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Article

Effect of Local Point Electroacupuncture with Balance Method on Waist Pain Scale in Farmers and Farm Laborers in Karanglo Village, Klaten

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ABSTRACT

Low back pain is one of the most common musculoskeletal disorders among farmers in Indonesia. This is related to unergonomic work positions, such as prolonged bending. Local point electroacupuncture therapy and the Balance Method are widely used as alternative treatment methods to help reduce pain and improve the quality of life and well-being of farmers. This study aims to determine the effect of local point electroacupuncture with the Balance Method on the scale of low back pain in farmers and hunters in Karanglo Village, Klaten. This study uses a type of quantitative research, a quasi-experimental design with a two-group pretest-posttest design. namely comparing 2 groups given different interventions. The research was conducted by measuring the initial NRS before being given the intervention (Pretest) and measuring the NRS value after being given the intervention (Posttest) with a purposive sampling method. The number of samples used was 40 research subjects, divided into two groups, namely the Balance Method group and the local point electroacupuncture group of 20 research subjects each. The Mann-Whitney test results showed a significance value of $p > 0.05$. This means that there is no significant difference between the two groups. The Balance Method group changes from a scale of 6 to 1, and the local point electro-acupuncture group from a scale of 5 to 1. Both groups showed changes in the low back pain scale. Both groups are influential in reducing the scale of low back pain in farmers and farm laborers in Karanglo Village, Klaten.

I. INTRODUCTION

Musculoskeletal pain (low back pain) is common in Indonesia, especially among workers who pay little attention to occupational health and safety(1). Low back pain affected 619 million people in 2020 and is expected to increase to 843 million cases by 2050, mainly due to population growth and aging(2). The incidence of low back pain in 2021 was

recorded at 12,914 people, or about 3.71% of the population. Low back pain is the second-highest-prevalence disease after influenza[3].

Indonesia is an agrarian country, so some of its population work as farmers. This condition shows that the agricultural sector is still the main source of livelihood, especially in Central Java[1]. Central Java ranks second in the province with the most farmers in Indonesia, at 625,807[4]. Farmers are often faced with various challenges that often cause physical pain as part of the consequences of their work. In fact, they tend to ignore health and safety aspects while working, including non-ergonomic working positions[1].

In the course of their work, farmers are at risk of accidents or health problems. Commonly caused by unergonomic working positions, which overload the lumbar spine and pose a risk of microfractures[5]. Low back pain complaints often experienced by farmers are usually related to activities such as hoeing, planting, lifting, or harvesting, triggered by unergonomic body positions when standing, sitting, or bending. This can lead to acute injuries, especially at the waist, affecting their quality of life[6]. In Central Java Province in 2022 there were 314,492 cases of low back pain. It is estimated that 40% are suffered by the population aged 20-65 years[7]. In Klaten Regency in January 2023, low back pain ranked seventh with 94 cases[8].

Common efforts made by farmers to relieve back pain complaints include massage, consumption of analgesic drugs, giving warm compresses, and using warming creams such as Hot In Cream[9]. Most farmers are not aware of the existence of alternative acupuncture treatment. Therefore, researchers tried to introduce acupuncture therapy to farmers through socialization about what acupuncture therapy is, the benefits of acupuncture, and how to treat low back pain using acupuncture therapy.

According to the preliminary study survey conducted in October 2024, the total population in Karanglo village was 2,107 people. Karanglo Village in Polanharjo Subdistrict consists of 7 hamlets, namely Karanglo, Karangwetan, Pusur, Suruh, Nglangun, Ngenthak, and Plumbon. The majority of farmers and farm laborers reside in 6 dukuh, namely Karanglo, Karangwetan, Pusur, Suruh, Nglangun, and Plumbon. Based on the results of the survey and socialization of the 6 dukuhs, there are 120 farmers and farm laborers who experience low back pain.

Karanglo Village is an active agricultural area with a high rate of low back pain complaints based on initial observations. Many farmers and farm laborers complain of low back pain, but there have not been many structured health interventions to deal with these problems. Through the application of physical therapy or appropriate modalities, it is hoped that there will be a significant decrease in the scale of low back pain in farmers, so that they can return to work optimally and increase productivity without being disturbed by pain[5][10].

In some studies, it is explained that acupuncture therapy can reduce pain without side effects, although the provision of acupuncture therapy requires a longer time. Acupuncture therapy has various effective treatment methods, such as manual acupuncture therapy, electroacupuncture, and balance method acupuncture. Manual acupuncture therapy technique involves inserting needles into certain points to stimulate the release of endorphins, to reduce pain naturally[11].

Electroacupuncture works by increasing electrical stimulation at acupuncture points to trigger specific physiological responses. This approach allows analgesic and anesthetic effects to be achieved more quickly compared to traditional manual acupuncture, as well as generating different physiological responses depending on the needs of the

therapy[12].

Balance Method Acupuncture (BMA) has the advantage of being able to provide a fast response in dealing with pain cases by using minimal acupuncture points, mostly at distal points without involving local points and the effects are immediately felt by the body[13]. Studies have shown that BMA is effective in providing analgesic effects in patients with low back pain[14]. In a study conducted[15], it was shown that the Numeric Rating Scale (NRS) measurement proved to be more effective than the Visual Analogue Scale (VAS) in measuring Low Back Pain".

II. METHODS

This study employed a quasi-experimental design with a two-group pretest–posttest design, comparing two groups receiving different interventions. Baseline pain intensity was measured before treatment using the Numeric Rating Scale (NRS) as the pretest, and the same instrument was used again after the intervention as the posttest to assess changes in pain intensity [16,17]. In this design, the first group received Balance Method Acupuncture (BMA), while the second group received local point electroacupuncture (EA).

The study was conducted in Karanglo Village, Klaten, from October 2024 to April 2025. The target population consisted of farmers and farm laborers in Karanglo Village who experienced low back pain. Based on a preliminary survey and community socialization conducted in October, a total of 120 individuals were identified as having low back pain complaints.

The sample consisted of farmers and farm laborers with low back pain who were selected using a purposive sampling technique, in which participants were chosen according to specific inclusion and exclusion criteria [18]. Referring to the general rule of thumb for bivariate statistical analysis, a minimum of 30 subjects is required. Therefore, 36 participants were initially recruited, and to anticipate possible dropouts, the sample size was increased by 10% (4 additional reserve participants), resulting in a total sample of 40 research subjects [19]. These participants were then equally allocated into two intervention groups.

Group assignment was carried out through a simple randomization procedure based on the attendance list order. Participants with odd numbers were assigned to Group 1 (BMA), while those with even numbers were assigned to Group 2 (EA). This process continued until each group consisted of 20 participants.

The inclusion criteria were as follows: participants signed informed consent, worked as farmers or farm laborers, experienced moderate (NRS 4–6) or severe (NRS 7–9) low back pain, were aged 50–70 years, were willing to undergo 10 treatment sessions with a frequency of twice weekly, did not require prior medical examination, and were not consuming pain medication. The exclusion criteria included participants who did not complete the study protocol or those who experienced a significant decline in health condition during the study period [20].

III. RESULT

The baseline characteristics of participants in both groups are presented in Table 1. In the Balance Method Acupuncture (BMA) group, the largest proportion of participants were aged 61–65 years (40.0%), followed by those aged 50–55 years and 66–70 years (25.0% each), while the smallest proportion was aged 56–60 years (10.0%). Similarly, in the electroacupuncture (EA) group, most participants were aged 61–65 years and 66–70 years (35.0% each), followed by 56–60 years (20.0%) and 50–55 years (10.0%). These findings indicate that the majority of participants in both groups were older adults.

Regarding gender distribution, the BMA group consisted of an equal

proportion of male and female participants (50.0% each). In contrast, the EA group included a higher proportion of females (60.0%) than males (40.0%). Based on syndrome differentiation, kidney deficiency was the most common syndrome in both groups, accounting for 45.0% of participants in the BMA group and 55.0% in the EA group. This was followed by damp cold syndrome (25.0% in BMA vs. 20.0% in EA). Meanwhile, stagnation of qi and xue was equally distributed in both groups (15.0%), whereas liver stagnation was the least common syndrome, observed in 15.0% of the BMA group and 10.0% of the EA group.

The pretest pain scale showed that most participants in the BMA group reported a pain score of 6 (40.0%), followed by a score of 5 (25.0%). In the EA group, the most frequent baseline pain score was 5 (35.0%), followed by a score of 6 (30.0%). Higher pain scores of 7 and 8 were less common in both groups.

After the intervention, posttest pain scores decreased substantially in both groups. In the BMA group, the majority of participants reported a pain score of 1 (75.0%), while 20.0% reported a score of 2 and only 5.0% reported a score of 3. Likewise, in the EA group, most participants also reported a pain score of 1 (65.0%), followed by a score of 2 (30.0%) and a score of 3 (5.0%).

Table 1. Characteristics of Respondents

Variable	Category	Group BMA n (%)	Group EA n (%)
Age (years)	50–55	5 (25.0)	2 (10.0)
	56–60	2 (10.0)	4 (20.0)
	61–65	8 (40.0)	7 (35.0)
	66–70	5 (25.0)	7 (35.0)
Gender	Male	10 (50.0)	8 (40.0)
	Female	10 (50.0)	12 (60.0)
Differentiation syndrome	Damp cold	5 (25.0)	4 (20.0)
	Stagnation of qi and xue	3 (15.0)	3 (15.0)
	Liver stagnation	3 (15.0)	2 (10.0)
	Kidney deficiency	9 (45.0)	11 (55.0)
	4	4 (20.0)	3 (15.0)
Pain scale (Pretest)	5	5 (25.0)	7 (35.0)
	6	8 (40.0)	6 (30.0)
	7	1 (5.0)	2 (10.0)
	8	2 (10.0)	2 (10.0)
Pain scale (Posttest)	1	15 (75.0)	13 (65.0)
	2	4 (20.0)	6 (30.0)
	3	1 (5.0)	1 (5.0)

In Table 2, the Mann-Whitney test showed a significant value of p = 0.521. If p> 0.050, then it can be interpreted that there is no significant difference between the balance method group and local point electroacupuncture.

Table 2. Mann-Whitney Test

Research Data	N	Mean Rank	p
Balance Method	20	19.55	0.521
Elektroakupunktur	20	21.45	

The Wilcoxon test in Table 3, shows a significant value of p<0.001, if p>0.050. So it can be interpreted that Ha is accepted, which means that there is an effect of changes in the low back pain scale before and after treatment for both groups.

Table 6. Wilcoxon Test

Group	Mean Difference	p
Balance Method Elektroakupunktur	1.90	<0.001

IV. DISCUSSION

The study subjects, based on the age range, were mostly 61-65 years old with a total of 15 people. Aging naturally causes degeneration in bone structure, including the spine, as well as a decrease in bone density. In addition, muscle strength and elasticity of connective tissue, especially in the area around the spine, also decrease. These changes in

bone, muscle, and connective tissue lead to reduced joint stability, making them more susceptible to disturbances and damage that can trigger pain[21].

The study subjects based on gender were mostly women, with a total of 22 people. Low estrogen levels in women, especially after entering menopause, can cause a decrease in the strength of the ligaments and muscles around the spine, which in turn increases the risk of pain. In addition, during perimenopause, weight gain in the abdominal area can also put additional pressure on the lower spine[22].

The study subjects based on syndrome differentiation were mostly renal deficiency, with a total of 22 people. Low back pain is related to the spine. In TCM, bone is one of the special organs of the kidney organ, and is closely related to the function of the kidney organ, as we age, there is a decrease in the function of the kidney organ and there is a decrease in bone density and can cause several complaints in the bones, one of which is complaints in the waist[23].

Research subjects with pain scale measurements using the Numeric Rating Scale (NRS), after 10 interventions, obtained Balance Method group values from a pain scale of 6 to 1, and a local point electroacupuncture group from a pain scale of 5 to 1. Based on the Mann-Whitney test, the significant value of p = 0.521, which is bigger than 0.050. The average percentage of blood pressure reduction in this study in the balance method group was 19.55. While the local point electroacupuncture group was 19.55. This means that there is no significant difference between the two groups. Based on the results of the Wilcoxon test, it has a significance of p <0.001, if p>0.050, which means that there is an effect of changes in the low back pain scale before and after treatment in both groups.

Stabbing at local acupuncture points can affect nociceptive, proprioceptive, and autonomic nerve pathways and can increase enkephalins and endorphins as well as segmental effects to send impulses to the midbrain, so that endorphin will increase. The flow of enkephalins can stimulate the release of monoamines, serotonin, and norepinephrine in the lower back so that it can inhibit pain, including musculoskeletal pain[24].

Electroacupuncture works through four main mechanisms, namely inflammatory reactions, meridian intercellular transduction, cutaneosomatoviseral reflexes, and neural transmission to the brain, so that the results of electroacupuncture therapy have the effect of reducing pain in low back pain[25].

Balance method has a rapid effect and reaction in the case of pain, can control physical stress by affecting the secretion and metabolism of the central nervous system and is proven to provide more effective pain relief (analgesic) effects in patients with low back and leg pain due to lumbar disc herniation, through regulating the function of the endogenous pain control system[14].

V. CONCLUSION

The characteristics of the study subjects were mostly female, with 22 subjects, in the age range of 61-65 years, with 15 subjects, renal deficiency syndrome with 22 subjects, changes in the pain scale of the BMA group from a scale of 6 to 1 and the EA group from 5 to 1. From the Wilcoxon test results, p<0.001, then the significance value of p>0.050. This means that there is an effect of using local point electroacupuncture with the balance method on the scale of low back pain in farmers and farm laborers in Karanglo Village, Klaten. In the Mann-Whitney test, p = 0.521; if p> 0.050, it can be interpreted that there is no significant difference between the balance method and local point electroacupuncture groups.

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