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The effectiveness of hypertension self-management education (HSME) booklet for controlling blood pressure in hypertension patients

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Abstract

Hypertension, often characterized as a silent killer, frequently manifests without overt symptoms, necessitating rigorous long-term management to mitigate the risk of severe complications. This study investigates the clinical efficacy of a Hypertension Self-Management Education (HSME) booklet designed as an instructional tool for patients and their caregivers. Employing a quasi-experimental, one-group pretest-posttest design, the research was conducted in June 2025 with a purposive sample of 40 participants in Pacitan, East Java. Data analysis via SPSS (v. 29) revealed a significant reduction in systolic pressure among 87.5% of respondents and diastolic pressure in 45%. Wilcoxon signed-rank tests yielded p-values of 0.000 (systolic) and 0.001 (diastolic), confirming that the HSME booklet is an effective intervention for blood pressure stabilization and the promotion of healthy lifestyle adherence.

Keywords

Booklet, Hypertension self-management education, Effectiveness, Blood pressure control, Self-management

Introduction

Hypertension is a chronic pathology that, while incurable, remains manageable through a multifaceted therapeutic regimen. This approach integrates clinical consultations and pharmacological adherence with substantial lifestyle modifications, such as nutritional balance, physical activity, and stress mitigation. Research indicates that patient compliance is influenced by a complex interplay of clinical, systemic, and psychosocial factors, though these correlations occasionally exhibit inconsistency. Notably, a significant majority (91%) of literature reviews identify a direct link between suboptimal adherence and diminished clinical outcomes alongside increased economic burdens [1].

The challenge of maintaining compliance is particularly pronounced in long-term preventative therapies where immediate symptomatic relief is absent. Furthermore, patient perceptions of health risks and limited health literacy often lead to the

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premature discontinuation of antihypertensive treatment, which is strongly associated with adverse cardiovascular events [2]. Although hypertension often remains asymptomatic, its uncontrolled progression poses a severe threat to vital organs, potentially resulting in sudden mortality. Consequently, addressing low health literacy is vital, as it fundamentally impairs decision-making and patient autonomy [3]. Establishing a collaborative, respectful relationship between healthcare providers and families is therefore essential to facilitate shared decision-making and optimize long-term adherence [4].

Hypertension patients need support for health literacy. One model of health literacy is using booklets. This helps the audience learn more, spread the messages they have received to others, and encourages their curiosity to understand the topic more deeply [5]. The booklet can be viewed at any time by patients and their families, and can serve as a guidebook for controlling hypertension [6].

Booklets are a form of health literacy media that are easy to understand and tailored to the culture and literacy level of the community. Booklets can be modified to contain information on self-care for patients with hypertension, which can be used as material for joint evaluation discussions with families on the success of healthy lifestyle changes and the health benefits experienced by patients with hypertension on a daily basis.

The hypertension self-management education booklet is multifaceted, covering self-integration, healthy dietary modifications, physical activity, self-regulation, blood pressure control, interaction with health workers, and medication adherence. Additionally, Hypertension Self-Management Education addresses respondents' cognitive understanding of normal blood pressure, symptoms, risk factors, causes, complications, and the urgency of seeking medical help. Hypertension Self-Management Education is highly comprehensive in improving self-care management and the health of hypertensive patients.

Systematic adherence to blood pressure monitoring protocols, evidence-based dietary habits, and physical exertion guidelines remains the cornerstone of hypertensive care. The HSME booklet acts as an essential didactic resource, reinforcing the importance of treatment compliance and healthy behavioral patterns. Consequently, this educational medium assists patients in sustaining stable, physiological blood pressure ranges, thereby reducing the risk of long-term cardiovascular complications associated with uncontrolled hypertension

Method

Participants and study design

This study is a quantitative study with a quasi-experimental research design using a one-group pre-test post-test design. The population of this study consists of families with hypertensive patients in Jetis Lor Village. The sample size in this study is 40 respondents. The sampling technique used purposive sampling with inclusion criteria.

Measurement and procedure

Data collection based on Table 1 was conducted using the hypertension Self-management Behavior Questionnaire (HMSBQ). Researchers conducted a pre-test (questionnaire) and then implemented the Hypertension Self-management Education (HSME) intervention using a booklet. After the intervention, respondents were invited to join a WhatsApp group for follow-up and reminders to fill out the diary in the booklet attachment. The post-test questionnaire was completed one week after the intervention. The questionnaire consisted of five main components of hypertension self-management, including self-integration, self-regulation, blood pressure control, interaction with healthcare professionals, and medication adherence.

Table 1. Components and Indicators of the hypertension self-management behavior questionnaire (HMSBQ)

Component	Indicators
Self-Integration	Diet modification, salt restriction, fruit and vegetable consumption, physical activity
Self-Regulation	Understanding normal BP range, recognizing symptoms, knowledge of risk factors, awareness of complications
Blood Pressure Control	Routine BP monitoring, recording BP results
Interaction with Healthcare Professionals	Consulting doctors/nurses, reporting symptoms, asking questions
Medication Adherence	Taking medication as prescribed, not stopping medication without consultation

Statistical analysis and ethical clearance

This study involved two types of data. Blood pressure measurements (systolic and diastolic) were treated as ratio data because they have a true zero value and equal intervals between measurements. The Hypertension Self-Management Behavior Questionnaire (HMSBQ) items were measured using a Likert scale and were considered ordinal data. However, after summing the item scores into a total score, the data were treated as interval data for statistical analysis.

Because the data were not normally distributed, the Wilcoxon Signed-Rank Test was used to examine differences in blood pressure and self-management behavior scores before and after the intervention ($p \leq 0.05$). Furthermore, this study has undergone ethical review and has been declared ethically sound with an ethical statement issued by the Health Research Ethics Committee of the Faculty of Health Sciences, Muhammadiyah University of Ponorogo, on June 12, 2025, with letter No. 698/ER/KEPK/2025.

Results

Baseline hemodynamic profile

Prior to the Hypertension Self-Management Education (HSME) intervention, the baseline hemodynamic profile of participants in Jetis Lor Village was characterized by a mean systolic blood pressure (SBP) of 151.00 mmHg (SD = 13.550) and a mean diastolic

blood pressure (DBP) of 86.63 mmHg (SD = 6.344). As detailed in Table 2, the SBP measurements ranged from 120 to 170 mmHg, while DBP values spanned from 70 to 100 mmHg, indicating a prevalent hypertensive state among the cohort at the onset of the study.

Table 2. Blood pressure of hypertensive patients before Hypertension self-management Education

Variable	Mean	S.D	Min	Max	Lower (CI 95%)	Upper (CI 95%)
Systolic blood pressure	151.00	13.550	120	170	146.67	155.33
Diastolic blood pressure	86.63	6.344	70	100	84.60	88.65

Post-intervention outcomes

Following the one-week HSME booklet intervention, a marked reduction in blood pressure metrics was observed. Table 3 illustrates that the post-intervention mean SBP declined to 136.75 mmHg (SD = 11.633), with a corresponding mean DBP of 83.00 mmHg (SD = 6.679). Maximum recorded values for SBP and DBP also decreased to 160 mmHg and 90 mmHg, respectively, suggesting a shift toward more controlled physiological ranges.

Table 3. Blood pressure of hypertensive patients after hypertension self-management education

Variable	Mean	S.D	Min	Max	Lower (CI 95%)	Upper (CI 95%)
Systolic blood pressure	136.75	11.633	120	160	133.03	140.47
Diastolic blood pressure	83.00	6.679	70	90	80.86	85.14

Comparative analysis of blood pressure variations

The longitudinal changes in blood pressure, summarized in Table 4, demonstrate the clinical impact of the educational intervention. The average SBP exhibited a significant reduction of 14.25 mmHg, transitioning from a hypertensive baseline (151 mmHg) to a normotensive average (136.75 mmHg). Similarly, DBP decreased by 3.63 mmHg. These findings conclude that the structured HSME booklet intervention effectively facilitates a downward trend in both systolic and diastolic pressures, successfully transitioning participants from high-risk categories to normalized blood pressure levels.

Table 4. Changes in blood pressure before and after hypertension self-management education

Variable	Pre-test Average	Post-test Average	Change	Description
Systolic blood pressure	151.00	136.75	14.25	Decreasing
Diastolic blood pressure	86.63	83.00	3.63	Decreasing

The effect of hypertension self-management education using booklets on blood pressure in hypertensive patients in jetis lor village

1. Normality test

   To determine the appropriate statistical framework for hypothesis testing, a normality assessment was performed on the pre- and post-intervention datasets. Given that the study involved a sample size of fewer than 50 participants (N=40), the Shapiro-Wilk test was employed. The results indicated that the significance values for

systolic (p=0.002) and diastolic (p < 0.05) measurements were consistently below the 0.05 threshold. Consequently, the null hypothesis for normal distribution was rejected, confirming that the data were not normally distributed. Based on these findings, the non-parametric Wilcoxon Signed-Rank Test was selected for subsequent analysis.

2. Wilcoxon signed-rank test

The therapeutic efficacy of the HSME booklet on blood pressure reduction is summarized in Table 5. Following the intervention, 35 participants (87.5%) exhibited a notable decrease in systolic blood pressure (SBP), while 5 participants (12.5%) remained stable. Regarding diastolic blood pressure (DBP), a reduction was observed in 18 respondents (45%), with 20 respondents (50%) showing no change. Statistical analysis yielded a p-value of 0.000 for SBP and 0.001 for DBP. Since both p-values were significantly below the *a*=0.05 level, H0 was rejected. These results provide strong empirical evidence that Hypertension Self-Management Education (HSME) significantly reduces blood pressure levels among hypertensive patients in Jetis Lor Village.

Tabel 5. Statistical test results of the effectiveness of hypertension self-management education on blood pressure reduction in hypertensive patients

Blood Pressure		N	P-Value
Post-HSME systole – Pre-HSME systole	Negative ranks	35	0.000
	Positive ranks	0	
	Ties	5	
	Total	40	
Post-HSME diastole – Pre HSME diastole	Negative ranks	18	0.001
	Positive ranks	2	
	Ties	20	
	Total	40	

Discussion

The results of the study show that the provision of hypertension self-management education (HSME) intervention based on booklets has a significant effect on lowering blood pressure in hypertensive patients in Jetis Lor Village. This intervention resulted in clinically and statistically significant reductions in both systolic and diastolic blood pressure measurements. The booklet provides health literacy for hypertensive patients. It enables hypertensive patients to access, understand, evaluate, and communicate health information, including facilitating discussions about patients' supportive care needs and reducing the severity of symptoms.

Based on the Wilcoxon test results, there was a significant difference between blood pressure before and after the intervention, with a p-value of 0.000 for systolic blood pressure and 0.001 for diastolic blood pressure. A total of 35 respondents (87.5%) experienced a decrease in systolic blood pressure and 18 respondents (45%) experienced a decrease in diastolic blood pressure.

The findings of this study demonstrate that the implementation of a booklet-based Hypertension Self-Management Education (HSME) intervention significantly reduces blood pressure among patients in Jetis Lor Village. Beyond statistical significance, the observed reductions in systolic (SBP) and diastolic blood pressure (DBP) carry substantial clinical implications. The HSME booklet functions as a pivotal instrument for enhancing health literacy, empowering patients to effectively access, synthesize, and apply health-related information. This improved literacy facilitates better communication regarding supportive care needs and aids in mitigating the severity of hypertensive symptoms [7].

Statistical analysis via the Wilcoxon test confirmed a significant disparity between pre- and post-intervention measurements, with p-values of 0.000 (SBP) and 0.001 (DBP). Specifically, 87.5% of the cohort experienced an SBP reduction, while 45% showed a decrease in DBP.

Average reduction in systolic and diastolic blood pressure

As illustrated in Figure 1, the average SBP declined by 14.25 mmHg (from 151 mmHg to 136.75 mmHg), and DBP fell by 3.63 mmHg (from 86.63 mmHg to 83.00 mmHg). From a clinical perspective, every 10 mmHg reduction in SBP is associated with a 20% lower risk of cardiovascular disease, a 27% reduction in stroke incidence, and a significant decrease in heart failure and coronary artery disease mortality [8]. The more pronounced impact on systolic pressure compared to diastolic pressure may be attributed to the sensitivity of SBP to behavioral and lifestyle modifications [9]. Systolic levels are highly influenced by sympathetic nervous system activity and peripheral vascular resistance, both of which are modifiable through the dietary adjustments, physical exertion, and stress management techniques emphasized in the HSME booklet [10] [11]. Conversely, as noted in previous literature, the cessation of such therapeutic adherence can lead to a sharp rebound in pressure, emphasizing the necessity of the continuous education provided by this intervention [2].

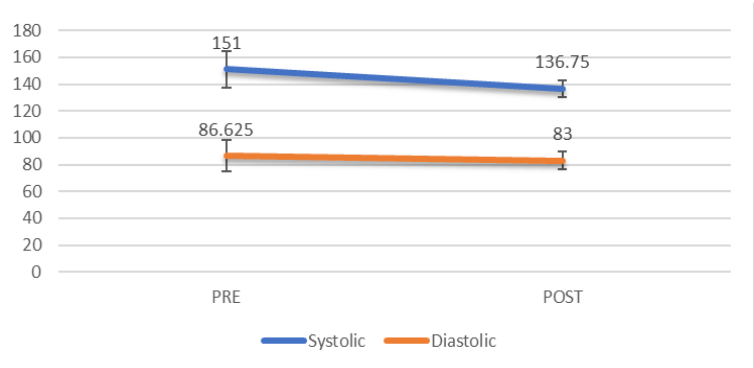

Figure 1. Decrease in systolic and diastolic blood pressure before and after HSME

Self-management components that affect blood pressure reduction

The HSME intervention includes various components of self-management of hypertension, and the significant reduction in blood pressure in patients receiving HSME demonstrates the success of increasing knowledge and changing health behaviors [12].

In line with research conducted by [13], hypertension education using booklets has an effect on increasing the knowledge and self-management attitudes of hypertension patients, thereby changing behaviors that impact patients' blood pressure. Education that focuses on self-management behaviors generally results in patient compliance with lifestyle modifications such as following a hypertension diet, engaging in physical activity, and adhering to treatment plans [14].

In this study, behavioral changes can be seen from the questionnaire results, where each component of self-management showed an increase in scores. This indicates that the five indicators of self-management, namely self-integration, self-regulation, blood pressure control, interaction with health workers, and medication adherence, each contributed to the reduction in respondents' blood pressure. HSME also changed the decision-making process between patients and their families. This is a form of appreciation within the family. A mutually respectful relationship is necessary to achieve optimal behavioral compliance [4].

Self-integration: Modification of healthy eating patterns and physical activity

The HMSE booklet has changed the self-integration behavior of all respondents on 13 indicators. The highest increase was in the indicator of fruit, vegetable, and nut consumption, with 42.5% of respondents showing improvement based Figure 2. The increase in self-integration behavior indicates that respondents have begun to improve their lifestyle through diet and increased simple physical activities such as walking or exercise, which have been proven to lower systolic blood pressure [15]. Changes in respondents' behavior related to diet and lifestyle, such as reducing high-salt foods and better portion control, as well as increasing simple physical activities such as walking and exercising, contributed significantly to the reduction in both systolic and diastolic blood pressure. Booklets as a medium for educating patients about healthy and varied diets [4].

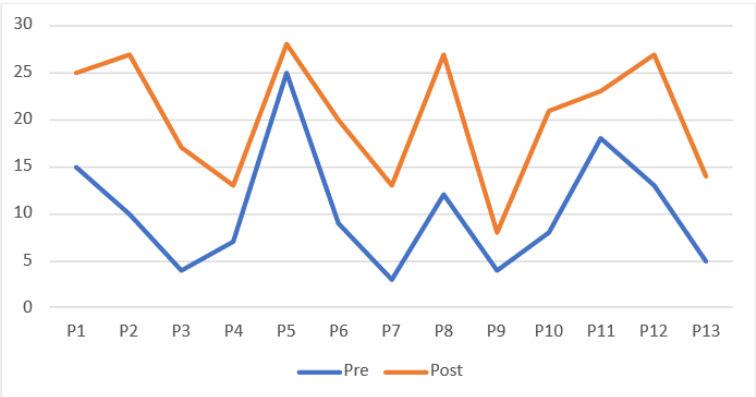

Figure 2. Self-integration component improvement after HSME

Booklets that provide examples of daily menus and recommendations for physical activities tailored to the local conditions of respondents can help people with hypertension improve their lifestyle to become healthier. The number of patients who exercised also increased by 37.5% after receiving the HMSE booklet. Increased physical

activity and exercise training (ET) leading to improved cardiorespiratory fitness levels are necessary in all age groups, races, and ethnicities, as well as both genders, to prevent various chronic diseases, especially cardiovascular diseases.

Self-regulation

Self-management components are very important in the management of hypertension [16]. Based on Figure 3 self-regulation, which includes understanding normal blood pressure ranges, signs and symptoms, risk factors, causes, complications, and the urgency of seeking medical help, can increase the participation of patients and their families in taking an active role in self-management [17]. The highest change in patient self-regulation behavior before and after intervention was in the indicator of patients recognizing signs and symptoms of increased blood pressure, with 45% of patients showing improvement. Self-monitoring of blood pressure can improve blood pressure control, thereby detecting uncontrolled blood pressure. Although in this study the respondents had limited access to blood pressure measuring devices at home, the questionnaire results still showed an improvement in good blood pressure control behavior. Adherence is associated with disease factors, therapy factors, healthcare factors, patient factors, and social factors, although with some inconsistencies. In total, 91% of reviews discussing outcomes reported that low adherence was associated with poorer clinical and economic outcomes [1].

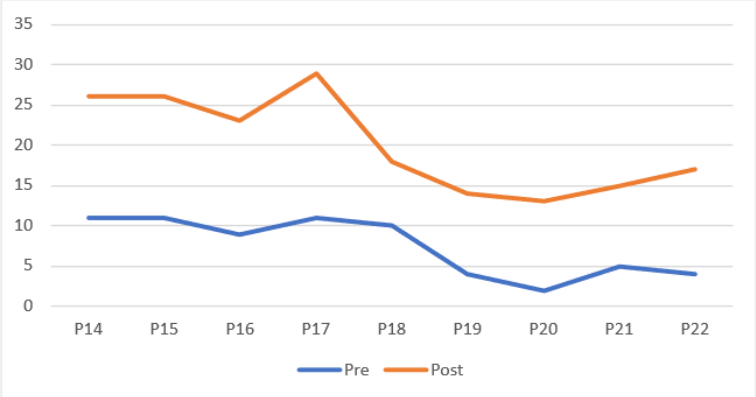

Figure 3. Self-regulation component improvement after HSME

Interaction with healthcare professionals

Improvements in indicators of interaction with health workers show that respondents became more proactive in communicating with health workers after receiving HSME education present by Figure 4. A better understanding of hypertension empowered patients to ask relevant questions, report symptoms or side effects, and participate in decision-making related to the management of their disease [18]. The importance of an open and effective relationship between patients and healthcare professionals [19]. Recognize changes and know how and when to contact healthcare professionals. Patients who interacted more with healthcare professionals after the intervention increased by 42.5%. Studies with complete engagement reports at the time of this investigation (26/29) showed that 92 percent reported engagement with patients and

stakeholders in the selection of interventions, and 88 percent involved stakeholders in the selection or measurement of outcomes.

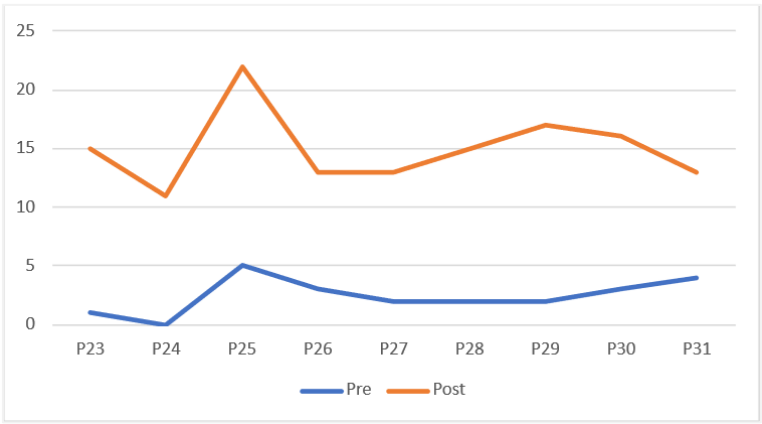

Figure 4. Interaction with healthcare professional's component improvement after HSME

Blood pressure control

On Figure 5 the patient went to the doctor to have his blood pressure checked when he felt that it had increased by 50%.

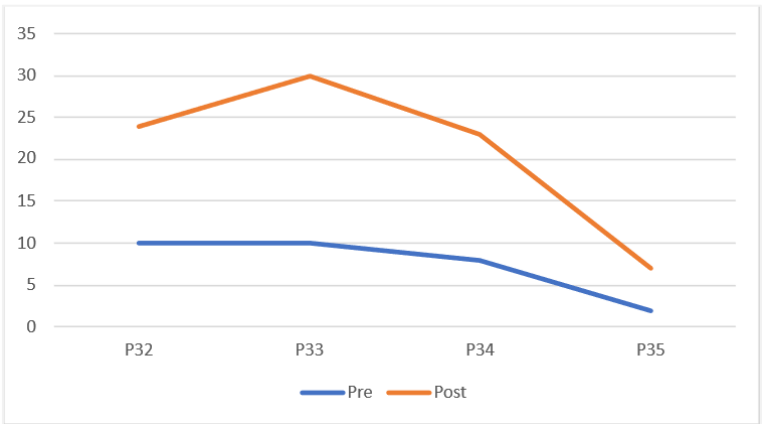

Figure 5. Blood pressure control component improvement after HSME

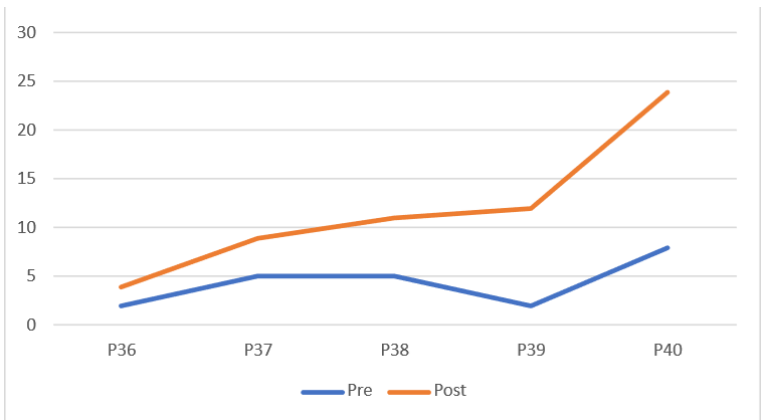

Figure 6. Blood Pressure Control Component Improvement After HSME

Medication adherence

Patients who followed their doctor's/nurse's advice on controlling blood pressure increased by 20% present at Figure 6.

In addition to lifestyle changes, another equally important component of self-management in lowering blood pressure is medication adherence. Non-adherence to antihypertensive medication is a major contributor to uncontrolled blood pressure [20]. In this study, it was found that the improvement in medication adherence behavior was still the lowest compared to other indicators, but it still showed an increase. Research by Ernawati et al., (2022) states that patients who are non-compliant with antihypertensive medication are six times more likely to experience uncontrolled blood pressure. Adherence may be a particular problem when medication is used as a long-term prevention strategy rather than to relieve symptoms. Patients' perceptions of the risks associated with their disease may also play a role [1].

Effectiveness of hypertension self-management education media booklets on blood pressure reduction

The significant decrease in blood pressure in this study is most likely the result of collaboration between the components of self-management. Improvements in dietary modification, increased physical activity, more consistent blood pressure monitoring practices, more effective communication with health workers, and increased medication adherence worked together and supported each other, resulting in more optimal blood pressure control.

Compliance may also depend on patients' awareness of alternative treatments that may have fewer side effects. Patients may be unaware of these alternatives and discontinue their current medication when faced with intolerable side effects or delays in providing healthcare support to explore viable alternatives [22].

Using booklets as an educational medium that provides systematically organized, comprehensive, and easily accessible information can help respondents read the booklet at any time and learn more quickly and extensively, as well as serve as a guidebook for controlling hypertension [23]. Health literacy also considers the readability of the material, including the use of visual aids to reinforce understanding, literacy levels, and design features such as font size.

Booklets are a means of information that can be used to reach the community. Written in simple and informal language, they can trigger changes in people's behavior and attitudes [24]. Booklets provide relevant self-care information in an easy-to-understand format.

Conclusion

This study shows that hypertension self-management Education (HSME) using booklets resulted in a statistically and clinically significant reduction in systolic and diastolic blood pressure in hypertensive patients in Jetis Lor Village, Nawangan District, Pacitan Regency. An average reduction of 14.25 mmHg in systolic and 3.63 mmHg in diastolic blood pressure was achieved through educational interventions that increased knowledge and changed self-management behaviors in five key components: self-

integration (diet modification and physical activity), self-regulation (understanding of hypertension), blood pressure control, interaction with health workers, and medication adherence.

The results of this study contribute to primary health care practice by demonstrating that cost-effective and easily scalable educational interventions can be an effective strategy for improving hypertension control at the community level. An approach that combines lifestyle modification with increased adherence to pharmacological therapy has an impact on improving cardiovascular health.

However, challenges remain in maintaining long-term behavioral changes, particularly in medication adherence and consistent self-monitoring. Further research should focus on developing more effective follow-up strategies, improving access to blood pressure monitoring devices, and evaluating the impact of interventions over a longer period of time.

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