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The effect of acupressure therapy on sleep quality in hypertension patients at Tidar Hospital Magelang

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Abstract

Hypertension is abnormal blood pressure that can be measured in at least three different situations. Purpose: This study aims to analyze the effectiveness in improving the sleep quality of hypertensive patients. This study used quantitative research with a Randomized Controlled Trial (RCT) design. The sample size was determined by the mean between two means, requiring 60 respondents divided into an intervention group (given acupressure therapy at LV3 (Taichong), ST36 (Yusanli), HT7 (Shen Men), and LI1 (Quchi) and a control group (receiving standard therapy and care without acupressure treatment). Sleep quality was measured using the PSQI questionnaire. Data analysis used the Mann-Whitney test. The results of the sleep quality measurement of the intervention group before the procedure were 7.20 (poor sleep quality) and after the acupressure procedure were 3.43 (good sleep quality). Meanwhile, in the control group before the procedure were 7.43 (poor sleep quality) and after the procedure were 7.87 (poor sleep quality). There was a difference in sleep quality before and after the acupressure procedure between the two groups (p:0.000). Acupressure theraphy is effective in improving sleep quality in hypertensive patients.

Keywords

Acupressure, Hypertension, Sleep quality, PSQI, Point LV3 (Taichong), ST36 (Yusanli), HT7 (Shen Men), LI1(Quchi)

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Introduction

Hypertension is abnormal blood pressure that can be measured in at least three different situations. If blood pressure rises above 140/90 mmHg, the person is usually considered to have hypertension (Herawati et al., 2021). According to the World Health Organization (2019), there are 1 billion people worldwide who suffer from hypertension, with two-thirds of them in developing countries. A very alarming figure is that 972 million people (26%) worldwide suffer from hypertension. This number continues to increase, and by 2025, approximately 29% of adults worldwide will have hypertension. According to the 2018 Basic Health Research, the prevalence of hypertension in

Indonesia is 34.1% of the population aged 18 years and over, with the number of cases reaching 63,309,620 people and the death rate due to hypertension reaching 427,218 people (Sari et al., 2025).

In Indonesia, the prevalence of hypertension is 34.1% based on measurements of the population aged 18 years, with the highest prevalence in South Kalimantan at 44.1%, and the lowest in Papua at 22.2%. Hypertension is also found in the 31-44 age group (31.6%), 45-54 age group (45.3%), and 55-64 age group. Most people with hypertension are also diagnosed with hypertension (Yasa Suartika et al., 2023).

Hypertension can increase the risk of cardiovascular disease. The risk of death, cardiovascular disease, stroke, and heart failure can be reduced by controlling systolic blood pressure. A 20 mmHg or 10 mmHg increase in diastolic blood pressure increases the risk of death from ischemic heart disease and stroke. Maintaining a healthy lifestyle for 4 to 6 months can lower blood pressure and generally reduce the risk of cardiovascular disease. Weight loss, reducing salt intake, exercising, reducing alcohol consumption, and quitting smoking are some examples of healthy lifestyle habits (Rifai & Safitri, 2022).

Several factors can cause hypertension, including a family history of hypertension, an unhealthy lifestyle, such as eating lots of fatty foods, smoking, lack of activity, stress, obesity, excess sodium intake, and vitamin D deficiency (Rahayu & Sucipto, 2023). The most common symptoms of hypertension are headaches that vary from mild to severe, dizziness, nausea and vomiting, weakness, back and neck pain, especially when waking up in the morning, muscle pain, joint pain, and difficulty sleeping (Lating et al., 2022).

People with hypertension can experience sleep problems that worsen their sleep quality. This can increase blood pressure and worsen the development of hypertension, potentially increasing the risk of stroke and heart complications. According to Yuliani (2016), one of the risk factors for hypertension is sleep. The Circulation Journal reports that sleep disorders should be included in the top ten modifiable risk factors for preventing heart disease (Purwandari & Fatimatuzzahroh, 2023).

Sleep quality can be addressed with pharmacological and non-pharmacological therapies. While sleeping pills are pharmacological and the most effective way to address sleep quality, excessive use can lead to dependency and negative side effects (N. Fitriani et al., 2022). The use of non- pharmacological therapy is the safest alternative method and has no side effects, namely acupressure therapy.

Acupressure is a traditional Chinese treatment that has been scientifically proven to help reduce complaints of sleep disorders by stimulating certain points on the body (D. Fitriani et al., 2025). Research result (Pramawati et al., 2025) It has been proven effective in treating sleep disorders in the elderly by significantly reducing the insomnia scale using the Wilcoxon test, showing a p-value of 0.000 ($p < 0.05$), which means that acupressure has an effect on reducing the insomnia scale. Respondents in the intervention group experienced improved sleep quality, feeling calmer, more

comfortable, and more relaxed after receiving acupressure therapy. Acupressure can improve health by balancing life energy (chi). It can also improve blood circulation, maintain the harmony of yin and yang, maintain normal body functions, and provide comfort. In addition, these effects improve sleep quality (Purwanti et al., 2023). The study aims to analyze the effect of acupressure on the sleep quality of hypertensive patients.

Method

This study used a quantitative research method with a Randomized Controlled Trial (RCT) design with a pretest-posttest control group design. This design was chosen because the researchers would analyze the effect of acupressure therapy on sleep quality in hypertensive patients by comparing the intervention and control groups before and after acupressure therapy. The research design is explained in Figure 1.

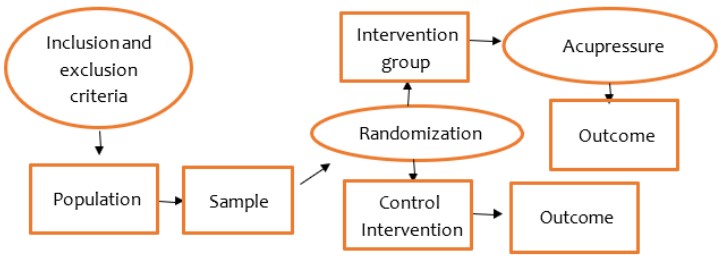

Figure 1. Research design

The population of this study included all hypertensive patients treated at Tidar General Hospital, Magelang. The sample selection for this study was hypertensive patients who met the inclusion and exclusion criteria. The required sample size was 60 respondents, calculated using the difference-of-two-means formula. All respondents were then randomly divided into two groups: an intervention group and a control group, each with 30 respondents. Respondents who met the inclusion criteria in this study were respondents aged 40 to 70 years and not currently undergoing any alternative therapy. Exclusion criteria in this study were patients with hypertension complications such as kidney failure, skin disorders at the acupressure site, pregnancy, and exhibiting an uncooperative attitude. The location of this study was Tidar General Hospital, Magelang, which includes five wards: Aster 2, Aster 3, Aster 4, Dahlia 4, and Anyelir.

The first stage in this study was to randomly determine the rooms for the intervention group and the control group. Next, the sample was selected using a simple random sampling technique and then randomly divided into the two groups. The researcher then explained the purpose, benefits, procedures, and risks. The research implementation stage involved measuring baseline blood pressure (pretest) in both groups using a digital sphygmomanometer. Next, sleep quality was measured before acupressure therapy was administered. The next stage involved administering acupressure therapy to the intervention group at points LV3 (Taichong), ST36 (Yusanli), HT7 (Shen Men), and LI11 (Quchi). Each respondent underwent acupressure for 30 minutes, applying pressure and holding it for 5 seconds, then releasing it for 1 second.

This procedure was carried out for two consecutive days. Meanwhile, the control group received only standard hospital care. Blood pressure and sleep quality measurements were conducted at the end (posttest) on the first and second days. The instruments used were (digital tensiometer), the brand used was Tensi One 1A from Onemed according to the one used at the research location and had been routinely calibrated every 6 months, observation sheet form, SOP for acupressure actions, lotion, tissue, stopwatch, and Pittsburgh Sleep Quality Index (PSQI), which is a standard questionnaire consisting of seven components of sleep quality assessment (subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction). PSQI scores ranged from 0–21, with a score <5 indicating good sleep quality. While a sleep quality score of 6–21 indicated poor sleep quality. Data analysis was carried out first to test for normality using the Kolmogorov-Smirnov test, homogeneity test using Levene's test, Independent t-test to compare results between the intervention and control groups. If the data was not normal, the Mann-Whitney test was used

Results

In this section, the researcher explains the research results including respondent characteristics, blood pressure and sleep quality and the effect of acupressure on the sleep quality of hypertensive patients.

Respondent characteristics

The researcher described the respondents' characteristics, including age, gender, education level, and occupation.

Table 1. Characteristics of respondents in the intervention group and control group along with homogeneity test (n=60)

No	Variable	Intervention Group (n=30)				Control Group (n=30)			P value
		mean	± sd	N	%	mean	± sd	N	%
1	Age	60.4	12.2	4		63.4	12.5		0.346
2	Gender								0.5916
	Male			11	36.7		9	30	
	Woman				63.3		21	70	
3	Level of Education								0.300
	Elementary School			11	36.7		9	30	
	Junior High School			6	20.0		5	16.7	
	High School			10	33.3		9	30	
	Diploma/ Bachelor's			3	10.0		7	23.3	
4	Work								0.652
	Not working/ housewife						14	46.7	
	Farmers						2	6.7	

Based on Table 1, it can be concluded that the average age of the intervention group was 60 years and the control group was 63 years. In terms of gender, the majority of both groups were women. In terms of education, the majority of both groups had elementary and high school education. The occupations of respondents in the

intervention group were mostly unemployed or housewives and private or self-employed, while in the control group, most were unemployed or housewives. The results of the homogeneity test for age, gender, education level, and occupation all had values >0.05, so it was concluded that both groups had the same variance or were homogeneous. The results of the homogeneity analysis showed that for all characteristics there was no significant difference in variance between the intervention and control groups or were homogeneous.

Respondents' blood pressure and sleep quality

Respondents' blood pressure and sleep quality data are described with the average (mean) and standard deviation as in Table 2.

Table 2. Blood pressure and sleep quality of respondents before and after acupressure therapy

Variable	Intervention Group (n=30)				Control Group (n=30)			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Blood pressure								
Systolic	172.00	26.091	136	240	165.93	23.067	140	230
Diastolic	95.33	13.959	62	124	92.60	16.220	66	134
Sleep quality								
Pretest	7.20	1.064	6	9	7.43	1.135	6	9
Posttest	3.43	1.165	2	5	7.87	1.358	6	9

Based on Table 2, it was found that systolic blood pressure in the intervention group showed an average of 172.00 with a diastolic of 95.33. While in the control group, systolic blood pressure showed an average of 165.93 and diastolic 92.60. Sleep quality in the intervention group pretest showed an average of 7.20 meaning respondents had poor sleep quality and posttest 3.43 meaning respondents had good sleep quality. While in the control group pretest showed an average of 7.43 meaning respondents had poor sleep quality and posttest 7.87 meaning respondents had poor sleep quality.

Sleep quality score normality test

Before conducting the bivariate analysis, the researchers conducted a normality test using the Kolmogorov-Smirnov test, yielding the results shown in Table 3.

Table 3. Normality test of respondents' sleep quality scores using the Kolmogorov–Smirnov scale

Group	Kolmogorov–Smirnov (p)		
	Statistic	Df	Sig
Intervention (Pretest)	0.204	30	0.003
Control (Pretest)	0.182	30	0.013
Intervention (Pretest)	0.191	30	0.007
Control (Pretest)	0.365	30	0.000

Table 3 shows that the analysis results for the intervention and control groups were <0.05, indicating that the data were not normally distributed. Based on these normality test results, the researchers used the Mann-Whitney test for bivariate analysis, as described in Table 4.

Bivariate analysis of the effect of acupressure on sleep quality

The results of the bivariate analysis of the effect of acupressure therapy on sleep quality in hypertensive patients are presented Table 4.

Table 4. Bivariate analysis of the effect of acupressure on sleep quality

Time	Group	Mean Rank	U Value	Z Value	P value
Pretest	Intervention	28.77	398.000	-0.796	0.426
	Control	32.23			
Posttest	Intervention	15.50	0.000	-6.768	0.000
	Control	45.50			

Description: U = Mann–Whitney test; Z = statistical test value; p-value is significant if < 0.05

Based on the results of the Mann–Whitney test, at the pretest stage, the U value was 398, Z value was –0.796, and p value was 0.426 ($p > 0.05$). This indicates that there was no significant difference in the initial sleep quality scores between the intervention group and the control group before acupressure therapy was given. Furthermore, at the posttest stage, the U value was 0, Z value was –6.768, and p value was 0.000 ($p < 0.05$). These results indicate that there was a significant difference in sleep quality scores after acupressure therapy, where the intervention group had better sleep quality scores compared to the control group

Discussion

Respondent characteristics

Based on the results of the study, the average age of respondents in the intervention group was 60 years, while in the control group it was 63 years. In Indonesia, the prevalence of hypertension tends to continue to increase with age, in the 55-64 age group as much as 45.9%, in the 65-74 age group as much as 57.6%, and in the age group over 75 years, as much as 63.8% (Khotimah, 2023). The results of other studies show that the average age of respondents in hypertension patients is 65-74 years (Mohi et al., 2023). These results confirm the relationship between age and hypertension, as demonstrated by the Chi-square statistical test with a p-value of 0.049. This suggests that gender is related to sleep quality in the elderly (Nurhayati et al., n.d.). People over 60 years of age often experience sleep quality issues, particularly related to insufficient or excessive sleep. Average sleep time is important because it can impact daily activities. Decreased sleep quality in the elderly may be linked to neurological dysfunction that accompanies the aging process, particularly reduced neurotransmitter levels. This condition disrupts the estrogen hormone regulation mechanism in the hypothalamus. The hypothalamus plays a role in regulating melatonin production. This hormone begins to form when the bulbar synchronizing nucleus releases it, which then stimulates the RAS (Reticular Activating System). The RAS then interacts with the SCN (Suprachiasmatic Nuclei), which is responsible for sending nerve signals and regulating melatonin to control the body's circadian rhythm. Decreased melatonin production can affect the NREM sleep cycle, phases 3 and the sleep phases, consisting of REM and

NREM, are crucial for the body because they repair damaged cells and create new ones (Kirana et al., n.d.).

Judging from the characteristics of the respondents, the gender of both study groups was predominantly female. This finding may impact sleep quality, as previous research has shown that women are more susceptible to sleep disturbances due to hormonal changes and psychosocial factors. The study, conducted by (Dewi & Susilo, 2021) found a higher prevalence of hypertension in women (28.8%) than in men (22.8%) due to the decline in postmenopausal estrogen hormones which affects blood vessel health and sleep quality, with a p-value of 0.000 for overall improvement in sleep quality after the intervention. This study is in line with research (Riyadi & Apriyani, 2024) which states that the gender variable is important, because women are more susceptible to sleep disorders due to hormonal and psychosocial factors, especially in pre-operative patients and other conditions related to hypertension.

Based on education level, the majority of respondents had elementary or high school degrees. Both education and age can influence a person's knowledge. The higher a person's education level, the easier it is for them to receive or grasp information. However, people over 20 are considered mature enough to consider their own well-being (Massiani et al., 2023). Education influences how easily a person can access health services, seek treatment, and find solutions to health problems they experience (Ardhiansyah & Hudiyawati, 2023).

In terms of occupation, both groups were largely unemployed and self-employed. Employment conditions are related to daily activities, stress levels, and rest patterns, which ultimately affect sleep quality. Overall, differences in respondent characteristics between groups need to be considered when interpreting the study results. Nevertheless, the distribution of respondents was relatively balanced, thus not causing significant bias in the effectiveness of the acupressure therapy analyzed in this study. Factors such as high workload, irregular work schedules, and significant responsibilities significantly affect physical and mental health, including sleep quality. Lack of sleep combined with an excessive workload can lead to stress. When someone is stressed, their thoughts will focus on the problems they are facing, which can disrupt their sleep quality (Mandaku et al., 2024).

Sleep quality

The results of the study showed that sleep quality before the intervention group was 7.20, meaning poor sleep quality, and after the intervention was 3.43, meaning good sleep quality. In the control group, sleep quality before the intervention was 7.43, meaning poor sleep quality, and after the intervention was 7.87, meaning poor sleep quality. There is an effect of acupressure on the sleep quality of patients with hypertension. Sleep quality is a person's level of satisfaction with their as the depth of sleep, the ability to stay asleep, and the ability to fall asleep without medical assistance. Good sleep quality can cause a person to feel calm, energetic, and not complain about

sleep disturbances in the morning. In other words, good sleep is very important for everyone's health (Hidayat & Amir, 2021).

Poor sleep quality in hypertensive patients is caused by the activity of angiotensin I and angiotensin II, which disrupt blood circulation. Symptoms include an inability to control emotions, headaches caused by increased cerebral vascular resistance, edema caused by sodium retention, shortness of breath, chest pain, nausea, vomiting, palpitations, and fatigue caused by increased blood pressure. Myocardial ischemia also causes chest pain, and increased blood pressure can also cause retinal damage and organ death due to lack of oxygen to the brain, leading to syncope. These symptoms contribute to poor sleep quality in hypertensive patients. During normal sleep, blood pressure decreases through sympathetic and parasympathetic autonomic regulation. If poor sleep quality is left untreated, it can lead to new problems such as fatigue during activity, headaches, hypertension, anxiety, fluid imbalances, and even new problems with the cardiovascular system. Hypertensive patients experience difficulty sleeping due to increased cerebral vascular resistance, which can lead to headaches (Yuniza et al., 2025).

Acupressure

Acupressure, a technique of applying pressure to specific points on the body, is known to have significant benefits for those suffering from sleep disorders. It works by stimulating these points, which then send complex signals to the brain, releasing compounds like serotonin. This serotonin release triggers deep relaxation, improves blood circulation, and ultimately increases stamina and endurance, creating a sense of well-being that supports better sleep quality (Erika et al., 2023).

This research is in line with research (Ilyas & Sriyanah, 2025) with the title "The Effect of Acupressure on the Hegu Point and Shenmen Point on the Sleep Quality of Kidney Failure Patients" obtained a p value of 0.001 and less than p <0.05, which means that there is an effect of providing acupressure therapy at the Shenmen acupoint. A p value of 0.003 was also obtained and less than p <0.05, which means that there is an effect of providing acupressure therapy at the Hegu acupoint. The research conducted by (Artini & Handayani, 2021) With the title "Implementation of Acupressure Therapy Intervention to Overcome Sleep Disorders in Elderly with Hypertension," after acupressure therapy intervention was given, the elderly's need for rest and sleep was met, and the client appeared refreshed. In the elderly, acupressure techniques can help them feel comfortable, calm, and relaxed. Stimulation of sensory nerve cells located around the acupressure points is then transmitted to the spinal cord, then to the mesencephalon, and finally to the hypothalamic-pituitary complex. This process results in the release of endorphins. This hormone has the ability to provide a feeling of calm. This feeling of calm, comfort, and relaxation will make the elderly want to sleep. If someone feels relaxed and comfortable, they will be able to fall asleep.

Such conditions are very important for the elderly so that they can meet their sleep needs and avoid further sleep problems.

Thus, the results of this study confirm that acupressure is a simple, inexpensive, and safe non-pharmacological intervention that can be independently implemented by patients to improve sleep quality, especially in hypertensive patients who often experience sleep disturbances due to changes in blood pressure and nervous system activity. This can help reduce dependence on sleeping pills that carry the risk of side effects, especially in elderly patients who are vulnerable to comorbidities. For community nursing, this study encourages the integration of acupressure into health education programs, which can be implemented by nurses or patients themselves after brief training. Overall, these implications open up opportunities for further research in the Indonesian cultural context, where alternative treatments such as this can be combined with conventional treatments to improve patient compliance and quality of life holistically. Although this study makes a valuable contribution, there are limitations that need to be acknowledged, namely, it did not measure levels of stress, anxiety, or lifestyle factors that affect sleep quality.

Conclusion

Based on the study results, acupressure therapy effectively improved sleep quality in hypertensive patients with a significant difference ($p<0.05$) in the Mann-Whitney test. Therefore, this simple and safe non-pharmacological intervention is recommended for both hospital and community care. Future researchers are advised to conduct studies with a longer intervention period and incorporate other variables such as stress levels, anxiety, or lifestyle factors to obtain a more comprehensive picture of the effectiveness of acupressure therapy on sleep quality.

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