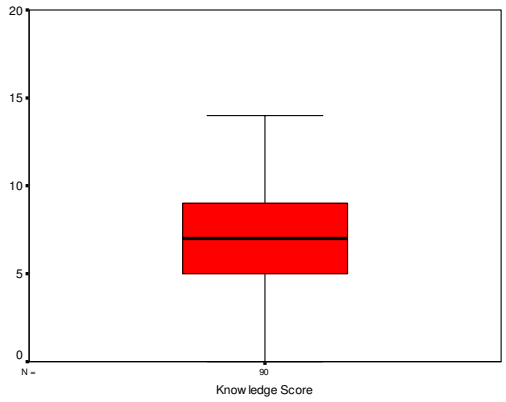

FIGURE 5: Box plot for knowledge scores

The box plot in "Figure 5" indicates maximum, upper quartile, median, lower quartile and minimum of the knowledge scores.

	Level of Knowledge	
Exposure to computer use	Inadequate knowledge	Adequate knowledge
<3.5	27	5
3.5 - 6.5	20	0
6.5 - 9.5	18	12
>9.5	4	4

TABLE III

The TABLE III shows that zero percent of students who work for 3.5 to 6.5 hours a day don't have enough knowledge about ergonomic issues related to computer use. According to Shikdar and Al Kindi (2007), people who work on the computer for more than 4 hours a day had inadequate knowledge of ergonomic positions that are to be maintained while working on the computer and this resulted in many countries to make interventions like conducting workshops/seminars and introducing health safety fact sheets to increase the knowledge of computer users and have succeeded to a certain extent to reduce the health risks associated with the computer use.

Chi Square test shows a significant association between the level of knowledge and frequency of computer use at $p<0.001$.

It was also observed in the study that most of the subjects did not have any formal training on ergonomic principles on computer use. They received only pieces of information from their friends, as email alerts, advertisements etc.

8. CONCLUSION

The study documents the lack of understanding of the health risks as well as the inability of the subjects to come up with strategies to deal with them. The results of the research supports literature reviews.[9]-[16] that there is a need to educate the people by conducting computer workshops/seminars on safety issues related to health due to extensive computer use. Health and Safety Fact sheet, related to health hazards of computer use is a publication of New York State United Teachers (NYSUT) has conveyed that they have set up various regional training centers for ergonomic training. Thus the researchers felt the need to send the self instruction module (SIM) to the students to educate them about the health issues, preventive measures and ergonomic behaviors related to prolonged computer use.

Having information about ergonomic issues is the first step towards minimizing computer health risks. In this study, it was observed that most of the subjects were ignorant of the ergonomic behaviors. Even though they had some information about the health issues related to prolonged computer use, they may not have tried to disseminate or discuss these issues with their peers. Neither have they tried to put these ergonomic principles into practice. Very few studies have been done on intervention of knowledge on this subject. The application of the SIM will create health awareness among the adult and the young generation of computer users in Oman. The SIM and presentations in different academic institutions and organizations would definitely motivate the students to get acquainted to the ergonomic behaviors and precautionary measures to develop a healthy computing environment. Computer users themselves should take the initiative of having an in-depth understanding of the self instruction module and practice in their college and work environment. This study is continuation of research conducted by S. Devesh and N.AL-Bimani (2011) [28]

9. RECOMMENDATIONS

a) Similar study can be conducted using a control group.
b) Explore strategies for colleges and organizations where intensive computer use is unavoidable in their study and work culture.
c) Similar study can be conducted on students and other firms to improve their knowledge on "Computer ergonomics".
d) Many organizations can train their employees by conducting workshops/ in-service educational programmes on ergonomics and health issues related to extensive computer use.

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