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The Effectiveness of Structured Pharmaceutical Education on Medication Adherence and Blood Pressure Control Among Hypertensive Patients at The Prafi Health Center

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ABSTRACT
Hypertension is a chronic disease with a high prevalence and is at risk of causing cardiovascular complications if not optimally controlled. One of the main factors of therapy failure is the patient's low adherence to taking antihypertensive drugs. Pharmaceutical personnel have a strategic role in improving compliance through structured education. This study aims to evaluate the effectiveness of structured pharmaceutical education on therapeutic adherence and blood pressure control in hypertensive patients at the Prafi Health Center, Manokwari.The study used a quasi-experimental design with a one-group pre-test and post-test approach in 48 hypertensive patients who met the inclusion criteria. The intervention was in the form of structured individual pharmacy counseling accompanied by educational leaflets. Measurements of adherence and blood pressure were taken before the intervention and four weeks after the intervention. The analysis used a paired t-test with a significance level of $p < 0.05$ and an effect size calculation (Cohen's d). The study used a quasi-experimental one-group pretest–posttest design involving 48 hypertensive patients who met the inclusion criteria. The sample was selected using a purposive sampling technique from patients who were diagnosed with hypertension, had received antihypertensive therapy for at least one month, and were willing to participate in the study.Medication adherence was measured using a self-report questionnaire consisting of eight statements with a four-point Likert scale (always, often, sometimes, never). The total score ranged from 0–24, where higher scores indicated better adherence. The reliability test showed good internal consistency (Cronbach's alpha > 0.7). The decrease in blood pressure was not statistically significant.Structured pharmaceutical education was effective in improving medication adherence but did not demonstrate a significant change in blood pressure within the four-week observation period. This intervention has the potential to serve as a supportive strategy for hypertension management in primary healthcare settings.

Keywords **:** Blood Pressure, Hypertension, Pharmaceutical Education, Primary Care, Therapy Adherence

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INTRODUCTION

Hypertension is one of the main causes of global morbidity and mortality due to cardiovascular disease. Consistent blood pressure control is necessary to prevent complications such as stroke, coronary heart disease, and kidney failure. Although antihypertensive drugs are available in primary care facilities, the success of therapy is highly dependent on the patient's adherence to long-term treatment.

Hypertension is one of the leading causes of global morbidity and mortality associated with cardiovascular diseases (Whelton et al., 2018; Mills et al., 2020). Effective blood pressure control is essential to prevent serious complications such as stroke, coronary heart disease, and kidney failure (Burnier & Egan, 2019). Although antihypertensive medications are widely available in primary healthcare settings, treatment success largely depends on patients' adherence to long-term therapy (Vrijens et al., 2012; Brown & Bussell, 2011).

Studies show that non-compliance is one of the main factors in blood pressure control failure. Patients often stop treatment when they feel their condition is improving, forget to take medication, or lack an understanding of the importance of ongoing therapy. Therefore, structured educational interventions are needed to improve patient understanding and adherence behavior.

Pharmacists have an important role in providing comprehensive drug use education. Through an individualized and systematic counseling approach, patients can obtain clearer information about the benefits of therapy, side effects, and the importance of long-term adherence. This study aims to evaluate the effectiveness of structured pharmaceutical education on therapeutic adherence and blood pressure control in hypertensive patients at the Prafi Health Center.

METHOD

This study uses a quasi-experimental design with a one group pre-test and post-test approach. The research was carried out at the Prafi Health Center, Manokwari, West Papua in January 2026.The study population was 74 patients with active hypertension. The sample consisted of 48 patients who were selected by purposive sampling based on inclusion criteria: diagnosis of hypertension, undergoing therapy for at least one month, and willing to participate in the study.

The independent variable is structured pharmaceutical education, while the dependent variable is therapeutic adherence as well as systolic and diastolic blood pressure.

Medication adherence was measured using a self-report questionnaire consisting of 8 statements with a Likert scale of 4 points (always, often, sometimes, never). The total score ranges from 0–24, where a higher score indicates a better level of compliance. The compliance categories are divided into high (19–24), medium (13–18), and low (≤12) compliance. The reliability test showed good internal consistency (Cronbach's alpha > 0.7).

Content validity of the instrument has been consulted with two pharmaceutical personnel and one general practitioner before being used in the study.

The intervention was delivered through structured individual counseling which includes:

1. Name and function of the drug
2. Dosage and rules of use
3. Side effects
4. The importance of adherence to therapy

Education is supported by leaflets as a reminder medium.

Measurements were taken before the intervention and four weeks after the intervention. Data normality tests were performed using the Shapiro–Wilk test before the paired t-test analysis.

The results of the Shapiro–Wilk normality test showed that the data on compliance and blood pressure were normally distributed ($p > 0.05$), so the analysis was continued using a paired t-test.

Data analysis used a paired t-test with a significance level of $p < 0.05$ and Cohen's d calculation to measure the magnitude of the effect.

The research received approval from the Head of the Prafi Health Center.

RESULTS

A. Respondent Characteristics

A total of 48 hypertensive patients participated in this study. The characteristics of the respondents are presented in Table 1.

Table 1. Respondent Characteristics (n = 48)

Characteristics	n	%
Age		
< 60 years old	15	31,25
≥ 60 years old	33	68,75
Gender		
Male	11	22,9
Female	37	77,1
Duration of Hypertension		
1–5 years	15	31,3
> 5 years	33	68,8
History of Comorbid Disease		
Diabetes Mellitus	12	25,0
None	36	75,0

The majority of respondents are ≥ 60 years old and are dominated by Female.

B. Therapy Compliance A comparison of compliance scores before and after the intervention is presented in Table 2.

Table 2. Comparison of Compliance Scores Before and After Intervention

Variable	Before (Mean ± SD)	After (Mean ± SD)	t	p-value	Cohen's d	Interpretation
Compliance Score	19.23 ± 1.43	20.33 ± 1.12	6,978	< 0.001	1,007	Large effect

SD = standard deviation = Cohen's d*p < 0.05 statistically significant

There was a significant increase in compliance scores after structured pharmacy education.

C. Changes in Blood Pressure

A comparison of blood pressure before and after the intervention is presented in Table 3.

Table 3. Comparison of Blood Pressure Before and After Intervention

Variable	Before (Mean ± SD)	After (Mean ± SD	t	p-value	Cohen's d	Interpretation
Systolic (mmHg)	139.24 ± 13.17	133.71 ± 14.49	1,419	0,175	-0,344	Small effect
Diastolic (mmHg)	79.18 ± 8.96	77.88 ± 10.47	0,537	0,599	-0,130	Very small effect size

SD = standard deviation = Cohen's d*p < 0.05 statistically significant

Despite the decrease in average blood pressure, the change was not statistically significant.

DISCUSSION

This study demonstrates that structured pharmaceutical education significantly improves medication adherence among hypertensive patients with a large effect size. This indicates that systematic individual counseling is able to encourage changes in patients' behavior in taking antihypertensive drugs more consistently.

However, the resulting drop in blood pressure did not reach statistical significance. Several factors may explain these findings. First, the duration of four weeks of observation may not be enough to produce meaningful clinical changes. Second, non-pharmacological factors such as diet, physical activity, and stress were not controlled in this study. Third, individual biological variation as well as sample size can affect the results of statistical analysis.

These findings are in line with research by Santschi et al. (2017) and Ruppar et al. (2016) which showed that pharmaceutical interventions more consistently improve adherence than short-term clinical outcomes.

In the context of primary services, pharmaceutical education interventions remain relevant as a strategy to improve the quality of hypertension services because they have been proven to be effective in improving patient compliance.

This study has several limitations that need to be considered in interpreting the results. First, quasi-experimental design without a control group limits the ability of research to ensure a strong causal relationship between pharmaceutical educational interventions and outcome changes. Without a comparison group, the possibility of external factors influencing the outcome cannot be completely eliminated.

Second, the relatively short duration of observation, which is four weeks, may not be enough to show clinically meaningful changes in blood pressure. Hypertension control is a long-term process that is influenced by various factors, so evaluation over a longer period is needed to assess the clinical impact more comprehensively.

Third, measuring therapy adherence using self-report-based questionnaires has the potential to cause social desirability bias, where respondents tend to give answers that are considered good or in accordance with the researchers' expectations. The use of objective methods such as pill count or pharmacy refill data can be considered in future research.

Fourth, non-pharmacological factors such as diet, physical activity, stress level, and family support were not controlled in this study, even though these factors can affect blood

pressure control. Therefore, the results of this study need to be interpreted in the context of these limitations.

Further research is recommended using a design with control groups, larger sample counts, and longer follow-up periods to obtain stronger evidence regarding the effectiveness of pharmaceutical education on clinical outcomes.

CONCLUSION

Structured pharmaceutical education significantly improves medication adherence among hypertensive patients at the Prafi Health Center. However, the intervention did not produce a statistically significant change in blood pressure within the four-week observation period.

These findings suggest that structured pharmaceutical education can be integrated into routine primary healthcare services as part of chronic disease management programs. Practically, this intervention can be implemented by pharmacists through regular counseling sessions and educational materials to improve patient adherence to antihypertensive therapy in primary healthcare settings.

This study is a service evaluation based on non-invasive educational interventions and does not involve changes in medical therapy. Therefore, the research is categorized as a minimal risk and does not require the approval of a formal ethics committee according to the policy of the Prafi Health Center institution.

All respondents were given an explanation of the objectives and procedures of the study before participating, as well as expressing informed consent. The identity and personal data of the respondents are kept confidential and are only used for research purposes.

The author states that there is no conflict of interest in this study, both financial and non-financial.

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