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The effect of an acupressure backrest on pain and disability in office workers with chronic low back pain: A randomized, controlled study and patients' preferences



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KEYWORDS

Low back pain;
Backrest;
Acupressure

Summary

Objective: This study investigated the effects of an acupoint-stimulating lumbar backrest on pain and disability in office workers who suffering from low back pain (LBP) as well as the preference influence on pain and disability.

Methods: Sixty-four participants were randomly assigned to two groups: one with no intervention ($n = 32$) and another with 1 month of backrest use ($n = 32$). An additional group ($n = 37$) who wished to try 1 month of acupressure backrest were recruited to indicate the preference effect. Pain and disability were two key outcomes.

Results: Significant differences between control and randomized acupressure backrest groups were found at 2 week period for disability and at 4 weeks for pain after the backrest use. Also, significant differences were found in both groups for 3 month period with an increase of the treatment effect on pain and disability. Both control and randomized acupressure backrest groups showed greater improvement in pain and disability scores which were more than the minimal clinically important change (30% improvement for both outcomes). No significant difference was found for pain and disability between the randomized and preferred backrest groups.

Conclusion: These findings suggested 1-month of acupressure backrest use could improve LBP conditions. Preference was not a powerful moderator to the significant treatment effect.

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Introduction

Low back pain (LBP) is the most common musculoskeletal disorder. Incidences of LBP are growing and creating an economic burden for society.¹ The total costs of LBP in the United States exceed \$100 billion per year.² In Thailand, the reported cost of management for low back pain in Thailand was about \$72.59 USD per person in one year.³ Thirty-four percent of 1428 Bangkok office workers surveyed were found to experience low back pain during a period of 12 months, which they attributed to work.⁴

Office workers who mostly spent prolonged periods of work seated regarded their chairs as crucial workstation equipment. Several aspects of chair design were mentioned in healthy and safety guidelines for computer ergonomics.^{5,6} One of the important factors for workers seated for prolonged periods is reduction of load through the lumbar spine. The reduced load could be achieved by transferring body weight through the armrests and feet as well as through the backrest.⁷ Backrests have become the focal point of several studies.^{8–10} Several designs of backrests have been proposed.^{11–13} The guidelines for office ergonomics recommended that a backrest should support the lumbar spine⁶ with have a specific size without restricting movement of the spine or upper extremity.¹⁴ Many studies were conducted to explore the effects of backrests with lumbar support while seated among normal subjects,^{10,11,15} but few clinical research studies involving LBP were conducted.^{15,16} Some of them indicated positive effects of backrests with lumbar support for LBP¹⁵ however, the treatment effect of backrests was still inconclusive. Therefore it was important and necessary to further develop the backrest and investigate its curative effects for LBP among office workers who sit for protracted periods.

Acupressure, a complementary and alternative therapy, has received increasing attention for its manipulated method, which uses fingers instead of needles on the acupoints. The mechanism of pain relief under the acupressure effect is caused by increasing threshold pressure, circulating blood and reducing waste products such as substance P and histamine.¹⁷ In addition, the gate control theory of Wall and Melzack¹⁸ could explain the pain theory and the endorphin release.¹⁹ The effect of acupressure for LBP has been demonstrated by a randomized, controlled trial.^{20,21} Based on the knowledge of traditional Chinese medicine and the recommended use of backrests with lumbar support among office workers, a backrest with adjustable acupressure lumbar support was designed and developed for LBP-suffering office workers. The aim of this study was to investigate the effectiveness of the acupressure backrest applied for a 1-month period among office workers with chronic LBP.

The randomized controlled trials are considered as the most robust method.²² However, the weakness of randomization was that the patient with low preference to intervention may participate partially or refuse the study protocol.²³ Otherwise, the Preference Collaborative Review Group²³ had reported that the preferences among patients in musculoskeletal trials were associated with their treatment effects.

For this reason, we integrated both designs in this study in order to investigate the effect of an adjustable acupressure

backrest on pain and disability as well as the preference effect of the acupressure backrest. Participants who preferred using the backrest were recruited to participate in this study in order to control the preference effects.

Methodology

Study design

A randomized, controlled study design comparing the control and acupressure backrest groups was conducted for the study. Participants who agreed to randomization were assigned to either a control group or an acupressure backrest group using the computers generating random numbers. Participants who declined to be allocated to the randomized groups were assigned to the preferred acupressure backrest group.

Participants

Participants consisted of office workers who worked in government offices or public enterprise in Bangkok, Thailand. The participants were aged 20–60 years, diagnosed as having chronic non-specific LBP (≥ 3 months), worked in their current position for at least 1 year, sat for at least 2 h per working period, and were able to write and read Thai. Standard office chairs were used, which consisted of specific components as per recommendations from the Ministry of Labor offices, Canada⁶ and Chaffin et al.²⁴ Participants were excluded if they had a BMI of >25 kg/m², history of non-employment related LBP, indication of neurological deficit, traumatic spinal fracture, serious spinal diseases such as cancer or tumors, previous spinal surgery, or were pregnant. Also excluded were those who experienced bleeding from the back, or had open wounds, contusions or swelling.

Sample size

Estimates of variability for the two key outcomes (pain and disability) were obtained from a pilot study and power calculation ($\alpha = 0.05$; $(1 - \beta) = 0.90$; effect size = 0.84). Based on this, 27 participants were required for each group. Allowing for 15 percent attrition by 3-month follow-up, a sample size of 32 participants per randomized group was required for this study.

Intervention

The study was approved by the Chulalongkorn University Human Ethics Committee. Written consent was obtained from all participants. Participants were asked to fill out the baseline data which consisted of three self-administered questionnaires. They were requested to continue normal activities and to avoid other forms of treatment while receiving intervention. However, if participants requested another form of treatment, it was recorded by a physical therapist.

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