

EFFECTIVENESS OF DASH DIET (DIETARY APPROACH TO STOP HYPERTENSION) EDUCATION ON THE LEVEL OF KNOWLEDGE IN PREVENTING HYPERTENSION IN THE ELDERLY AT THE KEDUNGWUNGU PUBLIC HEALTH CENTER

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Abstract— Background : Hypertension is a condition in which a person experiences an increase in blood pressure exceeding the normal limit, which is more than 140/90 mmHg. One non-pharmacological therapy for hypertension sufferers is providing education on the DASH diet. The DASH diet (Dietary Approach to Stop Hypertension) is a diet to lower blood pressure in hypertensive patients, or a diet to reduce salt consumption and consume foods containing high sodium.

Objective : This study aims to determine the effectiveness of DASH diet education on the level of knowledge in preventing hypertension in the elderly at the Kedungwungu Community Health Center.

Methodology : This study used a quasi-experimental design with a pre- and post-test design with one group. The research instrument used a record sheet in the form of a questionnaire about DASH diet knowledge.

Results : The results of the Wilcoxon test produced a Z test statistic of -4.301 with a significance value of 0.000, stating that DASH diet education was significantly proven to be effective in increasing the level of knowledge in preventing

hypertension before and after being given DASH diet education.

Conclusion : Providing DASH Diet education has proven to be very effective in increasing the knowledge of elderly people with hypertension.

Suggestion : It is hoped that DASH diet education can be implemented comprehensively in health services.

Keywords— *Hypertension; Elderly Knowledge Level; DASH Diet Education*

I. INTRODUCTION

The DASH (Dietary Approach to Stop Hypertension) diet is a diet to lower blood pressure in hypertensive patients, or a diet to reduce salt intake and consume foods high in sodium (Kolinug et al., 2023). It also promotes increased consumption of high-fiber fruits and vegetables, low-fat dairy, meat, and nuts in hypertensive patients, while reducing salt intake (Falah & Apriana, 2023).

The DASH diet emphasizes the consumption of foods 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), as well as low in saturated fatty acids and cholesterol (<200 mg/day), which are found in abundance in fruits, nuts, vegetables, fish, lean meats, low-fat dairy, and foods low in total and saturated fat (Desyana, 2021).

Hypertension is a condition in which a person experiences elevated blood pressure beyond normal limits, with systolic blood pressure exceeding 140 mmHg and diastolic blood pressure exceeding 90 mmHg, resulting in morbidity and mortality. This condition can lead to other complications if not properly managed. Knowledge is a crucial factor in shaping behavior. Knowledge about the DASH diet, along with nutritional counseling, will facilitate changes in eating behavior in people with hypertension (Nugroho et al., 2024).

Hypertension is a leading cause of premature death worldwide. According to the American Heart Association (AHA), 74.5 million Americans aged 20 and over suffer from hypertension. However, the cause of nearly 95% of cases is unknown (Silvianah Anita, 2024). With the increasing global population, the World Health Organization (WHO) estimates that hypertension will increase by approximately 29% by 2025. The highest prevalence of hypertension is found in developing countries (Nugroho et al., 2024).

Data from the 2018 Indonesian Basic Health Research (Riskesmas) indicates that the incidence of hypertension in Indonesia reached 36%, with a prevalence of 34.1%. According to the 2023 Indonesian Health Survey (SKI), hypertension was the fourth highest risk factor for death, accounting for 10.2% of the population, with a prevalence of 22.2% (Tarmizi, 2024).

According to the West Java Provincial Health Office (2023), hypertension in West Java increased by 108.18% in 2023 compared to previous years. According to the Indramayu Health Office (2021), in Indramayu Regency, an estimated 550,136 people with hypertension were treated, but only 302,830 (55%) received treatment. Based on data obtained from the Kedungwungu Community Health Center, 944 people suffered from hypertension between January and April 2025.

A preliminary study conducted from April 25 to May 3, 2025, through interviews and observations with 54 patients to determine their knowledge of hypertension prevention, revealed that 27 patients had hypertension with an average blood pressure above 150/113 mmHg. Five patients were not taking medication, and 22 patients did not regularly take their medication due to a lack of knowledge about hypertension prevention and an unhealthy diet. Hypertension sufferers only knew a few things about a hypertension diet, such as limiting excessive coconut milk consumption and eating foods high in oil, salt, and cholesterol.

Hypertension is a public health threat, and the increasing incidence of hypertension requires attention from all parties. Uncontrolled hypertension can lead to various complications. These complications can impair the function of other organs, especially vital organs like the heart and kidneys. Hypertension is the most important risk factor for coronary

heart disease, stroke, kidney disease, and retinopathy (Mukti, 2018).

To prevent these impacts, it is important to regularly check your blood pressure, maintain a healthy lifestyle (such as a healthy diet, exercise, and stress management), and follow medical advice if you have a history of hypertension. (Nanda Desreza, 2020 in Fitria et al., 2025).

The data above shows that the incidence of hypertension remains high. Factors contributing to hypertension include individual characteristics such as age and gender, genetic and environmental factors, and unhealthy lifestyles such as diet (salt consumption), lack of physical activity, and smoking (Kania Rahsa Puji et al., 2024).

An elderly person is someone aged 60 years and above who is unable to earn a living for themselves. The ability of tissues to repair or replace themselves, such as maintaining their normal structure and function, gradually diminishes. This According to a preliminary study by Suprayitna et al. (2022), they studied 17 patients at the Penimbung Community Health Center. Five elderly patients were aware of the DASH diet program but had never implemented it in their daily lives. Meanwhile, 12 elderly reported being unaware of the DASH diet program (Suprayitna et al., 2023).

Due to the high number of hypertension sufferers in the Kedungwungu Community Health Center, the authors were interested in conducting a study on "The Effectiveness of DASH Diet Education on Knowledge Levels in Hypertension Prevention in the Elderly."

II. METHOD

The research design used was a quasi-experimental with a pre- and post-test design with one group to determine the effectiveness of DASH diet education on the level of knowledge in preventing hypertension in the elderly. After calculations were carried out, it was found that the population at the Kedungwungu Health Center was 944 respondents, so the sample size was 24 respondents.

The research instrument used in this study was a questionnaire on knowledge of the DASH diet. Research conducted by N.A. Utami et al. (2018), undergraduate nursing students at Kusuma Husada University, Surakarta, showed that the questionnaire used the Guttman scale (yes-no). Validity and reliability were tested by experts. The validity test results were 0.3494 and the reliability test results were 0.941. The questionnaire's measurement results were categorized as follows: good if 76-100% of participants answered correctly, adequate if 56-75% of participants answered correctly, and poor if <55% of participants answered correctly.

In addition, the researchers created an Education Program Unit (SAP) to provide DASH diet education to patients with hypertension. Therefore, respondents who agreed to participate in this study were able to complete an informed consent form provided by the researchers.

The purpose of this instrument was to determine the effect of DASH diet education on knowledge levels in hypertension prevention before and after the study.

Bivariate analysis is the analysis of two variables suspected to be related or collaborative (Notoatmodjo, 2015, cited in Wini Arista Ni Komang, 2023). In this study, bivariate analysis was used to determine the effectiveness of DASH diet education on the level of knowledge in preventing hypertension in the elderly.

In hypothesis testing or statistical testing, we recognize parametric and non-parametric tests. Parametric tests are used when the data is normally distributed and numeric (interval or ratio). Meanwhile, in non-parametric tests, the data does not have to be normally distributed (non-normal distribution is allowed) and the data is categorical (nominal or ordinal) (Swarjana, 2023).

The statistical analysis method used was the Paired T-Test because the data collected from two related samples. The Paired T-Test uses the Shapiro-Wilk test for normality as the main test and the Wilcoxon test for alternative tests.

The Shapiro-Wilk test is a test conducted to determine the distribution of random data from a sample with data simulations of no more than 50 samples. The Wilcoxon test is a non-parametric test that is a pair of 24 paired sample t-tests when the assumptions of the paired sample t-test are not met.

III. RESULTS AND DISCUSSION

The results of the respondent characteristics analysis were used to obtain a description of the respondents, including age, education, and employment status, which were presented in a frequency distribution. The results of the respondent characteristics are as follows:

TABLE I. RESULTS OF RESPONDENT CHARACTERISTICS BASED ON GENDER, AGE, OCCUPATION AND EDUCATION

Karakteristik	Kategori	Jumlah	Persentase (%)
Jenis Kelamin	Laki-Laki	8	33.3
	Perempuan	16	66.7
	Total	24	100.0
Usia	60-65 tahun	14	58.3
	66-70 tahun	10	41.7
	Total	24	100.0
Pekerjaan	IRT	11	45.8
	Pegawai Swasta	6	25.0
	Pensiunan	6	25.0
	PNS	1	4.2
	Total	24	100.0
Pendidikan	SD	1	4.2
	SMP/SMA	16	66.7
	D3/S1/S2	7	29.2
Total	24	100.0	

Based on the analysis results in table 4.1, it is known that the research respondents were dominated by female respondents, namely 16 people (66.7%), aged 60-65 years, namely 14 people (58.3%). Research respondents based on occupation showed that the most respondents were housewives (IRT), namely 11 people

(45.8%). Based on education, the most research respondents had a junior high/high school education, namely 16 people (66.7%).

The description of the research variables explains the average level of knowledge in preventing hypertension in the elderly before and after being given DASH diet education. The variable studied is knowledge in preventing hypertension in the elderly.

TABLE II. Description of Knowledge Level Variables in Hypertension Prevention in the Elderly Before and After DASH Diet Education

Variabel Pengetahuan	Pretest	Posttest
Minimum	40.00	75.00
Maksimum	85.00	95.00
Rata-Rata	55.208	83.958
Standard Deviasi	11.747	5.311

It is known that the average knowledge score of the research respondents at the time of the pretest was 55,208 and the standard deviation (SD) was 11,747 with the lowest knowledge score range being 40 and the highest being 85. After being given DASH Diet Education, the average knowledge score of the research respondents was 83,958 and the standard deviation (SD) was 5,3118 with the lowest knowledge score range being 75 and the highest being 95. This shows that there was an increase in the average level of knowledge in preventing hypertension in the elderly after being given DASH Diet Education, namely from 55,208 to 83,958.

Bivariate analysis was used in this study to test the effectiveness of DASH diet education on the level of knowledge in preventing hypertension in the elderly. The effectiveness test used the Wilcoxon test. This was because the distribution of knowledge data during the pretest and posttest was not normally distributed. The test criteria state that if the significance value is less than $\alpha = 0.05$, then a significant difference in knowledge scores in the elderly between before and after receiving DASH diet education can be stated. The test results can be seen in the following table:

TABLE II. RESULTS OF THE WILCOXON TEST ON THE LEVEL OF KNOWLEDGE IN HYPERTENSION PREVENTION

Test	Rata-Rata	Median	Z	Nilai P	Estimate	95% CI	
						Lower	Upper
Pretest	55.21	55	-4.301	<0.001	30	25	32.5
Posttest	83.96	85					

Based on the analysis, the average pretest score was 55.21 with a median of 55, while the average posttest score was 83.96 with a median of 85. The Wilcoxon test showed a Z value of -4.301 with a significance value of $p = <0.001$ ($p < 0.05$). This indicates a significant difference between the pretest and posttest scores. Furthermore, the estimation results showed a median score increase of 30 points, with a 95% confidence interval between 25 and 32.5. Therefore, it can be concluded that there was a significant improvement in learning outcomes after the

treatment/intervention, with a consistent increase in the range of 25–32.5 points.

Statistically, the test results showed that the DASH diet education provided significantly improved the knowledge scores of the elderly. This means that the DASH diet education intervention was effective in increasing knowledge levels in hypertension prevention in the elderly, as evidenced by the 30-point increase in median scores after treatment.

Demographically, women have a higher life expectancy than men, resulting in a higher number of elderly women (Sari et al., 2023). This is influenced by biological factors, lifestyle, and access to health services, which are relatively more frequently utilized by women. The study found that 16 respondents (66.7%) were predominantly female. This finding aligns with a study in Denpasar that showed a higher attendance rate for women at the elderly health post (Posyandu) (integrated health post) than men (Mertha et al., 2025). This study confirms that the predominance of elderly women at the Kedungwungu Community Health Center is a common phenomenon in primary health care in Indonesia.

According to the demographic transition theory, the majority of elderly are in the 60–69 age group, known as young elderly, with relatively active physical conditions (Sari et al., 2023). The results of this study indicate that the majority of respondents were aged 60–65, at 14 (58.3%). The results of this study align with a Bethesda Journal report by Palupi and Sinaga (2024), which stated that young elderly people dominate because they still have good mobility, making it easier to access health services. This suggests that the Kedungwungu Community Health Center tends to be more accessible to younger elderly people than older elderly people.

Theoretically, the employment status of elderly people is influenced by gender roles and the life cycle, with females more often acting as housewives, while males are more often categorized as retired (Pangribowo, 2022). The results showed that the majority of respondents were housewives, 11 (45.8%). Previous research by Rahmawati and Isnaeni (2023) revealed that elderly female housewives were more active in utilizing integrated health posts (Posyandu) because they had more free time than elderly male informal workers. These results emphasize the importance of a family-based approach in healthcare for the elderly in Kedungwungu.

Education is a crucial factor influencing health literacy, with higher levels of education contributing to a better understanding of health information among older adults (Nutbeam & Lloyd, 2020). The results of this study indicate that the majority of respondents, 16 (66.7%) had a junior high/high school education. Analysis by Ezalina et al. (2023) indicates that health literacy is a predictor of healthy behavior adoption among adults and older adults. With a majority of junior high/high school graduates, education materials should utilize simple language, visuals, practical exercises, and repetition, and involve families to strengthen understanding.

The results of this study are consistent with those of Elisa and Oktaviana (2023), who found an effect of education on hypertension knowledge with a p -value of 0.000 ($p < 0.05$). Public knowledge of hypertension improves with education.

This is also consistent with the results of a study by Istiqomah et al. (2022), which also showed that post-test scores increased by 14.22% compared to pre-test scores. The t -test results indicated that providing hypertension education significantly increased the knowledge of Prolanis participants. A more recent study by Nurul Imam et al. (2025) also showed that DASH diet education effectively increased knowledge, adherence, and blood pressure control in elderly people with hypertension. Therefore, these results strongly indicate that DASH diet education is highly effective in improving the elderly's knowledge about hypertension prevention.

A study by Halawa et al. (2024) also concluded that there was a difference in respondents' knowledge before and after receiving health education about a low-salt diet for hypertensive patients. A more recent study by Yora Nopriani et al. (2024) concluded that there was an increase in the average knowledge score of hypertension patients in the Air Sugihan Community Health Center (Puskesmas) area of Jalur 25 after an intervention using a hypertension diet information booklet. The Wilcoxon statistical test showed an increase in knowledge with a p -value of 0.000, indicating the influence of education and awareness regarding hypertension diet among elderly people in the Air Sugihan Community Health Center area of Jalur 25. These results are also supported by Sakti and Luhung (2024), who concluded that hypertension control can be achieved by increasing elderly knowledge through health education in the form of counseling. The Puskesmas activities that have been implemented have shown an increase in the knowledge of elderly people with hypertension through counseling and simulation methods, indicating that the counseling provided to the elderly is well-received.

Another study by Audri Darmarani and H. Darwis (2020) found that continuous educational interventions have a positive impact on knowledge and adherence to hypertension diets ($p = 0.011$). Heriyandi et al., (2018) also confirmed that increased knowledge is directly proportional to changes in hypertension dietary behavior in the elderly. Furthermore, an experimental study in Indonesia by Gusty, (2023) showed that education using the Health Education model was effective in significantly improving knowledge, attitudes, and adherence to the DASH diet.

Lack of knowledge makes older adults tend to maintain unhealthy lifestyles, such as consuming foods high in salt and fat, consuming too few fruits and vegetables, not understanding the importance of physical activity, and rarely having regular blood pressure checks. Without adequate understanding, older adults struggle to prevent and control hypertension. Therefore, health education is a crucial strategy for providing older adults with accurate information, particularly regarding healthy eating patterns such as the DASH Diet (Notoatmodjo, 2014).

The results of the univariate analysis in this study indicated that before receiving DASH Diet education, the elderly's level of knowledge about hypertension prevention was in the poor category. The results showed that 19 of the 24 respondents (79.2%) had low knowledge. Quantitatively, the average knowledge score (pretest) was 55.2083, with a range of 40 as low as 85 as high as 40. This figure confirms a significant

knowledge gap among older adults, which makes them vulnerable to the risk of hypertension and its complications.

The results of this study are consistent with those of Wahyuni et al. (2019), which demonstrated that most elderly people have poor knowledge about hypertension. A similar study by Wahyudi et al. (2024) found that pretest results showed that 60% of 50 elderly people had inadequate knowledge about hypertension. This confirms that adequate information has not been effectively communicated to the elderly population. This is in line with the results of a study by Selnia Anindia Pramesti et al. (2024), which concluded that prior to education, 21 respondents (70%) had poor knowledge about hypertension and the DASH diet at the Wijayakusuma Elderly Health Post (Posyandu Lansia). Furthermore, a study by Munir (2024) also concluded that during the pretest, most people had poor knowledge about the DASH diet (77.4%).

Other studies have shown a similar trend. reported that approximately 69.05% of elderly people in Gorontalo had poor knowledge about the DASH diet, and dietary adherence was also low. Similar findings have also been seen in international studies. Research in India by Priyadarsini John, et al. (2018) found that patients' knowledge of hypertension was inadequate.

The increase in knowledge following an educational intervention can be explained through learning theory, which emphasizes that information presented in a structured, relevant, and repetitive manner makes it easier for respondents, especially older adults, to absorb and remember the material. In health, effective education not only provides data but also fosters a deeper understanding of the "why" of a behavior, such as the importance of the DASH Diet for preventing hypertension. The Health Belief Model theory also explains that increased knowledge can influence individuals' perceptions of disease susceptibility and severity, thus motivating them to take preventive action (Glanz et al., 2015). Therefore, DASH Diet education is designed to change the mindset and knowledge of older adults, bridging the gap between available information and necessary actions.

The results showed a significant increase in knowledge between before and after DASH diet education. Before DASH diet education, the average knowledge score in the pretest was only 55.208, with the majority of respondents (79.2%) falling in the "poor" category. This indicates that most older adults did not have adequate knowledge about hypertension prevention before the intervention.

However, after receiving DASH diet education, the average knowledge score increased sharply to 83.958, with 91.7% of respondents achieving the "good" category. The health education approach to the DASH diet emphasized how food can lower blood pressure as a companion to antihypertensive medications rather than simply requiring people to avoid salt. This improvement demonstrates that DASH diet education is highly effective in conveying easy-to-understand and relevant information to seniors, fundamentally changing their understanding.

The Wilcoxon test results showed a Z value of -4.301 with a significance value of $p = 0.000$ ($p < 0.05$). This indicates a significant difference between pretest and posttest scores.

Furthermore, the estimation results show a median score increase of 30 points with a 95% confidence interval between 25 and 32.5. Therefore, it can be concluded that there was a significant improvement in learning outcomes after the treatment/intervention, with consistent increases in the range of 25–32.5 points. Statistically, the test results indicate that DASH diet education significantly improved seniors' knowledge scores. This means that the DASH diet education intervention effectively increased knowledge about hypertension prevention in the elderly, as evidenced by a 30-point increase in median scores after treatment.

These results are consistent with those of Elisa and Oktaviana (2023), who found an effect of education on hypertension knowledge, with a p-value of 0.000 ($p < 0.05$). Public knowledge of hypertension improves with education. This is also consistent with the results of a study by Istiqomah et al. (2022), which also showed that post-test scores increased by 14.22% compared to pre-test scores. The t-test results indicated that providing education about hypertension significantly increased the knowledge of Prolanis participants. A more recent study by Nurul Imam et al. (2025) also demonstrated that DASH diet education effectively improved knowledge, adherence, and blood pressure control in elderly people with hypertension. Therefore, these results strongly indicate that DASH diet education is highly effective in improving the elderly's knowledge about hypertension prevention.

The results of research by Halawa et al., (2024) also concluded that there was a difference in respondents' knowledge before and after providing health education about a low-salt diet for hypertension sufferers. More recent research by Yora Nopriani et al., (2024) concluded that there was an increase in the average knowledge score of hypertension patients in the Air Sugihan Community Health Center (Puskesmas Jalur 25) work area after being given an intervention using a hypertension diet information booklet. The results of the Wilcoxon statistical test showed an increase in knowledge with a p-value of 0.000, indicating the influence of education and awareness of the hypertension diet in the elderly in the Air Sugihan Community Health Center (Puskesmas Jalur 25) work area. The results of this study are also supported by Sakti and Luhung (2024) who concluded that hypertension control can be done by increasing the knowledge of the elderly through health education in the form of counseling. The Puskesmas activities that have been implemented show an increase in the knowledge of elderly people with hypertension through counseling and simulation methods, this indicates that the counseling provided to the elderly is well received. Another study by Audri Darmarani and H. Darwis, (2020) found that intervention

Based on the researcher's direct experience in this research process, there were limitations encountered that could have influenced the results. Some limitations included not fully understanding the questions in the questionnaire or interviews, requiring direct and patient explanations. The researcher was not present at the integrated health post (Posyandu), so the researcher visited the respondents' homes.

IV. CONCLUSIONS

Before receiving the DASH diet education intervention, 79.2% of older adults had insufficient knowledge about

hypertension prevention. These results indicate a significant information gap and high health risks in this population.

Statistical analysis revealed a difference in knowledge levels before and after education. The Wilcoxon test showed a Z-value of -4.301 with a significance value of $p < 0.001$ ($p < 0.05$). This significant increase indicates that DASH diet education is a valid and effective tool for increasing knowledge about hypertension prevention among older adults, with consistent increases ranging from 25–32.5 points.

Providing DASH diet education proved highly effective in improving elderly knowledge. The average knowledge score increased significantly from 55.208 to 83.958, and 91.7% of respondents achieved good knowledge after receiving DASH diet education. This demonstrates that the DASH diet education method can fundamentally change understanding.

Based on the conclusions, several suggestions can be made to improve the health of the elderly: Health services, such as community health centers (Puskesmas) or integrated health posts (Posyandu), need to regularly hold health education programs focused on preventing chronic diseases such as hypertension. These programs should use methods that are easily understood by the elderly, such as demonstrations, visual media, and interactive question-and-answer sessions.

For Respondents: The results of this study are expected to serve as an evaluation of the implementation of the DASH diet in preventing hypertension. Education should not only be directed at the elderly but also at their family members who care for them. Family support is crucial to ensure that the knowledge gained is applied in daily habits, especially regarding meal preparation and healthy food selection.

For Future Researchers: Future researchers are expected to conduct comprehensive research, including on the motivations, attitudes, and implementation of the DASH diet for hypertension. It is recommended to create simple and easily accessible educational materials, such as brochures, posters, or short videos, explaining the DASH Diet and other healthy lifestyle habits. These materials should be distributed in places frequented by the elderly.

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