

## The Effect of Health Education on Low-Salt Diet Knowledge in Hypertensive Patients at Limboto Health Center

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### ABSTRACT

Hypertension is one of the non-communicable diseases with an increasing prevalence and is a public health problem because it is often asymptomatic but at risk of causing serious complications. One of the non-pharmacological efforts that plays an important role in controlling hypertension is the implementation of a low-salt diet. However, low patient knowledge about low-salt diets is still a major obstacle in the management of hypertension. This study aims to determine the effect of health education on the knowledge of low-salt diets in hypertensive patients at the Limboto Health Center. This study uses a quantitative design with a pre-experimental approach through one group pretest-posttest design. The study population is hypertension patients recorded in November 2025 with a sample of 44 respondents taken using purposive sampling techniques. Data collection was carried out using a low-salt diet knowledge questionnaire that has been tested for validity and reliability. Health education is provided through counseling methods using leaflet and Power Point media. Data analysis was carried out using the Paired Sample T-Test to see differences in knowledge levels before and after health education. The results of the study showed that after being given health education, most hypertensive patients had a good level of low-salt diet knowledge but still found patients with sufficient and insufficient knowledge levels. These findings show that there is a knowledge gap in some patients regarding the implementation of a low-salt diet. This study emphasizes the importance of continuous health education by health workers to improve patient understanding in hypertension control.

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### INTRODUCTION

Hypertension is a disease that is often referred to as "*The Silent Killer*" because this disease often does not show symptoms but can cause some serious complications such as stroke, coronary heart disease, kidney failure to death (Kristinawati *et al.*, 2025). Hypertension not only increases the risk of cardiovascular disease, stroke and kidney failure, but also poses an economic burden due to long-term medical costs (Yusuf *et al.*, 2025). The main problem in hypertension patients is blood pressure that continues to increase persistently without realizing it, so many sufferers do not know their health condition until complications occur. This condition is exacerbated by the low awareness of the public to conduct regular blood pressure checks and lack of knowledge about the importance of blood pressure control through lifestyle modifications (WHO, 2023).

Most hypertensive patients have difficulty controlling their blood pressure due to non-compliance in undergoing pharmacological and non-pharmacological therapy, including in terms of regulating a healthy diet. The high prevalence of hypertension is not only caused by genetic factors and age, but also influenced by unhealthy lifestyles such as consumption of high-salt foods, lack of physical activity, smoking and stress. The incidence rate of hypertension tends to increase with age due to the aging process which causes hardening of blood vessels and increased resistance of blood vessels. In addition, aging. It is often accompanied by a decrease in physical activity and weight gain which also increases the risk of hypertension, while regular physical activity plays a role in preventing an increase in blood pressure (Purwanto & Rajab, 2023). Despite

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various control efforts have been made, the incidence of hypertension continues to increase year by year and becomes a significant public health burden. One of the non-communicable diseases that is still often a health problem at the global level with an increasing prevalence every year is hypertension or high blood pressure (WHO, 2023). Data from *World Health Organization*, there are about 1.28 billion adults aged 30 – 79 worldwide suffering from hypertension and about 46% of them are still unaware of their health condition (WHO, 2021).

Hypertension is one of the diseases that are widely found in Indonesia. The increase in cases is closely related to lifestyle changes such as smoking habits, consumption of foods high in salt, lack of physical activity, alcohol consumption and psychological distress (Pakaya & Rahim, 2024). In Indonesia, the prevalence of hypertension continues to increase from year to year. Based on the results of Basic Health Research (Riskesdas), the prevalence of hypertension in the population aged  $\geq 18$  years reached 25.8% in 2013 and increased to 34.1%. (Riskesdas RI, 2018). The latest data on hypertension prevalence in Indonesia shows a significant increase in recent years, reaching 36.8% in 2023. The prevalence of hypertension in the population aged  $\geq 18$  years based on the results of the highest measurement was recorded in West Java (34.4%), East Java (34.3%) and Gorontalo in 10th place with 26.6% (Ministry of Health, 2023).

The high prevalence of hypertension that continues to increase shows that the problem of hypertension has not been optimally controlled. This can be caused by several factors, including low public awareness to conduct routine health checkups, lack of patient compliance in taking antihypertensive drugs regularly, and low implementation of healthy lifestyle modifications, especially in terms of dietary regulation (Andri *et al.*, 2019). The application of healthy living behaviors is important for every individual because it provides sustainable health benefits both in supporting the ability to work and daily activities (Suardi *et al.*, 2024). Research conducted by Simbolon *et al.* (2021) shows that non-compliance in undergoing pharmacological and non-pharmacological therapy is one of the main causes of uncontrolled blood pressure in hypertensive patients. In addition, the patient's lack of understanding of the importance of controlling hypertension through changes in health behavior also worsens this condition so that the risk of complications is higher (Simbolon *et al.*, 2021).

Based on data from hypertension screening results from the Provincial Health Office in 2024, there are 92,229 people with hypertension. The areas with the most hypertension patients are Gorontalo Regency with 42,607 people, Bone Bolango Regency with 18,976 people, Boalemo Regency with 10,899 people, Gorontalo City with 9,125 people, North Gorontalo Regency with 8,260 people and Pohuwato Regency with 2,362 people.

Data obtained from the Gorontalo Regency Health Office states that the number of hypertension patients spread across various health centers who will be diagnosed in 2024 is 86,623 people and 50,221 people who receive services. Of the 23 health centers in Gorontalo Regency, there are the top 5 areas with the most hypertension diagnosed, including the Limboto Health Center with a recorded number of patients of 10,670 people and 7,885 people who received services, Tilango Health Center 6,223 people and those who received services 4,626, Pulubala Health Center 6,194 people and those who received services 3,851, Tolangohula Health Center 5,424 people and those who received services 1,963 people, and West Limboto Health Center 5,414 people and 2,938 who received services. The high rate of hypertension cases in Gorontalo Regency, especially in the Limboto Health Center, indicates that hypertension management must be carried out comprehensively by combining pharmacological and non-pharmacological methods.

Hypertension can be managed effectively and requires a comprehensive approach that includes pharmacological and non-pharmacological therapies (Whelton *et al.*, 2018). Pharmacological therapy using antihypertensive drugs such as diuretics, *ACE inhibitor*, *ARB*, *beta blocker*, and *Calcium Channel blockers* that function to lower blood pressure. However, the use of drugs alone is not enough to control hypertension optimally if it is not accompanied by lifestyle modifications. Non-pharmacological therapy is a treatment approach that complements pharmacological therapy by using non-drug methods that aim to reduce hypertension risk factors and increase the effectiveness of drug therapy (Azizah & Hartanti, 2021). One of the non-pharmacological therapies that can be given to people with hypertension is nutritional therapy that is carried out with hypertension diet management, for example by limiting the intake of sodium or salt consumption (Nurpratiwi *et al.*, 2022).

A low-salt diet is one of the most important non-pharmacological strategies in the management of hypertension because excessive sodium consumption can increase blood volume and pressure on the blood vessel walls thereby worsening the condition of hypertension (Cricket *et al.*, 2019). *Dietary Approaches to Stop Hypertension (DASH)* Recommended by *American Heart Association (AHA)* emphasizes the importance of a low-salt diet with a sodium intake of no more than 2,300 mg per day for a population not affected by hypertensive diseases and 1,500 mg per day for individuals affected by hypertensive diseases (Lichtenstein *et al.*, 2021). Meta-study – analysis by Huang *et al.* (2020) in 133 studies with 12,197 participants showed that reducing sodium intake could significantly lower blood pressure and reduce the risk of cardiovascular disease (Huang *et al.*, 2020). Another study by Muhadi (2019) also proved that limiting salt consumption to less than 5 grams per day can reduce systolic blood pressure by 5-6 mmHg and diastolic blood pressure by 2-3 mmHg in

hypertensive patients. Thus, a low-salt diet not only helps control blood pressure but also reduces the risk of long-term cardiovascular complications (Muhadi, 2019).

Although the benefits of a low-salt diet have been scientifically proven, its implementation in daily life is still a major challenge for many people with hypertension. This is due to a variety of factors, including limited knowledge about low-salt diets, difficulties in changing long-established eating habits, limited access to low-salt foods, and lack of support from family and social environment (Kamso *et al.*, 2019). Research conducted by Safitri & Fitriyani (2021) shows that most hypertensive patients have less knowledge about low-salt diets and are unaware of food sources that are high in sodium. In addition, many patients think that a low-salt diet makes food tasteless and unpalatable, making it difficult to run in the long term. In fact, a good understanding of a low-salt diet is very important because it will affect the attitude and behavior of patients in implementing a healthy diet. Without adequate knowledge, patients tend to be non-compliant in undergoing a low-salt diet so that blood pressure is difficult to control and the risk of complications increases (Safitri & Fitriyani, 2021).

Limited knowledge about disease conditions and the benefits of a low-salt diet is one of the main obstacles (Sigh) *et al.*, 2025). Knowledge is an important domain in shaping a person's health behavior (Darsini *et al.*, 2019). Theory *Health Belief Model* explain that a person's knowledge of a disease and how it is treated will affect his perception and belief in the benefits of preventive measures or treatment (Fitriah *et al.*, 2023). Health education is one of the nursing interventions that can increase knowledge and change patient behavior. According to (Notoatmodjo, 2020), health education is a planned effort to influence others, whether individuals, groups or communities so that they do what is expected of health education actors. Various studies have proven the effectiveness of education in increasing the knowledge of hypertension patients, especially related to low-salt diets.

Halawa Research *et al.*, (2024) on "Influence *Health Education* On Knowledge and Attitudes About Low Salt Diets in Hypertensive Patients" in Kiarapayung Village with 30 respondents using *Quasi-experimental design* show significant influence *Health Education* on knowledge ( $p=0.000$ ) and attitudes ( $p=0.000$ ) about low-salt diets. There was an increase in the mean knowledge score from 11.67 to 15.83 and attitude from 45.50 to 52.17 after the intervention. This suggests that structured health education can improve patients' understanding of the importance of a low-salt diet (Laughter) *et al.*, 2024).

Similar findings were also put forward by Fitriah *et al.*, (2023) in a study on "Education Using Leaflets Based on Theory *Health Belief Model* (HBM) in Hypertensive Patients" with 32 respondents who showed that education using leaflets had a significant effect on increasing the knowledge of hypertension patients ( $p=0.000$ ). This research uses a design *Pre-Experimental with One Group Pretest-Posttest Design*, where there is an increase in knowledge from the category of sufficient to good after educational intervention. This study proves that the use of appropriate educational media can maximize the absorption of information by patients (Fitriah *et al.*, 2023).

Research by Oktaviana & Rispawati (2023) in a study on "The Influence of Education on Hypertension Patient Knowledge" at Puskesmas with 30 respondents using a design *Quasi-Experimental Pre-Post Test* showed a significant influence of education on the knowledge of hypertension patients with a value of  $p=0.001$ . The results showed an increase in the average knowledge score from 7.53 to 9.40 after being educated. This study confirms that educational interventions can effectively improve patient knowledge in a relatively short time (Oktaviana & Rispawati, 2023).

Based on a preliminary study conducted by researchers in the working area of the Limboto Health Center, researchers obtained data on the number of hypertension patients aged >15 years in July 2025 amounting to 497 people. Based on initial observations on August 25, 2025, researchers conducted preliminary interviews with five hypertensive patients. From the results of interviews with five hypertensive patients, four out of five patients did not know clearly what a low-salt diet meant or the medical reasons behind the recommendation. Some of them only understand that reducing salt makes food taste tasteless but don't know that excess sodium intake can increase blood pressure. Some patients also do not know how much salt consumption is recommended every day and still think that savory instant and processed foods are safe to consume even though they contain high salt content. Only one patient can explain that a low-salt diet is beneficial for controlling hypertension and preventing complications.

Although various studies have shown the positive influence of education on improving the knowledge of hypertension patients, studies that specifically test the influence of low-salt diet education on the knowledge of hypertension patients in the Limboto Health Center area are still limited. This research is important to identify the effectiveness of educational interventions in improving patient knowledge which can later be the basis for health workers in designing more targeted health education and promotion programs.

## RESEARCH METHODS

This research has been carried out at the Limboto Health Center on November 22 - December 13, 2025. Types of quantitative research using research design *Pre-Experimental* by using *One Group Pre-Test – Post Test*. The sampling technique in this study uses *purposive sampling* with a sample of 44 respondents. This

research instrument uses a demographic data questionnaire, a low-salt diet knowledge questionnaire. *leaflet*, and electronic media (*Power Point*).

## RESEARCH RESULTS

Table 1. Characteristics of Hypertension Patients at Limboto Health Center

Respondent Characteristics	Frequency (n)	Present (%)
<b>Age</b>		
19-44 years old (Adult)	1	2
45-59 years old (Pre-Elderly)	15	34
> 60 years old (Senior)	28	64
<b>Gender</b>		
Men – men	11	25
Women	33	75
<b>Long Suffering from Hypertension</b>		
< 1 year	14	32
1-3 years	15	34
4-6 years	8	18
> 6 years old	7	16
<b>Education</b>		
Not in school	0	0
SD	11	25
Junior High School	9	21
High School	20	45
College	4	9
<b>Jobs</b>		
Work	6	14
Not Working	38	86
<b>Blood Pressure</b>		
Severe hypertension (>180/110)	0	0
Moderate hypertension (160-179/100-110)	10	23
Mild hypertension (140-159/90-99)	34	77

Based on table 1, the characteristics of 44 respondents show that the majority of respondents are > 60 years old (elderly) as many as 28 respondents (64%) and female as many as 33 respondents (75%). Based on the length of time they suffered from hypertension, most of the respondents were in the 1-3 year category, as many as 15 respondents (34%). Judging from education, the majority of respondents had a high school education as many as 20 respondents (45%) with most respondents not working as many as 38 respondents (86%). Based on blood pressure, the majority of respondents were in the category of mild hypertension (140-159/90-99 mmHg) as many as 34 respondents (77%).

Table 2. Distribution of Respondents Knowledge of Low Salt Diet Before Being Given Health Education

Knowledge	Frequency (n)	Present (%)
Good	4	9
Enough	24	55
Less	16	36

Based on table 2, the frequency of knowledge of low-salt diets in hypertensive patients before being given health education shows that most of the respondents before being given health education about the low-salt diet in hypertensive patients were knowledgeable as much as 24 respondents (55%) and respondents who were knowledgeable were 16 respondents (36%).

Table 3. Distribution of Low-Salt Diet Knowledge Respondents After Being Given Health Education

Knowledge	Frequency (n)	Present (%)
Good	31	71
Enough	13	29
Less	0	0

Based on table 3, the frequency of knowledge of low-salt diets in hypertensive patients after being given health education about low-salt diets in well-informed hypertensive patients was 31 respondents (71%) and 13 respondents (29%) were moderately knowledgeable respondents.

Table 4. The Effect of Health Education on Low-Salt Diet Knowledge in Hypertensive Patients

Low-Salt Diet Knowledge	Red	Std. Deviation	P Value
Pre-Test	7,45	1,910	0,000
Post-Test	10,55	1,438	

Based on table 4, it is shown that the respondents' knowledge before being given health education is 7.45 with a standard deviation of 1.910 and after being given health education the average knowledge of a low-salt diet in hypertensive patients is 10.55. In this case, there is an average difference before health education is given and after health education is given. As for the SPSS *output* using the test, it is known that *the Paired Sample T-Test Asymp.sig* (2-tailed) is valued at  $0.000 < 0.05$ , so it can be concluded that the hypothesis is accepted, which means that there is an effect of health education on the knowledge of a low-salt diet in hypertensive patients at the Limboto Health Center.

## DISCUSSION

### Knowledge of Low-Salt Diets in Hypertensive Patients Before Being Given Health Education

The results showed that there were several respondents with good knowledge as many as 4 respondents (9%). Respondents with good knowledge were on average able to correctly answer question items related to the definition of a low-salt diet, the purpose of a low-salt diet, the impact of excessive salt consumption, low-salt diet abstinences, low-salt diet principles, and foods that can be consumed by hypertensive people while on a low-salt diet. However, there are still question items that have not been fully answered correctly, especially those related to daily salt consumption limits and foods/drinks that should not be consumed by people with hypertension. This shows that the respondents' knowledge is stronger in the conceptual aspect than in the technical aspect of the application.

This condition can be attributed to the characteristics of the respondents, especially those who have suffered from hypertension for a long time. Respondents in this group generally had hypertension for a period of 1 year to > 6 years. Long suffering from chronic illness allows respondents to obtain repeated exposure to health information through health service visits, consultations with health professionals and personal experiences in managing their illnesses. Continuous exposure to this information contributes to the formation of better knowledge about low-salt diets.

Respondents with the good knowledge category showed an adequate level of understanding of the basic concepts of a low-salt diet. This condition illustrates that the patient has a fairly strong conceptual understanding of the relationship between salt consumption and increased blood pressure. Research conducted by São Paulo *et al.*, (2022) About the overview of low-salt diet knowledge in hypertensive patients shows that respondents with good knowledge generally understand the meaning of a low-salt diet, the purpose of limiting salt consumption and the impact of excessive sodium consumption on blood pressure. The study also explained that a good understanding arises because patients have become accustomed to receiving health information from medical personnel during hypertension treatment.

One of the other factors that respondents are knowledgeable before being given an intervention is the education factor. Education level also plays a role in shaping knowledge of low-salt diets in hypertensive patients. Respondents with high school to college education levels tended to have better ability to understand health information, including the concept of a low-salt diet as a nonpharmacological therapy for hypertension. This research is in line with research conducted by Listari *et al.*, (2025), a person who is highly educated can understand the information better of the explanation given. Higher education can make it easier for a person to receive information. This information can be obtained both through formal and non-formal education which can have a short-term influence on changes in knowledge improvement.

According to Notoatmodjo (2020), education is a coaching process that is given to help individual development in achieving certain life goals. Education is an important suggestion in obtaining information including knowledge about health that can ultimately improve the quality of life. This is reinforced by research Safitri & Fitriyani (2021) which shows that the higher a person's level of education, the easier it is for him to accept and understand new information including health-related information such as a low-salt diet.

The age factor also affects the level of knowledge of the respondents. Well-informed respondents were found in the 19-44 age group (Adult) and the > 60 age group (Elderly). In this age group, individuals have generally experienced various changes in health conditions, including an increased risk of degenerative diseases such as hypertension, so they have a higher awareness of the importance of disease management. Late adulthood and early adulthood are also associated with longer life experiences and pain experiences, which

allows respondents to interact more frequently with health care workers and receive health information on a regular basis. Research by Symbolon *et al.*, (2021), the older a person gets, the more mature the level of thinking and life experience will also increase so that it can help in receiving health information if given in the right way.

Then the results of other studies were obtained as many as 24 respondents (55%) who were knowledgeable. If observed from the results of the questionnaire answers which contained 12 questions about the low-salt diet, it showed that out of 24 respondents who were knowledgeable, most of the respondents were able to answer 7-9 questions correctly but most of the respondents answered incorrectly on the question items regarding the impact of excessive salt consumption, foods/drinks that should not be consumed, foods processed using salt and daily salt consumption limits. Errors in answers to these items indicate that respondents have not understood the applicative aspects of a low-salt diet optimally.

Respondents in this category generally had a duration of hypertension between 1-3 years. In this phase, respondents have begun to get to know hypertension and obtain basic information related to its management, but the understanding they have is still general and not in-depth. The information obtained tends to be limited to recommendations to reduce salt consumption without a comprehensive understanding of sodium intake limits, hidden sources of salt and the physiological impact of excessive salt consumption on blood pressure.

According to Notoatmodjo (2020), knowledge is the result of knowing and occurs after a person senses a certain object through the five human senses. Knowledge or cognition is a very important domain for the formation of a person's actions. This is in accordance with research conducted by Squirrel *et al.*, (2025), stating that limited knowledge of the condition of the disease and the benefits of a low-salt diet is one of the main obstacles in the management of hypertension in patients.

One of the other factors that affect respondents who are knowledgeable is gender. In the results of the study, most of the respondents were female with a total of 33 respondents (75%). According to research Iswandari *et al.*, (2023) that women who experience hormonal changes (*menopause*), estrogen levels decrease so that there is an increase in renin release which will trigger an increase in blood pressure. So health education must be provided so that blood pressure can be controlled properly through dietary arrangements, including a low-salt diet. Education and health promotion are one of the ways women can get adequate information.

Then the results of other studies were obtained as many as 16 respondents (36%) who were less knowledgeable. It was shown through the questionnaire answers that of the 12 items of the low-salt diet question, it was found that the average respondent was not able to answer the question correctly on almost all question items, both related to the definition of a low-salt diet, the purpose of its application, the relationship between salt consumption and hypertension and the limit of daily salt consumption. Respondents were also unable to identify the types of foods high in salt that should be restricted. This shows that the respondents' understanding is still very lacking.

In line with research conducted by Safitri & Fitriyani (2021), most hypertensive patients have little knowledge about low-salt diets and are unaware of food sources high in sodium. Many patients think that a low-salt diet makes food tasteless and unpalatable, making it difficult to run in the long run. In fact, a good understanding of a low-salt diet is very important because it will affect the attitude and behavior of patients in implementing a healthy diet.

Another factor that affects the respondents' lack of knowledge is the long time suffering from hypertension. Based on the results of the study, the average respondent who is less knowledgeable in the long category suffers from < 1 year. Research by São Paulo *et al.*, (2020) Which says that the longer a person suffers from hypertension, the more likely it is that unhealthy lifestyle changes, non-adherence to therapy and the greater the risk of complications due to chronically elevated blood pressure that can cause changes in blood vessels. This is due to the lack of public knowledge related to low-salt diets so that by providing health education, it is able to increase respondents' knowledge insights into the importance of a low-salt diet.

In addition, the lack of knowledge or information obtained by respondents is one of the reasons that makes the lack of knowledge possessed by respondents. This is evidenced by the results of initial interviews in the preliminary study where four out of five patients did not know clearly what a low-salt diet meant or the medical reasons behind the recommendation. Some of them only understand that reducing salt makes food tasteless but don't know that excess sodium intake can increase blood pressure. In the management of hypertension, patient knowledge of a low-salt diet is an important part of patient adherence. Patients who already have information about the importance of a low-salt diet are expected to be more obedient in implementing it.

Based on this description, it is known that before the health education intervention was carried out, most of the respondents had sufficient to lack knowledge about the low-salt diet, so it was necessary to *recall* and provide comprehensive information related to the low-salt diet which was carried out by means of lectures using power point media and leaflets.

### Knowledge of a low-salt diet in hypertensive patients after being given health education

The intervention carried out by the researcher is to provide health education related to the knowledge of a low-salt diet in hypertensive patients. The health education provided is using lecture delivery techniques with power point media and leaflets containing material on the definition of a low-salt diet, low-salt diet goals, foods that should not be consumed, recommended foods, drinks that must be avoided and daily salt consumption limits according to the severity of hypertension and measurements of patient knowledge before and after being given health education.

Of the 44 respondents, 31 respondents (71%) were knowledgeable after being given health education. This can be seen from the results of the questionnaire answers from 12 items of low-salt diet questions, respondents were able to correctly answer questions related to the definition of a low-salt diet, low-salt diet goals, the impact of excessive salt consumption, the principles of a low-salt diet, foods that should not be consumed, recommended foods, drinks that must be avoided and daily salt consumption limits according to the severity of hypertension. So it can be concluded that a person's knowledge before being given health education and those who are given health education at the time after being given health education have different knowledge. Respondents who had been provided with health education on low-salt diets had higher knowledge than before getting the intervention.

Judging from age, respondents with good knowledge were dominated by the pre-elderly age group (45-59 years) and the elderly age group (>60 years). This shows that old age is not an obstacle in receiving health information if education is delivered in accordance with the conditions and needs of respondents. Research by Sridhar *et al.*, (2024) explained that the elderly with hypertension tend to have high motivation to understand low-salt diet information because it is directly related to the health conditions they experience. The findings are in line with this study, where respondents in the pre-elderly and elderly age groups were able to achieve a good level of knowledge after health education was provided.

Based on education level, the majority of respondents with good knowledge were educated in high school and college. Higher education makes it easier for respondents to understand health information, especially low-salt diet materials that require an understanding of concepts and applications in daily life. Research Rasnawati *et al.*, (2023) It shows that education level is related to an individual's ability to receive and process health information, so respondents with higher education tend to have better knowledge. This is in accordance with the results of the study where respondents with secondary to higher education are more in the category of good knowledge.

The respondent's employment status also affects the receipt of health information. Based on employment status data, the majority of well-informed respondents are not working. Respondents who are not working have more free time to participate in health education activities and implement low-salt diet recommendations at home. They do not have time constraints like respondents who are still working so they can focus more on managing their diet. Research Symbolon *et al.*, (2021) It also shows that respondents who have more free time tend to be more likely to adopt the recommended healthy lifestyle including adherence to a low-salt diet.

Judging from blood pressure levels, respondents with good knowledge were mostly in the category of mild hypertension (140-159/90-99). This condition shows that respondents with mild hypertension tend to be more open to education and lifestyle changes as an effort to prevent disease worsening. Research by Shirley *et al.*, (2023) explained that hypertensive patients with low blood pressure are motivated to understand and implement a low-salt diet as part of blood pressure control. The findings support the results of this study where respondents with mild hypertension showed a better level of knowledge after health education.

As for respondents who have a sufficient level of knowledge, as many as 13 respondents (29%) after being given health education. Even though they have been given education, some respondents are still in the category of sufficient knowledge because they do not fully understand the details of the information conveyed. From the results of the questionnaire, respondents in this category still had difficulty answering questions related to salt consumption limits according to the severity of hypertension and the type of processed foods high in sodium. According to Darsini *et al.*, (2019), the more information a person gets, the more extensive one's knowledge is, so respondents with enough knowledge may need repetition of information or further education so that their understanding can improve.

Based on gender, respondents with knowledge are quite dominated by women. Although women generally have an important role in the management of family food, the level of knowledge they possess has not entirely reached the good category. Research Amaliah *et al.*, (2024) mentioned that the level of knowledge of the low-salt diet is not only influenced by gender but also by previous experiences, habits and understandings related to hypertension management. This is in line with this study where some female respondents are still in the category of sufficient knowledge because their understanding is not fully applicable.

Judging from the length of time suffering from hypertension, the results of the study showed that respondents with the knowledge category were quite more in the group who had suffered from hypertension for a long time of 1-3 years. This condition suggests that the length of time a person has hypertension does not automatically increase the patient's knowledge of disease management, especially a low-salt diet. This is in line with research Sintia *et al.*, (2024) which states that long suffering from hypertension is related to dietary

adherence, but increased knowledge does not always occur without ongoing health education. In the study, it was explained that patients who have suffered from hypertension for a long time tend to have experience in undergoing treatment but still need to strengthen information to be able to understand and apply the principles of a low-salt diet optimally. This finding is in accordance with the results of this study where some respondents are still in the category of sufficient knowledge even though they have suffered from hypertension for a certain period of time.

Based on the description, it is known that respondents who have a good level of knowledge have a very high percentage compared to the category of sufficient knowledge. This is due to the intervention carried out on hypertensive patients.

### **The Effect of Health Education on Low-Salt Diet Knowledge in Hypertensive Patients**

Based on the results of data analysis using *the Paired Sample T-Test*, it is known that the mean value of respondents' knowledge before being given health education (*pre-test*) is 7.45 with a standard deviation of 1.910. This value shows that the level of knowledge of the respondents before the intervention is still relatively low and the variation in knowledge scores between respondents is quite large. After being given health education, there was an increase in the mean value of knowledge (*post-test*) to 10.55 with a standard deviation of 1.438. The decrease in the standard deviation value in the *post-test* showed that the respondents' knowledge became more evenly distributed after the educational intervention was given. Overall, there was an increase in the average knowledge score of 3.10 points from before to after health education. The results of the statistical test showed a *p value (Asymp.sig 2-tailed)* of 0.000 which was smaller than the value of  $\alpha$  (0.05) so it can be concluded that there is a significant influence of health education on the knowledge of a low-salt diet in hypertensive patients at the Limboto Health Center.

This significant increase in knowledge suggests that health education is an effective intervention in increasing hypertension patients' understanding of the importance of a low-salt diet. The education provided in a structured manner with comprehensive material including definitions, objectives, impacts of excessive salt consumption, the principles of a low-salt diet, types of foods that must be avoided and recommended, and limits on daily salt consumption succeeded in meaningfully increasing respondents' knowledge.

The results of this study are in line with the research conducted by Rajab & Purwanto, (2023) Regarding the development of a program to reduce salt intake in the elderly with hypertension. In his research, interventions in the form of education and training have been proven to be able to increase the knowledge and awareness of the elderly in reducing salt consumption. Providing education through media such as *booklet*, Guided practices and family approaches show a change in behavior of a lower salt diet for the better. This is in line with the results of this study which shows an increase in respondents' knowledge after being given health education which further has the potential to affect patient compliance in implementing a low-salt diet as part of hypertension control.

The results of this study are also in line with the research conducted by Squirt *et al.*, (2024) that show significant influence *Health Education* to the knowledge of a low-salt diet with a value of  $p=0.000$ . The study confirms that structured health education can improve patients' understanding of the importance of a low-salt diet in controlling blood pressure.

Health education is a process of delivering health information that is carried out systematically to form a correct understanding of a health issue. This process includes providing accurate knowledge, clarifying health concepts, and helping individuals or groups understand how to maintain and improve their health conditions through trustworthy information.

This health education has succeeded in increasing the knowledge of respondents at the Limboto Health Center. During this intervention, not all respondents immediately understood about the low-salt diet, but the increase in knowledge occurred because they understood the explanations related to the low-salt diet after receiving health education.

In this study, health education was provided using the method of lectures with the media *Power Point* and *leaflet*. The lecture method allows for two-way interaction between researchers and respondents so that respondents can immediately ask questions if there are things that have not been understood. Media *Power Point* helps convey information in a visually appealing manner while *leaflet* can be taken home by respondents as a reminder and re-reading material at home. This combination of methods and media has proven to be effective in increasing respondents' knowledge. According to Aji *et al.*, (2023) The right health education method greatly determines the success of delivering health messages. The lecture method is effective for small groups because it allows for hands-on interaction and Q&A. Use of visual media such as *Power Point* and *leaflet* It also helps to make it easier to understand because information is not only heard but also seen.

In this study, there were 2 (4%) people who did not experience an increase in the knowledge category after being given an intervention. This is shown by the category of respondents who are still in the category of sufficient knowledge, while 11 (25%) people who were in the category of insufficient before being given an intervention were then in the category of sufficient at the time of being given. But the category is still in the sufficient category, which means that respondents do not have full knowledge related to low-salt diets in

hypertensive patients. So that for further research, it can increase respondents' knowledge related to the low-salt diet in hypertensive patients through several methods, for example, researchers can develop educational methods through a small group approach with interactive discussions and are considered using more varied educational media such as illustrated booklets with examples of low-salt diet daily menus that can make respondents interested in the education provided so that they are not Respondents' knowledge related to low-salt diets in hypertensive patients can increase.

According to Stuttgart *et al.*, (2023) That providing health education about a low-salt diet is very important in efforts to control hypertension because through structured education, patients can understand the importance of limiting salt consumption, know the types of foods to avoid, and be able to apply the principles of a low-salt diet in daily life so that blood pressure can be properly controlled and the risk of complications can be minimized. This is in line with research Squirt *et al.*, (2024), Giving *Health Education* is one of the factors that influence knowledge about low-salt diets. The more optimal the provision of health education, the higher the knowledge that hypertension patients have about the importance of a low-salt diet in controlling their blood pressure.

## CONCLUSION

Based on the results of research conducted on hypertension patients at the Limboto Health Center, it can be concluded that:

1. Before being given health education, based on the results of the initial measurement of hypertension patients' knowledge about the low-salt diet, it was found that most patients were in the category of sufficient knowledge with the number of respondents as many as 24 people (55%).
2. After being given health education, based on the results of the final measurement of hypertension patients' knowledge about a low-salt diet, it was found that most of the patients were in the category of good knowledge with a total of 31 respondents (71%).
3. There is a significant influence between health education on the knowledge of low-salt diets in hypertensive patients. This is evidenced by an increase in the level of knowledge of patients after being given education which is characterized by an increase in knowledge scores and a shift in the category of knowledge from sufficient to good in the majority of respondents.

## ADVICE

The researcher hopes that patients can take advantage of the information obtained from health education by implementing a low-salt diet independently and adjusting it to the blood pressure conditions experienced.

The researcher hopes that the health center can periodically monitor and evaluate the implementation of a low-salt diet in hypertensive patients. This monitoring can be done through prolanis activities or advanced counseling to assess the extent to which the patient is implementing a low-salt diet in daily life.

For further researchers, it is recommended to use a *quasi-experimental* design with a control group for stronger results. In addition, it is necessary to conduct *long-term follow-up* to assess whether this increase in knowledge has an impact on behavioral changes in implementing a low-salt diet and ultimately better controlling blood pressure.

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