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Effect of Prayer-Based Movements on Pain and Endurance of Flexor Muscles in Patients with Non-specific Chronic Low Back Pain

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Authors
Jokarborzabad A.[1] *MSc,*
Karimi Z.[2] *PhD,*
Yazdanpanah P.[3] *MD,*
Roustaie N.[1] *PhD,*
Mohammadhossini S.*[4] *PhD*

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[1]Department of Medical Surgical Nursing, School of Nursing, Yasuj University of Medical Sciences, Yasuj, Iran
[2]Department of Operating Room, School of Paramedicine, Yasuj University of Medical Sciences, Yasuj, Iran
[3]Department of Physical Medicine and Rehabilitation, School of Medi-cine, Yasuj University of Medical Sciences, Yasuj, Iran
[4]Department of Biostatistics and Epidemiology, School of Health and Nutrition Sciences, Yasuj University of Medical Sciences, Yasuj, Iran

Correspondence
Address: School of Paramedicine, Yasuj University of Medical Sciences, Yasuj, Iran. Postal code: 7591994799.
Phone: +98 (74) 33234115
Fax: +98 (74) 33234115
hossini2370@yahoo.com

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ABSTRACT

Aims Chronic non-specific low back pain is the most common chronic lower back pain, and developing a therapeutic and rehabilitative plan to more rapidly mend patients with lower back pain has always been discussed. The present study aimed to determine the effect of prayer-based movements on pain and endurance of flexor muscles in patients with non-specific chronic low back pain.

Materials & Methods This quasi-experimental study was conducted on all the patients with a chronic non-specific LBP referring to Shahid Mofatteh Clinic No. 1 in Yasuj, 2020. According to block random assignment, Sixty-six patients were divided into two groups of the intervention and control. In the intervention group, prayer-based exercises were performed three sessions a week for eight weeks. The control group was not instructed. The demographic questionnaire and Quebec back pain disability scale were used to measure pain, and the maintain the 60° angle test was used to collect data before intervention; the visual pain measurement scale was used immediately after the intervention, and the endurance test of spine flexor muscles performed at the angle of 60° was used a week after the intervention. The collected data were analyzed by SPSS 21 using descriptive statistics and statistical tests of Paired T, Mann-Whitney, Independent T, Wilcoxon, Chi-square, and Shapiro-Wilk.

Findings There was no significant difference between the two groups in terms of pain severity and endurance of the flexor muscles at the starting point ($p>0.05$). The comparisons of the mean immediately and a week after the intervention were significant ($p<0.05$).

Conclusion Prayer-based exercises effectively affect pain severity and endurance of flexor muscles in patients with non-chronic lower back pain.

Keywords Exercise; Prayer; Pain; The Endurance of Flexor Muscles; Chronic Non-Specific Lower Back Pain

CITATION LINKS

[1] Diagnostic imaging for low back pain: Advice for high-value ... [2] An observational study on recurrences of low back pain during ... [3] Back and neck pain and psychopathology in rural Sub-Saharan Africa: Evidence ... [4] The effect of reflexology on pain intensity of ... [5] Influences of trunk muscles on lumbar lordosis and sacral ... [6] Comparing the effects of hydrotherapy and extension/flexion ... [7] The effects of Pilates training on pain and back stability ... [8] Does exercise increase or decrease pain? central ... [9] Muslim prayer-a new form of physical activity ... [10] Electromyographic activity of the upper limb muscle ... [11] The effect of bowing and kneeling on lower ... [12] Evaluation of a new physical exercise taken from Salat ... [13] Electromyographic activity of the medial gastrocnemius ... [14] Effectiveness of manual and electrical acupuncture for ... [15] A randomized controlled trial comparing the effects ... [16] The effect of core stability training on pain and ... [17] reliability and validity of the Dutch adaptation of the ... [18] Between-days reliability of subjective and objective ... [19] The effect of benson elaxation method on anxiety ... [20] The short effects of two spinal stabilization exercise ... [21] Comparison of different trunk endurance testing methods ... [22] A comparison of the effectiveness of suspended exercise ... [23] The relationship between abdominal muscle activity ... [24] Comparison of the effects and durabilities of isolated ... [25] The lumbar multifidus: Does the evidence support clinical ... [26] The relationship between core stability and performance ...

Introduction

Lower back pain (LBP) is the pain, tension, or muscle stiffness in the area between ribs and gluteal fold, which could be accompanied by sciatica [1]. Nowadays, some 70-80% of people experience low back pain at least once [2]. Non-specific lower back pain is an LBP for which no specific etiology, such as fractures, infections, etc., could be identified [3]. Many factors attribute to developing chronic non-specific lower back pain, including minimal but recurrent strokes, wrong body postures, skeletal structure weakness, muscular tone changes, decreased muscular strength, and endurance [4]. The extensor and flexor muscles are among positional body muscles that act against gravity to keep one in an erect position and control the body when flexing and extending [5].

According to the studies, musculoskeletal disorders or muscular strength imbalance are known as LBP's main etiologies [6]. Given that changes in the motor control system make individuals susceptible to LBP and vice versa, developing an appropriate exercise plan is essential to strengthen these muscles and improve the system's function in managing LBP [7]. Exercises alleviate pain by activating central inhibiting pathways. Moreover, it stimulates mechanisms related to opioids, serotonin, and N-methyl di-aspartate in the brain, which leads to pain alleviation [8]. Prayer movements (Namaz), five times a day in regular intervals, cause a gentle movement in different body parts, preventing injuries and stiffness [9]. These movements include Qiyam, Sajda, and Raku, which Muslims could use to maintain the functions of the trunk and lower limbs [10]. There are two main movements in Prayer: Raku (a 90-degree flexion where hands are resting on knees) and Sajda (the act of low bowing or prostration with hands and head on the ground) [11].

Most body joints and muscles are involved with little effort in Prayer, which probably has a critical role in cerebral blood flow and local reflexes [12]. Joints involved in Prayer movements (Namaz) are shoulders, ankles, elbows, the spine, temporal, hip, knee, ankle, proximal interphalangeal (PIPs), and distal interphalangeal (DIPs) [12]. Safee *et al*. concluded that, like stretching and rehabilitative exercises, Salah could be beneficial for lower limb activities [13]. Moreover, Comachio *et al*. showed no significant difference between electro-acupuncture and manual acupuncture, and both methods could be used to relieve pain and functional disability in patients with LBP [14]. A study by Bangash *et al*. Entitled "The effect of bowing and prostration on the back muscle" showed no significant differences between Muslim's four prayer movements and two of the LBM exercises included in the study. Ruku, Rafa'a Al-Ruku, Sujud, and Rafa'a Al-Sujud, were superior to the third exercise, and all of these four movements revealed higher consistency than the included LBM exercises [11].

As said above, low back pain is one of the main causes of disability, and non-pharmacological methods can be used along with pharmacological treatments to relieve discomfort and pain in these patients. No study was found on the effect of prayer-based movements on trunk muscle strength and pain intensity so far; this study was conducted to determine the effect of Prayer-based movements on pain and endurance of flexor muscles in patients with chronic non-specific pain.

Materials and Methods

This quasi-experimental study was conducted on all the patients (N=80) with a chronic non-specific LBP referring to Shahid Mofatteh Clinic No. 1 in Yasuj, 2020. Sixty-six patients were selected using a non-probability and available sampling method and using a random block assignment; they were then equally divided into two groups of the intervention and control. The number of required samples was calculated according to the results of the Osama *et al*. study [15] due to the similarity of the dependent variable and the research population with the present study with the first type error of 0.05, power 0.8, ratio 1:1 According to the 10% drop estimate for each group, the sample size was 33, and in total, 66. Inclusion criteria included age of between 20-45, an LBP with an onset of >12 weeks ago, physician's approval on having chronic non-specific lower back pain, no history of any surgeries, fractures, dislocation, and torsion in the spine, a disability score of 25-75 according to the Quebec back pain disability scale (QBPDS) (aimed at screening), a pain severity score of higher than four according to visual analog scale (VAS), and written consent to participate in the study. The exclusion criteria included neurological disorders, non-mechanical LBP, and a history of diseases such as osteoporosis, arthrosis, cancer, rheumatologic diseases, urinary tract infections, and hip disorders, disc herniation, sciatica, skeletal inflammatory diseases, malignant tumors, neurologic system disorders, and spinal cord lesions, progressive motor defects, or any other skeletal disorders disturbing the study, a severe and acute pain severity score (higher than 75) according to QBPDS.

In addition to demographic data, QBPDS, VAS, and endurance tests of spine flexor muscles performed at the angle of 60° were used. QBPDS consists of 20 6-option questions that assess pain severity in daily tasks. Each question grades pain severity from 0 (no pain) to 5 (unable to perform the activity). This questionnaire scores pain severity from 0 to 100 [16]. The reliability of this questionnaire in assessing LBP is approved, and its validity is reported 0.84 [16, 17]. The VAS scale was used to measure pain severity. This questionnaire's effective use in clinical studies has been studied [18, 19]. This is a 10-centimeter scale;

the far left side (0) shows no pain, and the far right side (10) shows maximum pain. A score of 1-3 shows mild, 4-7 moderate, and 8-10 severe pain [19]. The endurance test of spine flexor muscles performed at the angle of 60° is used to measure the endurance of flexor muscles of patients' trunks [20]. This test has high reliability, and studies have reported high validity [20, 21].

This study was approved by the Research Ethics Committee of the Vice Chancellor for Research and Technology of Yasuj University of Medical Sciences. Moreover, keeping the collected information confidential, entirely voluntary participation in the study, and free exit at any stage of the study was emphasized. Before the intervention, written informed consent was obtained from all patients upon full explanation of study objectives. In the pre-test stage, all the two groups underwent a flexor muscles stability test and an endurance test of spine flexor muscles performed at the angle of 60°, and the results were recorded. In the intervention group, the patients started the exercises. Two sessions of movements were performed under the researcher's supervision, and the other of the sessions were performed at home. Prayer movements (Namaz) were performed regularly for 8 weeks and 3 sessions a week. In the first 4 weeks, each session comprised 5 repetitions in 3 sets, 2 minutes for each exercise, making a total of 10 minutes for each exercise, 30 minutes to perform three exercises. In the second 4 weeks, each session was comprised of 10 repetitions in 5 sets, with 1 minute and 20 seconds for each exercise, making a total of 15 minutes for each exercise, 45 minutes to perform three movements, according to the principle of overload. The control group attended to their daily tasks, and they were not instructed with any exercises. At the end of the intervention, the LBP severity was evaluated and recorded using the VAS. A week after intervention, in the post-test stage, the flexor muscles stamina was re-measured using the endurance test of spine flexor muscles performed at the angle of 60°. The two variables of the study were evaluated only once after the intervention; pain variable immediately after the intervention and endurance variable one week after the intervention.

The collected data were analyzed by SPSS 21 with a significance level of 0.05 and using paired t-test, Mann–Whitney U test, independent t-test, Wilcoxon, Chi-square test, and Shapiro-Wilk test.

Findings

Two patients in the intervention group withdrew during the intervention, so the analysis was performed on 64 patients (n=31 in the intervention group and n=33 in the control group). The most prevalent age group was 35-40 years in both groups (Table 1). There was no significant difference between the two groups before intervention (p>0.05) except in the employment status variable (p=0.007).

Table 1) The comparison of the demographic information of patients with a chronic non-specific LBP in both understudy groups

Variables	Intervention N (%)	Control N (%)	p-value
Age (Year)			
25-30	5 (16.1)	8 (24.2)	0.79
30-35	7 (22.5)	9 (27.2)	
35-40	10 (32.2)	8 (24.2)	
40-45	9 (29.03)	8 (24.2)	
BMI (Age range)			
20-25	12 (38. 7)	18 (54.5)	0.36
25-30	13 (41.9)	12 (36.3)	
30-35	6 (19.3)	3 (9.09)	
Gender			
Male	13 (41.9)	15 (45.4)	0.77
Female	18 (58.06)	18 (545)	
Marriage status			
Single	3 (9.6)	3 (9.09)	1.00
Married	28 (90.3)	30 (90.9)	
Employment status			
Unemployed	3 (9.6)	12 (36.3)	0.007
Freelancer	5 (16.1)	9 (27.2)	
Employee	23 (741)	12 (36.3)	
Level of education			
Primary school	0	4 (12.1)	0.31
Guidance school	1 (3.2)	2 (6.06)	
Diploma	6 (19.3)	5 (15.1)	
Associate's degree	2 (6.4)	5 (15.1)	
Bachelor's degree	21 (67.7)	14 (42.4)	
Master's degree and higher	1 (3.2)	1 (3.03)	
Regular physical activity			
No	25 (80.6)	28 (48.8)	0.75
Yes	6 (19.3)	5 (15.1)	
Medication treatment			
No	28 (90.3)	31 (93.9)	0.67
Yes	3 (9.6)	2 (6.06)	

The intergroup comparison of the mean±SD overall scores of flexor muscles endurance and pain severity before the intervention was not significant (p>0.05). Nevertheless, the mean±SD overall scores of flexor muscles endurance a week after the intervention and pain severity immediately after the intervention were significant (p<0.05; Table 2).

The intragroup comparison of the overall scores of flexor muscles endurance and pain severity was performed separately for each group. The results showed that the intervention and control groups were significantly different (p<0.05; Table 2).

Table 2) The comparison of mean±SD flexor muscles endurance and pain between groups and within groups before, after, and a week after intervention

Variable	Intervention group	Control group	p-value
Endurance overall score			
Before intervention	127.26±18.74	126. 67±22.38	0.716*
One week after the intervention	142.74±22.13	121.82±18.37	<0.0001**
p-value	<0.0001***	0.034****	-
Pain overall score			
Before intervention	7.00±1.00	6.91±0.84	0.461*
Immediately after the intervention	4.84±1.21	6.64±1.19	<0.0001**
p-value	<0.0001***	0.154****	-

*Mann–Whitney; **Independent t-test; ***Wilcoxon signed-rank test; **** Paired t-test

Discussion

The present study was conducted to determine the effect of prayer-based movements on the pain and endurance of flexor muscles in patients with chronic non-specific pain. Given that very few studies are conducted on the effects of prayer-based movements on the pain severity and the endurance of trunk muscles, we used studies that assessed the effects of therapeutic effects on the pain and endurance of other muscles. The present study results showed that the overall pain severity mean±SD score changes are significant immediately after the intervention in patients with chronic non-specific pain ($p<0.05$).

Yarahmadi *et al*. showed that functional suspension and stability training are effective on pain severity, proprioception, and motor control ability in men with chronic non-specific LBP [22]. The reason for this consistency seems to be that these exercises would decrease pain, normalize muscle response patterns, improve the ability to adjust poor posture, retrain motor units, and improve the strength and proprioception in patients with LBP with increased load in a closed movement chain. However, Ehsani *et al*. showed no significant relationship between pain severity and the level of disability and abdominal muscle functions [23]. The results of this study are not consistent with ours. The ineffectiveness of abdominal muscle movements on pain indicators could be attributed to the study population sample in terms of sex and intervention methods.

The present study results showed that the changes in the mean±SD flexor muscle endurance overall score are significant a week after the intervention in patients with chronic non-specific pain ($p<0.05$). In this regard, Ghorbani *et al*. showed that muscle stamina and pain improved in the stabilization and combined exercise groups after the intervention with a 1-month endurance; however, reflexology was effective only on pain severity [24]. The results of this study are in line with ours. It may be due to the resulting increased endurance of flexor muscles. In recent years, movement therapy has focused on designing and performing a type of exercises that aim to maintain and increase the local stability of the back through retraining the proprioception in the lower back-hip region using the impact on muscles such as abdominal transverse, multifidus, diaphragm, oblique muscles, and pelvic floor. These muscles are crucial in increasing the segmental stability of the lower back [25].

On the other hand, Nesser *et al*. stated that there is no significant relationship between the stamina of trunk stabilizing muscles in female soccer players with their performance in their sports field in terms of performing strength and power variables. However, there is a relative association between central stability and strength and performance, and increased central strength does not significantly improve the lower limb power [26]. This inconsistency could be that the study subjects were 29 healthy athletes for whom to measure muscle stamina, several endurance tests were used.

Although the study results show decreased pain and increased flexor muscles endurance in patients with a chronic non-specific LBP, this study had limitations, including using self-report methods, Due to the mental severity of the pain may not be real pain performing other exercises outside the research; none of which could be controlled by the researcher. The stable intervention atmosphere and the moderately long-term study duration (eight sessions of Prayer -based movements) are among the advantages of this study. Given the study results, it is recommended that Prayer movements (Namaz) be performed along with other training methods effective on pain severity and endurance of muscles in patients with a chronic non-specific LBP. It is suggested for future research to compare these exercises with other training methods for patients with a chronic non-specific LBP.

Conclusion

According to the study results, Prayer-based movements have decreased pain severity and increased the endurance of flexor muscles in patients with a chronic non-specific LBP. Reducing the pain and increasing the endurance of flexor muscles in these patients have prevented short-term and long-term physical and mental consequences, and performing the exercises individually increased the effectiveness.

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Ethical Permissions: This study is registered in the Research Ethics Committee of the Vice Chancellor for Research and Technology of Yasuj University of Medical Sciences with the code IR.YUMS.REC.1398.166.

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