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Original Article

Relationship between knowledge level and medication adherence on blood pressure in elderly hypertension patients in Muara Enim community health center: A cross-sectional study

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Abstract

Background: Hypertension is a global health problem with a high prevalence, particularly among the elderly, and carries a significant risk of serious complications. Adequate knowledge and adherence to antihypertensive medication are essential factors in controlling blood pressure.
Objective: To determine the relationship between the level of knowledge and medication adherence with blood pressure among elderly patients with hypertension in the working area of Muara Enim Primary Health Center in 2024.
Methods: This study employed a quantitative analytic design with a cross-sectional approach. A total of 30 elderly women with hypertension were selected using purposive sampling based on inclusion criteria. Data on knowledge and adherence were collected using a structured questionnaire, while blood pressure was measured using an aneroid sphygmomanometer. Data were analyzed using univariate and bivariate methods, with the independent t-test applied at a significance level of $p < 0.05$.
Results: Of the total respondents, 43.3% had good knowledge and 56.7% had poor knowledge. Medication adherence was evenly distributed, with 50% adherent and 50% non-adherent. The mean systolic blood pressure was 165.33 mmHg (SD 11.25) and diastolic was 95.87 mmHg (SD 5.96). Knowledge was significantly associated with diastolic blood pressure ($p = 0.025$) but not with systolic blood pressure ($p = 0.098$). Adherence was significantly associated with lower systolic ($p = 0.011$) and diastolic blood pressure ($p = 0.010$).
Conclusion: Medication adherence has a more consistent influence on blood pressure control than knowledge level. Hypertension management programs for the elderly should prioritize improving adherence, supported by continuous education integrated with family and community support.

Background

Hypertension is a major non-communicable disease that has become a global health problem due to its high and progressively increasing prevalence, as well as its association with severe complications such as cardiovascular disease, stroke, retinopathy, and renal failure (Nuranti et al., 2020). According to the World Health Organization (2023), approximately 1.13 billion people worldwide live with hypertension, indicating that one in three adults is diagnosed with this condition. The number of affected individuals is projected to rise to 1.5 billion by 2025, with an estimated 9.4 million deaths annually resulting from hypertension and its related complications. This condition occurs more frequently among pre-elderly and elderly groups compared to younger populations (Purwono et al., 2020).

The aging process causes physiological changes in the cardiovascular system, including reduced arterial elasticity, which subsequently increases the risk of hypertension (Abu et al., 2018; Tamamilang et al., 2019). Several risk factors contribute to the development of hypertension, including advanced age, family history, excessive salt intake, obesity, smoking, physical inactivity, psychological stress, and the consumption of alcohol and caffeine (Musakkar & Djafar, 2021; Anggriani et al., 2014). Uncontrolled hypertension may lead to serious complications such as heart failure, stroke, renal impairment, and visual disturbances (Septi Fandinata, 2020).

Blood pressure control among older adults is influenced not only by biological mechanisms but also by their level of knowledge and adherence to prescribed medications (P2PTM Ministry of Health RI, 2020; Azhari, 2017). Adequate knowledge regarding hypertension and the benefits of treatment can enhance awareness of complication risks, thereby increasing medication adherence (Paczkowska et al., 2021; Christiyani et al., 2023). Conversely, limited knowledge may weaken perceived

health risk threats and reduce motivation to comply with therapy (Rachmawati et al., 2021). Adherence to antihypertensive medication plays a critical role in reducing blood pressure levels and preventing complications (Yacob et al., 2023; Hanum et al., 2019). However, among older adults, medication adherence remains challenging due to cognitive and physical barriers as well as limited social support (Burnier et al., 2020; Susanto et al., 2019).

Preliminary data from the Muara Enim Primary Health Care Center indicate a relatively high and gradually increasing prevalence of hypertension among older adults. Although the existing health services already include routine examinations and health education, the extent to which knowledge and medication adherence influence blood pressure control in this population has not yet been clearly identified. Previous studies have demonstrated the relationship between these factors and blood pressure control; however, evidence within the local context remains limited, particularly among elderly women.

Based on this situation, this study aims to analyze the relationship between knowledge level and medication adherence with blood pressure among older adults diagnosed with hypertension in the working area of Muara Enim Primary Health Care Center in 2024. The findings are expected to serve as a basis for developing more effective education strategies and intervention programs for hypertension management among the elderly population.

Methods

Study Design

This study employed a quantitative analytic design using a cross-sectional approach to assess the relationship between knowledge level and medication adherence with blood pressure among elderly women diagnosed with hypertension. This design was chosen because it allows all variables including knowledge, adherence, systolic blood pressure, and diastolic blood pressure to be measured simultaneously at a single point in time, thereby enabling the identification of correlational patterns without intervention. The study was conducted in Tanjung Jati Village, the working area of Muara Enim Primary Health Care Center, and data collection took place from July to November 2024.

Sampling

The sampling process was conducted using a purposive sampling technique, in which participants were selected based on predetermined inclusion criteria. The inclusion criteria consisted of elderly women aged ≥57 years, clinically diagnosed with hypertension by healthcare professionals, who had been taking antihypertensive medication for at least one month, were able to communicate effectively, and provided informed consent to participate voluntarily. Participants with severe cognitive impairment or acute complications were excluded from the study as these conditions could potentially affect data validity. The calculation of sample size was based on Slovin's formula, resulting in a total of 30 eligible respondents, all of whom agreed to participate without dropout.

Instrument

The research instruments consisted of two structured questionnaires and one clinical measurement tool. The knowledge questionnaire was developed based on hypertension guidelines and underwent expert content validation and reliability testing prior to administration. A self-reported medication adherence questionnaire was used to assess the consistency of participants in taking antihypertensive medication. Blood pressure measurements were performed using an aneroid sphygmomanometer and a stethoscope, measured twice with a five-minute interval, and averaged to enhance measurement accuracy and reduce potential bias.

Data Collection

The data collection process began with identifying participants who met the inclusion criteria through an initial community screening. After receiving a detailed explanation regarding the study objectives, benefits, risks, and procedures, participants provided written informed consent. The questionnaires were administered through structured interviews by trained enumerators to ensure procedural

uniformity and minimize interpretation bias. Blood pressure measurements were conducted by healthcare personnel following standardized procedures, ensuring that participants were in a resting state to reduce physiological variation.

Data Analysis

Data analysis was performed in sequential stages, beginning with univariate analysis to describe respondent characteristics, knowledge levels, medication adherence, and blood pressure distribution using mean, median, standard deviation, and frequency distribution. Subsequently, bivariate analysis was conducted using an independent t-test to examine differences in mean systolic and diastolic blood pressure based on knowledge and adherence categories. A p-value of <0.05 was set as the level of statistical significance. All analyses were performed according to STROBE guidelines to ensure appropriate reporting and selection of statistical tests based on numerical data distribution.

Ethical Considerations

This study obtained ethical approval from the Health Research Ethics Committee of Poltekkes Kemenkes Palembang in 2024, and all research procedures adhered to health research ethical principles, including respect for participant autonomy, confidentiality of personal identity, and voluntary participation. Prior to data collection, all participants were informed about the study objectives and procedures and signed written informed consent. No adverse events or harmful incidents occurred throughout the research process.

Results

A total of 30 elderly women diagnosed with hypertension participated in this study. The mean age of respondents was 67.17 years (SD = 5.35), with a median age of 68 years and an age range of 57–77 years. In terms of educational level, the majority of respondents completed senior high school (55.0%), followed by junior high school (30.0%) and elementary school (13.3%). Regarding knowledge level, 43.3% of respondents demonstrated good knowledge of hypertension, whereas 56.7% had a poor level of knowledge. Medication adherence was equally distributed, with 50% classified as adherent and 50% as non-adherent (Table 1).

Table 1. Respondent Characteristics (n = 30)

Characteristics	n	%	Mean ± SD
Age (years)	-	-	67,17 ± 5,35
Education			
Elementary school	4	13,3	
Junior high school	9	30	
Senior high school	17	55	
Knowledge			
Good	13	43,3	
Poor	17	56,7	
Adherence			
Adherent	15	50	
Non-adherent	15	50	

Blood pressure measurements showed that the mean systolic blood pressure among respondents was 165.33 mmHg (SD = 11.25), with a median of 160.5 mmHg and a range of 147–192 mmHg. Meanwhile, the mean diastolic blood pressure was 95.87 mmHg (SD = 5.96), with a median of 100.0 mmHg and a range of 80–114 mmHg. The analysis of systolic blood pressure based on knowledge level indicated that respondents with good knowledge had a lower mean systolic value (162.3 mmHg) compared to those with poor knowledge (169.2 mmHg), although the difference was not statistically significant (p = 0.098). Regarding diastolic blood pressure, the group with good knowledge had a lower mean value (96.0 mmHg) compared to the poor knowledge group (100.85 mmHg), and this difference was statistically significant (p = 0.025).

Based on medication adherence, respondents classified as adherent had a lower mean systolic blood pressure (160.3 mmHg) compared to those who were non-adherent (170.4 mmHg), with a statistically significant difference (p = 0.011). Similarly, for diastolic blood pressure, the adherent group had a lower mean value (95.4 mmHg) compared to the non-adherent group (100.8 mmHg), and this difference was also statistically significant (p = 0.010) (Table 2).

Table 2. Differences in Blood Pressure Based on Knowledge Level and Medication Adherence (n = 30)

Variable	n	Systolic Blood Pressure (Mean ± SD)	p-value	Diastolic Blood Pressure (Mean ± SD)	p-value
Knowledge					
Good	13	162,3 ± 9,7	0,098	96,0 ± 6,17	0,025
Poor	17	169,2 ± 12,3		100,85 ± 4,54	
Adherence					
Adherent	15	160,3 ± 9,1	0,011	95,4 ± 6,2	0,010
Non-adherent	15	170,4 ± 11,2		100,8 ± 4,4	

*Note: Independent t-test, significant if p < 0.05

Discussion

This study demonstrated that a higher level of knowledge among elderly women with hypertension was associated with lower diastolic blood pressure; however, it did not show a significant relationship with systolic blood pressure. This finding aligns with Saraswati et al. (2014), who reported that continuous hypertension-related education contributes to a reduction in diastolic pressure, although its effect on systolic pressure is often not statistically significant. This phenomenon may be attributed to the fact that systolic pressure is more strongly influenced by age-related arterial structural changes (Laurent & Boutouyrie, 2020), suggesting that short-term educational exposure may not produce substantial changes in systolic outcomes.

Medication adherence was found to have a significant association with both systolic and diastolic blood pressure reduction. This finding is consistent with Yacob et al. (2023), who reported that elderly patients who adhered to their antihypertensive regimen had more stable blood pressure compared to those with low adherence. Burnier et al. (2020) also emphasized adherence as a critical determinant of successful hypertension management in older adults. These findings indicate the importance of prioritizing adherence-enhancing interventions, such as medication reminders, family support, and continuous counseling.

The differential effect between knowledge and adherence in the current study suggests that, although knowledge constitutes the foundation of health behavior (P2PTM Ministry of Health RI, 2020), it does not automatically translate into behavioral compliance. Behavioral transformation may be mediated by factors such as perceived benefits, social support, and patient–provider relationships (Azhari, 2017; Rasajati et al., 2020). Consequently, knowledge improvement must be paired with practical behavioral modification strategies to optimize blood pressure control (Sari et al., 2024; Usnani & Setyani, 2025).

The findings of this study are consistent with Paczkowska et al. (2021), who reported that health education increased treatment adherence and therapeutic effectiveness but produced greater outcomes when accompanied by supportive interventions. Similar findings in Indonesia were reported by Christiyani et al. (2023), who observed that elderly populations with adequate knowledge demonstrated higher adherence to antihypertensive therapy. However, among individuals with cognitive impairment or limited health literacy, knowledge enhancement alone may not be sufficient to improve adherence nor clinical outcomes (Susanto et al., 2019).

From a physiological perspective, the significant association between medication adherence and blood pressure reduction observed in this study may be explained by the pharmacological mechanism of antihypertensive medications, which directly reduce peripheral resistance and/or circulating blood volume (Smith & Liehr, 2020). Conversely, systolic pressure tends to be more difficult to control among older adults due to increased arterial stiffness driven by degenerative processes (Tamamilang et al., 2019). Therefore, optimal blood pressure control in this population requires a combination of pharmacological and non-pharmacological strategies, such as reduced sodium intake and light physical activity (Indrasari, Harokan, & Suryani, 2025).

This study has several limitations, including a relatively small sample size and the inclusion of only elderly women from one geographical area, which limits its generalizability. Further research should employ longitudinal designs to observe long-term blood pressure changes and incorporate integrated behavioral and educational interventions aimed at improving adherence.

Practically, the findings underscore that hypertension management programs for older adults should prioritize medication adherence without disregarding knowledge enhancement. A collaborative approach involving family members, community stakeholders, and healthcare providers may improve intervention effectiveness. Community-based education tailored to older adults' literacy levels, combined with social support and simple technological tools, may have a greater impact on blood pressure control and complication prevention.

Conclusion and Recommendation

This study demonstrated that a higher level of knowledge among elderly women with hypertension was significantly associated with lower diastolic blood pressure; however, it was not associated with systolic blood pressure. Medication adherence showed a significant relationship with both systolic and diastolic blood pressure, in which the adherent group achieved better blood pressure control compared to the non-adherent group. These findings emphasize that adherence to antihypertensive therapy is a key determinant in hypertension management among older adults, while improving knowledge alone must be accompanied by behavior-change strategies to achieve optimal blood pressure control.

Primary health care services are encouraged to develop continuous educational programs on hypertension management tailored to the literacy level of older adults, and to integrate adherence-enhancement strategies such as medication-reminder systems, individual counseling, and active family involvement as primary support mechanisms.

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The authors declare no competing interests.

Declaration on the Use of AI
No AI tools were used in the preparation of this manuscript.

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