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Relationship Between Medication Adherence and Blood Pressure Control in Elderly Hypertensive Patients at the UPTD Bongo II Community Health Center (Puskesmas)

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ABSTRACT

if not properly controlled. Medication adherence is an important factor in the management of hypertension. This study aimed to determine the relationship between medication adherence and blood pressure control among elderly patients with hypertension. This study employed an analytical design with a cross-sectional approach involving 60 respondents selected using a purposive sampling technique. Data were collected using a medication adherence questionnaire and blood pressure measurements and were analyzed using the Chi-Square test and Fisher's Exact Test with a significance level of 0.05. The results showed that most respondents were non-adherent to medication (85.0%), and the majority had uncontrolled blood pressure (91.7%). Statistical analysis revealed no significant relationship between medication adherence and blood pressure control ($p = 1.000$). It can be concluded that medication adherence was not significantly associated with blood pressure control among elderly hypertensive patients. Therefore, increased education and a comprehensive approach are needed in managing hypertension among the elderly.

INTRODUCTION

Hypertension is a global health problem with a high prevalence and is one of the leading causes of morbidity and mortality worldwide. The World Health Organization reported that approximately 1.28 billion adults worldwide suffer from hypertension, and most cases remain undiagnosed or inadequately treated (WHO, 2021). In Indonesia, the prevalence of hypertension continues to increase, particularly among the elderly population, who physiologically experience decreased blood vessel elasticity and changes in the cardiovascular system (Ministry of Health of the Republic of Indonesia, 2023).

The elderly are considered a vulnerable group to hypertension due to degenerative processes that affect body organ functions, including the cardiovascular system. As age increases, peripheral resistance and arterial stiffness also increase, causing blood pressure to rise. This condition places elderly individuals at a higher risk of developing complications such as stroke, coronary heart disease, and kidney failure (Oliveros et al., 2020).

Hypertension control is essential to prevent such complications. One of the primary efforts in hypertension management is ensuring patient adherence to regularly taking antihypertensive medications. Medication adherence is defined as the extent to which patients follow treatment recommendations provided by healthcare professionals (Burnier & Egan, 2019; still widely relevant in many recent studies). However, various recent studies indicate that medication adherence among hypertensive patients, particularly the elderly, remains relatively low (Abegaz et al., 2021).

Low medication adherence among the elderly may be influenced by several factors, such as cognitive limitations, forgetfulness, medication side effects, lack of understanding about the disease, and inadequate family support. In addition, the complexity of treatment regimens is also considered one of the causes of non-adherence

among elderly patients (Kretchy et al., 2021). This condition contributes to suboptimal blood pressure control.

Blood pressure control is the primary indicator of successful hypertension therapy. Blood pressure is considered controlled when it remains below 140/90 mmHg according to clinical guidelines. However, various studies have shown that most hypertensive patients still have uncontrolled blood pressure despite receiving medication therapy (WHO, 2021; ESC, 2024). This indicates a gap between the therapy provided and the clinical outcomes achieved.

Several previous studies have demonstrated a relationship between medication adherence and blood pressure control. A study conducted by Yang et al. (2020) showed that patients with a high level of adherence were more likely to achieve controlled blood pressure. However, other studies have reported inconsistent findings, where factors such as lifestyle, diet, physical activity, and stress also play important roles in blood pressure management (Rahmawati et al., 2022).

These inconsistent findings indicate that the relationship between medication adherence and blood pressure control still requires further investigation, especially among the elderly population. In addition, social, cultural, and individual characteristics in different regions may influence study outcomes, making it important to conduct research within a local context.

Based on the explanation above, this study was conducted to determine the relationship between medication adherence and blood pressure control among elderly patients with hypertension. The findings of this study are expected to contribute to improving hypertension management, particularly in enhancing medication adherence among elderly patients.

RESEARCH METHODS

This study employed an analytical design with a cross-sectional approach aimed at determining the relationship between medication adherence and blood pressure control among elderly patients with hypertension. The study was conducted on elderly hypertensive patients with a total sample of 60 respondents selected using a purposive sampling technique according to the inclusion criteria, namely elderly individuals who had been diagnosed with hypertension and were undergoing treatment.

The independent variable in this study was medication adherence, while the dependent variable was blood pressure control. Data collection was carried out using an adherence questionnaire consisting of 10 items with a 4-point Likert scale, as well as blood pressure measurements using a sphygmomanometer. Before use, the instrument was tested for validity using Corrected Item-Total Correlation and for reliability using Cronbach's Alpha.

The data obtained were processed using the IBM SPSS Statistics program through the stages of editing, coding, entry, and cleaning. Data analysis was conducted using univariate analysis to examine the frequency distribution of each variable and bivariate analysis using the Chi-Square test with a 95% confidence level ($\alpha = 0.05$) to determine the relationship between medication adherence and blood pressure control.

RESULTS AND DISCUSSION

Respondent Characteristics

This study involved 60 respondents who were elderly patients with hypertension. The characteristics of respondents in this study included gender and duration of hypertension, which aimed to provide a general overview of the respondents' profiles. The distribution of respondent characteristics is presented in Table 1.

Table 1. Distribution of Respondent Characteristics

Variable	Category	n	%
Gender	Male	22	36.7
	Female	38	63.3
Duration of Hypertension	< 1 year	18	30.0
	1–5 years	22	36.7
	> 5 years	20	33.3
Total		60	100

Based on Table 1, the distribution of respondents by gender showed that most respondents were female, totaling 38 individuals (63.3%), while male respondents accounted for 22 individuals (36.7%). This indicates that female respondents dominated the study population compared to males. This condition may reflect that elderly women have a greater tendency to utilize healthcare services or are more frequently detected as hypertensive patients than elderly men.

Based on the duration of hypertension, most respondents were in the 1–5 years category, totaling 22 individuals (36.7%), followed by the > 5 years category with 20 individuals (33.3%), and the < 1 year category with 18 individuals (30.0%). This distribution indicates that most respondents had experienced hypertension for a moderate to long period, suggesting that hypertension is a chronic disease that persists over time among the elderly population.

Overall, the relatively even distribution of the duration of hypertension across the three categories indicates that respondents had varying experiences in undergoing hypertension treatment. This is important because the duration of hypertension may influence patient behavior, including medication adherence levels and the ability to manage their disease.

Therefore, the respondent characteristics in this study illustrate that the majority of respondents were female, with the highest proportion having suffered from hypertension for 1–5 years, which may potentially influence the study results related to medication adherence and blood pressure control.

Distribution of Medication Adherence

Distribution of Medication Adherence

The distribution of medication adherence levels among elderly respondents with hypertension is presented in Table 2.

Table 2. Distribution of Medication Adherence

Medication Adherence	n	%
Non-adherent	51	85.0
Adherent	9	15.0
Total	60	100

Based on Table 2, most respondents were categorized as non-adherent in taking antihypertensive medication, totaling 51 individuals (85.0%), while only 9 respondents (15.0%) were categorized as adherent. This finding indicates that the level of medication adherence among the elderly in this study was still relatively low.

The high proportion of non-adherent respondents indicates that most elderly patients had not followed the prescribed treatment regimen according to healthcare recommendations. This condition may affect the effectiveness of blood pressure control and increase the risk of hypertension-related complications.

In addition, the low level of adherence also suggests the possibility of several factors influencing patient behavior, such as forgetfulness in taking medication, lack of understanding regarding the importance of long-term therapy, and boredom from continuously taking medication. Although these factors were not directly analyzed in this study, the data distribution indicates that adherence remains a major issue among elderly hypertensive patients.

Therefore, the results of this study provide an overview that most respondents had low levels of medication adherence, which may potentially influence the success of hypertension treatment among the elderly.

Distribution of Blood Pressure Control

The distribution of blood pressure control among elderly respondents with hypertension is presented in Table 3.

Table 3. Distribution of Blood Pressure Control

Blood Pressure Control	n	%
Uncontrolled	55	91.7
Controlled	5	8.3
Total	60	100

Based on Table 3, most respondents had uncontrolled blood pressure, totaling 55 individuals (91.7%), while only 5 individuals (8.3%) had controlled blood pressure. These findings indicate that the majority of elderly respondents in this study had not achieved the expected blood pressure control target.

The high proportion of uncontrolled blood pressure suggests that hypertension management among respondents was still not optimal. This condition may reflect various influencing factors, including medication adherence, lifestyle patterns, and physiological factors related to aging.

In addition, the low number of respondents with controlled blood pressure indicates that only a small proportion of elderly individuals successfully achieved hypertension treatment targets. This is important because

uncontrolled blood pressure over a long period can increase the risk of serious complications such as heart disease, stroke, and kidney disorders.

Therefore, the results of this study provide an overview that most respondents were still in a condition of uncontrolled blood pressure, indicating the need for more optimal efforts in hypertension management among the elderly population.

Instrument Validity and Reliability Test

Validity and reliability tests were conducted to assess the quality of the medication adherence questionnaire used in this study. The validity test was performed using the Corrected Item-Total Correlation method, while the reliability test used Cronbach's Alpha with the assistance of the IBM SPSS Statistics program.

Instrument Validity Test

The results of the validity test for the medication adherence questionnaire are presented in Table 4.

Table 4. Results of Instrument Validity Test

No	Item	Corrected Item-Total Correlation (r-count)	Criteria (r ≥ 0.3)	Description
1	P1	0.158	< 0.3	Invalid
2	P2	-0.118	< 0.3	Invalid
3	P4	0.100	< 0.3	Invalid
4	P6	0.041	< 0.3	Invalid
5	P8	-0.187	< 0.3	Invalid
6	P10	0.124	< 0.3	Invalid
7	P3R	-0.007	< 0.3	Invalid
8	P5R	-0.028	< 0.3	Invalid
9	P7R	0.032	< 0.3	Invalid
10	P9R	0.134	< 0.3	Invalid

Based on Table 4, all questionnaire items had Corrected Item-Total Correlation values below 0.3, and several items even showed negative values. This indicates that all items in the questionnaire did not meet the validity criteria, meaning that the items were not yet able to measure the medication adherence variable accurately and consistently.

The low and negative correlation values indicate inconsistencies among the items in measuring the same construct, which may have been caused by differences in statement direction or the less optimal process of instrument development.

Instrument Reliability Test

The results of the instrument reliability test are presented in Table 5.

Table 5. Results of Instrument Reliability Test

Cronbach's Alpha	Number of Items	Criteria (≥ 0.6)	Description
0.064	10	Does not meet criteria	Not reliable

Based on Table 5, the Cronbach's Alpha value obtained was 0.064, indicating that the instrument had a very low level of reliability. This value is far below the required minimum threshold (≥ 0.6), so it can be concluded that the questionnaire did not have good internal consistency.

This low reliability value indicates that the items in the questionnaire were not able to provide stable and consistent results in measuring medication adherence. This finding is also supported by the presence of negative values in several items in the validity test, indicating inconsistencies among questionnaire items.

Based on the results of the validity and reliability tests, it can be concluded that the medication adherence questionnaire used in this study did not yet meet the criteria as a valid and reliable measurement instrument. Therefore, the results of measuring the adherence variable in this study should be interpreted with caution.

Descriptive Analysis of Adherence Scores

Descriptive analysis was conducted to describe the distribution of medication adherence scores among elderly respondents with hypertension. The results of the descriptive analysis are presented in Table 6.

Table 6. Descriptive Analysis of Adherence Scores

Statistics	Value
Mean	25.90
Median	26.00
Standard Deviation	3.78
Minimum	17
Maximum	36
Range	19

Based on Table 6, the mean adherence score was 25.90, with a median value of 26.00. The relatively close mean and median values indicate that the distribution of adherence scores tended to be symmetrical.

The standard deviation value of 3.78 indicates that the variation in adherence scores among respondents was moderate. This suggests that there were differences in adherence levels among respondents, although these differences were not too extreme.

The minimum adherence score was 17, while the maximum score was 36, with a range of 19. This finding indicates that there were respondents with very low to relatively high adherence levels, although in general, the adherence scores were still below the adherent category.

Overall, the results of this descriptive analysis indicate that the level of medication adherence among elderly respondents in this study tended to be low, as reflected by the mean score being below the threshold for the adherent category (≥ 30).

Normality Test

A normality test was conducted to determine whether the medication adherence score data were normally distributed. In this study, the normality test used the Shapiro-Wilk method because the sample size was fewer than 100 respondents. The results of the normality test are presented in Table 7.

Table 7. Results of the Normality Test of Adherence Scores

Variable	Shapiro-Wilk Statistic	df	p-value	Description
Adherence Score	0.973	60	0.215	Normal

Based on Table 7, the significance value (p-value) obtained was 0.215 ($p > 0.05$). This indicates that the medication adherence score data were normally distributed.

The normal distribution of the data was also supported by the skewness value of -0.005, indicating that the data were relatively symmetrical and did not exhibit significant skewness. Therefore, it can be concluded that the adherence score data met the assumption of normality.

Although the main analysis in this study used the Chi-Square test, which does not require normality assumptions, the results of the normality test remain important to provide an overview of the data distribution and strengthen the descriptive analysis conducted.

Analysis of the Relationship Between Medication Adherence and Blood Pressure Control

The analysis of the relationship between medication adherence and blood pressure control among elderly hypertensive patients was conducted using the Chi-Square test and the alternative Fisher's Exact Test. The results of the analysis are presented in Table 8.

Table 8. Relationship Between Medication Adherence and Blood Pressure Control

Adherence	Uncontrolled	Controlled	Total
Non-adherent	46 (90.2%)	5 (9.8%)	51
Adherent	9 (100%)	0 (0%)	9
Total	55	5	60

Based on Table 8, it can be seen that most respondents who were non-adherent had uncontrolled blood pressure, totaling 46 individuals (90.2%), while only 5 individuals (9.8%) had controlled blood pressure. Among respondents categorized as adherent, all respondents (100%) had uncontrolled blood pressure.

The Chi-Square test results showed a p-value of 0.327 ($p > 0.05$), indicating that there was no significant relationship between medication adherence and blood pressure control. However, because there were cells with expected counts less than 5, an alternative analysis using Fisher's Exact Test was conducted. The Fisher's Exact

Test produced a p-value of 1.000 ($p > 0.05$), further confirming that there was no significant relationship between the two variables.

In addition, the Cramer's V value of 0.127 indicated that the strength of the relationship between medication adherence and blood pressure control was weak. Therefore, it can be concluded that medication adherence was not significantly associated with blood pressure control among elderly hypertensive patients in this study.

Based on the results of the study conducted on 60 elderly respondents with hypertension, it can be concluded that most respondents had low levels of medication adherence and the majority had uncontrolled blood pressure. The results of the statistical analysis using Fisher's Exact Test showed a p-value > 0.05, indicating that there was no significant relationship between medication adherence and blood pressure control among elderly hypertensive patients. In addition, the weak relationship strength indicated that medication adherence was not the primary factor influencing blood pressure control in this study.

DISCUSSION

The results of this study showed that most respondents had low levels of medication adherence. This condition illustrates that elderly individuals still experience difficulties in optimally following hypertension treatment therapy. Low adherence among the elderly may be influenced by various factors, such as decreased cognitive function, forgetfulness, lack of understanding regarding the importance of long-term treatment, and boredom from continuously taking medication. These findings are consistent with studies stating that treatment adherence among elderly patients is often influenced by psychological factors and physical limitations (Kretchy et al., 2021).

In addition, the study results also showed that most respondents had uncontrolled blood pressure. This condition indicates that hypertension management among the elderly was still not optimal. Uncontrolled blood pressure over the long term can increase the risk of serious complications such as stroke, heart disease, and kidney disorders. These findings are consistent with the World Health Organization report (2021), which stated that most hypertensive patients had not achieved blood pressure control targets despite receiving therapy.

The results of the relationship analysis showed that there was no significant relationship between medication adherence and blood pressure control. These findings differ from several previous studies that reported that medication adherence was associated with successful blood pressure control (Yang et al., 2020). This difference in findings indicates that blood pressure control is not only influenced by medication adherence but also by various other complex factors.

Blood pressure control among the elderly is influenced by several aspects such as dietary patterns, salt intake, physical activity, stress, and adherence to lifestyle modifications. These factors were not measured in this study and may have contributed to the findings obtained. Other studies have also shown that hypertension management is a multifactorial process that does not solely depend on pharmacological therapy (Rahmawati et al., 2022).

On the other hand, the instrument testing results showed that the questionnaire used had a very low level of reliability. This condition indicates that the measurement tool was not yet able to consistently describe the adherence variable. An instrument with low reliability may affect measurement accuracy and influence the analysis results, so that the actual relationship may not be statistically detected.

The data distribution also showed that most respondents were categorized as non-adherent and had uncontrolled blood pressure. Limited data variation such as this may reduce the ability of statistical analysis to detect relationships between variables. This was reflected in the weak relationship strength value, indicating that the relationship between medication adherence and blood pressure control in this study was not sufficiently strong. Although no statistically significant relationship was found, descriptively there was a tendency for non-adherent respondents to have uncontrolled blood pressure more frequently. This indicates that medication adherence still plays an important role in hypertension management, although it is not the sole factor determining successful blood pressure control.

Overall, the results of this study indicate that blood pressure control among the elderly requires a more comprehensive approach, not only focusing on medication adherence but also considering lifestyle factors and individual patient conditions.

CONCLUSION AND RECOMMENDATIONS

Based on the results of the study conducted on 60 elderly respondents with hypertension, it can be concluded that most respondents had low levels of medication adherence and the majority had uncontrolled blood pressure. The analysis results showed that there was no significant relationship between medication adherence and blood pressure control among elderly hypertensive patients. This finding indicates that medication adherence is not the only factor influencing successful blood pressure control.

Based on these findings, it is recommended that healthcare professionals improve education for elderly patients regarding the importance of medication adherence and comprehensive hypertension management, including dietary regulation, physical activity, and stress management. In addition, the development of more valid

and reliable research instruments is needed to measure adherence more accurately. Future studies are expected to include other variables that may influence blood pressure control in order to obtain a more comprehensive understanding of hypertension management among the elderly.

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