



Article

The Effect of Acupuncture Therapy Combined with Fire Cupping on Changes in Pain Scale and BPFs in Low Back Pain Cases in Cluntang Village Musuk District, Boyolali Regency

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ABSTRACT

Low back pain is a musculoskeletal disorder caused by unergonomic work postures, affecting pain scale and functional ability. Acupuncture and fire cupping therapy are known to effectively reduce pain and improve blood circulation. This study aims to determine the effect of the combination of both on changes in pain scale and BPFs in 36 subjects in Cluntang Village, Musuk District, Boyolali, from October 2024 to March 2025. Using a quasi-experimental method with a two-group pretest-posttest design (acupuncture combined with fire cupping and fire cupping alone), the Mann-Whitney test results showed a p value > 0.05, which means there is no significant difference between groups. In conclusion, both therapies were equally effective in reducing the pain scale and improving the functional ability of BPFs, although there was no significant difference between them.

I. INTRODUCTION

The lifestyle of most people has the potential to cause health problems from the tendency to do excessive activity without considering the appropriate portion, which can cause various health problems and physical complaints. Common physical complaints occur with the onset of pain that can limit movement and reduce a person's functional ability, with different impacts on each individual according to their pain threshold. This condition causes various damage to muscles, bones, joints, and soft tissues, such as shoulder pain, neck pain, knee pain, and low back pain ^(1,2).

Low back pain is a musculoskeletal disorder, also known as Musculoskeletal Disorders (MSDs), a mismatch of ergonomic factors that result in errors in posture against workload. This condition will reduce the work of the extensor muscles to fight the burden on the spine, resulting in muscle spasms that can cause limitation of motion ⁽²⁾. One of the causes that affects the onset of low back pain includes several factors, such as age, gender, bodymass index (BMI), length of sitting, and posture at work⁽³⁾.

The World Health Organization (WHO) reports that approximately 619 million people in developing countries experience persistent low back pain, with

a 60% increase in cases from 1990 to 2020. This increase is largely due to population growth and aging. With the prevalence of acute low back pain cases reaching 26%, while chronic low back pain is 21%⁽⁴⁾. Based on the 2018 Basic Health Research, it shows that 11.9% of patients with musculoskeletal diseases in Indonesia were diagnosed by health workers, and 24.7% based on symptoms or diagnosis. The number of low back pain sufferers in Indonesia is not known for certain, but it is estimated to be between 7.6% and 37%⁽⁵⁾. Based on data from the population of Central Java province, around 40% of the population aged 65 years and over have suffered from low back pain, with the prevalence based on gender mostly experienced by men reaching 18.2% and in women 13.6%⁽⁶⁾. The Boyolali Regency Health Office in 2021 also reported the prevalence of Musculoskeletal cases as many as 15,491 people suffering from complaints of low back pain from the total population of Boyolali Regency of 1,111,945 people⁽⁷⁾.

Efforts that can be made in the management of low back pain with pharmacology and non-pharmacology. Pharmacological measures such as the use of non-opioid anti-inflammatory drugs (NSAIDs), oral opioids, paracetamol, and other accompanying analgesic drugs that work to reduce inflammation and relieve pain⁽⁸⁾. Non-pharmacological treatments include massage therapy, warm or cold compresses, TENS, physiotherapy, acupuncture, and cupping⁽⁹⁾. Acupuncture is one of the therapies to treat Musculoskeletal disorders. The mechanism of acupuncture involves

needling certain parts of the body surface, which causes a vasodilating effect, which serves to improve blood circulation and repair tissues⁽¹⁰⁾. Through its local effects, acupuncture can stimulate the nerves under the skin and muscles, which triggers the release of substances such as endorphins, dopamine, and serotonin, thus serving to reduce pain⁽¹¹⁾.

There have been many studies on acupuncture in treating low back pain. Some research results report that acupuncture is effective in relieving pain and functional improvement in low back pain. In a study that has been conducted⁽¹²⁾ explains that acupuncture therapy at points GB12 Wanguxue, GB26 Daimaixue, GB30 Huantiao, GB34 Yanglingquan, GB41 Zulinqi, BL23 Shenshu, BL24 Qihaishu, BL25 Dachangshu, BL37 Yinmen, BL40 Weizhong, ST4 Dicang, ST36 Zusanli, SP13 Fushe, SP14 Fujie, GV3 Yaoyangguan, GV4 Migmen, GV5 Xuanshu, GV24 Shenting, and GV26 Shuigou can significantly reduce the scale of low back pain.

Fire cupping is a therapeutic method through a vacuum process with the placement of rapidly heated cups on acupuncture points that can play a role in sending pain signals to the brain⁽¹³⁾. Fire cupping can reduce pain intensity, improve blood circulation, improve quality of life, and increase range of motion⁽¹⁴⁾. In an analytical study carrying out trials to see the effectiveness and safety of using fire cupping in cases of low back pain, the results showed that fire cupping is a safe therapy with minimal side effects. The results of the research conducted show that fire cupping therapy is effective in reducing complaints of low back pain with a significant decrease in the low back pain scale⁽¹³⁾.

In the preliminary study conducted, data were obtained on the number of residents in Cluntang Village, Musuk District, Boyolali Regency, in October 2024, namely 36 people who complained of low back pain, with the majority of the population working as farmers. Efforts to treat low back pain are often carried out by most residents in Cluntang Village by massaging, taking pain relievers, and using warming creams. Handling by utilizing acupuncture and fire cupping therapy to reduce the complaints they experience has not been widely done. If this is not given good treatment, it will have

a negative impact on health conditions and affect productivity. So, the combination of acupuncture and fire cupping therapy is expected to reduce pain intensity, improve blood flow, and increase range of motion.

Based on this data, researchers are interested in knowing the effect of acupuncture therapy at points BL23 Shenshu, BL24 Qihaishu, BL25 Dachangshu, BL40 Weizhong, and the combination of Fire Cupping on changes in pain scale and BPFS in cases of low back pain in Cluntang Village, Musuk District, Boyolali Regency.

II. METHODS

This study uses a type of quantitative research with the research design “Quasi Experimental” or pseudo- experiment used to reveal the cause and effect relationship by involving control groups and experimental groups. The purpose of this study was to determine the effect of acupuncture therapy combined with fire cupping on changes in pain scale and BPFS in cases of low back pain in Cluntang Village, Musuk District, Boyolali Regency. This study used the “Two Group Pretest-Posttest Design” method by giving treatment to two groups, namely group 1 receiving acupuncture therapy intervention with a combination of fire cupping, while group 2 received fire cupping therapy intervention. Measurements taken in this study, each group was observed before action (pretest), then observed again after action (posttest) ⁽¹⁸⁾.

The population in this study was people in Cluntang Village, Musuk District, Boyolali Regency who complained of lower back pain. In this study, the sample used consisted of 36 residents of Cluntang Village, Musuk Subdistrict, Boyolali Regency, who complained of lower back pain. The research subjects were divided into two treatment groups, with 18 people in the combination acupuncture and fire cupping therapy intervention group and 18 people in the fire cupping intervention group. This study used a sampling technique called total sampling, where the

sample was determined by using the entire population as the sample. Total sampling was used because the population size was less than 100, so the entire population was used as the research sample ⁽¹⁹⁾.

The variables used in this study were divided into independent and dependent variables. The independent variables in this study were acupuncture therapy BL 23 Shenshu, BL 24 Qihaishu, BL 25 Dachangshu, BL 40 Weizhong, and a combination of Fire Cupping. The dependent variables in this study were changes in the scale and BPFS of low back pain.

Sampling was conducted by distributing consent forms and observation sheets to fill out the NRS pain scale and then filling out the Back Pain Functional Scale (BPFS) questionnaire. The data obtained will be tested univariately, namely age, gender, occupation, changes in pain scale, BPFS, and syndrome differentiation. This will be followed by bivariate analysis using the Shapiro- Wilk normality test and homogeneity test using the Lavene test. If the data is normally distributed, the next analysis will be hypothesis testing using the Paired Sample T-Test and Independent Sample T-Test. If the data is not normally distributed, the Wilcoxon and Mann-Whitney tests will be used.

III. RESULT

This study involved 36 research subjects who met the inclusion criteria and were divided equally into two intervention groups. The Acupuncture group (n=18) and the Fire Cupping group (n=18). Both groups received therapy twice a week for a total of 10 treatment sessions. Outcome measurements included pain intensity using the Numeric Rating Scale (NRS) and functional ability using the Back Pain Functional Scale (BPFS), assessed before (pretest) and after (posttest) the intervention. Table 1 shows that the largest proportion of participants was aged 41–45 years (22.2%), while the smallest proportion was aged 31–35 years (5.6%). Most participants were male (63.9%), and

the most common occupation was farmer (72.2%).

Table 1. Characteristics of Respondents

Characteristics	N	%
Age (years)		
25–30	4	11.1
31–35	2	5.6
36–40	4	11.1
41–45	8	22.2
Other age groups	18	50.0
Gender		
Male	23	63.9
Female	13	36.1
Occupation		
Farmer	26	72.2
Laborer	5	13.9
Housewife	5	13.9

Table 2 indicates that some variables were normally distributed ($p > 0.050$), such as pretest NRS in the acupuncture group and pretest BPFS in both groups. However, most posttest data showed non-normal distribution ($p < 0.050$).

Table 2. Normality Test

Research Data	N	p-value
Pretest NRS – Acupuncture	18	0.066
Pretest NRS – Fire Cupping	18	0.011
Posttest NRS – Acupuncture	18	<0.001
Posttest NRS – Fire Cupping	18	<0.001
Pretest BPFS – Acupuncture	18	0.582
Pretest BPFS – Fire Cupping	18	0.130
Posttest BPFS – Acupuncture	18	<0.001
Posttest BPFS – Fire Cupping	18	0.003

Table 3 shows that all variables had p-values > 0.05 , indicating that the variance between the two groups was

homogeneous.

Table 3. Homogeneity Test

Research Data	N	p-value
Pretest NRS	36	0.339
Posttest NRS	36	0.135
Pretest BPFS	36	0.905
Posttest BPFS	36	0.392

Table 4 demonstrates significant differences between pretest and posttest scores in both intervention groups for pain intensity (NRS) and functional ability (BPFS) ($p < 0.05$). These findings indicate that both acupuncture and fire cupping significantly reduced pain intensity and improved functional ability after treatment.

Table 4. Wilcoxon Test

Variable	Group	Z	p-value
NRS	Acupuncture	-3.776	<0.001
NRS	Fire Cupping	-3.796	<0.001
BPFS	Acupuncture	-3.734	<0.001
BPFS	Fire Cupping	-3.727	<0.001

Table 5 shows no statistically significant differences between the acupuncture and fire cupping groups, either at baseline or after treatment, for both pain intensity and functional ability ($p > 0.05$). Although both interventions were effective within groups, neither treatment was superior to the other based on between-group comparisons.

Table 5. Mann-Whitney Test

Variable	Comparison	Mean Rank	p
Pretest NRS	Acupuncture vs Fire Cupping	15.22 vs 21.78	0.149
Posttest NRS	Acupuncture vs Fire Cupping	19.42 vs 17.58	0.791
Pretest BPFS	Acupuncture vs Fire Cupping	15.22 vs 21.78	0.060
Posttest BPFS	Acupuncture vs Fire Cupping	19.42 vs 17.58	0.568

IV. DISCUSSION

Based on an analysis of characteristics by age, it is known that the total number of research subjects was 36 people. The age group with the highest frequency was 41-45 years old, with 8 people (22.2%). Then, the age group with the lowest frequency was 31-35 years old, with 2 people (5.6%). The 25-30 age group and the 36-40 age group each had 4 subjects (11.1%). Lower back pain is often associated with the aging process, especially after the age of 30. As we age, the amount of fluid in the spinal discs decreases, reducing their ability to absorb shock effectively.

There were more male research subjects than female research subjects, with 23 males (63.9%) and 13 females (36.1%). Gender plays a role in the risk of lower back pain, although in general, men and women have an almost equal chance of experiencing it. However, there are several physiological differences that can affect the severity and risk factors for lower back pain in each gender⁽¹⁵⁾.

The most common occupation was farming, with 26 people (72.2%). Five people (13.9%) were employed as laborers and five (13.9%) as housewives. Each worker had a different workload. Workloads can include physical, mental, and social burdens. Physical burdens were found in jobs that required physical strength as the main tool, such as moving loads. The weight and frequency of loads lifted at work can have an impact on health, especially spinal health.

The results of the analysis using the Wilcoxon test obtained a significant value of $p < 0.001$ in both groups and measurement scales. Therefore, the Mann-Whitney test results obtained significant values on the Numeric Rating Scale (NRS) with a pretest value of $p = 0.149$ and a posttest value of $p = 0.791$, while on the Back Pain Functional Scale (BPFS) the pretest value was 0.060 and the posttest value was 0.568. Therefore, it can be interpreted that there is no significant

difference between the combination of acupuncture and fire cupping therapy and fire cupping therapy alone in terms of changes in pain scale and BPFS functional ability in cases of low back pain in Cluntang Village, Musuk District, Boyolali Regency.

One of the efforts to overcome lower back pain is acupuncture, which is a treatment technique that uses acupuncture needles on certain parts of the body's surface to improve blood circulation and repair tissue⁽¹⁶⁾. The points used in this study are BL 23 Shenshu, which is the Shu point behind the kidney located between lumbar 2 and 3, BL 24 Qihai, which is the Shu point of the Qi sea located between lumbar 3 and 4, BL 25 Dachangshu, which is the large intestine Shu point located between lumbar 4 and 5, and BL 40 Weizhong, which is the distal point for lower back pain located in the middle of the popliteal skin fold between the biceps femoris tendon and the semi-membranosus tendon, and fire cupping therapy with glass cups placed on the acupuncture points⁽¹⁷⁾.

The results of this study show that both acupuncture combined with fire cupping and fire cupping therapy are effective in treating lower back pain in Qi and Xue stagnation syndrome, both of which are effective in reducing pain levels and improving functional ability, but there is no significant difference. Combined acupuncture and fire cupping therapy showed no statistically significant difference compared to fire cupping therapy alone. However, in terms of clinical benefits, combined acupuncture and fire cupping therapy was more effective than fire cupping therapy. It can be said that both are equally effective in reducing pain levels and improving functional ability in lower back pain^(18,19).

V. CONCLUSION

The effect of the combination therapy of acupuncture and fire cupping on pain scale changes and functional

improvement in cases of back pain was functional ability, but there was no significant difference to reduce pain levels and improve functional ability.

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