# ENHANCING DIETARY KNOWLEDGE AND LOW-SALT COMPLIANCE IN HYPERTENSION PATIENTS THROUGH FLIP CHART-BASED NUTRITIONAL LITERACY

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**Abstract**

Hypertension is a non-communicable disease where blood pressure is above the normal limit, namely systolic $\geq$140 mmHg and diastolic $\geq$90 mmHg. Hypertension is often known as the "silent killer" because it has no symptoms. This research aims to determine the effect of nutritional literacy through flipchart media on knowledge and adherence to a low-salt diet in hypertension sufferers. This research is quantitative with a *quasi-experimental* design with a Pretest-Posttest Control Group Design approach. The intervention group was given nutritional literacy through *flipchart* media and the control group was only given *leaflets*. The results show a difference in the average post-test knowledge score between the intervention and control groups (p-value 0.000) and a difference in the average score for increasing sodium intake between the intervention group and the control group (p-value 0.017). After nutrition education with flipchart media, there was a difference in knowledge and salt intake between the intervention and control groups. The intervention group achieved higher knowledge and lower salt intake than the control group (p-value < 0.05).

**Keywords:** *Literacy; Flipchart; Low Salt; Hypertension*

## 1. Introduction

Hypertension is a non-communicable disease where blood pressure is above the normal limit, namely systolic $\geq$140 mmHg and diastolic $\geq$90 mmHg. Systolic blood pressure is the pressure when the heart pumps blood throughout the body, while diastolic blood pressure is the lowest pressure in the arteries when the heart is at rest (Niga et al., 2021). Hypertension is also known as the "silent killer" because it has no symptoms in sufferers. However, symptoms such as dizziness, nosebleeds, abnormal heartbeats, blurred vision, and ringing in the ears can occur if hypertension is at a more severe stage. If not controlled, hypertension has the potential to cause chest pain, heart attack, stroke, and even sudden death (Muzakkir et al., 2023).

An estimated 1.28 billion adults aged 30-79 years worldwide suffer from hypertension, the majority (two-thirds) of whom live in low- and middle-income countries. An estimated 46% of adults with hypertension are unaware that they have the disease. Less than half of adults (42%) with hypertension are diagnosed and treated. About 1 in 5 adults (21%) with hypertension can reverse it. Hypertension is the main cause of premature death worldwide. One of the global targets for non-communicable diseases is to reduce the prevalence of hypertension by 33% between 2010 and 2030 (WHO, 2023).

The prevalence of hypertension sufferers according to Basic Health Research (Riskesdas) data in 2018 based on measurement results in the population aged $\geq$18 years in Indonesia was 34,11%. This figure has increased quite significantly compared to the 2013 Riskesdas data where the prevalence of hypertension according to the diagnosis of health workers in the population aged $\geq$ 18 years is 25,8%, with Bengkulu being in 15th place in the prevalence of

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hypertension based on the diagnosis of doctors (Kemenkes RI, 2018). From the results of the SKI 2023 report where the prevalence of hypertension based on measurement results in residents ≥ 18 years old is 30,8% (BKPK, 2023).Efforts to prevent and control hypertension are based on changes in diet and lifestyle. Prevention efforts that can be taken include Changes in diet, limiting the use of salt to 4-6 grams per day, foods containing baking soda, seasonings, and food preservatives, reducing foods that contain high cholesterol (offal, egg yolks, squid, shellfish, crab, chocolate, butter, and margarine), stop smoking, drinking alcohol, exercise regularly, avoid stress (Nuraini, 2018).

Based on this explanation, efforts are needed to reduce blood pressure in hypertension sufferers by providing a low-salt diet. A low-salt diet is a diet that is cooked without using salt but with certain restrictions. The goal of a low-salt diet is to help lower blood pressure and maintain blood pressure towards normal. Patients with high blood pressure above normal will be given food with low salt consumption according to the level of severity (Pratiwi & Ismawati, 2014). So efforts to control a low salt diet can be done with nutritional literacy through flipchart media. This research aims to determine the effect of nutritional literacy through flipchart media on knowledge and adherence to a low salt diet in hypertension sufferers in the working area of the fish masker health center in Bengkulu City in 2024.

## 2. Method

This study uses a quasi-experimental design with the Pretest-Posttest Control Group Design approach. This study will compare two groups, namely the intervention group and the control group. Both groups will be given the same pretest to measure their knowledge of a low-salt diet. The intervention group will receive nutritional literacy through flipchart media, while the control group will only be given leaflets. After the treatment, both groups will be tested again with the same test (posttest), and the final test results of the two groups will be compared, as well as a comparison between the initial test and the final test in each group to see changes in knowledge and salt intake. Knowledge is the understanding of people with Hypertension related to the disease of Hypertension and the Low Salt Diet, its benefits, risks, and recommendations for maintaining the diet of people with hypertension the Low Salt Diet is the intake of salt in foods characterized by restriction of sodium intake. To measure knowledge using pretest and posttest questionnaires, salt intake was collected using 2x24-hour Food Recall. Data collection was carried out by researchers. The researcher measured knowledge and salt intake before and after the intervention with a time gap of 1 month. The researcher carried out interventions in the form of nutrition education to improve literacy, flipchart media for the intervention group, and leaflets for the control group. The intervention process was carried out by providing education with the same material between the two groups within the same period.

This research was carried out in the working area of the Bengkulu City Fish Market Health Center from April to May. The population in this study is all people who visit the Fish Market Health Center. The research sample was calculated using the Lemeshow formula, with the results of 28 samples in each group, namely 28 people in the intervention group and 28 people in the control group. Inclusion criteria include respondents who can read and write, can communicate well, and are in good health. Meanwhile, the exclusion criteria are respondents who are not willing to be interviewed and are not willing to be sampled. The implementation of a pre-test was carried out to both groups before treatment, to measure initial knowledge about a low-salt diet and measure salt intake. After treatment, a posttest will be given to both groups to measure changes in knowledge and salt intake after the intervention. The collected data will be analyzed to find out if there are significant differences in salt knowledge and intake between the intervention group and the control group, as well as changes in knowledge and salt intake for each group. Statistical tests used *Uji Mann-Whitney U Test, Uji Paired T-Test, and Mann-Whitney U Test.* The study has obtained ethical approval from the relevant ethics committees, and all study participants have given informed consent. Research Ethics Approval was obtained from the Health Research Ethics Commission of the Ministry of Health of the Ministry of Health Bengkulu No.KEPK.BKL/209/04/2024.

## 3. Result and Discussion

**Table 1.** Respondent Characteristics

| Characteristics | Intervention | Control | P-value |
|---|---|---|---|
| Gender | | | |
|     Male | 7 | 6 | 0.500 |
|     Female | 21 | 22 | |
| Age | | | |
|     Adult   19-44 year | 5 | 8 | 0.606 |
|     Middle   45-59 year | 23 | 20 | |
| Education | | | |
|     Low | 4 | 5 | 0.373 |
|     High | 24 | 23 | |
| Work | | | |
|     Working | 8 | 9 | 0.388 |
|     Not Working | 20 | 19 | |

Table 1 shows the characteristics of respondents based on gender, age, education, and employment. According to gender, men and women were homogeneous between the intervention group and the control group (p-value>0.05). Characteristics of ages 19-44 years and 45-59 years were homogeneous between the intervention group and the control group (p-value>0.05). Educational characteristics between the intervention group and control group were homogeneous (p-value>0.05) and employment characteristics between the intervention group and control group were homogeneous (p-value>0.05).

The results from Table 1 show that there are no significant differences between the two groups for any observed variables. In terms of gender, the number of male and female respondents in the intervention group and control group did not differ significantly, with a p-value exceeding 0.05. Likewise, age, education, and employment characteristics also showed homogeneity between the two groups, with p-values greater than 0.05 for each variable. Therefore, it can be concluded that the intervention group and control group have similar characteristics in terms of gender, age, education, and occupation based on the results of this univariate analysis.

This is in line with research conducted in Russia. This study explored whether gender influenced the results of the intervention in the group receiving treatment compared to the control group. The findings showed that there were no significant differences between the intervention group and the control group in terms of gender characteristics, with a p-value of more than 0.05, indicating homogeneity in both groups (García-Ceberino et al., 2019). Another study was conducted in Switzerland. This study aims to compare the age distribution and educational background between the intervention group and the control group. The results showed that there were no significant differences in age and educational characteristics between the two groups, with a p-value of more than 0.05, indicating homogeneity which is important in planning interventions (Schulze et al., 2020). This is different from research conducted in the Netherlands. This study investigated whether there were differences in intervention effectiveness between the intervention group and the control group based on job characteristics. Findings showed significant differences in job characteristics between the two groups, with a p-value of less than 0.05, highlighting the importance of considering these factors in the analysis of intervention outcomes (Robroek et al., 2020).

**Table 2.** Increasing knowledge before and after carrying out nutritional literacy through flipchart media and leaflet media

| Knowledge | | Intervention | Control | p-values [α] |
|---|---|---|---|---|
| Pretest | Min-max | 4.00-8.00 | 4.00-8.00 | 0.413 [α] |
| | X±SD | 5.96±1.45 | 5.60±1.22 | |
| Posttest | Min-max | 9.00-12.00 | 5.00-10.00 | 0.000 [b] |
| | X±SD | 10.50±0.79 | 7.14±1.32 | |
| | p- values | 0.000 [b] | 0.000 [b] | |
| Delta | Min-max | 2.00-8.00 | 4.53±1.68 | 0.000 [α] |
| | $X \pm SD$ | 0.00-4.00 | 1.60±1.31 | |

α. Uji Mann-Whitney U Test
b. Uji Paired T-Test
c. Mann-Whitney U Test

Table 2 illustrates the comparison of knowledge before and after carrying out nutritional literacy through Flipchart media and Leaflet media. The results of the analysis showed that the average knowledge score on the pre-test between the intervention and control groups was not significantly different (p-value > 0.05), indicating homogeneity. However, there was a significant difference in the post-test, where the intervention group achieved higher knowledge than the control group (p-value < 0.05). In addition, delta analysis showed a significant increase in knowledge before and after nutritional literacy, with a greater increase occurring in the intervention group. The results of the Mann-Whitney U Test showed a significant difference in increasing knowledge between the two groups. In addition, the Paired T-Test showed that there was a significant difference in knowledge before and after carrying out nutritional literacy in the two groups. Thus, this research concludes that nutritional literacy through Flipchart media and Leaflet media has a positive effect on the knowledge of Hypertension Sufferers in the Bengkulu City Fish Market Health Center working area in 2024.

These results are in line with research conducted at the Kaliwates community health center jember regency, based on the results of the Wilcoxon Signed Rank Test, it shows that there is a significant effect the intervention using flipchart media produces a p-value 0.000 (p>0.05). The increase in respondents' knowledge increased because the intervention was carried out 3 times but not consecutively (Yuanta et al., 2023). This is also in line with research conducted in Iran. This research conducted a systematic review and meta-analysis of nutritional literacy interventions on the knowledge of hypertension sufferers. The main findings support that nutritional literacy interventions are effective in increasing the knowledge of hypertension sufferers (p-value < 0.05) (Imanpour et al., 2023). Another study conducted at Medline, this study was conducted as a randomized controlled trial to measure the effectiveness of a nutrition education intervention on nutritional knowledge and eating habits in hypertension sufferers. The results showed a significant increase in nutritional knowledge and changes in healthy eating habits after the intervention (p-value < 0.05) (Jones et al., 2022). In contrast to the results of research conducted in Korea, this study used a qualitative approach to explore the impact of nutrition education on hypertension management. The main findings show that while nutrition education can increase knowledge, it does not always result in sustainable behavioral changes in hypertension management (p-value > 0.05) (Lee et al., 2020).

Table 3 shows the average pre-test compliance score for the intervention group with results of 3775.4 ± 533.36, while the average compliance score for the control group with results was 4063.7 ± 215.8. The results of the Mann-Whitney U Test obtained a p-value of 0.121 α > 0.05, meaning that the pre-test compliance of the intervention and control groups was homogeneous. The average post-test compliance score for the intervention group was 3026 ± 721.31, while the average compliance score for the control group was 3744 ± 269.98. The results of the Mann-Whitney U Test obtained a p-value of 0.000<0.05, meaning that there was a difference in the average post-test compliance score between the intervention and control groups.

**Table 3.** Changes in Salt Intake Compliance Nutritional Literacy Through Flipchart and Leaflet Media

| Salt Intake | | Intervention | Control | *p-value* |
|---|---|---|---|---|
| *Pre-test* | *Min-max* | 1408-2267 | 1824-4032 | 0.087 [α] |
| | *X ±SD* | 1887.4±266.6 | 2103.0±392.9 | |
| *Post-test* | *Min-max* | 963-1931 | 1432-2118 | 0.000 [α] |
| | *X ±SD* | 1491.0±325.9 | 1907.4±137.9 | |
| *p-value* | | 0.000[b] | 0.000[b] | |
| *Delta* | *Min-max* | 23.0-1268.0 | 18.0-2188.0 | 0.017 [α] |
| | *X ±SD* | 452.8±367.5 | 223.0±397.3 | |

a. *Mann-Whitney U Test*
b. *Uji Wilcoxon Signed Rank Test*
c. *Uji Paired T-Test*

Based on the discussion, it shows that there is compliance with sodium intake (mg) before and after carrying out nutritional literacy. In the intervention group, the average sodium intake compliance score (mg) was 452.8 ± 367.5 and in the control group, the average sodium intake compliance score (mg) was 223.0 ± 397.3. The results of the Wilcoxon Signed Rank Test obtained a p-value of 0.000<0.05, meaning that there was a difference in the average sodium intake compliance score (mg) between the intervention group and the control group. The average sodium intake compliance score (mg) was smaller in the intervention group.

The results of the Wilcoxon Signed Rank Test in the intervention group obtained a p-value of 0.001<0.05, meaning that there was a difference in average compliance before and after carrying out nutritional literacy through Flipchart media. Likewise, in the control group, a p-value of 0.000 <0.05 was obtained, meaning that there was a difference in the average compliance score before and after carrying out nutritional literacy through leaflet media. The results of this research show that nutritional literacy influences the compliance of hypertension sufferers in the Bengkulu City Fish Market Health Center work area in 2024.

This is in line with research conducted in America. This study tested the effect of a nutritional literacy program on adherence to dietary guidelines in hypertension sufferers through a randomized controlled trial. The results showed a significant increase in adherence to dietary guidelines following the intervention, in line with the increase in adherence observed in previous research (p-value < 0.05) (Taylor et al., 2019). Another study was conducted in Kansas. This study evaluated the impact of a nutritional education intervention on adherence to dietary recommendations in hypertensive patients through a prospective study. The findings showed a significant increase in compliance with dietary recommendations after the intervention, in line with the increase in compliance observed in previous studies (p-value < 0.05 (Tam et al., 2020). This is different from the results of research conducted at Soul. This study used a qualitative approach to explore the effectiveness of a nutrition education program on adherence to dietary guidelines in hypertensive patients. The main findings showed variations in the impact of nutrition education programs, with some participants reporting increased adherence while others did not, indicating results that are inconsistent with other studies showing significant increases in adherence (p-value > 0.05) (Shim et al., 2020).

In the results of research at the Bengkulu City Fish Market Community Health Center in 2024, it was found that there was a difference in average compliance before and after carrying out nutritional literacy through Flipchart media and Leaflet media. This media presents information in an interesting and easy-to-remember way, thereby motivating participants to be more compliant with dietary guidelines. In addition, this intervention provides more personalized and interactive support, increasing participants' sense of responsibility and commitment to the dietary recommendations provided. Thus, this study confirms the importance of selecting appropriate media in health education programs to achieve optimal levels of compliance among hypertension sufferers.

## 4. Conclusion and Suggestion

Based on the results of the research and discussion of the Influence of Nutritional Literacy through Flipchart Media on Knowledge and Compliance with Low Salt Diets in Hypertension Sufferers in the Bengkulu City Fish Market Health Center Work Area in 2024, it can be concluded that characteristics based on gender, most of them are female in both the intervention and intervention groups. in the control group, based on age, most were middle-aged (45-59 years), based on education, most were in higher education (SMA-PT), then based on occupation, most were unemployed. There is an influence of nutritional literacy on the level of knowledge before and after being given nutritional literacy between the intervention group and the control group. The increase in nutritional literacy knowledge was greater in the intervention group compared to the control group. There is an influence of nutritional literacy on the average compliance score before and after nutritional literacy in the intervention group and control group. The change in the average value of compliance through sodium intake in the intervention group decreased more compared to the control group. For health workers at community health centers, especially nutrition officers at the Bengkulu City Fish Market Health Center, to continue providing nutritional literacy to hypertension sufferers, future researchers are expected to be able to provide more detailed input and information regarding low-salt diets for hypertension sufferers. Suggestion: Health workers at community health centers, especially nutrition officers at Fish Market Health Center, Bengkulu City, can continue to provide nutritional literacy to hypertension sufferers. It is hoped that future researchers will be able to provide more detailed input and information regarding low-salt diets in hypertension sufferers. The results of this research can be used as a reference for other researchers to conduct further research with similar research. Hypertension sufferers are expected to reduce sodium intake by 1500 mg/day.

## 5. Acknowledgments

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