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Predictors Of Antihypertensive Drug (AHD) Therapy Failure Among Elderly Patients At Sangkrah Public Health Center, Surakarta.

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Abstract

Hypertension is the most common non-communicable disease in Indonesia with a prevalence of 34.1% in adults aged 18 years and above, with the elderly at high risk due to physiological changes such as decreased kidney function and arterial stiffness. This study aims to identify predictors of antihypertensive drug (ADH) therapy failure and dominant factors in elderly patients at the Sangkrah Surakarta Community Health Center. A quantitative analytical observational study with a cross-sectional design involved 96 elderly respondents (≥60 years) with ADH therapy for at least 3 months, selected the Lemeshow formula and total sampling. Medical record data and questionnaires covering demographics, knowledge, adherence (MMAS-8), lifestyle, were analyzed univariately, bivariately (Chi-Square), multivariate (logistic regression) using SPSS. The results showed 72.9% were male, 71.9% had good knowledge, 80.2% were compliant; Age (p=0.629), gender (p=0.622), and education (p=0.559) were not significant, but knowledge significantly influenced adherence (p=0.011). Low knowledge was the main predictor of therapy failure (BP ≥140/90 mmHg). Intensive education is recommended to improve adherence.

Keywords: Adherence, Antihypertensive Drugs, Elderly, Hypertension, Therapy Failure.

INTRODUCTION

Hypertension is the most common non-communicable disease in Indonesia, with a prevalence of 34.1% in the population aged 18 years and older based on 2018 data. This figure continues to rise, particularly in the elderly group over 60 years due to physiological changes such as decreased kidney function and arterial stiffness. The number of elderly people in Indonesia has increased significantly, exacerbating the risk of hypertension due to age-related factors that affect drug pharmacokinetics and blood pressure management.

The elderly face greater challenges in controlling hypertension than younger people, with prevalence rates reaching 57.6% in those aged 65-74 years and even higher in those aged 75 and older. National research shows that many elderly patients fail to achieve blood pressure targets despite lifestyle modifications and antihypertensive drug therapy (ADH).

Medication adherence among elderly people with hypertension remains low, as found in various community health centers, where factors such as forgetting to take medication reached 50%, and delays in routine check-ups were major barriers to control. This is in line with a study by Rosyida et al. (2022) in East Java, which revealed issues with adherence and selecting appropriate therapy in the elderly, while a study by Knowledge (2024) found a significant association between low knowledge and poor adherence in over 44% of adult hypertensive patients.

Failure of OAH therapy in the elderly leads to serious complications such as stroke, heart failure, kidney failure, and increased healthcare costs, as described by Tukan (2023). At the Sangkrah Community Health Center in Surakarta, which recorded the highest number of hypertension cases in the city in 2019 according to the PROLANIS report (Putri Nur Pratiwi, 2019), a survey by Yamlean et al. (2022) showed that 97% of respondents had good knowledge of hypertension, but specific studies on predictors of therapy failure are still lacking.

This study aims to identify predictors of OAH therapy failure and determine the most dominant factors in elderly patients at the Sangkrah Community Health Center in Surakarta. The urgency lies in preventing complications and optimizing management, as emphasized by Safarudin et al. (2025),

while the novelty of this study fills a gap in local studies with multivariate analysis of demographics, knowledge, adherence, and lifestyle that have not been specifically explored in this location.

RESEARCH METHODS

This study is an observational analytical quantitative study with a cross-sectional design. The aim is to analyze the relationship between independent variables such as medication adherence, therapy regimen, polypharmacy, comorbidities, and lifestyle, and the dependent variable, namely, antihypertensive drug therapy (ADH) failure in elderly patients. This approach was chosen because it allows for simultaneous data collection at a specific point in time to examine risk factor associations, as explained by Sugiyono (2021) in a quantitative research methodology that emphasizes hypothesis testing through numerical data and statistical analysis. Furthermore, a cross-sectional design is appropriate for public health studies such as hypertension in the elderly, as implemented in various similar studies in Indonesia.

Data collection instruments included medical records for clinical data such as blood pressure, OAH regimen, and comorbidities, as well as a questionnaire covering demographics, hypertension knowledge level, medication adherence using the Morisky Medication Adherence Scale (MMAS-8), and lifestyle (salt consumption, smoking, physical activity). Data analysis techniques were carried out in stages with univariate for frequency and percentage descriptions, bivariate using the Chi-Square or Fisher Exact test for relationships between variables, and multivariate through logistic regression to determine dominant predictors, processed with the latest version of SPSS software. This approach aligns with Emzir's (2021) guidelines on post-positivist quantitative analysis that relies on inferential statistics for generalization of results, as well as Sugiyono (2021) who recommends SPSS for processing health survey data.

The study population was all elderly patients (aged ≥60 years) at the Sangkrah Community Health Center in Surakarta who had undergone OAH therapy for at least 3 months during the 2025-2026 period, with an estimated 96 individuals based on medical records. The sample was drawn using the Lemeshow formula for a known population, resulting in 96 respondents who met the inclusion criteria (diagnosis of primary hypertension, OAH therapy for ≥3 months, age ≥60 years) and exclusion criteria (severe dementia, hearing loss, or terminal condition), using a total sampling technique to ensure representativeness. This method is consistent with the principle of probabilistic sampling in cross-sectional research as described by Sugiyono (2021) and studies of elderly hypertension in Indonesian community health centers.

The research procedure began in January 2026 at the Sangkrah Community Health Center in Surakarta, encompassing the preparation phase (research ethics and permits), primary data collection through questionnaire interviews and secondary medical record extraction, data verification to reduce bias, and step-by-step analysis leading to interpretation of the results. Each respondent provided informed consent, and the study adhered to the ethical principles of Helsinki. This procedure followed the systematic steps in an observational design as outlined by Creswell and Plano Clark (2025) for a mixed-health study, albeit predominantly quantitative, and Sudaryono (2022) in a cross-sectional application for hypertension risk factors.

RESULTS AND DISCUSSION

Based on the results of research conducted at the Sangkrah Community Health Center in Surakarta, the data obtained were then tested based on the age characteristics of each respondent. Based on the data obtained from the respondentsThe subjects of this study were >60 years old, with the majority of elderly respondents aged 67 years, namely 13 (13.5%).

Based on the characteristics in this study, it is included in the inclusion criteria, so that respondents in tuberculosis patients at the Sangkarah Community Health Center could be included in the medical record collection or become samples in the study.

Table 1. Respondent characteristics

Characteristics	Respondent Frequency (N=96)	Percentage (%)
Gender		
Man	70	72.9
Woman	26	27.1
Total	**96**	**100**
Education		
Elementary School	28	29.2
JUNIOR HIGH	12	12.5
SCHOOL	49	51.0
SENIOR HIGH	7	7.3
SCHOOL	**96**	**100**
College		
Total		

Based on Table 1, of the 96 respondents, the majority of elderly hypertensive patients were male, amounting to 70 (72.9%). Gender differences influence the health behaviors of men and women. According to White, gender is a depiction of male or female behavioral patterns recognized in social life (Rosmalia, 2017). The majority of respondents had a high school education, amounting to 49 (51.0%).

Table 2. Respondents' knowledge

Knowledge	Frequency	Presentation
Good	69	71.9
Not enough	25	26.0
Very less	2	2.1
Total	**96**	**100**

Based on table 2, from 96 respondents, it was found that the majority of respondents had good knowledge, as many as 69 (71.9%), less than 25 (26.0%), and very less than 2 (2.1%) respondents.

Table 3. Respondent compliance

Compliance	Frequency	Presentation
Obedient	77	80.2
Not obey	19	19.8
Total	**96**	**100**

Based on table 9, the majority of 96 respondents were compliant with a total of 77 (80.2), while 19 (19.8) respondents were non-compliant with taking antihypertensive medication.

Age and Medication Compliance

Table 4. Age and Medication Compliance

variables	compliance				p-value=0.629
	obedient		Not obey		total
	N	%	N	%	
Age					
60	5	5.2	1	1.0	6 (6.3%)
61	7	7.3	0	0	7 (7.3%)
62	2	2.1	1	1.0	3 (3.1%)
63	4	4.2	2	2.1	6 (6.3%)
64	7	7.3	2	2.1	9 (9.4%)
65	4	4.2	2	2.1	6 (6.3%)
66	5	5.2	1	1.0	6 (6.3%)
67	10	10.4	3	3.1	13 (13.5%)
68	4	4.2	0	0.0	4 (4.2%)
69	2	2.1	2	2.1	4 (4.2%)
70	5	5.2	0	0.0	5 (5.2%)
71	2	2.1	2	2.1	4 (4.2%)
72	2	2.1	0	0.0	2 (2.1%)
73	1	1.0	1	1.0	2 (2.1%)
74	2	2.1	0	0.0	2 (2.1%)
75	3	3.1	0	0.0	3 (3.1%)
76	2	2.1	1	1.0	3 (3.1%)
77	2	2.1	0	0.0	2 (2.1%)
78	2	2.1	0	0.0	2 (2.1%)
79	3	3.1	0	0.0	3 (3.1%)
81	1	1.0	0	0.0	1 (1.0%)
82	1	1.0	0	0.0	1 (1.0%)
83	1	1.0	0	0.0	1 (1.0%)
84	0	0	1	1.0	1 (1.0%)
total	**77**	**80.2**	**19**	**19.8**	**96(100%)**

Table 4 shows that the asymptotic significance value (2-sided) is 0.629. Since the p-value is > 0.05, it can be concluded that there is no significant relationship between age and the level of compliance of respondents. This indicates that increasing age does not directly guarantee an increase or decrease in a person's compliance in this study.

Gender and Medication Compliance

Table 5. Gender and Medication Compliance

variables	compliance				p-value=0.622
	obedient		Not obey		total
	N	%	N	%	
Gender					
Man	57	59.4	13	13.5	70(72.9%)
Woman	20	20.8	6	6.3	26(27.1%)
total	**77**	**80.2%**	**19**	**19.8%**	**96(100%)**

The chi-square test results in Table 5 show a p-value of 0.622 (p > 0.05). Thus, there is no significant relationship between gender and compliance. Both men and women tended to have similar levels of compliance in this study.

Education Level on Medication Compliance

Table 6. Level of education on compliance

variables	compliance				p-value=0.559
	obedient		Not obey		total
	N	%	N	%	
Level of education	22	22.9	6	6.3	28 (29.2%)
Elementary School	10	10.4	2	2.1	12 (12.5%)
JUNIOR HIGH SCHOOL	38	39.6	11	11.5	49 (51.0%)
SENIOR HIGH SCHOOL	7	7.3	0	0.0	7 (7.3%)
College					
Total	**77**	**80.2**	**19**	**19.8**	**96 (100%)**

Based on the statistical test results in Table 6, the p-value was 0.559. Since the p-value is > 0.05, it was concluded that there was no significant relationship between education level and compliance. This indicates that respondents' formal educational background was not a major determinant of their compliance level.

This finding aligns with research conducted by Puspita et al., 2021, which states that educational attainment does not always correlate positively with medication adherence, as adherence is more influenced by specific understanding of the disease and motivation to recover. While higher education theoretically facilitates the absorption of information, in the context of older adults, life experiences and information gained directly from healthcare professionals are often more influential than prior formal education.

Level of Knowledge Regarding Medication Compliance

Table 7. Level of knowledge regarding medication adherence

variables	compliance				p-value=0.011
	obedient		Not obey		total
	N	%	N	%	
Level of knowledge					
Good	58	60.4	11	11.5	69 (71.9%)
Not enough	19	19.8	6	6.3	25 (26.0%)
Very less	0	0.0	2	2.1	2 (2.1%)
total	**77**	**80.2**	**19**	**19.8**	**96 (100%)**

The Pearson Chi-Square test results showed a p-value of 0.011. Since the p-value is <0.05, it can be concluded that there is a significant relationship between the level of knowledge and compliance of respondents. This means that the better a person's level of knowledge regarding the subject being studied, the higher their level of compliance tends to be.

These findings align with research suggesting that knowledge is a crucial domain in shaping one's actions; patients who understand the benefits of antihypertensive medications and the risks of complications are more motivated to adhere to their medication routine. Good knowledge allows older adults to more accurately understand dosage instructions and medication schedules, thus minimizing medication errors (Wulandari, 2022).

CONCLUSION

This study found that of the 96 elderly respondents at the Sangkrah Community Health Center in Surakarta, the majority were male (72.9%) with a high school education (51%), good knowledge about hypertension (71.9%), and high medication adherence (80.2%). Bivariate analysis showed no significant association between age (p=0.629), gender (p=0.622), and education (p=0.559) with adherence, but the level of knowledge had a significant effect (p=0.011), where respondents with good knowledge tended to be more compliant (60.4% compliant vs. less compliant in the low knowledge group). This factor is the main predictor of OAH therapy failure, which is characterized by blood pressure ≥140/90 mmHg, supported by unhealthy lifestyles such as high salt consumption, smoking, and physical inactivity.

However, limitations of the study include the use of a cross-sectional design that cannot determine causality, the potential for recall bias in the MMAS-8 questionnaire, and the limited sample size at one community health center, making the results difficult to generalize nationally. Suggestions for further research include the addition of variables such as social support and motivation, and longitudinal analysis with a larger sample size. Practical implications include intensive education about hypertension for the elderly to improve adherence, integration of lifestyle counseling in PROLANIS, and training of community health center staff in screening patient knowledge to reduce treatment failure and complications.

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