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# CARROT (DAUCUS CAROTA L.) AND TOMATOES (SOLANUM LYCOPERSICUM) PUDDING TO LOWER THE BLOOD PRESSURE OF THE ELDERLY

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**Abstrak (Indonesia)**

**Latar Belakang:** Hipertensi pada lansia masih menjadi masalah kesehatan yang perlu ditanggapi dengan serius. Salah satu pengobatan non-farmakologis untuk hipertensi adalah dengan memanfaatkan kandungan kalium dalam buah-buahan, sayuran dan umbi-umbian seperti wortel dan tomat yang mengandung antioksidan tinggi seperti kalium, likopen, vitamin A, B, dan C.

**Tujuan:** Untuk mengetahui pengaruh pemberian puding wortel (Daucus Carota L.) dan tomat (Solanum Lycopersicum) terhadap penurunan tekanan darah pada lansia.

**Metode:** Penelitian ini menggunakan jenis Quasy-Experiment dengan desain penelitian Pretest-Posttest With Control Group. Jumlah sampel dalam penelitian ini berjumlah 22 orang dan dipilih oleh Simple Random Sampling. Sampel dibagi menjadi 2 kelompok yaitu kelompok kontrol dan kelompok intervensi dengan pemberian puding wortel dan tomat selama 7 hari berturut-turut.

**Hasil:** Uji statistik menyatakan bahwa tekanan darah sistolik pada kelompok intervensi diperoleh p value = 0,046 (p<, 0,05), pada kelompok kontrol a p value = 0,221 (p>, 0,05). Tekanan darah diastolik pada kelompok intervensi diperoleh p = 0,024 (p <, 0,05), dan pada kelompok kontrol tekanan darah diastolik diperoleh p = 0,588 (p>, 0,005). Hal ini menunjukkan bahwa terdapat perbedaan tekanan darah sistolik dan diastolik yang signifikan antara kelompok intervensi dengan kelompok kontrol**.**

**Kesimpulan:** Ada perbedaan yang signifikan dalam tekanan darah sistolik dan diastolik antara kelompok intervensi dan kelompok kontrol.

**Kata kunci**: blood Pressure, carrot and tomato pudding, elderly.

***Abstract (English)***

***Background:*** *Hypertension in the elderly is still a health problem that needs to be taken seriously. One of the non-pharmacological treatments for hypertension is to utilize the potassium content in fruits, vegetables and tubers such as carrots and tomatoes which contain high antioxidants such as potassium, lycopene, vitamins A, B, and C.*

***Objective:*** *To determine the effect of giving carrot (Daucus Carota L.) and tomato (Solanum Lycopersicum) pudding on reducing blood pressure in the elderly.*

***Methods:*** *This study used a Quasy-Experiment type with a Pretest-Posttest With Control Group research design. The number of samples in this study amounted to 22 people and selected by Simple Random Sampling. The sample was divided into 2 groups, namely the control group and the intervention group by giving carrot and tomato pudding for 7 consecutive days.*

***Results:*** *Statistical tests stated that the systolic blood pressure in the intervention group obtained a p value = 0.046 (p<, 0.05), in the control group a p value = 0.221 (p>, 0.05). Diastolic blood pressure in the intervention group obtained p = 0.024 (p <, 0.05), and in the control group diastolic blood pressure obtained p = 0.588 (p>, 0.005). This shows that there is a significant difference in systolic and diastolic blood pressure between the intervention group and the control group.*

***Conslusion:*** *There was a significant difference in systolic and diastolic blood pressure between the intervention group and the control group.*

***Keywords****: blood pressure, carrot and tomato pudding, elderly.*

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## INTRODUCTION

Hypertension is a global public health problem that contributes to degenerative diseases such as heart disease, stroke, kidney failure, premature death and disability. Based on the World Health Organization (WHO) in 2018 it was stated that 71% of the 37 million

deaths that occurred in the world in 2016 were caused by non-communicable diseases. Based on data collected in 2015, approximately 22% of adults aged 18 years and over suffer from hypertension. Meanwhile, according to the 2014 Indonesian Sample Registration System (SRS) data, hypertension with complications (5.3%) is the number 5 (five) cause of death at all ages.

Basic health research data (Riskesdas, 2018) shows the prevalence of hypertension based on measurements in the population aged 18 years is 34.1%, the highest is in South Kalimantan (44.1%), while the lowest is in Papua (22.2%). Hypertension occurs in the age group 31-44 years (31.6%), age 45-54 years (45.3%), age 55-64 years (55.2%).

One way to control blood pressure non-pharmacologically is by consuming fruits, vegetables, or tubers that contain high potassium. Some fruits and vegetables in Indonesia that can be used as an alternative treatment for hypertension are carrots, cucumbers, celery, garlic, sweet star fruit, rosella (Herlina, 2021a). Carrots are root vegetables that are usually yellow-red or yellow-orange in color with a texture similar to wood (Herlina, 2021b). One of the content of carrots that is good for lowering or controlling blood pressure is potassium. Potassium is a strong diuretic so that it can help maintain a balance of blood pressure. Consumption of potassium 4700 mg / day, there is a relationship between increased potassium intake and decreased intake of Na-K ratio with a decrease in blood pressure (Chmielewski & Carmody, 2017).

In addition to carrots, one of the natural ingredients used as non-pharmacological treatment is tomatoes. Tomato is a horticultural product that is easily obtained in Indonesia. The sweet-sour taste of the fruit is favored by most people. Tomatoes are a source of vitamin C, vitamin A, and are rich in antioxidants. In general, tomatoes are consumed in fresh form.

This is the reason for researchers to see the effect on lowering blood pressure when carrots and tomatoes are modified in the form of pudding. Modified tomatoes and fruit are given in the form of pudding to facilitate the chewing process in the elderly who have eating disorders.

## RESEARCH METHOD

The method in this study used a quasi-experimental method with a Pretest-Posttest design with a control group. In this study, there were two groups (experimental and control) which were selected by inclusion and exclusion criteria, then pretest was given to determine whether there was a difference between the treatment group and the control group. This research was conducted in the working area of the Kotaraja Health Center, Sikur, East Lombok, West Nusa Tenggara Province. Pudding was given for 7 days. The population in this study were patients at the Kotaraja Health Center who had been recorded in the 2019 medical record, namely 846 people and the sample used was 22 people selected by random sampling.

## RESULT AND DISCUSSION

1. Characteristics of Research Subjects

The following are the characteristics of the research subjects in table 1.

Table 1. Distribution of Characteristics of Research Subjects

| No | Characteristics | Intervention n= 11 % | Control n= 11 % | *P* |
|---|---|---|---|---|
| 1 | Age | | | 0,557 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | - 60-74 | 10 | 90,9 | 9 | 81,8 | |
| | - 75-90 | 1 | 9,1 | 2 | 18,2 | |
| | Gender | | | | | |
| 2 | - Man | 0 | 0 | 3 | 27,3 | 0,067 |
| | - Woman | 11 | 100 | 8 | 72,7 | |
| | Smoking habits | | | | | |
| 3 | - Mild: <10 sticks per day | 0 | 0 | 2 | 18,2 | 0,152 |
| | - No smoking | 11 | 100 | 9 | 81,8 | |
| | Physical Activity | | | | | |
| .64 | - Mild | 10 | 90,9 | 9 | 81,8 | 0,557 |
| | - Moderate | 1 | 9,1 | 2 | 18,2 | |
| | Family history of hypertension | | | | | |
| 5 | - Yes | 11 | 100 | 11 | 100 | 0,432 |
| | - No | 0 | 0 | 0 | 0 | |
| | Nutritional status | | | | | |
| | - Underweight Level II | 2 | 18,2 | 3 | 27,3 | |
| | - Underweight Level I | 2 | 18,2 | 1 | 9,1 | |
| 6 | - Normal | 5 | 45,5 | 6 | 54,5 | 0,851 |
| | - Overweight Level I | 2 | 18,2 | 0 | 0 | |
| | - Overweight Level II | 0 | 0 | 1 | 9,1 | |

Table 1 shows that the characteristics of the research subjects according to age in this study were mostly aged 60-74 years, as many as 10 people (90.9%) in the intervention group and 9 people (81.1%) in the control group. Based on gender, most of the research subjects from both groups were female, namely 11 people (100%) in the intervention group and 8 people (72.7) in the control group. In the characteristics of smoking habits, most of the research subjects were in the control group, as many as 2 people (18.2%). On the characteristics of moderate physical activity, it can be seen that some of them were in the intervention group as many as 1 person (9.1%) and 2 people (18.2%) were in the control group. In the characteristics of family history of hypertension, most of the two groups, both intervention and control, had a family history of hypertension, namely 11 people (100%) in the intervention group and 11 people in the control group (100%). On the characteristics of nutritional status, the intervention group had normal nutritional status as many as 5 people (45.5%) and 2 people (18.2%) had overweight nutritional status level I. p value > 0.05, it means that there is no difference in the characteristics of the intervention group and the control group.

2. The Effect of the Carrot and Tomatto Puding on Blood Pressure

Table 2. The Effect of the Carrot and Tomatto Puding on Blood Pressure

| Blood Pressure (mmHg) | Group | | | | | |
|---|---|---|---|---|---|---|
| | Intervention | | p-value | Control | | p-value |
| | After | Before | | After | Before | |
| | *Mean*±SD | | | *Mean*±SD | | |
| BP Systolic | *191,82*±28,90 | 179,09±21,192 | 0,006 | 151,82±13,28 | 148,18±14,70 | 0,004 |
| | *106,36*±11,20 | 99,06±10,44 | 0,029 | 85,45±9,34 | 87,27±13,48 | 0,048 |

| | | | |
|---|---|---|---|
| BP Diastolic | | | |

a = *independent sample t-test*

Based on table 2, it can be seen that the average value of systolic blood pressure before the intervention was 191.82 mmHg while after the intervention the average value of systolic blood pressure was 179.09. From these treatments, both before and after the results obtained were 0.005 ($p<0.05$) so that there was a change in systolic blood pressure between systolic blood pressure before and after treatment.

In the control group, it can be seen that the average value of systolic blood pressure before the intervention was 151.82 mmHg while at the end of the study the average value of systolic blood pressure was 148.18. there was a change in systolic blood pressure between systolic blood pressure before and after treatment.

The average value of diastolic blood pressure before the intervention in the intervention group was 106.36 mmHg while after the intervention the average value of diastolic blood pressure was 99.06 mmHg. From these treatments, both before and after the results were 0.029 ($p<0.05$) so that there was a change in diastolic blood pressure between diastolic blood pressure before and after the intervention.

While in the control group, it can be seen that the average value of diastolic blood pressure before the value was 85.45 mmHg and after the intervention the average value of diastolic blood pressure was 87.27. From these treatments, both before and after the results were 0.048 ($p<0.05$) so that there was a change in diastolic blood pressure between diastolic blood pressure before and after treatment.

Carrot and Tomato Pudding is a combination pudding of 150 grams of carrots and 100 grams of tomatoes given every day for 7 consecutive days with a fairly high potassium content of 601 mg in ±175 grams of pudding cup.

The effect of giving Carrot and Tomato pudding on reducing systolic and diastolic blood pressure can be seen by looking at the p value using the Independent Samples T-Test test, for the results of systolic blood pressure in the intervention group before and after the intervention, the p value = 0.046 ($p < 0.05$) ) which means that there is a difference in the decrease in systolic blood pressure before and after the intervention in the intervention group while the results of diastolic blood pressure after being given the intervention in the intervention group obtained a p value = 0.024 ($p <0.05$) which means that there is an effect of giving carrot and tomato pudding on diastolic blood pressure. .

From the results of Santika's research (Laila et al., 2019), there is an effect between the blood pressure of hypertensive patients before and after being given carrot juice in Padang Gelugur Village, Tapus Health Center Work Area for 7 consecutive days. The nutritional content of tomatoes, namely potassium, is very useful for lowering blood pressure because potassium can reduce or reduce sodium in urine and water in the same way as diuretics, keep the body's electrolytes balanced.

In addition to potassium, the content that plays a role is fiber. The mechanism of fiber to lower blood pressure is related to bile acids. Dietary fiber is able to reduce circulating cholesterol levels in blood plasma by binding to bile salts, preventing the absorption of cholesterol in the intestines and increasing bile acid excretion through feces which can increase the conversion of plasma cholesterol into bile acids and result in a decrease in blood pressure.

## CONCLUSION

There is a decrease in blood pressure both in systolic and diastolic after giving carrot and tomato pudding

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