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ORIGINAL RESEARCH

Effects of stretching exercise training and ergonomic modifications on musculoskeletal discomforts of office workers: a randomized controlled trial

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KEYWORDS

Musculoskeletal disorders;
Stretching exercise;
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Abstract

Objective: To evaluate the effectiveness of exercise, ergonomic modification, and a combination of training exercise and ergonomic modification on the scores of pain in office workers with neck, shoulders, and lower back pain.

Methods: Participants ($N=142$) in this randomized controlled trial were office workers aged 20–50 years old with neck, shoulders, and lower back pain. They were randomly assigned to either the ergonomic modification group, the exercise group, the combined exercise and ergonomic modification group, or the control group (no-treatment). The exercise training group performed a series of stretching exercises, while the ergonomic group received some modification in the working place. Outcome measures were assessed by the Cornell Musculoskeletal Disorders Questionnaire (CMDQ) at baseline, after 2, 4, and 6 months of intervention.

Results: There was significant differences in pain scores for neck (MD -10.55 ; 95%CI -14.36 to -6.74), right shoulder (MD -12.17 ; 95%CI -16.87 to -7.47), left shoulder (MD -11.1 ; 95%CI -15.1 to -7.09) and lower back (MD -7.8 ; 95%CI -11.08 to -4.53) between the exercise and control groups. Also, significant differences were seen in pain scores for neck (MD -9.99 ; 95%CI -13.63 to -6.36), right shoulder (MD -11.12 ; 95%CI -15.59 to -6.65), left shoulder (MD -10.67 ; 95%CI -14.49 to -6.85) and lower back (MD -6.87 ; 95%CI -10 to -3.74) between the combined exercise and ergonomic modification and control groups. The significant improvement from month 4 to 6, was only seen in exercise group ($p < 0.05$).

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Conclusion: To have a long term effective on MSDs, physical therapists and occupational therapists should use stretching exercises in their treatment programs rather than solely rely on ergonomic modification.

Clinical trial ID: NCT02874950 – <https://www.clinicaltrials.gov/ct2/show/NCT02874950>.

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Introduction

Musculoskeletal disorders (MSDs) are often associated with ergonomic risk factors,¹ and there is an association between the socioeconomic positions of workers and musculoskeletal pain at various anatomical sites of pain.² Evidence suggests ergonomic risk features including contact stress, awkward posture (positions of the body that deviate significantly from the neutral position while performing work activities), and repetition are the main cause of many ergonomic associated MSDs.³ Studies have demonstrated these ergonomic MSDs can lead to absenteeism and even disability,⁴ and also can lead to medical leave due to physical injuries/pain, and this can potentially have a negative influence on the financial productivity and efficiency of the employer.⁵ MSDs affect both the individuals' quality life and also have negatively impact on the productivity of the organization they are working with.

The musculoskeletal problems are especially predominant in industrialized countries since they affect approximately 70–80% of adults at some point in their lives.^{6,7} Most MSDs affect areas such as the neck, shoulders, and low back. The World Health Organization (WHO) has reported physique and working environment of a person, along with other sociological and psychosocial risks, can help work-related MSDs.⁸ This recommends a relationship between MSDs and working situations among workers of office.

The interventions and treatments suggested by earlier studies^{9,10} are oftentimes too general and expensive, with many recommendations require the specialists' consultation. A gap has also been identified in the literature since most studies^{11,12} only examine the short-term outcomes, such as a recent study which concluded that regular stretching exercises performed for four weeks can decrease neck and shoulder pain. However, it was not clear if the suggested exercise would result in long-term improvements.¹³ Therefore, the long-term effects of such treatments are often unknown. Some interventions have been used to treat ergonomic MSDs which includes, ergonomic modification, rest breaks, and workplace exercise.¹⁴ Though some of these interventions have been found to effectively reduce the symptoms of MSDs, the most effective intervention is the ergonomic modification, which can be effectively used for relief neck, shoulders, and lower back discomforts. To date, there is very limited information regarding the effects of a specific series of office training exercise on decreasing or preventing of MSDs in office workers, especially those with long time treatment. A recent review, concluded that there was moderate evidence of no benefit for job stress management training or office workstation adjustment for MSD

and symptoms, and it demonstrated that there is a need for using exercise training in the office setting,¹⁵ but there is not a specific package of office/home-based exercise for this purpose specially with focus on neck, shoulder and lower back.

The novelty of this research is related to the link made between sport science and occupational health and introduce a treatment, which has minimal side effects compared to other interventions and can improve companies' financial efficiency and productivity by decreasing MSDs-induced staff absence. Therefore, the purpose of this study was to evaluate the effects of a 6-month office training exercise, ergonomic modification, and a combination of the training exercise and ergonomic modification on the neck, shoulders, and lower back discomfort perception scores among office workers. It was hypothesized that 6 months intervention is able to reduce pain intensity among office workers.

Methods

Study type

A prospectively registered, three-arm, parallel, randomized, controlled trial. This trial followed the CONSORT recommendations as well as the TIdieR checklist for describing the interventions.¹⁶

Participants

The participants in this study (male = 85, female = 95) were office workers aged 20–50 years, working in Kuala Lumpur, Malaysia. Participants had to report an MSDs in at least one area of his/her body with medium/high severity of pain. Also, they had to participate in annual medical checkups performed by the company and their results were available. They voluntarily participated in this research (Table 1) from three various regions including the north, west, and east of the Selangor area, Malaysia (the manager of the south section did not agree to participate in this study). All participants had at least two years of experience working in offices and worked a typical shift (from 8:00 a.m. to 5:00 p.m.) with one hour of rest period from 1:00 to 2:00 p.m. However, they worked and sat on a chair during their entire work shift (i.e., for eight hours).

This study was conducted from August 2015 to April 2016 in Malaysia. Prior to participation in the study, medical history was completed by all participants. An informed consent form was signed by the participants who were in line with the Helsinki Declaration's ethical guidelines referring to the use of human participants in medical studies. This research

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