

ORIGINAL RESEARCH

## Education on the DASH Diet as a Comprehensive Nutritional Approach to Hypertension Management in the Coastal Region of Atowatu

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Article Info	Abstract
<p><b>Keywords:</b> Diet DASH; Knowledge; Hypertension</p> <p><b>Corresponding Author:</b> Ari Nofitasari Nursing Study Program, Faculty of Health Science, Mandala Waluya University, Indonesia</p> <p><b>Email:</b> <a href="mailto:nofitasariari@gmail.com">nofitasariari@gmail.com</a></p>	<p><b>Background:</b> Hypertension is one of the leading causes of morbidity and mortality in Indonesia. Public knowledge regarding hypertension management in coastal areas remains limited, as coastal communities generally consume high-salt diets due to the frequent intake of salted fish and processed seafood products.</p> <p><b>Objectives:</b> This study aimed to examine the effect of DASH (Dietary Approaches to Stop Hypertension) diet education as an integrated nutritional approach to hypertension control in coastal areas.</p> <p><b>Methods:</b> This study employed a quantitative approach with a quasi-experimental design using a pretest–posttest without a control group. The research was conducted in the coastal area of Atowatu Village, Soropia District. The study population consisted of individuals with mild to moderate hypertension residing in the coastal area of Atowatu Village, Soropia District. A total of 70 participants were selected through purposive sampling based on inclusion and exclusion criteria.</p> <p><b>Results:</b> Prior to the intervention, 48 respondents (68.6%) had poor knowledge, while 22 respondents (31.4%) had moderate knowledge. After the educational intervention, 1 respondent (1.4%) had poor knowledge, 62 respondents (88.6%) had moderate knowledge, and 7 respondents (10%) demonstrated good knowledge. Regarding hypertension categories, before DASH diet education, 38 respondents (54.3%) were classified as having severe hypertension. Following the intervention, the majority of respondents were classified as having mild hypertension (48 respondents; 68.8%).</p> <p><b>Conclusion:</b> There was a statistically significant difference in knowledge levels before and after the DASH diet education (<math>p = 0.000</math>), indicating that DASH diet education as an integrated nutritional approach significantly influenced hypertension control in the coastal area of Atowatu.</p>

### Background

Hypertension is one of the leading non-communicable diseases contributing significantly to morbidity and mortality in Indonesia. It is defined as a medical condition characterized by persistently elevated blood pressure levels, specifically  $\geq 140/90$  mmHg, according to the World Health Organization (WHO, 2023). The etiology of hypertension is multifactorial, involving genetic predisposition, unhealthy lifestyle behaviors, excessive dietary salt intake, physical inactivity, psychological stress, and poor nutritional habits. Hypertension is recognized as a major risk factor for cardiovascular diseases, including heart disease, stroke, and renal failure. Unhealthy lifestyle practices excessive salt intake, along with low consumption of fruits and vegetables, also constitutes a major risk factor contributing to the increasing prevalence of hypertension.

According to WHO data (2022), approximately 40% of countries with developing economies experience hypertension, while the figure for developed countries stands at 35%. The highest prevalence of hypertension is observed in Africa, reaching 46%, followed by the Americas at 35%. In Asia, the prevalence is estimated to range between 8% and 18%. In Indonesia, the prevalence of hypertension has shown a significant upward trend. The Household Health Survey (SKRT) reported a prevalence rate of 21% in 2020, which increased to 26.4% in 2021 and reached 27.5% in 2022. Projections suggest that this number could surge to 42% by 2025 (Indonesia Ministry of Health, 2022). In Southeast Sulawesi Province, there were 13,579 recorded cases of hypertension, with a physician-diagnosed prevalence rate of 6.25%. South Konawe Regency ranked second in terms of the highest number of hypertension cases in Southeast Sulawesi, with 1,592 cases, following Kendari City, which reported 2,095 cases (Basic Health Research, 2018)

The risk factors for hypertension consist of non-modifiable factors—such as age, sex, family history, and genetics—as well as modifiable factors, including smoking habits, excessive salt intake, consumption of saturated fats, use of reused cooking oil, alcohol consumption, obesity, physical inactivity, stress, and estrogen use (Hidayati et al., 2022). Coastal communities typically exhibit dietary patterns dominated by salty seafood, processed foods, and low fiber intake. These conditions make coastal populations more vulnerable to cardiovascular diseases, including hypertension. High salt intake among these populations is often linked to the frequent consumption of salted fish and processed marine products. Additionally, the consumption of fruits and vegetables tends to be low, due to limited access or cultural dietary habits. As a result, coastal communities are at higher risk of developing hypertension and other cardiovascular conditions (Indonesian Ministry of Health, 2018); (Livana et al., 2019). Public knowledge regarding hypertension management in coastal areas remains limited. Therefore, improving the level of knowledge among patients with hypertension is crucial for effective management and control of the disease.

Education is one of the key strategies to improve an individual's knowledge (Ulya et al., 2017). Prevention and treatment of hypertension can be achieved through lifestyle modifications, including limiting the intake of fatty foods, reducing salt consumption, and maintaining a healthy and balanced diet. The primary goal of a hypertension-specific diet is to ensure the consumption of a wide variety of foods, with types and combinations that meet balanced nutritional standards, tailored to individual patient needs, while minimizing sodium intake according to the degree of hypertension (Suprayitna et al., 2023); (Nirnasari et al., 2022). Through DASH diet education (Dietary Approaches to Stop Hypertension), information about hypertension can be effectively delivered to patients and their families, enabling them to increase their understanding and take more appropriate measures in caring for hypertensive family members. The DASH diet can serve as a medium for health education focused on hypertension management for both patients and their caregivers (Delta et al., 2024). The DASH diet emphasizes the consumption of vegetables and fruits rich in dietary fiber (30 grams/day), as well as key minerals such as potassium, magnesium, and calcium, while restricting sodium intake (Rizky et al., 2017). According to Dewi et al., (2017) the DASH diet is a dietary approach specifically designed to reduce high blood pressure. According Wicaksono et al., (2019) the principles of the DASH diet include a high intake of fruits and vegetables, the use of low-fat dairy products, moderate consumption of fish, nuts, and poultry, and limited intake of foods containing saturated fatty acids (SAFAs).

The DASH diet can help lower and control blood pressure. Applying the diet focuses on nutritious foods such as fruits and vegetables that are high in fiber and low in salt. The principle of the DASH diet is that the food consumed comes from fruits and vegetables, uses low-fat

dairy products, and consumes fish, nuts and poultry that contain sufficient saturated fat (Utami et al., 2020). The consistent application of the DASH diet has shown positive and significant effects for individuals with hypertension. The DASH diet can effectively help control blood pressure in hypertensive patients (Dewi et al., 2017). In addition to blood pressure control, the benefits of adopting the DASH diet include weight loss in obese patients, reduction in waist circumference, and decreased levels of cholesterol and LDL in the body (Prado et al., 2020); (Mukti, 2019). A study conducted by Hamdana, (2019) revealed a significant association between the provision of health education and the improvement of public knowledge regarding hypertension in Bukit Harapan Village, Bulukumba Regency. Similarly, Rizky et al., (2017) reported significant differences in blood pressure levels, knowledge, and carbohydrate intake before and after the implementation of DASH diet counseling among hypertensive patients at Sentolo Public Health Center.

Based on the aforementioned explanation, the researcher is interested in conducting a study to examine whether the DASH diet education (Dietary Approaches to Stop Hypertension), as an integrated nutritional approach, has an effect on hypertension control in the coastal area of Atowatu.

## **Methods**

This study is quantitative research with a quasi-experimental design, employing a pretest-posttest approach without a control group. The research was conducted in the coastal area of Atowatu Village, Soropia District, from May to June 2025. The population consisted of mild to moderate hypertensive patients residing in the coastal area of Atowatu Village, Soropia District. A purposive sampling technique was used to select 70 participants who met the inclusion and exclusion criteria.

The inclusion criteria were: (a) diagnosed with hypertension; (b) able to participate in the study; and (c) willing to be respondents. The exclusion criteria were: (a) currently experiencing hypertension complications; and (b) unwilling to participate as respondents. Data analysis was performed using the paired sample t-test to determine differences in knowledge and blood pressure before and after DASH diet counseling.

Data collected included participant characteristics (gender, age, history of hypertension, occupation, education), knowledge, systolic and diastolic blood pressure, measured before and after the education intervention. The DASH diet education intervention was conducted once, consisting of educational material on the DASH diet. The study began with a pretest on knowledge of the DASH diet, followed by the education intervention. At the subsequent visit, a posttest on DASH diet knowledge was administered. Data analysis was performed using the paired t-test or Wilcoxon test if the data were not normally distributed, to assess the effect of DASH diet education on hypertension control, with a significance level of 5%.

## **Results**

Based on table 1, the majority of respondents were female, totaling 39 individuals (55.7%), while males accounted for 31 individuals (44.3%). Most respondents worked as laborers, with a total of 23 individuals (32.9%). In terms of educational level, the majority had only basic education, totaling 35 respondents (50%). Regarding knowledge level, most respondents demonstrated a low level of knowledge, totaling 48 individuals (68.6%). Table 1

also shows that 38 respondents (54.3%) had a history of severe hypertension, 21 respondents (30%) had moderate hypertension, and 11 respondents (15.7%) had mild hypertension.

**Table 1. Univariate Analysis of the Frequency Distribution of Respondents Characteristics**

No	Variable	f	%
1.	Gender		
	• Woman	39	55,7
	• Man	31	44,3
2.	Employment		
	• Unemployed	11	15,7
	• Housewife	18	25,7
	• Civil servant	4	5,7
	• Labour	23	32,9
	• Fisherman	10	14,3
	• Self-employed	4	5,7
3.	Education		
	• High (College)	6	8,6
	• Intermediate (High School)	22	31,4
	• Elementary (Elementary, Middle School)	35	50,0

**Table 2. Univariate Analysis of Respondents Knowledge about the DASH Diet**

Knowledge Level	Before		After	
	f	%	f	%
Poor	48	68.6	1	1,4
Moderate	22	31.4	62	88,6
Good	0	0	7	10,0
Total	70	100	70	100

The DASH diet education was administered once. Prior to the intervention, a pretest was conducted. One month after the educational session, a posttest questionnaire was distributed to assess whether there was an improvement in respondents knowledge regarding the DASH diet in the context of hypertension management. Based on table 2, before the DASH diet education was provided, the majority of respondents (48 individuals, 68.6%) had a low level of knowledge about the DASH diet. A total of 22 respondents (31.4%) had a moderate level of knowledge. Following the educational intervention, only 1 respondent (1.4%) remained in the low knowledge category, while 62 respondents (88.6%) showed a moderate level of knowledge, and 7 respondents (10%) demonstrated good knowledge. These findings indicate a clear improvement in knowledge levels after the education session.

**Table 3. Univariate Analysis Based on Hypertension Stages**

Hypertension Stages	Before		After	
	f	%	f	%
1. Mild Hypertension	11	15.7	48	68,8
2. Moderate Hypertension	21	30.0	18	25,7
3. Severe Hypertension	38	54.3	4	5,7
	70	100	70	100

Based on the univariate analysis presented in Table 3, prior to the DASH diet education, the majority of respondents were categorized as having severe hypertension, with 38 individuals (54.3%). However, following the educational intervention, most respondents shifted to the mild hypertension category, totaling 48 individuals (68.8%). These findings suggest that the DASH diet education had a positive impact on reducing the severity of hypertension among the participants.

**Table 4. Analysis of Knowledge Before and After DASH Diet Education Using Paired Sample t-Test (N = 70)**

Variable	Mean Difference	SD	p-value
Knowledge (Pre–Post)	-15.871	5.644	0.000

Based on table 4, The results of the paired t-test analysis on respondents' knowledge before and after the DASH diet education show a significant increase in knowledge following the intervention ( $p < 0.05$ ).

**Table 5. Analysis of Blood Pressure Before and After DASH Diet Education Using Paired Sample t-Test (N = 70)**

Variable	Mean Difference	SD	p-value
Blood Pressure (Pre–Post)	1.014	0.825	0.000

Based on Table 5, the analysis of blood pressure before and after the educational intervention revealed a significant difference in hypertension levels ( $p < 0.05$ ). Regular adherence to the DASH diet can help normalize blood pressure by reducing the intake of high-sodium and high-fat foods, while increasing the consumption of fiber-rich foods.

## Discussion

Hypertension is a significant public health issue in many regions, including coastal areas such as Atowatu. Risk factors such as high salt intake, unbalanced dietary patterns, and limited access to nutritional education contribute to the high prevalence of hypertension. Therefore, educational approaches promoting healthy eating habits are essential for the prevention and management of hypertension. One proven and effective approach is the DASH Diet (Dietary Approaches to Stop Hypertension). This scientifically developed dietary plan is specifically designed to reduce blood pressure, particularly among individuals with hypertension. The DASH Diet emphasizes a high intake of fruits, vegetables, low-fat dairy products, whole grains, fish, poultry, and legumes, while limiting the consumption of sodium, added sugars, and saturated fats (Adiatman, 2020).

Respondents knowledge levels were assessed using a questionnaire administered before (pre-test) and after (post-test) the counseling session. The questionnaire consisted of 10 items related to hypertension and the DASH diet. Each correct answer was scored as 10 points, and each incorrect answer was scored as 0. The total knowledge score was calculated by multiplying the number of correct answers by 10. During the pre-test, the highest score achieved was 80, and the lowest was 50. In the post-test, the highest score increased to 90, with the lowest being 70. Based on the pre-test and post-test results conducted among hypertensive patients in the coastal area of Atowatu, there was a notable increase in knowledge following the counseling session. Before the intervention, the majority of respondents (48 individuals or 68.6%) had low knowledge levels, while 22 respondents (31.4%) demonstrated a moderate level of knowledge. After the educational intervention, knowledge levels improved: 62 respondents (88.6%) showed moderate knowledge, 7 respondents (10%) had high knowledge, and only 1 respondent (1.4%) remained in the low knowledge category. These findings are consistent with the study by Uliatiningsih & Fayasari, (2019), which reported a reduction of



13 mmHg in systolic blood pressure and 3 mmHg in diastolic pressure after patients received education about the DASH diet.

The implementation of DASH diet education not only helps reduce blood pressure but also increases public awareness regarding healthy dietary practices in general. In the long term, such interventions have the potential to lower the incidence of other non-communicable diseases, including diabetes and cardiovascular disease. As presented in Table 5, the analysis of blood pressure before and after the educational intervention revealed a statistically significant difference in hypertension levels ( $p < 0.05$ ). These findings are consistent with the study by Rizky et al., (2017), which reported a significant difference in knowledge levels before and after DASH diet counseling, with a  $p$ -value of 0.0086 ( $p < 0.05$ ). The study concluded that increased knowledge was positively associated with adherence to the prescribed diet.

In this study, before receiving the DASH diet education, most respondents were classified as having severe hypertension (38 respondents or 54.3%). After the intervention, the majority shifted to the mild hypertension category (48 respondents or 68.8%). (Phillips et al., (2019) suggested that the potential benefits of following a DASH diet, in terms of cardiovascular disease (CVD) prevention, extend beyond the well-known blood pressure-lowering effects. A deeper understanding of the relationship between dietary indices and cardiometabolic health biomarkers is essential to inform public health strategies and policy, ultimately supporting improved and sustained cardiometabolic health at the population level.

Overall, the results confirm that regular adherence to the DASH diet can contribute to the normalization of blood pressure by reducing the intake of high-sodium and fatty foods, while increasing the consumption of fiber-rich foods. The core principle of the DASH diet emphasizes balanced nutrition with a focus on whole grains, fruits, vegetables, lean protein sources, and low-fat dairy products, while minimizing saturated fats, sodium, and added sugars. was on the following eight components: high intake of fruits, vegetables, nuts and legumes, whole grains, and low-fat dairy products and low intake of sodium, sweets, and red or processed meats (Prado et al., 2020). Hashemi et al., (2019) showed that the DASH diet significantly reduces systolic and diastolic blood pressure, but this beneficial effect is reduced in DASH-like diets. In line with Rohman et al., (2023) implementing the DASH diet consistently and with commitment has a notably beneficial effect on individuals with hypertension.

## **Conclusion**

Based on the findings of the study on the effect of DASH Diet Education (Dietary Approaches to Stop Hypertension) as an Integrated Nutritional Approach to Hypertension Management in the Coastal Area of Atowatu, the following conclusions can be drawn: there was a significant difference in knowledge levels before and after the DASH diet education, with a  $p$ -value of 0.000. This indicates that DASH diet education had a significant impact on improving respondents' knowledge related to hypertension management and there was a significant difference in hypertension levels before and after the DASH diet education, with a  $p$ -value of 0.000. This confirms that DASH diet education had a positive effect on reducing hypertension levels among the coastal population in Atowatu.

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