

## Intervention of the DASH (*Dietary Approach to Stop Hypertention*) Diet on Blood Pressure Reduction in the Elderly at BSLU Mandalika

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**Background:** Physical changes in the elderly include changes in the aorta and systemic blood vessels that affect blood pressure. Increased blood pressure in the elderly is a health problem that must be handled properly. The management of hypertension can be done by giving the DASH diet, in this case this study provides an interlude to the DASH diet.

**Research Methods:** This type of research uses a quasi-experimental research design with a randomized pre-test-post-test control group design. Subjects were divided into two groups, namely the treatment group and the control group.

**Research Results:** Most of the subjects in this study were elderly aged 70-74 years (33.3%) in the treatment and 75-80 years (50%) in the control. The research subjects were mostly female, namely 27 elderly (75%). The average body weight for the treatment group was 54.24 kg and the control group was 48.48 kg. The mean blood pressure in both groups before the intervention was higher than the mean blood pressure after the intervention. The results of the paired-t test statistic showed that there was a difference in the mean of systolic (0.000) and diastolic (0.000) blood pressure before and after the intervention. Meanwhile, the two-group difference test showed that there was no difference in systolic and diastolic blood pressure before the intervention. However, after the intervention, there was a difference in systolic and diastolic blood pressure. Furthermore, there was an effect of the DASH diet interlude on Systolic blood pressure ( $p = 0.000$ ) and Diastolic blood pressure ( $p = 0.034$ ) after the DASH diet snack was given.

**Conclusion:** there is an effect of giving a DASH diet interlude on systolic blood pressure ( $p=0.000$ ) and diastolic blood pressure ( $p=0.034$ ) after giving the DASH diet snack.

**Keywords:** Blood Pressure; DASH Diet; Elderly

### INTRODUCTION

Increasing age causes a decrease in various physiological functions and changes in health. Physical changes in the elderly include changes in the cardiovascular system that result in the risk of degenerative diseases. The changes include changes in the aorta and systemic blood vessels that affect blood pressure in pre-elderly, both systolic blood pressure and diastolic blood pressure. Systolic blood pressure will increase progressively until the age of 70-80 years and diastolic blood pressure will continue to increase until the age of 55-60 years (Nugroho, 2000).

Based on the results of the 2013 Basic Health Research (Riskesdas), it shows that the prevalence of high blood pressure increases with age, starting at the age of 45 years with a prevalence of 35.6% compared to the age of 35 years at 24.8%. This prevalence has decreased from 2007 which is for the age of 45 years the prevalence is 42.4%. The results of the research state that the measurement of high blood pressure has decreased, but in this case it still requires special attention, because if high blood pressure is not treated immediately it will cause risk factors for various types of degenerative diseases (Riskesdas, 2013).

Blood pressure is influenced by several controllable factors, including fiber intake, sodium intake and physical activity. Lifestyle changes that are relaxed and less physically active can have a negative effect on health. Lifestyle changes also bring about changes in one's diet and eating habits. The types of restaurants or restaurants that offer foods that are high in sodium and low in fiber are preferred by the general public. Low fiber consumption is one of the risk factors for high blood pressure (Sulviana, 2008). A diet lacking in fiber which is abundant in vegetables and fruit will trigger atherosclerosis and increase the risk of high blood pressure (Khomsan, 2008). According to Dauche (2007), fiber intake can reduce circulating cholesterol levels in blood plasma, because fiber can prevent the absorption of cholesterol in the intestine and increase the excretion of bile acids into feces, thereby increasing the conversion of plasma cholesterol into bile acids. Cholesterol circulates a lot in the blood, the greater the accumulation of fat in the blood vessels and inhibits blood flow which has an impact on increasing blood pressure (Thompson, 2011).

Handling of hypertension patients can be done with 2 kinds of treatment with pharmacotherapy and non-pharmacotherapy. Treatment that can be done in patients with hypertension is pharmacotherapy, namely by taking drugs, while non-pharmacotherapy with lifestyle modification, weight loss, reducing alcohol intake, regular physical activity, reduction of sodium intake and smoking cessation (Smeltzer & Bare, 2002).

People with hypertension can also control their blood pressure by following the DASH (Dietary Approaches to Stop Hypertension) diet (National Heart, Lung, and Blood Institute, 2011). The DASH diet is a diet program by reducing salt intake, reducing cholesterol and saturated fat intake, reducing calorie intake, increasing foods containing fiber and high in potassium. The DASH diet is a dietary pattern that emphasizes the consumption of foods that are low in sodium (<2300 mg/day), high in potassium (4700 mg/day), magnesium (>420 mg/day), calcium (>1000 mg/day), and

fiber (25–30 g/day) and low in saturated fatty acids and cholesterol (<200 mg/day) which are abundant in fruits, nuts, vegetables, fish, lean meats, low-fat dairy, and foodstuffs with low total fat and saturated fat (Vollmer *et al.*, 2001). Based on a study entitled "Dietary Therapy in Hypertension" explains that the DASH diet is effectively applied to patients with hypertension because the DASH diet can reduce systolic and diastolic blood pressure in patients with hypertension (Sacks, *et al.*, 2010).

The Mandalika Elderly Social Center (BSLU) is a social center devoted to fostering the elderly in West Nusa Tenggara Province. Currently, there are 85 elderly people living in the elderly social center. According to data from the results of health checks carried out routinely at this social center, there are 45 elderly (52.9%) who have hypertension.

One of the facilities owned by BSLU Mandalika is a polyclinic and routine activities of meetings and morning exercises with the elderly residents and other elderly people in the city of Mataram. The polyclinic only has human resources in the form of nurses so that promotive and preventive coaching in the form of changes in knowledge and behavior has not been optimally implemented. This research as a promotive support in the form of efforts to reduce the risk of hypertension in the elderly is to provide an interlude in the form of the DASH diet (Dietary Approaches to Stop Hypertension).

## METHODS

This type of research uses a quasi-experimental research design with randomized pre-test-post-test control group design. Subjects were divided into two groups, namely the treatment group and the control group. The population in this study were all the elderly at BSLU Mandalika and the selected sample was the elderly who had hypertension. In this study, the DASH diet was given for 14 days. Data analysis was carried out with a different test for each group using the Independent sample t-test. While the analysis to determine the effect of differences before and after treatment in each group was analyzed by Paired t-test.

## RESULTS AND DISCUSSION

The subjects used in the study were 36 elderly people in BSLU Mandalika. The research subjects were divided into two groups, namely the treatment group with 18 elderly people giving DASH diet snacks and the control group with 18 elderly people. The characteristics of the research subjects are presented in table 1.

Table 1. Characteristics of Subjects by Group

| Characteristic              | Group              |                   |
|-----------------------------|--------------------|-------------------|
|                             | Intervensi (n=18)  | Control (n=18)    |
|                             | N %                | N %               |
| Age                         |                    |                   |
| 60-64                       | 2<br>(11,1 %)      | 2<br>(11,1%)      |
| 65-69                       | 5<br>(27,8 %)      | 1<br>(5,6 %)      |
| 70-74                       | 6<br>(33,3%)       | 6<br>(33,3%)      |
| 75-80                       | 5<br>(27,8%)       | 9<br>(50 %)       |
| Mean $\pm$ SD               | 70.56 $\pm$ 5.752  | 73.72 $\pm$ 5.050 |
| Gender                      |                    |                   |
| Man                         | 4<br>(22,2 %)      | 5<br>(27,8 %)     |
| Woman                       | 14<br>(77,8 %)     | 13<br>(72,2 %)    |
| Wight (kg)<br>Mean $\pm$ SD | 54.24 $\pm$ 11.257 | 48,48 $\pm$ 7.172 |

Most of the subjects in this study were elderly aged 70-74 years (33.3%) in the treatment and 75-80 years (50%) in the control. The mean age for the treatment was 70.56 years and the control group was 73.72 years, meaning that the age of the control group was higher than that of the treatment group. The results of the analysis test showed that there was no age difference between the two groups ( $p = 0.080$ ), meaning that each group had the same age distribution and had the same proportion in achieving the research results.

The subjects in this study were the elderly (elderly) who were all aged 60 years or older and had hypertension. The selection of subjects with elderly criteria was due to an increase in age which was directly proportional to an increase in blood pressure values (Babatsikou F, 2011). The risk of hypertension is greater in the elderly group due to the following mechanisms. In the elderly group there is a decrease in the elasticity of peripheral blood vessels due to the aging process so that it will

increase peripheral vascular resistance (Martono, 2010). In addition, in the elderly group there is an increase in sensitivity to sodium intake.

With age, the elderly experience several physical changes including: changes in the immune system, namely the body becomes susceptible to allergies and diseases; the digestive system begins to be disturbed, the teeth begin to fall out, the ability to digest food and absorption begins to be sluggish and less efficient, the peristaltic movement of the intestine decreases so that you often experience constipation; changes in the metabolic system; decreased nervous system, decreased sensitivity to smell, taste and touch, decreased hearing, vision and visual memory, slowed reactions, decreased mental function; changes in the respiratory system characterized by decreased elasticity of the lungs which makes breathing difficult so that the feeling of tightness and blood pressure increases; and decreased elasticity and flexibility of joints.

The research subjects were mostly female, namely 27 elderly (75%) and 9 (25%). There are more elderly women who live in orphanages than men. The average body weight for the treatment group was 54.24 kg and the control group was 48.48 kg, meaning that the weight in the treatment group was higher than the control group. The results of statistical tests on body weight ( $p = 0.081$ ) means that there is no difference between body weight in the treatment group and in the control group.

Examination of blood pressure in the elderly was carried out before the intervention was given and on the 15th day after the intervention. The results of the difference in mean blood pressure before and after the intervention are presented in table 2.

Table 2. Differences in the Mean Blood Pressure of the Two Groups Before and After Intervention

| Blood Pressure (mmHg) | Groups              |                    |                     |                    | <i>p-value</i>     |
|-----------------------|---------------------|--------------------|---------------------|--------------------|--------------------|
|                       | Intervensi (n = 18) |                    | Control (n=18)      |                    |                    |
|                       | Mean $\pm$ SD       | P                  | Rerata $\pm$ SD     | p                  |                    |
| Before                |                     |                    |                     |                    |                    |
| BPS                   | 153,56 $\pm$ 10,837 | 0.000 <sup>a</sup> | 147,89 $\pm$ 12,014 | 0.000 <sup>a</sup> | 0.147 <sup>a</sup> |
| BPD                   | 94,17 $\pm$ 11,252  | 0.000 <sup>a</sup> | 93,11 $\pm$ 8,159   | 0.000 <sup>a</sup> | 0.749 <sup>a</sup> |
| After                 |                     |                    |                     |                    |                    |
| Intervensi            | 126,72 $\pm$ 8,917  | 0.000 <sup>a</sup> | 138,11 $\pm$ 13,702 | 0.000 <sup>a</sup> | 0.006 <sup>a</sup> |
| BPS                   | 81,61 $\pm$ 6,326   | 0.000 <sup>a</sup> | 86,39 $\pm$ 5,575   | 0.000 <sup>a</sup> | 0.022 <sup>a</sup> |
| BPD e                 |                     |                    |                     |                    |                    |

The mean blood pressure in both groups before the intervention was higher than the mean blood pressure after the intervention. The results of the statistical paired-t test showed that there was a significant difference in the mean systolic (0.000) and diastolic (0.000) blood pressure before and after the intervention.

The results of statistical tests showed systolic blood pressure before the intervention ( $p=0.147$ ) and diastolic blood pressure before the study ( $p=0.749$ ). The results of the statistical test showed that there was no difference in systolic and diastolic blood pressure between the two groups before the intervention.

The results of statistical analysis for blood pressure in both groups after the intervention showed systolic blood pressure ( $p=0.006$ ) and diastolic blood pressure ( $p=0.022$ ). The results of the statistical test showed that there was a difference in systolic and diastolic blood pressure between the two groups after the intervention.

The DASH diet is recommended by the American Heart Association and the National Institutes of Health in the United States to manage blood pressure and protect heart health (Tiong, 2018). The DASH diet follows a heart-healthy way of eating because it is low in saturated fat, trans fat, and cholesterol and is rich in nutrients that can lower blood pressure, especially potassium, magnesium, calcium, protein, and fiber (National Institutes of Health, 2013).

Patients with hypertension recommended sodium intake is less than 100 mmol or 2000 mg / day equivalent to 5 g (one small teaspoon) of table salt. This can reduce systolic blood pressure (TDS) 3.7 mmHg and diastolic blood pressure (TDD) 2 mmHg. Most nutritionists recommend taking 250–350 mg of magnesium per day from magnesium supplements for adults. Consumption of potassium is good enough to lower blood pressure by consuming potassium in the amount of 4,700 mg / day. The recommended calcium requirement is more than 1000 mg/day (Nurhumairah, 2014). High fiber is very important for people with hypertension, dietary fiber can reduce cholesterol levels in the

bloodstream so as to reduce and prevent the risk of cardiovascular disease. Dietary fiber is also able to reduce the increase in blood glucose and become controlled (Santoso, 2011).

The DASH diet recommends consuming high levels of unsaturated fatty acids (ALTJ), omega 6 and omega 3 to lower blood pressure (Kumala, 2014). Adoption of the DASH diet can reduce systolic blood pressure by 8-14 mmHg by eating more fruits, vegetables, and low-fat dairy products with less saturated and total fat, and rich in potassium and calcium (Muhadi, 2016). ). The DASH Diet program carried out for 3 months greatly affected changes in the average systolic blood pressure score and diastolic blood pressure, besides the DASH diet program had the effect of changes in perceived severity, self-efficacy, and preventive behavior (Seangpraww, 2019).

The intervention carried out in this study was the application of an interlude in the form of the DASH diet for 14 days, with the distribution of feeding once a day. The results of statistical tests in this study showed that there was an effect of giving the DASH diet interlude on Systolic blood pressure ( $p = 0.000$ ) and Diastolic blood pressure ( $p = 0.034$ ) after the DASH diet. This is in accordance with the results of research on the application of the DASH diet and The GM diet conducted by Astuti *et al.* (Astuti *et al.*, 2021) on adult hypertensive patients at the North Larangan Health Center and Posbindu in Larangan area who applied the DASH diet showed a greater reduction in systolic and diastolic blood pressure than the low salt (GG) diet. Also supported by the results of a systematic review and meta-analysis of all randomized controlled trials (RCTs) up to 2013 in 2561 participants, which evaluated the effect of the DASH diet on blood pressure, showing that the DASH diet significantly reduced systolic blood pressure by 6.74 mmHg. and diastolic blood pressure of 3.54 mmHg. These results reveal a beneficial reduction effect in from the DASH diet on systolic and diastolic blood pressure in adults (Saneei P, 2014).

## CONCLUSIONS

The mean blood pressure in both groups before the intervention was higher than the mean

blood pressure after the intervention. The results of the paired-t test statistic showed that there was a difference in the mean of systolic (0.000) and diastolic (0.000) blood pressure before and after the intervention. Meanwhile, for the two-group difference test, the results showed no difference in systolic and diastolic blood pressure before the intervention. However, after the intervention, there were differences in systolic and diastolic blood pressure.

There was an effect of giving a DASH diet interlude on Systolic blood pressure ( $p=0.000$ ) and Diastolic blood pressure ( $p=0.034$ ) after the DASH diet snack was given.

#### CONFLICT OF INTEREST STATEMENT

It is necessary to conduct a study that examines the effect of implementing the DASH dietary intervention on systolic and diastolic blood pressure values in the elderly group with a longer study duration and a larger number of subjects.

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