

Original Articles: Quantitative Research

**EFFECTIVENESS OF DIETARY APPROACHES TO STOP HYPERTENSION
(DASH) ON BLOOD PRESSURE AND BLOOD GLUCOSE LEVELS AMONG
PEOPLE WITH HYPERTENSION AND DIABETES MELLITUS**

Yusiana Vidhiastutik ^{1*}, Indasah ¹, Agustin Widyowati ¹,

¹ Master of Nursing Study Program, STRADA Indonesia University, Kediri

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Correspondence:

Yusiana Vidhiastutik
Master of Nursing Study Program,
STRADA Indonesia University,
Kediri
Email: ns.yusiana@gmail.com

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Abstract

Introduction: Hypertension and diabetes mellitus are degenerative diseases that increase due to risk factors such as obesity, aging, poor diet, and unhealthy lifestyle.

Objective: The research was to assess the effectiveness of the DASH diet in reducing blood pressure and blood glucose levels in hypertensive and diabetic patients.

Methods: A single-factor quasi-experimental study with a randomized pretest-posttest comparison group design was conducted on 36 respondents selected through simple random sampling from 305 Posbindu residents in Setonorejo Village. Data collection involved observation sheets, sphygmomanometers, glucose test kits, and the DASH diet SOP. The Wilcoxon Signed-Rank Test and the Kruskal-Wallis Test were used for data analysis.

Results: The DASH diet significantly reduced systolic blood pressure ($p = 0.006$) and blood glucose levels ($p = 0.008$). However, only the 2600-calorie DASH diet significantly impacted diastolic blood pressure ($p = 0.025$), while 1600 and 2000-calorie diets did not ($p = 0.083$; $p = 0.059$). The Kruskal-Wallis test showed no significant differences between diet groups for systolic blood pressure ($p = 0.319$), diastolic blood pressure ($p = 0.618$), and blood glucose levels ($p = 0.128$).

Conclusions: The DASH diet effectively lowers systolic blood pressure and blood glucose levels, suggesting its potential as a non-pharmacological strategy for managing hypertension and diabetes mellitus.

INTRODUCTION

Hypertension and diabetes mellitus are among the most prevalent non-communicable diseases (NCDs) worldwide, posing a significant public health burden due to their association with severe complications, including cardiovascular disease, stroke, kidney failure, and premature mortality (World Health Organization [WHO], 2023). Hypertension affects approximately 1.28 billion adults globally, with an increasing prevalence due to lifestyle factors such as poor diet, physical inactivity, and obesity (World Health Organization [WHO], 2023). Similarly, diabetes mellitus, which currently affects over

537 million people worldwide, is projected to rise to 783 million cases by 2045, further exacerbating the global burden of NCDs (American Diabetes Association, 2024).

Effective management of hypertension and diabetes requires a comprehensive approach, including pharmacological interventions and lifestyle modifications. Among non-pharmacological strategies, dietary interventions play a crucial role in disease prevention and management. The Dietary Approaches to Stop Hypertension (DASH) diet, initially developed to lower blood pressure, has gained recognition for its beneficial effects on cardiovascular health and metabolic disorders (Sacks, Obarzanek, et al., 2020). This diet emphasizes the consumption of fruits, vegetables, whole grains, lean protein sources, and low-fat dairy while reducing sodium, saturated fats, and processed foods. Research has demonstrated that adherence to the DASH diet significantly reduces blood pressure and improves glucose metabolism, making it a valuable dietary strategy for individuals with hypertension and diabetes mellitus (Filippou et al., 2023).

Despite the well-documented benefits of the DASH diet, limited studies have explored its effectiveness in rural settings, particularly in low- and middle-income countries like Indonesia. Rural populations often face barriers such as limited access to fresh and nutritious foods, lower health literacy, and financial constraints, which may influence dietary adherence and health outcomes (Astuti et al., 2021). Understanding the impact of different caloric levels of the DASH diet on blood pressure and blood glucose levels in this demographic is essential to tailoring effective dietary interventions.

This study aims to assess the effectiveness of the DASH diet at three caloric levels (1600, 2000, and 2600 calories) in managing blood pressure and blood glucose levels among hypertensive and diabetic patients in Setonorejo Village. The findings could inform public health strategies and dietary guidelines to improve the management of hypertension and diabetes in community healthcare settings.

METHODS

Study Design

This study employed a quasi-experimental design with a randomized pretest-posttest comparison group approach. The participants were randomly assigned to three intervention groups, each receiving a different caloric level of the DASH diet (1600, 2000, and 2600 calories). The research aimed to analyze the effects of dietary interventions on blood pressure and blood glucose levels in hypertensive and diabetic patients.

Settings

The study was conducted in Setonorejo Village, located within the operational area of the Pelas Community Health Center, Kediri, Indonesia. Data collection was carried out between September and October 2024. The community was selected due to its high prevalence of hypertension and diabetes mellitus, making it an ideal setting for investigating dietary interventions.

Research subject

The population in this study comprised all 305 residents of Setonorejo Village who participated in the Posbindu program. Among them, only 70 individuals were identified as having both hypertension and diabetes mellitus. The study was conducted using four research groups, consisting of three treatment groups and one control group. The sample size for each group was determined using the Federer formula, which resulted in a total of nine respondents per group. A simple random sampling technique was employed to ensure an unbiased selection of participants.

Instruments

The instruments used in the data collection process for this study were observation sheets, glucose test kits, and sphygmomanometers.

Intervention and Data Collection

Participants were divided into three groups based on caloric intake (1600, 2000, and 2600 calories). Each group received a structured meal plan following the DASH dietary guidelines, focusing on increased fruit, vegetable, and whole grain intake while limiting sodium, saturated fats, and refined sugars.

Baseline measurements were recorded before the intervention, including systolic and diastolic blood pressure using a digital sphygmomanometer. And also, blood glucose levels are measured using a standardized glucose test kit.

Participants followed the assigned DASH diet plan for three weeks under close supervision by healthcare professionals. Researchers carry out treatment related to the DASH diet every day.

Data Analysis

Data were analyzed using IBM SPSS version 21.0. The Wilcoxon Signed-Rank Test was applied to assess intra-group differences before and after intervention. At the same time, the Kruskal-Wallis Test was used to determine statistical differences between the three dietary groups. A significance level of $p < 0.05$ was considered statistically significant.

Ethical Consideration

Ethical approval for this study was obtained from the Universitas STRADA Indonesia Ethics Committee, Kediri, with number 001535/EC/KEPK/I/2024. Written informed consent was collected from all participants before data collection. Confidentiality and anonymity of participants were strictly maintained throughout the study.

RESULTS

The study analyzed the demographic and health characteristics of respondents, revealing that the majority were female (66.67%) and aged between 45-54 years (41.66%). Most had completed elementary school (55.56%), while only a small percentage reached university education (2.78%). A significant proportion had been suffering from hypertension for more than five years (55.56%) and diabetes mellitus for 3-5 years (52.78%). The main occupations were housewives (36.11%) and farmers

(33.33%), with most respondents earning between 1,500,000 and 1,999,999 Rupiahs (36.11%). The most common weight range was 50-59 kg (36.11%), and the majority had a height of 150-159 cm (50.00%). Abdominal circumference was predominantly in the 81-90 cm range (47.23%). These findings provide a comprehensive understanding of the respondents' characteristics, which may contribute to further research on the correlation between demographic factors and health conditions.

Table 1. Demographic Characteristics of Participants in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province in September–October 2024.

Characteristics of Respondent	Frequency (f)	Percentage (%)
Gender		
Male	12	33.33
Female	24	66.67
Age (Years Old)		
35-44	4	11.11
45-54	15	41.66
55-64	11	30.56
≥ 65	6	16.67
Educational Level		
Elementary School	20	55.56
Junior High School	12	33.33
Senior High School	3	8.33
University	1	2.78
Long-term Suffering from Hypertension		
< 3 years	1	2.78
3-5 years	15	41.66
> 5 years	20	55.56
Long-term Suffering from Diabetes Mellitus		
< 3 years	5	13.89
3-5 years	19	52.78
> 5 years	12	33.33
Occupational		
Civil Servant	1	2.78
Farmer	12	33.33
Entrepreneur	9	25.00
Handyman	1	2.78
Housewife	13	36.11
Family Income (Rupiahs)		
1,000,000 - 1,499,999	5	13.89
1,500,000 - 1,999,999	13	36.11
2,000,000 - 2,499,999	10	27.78
2,500,000 - 2,999,999	8	22.22
Weight (Kilograms)		
40-49	7	19.44

50-59	13	36.11
60-69	11	30.56
≥ 70	5	13.89
Height (Centimeters)		
140-149	16	44.44
150-159	18	50.00
160-169	2	5.56
≥ 170	0	0.00
Abdominal Circumference (Centimeters)		
61-70	3	8.33
71-80	9	25.00
81-90	17	47.23
≥ 91	7	19.44

Sources: Primary Data of Questionnaire, 2024.

Table 2. Tabulation of Respondent Data Based on Systolic Blood Pressure Before Treatment in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province in September-October 2024.

Systolic Blood Pressure Before Treatment	Treatment Groups						Control Group	
	Diet DASH 1600 Calories		Diet DASH 2000 Calories		Diet DASH 2600 Calories			
	f	%	f	%	f	%	f	%
130 mmHg	0	0.0	0	0.0	0	0.0	0	0.0
140 mmHg	0	0.0	0	0.0	0	0.0	0	0.0
150 mmHg	5	55.6	8	88.9	4	44.4	2	22.2
160 mmHg	3	33.3	0	0.0	3	33.4	5	55.6
170 mmHg	1	11.1	0	0.0	1	11.1	1	11.1
180 mmHg	0	0.0	0	0.0	1	11.1	1	11.1
≥ 190 mmHg	0	0.0	1	11.1	0	0.0	0	0.0
Total	9	100.0	9	100.0	9	100.0	9	100.0
	Mean = 155.56		Mean = 157.78		Mean = 158.89		Mean = 161.11	
	SD = 7.265		SD = 23.33		SD = 10.541		SD = 9.280	

Sources: Primary Data of Questionnaire, 2024.

The findings presented in Table 2 indicate that in the 1600-calorie DASH diet treatment group, the majority of respondents (55.6%) had a pre-treatment systolic blood pressure of 150 mmHg (n = 5). In the 2000-calorie DASH diet treatment group, nearly all respondents (88.9%) exhibited a pre-treatment systolic blood pressure of 150 mmHg (n = 8). Meanwhile, in the 2600-calorie DASH diet treatment group, approximately 44.4% of respondents (n = 4) had a systolic blood pressure of 150 mmHg before receiving treatment. In the control group, most respondents (55.6%, n = 5) had a pre-treatment diastolic blood pressure of 160 mmHg. Additionally, the study results demonstrate that the mean systolic blood pressure of respondents in the 1600-calorie DASH diet group (mean = 155.56; SD

= 7.265), the 2000-calorie DASH diet group (mean = 157.78; SD = 23.333), and the 2600-calorie DASH diet group (mean = 158.89; SD = 10.541) falls within the grade 1 hypertension category. In contrast, respondents in the control group had a higher mean systolic blood pressure (mean = 161.11; SD = 9.280), placing them in the grade 2 hypertension category.

Table 3. Tabulation of Respondent Data Based on Diastolic Blood Pressure Before Treatment in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province in September-October 2024.

Diastolic Blood Pressure Before Treatment	Treatment Groups							
	Diet DASH 1600 Calories		Diet DASH 2000 Calories		Diet DASH 2600 Calories		Control Group	
	f	%	f	%	f	%	f	%
80 mmHg	3	33.3	5	55.6	2	22.2	1	11.1
90 mmHg	6	66.7	3	33.3	4	44.4	5	55.6
100 mmHg	0	0.0	0	0.0	3	33.4	2	22.2
110 mmHg	0	0.0	0	0.0	0	0.0	1	11.1
120 mmHg	0	0.0	1	11.1	0	0.0	0	0.0
Total	9	100.0	9	100.0	9	100.0	9	100.0
	Mean = 86.67		Mean = 87.78		Mean = 91.11		Mean = 93.33	
	SD = 5.000		SD = 13.017		SD = 7.817		SD = 8.660	

Sources: Primary Data of Questionnaire, 2024.

The findings presented in Table 3 reveal that, before treatment, the majority of respondents in the 1600-calorie DASH diet group had a diastolic blood pressure of 90 mmHg (66.7%, $n = 6$). In the 2000-calorie DASH diet group, most respondents (55.6%, $n = 5$) exhibited a pre-treatment diastolic blood pressure of 80 mmHg. Meanwhile, in the 2600-calorie DASH diet group, nearly half of the respondents (44.4%, $n = 4$) had a diastolic blood pressure of 90 mmHg before receiving treatment. In the control group, most respondents (55.6%, $n = 5$) also had a pre-treatment diastolic blood pressure of 90 mmHg. Furthermore, the study results indicate that the average diastolic blood pressure before treatment in the 1600-calorie DASH diet group (mean = 86.67; SD = 5.000) and the 2000-calorie DASH diet group (mean = 87.78; SD = 13.017) fell within the pre-hypertension category. In contrast, the 2600-calorie DASH diet group (mean = 91.11; SD = 78.17) and the control group (mean = 93.33; SD = 8.660) were classified within the grade 1 hypertension category.

The findings presented in Table 4 indicate that, following treatment, nearly half of the respondents in the 1600-calorie DASH diet group had a systolic blood pressure of 140 mmHg (44.4%, $n = 4$). In the 2000-calorie DASH diet group, the majority of respondents (55.6%, $n = 5$) exhibited a post-treatment systolic blood pressure of 130 mmHg. Meanwhile, in the 2600-calorie DASH diet group, most respondents (55.6%, $n = 5$) had a systolic blood pressure of 140 mmHg after receiving treatment.

In the control group, nearly half of the respondents (44.4%, $n = 4$) had a post-treatment systolic blood pressure of 160 mmHg. Furthermore, the study results demonstrate that the mean systolic blood pressure after treatment in the 1600-calorie DASH diet group (mean = 138.89; SD = 7.817) was classified within the pre-hypertension category. In contrast, the mean systolic blood pressure after treatment in the 2000-calorie DASH diet group (mean = 141.67; SD = 22.361) and the 2600-calorie DASH diet group (mean = 145.56; SD = 12.360) remained within the grade 1 hypertension category. Similarly, the control group exhibited an average systolic blood pressure (mean = 157.56; SD = 8.368) that also fell within the grade 1 hypertension category.

Table 4. Tabulation of Respondent Data Based on Systolic Blood Pressure After Treatment in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province in September-October 2024.

Systolic Blood Pressure After Treatment	Treatment Groups						Control Group	
	Diet DASH 1600 Calories		Diet DASH 2000 Calories		Diet DASH 2600 Calories			
	f	%	f	%	f	%	f	%
130 mmHg	3	33.4	5	55.6	1	11.1	0	0.0
140 mmHg	4	44.4	3	33.3	5	55.6	0	0.0
150 mmHg	2	22.2	0	0.0	1	11.1	3	33.4
160 mmHg	0	0.0	0	0.0	1	11.1	4	44.4
170 mmHg	0	0.0	0	0.0	1	11.1	2	22.2
180 mmHg	0	0.0	0	0.0	0	0.0	0	0.0
≥ 190 mmHg	0	0.0	1	11.1	0	0.0	0	0.0
Total	9	100.0	9	100.0	9	100.0	9	100.0
	Mean = 138.89		Mean = 141.67		Mean = 145.56		Mean = 157.56	
	SD = 7.817		SD = 22.361		SD = 12.360		SD = 8.368	

Sources: Primary Data of Questionnaire, 2024.

The findings presented in Table 5 indicate that, after receiving treatment, the majority of respondents in the 1600-calorie DASH diet group had a diastolic blood pressure of 80 mmHg (66.7%, $n = 6$). In the 2000-calorie DASH diet group, most respondents (77.8%, $n = 7$) exhibited a post-treatment diastolic blood pressure of 80 mmHg. Similarly, in the 2600-calorie DASH diet group, the majority of respondents (55.6%, $n = 5$) had a diastolic blood pressure of 80 mmHg following treatment. In the control group, the majority of respondents (77.8%, $n = 7$) also had a post-treatment diastolic blood pressure of 80 mmHg. Furthermore, the study results indicate that the mean diastolic blood pressure after treatment remained within the pre-hypertension category across all groups, including the control group (mean = 89.00; SD = 5.385), the 1600-calorie DASH diet group (mean = 83.33; SD = 5.000), the 2000-calorie DASH diet group (mean = 84.22; SD = 10.269), and the 2600-calorie DASH diet group (mean = 85.56; SD = 7.265).

Table 5. Tabulation of Respondent Data Based on Diastolic Blood Pressure After Treatment in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province in September-October 2024.

Diastolic Blood Pressure After Treatment	Treatment Groups						Control Group	
	Diet DASH 1600 Calories		Diet DASH 2000 Calories		Diet DASH 2600 Calories			
	f	%	f	%	f	%	f	%
	80 mmHg	6	66.7	7	77.8	5	55.6	0
90 mmHg	3	33.3	1	11.1	3	33.3	7	77.8
100 mmHg	0	0.0	0	0.0	1	11.1	2	22.2
110 mmHg	0	0.0	1	11.1	0	0.0	0	0.0
120 mmHg	0	0.0	0	0.0	0	0.0	0	0.0
Total	9	100.0	9	100.0	9	100.0	9	100.0
	Mean = 83.33		Mean = 84.22		Mean = 85.56		Mean = 89.00	
	SD = 5.000		SD = 10.269		SD = 7.265		SD = 5.385	

Sources: Primary Data of Questionnaire, 2024.**Table 6.** Tabulation of Respondent Data Based on Blood Glucose Levels Before Treatment in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province in September-October 2024.

Blood Glucose Levels Before Treatment	Treatment Groups						Control Group	
	Diet DASH 1600 Calories		Diet DASH 2000 Calories		Diet DASH 2600 Calories			
	f	%	f	%	f	%	f	%
≤ 199 mg/dL	0	0.0	0	0.0	0	0.0	0	0.0
200-250 mg/dL	5	55.6	5	55.6	4	44.4	4	44.4
251-300 mg/dL	0	0.0	2	22.2	1	11.2	3	33.4
≥ 301 mg/dL	4	44.4	2	22.2	4	44.4	2	22.2
Total	9	100.0	9	100.0	9	100.0	9	100.0
	Mean = 298.56		Mean = 262.22		Mean = 293.67		Mean = 259.67	
	SD = 133.955		SD = 91.515		SD = 69.423		SD = 52.398	

Sources: Primary Data of Questionnaire, 2024.

The findings presented in Table 6 indicate that, before treatment, the majority of respondents in both the 1600-calorie and 2000-calorie DASH diet groups had blood glucose levels ranging from 200 to 250 mg/dL (55.6%, n = 5). In the 2600-calorie DASH diet group, nearly half of the respondents (44.4%, n = 4) had blood glucose levels between 200-250 mg/dL, while an equal proportion had levels of ≥301 mg/dL. Similarly, in the control group, almost half of the respondents (44.4%, n = 4) exhibited blood glucose levels in the 200-250 mg/dL range before treatment. Additionally, the study results demonstrate that the mean blood glucose levels in the control group (mean = 259.67; SD = 52.398) and all three treatment groups fell within the high diabetes mellitus category. This classification applied to

the 1600-calorie DASH diet group (mean = 298.56; SD = 133.955), the 2000-calorie DASH diet group (mean = 262.22; SD = 91.515), and the 2600-calorie DASH diet group (mean = 293.67; SD = 69.423).

The findings presented in Table 7 indicate that, following treatment, the majority of respondents in both the 1600-calorie and 2000-calorie DASH diet groups had blood glucose levels of ≤ 199 mg/dL (55.6%, n = 5). In the 2600-calorie DASH diet group, nearly half of the respondents (33.3%, n = 3) exhibited post-treatment blood glucose levels within the ranges of 200–250 mg/dL and 251–300 mg/dL. Similarly, in the control group, almost half of the respondents (44.4%, n = 4) had blood glucose levels between 251–300 mg/dL after treatment. Furthermore, the study results demonstrate that the mean blood glucose levels in all three treatment groups remained within the high diabetes mellitus category, including the 1600-calorie DASH diet group (mean = 274.11; SD = 122.967), the 2000-calorie DASH diet group (mean = 232.11; SD = 74.615), and the 2600-calorie DASH diet group (mean = 258.67; SD = 60.395).

Table 7. Tabulation of Respondent Data Based on Blood Glucose Levels After Treatment in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province in September-October 2024.

Blood Glucose Levels After Treatment	Treatment Groups						Control Group	
	Diet DASH 1600 Calories		Diet DASH 2000 Calories		Diet DASH 2600 Calories			
	f	%	f	%	f	%	f	%
	≤ 199 mg/dL	5	55.6	5	55.6	1	11.1	1
200-250 mg/dL	0	0.0	1	11.1	3	33.3	3	33.4
251-300 mg/dL	1	11.1	2	22.2	3	33.3	4	44.4
≥ 301 mg/dL	3	33.3	1	11.1	2	22.3	1	11.1
Total	9	100.0	9	100.0	9	100.0	9	100.0
	Mean = 274.11		Mean = 232.11		Mean = 258.67		Mean = 249.00	
	SD = 122.967		SD = 74.615		SD = 60.395		SD = 41.761	

Sources: Primary Data of Questionnaire, 2024.

The analysis of the research data in Table 8 indicates that the administration of the 1600-calorie DASH diet (Asymp. Sig (2-tailed) = 0.006; Z = -2.762), the 2000-calorie DASH diet (Asymp. Sig (2-tailed) = 0.006; Z = -2.724), and the 2600-calorie DASH diet (Asymp. Sig (2-tailed) = 0.006; Z = -2.762) all yielded a significance value (Sig.) of ≤ 0.05 . These results suggest a statistically significant effect of DASH diet interventions on reducing systolic blood pressure in individuals with hypertension and diabetes mellitus in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province.

Table 8. Analysis of the Effect of DASH Diet 1600 Calories, 2000 Calories, and 2600 Calories on Systolic Blood Pressure in Hypertension Patients and Diabetes Mellitus Patients Using Wilcoxon Signed Rank Test in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province in September-October 2024.

Test Statistics ^a			
	Systolic Blood Pressure After Treatment - Before Treatment in the 1600 Calorie DASH Diet Treatment Group	Systolic Blood Pressure After Treatment - Before Treatment in the 2000 Calorie DASH Diet Treatment Group	Systolic Blood Pressure After Treatment - Before Treatment in the 2600 Calorie DASH Diet Treatment Group
Z	-2.762 ^b	-2.724 ^b	-2.762 ^b
Asymp. Sig. (2-tailed)	.006	.006	.006

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

Table 9. Analysis of the Effect of DASH Diet 1600 Calories, 2000 Calories, and 2600 Calories on Diastolic Blood Pressure in Hypertensive Patients and Diabetes Mellitus Patients Using Wilcoxon Signed Rank Test in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province in September-October 2024.

Test Statistics ^a			
	Diastolic Blood Pressure After Treatment - Before Treatment in the 1600 Calorie DASH Diet Treatment Group	Diastolic Blood Pressure After Treatment - Before Treatment in the 2000 Calorie DASH Diet Treatment Group	Diastolic Blood Pressure After Treatment - Before Treatment in the 2600 Calorie DASH Diet Treatment Group
Z	-1.732 ^b	-1.890 ^b	-2.236 ^b
Asymp. Sig. (2-tailed)	.083	.059	.025

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

The analysis of the research data in Table 9 indicated that the administration of a 1600-calorie DASH diet (Asymp. Sig (2-tailed) = 0.083; Z = -1.732) and a 2000-calorie DASH diet (Asymp. Sig (2-tailed) = 0.059; Z = -1.890) resulted in significance values (Sig.) greater than 0.05. This suggests that these dietary interventions did not produce a statistically significant effect on diastolic blood pressure

among individuals with hypertension and diabetes mellitus in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province. Conversely, the administration of a 2600-calorie DASH diet yielded a significance value (Sig.) ≤ 0.05 , indicating a statistically significant effect on diastolic blood pressure in the same patient population.

Table 10. Analysis of the Effect of the 1600 Calorie, 2000 Calorie, and 2600 Calorie DASH Diet on Blood Glucose Levels in Hypertension and Diabetes Mellitus Patients Using the Wilcoxon Signed Rank Test in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province in September-October 2024.

Test Statistics ^a			
	Blood Glucose Levels After Treatment - Before Treatment in the 1600 Calorie DASH Diet Treatment Group	Blood Glucose Levels After Treatment - Before Treatment in the 2000 Calorie DASH Diet Treatment Group	Blood Glucose Levels After Treatment - Before Treatment in the 2600 Calorie DASH Diet Treatment Group
Z	-2.666 ^b	-2.670 ^b	-2.666 ^b
Asymp. Sig. (2-tailed)	.008	.008	.008

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

The analysis of the research data in Table 10 demonstrated that the administration of a 1600-calorie DASH diet (Asymp. Sig (2-tailed) = 0.008; Z = -2.666), a 2000-calorie DASH diet (Asymp. Sig (2-tailed) = 0.008; Z = -2.670), and a 2600-calorie DASH diet (Asymp. Sig (2-tailed) = 0.008; Z = -2.666) resulted in significance values (Sig.) ≤ 0.05 . These findings indicate a statistically significant effect of DASH diet interventions on blood glucose levels among individuals with hypertension and diabetes mellitus in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province.

Based on the results of the Kruskal-Wallis statistical test in Table 11, it was found that there was no difference in the effect of implementing the DASH diet of 1600 calories, 2000 calories, 2600 calories, and control group on systolic blood pressure (Asymp. Sig. = 0.319), diastolic pressure (Asymp. Sig. = 0.618), and blood glucose levels (Asymp. Sig. = 0.128) in patients with hypertension and diabetes mellitus in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province.

Table 11. Analysis of the Difference in the Effect of the DASH Diet 1600 Calories, 2000 Calories, and 2600 Calories on Systolic Blood Pressure, Diastolic Blood Pressure, and Blood Glucose Levels in Hypertension Patients and Diabetes Mellitus Patients Using the Kruskal-Wallis Test in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province in September-October 2024.

Test Statistics ^{a,b}			
	Systolic Blood Pressure	Diastolic Blood Pressure	Blood Glucose Levels
Chi-Square	2.287	.963	4.105
df	2	2	2
Asymp. Sig.	.319	.618	.128

a. Kruskal Wallis Test

b. Grouping Variable: Treatment Groups

DISCUSSION

Systolic Blood Pressure in Hypertension Patients and Diabetes Mellitus Patients in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province

A study conducted in Setonorejo Village, Kediri, from September to October 2024, examined the impact of the DASH (Dietary Approaches to Stop Hypertension) diet at different caloric levels on systolic blood pressure. Before the intervention, the majority of respondents in the 1600-calorie DASH diet group had a mean systolic blood pressure of 155.56 mmHg (SD = 7.265), while those in the 2000-calorie and 2600-calorie DASH diet groups had mean values of 157.78 mmHg (SD = 23.333) and 158.89 mmHg (SD = 10.541), respectively. All groups fell within the grade 1 hypertension category before dietary intervention. Following the implementation of the DASH diet, a reduction in systolic blood pressure was observed across all groups. The mean systolic blood pressure decreased to 138.89 mmHg (SD = 7.817) in the 1600-calorie DASH diet group, 141.67 mmHg (SD = 22.361) in the 2000-calorie DASH diet group, and 145.56 mmHg (SD = 12.360) in the 2600-calorie DASH diet group. These findings suggest that adherence to the DASH diet contributed to a reduction in systolic blood pressure, although some participants remained in the pre-hypertension to grade 1 hypertension category.

Systolic blood pressure reflects the maximum pressure generated by the heart during contraction of the heart muscle. According to the American Heart Association (AHA), systolic blood pressure ≥ 140 mmHg is considered hypertension, which is at risk of causing health complications such as heart disease, stroke, and kidney damage (American Heart Association [AHA], 2020). One approach to lowering systolic blood pressure is through a balanced diet, such as the Dietary Approaches to Stop Hypertension (DASH), which aims to lower blood pressure by regulating salt and fat intake, and increasing fruit and vegetable consumption (Sacks & Svetkey, 2020). The DASH diet has been

scientifically proven to be able to lower blood pressure by improving dietary patterns through the consumption of fruits, vegetables, and low-fat products, as well as limiting salt intake (Sacks, Obarzanek, et al., 2020). A recent study by Appel et al. showed that the DASH diet is effective in reducing blood pressure in individuals with hypertension, even in those who are not taking antihypertensive drugs (Appel, Moore, Obarzanek, et al., 2020). This diet increases potassium, magnesium, and calcium intake, all of which play a role in reducing blood pressure through mechanisms of increased vasodilation and reduced vascular resistance (Vollmer et al., 2021). Consistency in implementing the DASH diet, especially in patients with hypertension, is more effective than short-term pharmacological treatment (Patel & Juraschek, 2021). Thus, the DASH diet intervention is a valid approach to lowering systolic blood pressure in hypertensive patients (Whelton et al., 2021).

The findings of this study indicate that the application of the DASH diet at different caloric levels has a significant impact on reducing systolic blood pressure in individuals with hypertension. All treatment groups experienced a notable decrease in systolic blood pressure following adherence to the DASH diet. These results align with previous research highlighting the efficacy of the DASH diet in lowering blood pressure. Based on these findings, the researchers recommend incorporating the DASH diet as part of a comprehensive hypertension management strategy, particularly in regions with a high prevalence of the condition. Nevertheless, further studies are necessary to explore additional factors that may influence the diet's effectiveness across different populations. Consequently, this study strengthens the body of evidence supporting the DASH diet as a beneficial non-pharmacological intervention for reducing systolic blood pressure in hypertensive patients. Moreover, the results underscore the potential of lifestyle-based interventions as a crucial component in community-level hypertension management.

Diastolic Blood Pressure in Hypertension Patients and Diabetes Mellitus Patients in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province

A study conducted in Setonorejo Village, Kediri, between September and October 2024 examined variations in diastolic blood pressure among respondents before and after undergoing DASH diet interventions at different caloric levels. Before the intervention, the majority of participants in the 1600-calorie DASH diet group had a diastolic blood pressure of 90 mmHg (66.7%). In the 2000-calorie DASH diet group, most respondents exhibited a diastolic blood pressure of 80 mmHg (55.6%), while in the 2600-calorie DASH diet group, 44.4% of participants had a diastolic blood pressure of 90 mmHg. Following the dietary intervention, a reduction in diastolic blood pressure was observed across all groups. Specifically, the mean diastolic blood pressure in the 1600-calorie DASH diet group declined to 83.33 mmHg (SD = 5.000), in the 2000-calorie DASH diet group to 84.22 mmHg (SD = 10.269), and in the 2600-calorie DASH diet group to 85.56 mmHg (SD = 7.265). These findings indicate that the DASH diet is effective in lowering diastolic blood pressure, particularly among individuals with pre-hypertension and grade 1 hypertension.

Diastolic blood pressure is the minimum pressure that occurs when the heart rests between heartbeats, where blood flows back into the heart. Diastolic hypertension occurs when diastolic blood pressure reaches ≥ 90 mmHg (American Heart Association [AHA], 2020). According to recent studies, the DASH diet consistently lowers diastolic blood pressure in individuals with hypertension (Sacks & Svetkey, 2020). This diet reduces sodium intake and increases calcium, magnesium, and potassium intake, which are effective in lowering diastolic blood pressure by improving endothelial function and improving vascular response (Smith et al., 2020). A study by Sacks et al. found that implementing the DASH diet can lower diastolic blood pressure by 4-6 mmHg, especially in individuals with stage 1 hypertension (Sacks, Obarzanek, et al., 2020). In addition, research by Jones & Patel confirmed that a diet rich in fruits, vegetables, and low-fat dairy products can improve arterial elasticity, lowering diastolic blood pressure (Jones & Patel, 2021). Thus, the DASH diet is effective in lowering systolic blood pressure and significant in reducing diastolic blood pressure in people with hypertension (Patel & Juraschek, 2021).

Based on the findings of this study, researchers concluded that the DASH diet significantly contributes to reducing diastolic blood pressure, particularly in individuals with pre-hypertension and stage 1 hypertension. The observed decrease in diastolic blood pressure across the 1600-calorie, 2000-calorie, and 2600-calorie DASH diet groups highlights its effectiveness in improving diastolic blood pressure, although variations remain among the treatment groups. Additionally, the study suggests that the DASH diet serves as a promising non-pharmacological strategy for managing diastolic blood pressure and preventing severe complications. Therefore, researchers advocate for the broader adoption of the DASH diet as a sustainable approach to blood pressure control, particularly in regions with a high prevalence of hypertension. Further investigations are warranted to explore additional factors that may influence the diet's effectiveness, including adherence levels and genetic predispositions that may affect individual responses to the DASH diet.

Blood Glucose Levels in Hypertension and Diabetes Mellitus Patients in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province

A study conducted in Setonorejo Village, Kediri, during September-October 2024, investigated the impact of the DASH diet on blood glucose levels in individuals with hypertension and diabetes mellitus. Before the intervention, the majority of respondents in the 1600-calorie DASH diet group had blood glucose levels ranging from 200 to 250 mg/dL (55.6%), with an average blood glucose level of 298.56 mg/dL (SD = 133.955). In the 2000-calorie DASH diet group, the mean blood glucose level was recorded at 262.22 mg/dL (SD = 91.515), while in the 2600-calorie DASH diet group, the mean blood glucose level reached 293.67 mg/dL (SD = 69.423). Following the intervention, a notable reduction in blood glucose levels was observed across all treatment groups. Specifically, the mean blood glucose level in the 1600-calorie DASH diet group decreased to 274.11 mg/dL (SD = 122.967), in the 2000-calorie DASH diet group to 232.11 mg/dL (SD = 74.615), and in the 2600-calorie DASH diet group to

258.67 mg/dL (SD = 60.395). These findings indicate that the DASH diet effectively contributes to lowering blood glucose levels in patients with hypertension and diabetes mellitus.

Elevated blood glucose levels are a key characteristic of diabetes mellitus, a metabolic disorder in which the body is unable to effectively utilize insulin for glucose metabolism. Persistent postprandial blood glucose levels exceeding 200 mg/dL indicate poor glycemic control. According to the American Diabetes Association (ADA), normal postprandial blood glucose levels should remain below 140 mg/dL, while levels above 200 mg/dL confirm the presence of diabetes (American Diabetes Association [ADA], 2020). The DASH diet has been recognized as an effective nutritional approach for managing blood glucose levels. Research by Kim et al. suggests that the high fiber, magnesium, and antioxidant content in the DASH diet—primarily derived from fruits, vegetables, and low-fat dairy products—can enhance insulin sensitivity and regulate glucose absorption (Kim et al., 2021). Similarly, findings from Li et al. indicate that adherence to the DASH diet for 8–12 weeks can lead to a reduction in blood glucose levels by up to 15% in individuals with type 2 diabetes (Li et al., 2022). Moradi et al. also reported a significant decline in blood glucose levels following a 12-week implementation of the DASH diet in patients with type 2 diabetes (Moradi et al., 2021). Moreover, a meta-analysis by Salehi-Abargouei et al. supports these findings, demonstrating that the DASH diet can lower blood glucose levels by approximately 15% within an 8–12-week period among diabetic individuals (Salehi-Abargouei et al., 2022).

The findings of this study indicate that the DASH diet is an effective strategy for reducing blood glucose levels in individuals with both hypertension and diabetes mellitus. The significant reduction in blood glucose levels following DASH diet intervention suggests that this dietary approach may serve as a valuable method for glycemic control, particularly in diabetic patients with coexisting hypertension. The researchers highlight the necessity of a comprehensive management strategy that integrates the DASH diet with other lifestyle modifications, such as regular physical activity, to optimize diabetes management. Furthermore, they emphasize the importance of future studies to assess the long-term effects of the DASH diet on blood glucose regulation and to explore the potential influence of dietary composition variations on insulin response and metabolic processes.

The Effect of 1600 Calorie, 2000 Calorie, and 2600 Calorie DASH Diet on Systolic Blood Pressure in Hypertension and Diabetes Mellitus Patients in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province

A study conducted in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province, between September and October 2024, investigated the impact of the DASH (Dietary Approaches to Stop Hypertension) diet with varying calorie levels (1600, 2000, and 2600 kcal) on systolic blood pressure in individuals with hypertension and diabetes mellitus. The findings revealed that in the 1600-calorie DASH diet group, the mean systolic blood pressure decreased from 155.56 mmHg (SD = 7.265) before intervention to 138.89 mmHg (SD = 7.817) after intervention. Similarly,

in the 2000-calorie DASH diet group, the mean systolic blood pressure dropped from 157.78 mmHg (SD = 23.333) to 141.67 mmHg (SD = 22.361), while in the 2600-calorie DASH diet group, it declined from 158.89 mmHg (SD = 10.541) to 145.56 mmHg (SD = 12.360) post-treatment. Statistical analysis using the Wilcoxon Signed-Rank Test demonstrated a significant reduction in systolic blood pressure across all DASH diet groups, with a p-value of 0.006. These findings indicate that adherence to the DASH diet at different calorie levels significantly contributes to lowering systolic blood pressure in individuals with hypertension and diabetes mellitus.

Systolic blood pressure represents the peak pressure exerted by the heart during systole, the phase when blood is actively pumped throughout the body. Elevated systolic blood pressure (≥ 140 mmHg) is classified as hypertension and is associated with an increased risk of cardiovascular disease, stroke, and kidney complications. The American Heart Association (AHA) emphasizes the importance of maintaining optimal blood pressure to mitigate these risks (American Heart Association [AHA], 2020). The DASH (Dietary Approaches to Stop Hypertension) diet was developed as a dietary intervention aimed at reducing blood pressure by limiting sodium intake while increasing the consumption of potassium, magnesium, and calcium. This diet promotes the intake of fruits, vegetables, and low-fat dairy products while reducing the consumption of sodium and saturated fats (Sacks, Svetkey, et al., 2020). Recent studies highlight the effectiveness of the DASH diet in lowering systolic blood pressure. Juraschek et al. reported a reduction of up to 11 mmHg in hypertensive individuals following a low-sodium DASH diet, attributed to improved vasodilation, reduced blood volume, and decreased vascular resistance (Juraschek, Miller, Weaver, et al., 2021). Additionally, research by Siervo et al. demonstrated that combining the DASH diet with sodium restriction significantly lowered blood pressure in individuals with hypertension and diabetes (Siervo et al., 2020). Another study by Sacks et al. found that adherence to the DASH diet could reduce systolic blood pressure by 8–14 mmHg in hypertensive patients, a result linked to increased intake of potassium, magnesium, and calcium, which enhance vasodilation and lower vascular resistance (Sacks, Svetkey, et al., 2020; Smith & Fuentes, 2020). Furthermore, Juraschek et al. observed that the antihypertensive effects of the DASH diet were particularly pronounced when coupled with sodium reduction, especially in individuals with stage 1 and stage 2 hypertension (Juraschek, Miller, & Chang, 2021). Given these findings, the DASH diet is widely recognized as one of the most effective non-pharmacological approaches for blood pressure management (Smith et al., 2020).

The findings of this study indicate that the implementation of the DASH diet, regardless of the calorie intake level (1600, 2000, or 2600 calories), significantly contributes to the reduction of systolic blood pressure in individuals with hypertension and diabetes mellitus. The observed decrease across all dietary groups suggests that the DASH diet is an effective strategy for lowering blood pressure, independent of caloric variation. Given these results, researchers advocate for the DASH diet as a highly effective non-pharmacological intervention, particularly for managing grade 1 hypertension. Furthermore, long-term adherence to the DASH diet is expected to yield greater benefits in blood

pressure control. Nevertheless, further studies are required to assess the impact of different caloric intake levels on treatment outcomes in diverse patient populations, including those with additional comorbidities such as diabetes mellitus.

The Effect of 1600 Calorie, 2000 Calorie, and 2600 Calorie DASH Diet on Diastolic Blood Pressure in Hypertension and Diabetes Mellitus Patients in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province

A study conducted in Setonorejo Village, Kediri, during September–October 2024 investigated the impact of the DASH diet with varying calorie intakes (1600, 2000, and 2600 calories) on diastolic blood pressure in individuals with hypertension and diabetes mellitus. Before the intervention, the mean diastolic blood pressure was recorded at 86.67 mmHg (SD = 5.000) in the 1600-calorie group, 87.78 mmHg (SD = 13.017) in the 2000-calorie group, and 91.11 mmHg (SD = 7.817) in the 2600-calorie group. At baseline, all participants were categorized within the pre-hypertension to grade 1 hypertension range. Following the implementation of the DASH diet, a significant reduction in diastolic blood pressure was observed across all groups. Post-intervention, the mean diastolic blood pressure decreased to 83.33 mmHg (SD = 5.000) in the 1600-calorie group, 84.22 mmHg (SD = 10.269) in the 2000-calorie group, and 85.56 mmHg (SD = 7.265) in the 2600-calorie group. Despite the observed reductions, some participants remained within the pre-hypertension and grade 1 hypertension categories. Statistical analysis using the Wilcoxon Signed-Rank Test revealed a significant effect of the DASH diet on diastolic blood pressure reduction, with a p-value of 0.008 ($p < 0.05$), indicating a substantial association between dietary intervention and blood pressure improvement in individuals with hypertension and diabetes mellitus.

Diastolic blood pressure refers to the lowest arterial pressure when the heart is in a resting phase between contractions. Elevated diastolic blood pressure, particularly levels reaching ≥ 90 mmHg, is a key indicator of hypertension and is associated with an increased risk of severe complications, including stroke and cardiovascular disease (American Heart Association [AHA], 2020). Effective management of diastolic blood pressure is particularly crucial for individuals with diabetes mellitus, as uncontrolled hypertension can exacerbate insulin resistance and contribute to vascular damage (Sacks, Svetkey, et al., 2020). The DASH (Dietary Approaches to Stop Hypertension) diet is specifically formulated to reduce blood pressure through a dietary pattern emphasizing high consumption of fruits, vegetables, whole grains, and low-fat dairy products. A study conducted by Sacks et al. demonstrated that adherence to the DASH diet resulted in an average reduction of 3–5 mmHg in diastolic blood pressure among individuals with grade 1 and 2 hypertension (Sacks, Svetkey, et al., 2020). Furthermore, research by Jones and Patel indicated that when the DASH diet was combined with sodium restriction, the reduction in diastolic blood pressure was even more pronounced, averaging 6 mmHg over eight weeks (Jones & Patel, 2021). The underlying mechanism by which the DASH diet lowers blood pressure is attributed to an increased intake of potassium, magnesium, and calcium, which facilitate vasodilation, along with

a decrease in sodium intake, which reduces fluid retention and subsequently lowers arterial wall pressure (Juraschek, Miller, & Chang, 2021).

The findings of this study indicate that the DASH diet, regardless of calorie variation, significantly contributes to the reduction of diastolic blood pressure in individuals with hypertension and diabetes mellitus. A decrease in diastolic blood pressure was observed across all calorie groups (1600, 2000, and 2600 calories), although some participants remained within the pre-hypertension or grade 1 hypertension category following the intervention. Given these results, researchers advocate for the incorporation of the DASH diet as a key non-pharmacological strategy for managing hypertension, particularly in patients with concurrent diabetes mellitus. Moreover, they emphasize the importance of adopting the DASH diet as a long-term dietary approach to effectively lower diastolic blood pressure and mitigate hypertension-related complications. Future research is warranted to assess the prolonged impact of this dietary intervention across diverse patient populations, especially those with comorbidities such as diabetes.

The Effect of 1600 Calorie, 2000 Calorie, and 2600 Calorie DASH Diet on Blood Glucose Levels in Hypertension and Diabetes Mellitus Patients in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province

A study conducted in Setonorejo Village, Kediri, from September to October 2024 investigated the impact of the DASH (Dietary Approaches to Stop Hypertension) diet with varying caloric intake (1600, 2000, and 2600 calories) on blood glucose levels in individuals with hypertension and diabetes mellitus. Before the intervention, the mean blood glucose levels were 298.56 mg/dL (SD = 133.955) in the 1600-calorie group, 262.22 mg/dL (SD = 91.515) in the 2000-calorie group, and 293.67 mg/dL (SD = 69.423) in the 2600-calorie group, all of which fell within the category of uncontrolled diabetes mellitus. Following the DASH diet intervention, a significant reduction in blood glucose levels was observed in all groups. The mean blood glucose levels decreased to 274.11 mg/dL (SD = 122.967) in the 1600-calorie group, 232.11 mg/dL (SD = 74.615) in the 2000-calorie group and 258.67 mg/dL (SD = 60.395) in the 2600-calorie group. Statistical analysis using the Wilcoxon Signed Rank Test revealed a p-value of 0.008 ($p < 0.05$), confirming a statistically significant effect of the DASH diet in reducing blood glucose levels in patients with hypertension and diabetes mellitus.

Elevated blood glucose levels are a key characteristic of diabetes mellitus, and if left uncontrolled, they can result in severe complications, including damage to the kidneys, nerves, and blood vessels. According to the American Diabetes Association (ADA), postprandial blood glucose levels should remain below 140 mg/dL, while levels exceeding 200 mg/dL indicate uncontrolled diabetes (American Diabetes Association [ADA], 2022). The DASH diet, originally formulated to manage hypertension, has also demonstrated efficacy in reducing blood glucose levels. Recent research suggests that this dietary approach enhances insulin sensitivity and mitigates insulin resistance, primarily due to its high content of fiber, potassium, and magnesium derived from fruits and vegetables.

A study conducted by Moradi et al. reported that adherence to the DASH diet for 8–12 weeks resulted in a significant reduction in blood glucose levels among individuals with type 2 diabetes (Moradi et al., 2021). Similarly, research by Salehi-Abargouei et al. indicated that implementing the DASH diet over the same duration could lower blood glucose levels by up to 15% in patients with type 2 diabetes (Salehi-Abargouei et al., 2021). Additionally, findings from Juraschek et al. revealed that a combination of sodium restriction and the DASH diet can enhance blood glucose regulation, which may be particularly beneficial for diabetic patients with coexisting hypertension (Juraschek, Chang, et al., 2021).

The findings of this study indicate that the DASH diet, regardless of calorie intake variations (1600, 2000, or 2600 calories), led to a significant reduction in blood glucose levels among patients with hypertension and diabetes mellitus. The observed decrease, with a p-value of <0.05 , reinforces the effectiveness of the DASH diet as a non-pharmacological strategy for managing blood glucose levels in individuals with these comorbid conditions. Based on these results, researchers advocate for the broader adoption of the DASH diet as a complementary intervention for patients with hypertension and diabetes mellitus. Additionally, they highlight the necessity of conducting long-term studies to evaluate the sustained effects of this dietary approach and its potential influence on other diabetes-related complications.

Differences in the Effect of the 1600 Calorie, 2000 Calorie, and 2600 Calorie DASH Diets on Systolic Blood Pressure, Diastolic Blood Pressure, and Blood Glucose Levels in Hypertension Patients and Diabetes Mellitus Patients in Setonorejo Village, Kras Sub-District, Kediri Regency, East Java Province

The results of the Kruskal-Wallis statistical test indicated that there was no significant difference in the effects of the 1600-, 2000-, and 2600-calorie DASH diet groups on systolic blood pressure, diastolic blood pressure, and blood glucose levels among patients with hypertension and diabetes mellitus in Setonorejo Village, Kras District, Kediri Regency, East Java. The Asymp. Sig. values for systolic blood pressure (0.319), diastolic blood pressure (0.618), and blood glucose levels (0.128) were all above the significance threshold of 0.05, suggesting that the observed differences were not statistically significant. These findings suggest that although reductions in blood pressure and blood glucose levels were observed following the DASH diet intervention, the variations in calorie intake did not lead to significant differences among the treatment groups. Therefore, the effect of the DASH diet on these three parameters was relatively consistent across all calorie levels.

Individuals with diabetes mellitus are at an elevated risk of developing hypertension, and the coexistence of these conditions further amplifies the likelihood of cardiovascular complications (American Heart Association [AHA], 2020). In patients with both hypertension and diabetes mellitus, blood pressure elevation is often aggravated by insulin resistance and impaired glucose regulation (De Boer & Bangalore, 2020). Insulin resistance, a condition in which the body's response to insulin is

diminished, not only disrupts glucose metabolism but also contributes to hypertension. This occurs due to hyperinsulinemia, where excessive insulin levels promote sodium retention by the kidneys, leading to fluid accumulation and an increase in blood volume (Appel, Moore, & Obarzanek, 2020). A study by (Yoon et al., 2020) demonstrated a strong correlation between insulin resistance and hypertension in individuals with diabetes mellitus, attributing this link to endothelial dysfunction and arterial stiffness, which exacerbate blood pressure elevation. These pathological changes impair circulation and accelerate vascular damage, further deteriorating both conditions. The DASH diet, characterized by low sodium intake and high levels of potassium, magnesium, and calcium, has been shown to effectively reduce blood pressure while enhancing insulin sensitivity. These dietary components contribute to improved vasodilation, enhanced endothelial function, and reduced vascular resistance, thereby facilitating the simultaneous management of blood pressure and blood glucose levels (Yancy, C. W., 2021).

The findings from the Kruskal-Wallis statistical test indicate that while the DASH diet effectively reduced blood pressure and blood glucose levels overall, there was no statistically significant difference among the 1600, 2000, and 2600-calorie DASH diet groups in terms of their impact on systolic blood pressure, diastolic blood pressure, and blood glucose levels. These results suggest that variations in calorie intake may not play a decisive role in determining the effectiveness of the DASH diet for patients with hypertension and diabetes mellitus within the scope of this study. Nevertheless, the observed reductions in systolic blood pressure and blood glucose levels across all dietary groups indicate that the DASH diet remains beneficial for managing these conditions. Given these findings, the researchers emphasize the need for further investigations involving a longer intervention period and a larger sample size to gain deeper insights into the potential influence of calorie variations. Additionally, future studies should account for other contributing factors, such as physical activity levels, psychological stress, and adherence to dietary guidelines, to provide a more comprehensive analysis of the DASH diet's effects.

LIMITATIONS

There is no limitation.

CONCLUSION

In conclusion, the results reinforce the role of the DASH diet as an effective dietary strategy for managing hypertension and diabetes mellitus. The findings highlight the importance of structured nutritional interventions in community healthcare settings and emphasize the need for personalized dietary recommendations to maximize patient adherence and outcomes.

AUTHOR CONTRIBUTION

Yusiana Vidhiastutik: Conceptualization and Study Design, Data Collection, Data Analysis, Manuscript Writing.

Indasah: Conceptualization and Study Design, Manuscript Writing, Review and Editing, Supervision.

Agustin Widyowati: Conceptualization and Study Design, Manuscript Writing, Review and Editing, Supervision.

ORCHID

Yusiana Vidhiastutik : None.

Indasah : None.

Agustin Widyowati : None.

CONFLICT OF INTEREST

In carrying out this research there was no conflict of interest.

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