

# Garlic as A Modern Nursing Complementary Therapy (MNCT) For Hypertensive Patients

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## Abstract

**Introduction:** Hypertension is a severe problem that needs to be addressed because it is a significant factor causing premature death worldwide. The use of garlic herbs as a treatment for hypertension has been widely done but still needs further research, especially providing the correct dose for patients. **Objective:** This study aims to find the right amount to treat hypertension, determine the decrease in systole and diastole blood pressure, and see the impact of BMI on lowering blood pressure from garlic therapy. **Method:** Pre-experimental Design research design with One-group Pretest-posttest Design. The sampling technique was non-probability with a purposive sampling approach. This study consisted of 45 respondents divided into three groups: Group 1 (dose 3gr), Group 2 (dose 6gr), and Group 3 (dose 9 gr). The intervention was carried out by giving garlic steeping to patients with hypertension who were monitored for seven days. **Results:** There was an effect of garlic steeping on reducing systole blood pressure in group 1 (0.033), group 2 (0.011), and group 3 (0.001) as well as diastole blood pressure, group 1 (0.038) and group 3 (0.034) while in group 2 (0.102) was not significant. Decrease in systole and diastole blood pressure in group 1 10.01±4.67 mmHg in group 2 12±2 mmHg while in group 3 18±4 mmHg. **Conclusion:** Steeping garlic in all three intervention groups can lower systole and diastole blood pressure, where high doses show more significant blood pressure reductions than low doses. **Recommendation:** Garlic can be used as a complementary nursing therapy by adjusting the dosage needs according to the patient's blood pressure.

**Keywords:** BMI, Garlic; hypertension; modern nursing complementary therapy; therapeutic dose

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## INTRODUCTION

Hypertension is one of the most widespread factors in cardiovascular disease and the cause of premature death worldwide (1), with most deaths attributed to hypertension due to coronary heart disease (2,3). The World Health Organization (WHO) estimates that the global prevalence of hypertension is 22% of the world population. Southeast Asia occupies the 3rd highest position, with a majority of 25% of the total population(4). In Indonesia, cases of hypertension are in the range of 6-15% (5)

Currently, the treatment of hypertension has been carried out in various ways, both pharmacologically with antihypertensive drugs and nonpharmacologically, such as low-salt diets and physical activity (6). One nonpharmacological treatment that can also be done is the use of herbs such as toasters ((7)), celery, cat's whiskers, noni leaves ((8), and garlic (9).

A study also compares garlic with lemon in lowering blood pressure, showing both can lower blood pressure. Still, the two have no significant difference in lowering blood pressure (10). Of the many herbal developments for hypertension, garlic is an effortless source to find and always at home because it is part of the kitchen spice, so it will be easier if you want to use it. The use of herbs in nursing therapy is part of complementary nursing therapy, so that as a nurse must also understand well how it is managed (11,12)

Herbs for overcoming hypertension are not new, and most people have used herbs that can lower blood pressure (13). The use of this herb needs to be accompanied by health workers who understand its use. Including in the use of garlic as a complementary therapy still needs to be developed again. Currently, garlic is an herbal medicine for dealing with hypertension, as several journal articles mention that garlic is effective in lowering blood pressure (9,14).

The use of garlic to lower blood pressure with a decrease in systole blood pressure of  $8.4 \pm 2.8$  mmHg while diastole blood pressure of  $7.3 \pm 1.5$  mmHg (15) some even reported a reduction of 28.68 mmHg in systolic blood pressure and 9.76 mmHg in diastolic blood pressure compared to the pre-test (16)(16). Garlic consumption has been reported to modulate many biomarkers of various diseases.

In addition, its combination with drugs or other food matrices is safe and prolongs its therapeutic effect (17).

However, from the many articles that discuss garlic as a therapy to overcome hypertension, people have yet to discuss how to dose its use in detail. Even though complementary nursing therapy is recommended to be measured so that it can be used wisely and not excessively, researchers want the herbal treatment provided to be part of Modern Nursing Complementary Therapy (MNCT), which can be measured and measured so that it is easily duplicated in its use. However, until now, studies have yet to explain the appropriate dosage for using garlic as a complementary therapy in hypertensive patients. Therefore, researchers are interested in researching "Garlic as a Modern Nursing Complementary Therapy (MNCT) for Hypertensive Patients."

## METHOD

### Design

The Pre-experimental design with a One-group Pretest-posttest Design was used in this study. This research was carried out in the working area of Liang Health Center, Central Maluku Regency. This research will be carried out on August 1-14, 2023.

### Sample, sample size, & sampling technique

The sampling technique was non-probability with a purposive sampling approach. This study consisted of 3 groups, each consisting of 15 respondents, so the total respondents in this study were 45 respondents with inclusion criteria for patients who had hypertension and were willing to take part in the implementation of the research, while the exclusion criteria were that there were other aggravating diseases, were taking certain drugs and did not complete the research process until completion.

### Data collection process

Data was collected in two weeks, during the first week of screening hypertensive patients, and at the end of the first week of informed consent with patients who will be respondents in this study. Furthermore, in the second week, intervention and observation of blood pressure were carried out.

**Instrument for data collection**

The research instrument used in this study is an observation sheet containing weight, height, and blood pressure measured by Onemed Sphygmomanometer 200 Aneroid Gray Sphygmomanometer Manual. Especially for blood pressure, measurements are taken every day for seven days before therapy.

**Ethical consideration**

The research was carried out after the Research Ethics Committee of STIKES Nani Hasanuddin Makassar issued a research ethics permit with number 191/STIKES-NH/KEPK/VII/2023.

*Dosage Assignment*

Previous research shows that 2-3 cloves of ordinary garlic are used. Based on this statement, three garlic cloves of different sizes are used in this study, as in Figure 1. Based on Figure 1, it can be seen that the average gram of 3 garlic cloves is 3.2 gr, which is then rounded to 3 gr. The first group with a dose of 3 gr of garlic, group 2 with a quantity of 6 gr of garlic, and group 3 with 9 gr of garlic (Fig. 1)

*Preparatory Stage*

Garlic weighing is carried out in the morning every day, where garlic slices are weighed according to predetermined doses of 3gr, 6gr, and 9gr, then packaged in tea bags that have been prepared so that it is more practical. Researchers also provide weight scales and height gauges.

*Management Stage*

Respondents were visited one by one in their respective homes, and the brewing of garlic was carried out at the respondents' homes using

glass glasses ( $\pm 200$  ml) and thermos of hot water prepared in this study. At the same time, they were waiting for the steeping water to become warmer, stirring and measuring blood pressure before respondents drank the steeping garlic water. Especially on the first day, respondents' weight and height measurements were also carried out. In contrast, respondents' blood pressure observations were carried out every day for seven days before being given the intervention.

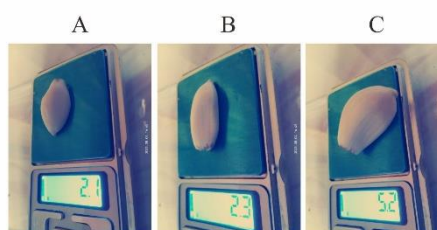


Figure 1. Garlic Clove Weighing

**Data analysis**

The data was analyzed using the SPSS program version 24. The relationship between BMI and blood pressure was assessed with the Spearman-Rho test. In contrast, changes in blood pressure before and after the intervention were evaluated with the Wilcoxon test because abnormally distributed data were obtained.

**RESULTS**

Table 1  
Frequency distribution of respondents' demographic data by gender

Gender	Frequency	Percent (%)
Man	24	53.3
Woman	21	46.7
Total	45	100

Based on Table 1, it can be explained that most of the respondents were male (53.3%) and fewer female (46.7%).

Table 2  
Frequency Distribution Based on Weight, Height and BMI

No	Group 1			Group 2			Group 3		
	kg)	cm)	BMI	kg)	cm)	MI	kg)	cm)	3MI
1	0	55	20.81	6	53	1.84	6	50	5.78
2	2	69	21.71	4	50	1.91	4	55	2.48
3	6	72	22.31	2	52	1.18	4	54	2.77
4	2	66	22.50	3	40	1.04	8	57	7.59
5	3	55	22.06	2	55	1.81	8	50	0.22
6	9	55	21.67	0	55	1.97	3	55	3.14

7	0	55	20.81	4	56	1.23	7	56	5.75
8	9	60	19.14	2	54	1.36	2	57	9.21
9	2	50	23.11	2	56	1.13	2	56	6.13
10	4	67	19.36	3	50	1.44	2	56	9.76
11	1	56	25.07	9	55	1.40	3	70	1.80
12	0	55	24.97	3	52	1.94	8	53	3.32
13	2	50	23.11	2	50	1.22	9	52	2.48
14	2	63	23.34	0	55	1.97	1	55	1.23
15	4	45	35.20	5	56	1.59	2	54	3.05
<b>AV</b>	.73	3.87	23.01	.80	5.60	1.20	.60	1.33	6.31

W: Weight, H: Height, BMI: Body Mass Index, AV: Average

Based on Table 2, the average BMI in group 1 (23.01) is at normal limits, while groups 2 and 3 are included in the category of mild obesity (25.20 and 26.31). Respondents with the highest BMI were in the type of severe obesity (35.7), but most were in the category of normal BMI. Based on Table 3, the substantial

correlation coefficient value can be Post systole Blood Pressure (0.473) in group 1, while the weakest is in group 2, namely in Pre systole Blood Pressure. Of all the groups, none were significantly related, but the one that came close to significant was group 1 systole Post Blood Pressure (0.075)

Table 3  
Relationship of BMI with systole Blood Pressure Before and After Garlic Steeping Intervention

Group	relation Coefficient (r)	P value
<b>Group 1 (Dose 3gr)</b>		
Blood Pressure systole Pre	0.168	0.550*
systole Post Blood Pressure	0.473	0.075*
<b>Group 2 (6gr dose)</b>		
Blood Pressure systole Pre	0.126	0.654*
systole Post Blood Pressure	0.173	0.539*
<b>Group 3 (Dose 9gr)</b>		
Blood Pressure Systole Pre	0.173	0.537*
Systole Post Blood Pressure	0.384	0.157*

\*Spearman-rho Test

Table 4  
Relationship of BMI with Diastole Blood Pressure Before and after Garlic Steeping Intervention

Group Diastolic Blood Pressure	relation Coefficient (r)	P value
<b>Group 1 (Dose 3gr)</b>		
Pre-test	-0.434	0.106*
Post-test	0.396	0.033*
<b>Group 2 (6gr dose)</b>		
Pre-test	0.091	0.747*
Post-test	-0.095	0.737*
<b>Group 3 (Dose 9gr)</b>		
Pre-test	0.236	0.398*
Post-test	0.325	0.237*

\*Spearman-rho Test

Based on Table 4, the substantial correlation coefficient value can be Post Diastole Blood Pressure (0.396) in group 1, while the weakest is in group 2, Pre-Diastole

Blood Pressure (0.091). Of all the groups, there was group 1 significant, namely group 1 Diastole Post Blood Pressure (0.033

Table 5  
Comparison of Steeping Garlic Against Blood Pressure of Systolic Respondents

Group	Mean	Std. Deviation	Min	Max	Mean Rank		$\Delta$ Mean $\pm$ SE	P value
					Negative	Positif		
Group 1 (Dose 3gr)								
Blood Pressure systole Pre	144.67	11.87	130	170	7.55	5.17	-10.01 $\pm$ 0.59	0.033*
systole Post Blood Pressure	134.66	12.46	110	150				
Group 2 (6gr dose)								
Blood Pressure systole Pre	152.00	12.65	140	180	6.00	6.00	-12.00 $\pm$ 5.08	0.011*
systole Post Blood Pressure	140.00	17.73	120	180				
Group 3 (Dose 9gr)								
Blood Pressure Systole Pre	152.67	23.74	130	230	7.00	0.00	-18.00 $\pm$ -9.67	0.001*
Systole Post Blood Pressure	134.67	14.07	120	180				

\* Wilcoxon-test

Based on Table 5, systole blood pressure in group 3 with a dose of 9gr had a solid significant value (0.001) with garlic steeping, while the weakest was in group 1 (0.033). In

general, there was a decrease in systole blood pressure in all groups from groups 1, 2, and 3 ( $\Delta$  mean 10.01, 12, and 18)

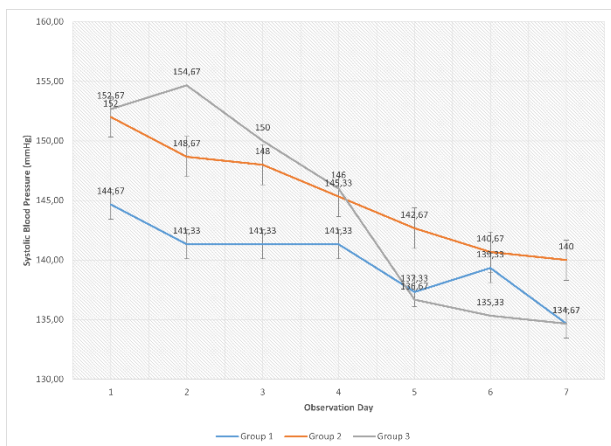
Table 6. Comparison of Steeping Garlic to Diastole Blood Pressure of Respondents

Group	Mean	Std. Deviation	Min	Max	Mean Rank		$\Delta$ Mean $\pm$ SE	P value
					Negative	Positif		
Group 1 (Dose 3gr)								
Blood Pressure diastole Pre	144.67	11.87	130	170	7.55	5.17	-10.01 $\pm$ 0.59	0.033*
Diastole Post Blood Pressure	134.66	12.46	110	150				
Group 2 (6gr dose)								
Blood Pressure diastole Pre	152.00	12.65	140	180	6.00	6.00	-12.00 $\pm$ 5.08	0.011*
Diastole Post Blood Pressure	140.00	17.73	120	180				
Group 3 (Dose 9gr)								
Blood Pressure diastole Pre	152.67	23.74	130	230	7.00	0.00	-18.00 $\pm$ -9.67	0.001*
Diastole Post Blood Pressure	134.67	14.07	120	180				

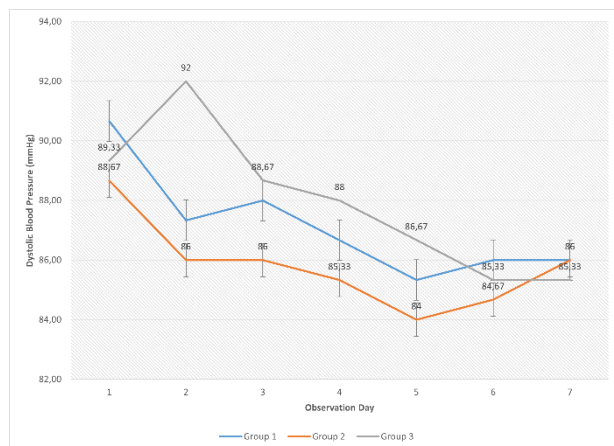
\* Wilcoxon-test

Based on Table 6, diastole blood pressure in group 3 with a dose of 9gr had a solid significant value (0.034) with garlic steeping, while the weakest was in group 2 (0.0102). In

general, there was a decrease in diastole blood pressure in all groups from groups 1, 2, and 3 ( $\Delta$  mean 4.67, 2, and 4)



A



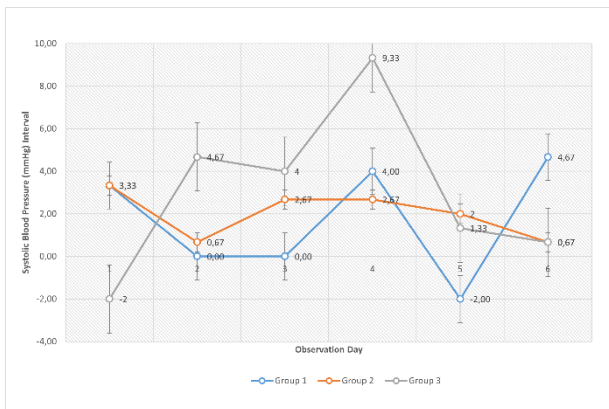
B

Figure 2. Results of observation of average blood pressure for seven days of garlic steeping  
 A: Changes in Systolic Blood Pressure | B: Changes in Diastolic Blood Pressure

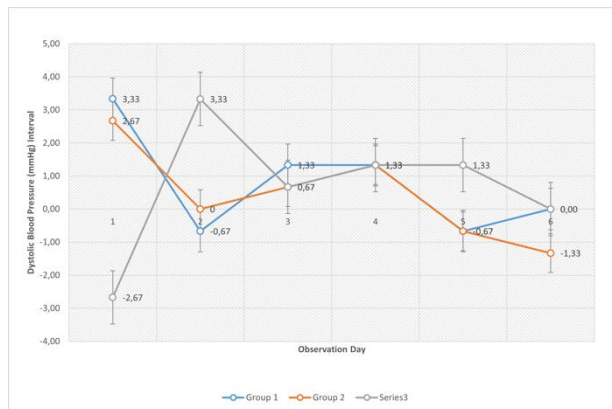
Based on Figure 1, all groups experienced a decrease in both systole and diastole blood pressure. The maximum reduction in systole blood pressure was in group 3, with an average decline of 18 mmHg during seven days of monitoring, while diastole blood pressure that experienced a maximum decrease was in group 1, with an average reduction of 4.67 mmHg.

Based on Figure 2, the decrease in systole blood pressure was highest on the fifth day,

with an average reduction of 9.33 mmHg in group 3. On the seventh day, the decline in systole blood pressure still occurred in groups 2 and 3, although very small, averaging 0.67 mmHg, while group 1 still experienced a relatively high decrease of 4 mmHg. The decline in diastole blood pressure averaged 1.33 mmHg in all groups.



A



B

Figure 3. Blood pressure interval for seven days of monitoring  
 A: Systolic Blood Pressure Interval | B: Diastolic Blood Pressure Interval  
 (Example: Day 4 blood pressure reduced day 5 to 4th interval)

## DISCUSSION

Hypertension is found more in male elderly than in female elderly (Table 1). This aligns with the study's results, which state that hypertension is higher in men associated with family history, lack of physical activity, and obesity (18,19). In this study, it can be seen that based on the calculation of BMI from 3 existing groups, there are two groups with an average BMI included in the category of mild obesity (Table 2).

BMI is an indication of obesity in an individual, which also means double the risk of causing hypertension (20,21). However, in this study, it was seen that based on the significance of the p-value between BMI and systole blood pressure, insignificant values were obtained in all groups, both pre and post-intervention. In contrast, BMI with diastole blood pressure in group 1 showed a significant p-value in the post-intervention, while the other groups were

not significantly influential. However, when viewed in general on BMI with systole and diastole blood pressure, there is a difference in the p-value of post-intervention. Research shows that a change occurs after the intervention where the p-value is smaller (Table 3 and Table 4). In group 1, on average, they had a normal BMI, so the dose of 3gr reduced systole and diastole blood pressure better than group 2 and Group 3. In groups 2 and 3 with higher doses with BMI in the moderate obesity category, Group 3 was better than Group 2. Higher BMI values require higher doses, in line with the explanation that people with obesity often require adjustments to the amount of medication (22). However, it is still a dilemma because general quantities usually do not change in people with obesity, and more research should be done on the pharmacokinetics and pharmacodynamics of the therapy to be given (23,24)

The incidence of hypertension cases in the elderly is relatively high, requiring attention, especially in nursing. One of the complementary nursing therapies provided is the provision of herbs to help reduce high blood pressure. Herbs for overcoming high blood pressure are familiar because most people already use herbs that can lower blood pressure (13). Health workers need to accompany the use of this herb so that it can remain targeted following its consumption. In this study, garlic is the herb used to help overcome hypertension, where garlic is proven effective in dealing with hypertension, as explained by several journal articles that mention that garlic is effective in lowering blood pressure (9,14)

This study showed that garlic was significantly able to lower blood pressure both in systole blood pressure and in diastole blood pressure. Given the intervention, systole blood pressure decreased in all three groups. However, when viewing the mean delta value from group 1 to group 3, the higher the dose, the greater the mean delta value and the more significant the change (Table 5). While diastole blood pressure also decreased, values in groups 1 and 3 were better than in group 2 (Table 6).

Decrease in systole blood pressure and above in group 1  $10.01 \pm 4.67$  mmHg, in group 2  $12 \pm 2$  mmHg while in group 3  $18 \pm 4$  mmHg. However, this study showed that increasing the dose could lower blood pressure better after being consumed for seven days. However, further research is still needed to determine the maximum dose limit and minimum amount to be safer in providing therapeutic effects (25) So that in the future, garlic as a complementary nursing therapy has the correct amount in its administration, known as the therapeutic index (26)

The three study groups looked at systole and diastole blood pressure from the beginning of observation to the end of the word, with a relatively steady decrease (Figure 2). In contrast, a significant reduction occurred on the fifth day of observation with a drop in systole blood pressure and diastole in group 1  $4 \pm 1.33$  mmHg, in group 2  $2.67 \pm 1.33$  mmHg while in group 3  $9.33 \pm 1.33$  mmHg became the peak of blood pressure reduction during observation (figure 3). This can be concluded below for garlic steeping therapy as a complementary therapy to overcome hypertension. The peak

can be seen on the 5th day after starting treatment, so after the fifth day, the dose can be decreased to provide the expected therapeutic effects.

As explained in several previous studies, the main ingredient that regulates blood pressure in garlic is Allicin. Allicin, a compound found in garlic, can prevent the production of angiotensin II. This compound increases blood pressure by causing blood vessels to stiffen or contract. By controlling the production of angiotensin II, Allicin's effect makes it easier for blood to flow freely, lowering blood pressure. In addition, garlic also contains hydrogen sulfide and nitric oxide, two important compounds for regulating blood pressure levels. Garlic also has anti-inflammatory and antioxidant properties that can contribute to reducing or preventing increases in blood pressure levels (27).

## CONCLUSION

Steeping garlic in all three intervention groups can lower systole and diastole blood pressure, where high doses significantly reduce blood pressure more than low doses. However, research on this dosage must be more explored to get the correct therapeutic amount.

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