

The effects of exercise reminder software program on office workers' perceived pain level, work performance and quality of life

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Abstract. In direct proportion to current technological developments, both the computer usage in the workplaces is increased and requirement of leaving the desk for an office worker in order to photocopy a document, send or receive an e-mail is decreased. Therefore, office workers stay in the same postures accompanied by long periods of keyboard usage. In recent years, with intent to reduce the incidence of work related musculoskeletal disorders several exercise reminder software programs have been developed. The purpose of this study is to evaluate the effectiveness of the exercise reminder software program on office workers' perceived pain level, work performance and quality of life. 39 healthy office workers accepted to attend the study. Participants were randomly split in to two groups, control group (n=19) and intervention group (n=20). Visual Analogue Scale to evaluate the perceived pain was administered all of the participants in the beginning and at the end of the study. The intervention group used the program for 10 weeks. Findings showed that the control group VAS scores remained the same, but the intervention group VAS scores decreased in a statistically significant way ($p<0.01$). Results support that such exercise reminder software programs may help to reduce perceived pain among office workers. Further long term studies with more subjects are needed to describe the effects of these programs and the mechanism under these effects.

Keywords: musculoskeletal disorders; VAS; preventive training

1. Introduction

Nowadays, due to the increasing computer usage rate, office workers have become more and more dependent to their desks [1, 2]. According to data from the European Foundation of Living and Working Conditions the percentage of workers who use computer "all the time" or "almost all the time" is 19% in the European Union [3]. Although there is no such statistical data in our country, the rate is thought to be similar.

Computer work requires looking at monitor and repetitive movements of the fingers, hands and wrists besides maintaining static postures for a long time [4]. Despite the low level of physical load of computer work requires staying in the same position for a long

time and repetitive movements which may cause musculoskeletal problems [5]. Frequent rest breaks are recommended to prevent the onset of problem by reducing static loads on the musculoskeletal system. But workers generally continue working until the problem occurs [6]. Several software programs have been developed in order to reduce musculoskeletal problems due to the long term computer usage in recent years [7]. There are several studies supporting the effectiveness of these programs in the literature [2, 4, 8, 9, 10, 11, 12]. American Ergotherapy Association (AOTA) also suggests use of exercise reminder software [13]. Several minor changes such as office exercises and additional rest breaks, are cost effective. Also in several studies, it has been shown that such interventions are advantageous [14, 15].

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The studies in the literature have searched the relation between exercise reminder software and satisfaction, compliance and musculoskeletal discomfort. But still there are not many studies on this issue [5, 16].

In our country there was no Turkish software which reminds the office workers to take break and do exercises. Additionally there are limited number of studies on this issue. The purpose of this study was to evaluate the effects of an exercise reminder software program on perceived pain, work performance and quality of life.

2. Method

39 healthy office workers were accepted to attend the study. The inclusion criteria were to be 20-65 years old, to have at least 4-5 hours daily computer usage, not to have acute orthopedic problem and not to have mental problem which barriers to read and understand. Participants were given an informed consent form. Participants were randomly split into two groups, intervention group (n=20) and control group (n=19). The intervention group used the program for 10 weeks, and the control group received no intervention. Visual Analogue Scale (VAS) to evaluate the perceived pain, Turkish version of Work Role Functioning Questionnaire (WRFQ) [17] to evaluate the perceived work performance and Short Form-36 (SF-36) to evaluate the quality of life were administered all of the participants in the beginning and at the end of the study.

Features of the software: There were 53 strengthening, stretching and posture exercises for all body parts which were suitable for office environment. Also there was an ergonomic advice slide. The frequency of exercises was 2 exercises per 45 min (Figure 1) [18].

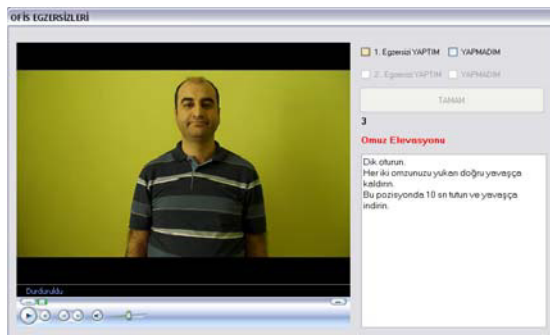


Figure 1. Office exercises software program

3. Results

The difference between the baseline pain levels of the two groups were not statistically significant ($p>0,05$). The change of the VAS scores were calculated and compared. Following the intervention the rest VAS scores of the intervention group decreased in a statistically significant way ($p<0,05$). According the Mann Whitney U test the difference between the groups was statistically significant in VAS scores ($p<0,01$). In the post-intervention evaluation both rest and activity VAS scores of intervention group were lower than control group in a statistically significant way ($p<0,005$) (Table 1).

Table 1. Comparison of the difference in the VAS scores of groups

VAS	Groups		U	p
	Interven- tion D ± SD	Con- trol D ± SD		
Rest	-0,89 ± 1,23	0,25 ± 1,38	70	0,005*
Activ- ity	-0,3 ± 1,42	0,98 ± 1,26	67	0,004*

* $p<0,01$

When the two group were compared, there is no statistically significant difference between the groups according to SF-36 and WRFQ scores ($p>0,05$).

4. Discussion

Results showed that the exercise reminder software is effective in reducing pain. However, it has no effect on work performance and quality of life. These results seem to conflict with each other. In order to evaluate the work performance we applied questionnaires which is a subjective way. There are several objective outcome measures such as keystroke, daily document number or work speed. Unfortunately the participants nonstable work schedule was not appropriate for such an evaluation.

Van Den Heuvel et al. performed a randomized controlled study on the effects of an exercise reminder software program on recovery [7]. In this study the participants slip into a control group and two intervention groups. Participants in the first intervention group stimulated to use a rest break reminder software program, others stimulated to perform exercises during the extra breaks. In terms of frequency and severity of complaints did not differ between groups. Workplace adjustments and information booklet were provided before the onset of the study in all groups. That could have influenced the results. In our study, lack of any intervention in the control group may have resulted in more significant results. While there was no statistically significant difference between the activity VAS scores before and after intervention in the intervention group, the scores in the control group were increased. This results suggest that a possible increase in pain may be prevented by the exercise reminder software program.

In a study investigating the effects of short-term office exercises, an exercise reminder software called Dataspan was downloaded on the participants' computers [19]. Results showed that the computer-assisted exercises may reduce short-term discomfort among office workers.

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- Continuous and intermittent static muscular work are among the risk factors for work related musculoskeletal disorders [20]. The balance between muscle fatigue and recovery will reduce probability of occurrence of symptoms. In this context our study aimed to reduce pain by dividing fatigue periods with exercise breaks.
- With the spread of the use of computers in the workplace, it has become essential to examine how this change affects the health and wellbeing. In order to explain behavior changes several models have been developed. Transtheoretical model is a widely used model in behavioral changes. According to this model, stages of change are pre-contemplation, contemplation, preparation, action and maintenance. If activity is maintained for 6 months, maintenance step is achieved. Relation between exercise habit stage and quality of life was examined. It is found that quality of life scale scores increase across the stages from pre-contemplation to maintenance [21]. According to these findings, lack of time to reach maintenance step may be the reason for no change in SF-36 scores in intervention group. Further long term studies with more subjects are needed to describe the effects of these programs and the mechanism under these effects.
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