

## Conference Paper

# Impact of Computer Misuse in the Workplace

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## Abstract

Computer misuse leads to computer-related injuries. The incidence of computer-related injuries (CRIs) is reported having a high incidence among office personnel who works routinely with the computer. The purpose of this research is to figure out the incidence of computer-related injuries in an organization with a majority of employees using technology such as a computer. This research is a survey of 120 office personnel selected with a simple random sampling method. The data was collected by distributing a self-administered questionnaire. The results showed that the office personnel experienced computer-related injuries such as computer vision syndrome (eye strain, blurred vision, watery eyes, and headache) and musculoskeletal disorders such as neck pain, shoulder and, waist pain. Ergonomic training is highly recommended to be conducted routinely by the organization to reduce the incidence of CRIs among office personnel.

**Keywords:** computer misuse; computer vision syndrome; musculoskeletal disorder; office personnel.

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Received: 27 December 2019

Accepted: 15 April 2020

Published: 23 April 2020

Publishing services provided by  
Knowledge E

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Selection and Peer-review under the responsibility of the 3rd IRCEB Conference Committee.

## 1. Introduction

The development of technologies over the last five decades has led to a significant increase in the number of office workers who use computers daily in the offices. Because of this, some musculoskeletal disorders (MSDs), computer vision syndrome (CVS), problems with peripheral nervous system such as carpal tunnel syndrome (CTS) were highly reported experienced among the office workers.[1] All these symptoms were called computer-related injuries (CRIs).[2] It is reported that 25% of computer users are suffering from CRIs and MSDs are the most prevalent disorders among office workers.[3, 4] The neck and shoulders pain was mostly experienced by the office workers, followed by CVS such as eyestrain, blurred vision, and headache.[4, 5] It is undeniable that computer is an important device to manage a lot of activities and jobs, but a long period of using a computer may increase the chances of developing CRIs.[6]

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The university workers mostly work with computer daily, hence the incidence of MSDs or CRIs is often among these population. From observation at one university in Jakarta, many of the office workers showed improper position while working with computers and they complained of muscle and joint pain, headache, blurred vision, watery eyes, and numbness of the feet. This situation can cause serious injuries and illnesses among workers in the future. Since there was no research had been conducted regarding the incidence of CRIs at the university, this study was carried out to find out the incidence of CRIs among the office workers.

## 2. Literature Review

Computer-related injuries (CRIs) are injuries caused by misuse of computer. Prolong use of computer can cause MSDs, CVS, and CTS.[7] Injuries due to the usage of computer has been recognized world-wide and several movements that involved repetitive or awkward postures have been associated with MSDs or Repetitive Strain Injury (RSI).[8] For instance, CTS is the most common repetitive motion injury. Five percent of the working population suffers from CTS, caused by continuous daily use of their hands and wrists.[9] The neck, back, shoulder, headaches, eyestrain are also common CRIs among office workers.[7] Some of muscle and joint problems become worse by inappropriate workstation, bad posture or sitting for long periods of time. This reduces circulation of blood to the muscles, bones, tendons and ligaments, and leading to stiffness and pain. If a workstation is not set up properly dan does not follow rule of ergonomics, these steady positions can cause more stress on the muscles and joints.[10]

The incorrect computer workstation set-up, prolonged work in fixed or awkward positions, seated and static work, and overuse of hand has been discovered to affect the lower back, eyes, arm of computer users.[11] With the increase in computer use in various works of daily life, people who spend more period of time on the computer are prone to a greater risk of developing CRIs. [8] Furthermore, focusing the eyes at the same distance point for long periods of time causes CVS. The American Optometric Association defines CVS a complex of eye and vision problems related to the activities which stress the near vision and which are experienced in relation, or during, the use of the computer.[12] The main symptoms reported by workers are eyestrain, irritation, burning sensation, redness, blurred vision and double vision. These symptoms are usually temporary and disappear at the end of the working day, a minority of worker may experience continuity of symptoms after work.[13]

The increasing usage of laptop computers has caused more pains, strains and injuries among computer users. Laptop computers were designed to be used for short periods of time when a person could not access a desktop computer. But these days many people use a laptop all the time. The problem is that the monitor and keyboard of a laptop are very close together. To position the monitor at the right height for the back and neck causes the users to lift their arms and shoulders too high. But to position the keyboard at the best height for their arms and shoulders, they must hunch their shoulders and neck to see the monitor and all of these will cause neck, shoulder and back pain.[10]

Since computer-related injuries may lead to an increase in operating costs due to a loss in productivity, some organizations have implemented programs to prevent the CRIs. The most common method is office ergonomics assessments, which involves the evaluation of an individual employee's workstation by a person with specialized ergonomics training. Ergonomic workstation can help to avoid the occurrence of CRIs. The employers also need to be aware regarding this issue by choosing proper furniture, such as desks and chairs for their workers. On the other hand, practicing better posture and good working habits are essential for every worker. This habit can be ingrained if the workers are aware regarding workstation ergonomic.[14] Incorporating the science of ergonomics and the art of counseling into everyday business can lead to healthier and more satisfied employees, along with improved efficiencies and lower costs.[9]

### 3. Methods

A descriptive study was used in this study. The study was conducted at one university in Jakarta, *Universitas Mercu Buana*, Jakarta, from January-February 2019. A number of 120 office workers who have been working at least for one year and using computer minimum 5 hours daily were selected with simple random sampling method. The workers who were having musculoskeletal problems because of acute trauma such as accident in the last 30 days or any systemic diseases such as hyperlipidemia, hyperuricemia or any eye diseases were excluded from the study.

The data was obtained by using a validated self-administered questionnaire that consists of questions on sociodemographic data and modified Nordic Body Map to assess the incidence of CRIs.[15] A pilot study was carried out by distributing a questionnaire to 30 non-sample participants with the result of Cronbach's alpha 0.7. Next, the data were analyzed using SPSS version 23 with a significance level set at 0.05.

## 4. Results

The result showed that majority of participants are women (50.8%), aged 20-30 years old (56.7%), having a bachelor's degree (73.3%), with duration of occupation 1-5 years (68.3%), and never attended any ergonomics training (87.5%). Assessment using Nordic Body Map showed that most of the participants experienced pain on the upper neck (44.2%), back (40.8%), waist (40%) and lower neck (39.2%) (Table 1). Many of them had complaints about eye strain (78.3%), blurred vision (41.7%), watery eyes (39.2%), headache (37.5%) (Table 2).

## 5. Discussion

In this study, most of the participants felt pain on the neck (upper and lower neck) (44.2% and 29.2% respectively), back (40.8%), waist (40%) and shoulder (35%). It is similar with the studies conducted by Daneshmandi, Besharati, Loghmani in Iran, Akrouf in Kuwait, also Salem in India. Daneshmandi reported that the highest pain was on the neck and back (41.6% respectively) and shoulder (40.6%).<sup>[11]</sup> It was similar with the study conducted by Salem among 500 software professionals in information technology (IT) reported that the common pain were on the neck, back, and shoulder.<sup>[13]</sup> A study conducted by Besharati also found that the highest pain was on the neck.<sup>[12]</sup> A study conducted by Loghmani among 101 Iranian office workers from a university, reported most common pain on the neck (69.2%), low back (58.2%), knees (41.8%), shoulders (35.2%), and upper back (34.1%).<sup>[14]</sup> An observational study conducted by Akrouf among 750 bank office workers in Kuwait reported the most affected body parts were the neck (53.5%), lower back (51.1%), shoulders (49.2%) and upper back (38.4%).<sup>[15]</sup>

Another study showed different results. A case study conducted by Moom among 50 computer bank office workers in Punjab, India, found that some workers suffering from MSDs were due to low-back pain (40.4%), upper back (39.5%), neck (38.6%), hand or wrist (36.8%) and shoulder (15.2%).<sup>[16]</sup> A study conducted by Quemelo among 50 office workers in Brazil also reported that 74% of the workers experienced MSDs on back (81%).<sup>[17]</sup> It is similar with a study conducted by Noorozi among 392 office workers at a university in Iran, reported that the most of body part affected were back region (51%), neck (36.7%), wrist (23%), right shoulder (10.2%) and right elbow (3.8%).<sup>[18]</sup>

Some visual problems were reported in this study. Most of the workers experienced eyestrains (78.3%), followed by blurred vision (41.7%), watery eyes (39.2%) and headache (37.5%). It is similar with a study conducted by Chiemeké among 103 computer users

TABLE 1: Nordic Body Map\*.

No.	Location	Feeling		Rating
		No pain Frequency (%)	Pain Frequency (%)	
0	Pain on upper neck	67 (55.8)	53(44.2)	1
1	Pain on lower neck	73 (60.8)	47 (39.2)	4
2	Pain on left shoulder	88 (73.3)	32 (26.7)	6
3	Pain on right shoulder	78 (65.0)	42 (35.0)	5
4	Pain on left upper arm	104 (86.7)	16 (13.3)	14
5	Pain on the back	71 (59.2)	49 (40.8)	2
6	Pain on right upper arm	99 (82.5)	21 (17.5)	11
7	Pain on waist	72 (60.0)	48 (40.0)	3
8	Pain on buttock	90 (75.0)	30 (25.0)	7
9	Pain on bottom	92 (76.7)	28 (23.3)	8
10	Pain on left elbow	114 (95.0)	6 (5.0)	21
11	Pain on right elbow	110 (91.7)	10 (8.3)	19
12	Pain on left lower arm	114 (95.0)	6 (5.0)	21
13	Pain on right lower arm	105 (87.5)	15 (12.5)	15
14	Pain on left wrist	111 (92.5)	9 (7.5)	20
15	Pain on right wrist	95 (79.2)	25 (20.8)	9
16	Pain on left hand	108 (90.0)	12 (10.0)	17
17	Pain on right hand	97 (80.8)	23 (19.2)	10
18	Pain on left thigh	107 (89.2)	13 (10.8)	16
19	Pain on right thigh	108 (90.0)	12 (10.0)	17
20	Pain on left knee	107 (89.2)	13 (10.8)	16
21	Pain on right knee	109 (90.8)	11 (9.2)	18
22	Pain on left calf	100 (83.3)	20 (16.7)	12
23	Pain on right calf	101 (84.2)	19 (15.8)	13
24	Pain on left ankle	113 (94.2)	7 (5.8)	20
25	Pain on right ankle	111 (92.5)	9 (7.5)	20
26	Pain on left foot	104 (86.7)	16 (13.3)	14
27	Pain of right foot	105 (87.5)	15 (12.5)	15

\* modified Nordic Body Map (Kuorinka, 1987)

at University of Benin, Nigeria, found that they experienced eyestrain, blurred vision and headache (42.7%, 45.7%, 28.2% respectively). Another study conducted among 471 university students in United Arab Emirate by Shantakumari reported that the most common visual problems reported were a headache (53%), burning sensation in the

TABLE 2: Computer vision syndrome (CVS).

Symptoms	Frequency (%) (n = 120)	Ranking
<b>Blurred vision:</b>		
Yes	50 (41.7)	2
No	70 (58.3)	
<b>Watery eyes:</b>		
Yes	47 (39.2)	3
No	73 (60.8)	
<b>Eyestrain:</b>		
Yes	94 (78.3)	1
No	26 (21.7)	
<b>Headache:</b>		
Yes	45 (37.5)	4
No	75 (62.5)	

eyes (54.8%) and tired eyes (48%),[20] These high incidences of CRIs may reduce the productivity of the office personnel because of sickness absence or disability, decreasing work efficiency, lost of human resources and extensive cost for medical claims. [4] Therefore, the organization needs to implement a strategy to reduce the incidence in the future.

## 6. Conclusion

Most of the office workers in UMB experienced body pain especially on the neck, back, waist, and shoulder and computer visual syndrome such as eyestrain and blurred vision. Hence, well-designed workstation and ergonomic training are highly recommended to all office workers at UMB to to reduce health risk associated with the use of computers.

## Suggestion for Future Research

Similar research can be conducted in other institutions to find out the incidence of computer misuse among office workers in Indonesia.

## Impact of the Research

The organization needs to provide special funding not only for conducting the ergonomic training but also for purchasing the ergonomic chairs, tables, and computer

accessories to set an ergonomic station for every office personnel. This research also contributes to the literature, especially for ergonomic studies in Indonesia.

## Limitation of the Study

The study was only a descriptive study and conducted only in one university in Jakarta, Indonesia.

## Acknowledgments

This study was supported by the Ministry of Research, Technology and Higher Education of Indonesia.

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