A RANDOMIZED CONTROLLED TRIAL COMPARING THE EFFECTS OF REST BREAKS AND EXERCISE BREAKS IN REDUCING MUSCULOSKELETAL DISCOMFORT IN STATIC WORKSTATION OFFICE WORKERS

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Abstract

AIM: The aim of this clinical trial was to compare the effectiveness of Rest Breaks and Exercise Breaks in reducing work related musculoskeletal discomfort in static workstation office workers.

METHODS: This study was conducted at a corporate sector organization in Karachi, between August, 2014 and February, 2015. A total of 32 participants, 26 males and 6 females with musculoskeletal discomfort working in static work station, were randomly allocated to two interventional groups (16 in each group). One group received a Supplementary Rest Break Intervention and the other group received Exercise Break Intervention. Visual Numeric Rating Scale (VNRS) and Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) were used to evaluate the self-perceived discomfort and general body discomfort respectively. Pre- and post- scores of VNRS and CMDQ were recorded. Paired sample T-test was used to analyze the results within groups and independent t-test was used to compare the effectiveness among the two treatment protocols.

RESULTS: A statistically significant differences favoring the outcomes of the patients in Exercise Breaks group compared to the outcomes of the patients in Rest Breaks group were observed on self-perceived discomfort ($p<0.05$) and general body discomfort ($p<0.05$).

CONCLUSION: Exercise Breaks provide better protection than Supplemental Rest Breaks in decreasing musculoskeletal discomfort.

KEY WORDS: Exercise Breaks, Rest Breaks, Static Workstation, Ergonomics, Office Workers, Musculoskeletal Discomfort, Musculoskeletal Disorders (MSD's), Visual Display Unit (VDU), and Ergonomics.

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INTRODUCTION

Office workers working in static work station in countries like Pakistan are used to work continuously for many hours using a visual display unit or a computer. Similarly, a large number of population over 77 million people in USA[1] and 88 million in the European Union[2] are using computer at their work. On average, six persons per thousand people are using computer with a persistent increase in this figure over time[3]. Continuous computer use has come to be very prevalent in the former decade and a large proportion of population with musculoskeletal discomfort has been reported[4-5]. One of the reasons for this is exposure of these workers to a variety of risk factors associated with computer usages[6,7]. The common signs reported with these injuries included fatigue or tension in the involved musculature, numbness or paresthesia, pain or physical/biomechanical strain in the soft tissue structures and/or bones[8-9], the prognostic of which are either the scarce postural variations or the occurrence of discomfort when sitting[10].

Nearly three fourth of all persons using a computer declared having some sort of musculoskeletal problems[11]. The general occurrence of musculoskeletal symptoms of distress among computer workstation has been reported 50%-76. 5% among static workstation office workers[11], most of which were found to be

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in their spine (back 80-82% & neck 70-72%)[6,12,13] and upper limb (24-44%)[4,14,15,16]. It has also been established that there is a steady upsurge in musculoskeletal and visual symptoms as the work hours spent per day on a computer were increased. The prevalence of musculoskeletal complications is not solitary reliant on the occupation but likewise the working atmosphere and posture adapted by the person[11,3].

Numerous interventions are employed to reduce musculoskeletal discomfort secondary to static workstation tasks[17]. These interventions are either individual, organizational or ergonomic adjustments[17]. The individual interferences comprise everyday exercises along with termination of cigarette use[18,19,20,21]. On the other hand, the organization interventions included improved task diversity, diminished computer usage[20], intensified rest and exercise break prospects[21,22]. Ergonomic modifications are the most often employed[17], however they are not adequate for totally removing work related musculoskeletal discomfort[9]. In certain circumstances ergonomic intervention produced no variations suggesting to integrate organizational modification with ergonomic modifications and interventions[17].

Supplemental rest breaks and workstation exercise breaks are employed as organizational interventions for the intention of lessening Work Related Musculoskeletal Disorders (WMSDs) and discomfort arising from computer tasks[17] that has been reported economical and profitable[23]. Rest breaks are defined as termination of computer without been involved in physical activities that are considered exercises[17]. Though, inadequate prospects for rest breaks is a significant contribution in various musculoskeletal disorders among workers using computer[5]. Exercise breaks are small breaks during work timings to diminish muscular discomfort by performing overall strengthening and stretching exercises. Numerous exercises have been suggested to decline musculoskeletal distress, with variable levels of efficacy[24,25]. These exercises comprise of stretching and methods of relaxation that can be executed at a VDU workplace in less than 10 min[17].

Scientific evidence shows that workstation exercise breaks are advantageous in declining musculoskeletal discomfort[23-30] and supplemental rest breaks[23,26,5,27]. Though there is no existing evidence on supplemental rest breaks nor exercise breaks in decreasing musculoskeletal discomfort under paced conditions[28]. Externally paced situations are those in which the total work load for a worker is proscribed externally and not by the worker him/herself. It is recommended that it may be because externally paced situations bound a worker's capability to have self-administered Rest Halts or Exercise Breaks from his/her Computer Workstation[29,30,31,22]. The lacunae that the effects of exercise break[35,36] and Rest Breaks[37,38] have not been compared previously led the authors to conduct this clinical trial in order to compare its effects on workers working in static working stations.

METHODS

This study was conducted between August, 2014 and February, 2015 after being approved by the institutional review committee of Institute of Physical Medicine and Rehabilitation. A total of 32 participants were selected from Octara International, Karachi using the non-probability convenience sampling. The inclusion criteria was limited to those workers working on a static workstation using a computer for at least 6 hours per day having musculoskeletal pain or discomfort greater than 2 weeks. The exclusion criteria were discomfort from non-musculoskeletal origin, musculoskeletal pain from any reason other than work, recent history of trauma and receiving any medical or physical treatment for the current condition. A total of 32 participants (26 males and 6 females) were randomly allocated to rest break and exercise break groups using computer generated random numbers. Prior to Intervention the 'Visual Numeric Rating Scale' and 'Cornell Musculoskeletal Discomfort Questionnaire (CMDQ)' were filled by the participants of both groups.

Participants in the rest breaks group received 'Supplemental Micro Breaks', of 30 seconds after every 15 minutes of working on a static computer workstation in addition to the two 'Conventional Rest Breaks' of 15 minutes twice a day during the work hours. During the rest breaks cessation of static computer tasks was required, though it was not requisite to stay static; but the participant were advised not to execute any sort of exercise. Individuals in the exercise group received 'Exercise Breaks', of 10 minutes, twice a day during the work hours, in addition to the two 'Conventional Rest Breaks' of 15 minutes, twice a day during the work hours. A total of 12 exercises were included in the exercise break protocol, which were shoulder shrugs, neck tilts, wrist and forearm stretch (2 exercises), back and hip stretch, upper body stretch, hamstring stretch, upper back stretch, hand/finger stretch, side stretch and neck stretch. In addition to the two protocols, all participants received ergonomic training, workstation modification and postural education.

Prior to the intervention and training sessions, initially a pre interventional score of the outcome measurements was obtained from the participants on the first day in the two groups. The follow up scores were obtained by the participants after 5 weeks for the two groups. SPSS v16.0 was used for statistical analysis. A *p*-value of <0.05 was considered significant for the interpretation of results. Independent sample *t*-test was used to compare the effectiveness among

Table-I: P-Values for Base line similarity among the Rest Break & Exercise Break groups

Variable	P-Value
Age	0.81
Gender	1.00
Baseline VNRS	0.659
Baseline CMDQ	0.814

VNRS-visual numeric rating scale, CMDQ-cornell musculoskeletal discomfort questionnaire

Table-II: Pre & Post Results of Rest Break & Exercise Break groups

Outcome Measures	Pre-Values	Post-Values	p-value
VNRS	7.09 (1.17)	4.10 (1.14)	0.00
CMDQ	164.41 (58.45)	28.48 (14.50)	0.00

VNRS-visual numeric rating scale, CMDQ-cornell musculoskeletal discomfort questionnaire

Table III: Comparison of Outcomes in Rest Break & Exercise Break groups

Outcome Measure	Rest Break Group	Exercise Break Group	P-value
VNRS	4.50 (1.15)	3.70 (1.02)	0.045
CMDQ	35.39 (16.39)	21.59 (8.03)	0.006

VNRS-visual numeric rating scale, CMDQ-cornell musculoskeletal discomfort questionnaire

the two treatment protocols and paired sample T-test was used to analyze the results within groups.

RESULTS

There were no differences at baseline amongst the patients on age, gender and subjective assessment tools used in this trial. This suggests that both the groups were similar and comparable at baseline (Please see table I for baseline similarity).

Significant differences between the pre and post scores of the patients in both groups were observed on both VNRS and CMDQ (p-values 0.05) indicating that patient in both groups improved at the end of assessment (Please see table II).

To determine which treatment was more effective than the other, the two groups were compared using the independent t-test, which indicated Exercise Breaks to be significantly better than the Rest Breaks (p 0.05, (Table III).

DISCUSSION

The aim of this clinical trial was to compare the effects of rest breaks and exercise breaks amongst office workers working on computers in static workstation. Outcome of this clinical trial suggested a mean decline in self-perceived discomfort and general body discomfort in both groups suggesting that patients in both groups improved significantly following these types of exercise breaks. While comparing the outcomes between the two groups, the patients in the exercise group showed superior results compared to the patients in rest breaks group on self-perceived and general body discomfort. This suggests that exercise breaks were more effective than rest breaks in preventing discomfort associated with musculoskeletal. A combination of the both exercise showed superior outcomes that is in accordance to the previos trials carried out [23].

Clinical trials carried out on the effects of such breaks in reducing musculoskeletal discomfort on workers working on a static workstation reported similar outcomes [23,5,17,26,8]. In a clinical trials carried out by Balcia and Aghazadeh, a decrease in musculoskeletal distress in cervical, back, trunk and upper extremity was reported [23]. The micro break rest schedule was found to be most effective[23]. Similarly, a study conducted by Galinsky et al showed that supplementary rest breaks resulted in a significant decrease in musculoskeletal discomfort and eye strain and also prevented build up during work timing. However no changes on distress and performance were reported due to stretching exercises [5]. A systematic review conducted by De Verra et al showed that majority of the included trials favour the use of rest and exercise halts both in reducing the musculoskeletal distress during static workstation chores. Though, literature demonstrates no added profits of exercises above unaided rest halts[17]. Van Den et al showed productivity to be highest in the breaks only group as compared to exercises and control group [8]. Mclean et al evaluated a decrease in musculoskeletal discomfort in micro break protocols in all regions as compared to the control group though the productivity was not significantly increased by micro breaks[27].

On the other hand numerous studies supported the concept of using exercise breaks as organizational interventions in reducing musculoskeletal discomfort[28,34,36,17]. A study conducted by Fenety and Walker showed a significant decrease in perceived discomfort when participants exercised at 30, 65 and 115 minutes[28]. Saltzman examined the impact of stretch break and reported reduction in muscle ache, stiffness and stress with short exercise breaks along with increased productivity and enjoyment with using stretch breaks while working at computer workstation[34]. Thomson demonstrated a minimized distress during tasks and a largely enhanced state outside of office work beside 25% upsurge in efficiency[36]. Swanson and Sauter demonstrated efficiency decreased more significantly in the passive rest break group than the exercises group[5]. Henning examined the effect of small rest halts along with exercise on musculoskeletal distress and symptoms, attitude and efficiency at 2 ground locations and found improvement in leg, feet and eye comfort and productivity at small work site in both treatment conditions[22]. Van Den et al presented that together the two management clusters demonstrated significant improvement in musculoskeletal discomfort as compared to the no intervention group. Though, there was no difference in recovery among the two intervention groups[8].

Despite supporting evidences for both the treatments in some studies, results were inconclusive in other[5,38,39]. In a study conducted by Swanson and Sauter, distress amplified in the two protocols during the course of the work timing, highest in the region of trunk, cervical and upper limb. No difference was found among the clusters in attitude and musculoskeletal distress[5]. Similarly Boucsein and Thum showed that musculoskeletal distress along with fatigue amplified considerably in the two rest halt protocols, without any noteworthy alteration amongst both protocols[39]. Zwahlen et al showed an increase in musculoskeletal distress during the course of work hours. Though, investigators established the rest halts protocol to be extremely valuable in decreasing discomfort[38].

CONCLUSION

Based on the findings of this clinical trial, it may be concluded that that both rest breaks and exercise breaks are effective means of reducing general body musculoskeletal discomfort while working on a static workstation in externally paced conditions. However, Exercise Breaks produce better outcomes in improving the general body musculoskeletal discomfort compared to supplemental rest breaks. Therefore exercise breaks along with supplementary rest breaks should be implemented as an organizational intervention to decrease the musculoskeletal discomfort arising from working in a static workstation office setting as both of them are inexpensive and advantageous, in order to enhance the general health and wellbeing of the office workers.

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NOTES ON CONTRIBUTORS

The study was part of MO's Bachelors in Physical Therapy Education. MBAJ & HD supervised the dissertation, and was involved in every part of the analysis, idea's development, and write-up.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ETHICS APPROVAL

The approval/permission was obtained from Institute of Physical Medicine and Rehabilitation KMU.

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