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Article

The Effect of Electroacupuncture Therapy with a Combination of Noni Herbs on Lowering Blood Pressure in Hypertension Cases at Ja'far Medika Hospital, Karanganyar

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ABSTRACT

Hypertension is one of the main risk factors for cardiovascular disease, whose prevalence continues to increase. Electroacupuncture therapy with a combination of noni herbs can be an alternative treatment option in lowering blood pressure in patients with hypertension. This study aims to determine the effect of electroacupuncture therapy with a combination of noni herbs on lowering blood pressure in patients with hypertension at Ja'far Medika Hospital, Karanganyar. This study used a "Quasi-Experimental" research design with the Non-equivalent two-group pretest-posttest design method. with a purposive sampling method. This design uses a non-randomized trial in each experimental group Pretest was given to research subjects before intervention, and posttest was given to research subjects after intervention. The number of samples used was 34 research subjects which were then divided into 2 control groups and experimental groups. The results of the Mann-Whitney test showed that there were changes in systolic blood pressure p=0.022 and diastolic blood pressure had a value of p=0.023 which showed significant differences between the two groups, with the intervention group (electroacupuncture with a combination of noni herbs) showing more significant changes compared to the control group (sham electroacupuncture) Wilcoxon test showed a statistically significant decrease in blood pressure in both groups (p<0.001). Electroacupuncture therapy with a combination of noni herbs has more effect on reducing systolic and diastolic blood pressure in hypertensive patients at Ja'far Medika Hospital, Karanganyar.

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I. INTRODUCTION

The prevalence of hypertension in the world in 2019 reached 1.3 billion adults[1]. Hypertension or high blood pressure is a non-communicable disease and a very serious health problem, so it is often called “the silent killer” because it often occurs without any complaints[2][3]. In Indonesia, the percentage of people with hypertension in 2023 was recorded at 22.2%[2]. In Central Java Province, the percentage of people with hypertension will reach 31.3% by 2023[3]. In Karanganyar Regency, the number of people with hypertension aged over 15 years reached 163,893 people[4]. This shows how significant the problem of hypertension is at the local level.

Treatment of hypertension can be done with pharmacological and non-pharmacological treatments. One of the pharmacological treatments is beta-blockers which can slow down the heart and widen blood vessels[5][6]. However, long-term use of antihypertensive drugs may cause side effects, such as worsening serum lipid levels and decreased glucose tolerance [7]. As an alternative, non-pharmacological treatments such as electroacupuncture with a combination of noni herbs are increasingly in demand because they are considered safer, cheaper, and have fewer side effects compared to pharmacological therapy[8].

Acupuncture is a system of traditional Chinese medicine based on the pattern of energy (Qi) flow through the body's meridian system[9]. Electroacupuncture modality can be added in acupuncture therapy to reduce high blood pressure. Electroacupuncture is the most frequently used intervention strategy in anti-hypertension research, because the amount of stimulus and strength of electroacupuncture are consistent and regular compared to manual manipulative stimuli[10].

Acupuncture points LI11 Quchi, PC6 Neiguan, ST36 Zusanli and LV3 Taichong were selected because they are the most commonly used points in hypertension and Evidence Based Medicine (EBM) proves that these points can reduce blood pressure because they have similar healing effects as anti-hypertensive drugs. In addition, the experimental point ST36 has been shown to reduce blood pressure and increase NO/NOS activity, that role in vascular smooth muscle relaxation[11].

Noni (Morinda Citrifolia) is a type of fruit with natural content and has various health benefits. Noni contains a type of phytonutrient, scopoletin, which functions to widen blood vessel channels that are narrowed. This causes the heart not to have to work too hard to pump blood, resulting in normal blood pressure[12]. The results of preliminary studies that have been carried out in November 2024 with data collection methods sourced from total visits at Ja'far Medika Hospital, obtained data that from October 21, 2024, to November 15, 2024, there were 185 patients with hypertension.

II. METHODS

This study employed a quasi-experimental design using a non-equivalent two-group pretest–posttest design. This design involves two groups: an experimental group and a control group, with non-random assignment of participants[13]. Both groups received a pretest to measure baseline blood pressure values before the intervention, and a posttest after the intervention to assess the effects. The experimental group received electroacupuncture therapy combined with noni (Morinda citrifolia) herbal capsules, while the control group received sham electroacupuncture therapy combined with the same herbal supplement.

The study was conducted at Ja’far Medika General Hospital, located in Karanganyar, Indonesia. The research took place over a six-month period from October 2024 to April 2025. Preliminary data collected between October 21 and

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November 15, 2024, identified 185 patients with hypertension at the hospital.

This study uses a purposive sampling method where this technique uses a non-random sampling method where the selection of this sample is based on certain considerations[14]. Based on statistical requirements for bivariate analysis, a minimum of 30 participants is recommended. To accommodate potential dropouts, 10% was added [15]. The final sample size was 34 research subjects, divided equally into two groups (n=17 each).

The inclusion criteria for participants were as follows: (1) patients of Ja'far Medika General Hospital; (2) aged between 45 and 60 years; (3) able to communicate effectively; (4) diagnosed with mild, moderate, or grade 3 hypertension (systolic 140–≥180 mmHg and diastolic 90–≥110 mmHg); (5) willing to sign informed consent; (6) willing to undergo 10 sessions of acupuncture therapy at a frequency of two sessions per week; and (7) willing to consume noni herbal capsules at a dose of 2 capsules per day.The exclusion criteria included: (1) withdrawal from the study at any time; (2) receiving any other treatments that could affect the outcomes; and (3) a history of stroke.

The independent variables in this study were the types of intervention: electroacupuncture combined with noni herbal capsules, and sham electroacupuncture combined with noni herbal capsules. The dependent variable was the change in systolic and diastolic blood pressure after the intervention period.

All collected data were analyzed using SPSS. Descriptive statistics were used to summarize demographic characteristics and baseline data of the participants. The Wilcoxon signed-rank test was used to evaluate the differences in pretest and posttest blood pressure values within each group (electroacupuncture and noni and sham electroacupuncture and noni), as the data were not normally distributed. The Mann–Whitney U test was employed to compare the posttest outcomes between the two groups. A p-value of <0.050 was considered statistically significant.

III. RESULT

This study was conducted over 10 therapy sessions, administered twice a week. Data collection began with initial observation at the research site, followed by baseline blood pressure measurement prior to the intervention. Blood pressure was measured twice: once before the first therapy session and again after the completion of the tenth session.

Table 1. Characteristics of Respondents

Characteristics	Control Group		Treatment Group	
	N	%	N	%
Sex				
Male	6	35.3	5	29.4
Female	11	64.7	12	70.6
Age (years)				
30–40	0	0	1	5.9
41–45	2	11.8	2	11.8
46–50	5	29.4	1	5.9
51–55	2	11.8	3	17.6
56–60	8	47.1	10	58.8
Syndrome Differentiation				
Liver Yang Rising	9	52.9	9	52.9
Hyperactivity of Liver Fire	1	5.9	2	11.8
Accumulation of Damp-Phlegm in Middle Jiao	1	5.9	3	17.6
Spleen Deficiency	6	35.3	3	17.6

Table 1 shows the characteristics respondents, it can be seen that the most gender data is female with 23 subjects, in the age range of 56-60 years as many as 18 subjects, housewife work as many as 10 subjects. The most syndrome differentiation is the rise of the liver as many as 18 subjects.

Table 2. Mann-Whitney Test

Blood Pressure Parameter	Group	Mean Rank	p
Systolic	I (Control)	13.85	0.022
	II (Treatment)	21.15	0.022
Diastolic	I (Control)	20.88	0.023
	II (Treatment)	14.12	0.023

Before therapy in group I the average systolic pressure was 148.82 mmHg diastolic 91.18 mmHg, while after treatment the average systolic blood pressure became 125.29 mmHg and diastolic 78.82 mmHg. In group II, the average systolic blood pressure was 159.41 mmHg and diastolic was 91.18 mmHg, while after treatment, the average systolic blood pressure was 127.06 mmHg and diastolic was 78.82 mmHg. The Mann–Whitney test results in Table 2 showed a statistically significant difference in systolic blood pressure (p=0.022), and diastolic blood pressure (p=0.023) between the two groups, indicating that the intervention had a significant effect on reducing blood pressure

Table 3. Wilcoxon Test

Group	Variable	Z-value	p
I (Control)	Systolic	-3.66	<0.001
	Diastolic	-3.63	<0.001
II (Treatment)	Systolic	-3.63	<0.001
	Diastolic	-3.71	<0.001

Based on Table 3, The Wilcoxon test results indicated a significance value of p < 0.050 for both groups. This suggests that there was a significant change in blood pressure before and after treatment in both groups.

IV. DISCUSSION

The study subjects were mostly female, with 23 people (67.6%). Men have a higher potential for hypertension than women, but it is likely that women also have the potential to develop hypertension due to excessive stress and menopause. This is because increasing age in women can cause a decrease in post-menopausal estrogen hormones[16].

Most research subjects were in the age range of 56-50 years, totaling 18 people (52.9%). Along with increasing age, the risk of hypertension. This increased risk is triggered by structural changes in the blood vessels, causing the lumen to narrow and the walls of the blood vessels to become more rigid, which is due to an increase in systolic blood pressure[16].

The most research subjects were housewives, totaling 10 people (29.4%). Stress is one of the factors causing hypertension. A poor lifestyle, such as fatigue, stress, lack of rest, and sleep. This can cause an increase in blood pressure[17]. There were 18 subjects (52.9%) with liver Yang syndrome. Yin disorders in the kidneys can trigger liver Yang hyperactivity and cause hypertension. This is shown by the manifestations of research subjects such as dizziness, irritability, and neck stiffness[18].

The average systolic pressure in the electroacupuncture Sham group and the combination of noni herbs was 148.82 mmHg and diastolic was 91.18 mmHg, while after treatment, the average systolic blood pressure became 125.29 mmHg and diastolic was 78.82 mmHg. The average systolic pressure of the electroacupuncture therapy group with a combination of noni herbs was 159.41 mmHg, and the diastolic was 91.18 mmHg, while after treatment, the average systolic blood pressure became 127.06 mmHg and the diastolic was 78.82 mmHg.

Age, gender, and genetics are factors that affect blood pressure and cannot be changed. Poor living habits can also cause an increase in blood pressure[16,19]. Sham electroacupuncture therapy can still have a therapeutic effect although the effect is not as good as that shown by the original electroacupuncture group[20].

Based on the Mann-Whitney test has a systolic p= 0.022 and a diastolic p=0.023 The average percentage of blood pressure reduction in this study in group I (Sham electroacupuncture therapy with a combination of noni herbs) systolic pressure was 13.85 and diastolic pressure was 20.88, while in group II (electroacupuncture therapy with a combination of noni herbs)

systolic pressure was 21.15 and diastolic pressure was 14.12. Based on the results of the Wilcoxon test, it has a significance of p <0.050, which means that there is a significance of changes in systolic and diastolic blood pressure before and after treatment in both groups.

From the results of the Wilcoxon test, a significance value of p<0.001 was obtained, and a significance value of p < 0.050, which means that there is an effect of electroacupuncture therapy and electroacupuncture with a combination of noni herbs. In the Mann-Whitney test, the significance value obtained in the post-test p = 0.009, the significance value of p<0.050, which means that the research hypothesis testing Ha is accepted and H0 is rejected.

Acupuncture can physiologically affect the Renin-Angiotensin-Aldosterone system (RAAS) which can regulate blood pressure homeostasis, acupuncture can function to lower blood pressure by reducing renin activity[21]. Stabbing at LV3 Taichong point can have a blood pressure lowering effect by inhibiting plasma angiotensin II[22]. Stabbing at the ST36 Zusanli point can function to increase the activity of No./NOS which plays a role in the process of relaxing smooth muscles in blood vessels[11]. Acupuncture point PC6 which is located on the palmar aspect of the forearm, 2 cun above the transverse crease of the wrist can increase endorphins which provide a sense of calm[23], and LI11 Quchi points can help lower blood pressure by relaxing vascular smooth muscles that function to facilitate the flow of energy and blood[24]. Noni herbs have several ethanol contents, scopoletin, prexeronin, soranjidiol, flavoids, alkanoids, and xeronin which are beneficial for health, one of which is to reduce high blood pressure or hypertension[25–27]

Sham acupuncture is a placebo acupuncture procedure performed by disguising the stabbing of acupuncture points and is believed not to have any physiological effect. This is done in order to provide differences regarding the effect of Sham electroacupuncture therapy and electroacupuncture therapy on blood pressure reduction. In the sham electroacupuncture group intervention with noni herbs there was a change in systolic blood pressure by 23.53 mmHg, while in the electroacupuncture group with noni herbs there was a change in systolic blood pressure by 32.35 mmHg. It can be concluded that electroacupuncture therapy with a combination of noni herbs has a more effective effect on lowering blood pressure compared to sham electroacupuncture therapy with a combination of noni herbs[28].

V. CONCLUSION

The characteristics of the research subjects were predominantly female, with 23 subjects in total. The majority were within the age range of 56-60 years (18 subjects), and most were housewives (10 subjects). The average systolic blood pressure in Group I was 148.82 mmHg, with a diastolic pressure of 91.18 mmHg before treatment. After the treatment, the average systolic value decreased to 125.29 mmHg, and the diastolic value decreased to 78.82 mmHg. In Group II (electroacupuncture), the average systolic value before treatment was 159.41 mmHg, and the diastolic value was 91.18 mmHg. After treatment, the average systolic value decreased to 127.06 mmHg, and the diastolic value dropped to 78.82 mmHg.

The Wilcoxon test showed a significant change with a p-value of <0.001, indicating an effect of both sham electroacupuncture therapy with noni herbs and electroacupuncture with noni herbs on reducing blood pressure in hypertension cases. The Mann-Whitney test indicated that post-test systolic blood pressure had a p-value of 0.022, and diastolic pressure had a p-value of 0.023, both of which are below the 0.050 significance threshold, suggesting that the treatments had a significant effect on blood pressure reduction.

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