

ORIGINAL ARTICLE

REPETITIVE STRAIN INJURY (RSI) AMONG COMPUTER USERS: A CASE STUDY IN TELECOMMUNICATION COMPANY

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ABSTRACT

Repetitive Strain Injury (RSI) is the most common occupational injury faced by computer users. Computer users faced higher possibility of getting RSI due to their prolonged working time and static posture. The three main objectives of this study are, first: to identify the prevalence of RSI among computer users; second, to investigate and determine the RSI risk factors; and third to analyze the association between RSI risk factors and the prevalence of RSI among computer users at a Telecommunication Company X. A total of 100 respondents were selected based on their daily exposure to computer usage of more than 4 hours. Nordic modified questionnaire was used to gather respondents' socio-demographic data, job's information, physical risk exposure, physical symptoms and their awareness level towards RSI. Body Parts Symptoms Survey (BPSS) form were also used to identify the body parts exposed to the RSI risk among computer users. The data was analysed using Statistic Package for Social Science (SPSS) version 22. Study results showed that the 41% of computer users in Telecommunication Company X felt tired at the upper-back near the neck and 38% at the shoulder region. In conclusion, the prevalence of RSI among computer users is high at upper back near the neck and at the shoulder region. There is a significant association between risk factors of RSI and the prevalence of RSI among the computer users at Telecommunication Company X.

Keywords: awareness; ergonomic; RSI; computer use; RSI risk factors; prevalence of RSI

INTRODUCTION

Work-related Repetitive Strain Injuries (RSI) and Musculoskeletal Disorders (MSDs) are among the major occupational hazard for computer users especially in Telecommunication Company. The term MSDs refers to conditions that involve the nerves, tendons, muscles and supporting structures of the body¹. It is common for employers to find MSDs among employees. The MSDs usually ranging from back pain to carpal tunnel syndrome accounted for 40% or more of their injury cases and 60% of their users' compensation costs². Whilst RSI refers to the pain felt in muscles, nerves, tendons and other soft body tissues. RSI refers to conditions that resulted from prolonged repetitive movement, forceful, or awkward movements and overuse from continuous use of a tool^{3,4}.

Nowadays, computers have been used widely especially at schools, universities and offices. It has become a common tool used by almost every person in every aspect of human everyday activities such as for work, education and also recreational. Over time, the number of users using computers in performing their activities continue to increase. Many office jobs are now dependent on the use of computers.

Physical workplace factors, such as prolonged static muscle load and workstation factors have been identified as risk factors for musculoskeletal diseases (MSDs)⁵. In the computing environment, incorrect computer workstation set-up, prolonged work in fixed or awkward positions, seated and static work, and overuse have been identified as

MSDs risk factors^{6,7,8}. Analysis of risk factors versus physical discomfort reveals that computer operators who perceive higher job stress have significantly increased risk on several health complaints, including eye strain, tinnitus, hoarse or painful throat, chronic cough with phlegm, chest tightness, irritable stomach or peptic ulcers, frequent urination and musculoskeletal discomfort⁹.

Much research has been carried out to investigate MSD and RSI in offices^{10,11}. It has been shown that in telecommunication centres work setting, workers are exposed to MSD from working long hours with computers⁹. Therefore, this study try to affirm that fact at Malaysian telecommunication centre which is assumed to have similar work setting. Three main objectives of this study are: to identify the prevalence of RSI among computer users; to investigate and determine the RSI risk factors; and to analyze the association between RSI risk factors and the prevalence of RSI among computer users at a Telecommunication Company X.

METHODS

Respondents

The study population is computer users at Telecommunication Company X since it is high possibility that they are already exposed to RSI. Selection of computer users was based on simple random sampling from many departments in the Telecommunication Company X. The sampling unit was computer users whom fulfilled the selection criteria.

The inclusive criteria of study sample unit were users who works with computer and minimum computer use of four hours daily. After considering the inclusive criteria, 100 workers were selected as respondents for this study. The respondents selected were those who randomly picked by the Safety and Health Officer from the Telecommunication Company X. Respondents filled their details voluntarily after being briefed by the researcher on the objectives and the items in the questionnaire.

Data Collection

The questionnaire comprised of several parts; socioeconomic status, job information (work department, duration of employment in current work, average working, hours per week, job after working hours) and job routine, physical risk exposure, physical symptoms, work stress, work station design and awareness level.

The survey questions used in this survey is a mixture of closed-ended question such as (Yes/No), rating scale and multi-answer questions. For rating types questions (e.g. Never, Rarely, Sometimes, Frequently and Always). There are two commonly used as a matrix rating scale, it is Likert and semantic differential scales. The purpose of using Likert scale is because it is the easiest way to sum the score for each respondent without any bias.

The data was analysed using Statistic Package for Social Science (SPSS) version 22. Data obtained from the computer users were classified into frequency percentage. Besides that, questions involving worker’s knowledge on ergonomics, work station design and BPSS has multiple choice answers.

Body Parts Symptom Study (BPSS)

BPSS was used to determine which body part was exposed to the risk especially when working with computer. As shown in Figure 1, ten (10) body parts namely neck, shoulders, upper back, lower back, buttock, elbow, arms, wrists, thighs and calves and knees were included in the BPSS to be evaluated by the respondents. This assessment is filled by the respondents and questions and answers were in Malay language.

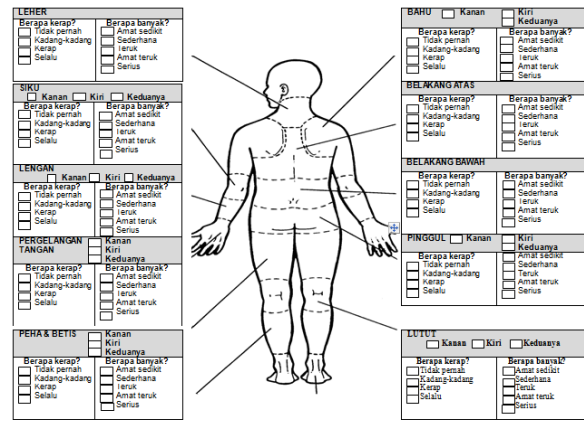


Figure 1. Body Part Symptoms Survey (BPSS)

RESULTS

Questionnaire Results from Telecommunication X

Prevalence of RSI

Table 1 shows the prevalence of RSI among the computer users in the telecommunication company. It was found that shoulder region indicated the highest prevalence in the ‘pain’ column, with 18 out of 73 users (24.7%) claimed to feel pain in the shoulder region. For ‘sense of tingling’ and ‘numbness’ at high prevalence in the finger area with 6.8% and 15.1% respectively. Computer users also claimed that they are ‘feeling tired’ with 41.1% at the neck region and 38.4% shoulder region respectively.

The survey result in Table 1 shows that neck, shoulder, hand, wrist and fingers have the highest prevalence of ‘feeling tired’ for majority of the users, followed by ‘pain’, ‘numbness’ and ‘sense of tingling’.

Risk Factors

For physical risk as shown in Table 2, the highest frequency is from ‘once a while’ column. Awkward posture with 32.9%, static posture 34.2%, pinch grip on the mouse 34.2%, unsupported hand and wrist with 26% and 21.9% respectively. Followed by leaning forward to computer screen 32.9%. Findings for physical risk summarized as in Table 2.

Table 1 - Prevalence of Repetitive Strain Injuries (RSI) among respondents

Area	Frequency (%)				
	Pain	Sense of Tingling	Numbness	Feeling Tired	None
Neck	16.4	1.4	2.7	41.1	38.4
Shoulder	24.7	4.1	2.7	38.4	30.1
Hand	4.1	2.7	12.3	30.1	50.7
Wrist	12.3	4.1	9.6	27.4	46.6
Fingers	5.5	6.8	15.1	20.5	52.1

Table 2- Physical Risk

Profile	Frequency (%)					
	Never	Seldom	Once in a while	Sometimes	Often	Missing
Awkward posture	19.2	23.3	32.9	20.5	1.4	
Static posture	8.2	23.3	34.2	24.7	6.8	2.7
Pinch grip on the mouse	11	27.4	34.2	17.8	2.7	6.8
Excessive body movement	6.8	30.1	27.4	26	6.8	2.7
Unsupported hand	16.4	23.3	26	16.4	13.7	4.1
Unsupported wrist	19.2	21.9	21.9	19.2	13.7	4.1
Leaning forward to computer screen	6.8	16.4	32.9	27.4	12.3	4.1
Repetitive work	2.7	15.1	21.9	31.5	26	2.7
Needs to work fast		12.3	26	32.9	26	2.7

Table 3 shows the most often work pressure is to fulfil work dateline which account for 50.7% of cases. This will lead to stress that could cause RSI

because users will try to work faster without practicing the proper ergonomic approach.

Table 3- Work Pressure

Profile	Frequency (%)				
	Never	Seldom	Once in a while	Sometimes	Often
Fulfill work dateline	2.7	5.5	26	12.3	50.7
Often distracted	2.7	15.1	23.3	27.4	26
Annoyed	17.8	17.8	35.6	17.8	5.5
Limits the ability for normal activities	2.7	15.1	23.3	27.4	26

Table 4 shows high majority that most of the respondents agreed that their workstation is comfortable to be used, comfortable seat 78.1%, adjustable chair and computer screen to the appropriate height 84.9%, adjustable armrest

57.5%, desk with large surface and no obstacle 84.9%, computer screen can be put at a sufficient distance 90.4% and sufficient space under the desk 89%.

Table 4- Chair, table and accessories

Profile	Frequency (%)		
	Yes	No	Missing
Comfortable seat	78.1	20.5	1.4
Adjustable chair and computer screen to the appropriate height	84.9	13.7	1.4
Adjustable armrest	57.5	41.1	1.4
Table with large surface and no obstacle	84.9	13.7	1.4
Computer screen can be put at a sufficient distance	90.4	6.8	2.7
Sufficient space under the table	89	9.6	1.4

Relationship between Risk Factors and Prevalence of RSI

This study will only discuss the result of relationship between risk factors and prevalence for work station design. The result from Table 5 shows Pearson Chi-Square statistic for work

station design with prevalence of RSI among computer users. It can be seen that there is a significant correlation between prevalence of RSI with work station design, because the value of $p < 0.05$.

Table 5- Correlation between physical risks with prevalence of RSI

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	139.889 ^a	102	.008
Likelihood Ratio	91.494	102	.763
Linear-by-Linear Association	4.154	1	.042
N of Valid Cases	71		

a. 124 cells (98.4%) have expected count less than 5. The minimum expected count is .03.

Some examples of working postures practiced by computer users in Telecommunication Company X. Figure 2 (a) is one of the example that showed that there is insufficient space under desk because it is occupied with other items such as file, documents and other items. This figure also gives an example of a user sit on a chair that is too high, it can be seen that user's feet do not completely touch the ground and also computer screen is too low for her. Figure 2 (b) also showed that there is insufficient space under desk because the respondent is too tall for that chair and desks used. The computer screen is too low for him. Another mismatch workstation design with respondents.



Figure 2 (a). Insufficient space under desk, chair too high and computer screen too low (b) Insufficient space under desk and computer screen too low

DISCUSSION

Based on the study, feedback given by the respondents in the survey questionnaires session, and BPSS form, it is proven that there is a prevalence of RSI among computer users in Telecommunication Company X.

This study found two specific regions that experienced prevalence of RSI, which is in the upper body region that affected neck and shoulder region. These were found among the computer users based on their questionnaire and Body Parts Symptoms Survey (BPSS) feedback. Majority of the respondents responded 'feeling tired' at the neck and shoulder region when working with computers on a daily basis. All of the respondents work for 9 hours daily for 5 days a week.

This study also found three major risk factors of RSI in Telecommunication Company X. These risk factors were (a) body posture during working; (b) work stress; and (c) work station design. Wrong body posture during working are consequences of poor habits of users since ergonomic courses already been held to increase awareness among them. For work stress factors basely because of the work dateline that they usually need to fulfil. Workstation design also a big factor that contributes to the RSI since the poor workstation design preventing users from working comfortably. Prevalence of RSI in this study was found to be associated with the risk factor workstation design. Workstation design is a major risk factor to the prevalence of RSI. This is because the respondents complained that the work stations are not comfortable to work with for a few respondents who are too tall, or too short and also overweight. Other factors are they are not ergonomically design.

CONCLUSION

Based on the study that have been done, feedback given by the respondents in the survey questionnaires session, and Body Parts Symptoms Survey (BPSS) form, it can be said that there is a prevalence of RSI among computer users in Telecommunication Company X. Prevalence of RSI in this study was found to be associated with the risk factors of RSI stated earlier which is body posture during working, work stress and workstation design.

ABBREVIATIONS

RSI-Repetitive Strain Injury, BPSS- Body Parts Symptoms Survey, MSD-Musculoskeletal Disorders

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