THE PREVALENCE OF DEPRESSION AMONG FIRST & SECOND YEAR MEDICAL STUDENTS IN THE FACULTY
OF MEDICINE & HEALTH SCIENCES, UNIVERSITY MALAYA MALAYSIA

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The prevalence of ergonomic problems in computing among year 1 and year 2 medical students of the faculty of medicine and health sciences, Universiti Malaysia Sarawak

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Abstract

The purpose of this research is to study the prevalence of ergonomics problems in computing among year 1 and year 2 medical students of Faculty of Medicine and Health Sciences (FMHS), Universiti Malaysia Sarawak. Students generally carry out a lot of computer related tasks which notably typing. Inadvertently, some cases of ergonomics problems will arise. Working with computer for hours can result in ergonomics problems such as neck stiffness, back pain, dry eyes and many more. Thus, as medical students ourselves, we decided to conduct a research in order to identify the problems related to ergonomics in computer usage. The main objective of this study is to identify the factors contributing to ergonomics problems and their prevalence among the students.

Questionnaire-based survey was applied to collect data with targeted participants from year 1 and year 2 medical students. Eye discomfort is the most prominent ergonomic problem as only 22 students (13.6%) were not affected by eye discomfort. Neck pain is the second most prevalent ergonomic problem experienced by the students. 86 out of 162 participants (53.1%) were affected by this symptom while operating computers. In a cross-tabulation study between the amount of time allocated on computer usage and eye problems, this study had concluded that prolonged exposure towards computer screen does not necessarily lead to eye problems. This is because certain measures could be taken in order to prevent eye problems due to computer usage such as using antiglare screens, having frequent intermittent eye rests, sufficient lighting, proper adjustment of computer screen positions and positioning of the eyes from the computer monitor at an appropriate distance.
Table of Contents

Chapter 1: Introduction ........................................................................................................... 1

Chapter 2: Literature Review ................................................................................................. 3

Chapter 3: Methodology
3.1) Study population ....................................................................................................... 6
3.2) Design .......................................................................................................................... 6
3.3) Instrument ...................................................................................................................... 6
3.4) Variables ......................................................................................................................... 7
3.5) Validity ........................................................................................................................... 7
3.6) Reliability ....................................................................................................................... 7
3.7) Organisation ................................................................................................................... 7
3.8) Procedure ....................................................................................................................... 8

Chapter 4: Results
4.1) Amount of time spent on computer usage per day .................................................. 9
4.2) Frequency on the adjustment of brightness of the computer screen ...................... 9
4.3) Frequency of intermittent eye rest .............................................................................. 10
4.4) Frequency of ensuring that the screen faces away from an open window .............. 10
4.5) Preference of input devices ......................................................................................... 11
4.6) Foot rest while seated .................................................................................................. 12
4.7) Opinions on the current condition of the computer laboratory .............................. 12
4.8) Distance between eyes and computer screen ............................................................ 14
4.9) Use of ergonomic appliances ..................................................................................... 14
4.10) Frequency of item clearing ....................................................................................... 15
4.11) Type of chair.................................................................................... 15
4.12) The comfort of the chairs provided in the computer laboratory of the medical faculty.......................................................... 16
4.13) Frequency of intermittent breaks taken ......................................... 17
4.14) Eye problems after prolonged exposure towards computer screen................... 17
4.15) Ergonomic aspects which concern computer users the most................. 18
4.16) Attitude towards seeking medical assistance........................................ 19
4.17) Severity of the ergonomic problems at different anatomical sites and their effects upon the medical students' ability to study ......................... 20
4.18) Cross-tabulation study between the amount of time spent for computer usage and the presence of eye problems associated .................. 23

Chapter 5: Discussion................................................................................. 25

Chapter 6: Summary and Conclusions....................................................... 35

References.................................................................................................. 37

Appendices................................................................................................... 40
List of figures in chapter 4

FIGURE 1: Amount of time spent on computer usage per day.........................9

FIGURE 2: Frequency on the adjustment of brightness of the computer screen........9

FIGURE 3: Frequency of intermittent eye rest...........................10

FIGURE 4: Frequency of ensuring that the screen faces away from an open window........10

FIGURE 5: Preference of input devices........................................11

FIGURE 6: Foot rest while seated..........................................12

FIGURE 7: Distance between eyes and computer screen..............................14

FIGURE 8: Use of ergonomic appliances........................................14

FIGURE 9: Frequency of item clearing........................................15

FIGURE 10: Type of chair.......................................................15

FIGURE 11: The comfort of the chairs provided in the computer laboratory of the medical faculty..................16
FIGURE 12: Frequency of intermittent breaks taken during typing...

FIGURE 13: Eye problems after prolonged exposure towards computer screen...

FIGURE 14: Ergonomic aspects which concern computer users the most...

FIGURE 15: Attitude towards seeking medical assistance...

FIGURE 16: Prevalence of musculoskeletal pain at different anatomical sites...
### List of tables in chapter 4

**TABLE 1:** Techniques applied while using the mouse..................................................11

**TABLE 2:** Opinions on the current condition of the computer laboratory..................12

**TABLE 3:** Types of ergonomic appliances................................................................14

**TABLE 4:** Severity of the ergonomic problems at different anatomical sites and their effects upon the medical students' ability to study..........................................................20

**TABLE 5:** Prevalence of musculoskeletal discomfort and majority stands for the frequency, intensity and the effects upon ability to study of discomfort experienced due to poor computer ergonomics.................................................................20

**TABLE 6:** Cross-tabulation study between the amount of time spent for computer usage and the presence of eye problems associated..................................................23
Chapter 1: Introduction

For the past 20 years, computers have not only been a sign of new technology, but have been increasingly used in workplaces, schools and homes. In 2006, the United States alone has more than 240 million users of personal computers according to the United Nations (2010). Malaysia has also joined in the bandwagon. Malaysian students particularly university students constantly use computer in their daily lives.

There are many health problems/discomfort arising from poor ergonomics related to computer usage. Students frequently use computer to do their tasks/assignment and this requires them to do a lot of typing. This situation also applies to preclinical medical students from UNIMAS. Ergonomic problems could be a major concern as eye or musculoskeletal discomfort could affect their ability to study. For instance, repetition of typing increases the risk of contracting repetitive injury to their wrist and hands which is known as carpal tunnel syndrome (CTS). This syndrome usually results from the compression of the median nerve according to Medscape. This is one of the many examples of computer related ergonomics problems.

Since the inventions of electronics devices such as laptops, hand phones and computer, it is only lately that medical professionals have become aware of health risks and problems associated with their constant use. One of the good examples would be carpal tunnel syndrome; due to repetitive injury to median nerve at flexor retinaculum.

This study is important in order to gain information on the causes of the ergonomic problem, and the effects of the problems to health of computer users. This study may also benefit the future generation of computer in terms of their design, ergonomic and safety.
The main objective of this research is to study the prevalence of ergonomics problems in computer usage faced by Year 1 & 2 medical students of the Faculty of Medicine & Health Sciences, UNIMAS. The objective is divided into two major components which include:

1. Determination of the habits practiced by Year 1 and Year 2 UNIMAS medical students while using computers in conjunction with computer ergonomics.

2. Determination on the prevalence and frequency of complication(s) experienced by preclinical UNIMAS medical students in the past 3 months due to poor computer ergonomics.

3. Determination on whether discomforts arising from poor computer ergonomics affect medical student’s ability to study.

The study was conducted in the FMHS, UNIMAS because of the easy access to the participants for data collection. The targeted participants were the 1st and 2nd year pre-clinical medical students. Clinical year students were not being included in this research due to their varied and dispersed locations as well as their irregular schedules, which may cause a lot of logistic problems.

As for the data collection, the questionnaire method was identified as the most suitable method as compared to interview sessions for this particular study. This was because the distribution of questionnaire provided convenience in terms of data analysis, timing and privacy for both researchers and participants. No major problems were experienced throughout the research period as the participants exhibited cooperation and successfully answered the questionnaires completely. There was no financial aid from any other party as this research was self-funded. The expenditure only covered the printing cost for questionnaires and consent forms. This small scale research had been conducted with minimal financial needs.
Chapter 2: Literature Review

Ergonomics is defined as an applied science targeted in investigating individual’s physical work patterns and helping in improving the work patterns by seeking to create a better match between an individual’s physical capabilities and their activities in a particular environment. Proper ergonomic practice is crucial to prevent discomfort and to lower the risk of musculoskeletal disorders according to the Ergonomic Times (2009). Musculoskeletal disorders, refers to a variety of soft tissue disorders which can affect muscles, cartilage, intervertebral discs, nerves, blood vessels, tendons, ligaments or joints (Microsoft Corporation, 2005). A study of schools in Western Australia shows that 60% of children ranging from 10 to 17 years old complained of discomfort with notebook use and 61% of the same population reported experiencing discomfort while carrying their notebooks (Harris & Straker, May 1999).

In a nationwide survey among Finnish computer users ranging from 12 to 18 years old, eye discomfort was reported to be the commonest symptom. This is followed by discomfort in the neck & shoulders, head, hands and finally, lower back symptoms (Hakala et al., 2001).

In a study conducted on the usage of personal computers among the elementary, junior and high schools in Yokohama & Kawasaki Cities, 24% of the high schools students complained of eye discomfort, followed by 19% of the junior high students. Other complaints include neck or shoulder and arm or hand discomforts among 4% and 8% of high school students respectively and 3% and none in among junior high students respectively (Sotoyama et al., 2001). In Sudan, 53% of the 250 computer office workers had experienced mild cases of arm, neck and or shoulder complaints. 64% of the respondents were affected by neck symptoms while 41% were affected by shoulder symptoms (Shahla et al., 2005). In Netherlands, 33% and 31% out of 264 respondents complained of neck and shoulder symptoms respectively which indicated that the
stated symptoms had the highest prevalence compared to other symptoms (Eltayeb et al., 2002). A study conducted on library staffs of University of Lagos (Unilag) and Covenant University of Nigeria showed that pain in the wrist, forearm, elbow, neck or back followed by discomfort has the highest prevalence of 93% among the Covenant University library staffs whereas tension, stress, headaches & related ailments has the highest prevalence of 88% among Unilag library staffs (Adeyemi, March 2010).

According to a study conducted for neck and shoulder symptoms and disorders among 9480 technical assistants and machine technicians of the Danish Association of Professional Technicians, Brandt et al. (2004) reported that 36% and 21.5% of the respondents had neck pain and shoulder pain respectively. In a separate study conducted by Lassen (2005) on the same sample population (Danish Association of Professional Technicians), Lassen reported that 821 out of 9480 participants in the past 1 year had reported severe discomfort in the right elbow, forearm or hand.

In a study conducted on office workers using computers at Netherland’s National Social Security Institution, 54% reported on ergonomic complaint with neck and shoulder complaints as having a higher prevalence compared to arm, elbow and hand complaints. “The highest prevalence rates were found in those with neck and shoulder complaints (33% and 31% respectively), followed by hand and upper arm complaints (11% to 12%) and elbow, lower arm and wrist complaints (6% to 7%).” (Eltayeb et al., 2007).

According to Medscape, the usage of computer could predispose to carpal tunnel syndrome (CTS). Both computer and repetitive, low force works increase the risk of CTS. A study made on the influence of carpal tunnel pressure (CTP) and median nerve function showed
positive correlation. All of these factors contribute to the possible pathophysiological mechanisms of CTS.

The proximity of the computer monitor with the eyes is one of the main causes for computer-related eyestrain. If the monitor is too close with the person resulting in some kind of eye problems, one of the solutions is to remove it further away. Accommodation is when the eyes change focus in order to see nearby objects while convergence is when the eyes turn inward towards the nose to prevent from getting double vision. So when viewing close objects, the eyes must accommodate and converge. Hence, the further the object in view, the eyes will be less strained (Fisher 1977; Collins 1975). Thus, it is preferable to locate the monitor at least 25 inches from the eyes to reduce the risk of getting eyestrain according to Ankrum (n.d.).
Chapter 3: Methodology

Section 3.1: Study population

In this study, there were 162 participants involved. Year 1 and Year 2 UNIMAS medical students pursuing Medical course for the 2010/2011 session were included in this study. The age of UNIMAS medical students participating in this study ranges from 19 to 21 years old.

Section 3.2: Design

Cross sectional study was applied in this research. The data was obtained directly from the completed written responses in the questionnaires. The data extracted were based on the participants' computer usage habit and the awareness level of computing ergonomics. These data are relevantly linked to ergonomics problem which might affect the participants in the future.

Section 3.3: Instrument

A questionnaire was made on the basis that the majority of the questions were constructed based on the necessary information relevant to this study. Online forms from the Cornell University Ergonomics Web under the Department of Design & Environmental Analysis at Cornell University complete with analytical methods were used in this study with some modifications made.

The sample forms can be referred from the following addresses:

1. http://ergo.human.cornell.edu/Pub/AHquest/CUCompWallStationEval.pdf (Specifically for computing in workstations)
Section 3.4: Variables

In this study, the questions available in the applied questionnaire consisted of 3 main categories which are the habits related to computer ergonomics practiced by the respondent while using the computer, eye discomfort and musculoskeletal problems.

Section 3.5: Validity

The content of the questionnaire was specially designed to elicit answers from the participants in an indirect manner hence ensuring more reliable information. The anonymity of the results as well as one hundred percent completion of the questionnaires by the participants was ensured by the researchers.

Section 3.6: Reliability

The questionnaire was tested for reliability by carrying out a pilot study on three year 1 and three year 2 students before the actual survey was carried out. The results of the pilot study showed that the problems were related to the habit of computing, the level of awareness in computer ergonomics and efforts made by the students in using the computer in a more comfortable position at home/ rental home or hostel.

Section 3.7: Organisation

The data from the participating students were collected by four members of this research group who are under the supervision of Madam Siti Fairouz Ibrahim.
Section 3.8: Procedure

In this study, class representatives of the Year 1 and Year 2 medical students were contacted to arrange appointments. A prior notice was issued to the medical students to stay back after class in order to participate in this study. Consent forms were attached together with the questionnaires. Participation in this study requires respondents to sign the forms before starting to fill in the questionnaires. A brief explanation on the studies conducted was given to the participants. The participants completed the questionnaires provided in a given period of time. Finally, the data was collected and analysed.
Chapter 4: Results

Section 4.1

*Amount of time spent on computer usage per day*

- < 1 hour: 19%
- 1 - 3 hours: 38%
- 4 - 6 hours: 30%
- > 6 hours: 13%

**FIGURE 1: Amount of time spent on computer usage per day**

Based on the amount of time spent daily on computer usage, the majority 38.3% out of 162 students uses computer or laptop from 1 to 3 hours daily.

Section 4.2

*Frequency on the adjustment of brightness of the computer screen*

- Always: 34%
- Often: 16%
- Seldom: 7%
- Never: 43%

**FIGURE 2: Frequency on the adjustment of brightness of the computer screen**

69 (43%) out of 162 participants of this study seldom modify the brightness of the screen according to the surrounding brightness before using the computer while 34% never take such an action at all. This indicates that very few of the students realize the importance of adjusting screen brightness.
Section 4.3

Frequency of intermittent eye resting

- Once in 0 - 10 minutes: 22%
- Once in 11 - 20 minutes: 21%
- Once in 21-40 minutes: 30%
- Once in more than 40 minutes: 27%

**FIGURE 3: Frequency of intermittent eye rest**

Majority of the participants; 49 of 162 students (30.2%) rest their eyes intermittently once in 21 to 40 minutes when using computer. There are 34 and 43 students who rest their eyes intermittently in 0 to 10 minutes and in 11 to 20 minutes respectively, making up to a total of 47.5%. Both of these categories are considered appropriate time intervals to rest eyes during work.

Section 4.4

Frequency on making sure that the screen does not face towards an open window

- Always: 24%
- Often: 23%
- Seldom: 25%
- Never: 28%

**FIGURE 4: Frequency of ensuring that the screen faces away from an open window**

There are 45 out of 162 students made sure that their laptops or computer screens were not facing an open window while in use. The window is one of the most common sources of glare on the computer screen.
Section 4.5

Preference of input devices

![Preference of input devices](Image)

**FIGURE 5: Preference of input devices**

<table>
<thead>
<tr>
<th>Techniques:</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performing small circular movements with the mouse by making arm movements from the shoulder.</td>
<td>56</td>
<td>29</td>
</tr>
<tr>
<td>Gripping the mouse with fingers.</td>
<td>71</td>
<td>14</td>
</tr>
<tr>
<td>Clicking the mouse button with the middle section of finger.</td>
<td>30</td>
<td>55</td>
</tr>
</tbody>
</table>

There is a slim majority of students; 85 out of 162 students (52.5%) who prefer to use mouse when using computer rather than using touchpad. Out of 85 participants who prefer to use the mouse, there are 65.9% who performed small circular movements is good prevention against musculoskeletal injuries. However, there is a relatively high number of mouse users; up to 71 participants or 83.5% who grip the mouse with their fingers, and there are 55 participants making up to 64.7% who click mouse buttons other than the middle section of finger predisposing them to carpal tunnel syndrome due to positive tilting of the wrists.
Section 4.6

Feet resting while being seated

According to the results of foot rest, most of the participants (37.04%) usually rest their feet by positioning their feet perpendicular to the floor. This indicates that majority of the pre-clinical medical students from UNIMAS are practicing the proper habit of foot rest.

Section 4.7

TABLE 2: Opinions on the current condition of the computer laboratory

<table>
<thead>
<tr>
<th>Aspects</th>
<th>Good</th>
<th>Satisfactory</th>
<th>Unsatisfactory</th>
<th>Poor</th>
<th>Very Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Height of computer table &amp; chair.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>44</td>
<td>27.2</td>
<td>75</td>
<td>46.3</td>
<td>22</td>
</tr>
<tr>
<td>Room temperature.</td>
<td>26</td>
<td>16.0</td>
<td>90</td>
<td>55.6</td>
<td>25</td>
</tr>
<tr>
<td>Lighting.</td>
<td>60</td>
<td>37.0</td>
<td>73</td>
<td>45.1</td>
<td>20</td>
</tr>
<tr>
<td>Ventilation/ Air quality.</td>
<td>52</td>
<td>32.1</td>
<td>75</td>
<td>46.3</td>
<td>25</td>
</tr>
<tr>
<td>Working space. (Area of computer table for each PC)</td>
<td>32</td>
<td>19.8</td>
<td>81</td>
<td>50.0</td>
<td>33</td>
</tr>
<tr>
<td>Cleanliness</td>
<td>53</td>
<td>32.7</td>
<td>80</td>
<td>49.4</td>
<td>21</td>
</tr>
<tr>
<td>Privacy</td>
<td>7</td>
<td>4.3</td>
<td>49</td>
<td>30.2</td>
<td>37</td>
</tr>
</tbody>
</table>
Based on the collected data, 37.03 % of respondents agreed that the lighting in the computer lab is good while, 0.62 % disagreed. The highest percentage of 45.06 % found it satisfactory. Based on the researchers' observation of the computer laboratory in FMHS, the room was neither very bright nor dim which probably explained why most of respondents were satisfied.

46.30 % of the participants are satisfied with the height of table and chair as well as the air ventilation in the computer lab. The height of the table and chair are well matched and adjustable to individual’s preference.

55.56 % of the participants are satisfied with the room temperature while 1.85 % did not agree. The room temperature was fixed at a low temperature and not adjusted accordingly to changes in environmental temperature due to weather. Hence, some of the respondents find the cold temperature uncomfortable.

50.00% of the respondents are satisfied with the working space provided in the computer lab. Enough working space was provided and this allowed them to work comfortably.

None of the respondents rated the cleanliness of the computer lab as very poor as the cleanliness were well maintained by the cleaners.

Only 4.32 % respondents rated the privacy in computer lab as good while 19.14 % rated it as very poor. This was because of the poor arrangement of the PCs which were positioned close to one another giving less privacy to the users.