



## THE EFFECT OF PHALERIA MACROCARPA ETHNIC FOOD COMPLEMENTARY TO DECREASE BLOOD PRESSURE

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Research Report

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### ABSTRACT

**Introduction:** Hypertension is one of degenerative disease that is often found in the elderly group. Many studies have been developed to reduce blood pressure, including complementary therapies. One of the complementary therapies is by utilizing *Phaleria Macrocarpa*. This study was aimed to explain the effect of *Phaleria macrocarpa* ethnic food complementary to decrease blood pressure of elderly with hypertension. **Methods :** Design used in this study was quasy experiment design. The population was the elderly with hypertension in UPT PSTW Blitar (in Blitar and Tulungagung). Total sampel was 40 respondents, taken according to inclusion criteria. The independent variabel was *Phaleria macrocarpa* ethnic food complementary. The dependent variabel was blood pressure. Data were collected using measurement blood pressure and made ethnic food complementary with Standart Operational Procedure. Data were analized using paired t-test and ANOVA with level of significance of  $\leq 0,05$ . **Results :** The Results showed that there were effect of giving intervention by ethnic food complementary with *phaleria macrocarpa* fruit, leaf, or mixed (fruit and leaf) to decrease blood pressure (systolic, diastolic, and MAP). **Conclusion :** This intervention can be used as a complementary therapy herbal to decrease high blood pressure.

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### INTRODUCTION

Hypertension is a degenerative disease that is often found in the elderly group (Abdullah, 2005). Hypertension has a high prevalence in the elderly, there were 57.6% elderly with hypertension at the age of 65-74 years (Kemenkes RI, 2013). According to a study which were done by Noorhidayah (2016), out of 104 respondents there were 82 respondents (78.8%) who were obedient in taking medication, such as amlodipine or captopril. It turns out that the elderly with hypertension still have a high systolic pressure of 77%.

According to the study of NHANES (2017), those aged 60 years and over who have hypertension in the United States amounted to 63.1% during 2015-2016. According to the Kemenkes RI (2013), the prevalence of hypertension at the age of 55-64 years is 45.9%, age 65-74 years is 57.6%, and age  $\geq 75$  years reaches 63.8%. The percentage of blood

pressure measurements in the elderly in East Java shows that the age group 55-64 years has hypertension as much as 42.5%, age group 65-74 years as much as 54.1%, and age group > 75 years as much as 62% (Dinkes Provinsi Jatim, 2013). Elderly people who have hypertension in Tulungagung as many as 23,296 people in 2017, consist of men as many as 8,113 people and women as many as 15,183 people (Dinkes Kabupaten Tulungagung, 2017). Even though the number of elderly people who have hypertension in Tulungagung is not the highest in East Java, the achievements that are served / treated are still not optimal at 54% (Dinkes Kabupaten Tulungagung, 2017). The theory developed by Miller (2012) explains that functional consequences for the elderly are influenced by changes related to age and risk factors. Elderly people will experience changes in the arteries in the body to be wider and stiffer resulting in reduced recoil capacity of blood vessels.

Reducing the function of blood vessels causes systolic pressure to increase. Arterial stiffness can also be caused by a buildup of plaque in the arteries (atherosclerosis). Endothelial dysfunction and decreased nitric oxide are associated with increased arterial susceptibility and the incidence of isolated systolic hypertension (ISH) (AHA, 2011 in Yuliana, 2017). Therefore, the participation of all parties, both doctors from various fields of hypertension, government, private and community specialization is needed so that hypertension can be controlled (Kemenkes RI, 2014).

In general, the management of hypertension is divided into pharmacological management and non-pharmacological management. Various studies have been developed to reduce blood pressure, including complementary therapies. One of the complementary therapies is by utilizing Mahkota dewa plant (*Phaleria macrocarpa*). The researcher was interested in examining the influence of the *Phaleria macrocarpa* which was packaged in the form of ethnic food. Formerly, the Tulungagung people used cassava as a staple food before changing into rice. The processed cassava is used as staple food in the form of *gaplek* or *thiwul* (Januariani, 2018). While *phaleria macrocarpa* has been proven and often carried out by the community to reduce blood pressure and not cause complications (Priharninuk, 2017). It is hoped that the administration of the *phaleria macrocarpa* ethnic food complementary intervention can change negative functional consequences into positive functional consequences.

Therefore, the researcher was interested in examining the effect of *phaleria macrocarpa* ethnic food complementary intervention on the reduction of blood pressure in elderly people with hypertension in UPT PSTW Blitar (in Blitar and Tulungagung).

## MATERIALS AND METHODS

The research design which used was quasi-experiment. The research subjects were divided into 4 groups, namely intervention group A (50 grams of ethnic food complementary mixed with 15 grams of

*phaleria macrocarpa's* fruit), intervention group B (50 grams of ethnic food complementary mixed with 15 grams of *phaleria macrocarpa's* leaves), intervention group C (50 grams of ethnic food complementary mixed with *phaleria macrocarpa's* leaves as much as 7.5 grams and *phaleria macrocarpa's* fruit as much as 7.5 grams), and control subjects (ethnic food without mixed with *phaleria macrocarpa*).

The population in this study were elderly with hypertension at UPT PSTW Blitar (in Blitar and Tulungagung). The sampling was using purposive sampling technique. The sample in the study was 40 respondents. So that each group has 10 respondents.

The time and location of the study was done on December 1-10, 2018 in the UPT PSTW Blitar in Tulungagung and December 11-19, 2018 at the UPT PSTW Blitar in Blitar. The independent variabel is *Phaleria macrocarpa* ethnic food complementary. The dependent variabel is blood pressure. Data analysis used paired t-test and ANOVA with a significant level of  $\leq 0.05$ . Data collection prosedur : 1 hour before the study, the researcher conducted a pre-test by measuring blood pressure with a sphygmomanometer in a sitting position; The researcher gave *phaleria macrocarpa* ethnic food complementary in the intervention group according to their respective groups and ethnic food complementary without the *phaleria macrocarpa* in the control group; The researcher conducted a post-test by measuring the respondent's blood pressure every 30 minutes for 2 hours after giving an intervention to anticipate the occurrence of hypotension and noting how long the intervention has an effect on reducing blood pressure; As long as the research process takes place, researchers strictly maintain the compliance of the elderly in the study, such as not smoking, consuming coffee and / or fried foods; Final observation is carried out after being given the *phaleria macrocarpa* ethnic food complementary for 7 consecutive days (8th day).

**RESULTS**

**Table 1** Characteristics of respondents based on age groups, stadium of hypertension, activities, and drug consumption.

No.	Characteristics of respondents		Intervention A		Intervention B		Intervention C		Control Group	
			n	%	n	%	n	%	n	%
1	Age groups	61-65 years	2	20	2	20	2	20	2	20
		66-70 years	3	30	2	20	2	20	1	10
		71-75 years	2	20	2	20	2	20	3	30
		76-80 years	2	20	3	30	2	20	2	20
		81-85 years	0	0	1	10	1	10	1	10
		86-90 years	1	10	0	0	1	10	1	10
	Σ Respondents	10	100	10	100	10	100	10	100	
2	Gender	Male	1	10	4	40	3	30	3	30
		Female	9	90	6	60	7	70	7	70
		Σ Respondents	10	100	10	100	10	100	10	100
3	Stadium of hypertension	Stadium 1	6	60	5	50	5	50	4	40
		Stadium 2	4	40	5	50	5	50	6	60
		Σ Respondents	10	100	10	100	10	100	10	100
4.	Exercise activities	Routine	4	40	4	40	2	20	4	40
		Not routine	6	60	6	60	8	80	6	60
		Σ Respondents	10	100	10	100	10	100	10	100
5.	Hypertension's drug consumption	Routine	0	0	0	0	0	0	0	0
		Not routine	8	80	7	70	8	80	8	80
		Not consumption	2	20	3	30	2	20	2	20
		Σ Respondents	10	100	10	100	10	100	10	100

**Table 2.** The value of pre and post test, and the results of paired t-test intervention group A

Respondent Code	Intervention group A					
	Systolic		Diastolic		MAP	
	Pre	Post	Pre	Post	Pre	Post
1	160	150	90	80	113,33	103,33
2	180	170	100	90	126,67	116,67
3	150	140	70	70	96,667	93,333
4	170	160	90	80	116,67	106,67
5	160	150	90	80	113,33	103,33
6	170	160	90	80	116,67	106,67
7	150	140	80	70	103,33	93,333
8	160	140	90	70	113,33	93,333
9	160	150	90	80	113,33	103,33
10	170	160	100	90	123,33	113,33
Paired t-test	p = 0,000		p = 0,000		p = 0,000	

**Table 3** The value of pre and post test, and the results of paired t-test intervention group B

Respondent Code	Intervention group B					
	Systolic		Diastolic		MAP	
	Pre	Post	Pre	Post	Pre	Post
11	150	140	70	70	96.667	93.333
12	160	150	80	70	106.67	96.667
13	180	170	100	90	126.67	116.67
14	180	170	90	80	120	110
15	170	160	100	90	123.33	113.33
16	170	160	90	80	116.67	106.67
17	160	160	80	70	106.67	100

18	150	150	80	70	103.33	96.667
19	180	170	90	80	120	110
20	150	140	70	70	96.667	93.333
Paired t-test	p = 0,000		p = 0,000		p = 0,000	

**Table 4** The value of pre and post test, and the results of paired t-test intervention group C

Respondent Code	Intervention group C					
	Systolic		Diastolic		MAP	
	Pre	Post	Pre	Post	Pre	Post
21	160	150	80	70	106.67	96.667
22	180	170	100	90	126.67	116.67
23	150	150	70	70	96.667	96.667
24	180	170	90	80	120	110
25	160	150	80	70	106.67	96.667
26	170	160	90	80	116.67	106.67
27	180	160	100	90	126.67	113.33
28	170	160	90	80	116.67	106.67
29	150	150	70	70	96.667	96.667
30	150	140	80	70	103.33	93.333
Paired t-test	p = 0,001		p = 0,000		p = 0,000	

**Table 5** The value of pre and post test, and the results of paired t-test control group

Respondent Code	Intervention group C					
	Systolic		Diastolic		MAP	
	Pre	Post	Pre	Post	Pre	Post
31	170	170	90	90	116.67	116,67
32	150	150	70	80	96.667	103,33
33	170	170	90	90	116.67	116,67
34	180	180	100	100	126.67	126,67
35	180	180	90	90	120	120
36	150	160	80	70	103.33	100
37	190	180	100	100	130	126,67
38	170	170	90	90	116.67	116,67
39	160	160	90	90	113.33	113,33
40	160	160	80	80	106.67	106,67
Paired t-test	p = 1,000		p = 1,000		p = 1,000	

**Table 6** Difference in mean blood pressure among groups with ANOVA test

Group	Average difference	P Value
<b>Systolic</b>		
Intervention group A	11	0,011
Intervention group B	8	
Intervention group C	9	
Control group	0	
<b>Distolic</b>		
Intervention group A	10	0,014
Intervention group B	8	
Intervention group C	8	
Control group	0	
<b>MAP</b>		
Intervention group A	10,33	0,011
Intervention group B	8,00	
Intervention group C	8,33	
Control group	0	
Significant $\alpha \leq 0,05$		

## DISCUSSION

From the results of the analysis showed that in the intervention group A after being given the phaleria macrocarpa's fruit ethnic food complementary for 7 days, there is decrease of mean blood pressure values of both systolic, diastolic and MAP. This is proven by the paired t-test which results p less than  $\alpha$  ( $\alpha \leq 0.05$ ), that are  $p = 0,000$ . In the intervention group B after being intervention for 7 days, there is a decrease of mean blood pressure values of both systolic, diastolic and MAP. This is proven by the paired t-test which results p less than  $\alpha$  ( $\alpha \leq 0.05$ ), that are  $p = 0,000$ . In the intervention group C after being intervention for 7 days, there is a decrease of mean blood pressure values of both systolic, diastolic and MAP. This is proven by the paired t-test which results p less than  $\alpha$  ( $\alpha \leq 0.05$ ), that is  $p = 0.001$  on systolic, and  $p = 0,000$  on diastolic and MAP. Whereas in the control group after being given ethnic food without mixed with phaleria macrocarpa, there isn't change in the mean blood pressure value of either systolic, diastolic or MAP. This is proven by the paired t-test which results p more than  $\alpha$  ( $\alpha \geq 0.05$ ), that are  $p = 1.000$ .

According to the study of Sudewa, Ismanto, & Rompas (2014) which stated that there was an influence of the phaleria macrocarpa on decreasing blood pressure in patients with hypertension. Some chemicals contained in the fruit and leaves of the phaleria macrocarpa include alkaloids, flavonoids, polyphenols, and saponins (Maharani, 2016). Flavonoid compounds can reduce systemic vascular resistance (SVR) because it causes vasodilation and affects the work of angiotensin converting enzyme (ACE) which can inhibit the occurrence of changes in angiotensin I to angiotensin II. The effects of vasodilation and ACE inhibitors can reduce blood pressure (Junaedi, Yulianti, & Rinata, 2013). Alkaloids function the same as drugs of  $\beta$ -blockers which have negative inotropic and negative chronotropic to the heart. The result is a decrease in cardiac output, decreased heart rate and lack of contraction strength of the myocardium. Peripheral resistance sometimes goes up, sometimes it also stays. Reduction of chronic cardiac output causes peripheral resistance to decrease. This causes a decrease in blood pressure (Apriyati, 2008 in Mantong, 2017).

According to Mantong (2017),

Saponins have diuretic effect by reducing plasma volume and removing water and electrolytes, especially sodium, so that ultimately cardiac output decreases. According to the table 6, showed the mean difference of 4 groups. The intervention group A or giving phaleria macrocarpa's fruit ethnic food complementary is the most effective compared to other groups with p value = 0.011 on systolic, p value = 0.014 on diastolic, and p value = 0.011 on MAP. All respondents in Group A (100%) have a decrease in systolic blood pressure with mean difference of 11 mmHg. Almost all respondents A (90%) have a decrease in diastolic blood pressure with mean difference of 10 mmHg. All respondents of group A (100%) have a decrease in MAP with mean difference of 10.33 mmHg. The direct effect of reducing blood pressure can be seen 1 hour after intervention of phaleria macrocarpa ethnic food complementary. This is accord with the study of Daud, Badruzzaman, Sidik, & Tawang (2016) which states that methanol fruit extract Phaleria macrocarpa shows anti-hypertensive activity. In addition, the study of Sudewa et al. (2014) and Baradero, Dayrit, & Siswadi (2008) stated that the results of statistical tests of blood pressure measurements before and after being given therapy for phaleria macrocarpa fruit decoction in the intervention group obtained a significance of 0,000. The direct effect of the decline can be seen 1 hour after giving the god crown fruit. The magnitude of the decrease in blood pressure during the intervention of the phaleria macrocarpa's fruit varies, depending on the response of each respondent (Sudewa et al., 2014). According to research by Soeksmanto, Hapsari, & Simanjuntak (2007), based on the results of analysis of antioxidant testing of the phaleria macrocarpa, the inhibition value in 100 ppm ethanol extract on the phaleria macrocarpa's old fruit is 83.08% and inhibition value in 100 ppm methanol extract on the phaleria macrocarpa's old fruit is 79.03%. While the inhibition value in 100 ppm ethanol extract on the phaleria macrocarpa's leaves is 43.69% and the inhibition value in 100 ppm methanol extract on the phaleria macrocarpa's leaves is 38.46%. This shows that the inhibition power of the phaleria macrocarpa's fruit is higher than the leaves caused by the composition of fruit flavonoids is higher than the leaves.

Respondents in code R8 had the highest rate of reduction in systolic and diastolic pressure, which is 20 mmHg after being given

phaleria macrocarpa's fruit for 7 days. This happened because the R8 respondents were the youngest respondents in the group and were routinely involved in physical activity. In addition, respondent in code R37 also had the highest reduction in systolic pressure in the intervention group C, which is 20 mmHg. Although the respondent R37 were not the youngest in the group, but she is routine in carrying out physical activities. Whereas in respondents R17, R18, R23, and R29 there was no change in blood pressure after 7 days given the phaleria macrocarpa ethnic food complementary. The reason is because the respondents included the oldest age, not routine of physical activity, and not routine or did not take antihypertensive drugs. According to the functional consequence theory developed by Miller (2012), the quality of life of elderly people is affected by changes related to age and risk factors. As age increases, physical and functional changes are inevitable, progressively over time and irreversible. While risk factors include lifestyle, support systems, environment, psychosocial conditions, and attitudes based on lack of knowledge. This combination can cause negative functional consequences.

Negative functional consequences are all forms of disorders that affect the quality of life of the elderly. The role of nurses in this case aims to improve the welfare of the elderly by considering two components, namely changes related to age and risk factors (Miller, 2012). One form of this intervention is complementary therapy. The complementary therapy carried out in this study is the phaleria macrocarpa ethnic food complementary which can reduce blood pressure, so that it can change negative functional consequences into positive functional consequences.

## CONCLUSION

All respondents in the treatment group A experienced a decrease in systolic blood pressure. Almost all respondents in the treatment groups B and C experienced a decrease in systolic blood pressure. Almost all control group respondents did not experience changes in systolic blood pressure

All respondents in the treatment group A experienced a decrease in diastolic blood pressure. Almost all respondents in the B and C treatment groups experienced a decrease in diastolic blood pressure. Almost all control group respondents did not experience changes in diastolic blood pressure.

All treatment group A and C respondents experienced a decrease in MAP. Almost all respondents in the treatment group B experienced a decrease in MAP. Almost all control group respondents did not experience changes in systolic blood pressure. The administration of herbal crown god getuk intervention has an effect on the decrease in blood pressure in elderly hypertension. UPT PSTW Blitar is expected to be able to create a work program to increase efforts to treat hypertension in the elderly with complementary or alternative efforts. In the management of hypertension, phaleria macrocarpa ethnic food complementary can be used as a pharmacological companion therapy for the elderly with hypertension.

## REFERENCES

- Abdullah, M. (2005). *Faktor yang Berhubungan dengan Kejadian Hipertensi pada Kelompok Usia Lanjut di kecamatan Pegandon Kabupaten Kendal*. Universitas Diponegoro.
- Altaf, R., Umar, M. I., Asmawi, M. Z., Sadikun, A., Dewa, A., Manshor, N. M., ... Khadeer, M. (2018). Polar components of Phaleria macrocarpa fruit exert antihypertensive and vasorelaxant effects by inhibiting arterial tone and extracellular calcium influx, *14*(56), 312–327.
- Andriadi, D. (2016). *Pengaruh mahkota dewa terhadap tekanan darah usia lanjut dengan hipertensi di Dusun Biru Trihanggo Gamping Sleman Yogyakarta*. Universitas 'Aisyiyah Yogyakarta.
- Baradero, M., Dayrit, M. W., & Siswadi, Y. (2008). *Seri Asuhan Keperawatan Klien Gangguan Kardiovaskular*. Jakarta: EGC.
- Daud, D., Badruzzaman, N. A., Sidik, N. J., & Tawang, A. (2016). *Phaleria macrocarpa Fruits Methanolic Extract Reduces Blood Pressure and Blood Glucose in Spontaneous Hypertensive Rats ( SHR )*, *6*(01), 158–161. <https://doi.org/10.7324/JAPS.2016.60126>.
- Dinkes Kabupaten Tulungagung. (2017). *Profil Kesehatan Kabupaten Tulungagung 2016*. Tulungagung.
- Dinkes Provinsi Jatim. (2013). *Riset Kesehatan Dasar dalam Angka (Riskesdas 2013) Provinsi Jawa Timur*. (H. Susilowati, M. Sudomo, &

- A. Suprpto, Eds.). Jakarta: Tim Risesdas 2013.
- Efendi, F., & Makhfudli. (2009). *Keperawatan Kesehatan Komunitas; Teori dan Praktik dalam Keperawatan.* (Nursalam, Ed.). Jakarta: Salemba Medika
- James, P. A., & Ortiz, E. (2014). *JNC 8 Hypertension Guideline Algorithm, 311(5).* Januari. (2018). *Tulungagung dalam Rasa (1st ed.).* Yogyakarta: Deepublish.
- Junaedi, E., Yulianti, S., & Rinata, M. G. (2013). *Hipertensi Kandas Berkat Herbal.* (T. Yulia, Ed.). Jakarta Selatan: FMedia (Imprint AgroMedia Pustaka).
- Kemkes RI. (2013). *Riset Kesehatan Dasar; RISKESDAS 2013.* Jakarta: Badan Penelitian dan Pengembangan Kesehatan.
- Kemkes RI. (2014). *Pusat Data dan Informasi Kementerian Kesehatan RI; Hipertensi.* Jakarta Selatan: Pusat Data dan Informasi Kemkes RI.
- Kusmardi, K., Tamzir, A. R., Widiyari, S., & Estuningtyas, A. R. I. (2018). *Suppression Effect Of Mahkota Dewa ( Phaleria Macrocarpa ) Leaf Extract in Chitosan Nanoparticles on The Small Intestine of Dextran Sulfate Sodium-Induced Mice : Focus on Mitosis and Hyperplasia, 11(6), 11–13.*
- Lilly, T. E. (2015). *25 Kreasi Antaran Cantik dari Getuk Singkong.* Jakarta: Gramedia. Mantong, Y. A. (2017). *Pengaruh Pemberian Air Rebusan Daun Alpukat terhaap Penurunan Tekanan Darah Pasien Hipertensi Laki-Laki.* Universitas Hasanuddin Makassar.
- Martin, J. (2008). *Hypertension Guidelines: Revisiting the JNC 7 Recommendations.* *The Journal of Lancaster GeneralHospital, 3(3), 91–97.*  
<https://doi.org/10.1001/jama.290.10.1312-c>
- Miller, C. A. (2012). *Nursing Care of Older Adults: Theory and Practice Second Edition.* Philadelphia: Lippincolt Company.
- Noorhidayah, S. A. (2016). *Hubungan Kepatuhan Minum Obat Antihipertensi terhadap Tekanan Darah Pasien Hipertensi di Desa Salamrejo.* Universitas Muhammadiyah Yogyakarta.
- Nursalam. (2016). *Metodologi Penelitian Ilmu Keperawatan (4th ed.).* Jakarta: Salemba Medika.
- Padila. (2013). *Keperawatan Gerontik (Pertama).* Yogyakarta: Nuha Medika.
- Priharninuk, D. (2017). *Efek Stimulus Konstektual (Mie Herbal Mhkota Dewa dan Aroma Terapu Lavender) terhadap Penurunan Tekanan Darah dan Peningkatan Ankle Brachial Indeks pada Lansia dengan Hipertensi di Jombang.* Universitas Airlangga.
- Soeksmanto, A., Hapsari, Y., & Simanjuntak, P. (2007). *Kandungan Antioksidan pada Beberapa Bagian Tanaman Mahkota Dewa, Phaleria macrocarpa (Scheff) Boerl. (Thymelaceae), 8, 92–95.*
- Sudewa, I. W. B., Ismanto, A. Y., & Rompas, S. (2014). *Pengaruh buah mahkota dewa (phaleria macrocarpa) terhadap penurunan tekanan darah pada Penderita hipertensi di Desa Werdhi Agung Kecamatan Dumoga Tengah Kabupaten Bolaang Mongondow.* Universitas Sam Ratulangi Manado.
- Widyatuti. (2008). *Terapi Komplementer dalam Keperawatan.* *Keperawatan Indonesia, 12(1), 53–57.*
- Yuliana, C. D. (2017). *Pengaruh JAKI-MAAP (Jalan Kaki, Markisa, dan Air Putih) terhadap Perubahan Kolesterol dan Tekanan Darah pada Lansia Hipertensi.* Universitas Airlangga