The Effect of Workplace Office Ergonomics Intervention on Reducing Neck and Shoulder Complaints and Sickness Absence

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Abstract. The effect of office ergonomics intervention on neck and shoulder complaints and sickness absence was explored in this study. A cluster randomized controlled trial was conducted in which three units were randomized to intervention and received training and three units were given a leaflet and no training. The effect of intervention on musculoskeletal complaints and sickness absence were assessed at 6 and 12 months. The results showed that there were significant reductions in neck complaints but did not reduce the number and episode of sickness absence among workers. In conclusion, office ergonomics training can be beneficial in reducing neck complaints among workers.

Keywords: Cluster Randomized Controlled Trial, Office Ergonomics Training, Computer User, Musculoskeletal Complaints

1. Introduction

Workers spend many hours working with computers each day, and the pains and aches experienced by those working with computers, makes them vulnerable to work-related musculoskeletal disorders (MSDs) [1-2]. Numerous cross-sectional studies have reported neck and upper extremities discomforts as computer-related disorders [3-9]. One longitudinal study also reported that the longer hours spent on mouse and keyboard would increase the risk of having the neck and shoulder disorders [10].

The prevention of the development of MSDs is essential. This is to reduce the escalating costs related to medical, compensation and litigation, emotional distress and demoralization of workers [11]. It was reported in previous studies that workers who have a history of musculoskeletal pain have higher risk of short and/or long term sickness absence [12-13]. Ergonomic interventions in the form of personal (education) and behavioral interventions (workstation adjustments) may provide solutions to these problems. One study comparing different styles of training found positive results in the reduction of pain/discomfort and psychosocial work stress among those who received participatory and traditional education [14]. Four randomized controlled trial studies investigated the effect of an education strategy on MSDs and behavioral changes and were followed up between three to 12 months. These studies reported reduction in MSDs rate [15-17], and less pain/discomfort and symptom severity [18]. On the other hand, there was no effect reported in the incidence of neck/shoulder symptoms in Gerr et al. study comparing three intervention groups [19]. The interventions consisted of workstation reconfigured based on the protective factors for both neck/shoulder and hand/arm symptoms and verbal and written instructions for posture guidelines, workstation reconfigured based on recommendations from a number of sources, including OSHA and no intervention.

Given the important of training as an initial step in providing information for proper technique working with computer, it is the aims of this study to investigate the effectiveness of office ergonomics training on neck and shoulder complaints and sickness absence among computer users. The respondents were chosen because they have very low awareness of office ergonomics and there was no serious effort made by the management to upgrade the workstations ergonomically [20].

2. Method

A cluster randomized controlled trial study was conducted in which three units were randomized to intervention group and received training and three units were given a leaflet (control group). A random

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number table was used in assigning the units to intervention and control group. Respondents were blinded as to whether they belong to the experimental or control group but researchers were aware of the group allocation. Respondents were given a baseline questionnaire before the commencing of the training program. Those who did not fulfill the inclusion criteria (at least three hours working with computer per day and either on permanent or contract employment) were excluded. Respondents who reported an existing injuries and/or illness which may contributed to MSDs were also excluded from the study. The one-day in house office ergonomics training was conducted by the trainers from the National Institute of Safety and Health (NIOSH). Training consisted of lectures on office ergonomics (morning session) and workstations adjustment (afternoon session). The lectures consisted of ergonomics principles, work-related MSD awareness, information about workstation set-up and computing working posture and the importance of break and stretching exercises. The workstation adjustment refers to the evaluation of workstations and suggestion on how to improve them. The adjustment of workstations was limited to the available furniture.

Self-reported neck and shoulder complaint was assessed at 6 and 12 months, based on a binary data: Yes or No. The questionnaire was based on the modified Nordic Questionnaire [21]. Sickness absence was measured by two items : "In the last 6 months, how many days (approx.) in total have you had off work due to work-related musculoskeletal complaints?" and "In the last 6 months, how many separate times have you had time off work due to work-related musculoskeletal complaints?"

The effects of training on neck and shoulder and sickness absence were analyzed by Analysis of repeated measures (ANOVAs). Difference scores were used for analysis if there were significant differences at baseline.

3. Results

3.1. Response rate

There were 89 respondents in the intervention group and 90 respondents in the control group. The response rate at 12 months was 71.6% for intervention group and 77.5% for control group. A total number of 8.9% (intervention group) and 1.1% (control group) respondents drop out from the study because of resignation. Respondents with the same ID were included in the analysis. Therefore only 42 respondents for intervention group and 50 respondents for control group were included for analysis.

3.2. Self-reported musculoskeletal complaints

Table 1: Results of repeated measures ANOVAs for neck and shoulder complaints

Musculoskeletal complaints	*Within subjects effects*	*Between subjects effects*		**Interaction effects**
	Main time effect	Main group effect	Contrast analyses	Group*time effect
Neck	F (1.900) = 2.404 (p = 0.096)	F = 22.882 (p = < 0.0001)	CG > TG (p = < 0.0001)	F = 5.289 (p = 0.024)
Right shoulder	F (1.903) = 2.302 (p = 0.106)	F = 9.228 (p = 0.003)	CG > TG (p = 0.003)	F = 1.936 (p = 0.168)
Left shoulder	F (2) = 0.097 (p = 0.907)	F = 6.040 (p = 0.016)	CG > TG (p = 0.016)	F = 0.411 (p = 0.523)

There was a reduction of musculoskeletal complaints at 12 months for neck and shoulder regions. The results showed that there was a significant interaction between groups across time for neck, but was not significant for shoulder (Table 1). There was consistently increase of complaints in the neck region in the control group. The reported complaint in the left shoulder was consistent at all three times and there was a

slight decrease of complaints for right shoulder at 6 months. There were no significant differences of neck and shoulder complaints over time in the control group.

3.3. Number of days and episodes of sickness absence

There were no significant interactions between groups over time for the number of days and episodes of sickness absence in the training and control groups (Table 2).

Table 2: Results of repeated measures ANOVAs for the number of days and episodes of sickness absence using difference scores

Sickness absence	*Within subjects effects*	*Between subjects effects*	**Interaction effects**
	Main time effect	Main group effect	Group*time effect
Number of days of sickness absence	F (1.161) = 0.039 (p = 0.876)	F = 1.162 (p = 0.284)	F = 0.001 (p = 0.978)
Episodes of sickness absence	F (2) = 0.020 (p = 0.981)	F = 0.326 (p = 0.569)	F = 1.813 (p = 0.182)

4. Discussion

The results from this study reported that a one day ergonomics education program is beneficial in reducing neck complaints among respondents. This is supported by the previous studies that office ergonomics training can reduce the risks of musculoskeletal disorders (MSD) among computer users [14,18]. On the other hand, other studies reported that ergonomics training could not reduce the symptoms of musculoskeletal complaint unless it is paired with adjustable chairs [22]. A similar result was found with Robertson (2008) study that training plus flexible work station reduces MSD [23]. Although this study has limitation, that respondents were not equipped with adjustable workstation; the results showed that basic training can help in reducing neck complaints. It was also found that that the neck complaints did not have an effect on the sickness absence. There were no significant differences in sickness absence in both groups. The explanation of the results could not be provided as we only measure the reduction/increase of complaints (Yes/No) and not the severity of the symptom. Further exploration is needed to explain the relationship between the two variables.

The limitation of our study is the contamination factor in terms of knowledge sharing between clusters while attending courses and/or engaging in social interactions. This is because respondents are from the same geographical area but from different location. We could not adjust for effect of possible confounders because of the small sample size.

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