ORIGINAL ARTICLE

A STUDY OF WORK RELATED COMPLAINTS OF ARM, NECK AND SHOULDER (CANS) AMONG OFFICE WORKERS IN SELANGOR AND KUALA LUMPUR

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ABSTRACT

The computer is well known as one of the important tools in the office that gives a lot of benefits but silently leads to musculoskeletal pain. There are many different kinds of musculoskeletal complaints pain but the most common seen among computer users in developed countries is the complaint of arm, neck and shoulder (CANS). Despite this, definite factors that can be associated with the prevalence of CANS have not been established. This study was conducted to identify the prevalence and factors associated with work-related complaints of arm, neck and shoulder (CANS) among office workers in Selangor and Kuala Lumpur. A survey study design was conducted where 110 (n=110) office workers were recruited from around the Selangor and Kuala Lumpur area for 5 months periods. Participants were required to answer the Maastricht Upper Extremity Questionnaire (MUEQ) and the Level of Ergonomic Knowledge Questionnaire. The study showed the highest percentage of CANS reported was at neck region (53.6% of participants), followed by shoulders with 53.0%. The majority of participants have low level of computer ergonomic awareness where only 19.09% (n=21) from government sector and 10% (n=11) office workers from private sector reported knowledge of ergonomics. Majority of the participants did not have the know-how in implementing correct computer ergonomics. However there was a weak association (r=<0.5) between CANS with work-related risk factors (work station, body posture, break time and social support), duration of hours using a computer and levels of ergonomic knowledge.

Keywords: *office ergonomic, CANS, office worker, computer.*

INTRODUCTION

One of Malaysia 2020 visions is to become a country fully equipped with high end technology. In light of this, more offices in Malaysia would use computers. The computer is an important tool in offices that gives lots of benefits to one organization, starting from data entry, data storage, designing and information search. It might seem that computers will have only good contributions but silently it leads to bad effects to the computers users and this has been proven in many researches[1-9].

According to statistics reported by Social Security Organisation(SOCSO), musculoskeletal disorders (MSDs)are one of the most common occupational diseases in Malaysia at 15% compared to other diseases such as accident at workplace and respiratory diseases[10]. The prevalence of reported work-related musculoskeletal pain is seen to be on the rise in Malaysia. Malaysian Institute of Occupational Safety and Health Organization has recorded a ten-fold rise in cases of musculoskeletal pain, a total number of 194 cases in 2012, compared to only 16 cases in 2006[11]. Musculoskeletal pain can be described as pain that affects the bones, muscles, ligaments, tendons and nerves. It could be acute or chronic and the pain can be localized in one area or widespread[12]. The prolonged symptoms of pain, body ache and fatigue over time could lead to musculoskeletal disorders (MSDs)[13].Musculoskeletal upper extremity symptoms and complaints of arm, neck and shoulder (CANS) are common in the general population, especially among office workers in many developed countries[4]. CANS can be defined as the presence of musculoskeletal complaints of the said region not caused by acute trauma or by any systemic disease[14]. CANS could cause severe and debilitating symptoms such as pain, numbness and tingling. It may further result in reducing work productivity, inability to perform job tasks and an increase in workers compensation costs[3,5,8,14-16].In other words, CANS could lead to lower levels of performance, productivity and health of the workers[1,4,5].

An office worker can be defined as a person whose job tasks include typing or filing documents, correspondence, reports, statements and other material[1]. Most of their tasks involve using a computer to maintain and update filing, inventory, mailing and database systems. Generally, this 'white collar' work environment is in the office, in a sitting position and their workstation mainly equipped with a chair, computer, table, telephone and other equipment in order to perform their work tasks[17]. Although their work environment is seemingly more comfortable than other jobs such as construction workers, who are more exposed to hazards, in reality the office worker is one of the occupations that can potentially be affected by CANS [5,7,18,19].Efforts in the identification of risk factors for the development of work related CANS have shown that these complaints may not be caused solely by highly physical job demands; repetitive movements, poor workstation and

awkward posture, but it also be caused by psychosocial demands; low social support, less break time and high job demands at the workplace[3,16,20-24]. The high prevalence of upper extremity pain among office workers is largely due to increase in job demands that necessitate the use of computers for a prolonged period of time[2]. These findings are supported by other studies that conclude that computer users with a long daily duration of computer use and mouse use experience more musculoskeletal symptoms than those with a short duration of computer usage[25]. Meanwhile psychosocial demands among office workers, synonymous with the term workplace stress, can be described as it happens when there is a conflict between job demands on the employee and the amount of control by the said employee. The combination of high demands in a job and a low amounts of control over the situation can lead to stress[26]. One study reported that the numbers of stress cases among Malaysian office workers in a multinational company was surprisingly high[27].

As the numbers of CANS and stress among office workers increases, ergonomics is being seen as an important medium to overcome this problem[28-33]. Basically, the aim of ergonomic training is to increase office workers' knowledge regarding their workstation configuration, to change inappropriate behaviour and to control their workstation environment[32,34,35]. The importance of ergonomics had been discussed in other studies that concur that poor ergonomics at the workstation leads to work stress and negatively impacts the worker's health[31]. In addition, ergonomics can assist in reducing the upper musculoskeletal symptoms[30].Therefore, it is important for an office worker to have ergonomic awareness and knowledge as to reduce CANS.

On the other hand, there is a lack of studies on the prevalence of CANS among Malaysian office workers and studies that identify work-related factors that lead to the prevalence of CANS. The identification of risk factors for the development of CANS before they develop into a disabling musculoskeletal complaints is an important step in order to recognize relevant subgroups that have high risk profiles for CANS[7]. Besides, ergonomic awareness among office workers are still not clearly discussed in study and need to be emphasized in companies in Malaysia. Hence, targeting office workers as the selected case population on which to base and to develop measurement tools specifying the risk factors of CANS would seem to be the appropriate step. This study informs on the prevalence of CANS among office workers in Selangor and Kuala Lumpur, identifies factors leading to CANS and the levels of ergonomic awareness. The findings from this study could benefit organizations such as SOCSO, in order to reduce the cases of CANS, cost of treatment and cost of compensation.

METHODOLOGY

Ethical approval from Universiti Teknologi Mara (UiTM) was obtained to conduct this study. This study participants are 110 office workers (n=110) recruited from different organization around Selangor and Kuala Lumpur for 5 months periods. Convenience sampling was employed, where surveys were carried out by using questionnaires. Permission from the companies and participants were obtained before questionnaires were directly distributed. Typical participants in this study was an office worker with minimum 1 hour usage of computer per day, have job demands requiring the use of computers, having more than one years' experience working in the office and did not have other diseases affecting the musculoskeletal system. The questionnaire used in this study consists of 3 sections which are Demographic Data, Maastricht Upper Extremity Questionnaire (MUEQ) and Level of Ergonomic Knowledge. The participants were required to answer and respond to the entire questionnaire. Prior to the data collection process, participants were given a brief overview of the study to ensure their understanding and clarity. All the information about the participant was confidential. The participants were given 2 weeks to respond and return the questionnaire. The data collection period was 3 months.

Section 1-Demographic Data

Participants were asked to answer several questions related to their personal details which are gender, age, and working sector, whether private or government. Then, the questionnaire proceeded to ask questions related to work which were duration of working position, duration of work in days and hours and duration of hours worked behind a computer.

Section 2-Maastricht Upper Extremity Questionnaire (MUEQ)

MUEQ assesses the occurrence and nature of CANS in computer workers for associated physical and psychosocial risk factors. The MUEQ consists of 87 questions and completion time was approximately 20 minutes. The questionnaire covers socio-demographic characteristics (age, gender and employment status) and other seven different domains (scales) which are workstation, body posture, job control, job demand, break time, work environment and social support. Age, sex and previous history of complaints were regarded as potential confounders and were considered as independent risk factors of CANS. The outcome variable was the occurrence of complaints of the neck, shoulder, arm, forearm and hands with duration of at least one week during the preceding 12 months. The risk factor analysis was conducted for each area independently. The item in this questionnaire were mainly scored on 5 point scale (completely true-completely false) or a dichotomous scale (yes-no).

Section 3- Level of computer ergonomic knowledge

The participants' knowledge and awareness of ergonomics, the extent to which the principles of ergonomics were put into practice in the work-place were evaluated by using a set of expert-validated self-administered questions. Ten pictorial questions evaluated participant's knowledge on correct postures and equipment placement, each correct answer was given one mark (total score-10).

The data was analysed using the SPSS (Statistic Program for Windows package version 18.0). Descriptive analysis was used for demographic data, mean of each domain in MUEQ and prevalence of CANS and level of computer ergonomic knowledge. A Spearman Correlation test was used to test the hypothesis to identify association between prevalence of CANS with duration of hours using computer, levels of ergonomic knowledge, duration years of worked and work-related factors.

RESULTS

The total number of participants in this study was 110 office workers (n=110) where 54% (n=59) were females and 46% (n=51) males. The major age group among the participants was the 20 – 29 year old group, with a percentage of 40.91% (n=45). The participants were distributed equally between the private and government sectors. The majority of the participants had 1-3 years of working experience, with percentage of 38.18% (n=42). Moreover, 94.64% (n=103) reported working 5 to 6 days per week. In terms of education levels, majority 40% (n=44) of the participants had Diploma qualification. A higher percentage of participants worked 7 to 9 hours per day and used the computer at an average of 7 to 9 hours per day. The detail of demographic data is shown in Table 1.

Table 1: Participant's number (n) and percentage (%) based on demographic data (Section 1)

Characteristics	n=110	Percentage (%)
Gender		
Male	51	46.00
Female	59	54.00
Age		
20-29 years old	45	40.91
30-39 years old	27	24.55
40-49 years old	19	17.27
50-59 years old	19	17.27
Work sector		
Private	55	50.00
Government	55	50.00
Working years' experience		
1 - 3 years	42	38.18
4 - 6 years	24	21.82
7 - 9 years	7	6.36
10 – 12 years	6	5.45
More than 13 years	31	28.18
Days of working per week		
3 – 4 days	2	1.82
5 – 6 days	103	94.64
7 days	5	4.55
Level of education		
SPM	26	23.64
Diploma	44	40.00
Degree	37	33.64
Master	3	2.73
Participant's hours of working per day		
4 – 6 hours	3	3.00
7 – 9 hours	85	77.0
10- 12 hours	19	17.0
12 hours and more	3	3.00
Participant's hours of working behind computer		
1 – 3 hours	20	18.00
4 – 6 hours	30	27.00
7 – 9 hours	45	41.00
10 – 12 hours	12	11.00
12 hours and more	3	3.00

Mean from MUEQ regarding 7 domain work risk factors were presented in Table 2. The study indicates that the highest mean of work-related factors was body posture with a mean of 32.34, followed by the factors work environment, job demands and break time. With regards to the prevalence of CANS, we found that complaints of pain at neck was the highest, with 53.6% (n=59) of those surveyed, followed by complaints of pain at the shoulders [53% (n=58)], wrist 33% (n=36) and hand 33% (n=36). The summary of the prevalence of CANS is detailed in Table 3.

Table 2 Mean of risk work related factors to CANS based on participant's scores in MUEQ (Section 2)

Characteristics	n= 110	Mean	Std. Deviation (SD)
Work station	110	12.40	2.359
Body posture	110	32.34	5.763
Job control	110	18.36	5.154
Job demand	110	20.49	6.056
Break time	110	20.05	5.657
Work environment	110	26.30	5.418
Social support	110	13.01	3.811

Table 3 Prevalence complain of pain at neck, shoulder(s), upper arm, elbow(s), lower arm(s), wrist(s) and hand(s) based on participant's scores in MUEQ (Section 2)

Complaint of pain	n=110	Percentage %	Gender				Work Sector			
			Male		Female		Government		Private	
			%	n	%	n	%	n	%	n
Neck										
No	51	46.4	58.8	30	35.6	2	41.8	23	50.9	28
Yes	59	53.6	41.2	21	64.4	38	58.2	32	49.1	27
Shoulder(s)										
No	52	47.3	56.9	29	39	23	47.3	26	47.3	26
Yes-left	4	3.6	3.9	2	3.4	2	7.3	4	0	0
Yes-right	15	13.6	9.8	5	16.9	10	10.9	6	16.4	9
Yes- both	39	35.5	29.4	15	40.7	24	34.5	19	36.4	20
Upper arm										
No	76	69.1	70.6	36	67.8	40	69.1	38	69.1	38
Yes-left	3	2.7	0	0	5.1	3	1.8	1	3.6	2
Yes-right	12	10.9	15.7	8	6.8	4	10.9	6	10.9	6
Yes-both	19	17.3	13.7	7	20.3	12	18.2	10	16.4	9
Elbow (s)										
No	91	82.7	86.3	44	79.7	47	78.2	43	87.3	48
Yes-left	0	0	0	0	0	0	0	0	0	0
Yes-right	7	6.4	7.8	4	5.1	3	7.3	4	5.5	3
Yes-both	12	10.9	5.9	3	15.3	9	14.5	8	7.3	4
Lower arm (s)										
No	86	78.2	82.4	42	74.6	44	74.5	41	81.8	45
Yes-left	3	2.7	0	0	5.1	3	3.6	2	1.8	1
Yes-right	8	7.3	11.8	6	3.4	2	7.3	4	7.3	4
Yes-both	13	11.8	5.9	3	16.9	10	14.5	8	9.1	5
Wrist (s)										
No	74	67.3	68.6	35	66.1	39	70.9	39	63.6	35
Yes-left	7	6.4	5.9	3	6.8	4	9.1	5	3.6	2
Yes-right	17	15.5	15.7	8	15.3	9	7.3	4	23.6	13
Yes-both	12	10.9	9.8	5	11.9	7	12.7	7	9.1	5
Hand (s)										
No	74	67.3	72.5	37	62.7	37	63.6	35	70.9	39
Yes-left	2	1.8	0	0	3.4	2	1.8	1	1.8	1
Yes-right	15	13.6	15.7	8	11.9	7	12.7	7	14.5	8
Yes-both	19	17.3	11.8	6	22	13	21.8	12	12.7	7

In addition, we found that the higher numbers of participants had low levels of computer ergonomic awareness, as only 19.09% (n=21) from the government sector and 10% (n=11) from the private sector reported to know what ergonomics was. Furthermore, the participants did not how to implement correct computer ergonomics, as only 10.91% (n=12) of government office workers and 4.55% (n=5) of private office workers were able to answer all questions correctly regarding

picture knowledge of ergonomics. Despite low levels of ergonomic knowledge among the workers, 86.4% (n=95) believed that poor ergonomics practices could potentially lead to physical symptoms.

As seen in the results, there were associations between the prevalence of CANS with work related factors listed in MUEQ in Table 4. The work risk factors; work station, body posture, break time and social support were all found to have weak correlation (r= <0.5) with complaints pain at neck, shoulders, upper arm, elbow, lower arm, wrist and hand. Again, a weak association (r= <0.5) was recorded between complaints of pain at wrist and duration of hours working using computer. This data is presented in Table 5. We also found that there was a weak association (r= <0.5) between complaints of pain at upper arm and wrist region with level of ergonomic knowledge. The data is presented in Table 6. On the other hand, there was no correlation between prevalence of CANS with duration years) of working.

Table 4 Spearman correlation between complain of pain (CANS) and work related factorsbased on participant's scores in MUEQ (Section 2)

Complaints of pain (n=110)	Work station (n=110)	Body posture (n=110)	Job control (n=110)	Job demands (n=110)	Break time (n=110)	Work environment (n=110)	Social support (n=110)
Neck	-.025	-.365**	-.063	-.071	.206*	.161	-.013
Shoulders	-.156	-.403**	-.010	-.175	.095	.023	.061
Upper arm	-.177	-.401**	.020	-.091	-.031	-.093	.033
Elbow	-.039	-.266**	.171	-.022	.118	-.001	.201*
Lower arm	-.112	-.093	.093	-.169	.065	-.107	.061
Wrist	-.191*	-.198*	-.124	-.054	.046	-.043	-.004
Hand	-.186	-.307**	-.051	-.012	.015	.000	.089

**Correlation is significant at the 0.05 level (2tailed)*
***Correlation is significant at the 0.01 level (2tailed)*

Table 5 Spearman correlation between complain of pain (CANS) and duration of hours working using computer based on participant's scores in MUEQ (Section 2)

Complaints of pain (n=110)	Duration of hours working using computer (n=110)
Neck	.052
Shoulders	.097
Upper arm	.123
Elbow	.016
Lower arm	.126
Wrist	.275**
Hand	.114

***Correlation is significant at the 0.01 level (2tailed)*

Table 6 Spearman correlation between complain of pain (CANS) and level of ergonomic knowledge based on participant's scores in MUEQ (Section 2)

Complaints of pain (n=110)	Level of ergonomics knowledge (n=110)
Neck	.158
Shoulders	.157
Upper arm	.235*
Elbow	.093
Lower arm	.081
Wrist	.196*
Hand	.179

***Correlation is significant at the 0.05 level (2tailed)*

DISCUSSION

In this study, 110 office workers (n=110) participated, where they represented the government sector and private sector around Selangor and Kuala Lumpur. Based on the results, highest mean of work-related factors was body posture, followed by work environment, job demands and break time. Body posture can be said to be the position of an individual while does their work task using computer. Therefore, it can be said that majority of the office workers

did not know how to practice correct body posture when using a computer in terms of body posture while sitting, while using a keyboard and posture while looking at the monitor. As for the prevalence of CANS, it was reported all the participants experienced at least pain in one part of their body region.

In addition, majority of office workers in Selangor and Kuala Lumpur have low levels of computer ergonomic awareness and did not how to implement correct ergonomics while using computer. The level of ergonomics awareness reported in this study are quite similar in Sri Lanka where a study done showed the level of ergonomic awareness was low and they did not know to implement correct posture when using a computer[1]. Besides, this result was predictable, since the highest mean of work-related factors asked in MUEQ was a body posture which it is related to the knowledge of ergonomic among participants while using computer.

In addition, this study also depicted similar results with other studies, where there were associations between the prevalence of CANS; neck, shoulders, upper arm, elbow, lower arm, wrist and hand with work related factors; work station, body posture, break time and social support. The studies associate the upper musculoskeletal extremity complaints among computer office workers with both work related psychosocial and physical factors[4,8,20].High job demands, low decision latitude, time pressure, mental stress, job dissatisfaction, high workload and lack of social support from colleagues were all suggested as risk factors of upper extremity musculoskeletal disorder[21,22].Psychosocial factors are also important determinants of CANS among computer office workers, where it was found that high job demand, low decision of autonomy, time pressure, mental stress, high workload, job dissatisfaction and lack of support from colleagues are all risk factors of CANS[21].However, there was a low correlation between prevalence of CANS and work-related factors. This is probably due to the small sample size in this study, where the participants for this study were 110 office workers (n=110).A similar study reported a strong correlation and this is probably due to the large sample size of office workers (n=2500)[1].

Our results show a weak association between complaints of pain at wrist and duration of working hours using a computer. The significant association of musculoskeletal symptoms and duration of computer use was also reported in another study in Denmark, where computer users with a long duration of use experienced more musculoskeletal symptoms than those with shorter duration of use[25]. Computer work in general seems to be characterized by repetitive movements which may be a risk factor for musculoskeletal symptoms. Higher prevalence of symptoms in the wrist were proven by the positions of ulnar deviation and wrist extension among mouse users who worked 4 – 6 hours per day and over 7 hours per day[2]. Again, our result shows weak correlation and once again this finding could be due to the small sample size (n=110).

We found a weak association between complaints of pain at the upper arm and wrist region with levels of ergonomic knowledge. This finding was supported by another study that confirmed that poor ergonomic conditions at the workstation will contribute to musculoskeletal symptoms or disorder[20]. Modification of incorrect postures at work and improvements in the ergonomic designs of the workstation could be important, not only as primary preventive strategies but also as secondary preventive measures in those with symptoms[1]. This study recruited only 110 office workers as participants and this could be the reason why the results show weak correlations. It is entirely possible that the higher the number of participants recruited, the stronger the correlation results between variables[36].On the other hand, there was no correlation between the prevalence of CANS with duration of working years. . In this respect, caution needs to be taken when considering the accuracy of duration of working years reported using a computer and hours using computers by self-reports generally found the numbers to be overestimated[9].

CONCLUSION

It can be concluded from this study that office workers in Selangor and Kuala Lumpur have a high prevalence complaints of pain at neck, arm and shoulder (CANS). The increasing number of CANS in Selangor and Kuala Lumpur office worker population was found to be associated with work risk factors such as work station, body posture, break time and social support. Furthermore, the duration working using computers and levels of ergonomic knowledge were also identified as the factors that lead to CANS.

The present study has several limitations that can be taken into consideration for future studies. Firstly, the questionnaire used in this study is lacking in validity and reliability for Malaysian population. Moreover, the questionnaire is in English, and it might be difficult to be understood by office workers in Malaysia, whose first language is Malay. Therefore, further research could be conducted by translating the questionnaire into Malay language to find validity and reliability in a Malaysian population. Future research could be done by recruiting office workers from all over Malaysia including Peninsular Malaysia, Sabah and Sarawak as a true representation of the Malaysian population, as there is limited data on the prevalence of CANS in Malaysia.

Researchers may evaluate the level of ergonomics based on Occupational Safety and Health Association (OSHA) computer ergonomics checklist and cooperate with the National Institute Occupational Safety and Health (NIOSH) organization in Malaysia to self-check the office computer ergonomics to get more accurate data and relation regarding ergonomics in office settings. Incorporation of the Interview technique might be effective to reduce bias from the self-reporting technique done in this study.

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