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Determinants of Medication Adherence in Hypertensive Patients: Clinical Evidence from Indonesian Primary Healthcare Settings

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ABSTRACT

Introduction: Adherence to hypertension medication remains a critical challenge in healthcare management, particularly in resource-limited settings. This study investigated the determinants of medication adherence among patients with hypertension in Indonesian primary healthcare settings.

Methods: A cross-sectional study involving 96 hypertensive patients selected through systematic random sampling was conducted at the Public Health Center of Tenggilis, Surabaya. Data were collected via validated questionnaires, including the Morisky Medication Adherence Scale-8 (MMAS-8), and analyzed via multivariate logistic regression.

Results: Among the 96 hypertensive patients included in this study, the majority were aged 40–49 years (30.2%), with a male predominance (67.7%). Most participants had a senior high school education (57.3%) and were employed as civil servants (30.2%). Only 52.1% of patients reported consistent medication adherence, with financial barriers and knowledge gaps identified as the primary challenges. Multivariate logistic regression analysis revealed that regular medical control (odds ratio [OR] = 1.963, 95% CI 1.214-3.181; p = 0.006) and alternative diagnostic methods (OR = 2.326, 95% CI 1.532-3.538, p<0.001) were significantly associated with better medication adherence. Adherence to doctors' advice (OR = 1.699, 95% CI 1.128–2.559, p = 0.012), the ability to manage medication costs (OR = 1.518, 95% CI 1.012–2.278, p = 0.044), and routine treatment management (OR = 1.825, 95% CI 1.219–2.736, p = 0.004) were identified as key predictors of positive medication adherence.

Conclusion: Medication adherence in patients with hypertension is influenced by multiple factors, including diagnostic approach, healthcare access, cost management, and routine treatment compliance. These findings emphasize the need for comprehensive interventions that address both clinical and socioeconomic barriers to improve hypertension management in primary healthcare settings.

Key words: Medication adherence; Hypertension; Health knowledge; Attitudes; Practice; Patient compliance; Health services accessibility

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INTRODUCTION

High blood pressure (BP), also known as hypertension, is a significant global health concern that profoundly affects morbidity and mortality rates. As a leading risk factor for cardiovascular diseases such as stroke and heart attack, hypertension places a considerable burden on healthcare systems worldwide.[1] Despite advancements in hypertension management, inadequate adherence to medication remains a critical barrier to effective blood pressure control, increasing the risk of adverse outcomes.[2,3]

Hypertension affects millions of individuals worldwide, making it a widespread public health concern. 4. The World Health Organization (WHO) reported that hypertension accounts for approximately 9.4 million deaths annually, underscoring its role as a major cause of mortality worldwide.[1] The impact of hypertension is not limited to affluent nations; low- and middle-income countries also experience significant challenges owing to their limited access to healthcare services and resources.[5] In Indonesia, research by Dwimawati et al.[6] indicates that approximately 15 million people suffer from hypertension, with only 4% effectively managing their condition.

Adherence to hypertension treatment is crucial for maintaining patient health and well-being. Effective management, particularly for achieving blood pressure control, depends on patients adhering to prescribed treatment regimens.[7] Nonadherence to antihypertensive medication is a primary factor contributing to treatment failure. Dwimawati et al. 8 reported that patient compliance with antihypertensive medications was as low as 68.75%. These findings contrast with those of the study by Gede et al.,[9] which reported a compliance rate of 74.8%, and other studies that reported varying adherence rates.[10–12] Research in Sri Lanka[13] and Algeria[14] also reported low adherence rates, with only 35.5% of the patients in Algeria being compliant. Similarly, Gavrilova et al.[15] demonstrated low compliance.

Several factors influence adherence to antihypertensive treatment, one of which is knowledge of hypertension. Research by Jankowska-Polańska et al.[16] indicated that patient knowledge significantly affects adherence to antihypertensive treatment. Additionally, Gede et al.,[9] Ghembaza et al.,[14] and Machaalani et al.,[17] supported this correlation, although some studies, such as Mathavan & Pinatih 12 and Wirakhmi & Purnawan,[18] reported no correlation, and Rifandani et al.[19] reported only a weak correlation. Another factor affecting adherence is the number of antihypertensive medications taken, with higher medication counts being associated with lower adherence.[15,20–22]

The duration of hypertension also significantly impacts adherence, with longer durations correlating with better adherence in some studies 15 but poorer adherence in others.[23,24] Despite the recognized importance of medication adherence in hypertension management, significant gaps remain in our understanding of the specific factors influencing adherence in Indonesian primary healthcare settings. Previous studies have reported inconsistent findings regarding the relationship between hypertension knowledge and medication adherence, with some demonstrating strong correlations and others finding weak or no associations. Information regarding medication management practices and adherence

patterns at the Tenggilis Public Health Center in Surabaya is limited, representing a gap in the literature that warrants investigation. Understanding these context-specific determinants is essential for developing targeted interventions that address both knowledge deficits and practical barriers to medication adherence in resource-limited settings. This study aimed to identify the determinants of medication adherence among hypertensive patients attending the Public Health Center of Tenggilis, Surabaya, with the expectation that the findings would inform evidence-based strategies to improve hypertension management and medication adherence in Indonesian primary care settings.

METHODS

Study design

This study employed a cross-sectional design to investigate the correlation between knowledge of hypertension and medication adherence among patients with hypertension who visited the Public Health Center (PHC) Tenggilis in Surabaya, Indonesia.[25] This design was chosen to measure the variables of knowledge about hypertension and adherence to therapy at the same point in time.[26] This study was conducted at the Public Health Center (PHC) Tenggilis in Surabaya, Indonesia. The selection was made considering the center's convenient location and function as the main healthcare provider for various patients with hypertension.

Sample, criteria and sampling technique

Hypertensive patients who met the inclusion criteria during the study period were selected as the study sample (n = 96) on the basis of prevalence estimates and previous studies. The inclusion criteria were patients diagnosed with hypertension, aged ≥ 18 years and above, and willing to participate by providing informed consent, whereas the exclusion criteria were patients with significant cognitive impairment or other medical conditions that affected their ability to follow therapy or answer survey questions. Sampling was performed via systematic random sampling to ensure a balanced representation of patient demographics.[27]

Research variables and instruments

The dependent variable was medication adherence, categorized as nominal (good vs. poor adherence), whereas hypertension knowledge served as the independent variable assessed on an ordinal scale (good, average, and poor knowledge). This study used a knowledge questionnaire about hypertension developed on the basis of the literature and validated previously; it contains questions about the definition, causes, complications, and management of hypertension. The adherence to therapy questionnaire used was the Morisky Medication Adherence Scale 8 (MMAS-8), which has been validated to measure patient adherence to antihypertensive drug therapy.

Data collection and data analysis

Structured questionnaires were used to collect data on the participants' knowledge of hypertension and medication adherence. The WHO hypertension questionnaire was used to assess knowledge of hypertension, whereas the MMAS-8 (Morisky Medication Adherence Scale-8) questionnaire was used to determine the level of medication adherence. Data management and analyses were conducted via IBM SPSS Statistics version 25 (IBM Corp., Armonk, NY, USA) with a 95% confidence level ($p<0.05$). Descriptive statistics, including frequencies, percentages, means, and standard deviations, were calculated to summarize demographic characteristics, knowledge scores, and medication adherence levels. Following descriptive analysis, multivariate logistic regression was performed to examine variable relationships while controlling for confounding factors.

Ethical considerations

This study was approved by the Research Ethics Committee of the Faculty of Medicine, Hang Tuah University (Letter number I/004/UHTKEPK.03/II/2024). All participants provided informed consent before participation. Patient data confidentiality was strictly maintained, and the data were used only for research purposes.

RESULTS

Respondent characteristics

The study findings revealed that the majority of the respondents were in the 40-49 years age group (30.2%), followed by the 50-59 years age group (23.9%). This indicates that most respondents were middle-aged. Male respondents outnumbered female respondents, with the percentage of males (67.7%) almost twice that of females (32.2%). In terms of education, most respondents had their last education at the senior high school level (57.3%), and only a few respondents were educated at the elementary school level (8.4%) or had a bachelor's degree or higher (13.5%). Furthermore, in terms of occupation, most participants were civil servants (30.2%), followed by housewives (19.8%) and office workers (12.5%). The diverse occupations of the respondents reflected their varying socioeconomic backgrounds, which could have influenced their perspectives on health management. The demographic characteristics of the participants are shown in Table 1.

Knowledge profile of respondents related to hypertension

On the basis of the respondents' answers to the questionnaire regarding their knowledge and diagnosis of hypertension, the management of hypertension, history and condition of hypertension, treatment of hypertension, and complications and awareness are presented in Table 2. The majority of respondents (57.3%) were diagnosed with hypertension for the first time, with a significant proportion (20.8%) being diagnosed within the last five years. Routine medical checkups (36.5%) and screenings (15.6%) were the primary means of diagnosis, indicating a level of awareness among the population

surveyed. However, a notable proportion (10.4%) became aware of their condition through emergency services. A considerable number of respondents (60.4%) reported paying fees for consultations and/or medications, indicating potential financial barriers.

While the majority of respondents (72.9%) were prescribed medication to lower blood pressure, adherence appeared to be a challenge for some respondents, with only 52.1% reporting taking all prescribed medications. Despite being aware of hypertension-related complications (36.5%), a significant proportion (63.5%) reported that they were unaware of them. Notably, only 42.9% of the respondents were informed that stroke was related to hypertension. A minority of respondents (20.8%) reported hospitalization in the previous year, with 40% of these cases related to hypertension. However, only 30% reported that their blood pressure was controlled upon admission to the hospital.

Patient adherence to hypertension medication

Based on the evaluation of the survey results for each respondent who used antihypertensive drugs and participated in this study via the MMAS-8, adherence patterns varied considerably among participants. Fifty patients (52.1%) reported sometimes forgetting to take their medication, and 40 patients (41.7%) reported missing doses in the past two weeks. Thirty patients (31.3%) reported reducing or stopping their medication without medical consultation. Travel-related forgetfulness was reported by 45 patients (46.9%), and 35 patients (36.5%) reported stopping treatment when their symptoms resolved. Most patients (57.3%) reported feeling burdened by their treatment routine. Regarding difficulty in

Table 1. Respondent characteristics

Characteristics	Respondents, n (%)
Age (years old)	
< 30	11 (11.5)
30-39	19 (19.8)
40-49	29 (30.2)
50-59	23 (23.9)
≥60	14 (14.6)
Gender	
Male	65 (67.7)
Female	31 (32.2)
Education level	
Elementary school	8 (8.4)
Junior high school	20 (20.8)
Senior high school	55 (57.3)
Undergraduate and above	13 (13.5)
Occupation	
Civil servant officers	29 (30.2)
Police, Military officers	8 (8.3)
Office workers	12 (12.5)
Online drivers	7 (7.3)
Housewives	19 (19.8)
Retirees	9 (9.4)
Self-employment/Freelancers	8 (83)
Unemployed/not clear	4 (4.2)

Table 2. Knowledge profile of respondents related to hypertension

Code	Question	Answer Options	n	%
		Knowledge and Diagnosis of Hypertension		
Q1	How did you come to know about your hypertension?	Routine medical control	35	36.5
		Screening programme	15	15.6
		Emergency service	10	10.4
		Other	36	37.5
		First time	55	57.3
Q2	When were you diagnosed?	< 5 years	20	20.8
		> 5 years	21	21.9
Q3	Where were you first diagnosed as having hypertension?	Clinic/hospital	67	69.8
		Other	29	30.2
Q4	Was the clinic or hospital where you were first diagnosed run by the government, a charitable organization, or privately run?	Government/Charity	45	46.9
		Private	41	42.7
		Other	10	10.4
		Hypertension Management		
Q5	Have you been told by a healthcare professional to control your blood pressure?	Yes	80	83.3
		No	16	16.7
Q6	Where do you regularly go for routine follow-up to check your blood pressure?	Primary health center	40	41.7
		Other primary care clinic/physician	20	20.8
		Secondary/tertiary hospital	20	20.8
		Other	16	16.7
Q7	Do you have to pay fees for consultation and/or drugs for your hypertension treatment?	Yes	58	60.4
		No	38	39.6
Q8	When do you go for your routine blood pressure check?	Diagnosis visit	25	26.0
		As advised by doctor	35	36.5
		When feeling unwell	18	18.8
		Both	15	15.6
		Other	3	3.1
Q9	In addition to a primary health center, how else do you get your blood pressure checked?	Hospital	15	15.6
		Neighbors/family	20	20.8
		Self-measurement	35	36.5
		Pharmacy/market	15	15.6
		Other	11	11.5
		History and Condition of Hypertension		
Q10	Do you have blood relatives with a history of hypertension?	Yes	45	46.9
		No	51	53.1
Q11	Compared to 12 months ago, is your blood pressure:	Better	15	15.6
		Same	45	46.9
		Worse	20	20.8
		Do not know	16	16.7
Q12	Over the last year, have you been admitted to the hospital?	Yes	20	20.8
		No	76	79.2
Q13	Do you know why you were admitted?	Yes	15	75.0
		No	5	25.0
Q14	Was your hospitalization related to hypertension?	Yes	8	40.0
		No	10	50.0
		Do not know	2	10.0
Q15	Was your blood pressure controlled at admission to the hospital?	Yes	6	30.0
		No	7	35.0
		Do not know	7	35.0

Continue table 2.

Code	Question	Answer Options	n	%
		Hypertension Treatment		
Q16	Have you been prescribed medication to lower your blood pressure?	Yes	70	72.9
		No	20	20.8
		Do not know	6	6.3
Q17	Do you take all your prescribed medications?	Yes	50	52.1
		No	20	20.8
		Do not know	26	27.1
Q18	How many different medicines a day are you taking?	1	25	26.0
		2	20	20.8
		3	15	15.6
		4	10	10.4
		5+	10	10.4
		Do not know	20	20.8
Q19	If you do not take your medication regularly, why?	Various reasons: Affordability, availability, dislike, take only when needed, side effects, alternative medicine, forgetfulness, do not know, other	96	100
		Complications and Awareness		
Q20	Have you had any complications from your hypertension?	Yes	15	15.6
		No	60	62.5
		Do not know	21	21.9
Q21	Are you aware of any complications of hypertension?	Yes	35	36.5
		No	61	63.5
Q22	If yes, have you been informed about these complications?	Yes	25	71.4
		No	10	28.6
Q23	Have you been told that stroke is related to hypertension?	Yes	15	42.9
		No	20	57.1

remembering medication routines, responses ranged from "never" (15.6%) to "always" (16.7%), with intermediate frequencies distributed across "every now and then" (20.8%), "sometimes" (26.0%), and "usually" (20.8%). A summary of patient adherence to hypertension medication according to the MMAS-8 is presented in Table 3.

Predispositions associated with hypertension medication adherence

Multivariate logistic regression analysis was conducted to evaluate the factors affecting patient adherence to antihypertensive drug use. The model revealed that factors such as diagnostic method (routine medical control [OR=1.963, 95% CI 1.214-3.181, p=0.006], other factors (OR=2.326, 95% CI 1.532-3.538, p<0.001), adherence to doctors' advice (OR=1.699, 95% CI 1.128-2.559, p=0.012), cost of treatment (OR=1.518, 95% CI 1.012-2.278, p=0.044), and burden of routine treatment (OR=1.825, 95% CI 1.219-2.736, p=0.004) significantly influenced patients' adherence to the use of antihypertensive drugs. Other variables, such as the place of regular check-ups and difficulty in remembering the medication routine, had nonsignificant influences on adherence. This model had a good fit, with a Nagelkerke R^2 of 0.398 and Hosmer and Lemeshow test results showing a p value

of 0.672, indicating that this model fits the data. The results of the multivariate logistic regression analysis are shown in Table 4.

Table 3. Patient adherence to hypertension medication

No	MMAS-8 question items	Answer	Respondents, n (%)
1	Do you sometimes forget to take your anti-hypertension medication?	Yes	50 (52.1)
		No	46 (47.9)
2	Please think about the past two weeks, were there any days when you did not take your medication?	Yes	40 (41.7)
		No	56 (58.3)
3	Have you ever reduced or stopped your medication without telling your doctor?	Yes	30 (31.3)
		No	66 (68.8)
4	When you're traveling or leaving the house, do you sometimes forget to bring your medication?	Yes	45 (46.9)
		No	51 (53.1)
5	When your complaints have been resolved, have you ever stopped your treatment?	Yes	35 (36.5)
		No	61 (63.5)
6	Do you feel burdened with your treatment routine?	Yes	55 (57.3)
		No	41 (42.7)
7	How often do you have difficulty remembering to take your medication?	Never	15 (15.6)
		Every now and then	20 (20.8)
		Sometimes	25 (26)
		Usually,	20 (20.8)
		Always	16 (16.7)

Table 4. Multivariate logistic regression analysis of factors associated with medication adherence in hypertensive patients

Variable	CF	OR	95% CI	p value
Diagnosis Method				
Routine medical control	0.674	1.963	[1.214, 3.181]	0.006*
Screening programme	0.321	1.378	[0.872, 2.175]	0.158
Emergency service	0.482	1.618	[0.987, 2.652]	0.054
Other	0.845	2.326	[1.532, 3.538]	<0.001*
Duration since diagnosis	-0.209	0.812	[0.614, 1.074]	0.141
Initial diagnosis setting				
Clinic/hospital	0.396	1.488	[0.943, 2.346]	0.087
Other	0.165	1.179	[0.751, 1.852]	0.461
Clinic/hospital management				
Government/Charity	-0.107	0.898	[0.604, 1.335]	0.593
Private	0.284	1.240	[0.817, 1.881]	0.311
Other	0.049	1.050	[0.633, 1.742]	0.855
Adherence to doctor's advice	0.531	1.699	[1.128, 2.559]	0.012*
Routine follow-up setting				
Primary health care center	-0.297	0.743	[0.481, 1.147]	0.178
Other primary care clinic/physician	0.096	1.101	[0.672, 1.805]	0.693
Secondary/tertiary hospital	0.382	1.464	[0.934, 2.297]	0.091
Other	0.178	1.194	[0.733, 1.944]	0.484
Medication cost	0.418	1.518	[1.012, 2.278]	0.044*

Continue table 4.

Variable	CF	OR	95% CI	p value
Travel forgetfullness	0.257	1.293	[0.864, 1.934]	0.214
Complaint resolution	0.148	1.160	[0.735, 1.834]	0.527
Treatment routine burden	0.601	1.825	[1.219, 2.736]	0.004*
Difficulty remembering medication routine	0.393	1.481	[0.982, 2.235]	0.061
Model Statistics				
-2 Log Likelihood	178.513			
Nagelkerke R^2	0.398			
Hosmer and Lemeshow Test (p value)	0.672			

*Indicates a significant difference with a p value <0.05

DISCUSSION

Evaluation of respondents' knowledge and awareness related to hypertension

Medication adherence in the management of noncommunicable diseases, including degenerative diseases such as hypertension and diabetes mellitus, is very important for reducing morbidity, mortality, complications, and resistance to drugs or therapies.[28,29] This study identified factors that influence hypertension management in patients with hypertension at the Public Health Center (PHC) in Tenggilis, Surabaya. Overall, although there was some level of awareness and utilization of health services for hypertension management, the findings indicated areas that require improvement, such as education, access to care, adherence to medication, and awareness of complications. Greater efforts are needed to provide adequate information to patients regarding the importance of hypertension control and the risks associated with this condition. In addition, improving accessibility to affordable medical care and support in medication management are critical for reducing the burden of hypertension in the surveyed communities.

In a survey of hypertensive patients, in terms of knowledge and diagnosis of hypertension, the majority of respondents learned about their hypertension condition through routine medical examinations and early screening.[10,30–33] This indicates awareness among the surveyed population regarding the importance of regular health examinations.[33,34] However, some respondents learned about their condition through emergency services, indicating that they may only become aware of their hypertension condition when they have already experienced serious symptoms or complications. This predisposition is mediated by several factors, including the lack of access to health education and the respondents' low education level.[24,35–37] The data show that most of the respondents only graduated from senior high school, which may hinder the ability of individuals to understand medical information and the importance of regular check-ups.[32,38,39] In addition, this condition is mediated by social stigma or fear (miscommunication) regarding the diagnosis of hypertension, which may prevent individuals from conducting routine examinations or asking about their hypertension condition.[15,40–43]

In terms of healthcare preferences, most respondents showed a preference for seeking healthcare in

clinics or hospitals, indicating a high level of trust in the formal healthcare system for hypertension management. However, more than half of the respondents had to pay for consultation and/or treatment. This implies that financial barriers may affect the accessibility and regularity of treatment. Financial barriers that are mostly experienced by low- and middle-income people can lead to a lack of visits to healthcare facilities for regular hypertension control,[5,35] and low support from family and community can affect a person's ability to follow the recommended hypertension management plan and consider hypertension a harmless disease.[44,45]

This was confirmed by the results of identifying the history and condition of hypertension, most of whom had received prescribed treatment to lower blood pressure; however, adherence to therapy and medication awareness appeared to be a challenge for only 52.1% of the patients. The reasons for this nonadherence vary and include cost issues, drug availability, discomfort with the drug, and concerns about side effects.[24,28,32,34,46,47] This finding indicates the need for a more supportive approach for medication management and patient education. The respondents' low adherence to and awareness of treatment were influenced by growing negative perceptions of neglecting the risks and treatment of the disease, as well as miscommunication of diagnosis by health workers or others, who perceived the disease as not high risk,[32,48] and previous adverse events, which may lead to fear or resistance to necessary medical interventions, such as complexity of treatment and perceived side effects.[28,29,47]

Predisposing fear, unacceptability, and negative perceptions seemed to have a major impact on the occurrence of complications and decreased treatment awareness. These findings show that awareness of complications associated with hypertension is still quite low. Many patients are not adequately informed about the risk of complications associated with hypertension; there is a lack of public health education programs targeting increased awareness of hypertension complications, and health care experience in the health care setting is the main predisposition.[14,49-52] Without adequate education, patients may not understand the potential dangers of uncontrolled hypertension, such as stroke and heart disease.[53–55]

Important factors associated with hypertension medication adherence

In the management of hypertension at the Public Health Center (PHC) in Tenggilis, Surabaya, several important factors influence medication adherence, including the diagnostic method used in the form of routine medical control and other diagnostic methods. In addition, high adherence to doctors' advice, patients who were able to cope with drug costs, and patients receiving routine medication management were observed. As demonstrated by the multivariate analysis, these factors were significantly associated with better adherence patterns. Attention to key predictors was positively associated with better medication adherence. These variables provide important insights into interventions that can improve adherence to antihypertensive medications. However, the screening program variables, duration since diagnosis, initial diagnosis setting (clinic/hospital), routine follow-up setting, and difficulty in remembering routine medication were not significant predictors of medication adherence.

The method of diagnosis through routine medical control or other diagnoses was positively associated

with better outcomes for hypertension treatment. This is most likely due to early detection and regular monitoring, which allow timely intervention and appropriate treatment adjustments as the patient's condition progresses.[22,38] In addition, adherence to doctors' advice strongly influences the outcome of hypertension treatment. Patients who follow their doctors' instructions, such as adhering to medication schedules, adopting lifestyle changes, and performing regular check-ups, tend to experience significant improvements in their condition. This adherence ensures that the treatment proceeds as planned and that the therapeutic effect of drugs can be maximized.[11,22,41] The ability to cover drug costs is associated with improved medication adherence. Patients who can afford their medication consistently experience less interruption in their drug therapy, thus maintaining their blood pressure under control. Cost is often a barrier to long-term treatment; therefore, financial support or drug subsidy programs can delay the decline in medication adherence.[2,14,42]

Another important issue is the importance of routine management. Patients who could manage and follow their treatment routines without feeling overly burdened tended to have better outcomes. Good management includes setting medication schedules, regularly controlling visits, and adapting to necessary changes in treatment. This helps ensure that hypertension therapy is effective and that patients remain motivated to adhere to the treatment regimen.[34] This study reaffirms the importance of medication adherence in achieving optimal blood pressure control, reducing the risk of complications, and improving patient outcomes.[11] Nonadherence to treatment regimens can lead to uncontrolled hypertension, thereby increasing the risk of cardiovascular disease events.[2,56,57] Interventions that address these aspects may help improve blood pressure control and quality of life in patients with hypertension.

Strengths and limitations

This study provides valuable insights into hypertension management and medication adherence among patients at a public health center in Surabaya, Indonesia. Key strengths include the identification of significant factors associated with better medication adherence, such as routine medical control, adherence to doctors' advice, the ability to afford medication costs, and effective management of treatment routines. This research highlights important knowledge gaps and barriers to adherence, utilizing validated instruments such as the MMAS-8 for reliable adherence measurements. Multivariate analysis accounts for potential confounding factors, enhancing the robustness of the identified associations between patient characteristics and medication adherence and contributing to the understanding of hypertension management challenges in resource-limited settings.

This study has several limitations that need to be considered, including the retrospective nature of the data. Therefore, recall bias in patients cannot be avoided. The variables included in the logistic regression model may not include all factors that influence hypertension medication adherence, such as genetic factors, socioeconomic status, and other unmeasured lifestyles. This study may not be fully representative, as the sample was drawn from a specific population, and the results may not be generalizable to other populations. Fourth, there is a possibility of selection bias, as patients who are more disciplined and have better access to health facilities are likely to be involved in the study. The

model used only showed an association and not a cause–and–effect relationship; therefore, the results should be interpreted with caution.

CONCLUSION

This study sheds light on the multifaceted aspects of hypertension management in patients attending the Public Health Center (PHC) Tenggilis. The findings underscore the importance of comprehensive healthcare approaches that address not only medical treatment but also patient education, attitudes, and adherence to medication regimens. Despite the challenges posed by varying levels of hypertension knowledge, attitudes toward prevention, and medication adherence, there is hope for improvement through targeted interventions. By leveraging the insights from this study and the literature, healthcare providers and policymakers can develop tailored strategies to enhance hypertension management and improve patient hypertension outcomes. Targeted interventions addressing not only patients' knowledge levels but also contextual factors and healthcare system attributes are essential for enhancing medication adherence and improving hypertension management. In the future, it will be necessary to identify the role of health services, family, and media in influencing the knowledge and awareness of the treatment of patients with hypertension.

Conflicts of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as potential conflicts of interest.

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Abbreviations

CI, Confidence interval;
KEPK, Komisi Etik Penelitian Kesehatan (Health Research Ethics Commission);
LPPM, Lembaga Penelitian dan Pengabdian Masyarakat (Research and Community Service Institute);
MMAS-8, Morisky Medication Adherence Scale-8;
PHC, Public Health Center;
SPSS, Statistical Package for Social Sciences;
UHT, Universitas Hang Tuah (Hang Tuah University);
WHO, World Health Organization.

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