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EFFECT OF HERBAL TEA CONSUMPTION COMBINATION OF SALAM LEAVES (*SYZYGIUM POLYANTHUM*) AND CINNAMON (*CINNAMOMUM BURMANNII*) ON BLOOD PRESSURE REDUCTION IN BARRU REGENCY, INDONESIA

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Abstract

Background: Hypertension is a condition of increased blood pressure > 140 mmHg, hypertension management can be done with pharmacological and nonpharmacological efforts. Herbs of bay leaves and cinnamon are herbal plants commonly used by the community as an alternative to lowering blood pressure **Objectives:** this study was to determine the effect of the consumption of herbal tea combined with bay leaves and cinnamon in lowering blood pressure for PROLANIS participants. **Methodology:** The research used a quantitative quasi-experimental design with randomized pre-test and post-test control groups in Padongko and Palakka Health Centers, Barru Regency. Simple Random Sampling selected 60 respondents (30 intervention, 30 control). Analysis used the paired sample T test for normally distributed data and the Wilcoxon test otherwise. **Results:** There was a significant decrease in systolic blood pressure in both groups, but the average decrease in systolic blood pressure was significantly higher in the Intervention group ($p = 0.000$ and $p < 0.001$). Using herbal tea with a combination of bay leaves and cinnamon as complementary therapy twice a day can be effective in managing and reducing blood pressure in stage one and two hypertension along with lifestyle and dietary modifications and compliance in taking medication. **Conclusions:** There is an effect of the consumption of herbal tea with a combination of bay leaves and cinnamon on lowering blood pressure for PROLANIS participants in the Padongko Health Center and Palakka Health Center working areas, Barru Regency in 2023. It is recommended that the community to continue to cultivate herbal plants such as bay leaves and cinnamon in their environment as an effort to support and consume herbs as complementary therapy for hypertension.

Keywords: Blood Pressure, Hypertension, Herbals, Cinnamon, Bay Leaves.

1. INTRODUCTION

Hypertension is a major problem in the world, especially in low- and middle-income countries. Based on region in each continent, the highest prevalence of hypertension occurs in the African region (46%) and the lowest occurs in the United States region (35%). While in Southeast Asia, the prevalence of hypertension reaches (36%)(1). Indonesia is one of the countries that has a high burden of hypertension. The incidence of hypertension reached 34.11%. The results of blood pressure measurements of Indonesian people aged> 18 years were 25.8% and increased at the age of 60 years, which amounted to 25.8% (2).

Hypertension is a disease with various causes. Factors that cause hypertension can be categorized into uncontrollable hypertension factors such as family history, gender, and age(3). And controllable factors such as food consumption patterns that have sodium content, fat, as well as smoking behavior, obesity, and lack of physical activity(4). Hypertension can be prevented through pharmacological and non-

pharmacological measures(5). Pharmacological therapy can be done by using anti-hypertensive drugs, while non-pharmacological therapy can be done by overcoming obesity by losing excess weight, providing potassium in the form of food by consuming fruits and vegetables, reducing salt and saturated fat intake, quitting smoking, reducing alcohol consumption, creating a relaxed state and regular physical exercise (exercise) (6). Non-pharmacological therapy or better known as traditional medicine (herbal) has been widely practiced. Medicinal plants have been used since ancient times for the treatment of various diseases. Such remedies have now spread across the global market and both consumers and medical professionals have started trusting and relying on phytomedicine (7). There are 1329 species of plants used traditionally in medicine. Among them include Leaves (Syzghium Polyanthum) and Cinnamon (Cinnamomum Burmannii), the most commonly utilized parts are the leaves fruits, and roots with the method to process before consuming is by decoction (50%) and infusion (22%) (7).

Bay leaf is one of the types of herbal therapy to treat hypertension. The chemical content in bay leaves that is thought to play a role in lowering blood pressure is flavonoids, volatile oils, potassium, and alkaloids that are diuretic in nature (8). Based on research conducted by Prasetyo & Hasyim (2022), it was found that there was a significant effect of bay leaf water decoction in reducing blood pressure in the elderly (9). In addition, Cinnamon has bioactive components of the cinnamon plant that have the effect of lowering blood pressure are flavonoids, phytosterols and volatile oils. Phytochemical screening conducted by Sharififar reported that cinnamon contains high levels of flavonoids and phytosterols (10). Research conducted by Shirzad (2021) found that cinnamon is proven to be able to reduce blood pressure in hypertensive participants at a dose of 2 gr/day (11)

Some plants commonly used for nonpharmacological therapy to treat diseases such as diabetes mellitus, hypertension, and cholesterol are green tea, gotu kola, cinnamon, yacon, breadfruit, and bay leaves. These plants can be combined to produce an instant health drink or instant herbal product that has high efficacy with a refreshing taste and aroma (12). The efficacy of bay leaves in the form of herbal tea powder can be processed through an oven drying process that is seen from the difference in the type of young leaves and old leaves.

Some of the chemical compounds in tea can give the impression of color, taste and aroma that satisfies the drinker, so until now, tea is one of the most popular refreshing drinks. Apart from being a beverage, tea is also widely used for medicine and cosmetics (13) The need for a good understanding of the use of herbal medicines to people with hypertension in the community as a form of management of hypertension that has a lower economic value and is easily accessible to the community so that people are able to make good use of such as bay leaves and cinnamon as a form of non-pharmacological treatment.

Instant herbal drinks packaged in tea bags have several advantages including being practical and easy to make because they are directly brewed. The processing of bay leaf herbal tea and cinnamon into instant drinks is one alternative in the context of diversifying traditional herb products which is expected to be an added value for traditional herbs that have not been optimally utilized (14).

2. RESEARCH METHOD

a. Design Study

This type of research is quantitative research using a quasy experiment design with The Randomized Pre Post Test With Control Group.

b. Population and Sample

The population in this study were all PROLANIS participants at Padongko Health Center and Palakka Health Center, Barru Regency, totaling 120 respondents. The control intervention group in this study were all hypertensive patients who were members of PROLANIS in 2 health centers determined based on a history of grade 1 and grade 2 hypertension experienced.

Based on the results of calculations using the Fredere formula, a sample size of 28 people was obtained. According to (Juwita et al, 2022) to anticipate the possibility of dropping out, the sample size was increased by 10%, so that the sample amounted to 30 respondents. Every patient aged 40 years and above with stage 1 and stage 2 hypertension diagnosed by the same health center staff was included in the study. Patients had systolic and diastolic blood pressures ranging from 140 to 190 and 90-100 mmHg, respectively. These patients had no previous medical illnesses, and were neither pregnant nor breastfeeding. According to these criteria, 60 patients were divided into two experimental and control groups. After taking informed consent and in accordance with the declaration of Helsinki, patient demographic information including age, gender, and body mass index were entered into a questionnaire. Blood pressure was measured with an Omron Sphygmomanometer type HEM-8712. The manometer cuff was attached to the brachial artery as the tip was 2 cm above the elbow pulse of the brachial artery. Blood pressure was measured in the sitting position twice at 5-minute intervals. The average of the two attempts was recorded. Thirty respondents in the intervention group agreed to consume 2 bags of herbal tea with a combination of bay leaves and cinnamon in the morning and evening after meals with 1 bag containing 1 g cinnamon and 2 g bay leaves, which were then consumed for 14 days. Instructions for using the herbal tea were given to the participants by the same researcher. All tea bags were purchased from the same trusted herbal shop and prescribed free of charge to the study participants. The control group took only amlodipine antihypertensive drugs. Respondents were then visited by the researcher before and after the intervention, and their blood pressure was measured.

c. Data Analysis

Data processing and analysis in this study used the STATA version 22 program. The difference in mean blood pressure before and after the intervention was analyzed using the paired sample T test if the data was normally distributed and if the data was not normally distributed then using the Wilcoxon test with a significance value of 0.05

d. Etical Cinsiderations

This study was Has obtained recommendations for ethical approval by the Research Ethics Commission of the Faculty of Public Health, Hasanuddin University with Number: 4785/UN4.14.1/TP.01.02/202 dated 27 July 2023

3. RESULTS

a. Univariate Analysis

Table 1: Frequency Distribution of Respondent Characteristics

General Characteristic Respendents	Intervention		Control		Total	
	n	%	n	%	n	%
Gender						
Male	4	13.33	6	20.00	10	16.67
Female	26	86.67	24	80.00	50	83.33
Age						
45-59	23	76.67	15	50.00	38	63.33
≥ 60	7	23.33	15	50.00	22	36.67
Marriage Status						
Marry	22	73.33	28	93.33	55	91.67
Widow/Widower	8	26.67	2	6.67	4	6.67
Education						
Elementary school	4	13.33	0	0.00	4	6.67
Junior High School	4	13.33	11	36.67	15	25.00
Senio High School	15	50.00	7	23.33	22	36.67
Bachelor degree	7	23.33	12	40.00	19	31.67
Jobs						
Civil Servant	8	26.67	12	40.00	20	33.33
Self-employed	3	10.00	1	3.33	4	6.67
Housewife	19	63.33	17	56.67	36	60.00
Consumption Statification						
Statisfied	18	60.00	0	0.00	18	60.00
Very Statisfied	12	40.00	0	0.00	12	40.00
Medication Supervisor						
Husband/Wife	5	16.67	18	60.00	23	38.33
Children	21	70.00	12	40.00	33	55.00
Brother	3	10.00	0	0.00	3	10.00
More	1	3.33	0	0.00	1	3.33

Source: Primary Data. 2023

Table 1 shows that in the intervention group 13.33% of respondents were male and 86.67% were female and in the control group 20.00% of respondents were male and 80.00% were female. Most of the respondents in the intervention group were in the age category 55-64 years (60.00%) and in the control group 50.00% were in the age category 55-64 years. Most respondents in the intervention group were married (73.33%) and in the control group were married (93.33%).

Most respondents in the intervention and control groups had a high school education level of (50.00%) and (36.67%). most respondents worked as housewives. namely in the intervention group (63.33%) and control group (56.67%).

Most of the respondents in the intervention group were satisfied (60.00%). Most of the respondents in the control group had PMO children (70.00%) and the control group had husband/wife (60.00%).

Table 2: Frequency Distribution of Clinical Characteristics of Respondents

Clinical Characteristic Respondents	Intervention		Control		Total	
	n	%	n	%	n	%
Body Mass Index (IMT)						
Skinny	1	3.33	0	0.00	1	1.67
Normal	11	36.67	12	40.00	23	38.33
Fat	8	26.67	10	33.33	18	30.00
Obesity	10	33.33	8	26.67	18	30.00
Smoking Behavior						
Yes	3	10.00	4	13.33	7	11.67
No	27	90.00	26	66.00	53	88.33
Family History						
Yes	28	93.33	21	70.00	49	81.67
No	2	6.67	9	30.00	11	18.33
Duration of Suffering						
>5 Years	9	30.00	6	20.00	15	25.00
>5 Years	21	70.00	24	80.00	45	75.00

Source: Primary Data. 2023

Table 2 shows that BMI in the intervention group was mostly in the normal category. namely 30.67%) and in the control group (40.00%). Most respondents in the intervention and control groups were in the non-smoking category. namely (90.00%) and 66.00%). Most of the respondents in the intervention and control groups had a family history. namely (93.33%) and (70.00%). Most respondents had a history of hypertension >5 years. namely in the intervention group (70.00%) and the control group (80.00%).

Table 3: Distribution of Average Systolic Blood Pressure of Intervention Group Before and After Treatment at Padongko Health Center and Palakka Health Center. Barru Regency

Group	Mean	Min	Max	SD
Pretest	153.63	140	189	10.86
Posttest	136.63	120	160	13.48

Source: Primary Data. 2023

Table 3 shows that the average blood pressure in the intervention group before treatment was higher at 153.63 mmHg. min/max value = 140/189 mmHg and SD = 10.86 and after treatment the average blood pressure decreased to 136.63. The min/max value = 120/160 and Standar Deviasion= 13.48.

Table 4: Distribution of Average Systolic Blood Pressure of Control Group Before and After Treatment at Padongko Health Center and Palakka Health Center. Barru Regency

Group	Mean	Mini	Max	SD
Pretest	156.7	140	177	10.59
Posttest	153.43	134	174	11.50

Source: Primary Data. 2023

Table 4 shows that the average blood pressure in the intervention group before treatment was higher at 156.7 mmHg. blood pressure min/max=140/177. dan

SD=10.59 and after treatment the average blood pressure decreased to 153.43 mmHg the min/max value= 134-174 and Standar Deviasion=11.50

b. Bivariate Analysis

Table 5: Differences in Blood Pressure Before and After Treatment in the Intervention and Control Groups at Padongko Health Center and Differences in Blood Pressure Before and After Treatment in the Intervention and Control Groups at Padongko Health Center and Palakka Health Center. Barru Regency

Group	Variable	Mean (mmHg)	Standar Deviasion	Δ Mean	P-*Value*
Intervention (n=30)	Before	153.63	11.06	17	0.000
	After	136.63	9.58		
Control (n=30)	Before	156.7	10.59	3.26	0.001
	After	153.43	11.56		

Deiscription: Inteirveintion: Wilcoxon teist. Control: Indeipeindeint t-teist

Sourcei: Primary Data. 2023

Table 5. It can be seen that the mean value of blood pressure in the intervention group has decreased before and after consuming herbal tea with a combination of bay leaves and cinnamon. which is a difference of 17 with a p value of 0.00 < α 0.05. which means there is a significant difference in blood pressure before and after consuming herbal tea with a combination of bay leaves and cinnamon. The mean value of blood pressure in the control group also decreased. namely the difference of 3.27 with a p value of 0.001 <0.05. which means there is a significant difference in blood pressure before and after taking antihypertensive drugs. The percentage comparison of blood pressure reduction between the intervention group was 11.07% and the control group was 2.09%.

4. DISCUSSION

1. Effect of Herbal Tea Combination of Salam Leaves and Cinnamon and Antihypertensive Drugs on Reducing Blood Pressure of PROLANIS Participants with Hypertension

Herbal tea with a combination of bay leaves and cinnamon is a combination of spices that are processed by slowly drying until they finally reach a dry point which is then pureed into simplisia and put into tea bags. Herbal tea is different from normal tea because it does not come from tea but is made from spices or plant parts such as roots. stems. leaves. flowers and tubers. Herbal tea as a regular drink in the form of a single or mixture of herbs which in addition to being efficacious as a regular drink is also efficacious as a drink that can provide good benefits for health. (15). Hypertension is a condition of increased blood pressure above normal. In dealing with hypertension. pharmacological and non-pharmacological treatments can be used. (16). Based on table 5. it can be seen that the results of giving herbal consumption of a combination of bay leaves and cinnamon obtained differences in blood pressure results between before intervention and after intervention.

This is in line with research conducted by Gobel. et. al (2022) found that there are influences and differences in blood pressure before and after consuming bay leaves in hypertensive patients with a value of p = 0.000 (17). Another study conducted by Sari (2021) found that there was an effect of giving cinnamon bark on reducing blood

pressure in hypertensive patients with a p value of 0.000. In line with this research. clinical studies have found that cinnamon's natural compounds support the process of reducing cardiovascular risk. preceded by modulation of other factors. such as oxidative stress. inflammation. hyperlipidemia. and vascular resistance(18). Bay leaves and cinnamon are one of the herbs that have ingredients that are beneficial in lowering blood pressure. Bay leaves and cinnamon both contain flavonoids. essential oils. (Sitra. eugenol) (19). The administration of cinnamon at 1500 mg / day for 90 days in patients with grade 1 hypertension is able to reduce the average systolic blood pressure of outpatients with moderate clinical degrees (11) This is supported by the theory put forward by Julizan et al. (2023) that bay leaves have 28% tannin groups and their derivatives. followed by 25% phenolic groups. The primary secondary metabolites in the water extract of S. polyanthum are phenol hydroquinone. tannin. and flavonoids. The flavonoid extract of S. polyanthum showed the highest antioxidant activity and functioned in lowering blood pressure (20). The higher the cell oxidation in the body. the higher the possibility of degenerative diseases. In bay leaves there are 3 components. namely essential oils as fragrances or flavorings that can calm the mind and also reduce the production of stress hormones. tannins in bay leaves are able to relax arterial muscles so as to lower blood pressure for people with hypertension. and flavonoids as ACE inhibitors by inhibiting ACE activity so that the formation of Angiotensin II can be limited so as to prevent hypertension(21). The theory that explains the content of cinnamon which has properties in lowering blood pressure is explained by C. Shang et al. (2021) the main content is Cinnamaldehyde with its main constituent (46-65% essential oil in cinnamon bark) eugenol is contained as the second main constituent. and cinnzeylanine. cinzelanol. In invio and invito studies of cinnamon extract (cinnamaldehyhe main component) explain that the substance produces a variety of pharmacological effects including antifungal. anticardiovascular. anticancer. anti-inflammatory. antiulcer. antidiabetic. antihypertensive antioxidant and lipid cholesterol reduction. (22).

2. Effect of Antihypertensive Drug Administration on Blood Pressure Reduction of PROLANIS Participants with Hypertension

Based on the results of the study in table 5. it shows that the group that only took antihypertensive drugs obtained a p value = 0.001. so it can be concluded that there is a significant difference in reducing systolic blood pressure. This research is in line with research. This study is in line with research conducted by Baharuddin et al (2013) explaining that amlodiphine can reduce blood pressure in hypertensive patients by 32.94/16.38 mmHg and captopril can reduce blood pressure by 29.16/11.83 mmHg. (23). Another study conducted by Mukarromah et al (2023) obtained the results of an independent t test with a p value of 0.000 <0.05. which means that there is a difference in systolic blood pressure reduction between the elderly intervention group given bay leaf boiled water compared to the control group who only consumed antihypertensive drugs (24). Amlodipine and captopril have the same mechanism of action. namely by reducing blood volume. amlodipine is able to reduce blood volume by reducing cardiac output while captopril by reducing the amount of aldosterone which works in the reabsorption of water and sodium. (25). Amlodipin adalah obat antihipertensi yang termasuk kedalam golongan CCB (*Calsium Chanel Blocker)* dan termasuk kelompok dihidropiridin. Agen dihidropiridin yakni direct vasodilator yang lebih selektif dibandingkan agen non-dihidropiridin. Selain itu agen dihidropiridine mempunyai efek pada jantung yang lebih sedikit dibandingkan agen nondihidropiridin (26). However.

acute administration of antihypertensive drugs such as diuretics can cause hypotension in the elderly (27).

Based on the theory of non-adherence. the use of antihypertensive drugs is a factor that causes therapeutic failure in reducing hypertension (28). Research conducted by Moningkey (2023) also found the results of the p value <0.001 and OR = 5.35. it can be concluded that patients who are not obedient to taking anti-hypertensive drugs are likely to experience hypertension 5.35 times greater(29). This is in line with research conducted by Khayyat et al.. (2017) found that predictors in drug adherence and blood pressure control in 204 patients found that low adherence to hypertension treatment was one of the factors for uncontrolled blood pressure (30).

5. RESEARCH LIMITATION

1) In this study. variables related to the type of medication consumed. stress levels. diet and physical activity were not investigated due to limitations related to time in conducting research.
2) There are limitations in the research subjects so that the sample is less in this study.

6. CONCLUSION

There are changes in systolic blood pressure in elderly PROLANIS participants at Padongko Health Center and Palakka Health Center. Barru Regency after consuming herbal tea with a combination of bay leaves and cinnamon plus antihypertensive drugs with a p value of 0.000. There are changes in systolic blood pressure in elderly PROLANIS participants at Padongko Health Center and Palakka Health Center. Barru Regency after taking antihypertensive drugs with a p value of 0.001.

7. SUGGESTIONS

1. For PROLANIS participants: can make herbal tea with a combination of bay leaves and cinnamon as a complementary therapy to become a pioneer in promoting bay leaf and wood herbs. and be able to cultivate bay leaf plants in their respective areas.
2. For health workers. it is hoped that they will be able to educate on how to prevent hypertension and participate in mobilizing health information through social media such as Whatsapp. Instagram. and Facebook.
3. For future researchers. it is expected to develop herbal tea products with a combination of bay leaves and cinnamon using different doses and conduct testing both organoleptic. flavonoid content and are expected to conduct additional research subjects in the form of stress levels. diet and activity.

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