



Article

The Effect of Acupuncture Therapy with a Combination of Moxibustion in Cases of Low Back Pain on Changes in Pain Scale in Mekarjaya Village, Indramayu Regency

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ABSTRACT

Low back pain is a musculoskeletal disorder caused by abnormalities or dysfunctions in the muscles and tendons, often triggered by excessive physical activity or work that demands high energy and muscle strength, thereby increasing the risk of musculoskeletal injury. This study aimed to determine the effect of acupuncture therapy combined with moxibustion on changes in pain scale among patients with low back pain in Mekarjaya Village, Indramayu Regency. Using a quasi-experimental design with two groups (pretest–posttest), 32 subjects were divided into an acupuncture-only group and an acupuncture plus moxibustion group. Pain intensity was measured using the Numeric Rating Scale (NRS) before and after the intervention, and data were analyzed using the Mann–Whitney and Wilcoxon tests. The results showed a significant decrease in NRS pain scores after the intervention in both groups ($p < 0.050$). The Mann–Whitney test revealed a significant difference between the two groups ($p = 0.001$), with the combination therapy group showing a greater reduction in pain than the acupuncture-only group. Thus, acupuncture therapy combined with moxibustion is more effective than acupuncture therapy alone in reducing low back pain and may serve as an effective complementary approach for managing this condition.

I. INTRODUCTION

Low back pain is pain that is limited to the lumbar region, but the symptoms are more evenly distributed and not only in the nerve radices, but broadly originating from the lumbar intervertebral disc. Disorders that occur in low back pain are tenderness in the lumbar region, spasm of the muscles of the lower back, it can lead to an imbalance between the lower

back and the lumbar region. abdominal muscles and vertebrae, which can result in limitation of movement⁽¹⁾ Low back pain is caused by several factors, namely age, activity or exercise, weight gain, genetics, occupation, psychological factors, and smoking habits⁽²⁾.

The incidence of low back pain in the world is the third largest problem in the world, with 17.3 million in 2022⁽³⁾. In Indonesia in 2021, there were 12,914 cases of

low back pain, or around 3.71% of the population. On the island of Java, the province of West Java was recorded to be ranked third in complaints of low back pain, with an average of 16%⁽³⁾.

Acupuncture is effective in relieving pain associated with low back pain⁽⁴⁾. Mainly, acupuncture is used for pain management or inhibition by stimulating inhibitory nerve fibers in a short time, which results in reduced transmission from pain receptors to the brain. In addition, acupuncture also has many benefits, both in terms of therapy and prevention, including being able to effectively treat chronic neck pain, low back pain, and knee pain associated with arthritis⁽⁵⁾.

Based on research that has been done before. Acupuncture is effective in relieving pain associated with low back pain. by balancing the flow of Qi energy in the body. Acupuncture therapy points on Shenshu (BL23), Weizhong point (BL 40), Qihai Point (BL 24), Guanyuan Point (BL26), Dachangshu Point (BL25), Hegu Point (LI 4), and Taixi Point (KI3) can reduce the level of pain in patients with low back pain⁽⁴⁾.

Moxibustion is a non-invasive therapy that uses burning moxa, a dried herb from mugwort leaves (*Artemisia Vulgaris*), over the skin at acupuncture points to provide warmth and symptom relief. The term moxibustion is derived from the name of the most commonly used wormwood plant, which is *Artemisia Moxa*⁽⁶⁾. These leaves have bitter and spicy properties⁽⁷⁾. Mugwort leaves also contain volatile, beta-sitosterol, stigmasterol, alpha-aromatic resins, and beta-aromatic resins. It can reduce the risk of muscle sprain, muscle stiffness, and blood clots⁽⁷⁾. Its clinical effectiveness depends on how the effects of heat are transmitted to specific points and areas on the body surface, which affect vascular changes and other conditions. Its therapeutic mechanisms have been researched and used widely to treat a variety of condi-

tions, including improving breech presentation, dysmenorrhea, constipation, prostatitis, chronic fatigue syndrome, osteoarthritis, as well as pain including low back pain and peripheral neuropathy⁽⁷⁾.

Based on the results of a preliminary study conducted in November 2024, using observation and interview methods in Mekarjaya Village, Indramayu Regency, 55 people were found to suffer from low back pain. Of the low back pain sufferers, 30 people chose to overcome complaints by consuming over-the-counter drugs, and the other 25 people chose to be left to heal themselves. This study aimed to determine the effect of acupuncture therapy combined with moxibustion on changes in pain scale among patients with low back pain in Mekarjaya Village, Indramayu Regency.

II. METHODS

This study employed a quasi-experimental design to examine the cause-and-effect relationship between acupuncture therapy, both alone and in combination with moxibustion, and changes in pain intensity among individuals with low back pain. The quasi-experimental approach was chosen because it does not allow for complete control or randomization of variables, but still enables the observation of the effects of interventions under natural conditions. Specifically, a non-randomized pretest–posttest design was applied, in which both groups experimental and comparison, were observed before and after the intervention to assess changes in the pain scale.

The study was conducted in Mekarjaya Village, Indramayu Regency, an area with a considerable number of individuals reporting musculoskeletal complaints. The research activities were carried out from October 2024 to May 2025, encompassing stages of preparation, data collection, and analysis. The study population included residents of Mekarjaya Village who experienced low back pain. A total of 32 participants who

met the inclusion criteria were selected as the study sample.

Inclusion criteria were as follows: (1) residents of Mekarjaya Village, Indramayu Regency; (2) male or female participants aged 30–60 years; (3) not currently undergoing medical therapy or taking pain medication; (4) willing to participate and sign an informed consent form; (5) experiencing lower back pain with an intensity score greater than 3 on the Numeric Rating Scale (NRS); and (6) agreeing to complete 10 therapy sessions with a frequency of two times per week. Exclusion criteria included: (1) withdrawal from the study; (2) pregnancy; (3) unconsciousness or uncooperative behavior; and (4) unwillingness to complete the required 10 therapy sessions.

The independent variable in this study was the type of therapy provided: acupuncture therapy alone and acupuncture therapy combined with moxibustion. The acupuncture points used were BL23 (Shenshu), BL24 (Qihaihu), BL25 (Dachangshu), and BL40 (Weizhong) while moxibustion was applied as a combination treatment at the same points. The dependent variable was the change in the low back pain scale, measured using the Numeric Rating Scale (NRS) before and after the intervention.

Data collection was carried out through direct observation and measurement of pain intensity using the Numeric Rating Scale (NRS). Each participant was assessed before and after undergoing the intervention. The NRS was used to measure subjective pain levels on a scale from 0 to 10, where 0 indicates no pain and 10 indicates the most severe pain imaginable. The measurement process was conducted by trained research assistants to ensure consistency and accuracy of data collection.

Participants in the acupuncture group received therapy at the acupuncture points BL23 (Shenshu), BL24 (Qihaihu), BL25 (Dachangshu), and BL40 (Weizhong). In

the combination therapy group, moxibustion was additionally applied at the same points after acupuncture needle insertion. Each therapy session lasted approximately 30–40 minutes and was conducted twice a week over the course of five weeks, totaling ten sessions per participant.

III. RESULT

The study was conducted from October 2024 to March 2025 with a sample of 32 subjects. The sample was divided into two groups, namely acupuncture therapy group and acupuncture therapy group with a combination of moxibustion. Therapy was carried out twice a week for 10 sessions. Before and after therapy, pain scale measurements were taken on the research subjects.

Table 1. Characteristics of Respondents

Characteristics	Group I		Group II	
	N	%	N	%
Gender				
Female	13	81.3	10	62.5
Male	3	18.7	6	37.5
Age (years)				
31–40	4	25.0	2	12.5
41–50	4	25.0	4	25.0
51–60	8	50.0	10	62.5
Occupation				
Farmer	11	68.8	10	62.5
Self-employed	1	6.2	1	6.2
Private employee	0	0.0	2	12.5
Housewife	4	25.0	3	18.8
Pain Scale (Pretest)				
5	5	31.2	2	12.5
6	6	37.5	3	18.8
7	3	18.8	7	43.7
8	2	12.5	4	25.0
Pain Scale (Posttest)				
0	1	6.2	6	37.5
1	4	25.0	7	43.7
2	5	31.2	3	18.8
3	6	37.5	0	0.0

Table 1 it can be seen that the most data on is female with 23 subjects, in the age range of 51-60 years as many as 18 subjects, 21 subjects work as farmers. On the pain scale before therapy, it was found that the most on a pain scale of 7 was 10 subjects. After therapy, the most pain scale on a pain scale of 1 was 11 subjects.

Table 2. The Result of the Wilcoxon Test

Group		N	p
I	Pretest	16	0.001
	Posttest	16	
II	Pretest	16	0.001
	Posttest	16	

Table 2 shows the results of the Wilcoxon test, which assessed differences in pain scale scores before and after the intervention within each group. The analysis revealed a significant decrease in pain levels in both the acupuncture group (Group I) and the acupuncture combined with moxibustion group (Group II), with $p = 0.001$ (< 0.05). This indicates that both interventions effectively reduced the intensity of low back pain among participants.

Table 3. The Result of Mann-Whitney Test

Group	Mean Rank	p
I	8.50	<0.001
II	8.50	

Table 3 presents the results of the Mann-Whitney test, which compared the differences in pain reduction between the two groups. The test showed a significant difference between the groups ($p < 0.001$), with the combination therapy group (Group II) achieving a greater reduction in pain scores compared to the acupuncture-only group (Group I). This finding suggests that acupuncture combined with moxibustion is more effective in reducing low back pain than acupuncture therapy alone.

IV. DISCUSSION

In this study, the number of female subjects was more than men, namely 23 subjects. The level of endurance between men and women is different. Physiologically, women's muscle ability is lower than men⁽¹⁰⁾ and influenced by various other factors such as hormonal changes that occur during the menstrual cycle and menopause. In menopause, estrogen levels decrease significantly, which can contribute to various physiological changes in women, including disorders of the musculoskeletal system, especially joint pain. This is because the reduced production of estrogen hormone affects a significant decrease in muscle mass, resulting in reduced muscle performance, functional capacity, and quality of life⁽¹⁰⁾

The highest number of ages was at the age of 51-60 years as many with 18 subjects. WHO (2023) reports that the incidence of low back pain is experienced by 619 million people in the world, and the highest number of cases occurs at the age of 50-55 years⁽¹¹⁾. After the age of 50 years, muscle mass begins to decrease by about 1-2% each year. Muscle strength also decreases, which is about 1.5% at the age of 50-60 years, and after that, it can drop up to 3% per year⁽¹²⁾. This condition occurs due to the degenerative process. The degenerative process that results in decreased flexibility and thinning of the nucleus pulposus. In addition, Degeneration in the elderly also causes a decrease in water content in the disc, from about 90% in infancy to about 70% in old age⁽¹²⁾.

The most common occupation was farmer as many as 21 subjects. The type of work, location, and how to do it are the main factors in the occurrence of low back pain⁽¹³⁾. The farming profession involves various physical activities, such as hoeing, planting, irrigating fields, and harvesting. Farmers' work activities that are not ergonomic, such as bending, standing for too long, carrying and lifting weights, and turning the body repeatedly.

These work attitudes, if carried out continuously for a long time, have the potential to cause musculoskeletal disorders⁽¹³⁾. Functional activities that involve excessive use of muscles, especially in static positions such as bending over for a long time, cause the muscles of the lower back to continue to contract. Contractions that take place continuously trigger excessive tension and increase the risk of low back pain. Static muscle work is one of the main causative factors of pain in the lower back that is often experienced by farmers⁽¹³⁾.

The pain scale before therapy has the highest number of subjects on a pain scale of 7 (severe pain scale), which is as many as 10 subjects. The pain scale felt by each person varies with Many factors can influence it, such as gender, age, and even psychological⁽¹⁴⁾. Acupuncture therapy combined with moxibustion proved to be more effective in reducing the low back pain scale. From the results of the Wilcoxon test, a significance value $p < 0.001$ was obtained, which significance value $p < 0.050$, which means that there is an effect of acupuncture therapy and acupuncture therapy with a combination of moxibustion on reducing the low back pain scale. In the Mann-Whitney test, the significance value obtained in the post-test is $p = 0.001$, the significance value $p < 0.050$, which means that the research hypothesis testing H_a is accepted and H_0 is rejected.

Moxibustion therapy in this study aims to provide warm stimulation and therapeutic effects that can reduce NRS scores compared to before treatment⁽¹⁵⁾. With traditional treatment methods that utilize moxibustion (talented leaf), especially from mugwort leaves (*Artemisia Vulgaris*)⁽¹⁵⁾. The purpose of this moxibustion therapy is to warm and smooth qi and xue, stimulate blood flow, strengthen the kidneys, expel cold wind, and relieve stagnation⁽¹⁶⁾ and the burning effect of

moxibustion produces a therapeutic aroma which, when inhaled, can stimulate the endocrine nervous system, which provides a relaxing effect and helps speed up the pain recovery process⁽¹⁵⁾.

Acupuncture therapy using points BL 23 Shenshu, BL 24 Qihai, BL 25 Dachangshu, and BL 40 Weizhong can help treat low back pain effectively. It is said in a study that acupuncture points have more effective results than other acupuncture methods⁽¹⁷⁾. Because the needling of acupuncture points produces a distinctive sensation called "deqi". Needling at acupuncture points is proven to increase the levels of several neurotransmitters in plasma and brain tissue, such as β -endorphins, enkephalins, serotonin (5-HT), and dopamine. These chemicals are known to play an important role in reducing pain and providing a calming effect. Apart from helping to relax tense muscles so that the body becomes more relaxed, these neurotransmitters also play a role in stabilizing organ function and provide psychological calm⁽¹⁷⁾.

V. CONCLUSION

The characteristics of the research subjects were mostly female, with 23 subjects, in the age range of 51-60 years as and 18 subjects; 21 subjects were farmers. On the pain scale before therapy, it was found that the highest score on a pain scale of 7 was 10 subjects. After therapy, the highest pain scale score on a pain scale of 1 was 11 subjects. From the results of the Wilcoxon test, a significance value of $p < 0.001$ was obtained, which significance value of $p < 0.050$, which means that there is an effect of acupuncture therapy and acupuncture therapy with a combination of moxibustion on reducing the lower back pain scale. In the Mann-Whitney test, the significance value obtained in the post-test is $p = 0.001$, which significance value of $p < 0.050$.

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