Urban-Rural Difference in Adherence Treatment of Hypertensive Patients In South Sumatra Indonesia

Yopi Rikmasari[1,2], *Tri Murti Andayani*[3*], *Susi Ari Kristina*[4], and *Dwi Endarti*[4]
[1] Doctoral Program in Pharmacy, Faculty of Pharmacy, Universitas Gadjah Mada, Yogyakarta, Indonesia.
[2] Faculty of Pharmacy, Sekolah Tinggi Ilmu Farmasi Bhakti Pertiwi, Palembang, Indonesia
[3] Department of Pharmacology and Clinical Pharmacy, Faculty of Pharmacy, Universitas Gadjah Mada, Yogyakarta, Indonesia
[4] Department of Pharmaceutic, Faculty of Pharmacy, Universitas Gadjah Mada, Yogyakarta, Indonesia

Abstract. Treatment adherence is essential for controlling blood pressure and preventing complications. The availability of information regarding factors related to adherence is needed to design appropriate interventions. However, this information is still limited. This study aims to evaluate medication adherence and identify the main factors associated with hypertension patients living in urban and rural areas. A cross-sectional study was conducted in ten primary healthcare facilities in South Sumatra Province, consisting of 5 urban and 5 rural areas, totaling 458 hypertensive patients. Medication adherence was measured using the MGLS questionnaire, social support with the MSPSS, and level of knowledge with HK-LS. Data were analyzed using descriptive statistics, bivariate tests using chi-square, independent T-test, and mann-whitney tests, and then continued multivariate logistic regression analysis. Adherence to hypertension medication in urban (38.2%) and rural (23.6%) areas differed significantly (p=0.000). Medication adherence in urban areas was related to work (OR=4.787, p=0.000), social support (OR=5.054, p=0.000), and level of knowledge (OR=6.558, p=0.000). In rural areas, medication adherence is associated with social support (OR=4.696, p=0.000), knowledge level (OR=12.555, p=0.022), high/middle school education (OR =3.290, p=0.000), bachelor or above education (OR=12.871, p=0.000). Most patients are non-adherent to treatment hypertension in urban and rural areas. The factors most related to medication adherence in urban areas were employment status, social support, and knowledge about hypertension, while education, social support, and knowledge were the factors most related to adherence in rural areas. Interventions must be designed based on the information obtained to improve medication adherence.
Keywords: hypertension, adherence, urban, rural

1 Introduction

The global prevalence of hypertension is high and continues to increase [1]. At 30-70 years old, hypertension sufferers are estimated to have doubled between 1990 and 2019. The prevalence of hypertension in high-income countries has decreased, but in low-middle-income countries, it has increased [2]. In Indonesia, the ministry of health reported that the national hypertension prevalence had increased in 2013 by 25.8% to 34,1% in 2018 [3]. Hypertension is the leading cause of premature death globally, accounting for 10.4 million deaths per year, and is a cause of disability-adjusted life-years (DALYs) worldwide. Suboptimal blood pressure is a risk factor often associated with cardiovascular and cerebrovascular disease and is the leading cause of kidney disease [4,5].

This complication can be prevented by controlling blood pressure. Blood pressure control is influenced by individual factors and system/provider factors [6,7]. The main factors affecting blood pressure control in patients receiving drugs are prescribing adequate amounts and doses of antihypertensive drugs and medication adherence [8]. Compliance with treatment is a process in which patients take medication according to prescription [9]. A systematic review and meta-analysis reported that the percentage of hypertensive patients who adhered to treatment was 45.2% and significantly affected uncontrolled blood pressure [10]. Social/economic, health system, condition-related, therapeutic, and patient factors are five dimensions that interact with each other in influencing medication adherence. The patient's ability to follow treatment is often influenced by more than one obstacle from influential factors, so interventions to improve adherence need to be targeted at how to overcome these obstacles. Therefore, health professionals must be able to identify systematically to assess the barriers that exist in patients [11].

Community in urban and rural areas have different demographic, economic, and social-environmental characteristics, so it is possible for variations in medication adherence. Studies in China show that hypertension patients' knowledge level in rural areas is worse than in urban areas, with the main influencing factors being gender and age [12]. However, studies in Brazil show the opposite; adherence rates are better in

*Corresponding author email: trimurtia@ugm.ac.id

rural areas than in urban areas [13]. A study at Columbia showed no difference in the level of adherence to treatment of hypertension patients in urban and rural areas [14].

In Indonesia, the level of adherence to the treatment of hypertensive patients varies. Some research data in primary care facilities show different results, including 33% adherence to treatment with factors that affect employment status, distance, level of knowledge, motivation to seek treatment, and family support [15]. In other healthcare facilities, a compliance rate of 36.1% was reported, with factors influencing knowledge, motivation, staff support, and family support [16]. Another study reported a compliance rate of 36.58% with an influential factor, namely education [16]. Similar studies reported a compliance rate of 42.4% with influential factors, namely co-morbidities, older age, and higher education, which support adherence to hypertension treatment [17]. There have been many studies to find out the level of compliance. However, studies comparing compliance levels in urban and rural areas and identifying related factors still need to be completed.

Based on the description above, we conducted a study to evaluate medication adherence and identify the main factors associated with medication adherence in hypertensive patients in Indonesia's urban and rural areas. When non-compliance is known, interventions should focus on improving and maintaining long-term compliance using different approaches based on the obstacles encountered [8].

2 Methods

2.1 Study design

A cross-sectional study on hypertensive patients was conducted in ten primary healthcare facilities, consisting of 5 places in urban areas (Palembang City) and 5 in rural areas (Oku Selatan district) in South Sumatra Province from November 2021 to February 2022 using convenience sampling. Data were obtained from medical records and questionnaires. This research has received approval from the ethical committee of the Faculty of Medicine, Gadjah Mada University, with the number KE/FK/0833/EC/2021.

2.2 Sample

The research subjects were hypertensive outpatients enrolled in ten primary healthcare facilities. Patients in this study met the inclusion criteria: adult patients aged ≥ 18 years and willing to participate in the study, diagnosed with essential hypertension and had undergone treatment for at least 3 months, patients taking antihypertensive drugs, and able to communicate in Indonesian. Exclusion criteria: patients with complicated diseases (heart disease, stroke, and kidney failure), pregnant and patients with motor disorders that limit daily activities. The number of samples was determined according to the sample calculation in logistic regression; the sample size per predictor was 15-30 subjects [18]. In this study, there were 13 predictors, so the total sample size was at least 15 subjects per predictor. The final sample size was at least 195 for each region, so the total sample was at least 390. In this study, there were 458 research subjects**.**

2.3 Study instrument

Socioeconomic data were obtained from questionnaires covering age, gender, education, employment status, monthly income, marital status, health insurance, and distance from home to primary healthcare facilities. Therapeutic data and clinical conditions were obtained from the patient's medical records. Investigators documented the amount of antihypertensive, duration of illness, presence of comorbidities, and blood pressure.

In this study, three questionnaires were used, namely the Multidimensional Scale of Perceived Social Support (MSPSS), Hypertension Knowledge-Level Scale (HK-LS), and Morisky Green Levine Adherence Scale (MGLS). The MSPSS questionnaire used to assess social support was first developed by Zimet et al. (1988), having a Cronbach alpha coefficient of 0.85 – 0.9. In addition, the MSPSS has been used in hypertensive patients with a Cronbach alpha coefficient of 0.96, indicating a reliable questionnaire. The MSPSS questionnaire consists of 12 items with 3 subscales: family, friends, and other influential individuals. Patients were asked to respond from 1 (strongly disagree) to 7 (strongly agree). After adding up, the scores will be in the range of 12 – 84. The bigger the score, the better social support. The cut-off point method is used to determine the category of social support [19].

The HK-LS questionnaire, used to measure the level of knowledge developed by Erkoc et al., (2012), has a Cronbach alpha coefficient of 0.82 and has been tested for validity and reliability for hypertensive patients in Indonesia. Internal consistency validity (Cronbach α 0.758), test re-test reliability (Spearman rank correlation 0.890), and discriminative validity (Mann Whitney p <0.05) show that the HK-LS questionnaire is valid and reliable [20,21]. The HK-LS questionnaire consists of 22 questions, with the answer options being true, false, or do not know. The correct answer was given a score of 1, and the wrong or did not know given a score of 0. A total score of 22 was obtained if the respondent answered all questions correctly. The level of knowledge is declared low if the score is ≤ 17 and high if the score is between 18 – 22.

The level of adherence was measured using the MGLS questionnaire consisting of 4 items that have been tested for validity and reliability in Indonesia with internal consistency reliability with Cronbach's α = 0.651, test-retest reliability with Spearman's rank correlation = 0.425 and convergent validity with r = 0.58 [22]. Each answer "yes" is given a score of 1, and "no" is given a score of 0. The assessment results are totaled, and it is concluded that a score of 4 indicates low compliance, 1-3 indicates moderate compliance, and a score of 0 is high compliance. In this study, the level of adherence was divided into 2 categories: patient adherence to taking medication for patients with high

compliance (score 4) and non-adherence for low-moderate adherence (score 1-3). The Cronbach alpha coefficients for MSPS, HK-LS, and MGLS were 0.702 - 0.858, 0.713 - 0.862, and MGLS 0.656, respectively in this study.

2.4 Data collection

Data were collected by 10 pharmacists in charge of the pharmacy room at each primary healthcare facilities. Pharmacists as research assistants were given 2-4 hours of training focusing on research objectives, instruments used, and data collection methods. Patients presenting for outpatient treatment at primary healthcare facilities were identified and invited to participate in the study by research assistants. Patients who met the inclusion criteria signed prior informed consent to participate, allowing the investigators to access the patient's medical records. The research assistant explained the purpose of the study and provided standard instructions before the patient filled out the questionnaire. The research assistant was on hand to fill out the questionnaire with the participants to answer questions and clarify issues if needed.

2.5 Data analysis

Descriptive statistics summarize socioeconomic, therapeutic, and clinical characteristics based on urban and rural area criteria. Continuous variables are reported using the mean with a standard deviation. The bivariate test uses independent T-test or Mann-Whitney for numerical variables and uses chi-square for categorical variables. Logistic regression backward method was used to identify predictors of compliance. All variables related to medication adherence in the bivariate analysis had a $p \leq 0.25$ value in the final model. Significance is set at p-value <0.05. All statistical tests use SPSS version 26.

3 Results

3.1 Socioeconomic Characteristics, disease knowledge and social support

A total of 500 patients participated in this study, 250 patients each in urban and rural areas. Participants who met the inclusion criteria and filled out the complete questionnaire were 225 people in urban areas and 233 people in rural areas, so the final total participants obtained were 458 people (**Table 1**). A total of 10 patients received <3 months of treatment and 32 incomplete questionnaires.

Table 1. Socioeconomic characteristics, disease knowledge and social support of hypertension patients in urban and rural

Variables		Urban (n=225)		Rural (n=233)	
		n	%	n	%
Age, years	≥ 60	106	47.1	100	42.9
	45 – 59	100	44.4	107	45.9
	≥ 18 – 45	19	8.4	26	11.2
	Mean (SD)	58.27±9.259		56.26±8.670	
Gender	Female	144	64.0	139	59.7
	Male	81	36.0	94	40.3
Education	Primary and below	66	29.3	95	40.8
	High/middle school	112	49.8	97	41.6
	Bachelor and above	47	20.9	41	17.6
Working status	Retired/not working	84	37.3	42	18.0
	Working	141	62.7	191	82.0
Monthly income (IDR)	< 1.000.000	70	31.1	64	27.5
	1.000.000 - < 3.000.000	82	36.4	120	51.5
	3.000.000 – 5.000.000	53	23.6	49	21,0
	>5.000.000	20	8.9	0	0
Marital status	Divorce/single	34	15.1	34	14.6
	Married	191	84.9	199	85.4
Medical insurance	No insurance	22	9.8	10	4.3
	Indonesian National Social Health Insurance	203	90.2	223	95.7
Distance	>5 km	22	9.8	35	15
	1-5 km	106	47.1	131	56.2
	< 1 km	97	43.1	67	28.8
Disease knowledge	Low (≤ 17)	110	48.9	159	68.2
	High (>18-22)	115	51.1	74	31.8
	Mean (SD)	16.40±3.462		15.53±3.154	
Social support	Low (≤ 62)	102	45.3	145	62.2
	High (63-84)	123	54.7	88	378
	Mean (SD)	64.79±12.708		58.48±8.725	

Abbreviations: IDR, Indonesia Rupiah

3.2 Therapeutic and clinical outcomes

Table 2 shows therapeutic and clinical outcomes include number of antihypertensive drugs, duration of illness, comorbid and blood pressure.

3.3 Adherence to medication

There are differences in adherence levels in urban and rural areas (p=0.002). The level of adherence is better in urban than rural areas (**Table 3**).

Adherence with treating hypertension patients among healthcare facilities in each region varies. The highest adherence rate was in urban areas, namely hypertensive patients in urban primary healthcare facilities 2 (43.5%) and the lowest in urban primary healthcare facilities 1 (28.6%), while in rural areas the highest in rural primary healthcare facilities 2 (49.2%) and the lowest in rural primary healthcare facilities 5 (2%) as shown in **Figure 1**.

Table 2. Therapeutic and clinical characteristics of hypertensive patients in urban and rural areas

Variables		Urban (n=225)		Rural (n=233)	
		n	%	n	%
Number of antihypertensive drugs	2	30	13.3	31	13.3
	1	195	86.7	202	86.7
Duration of illness, years	≥5	76	33.8	66	28.3
	1 - < 5	131	58.2	117	50.2
	< 1	18	8.0	50	21.5
Comorbid	With comorbids	66	29.3	55	23.6
	No comorbids	159	70.7	178	76.4
Blood pressure	Not controlled	166	73.8	170	73.0
	Controlled	59	26.2	63	27.0
	Mean SBP	150.03±18.78		147.47±18.28	
	Mean DBP	89.49±10.08		90.19±10.05	

Abbreviations: SBP = Systolic Blood Pressure
DBP = Diastolic Blood Pressure

Table 3. Patient adherence in urban and rural areas

Areas	Adherence (n=141)		Non Adherence (n=317)		*p*	(95% C.I.)
	n	%	n	%		
Urban	82	36.4	143	63.6	0.002	1.947 (1.293 – 2.932)
Rural	53	22.7	180	77.3		

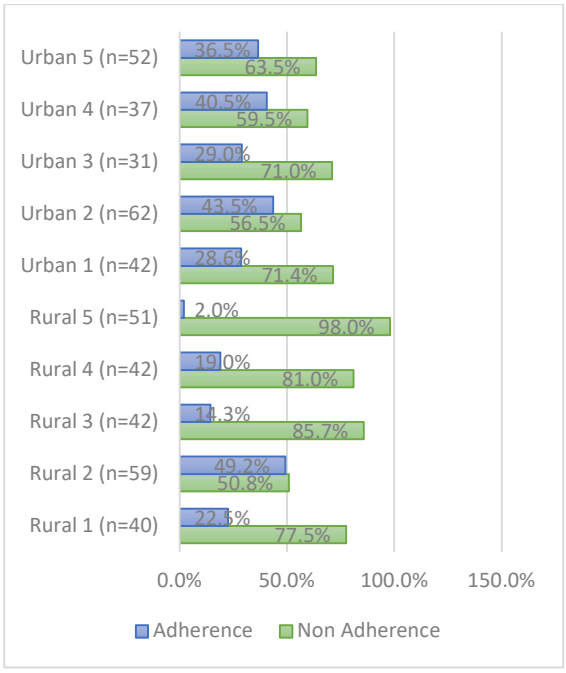

Fig. 1. Level of adherence in each health center in urban and rural areas

Patients in urban areas do not adhere to treatment because they forget to take their medication. In contrast, if they feel healthier in rural areas, they sometimes stop taking medication. This complete information is in **Table 4.**

3.4 Factors related to adherence in urban and rural

Table 5 summarises the bivariate compliance test with socioeconomic factors, clinical characteristics and therapy in urban and rural areas. Selection is made to determine the variables included in the multivariate analysis. Variables with a p-value <0.250 were continued into multivariate analysis to determine the factors most related to medication adherence. In urban areas, the variables of working status (p=0.000), monthly income (p=0.000), social support (p=0.000) and level of knowledge (p=0.000) are included in the multivariate analysis. In rural areas, the variables were education (p=0.000), working status (p=0,109), monthly income (p=0.010), distance from home to health care facilities (p=0.002), social support (p=0.000), level knowledge (p=0.000) and duration of illness (0.185) were included in the multivariate analysis.

3.5 Logistic regression test results

Table 6 summarizes the logistic regression analysis results using the backward method. In urban areas, the final model related to compliance is working status, social support and level of knowledge. In contrast, in rural areas, the final model obtained is social support and level of education.

4 Discussion

Most were female in urban (64.0%) and rural (59.7%) areas. In urban areas, education is dominated by high/middle school (49.8%) and rural (41.6%). Most of the patients were working, but patients do not work/retire in urban areas than in rural areas. The highest income per month is in the range of 1,000,000 - < 3,000,000 IDR amounting to 36.4% in urban areas and 51.5% in rural areas; there is no income > 5.000.000 IDR in rural areas. Most of them are married, with a percentage of 84.9% in urban areas and 85.4% in rural areas. Most of them are Indonesian National Social Health Insurance participants, but the percentage of non-Indonesian National Social Health Insurance patients is higher in rural areas (95.7). The distance from home to primary health care facilities is mostly 1-5 Km, 47.1% in urban and 56.2% in rural areas. However, data also shows distances > 5 Km are more in rural areas than urban areas, and distance < 1 Km is more in urban than rural areas. Social support in urban areas is better than in rural areas, where social support in urban areas is high (54.7%), while in rural areas, it is dominated by low social support (62.2%). The average social support score in urban areas is at a high rating, while in rural areas, it is low. The knowledge about hypertension is low in both

Table 4. The percentage of respondents' answers to each item of the MGLS questionnaire

No	Questions	Urban (n=225)				Rural (n=233)			
		Yes	%	No	%	Yes	%	No	%
1	Have you ever forgotten to take your medication?	95	42.2	130	57.8	124	53.2	109	46.8
2	Are you sometimes negligent in taking medicine?	84	37.3	141	62.7	124	53.2	109	46.8
3	When you feel better, do you sometimes stop taking your medication?	87	38.7	138	61.3	149	63.9	84	36.1
4	Sometimes if you feel uncomfortable/worse while taking medicine, do you stop taking it?	86	38.2	139	61.8	148	63.5	85	36.5

Table 5. Patient characteristics related to medication adherence in urban and rural areas on bivariate tests

Variables		Urban					Rural				
		Non-adherence (n=154)		Adherence (n=71) %		*p*	Non-adherence (n=180)		Adherence (n=53) %		*p*
		n	%	n	%		n	%	n	%	
Age, years	Mean (SD)	58.28±8.987		58.24±9.771		0.978[c]	56.66±8.518		54.91±9.122		0.322[a]
Gender	Female	91	63.2	53	36.8	0.995[b]	104	74.8	35	25.2	0.359[b]
	Male	52	64.2	29	35.8		76	80.9	18	19.1	
Education	Primary and below	39	59.1	27	40.9	0.645[b]	87	91.6	8	8.4	0.000[b*]
	High/middle school	74	66.1	38	33.9		75	77.3	22	22.7	
	Bachelor and above	30	63.8	17	36.2		18	43.9	23	56.1	
Working status	Retired/not working	72	85.7	12	14.3	0.000[b*]	28	66.7	14	33.3	0.109[b*]
	Working	71	50.4	70	49.6		152	79.6	39	20.4	
Monthly income (IDR)	< 1.000.000	54	77.1	16	22.9	0.000[b*]	53	82.8	11	17.2	0.010[b*]
	1.000.000 - < 3.000.000	47	57.3	35	42.7		97	80.8	23	19.2	
	3.000.000 – 5.000.000	37	69.8	16	30.2		30	61.2	19	38.8	
	>5.000.000	5	25.0	15	75.0		0	0	0	0	
Marital status	Divorce/single	19	55.9	15	44.1	0.415[b]	25	73.5	9	26.5	0.735[b]
	Married	124	64.9	67	35.1		155	77.9	44	22.1	
Medical insurance	No insurance	15	68.2	7	31.8	0.809[b]	7	70	3	30	0.699[b]
	Indonesian National Social Health Insurance	128	63.1	75	36.9		173	77.6	50	22.4	
Distance	>5 km	15	68.2	7	31.8	0.759[b]	21	60.0	14	40.0	0.002[b*]
	1-5 km	69	65.1	37	34.9		112	85.5	19	14.5	
	< 1 km	59	60.8	38	39.2		47	70.1	20	29.9	
Disease knowledge	Mean (SD)	15.24±3.565		18.43±2.085		0.000[a*]	14.77±2.973		18.11±2.276		0.000[a*]
Social support	Mean (SD)	61.62±12.394		70.32±11.343		0.000[a *]	57.27±8.778		62.60±7.209		0.000[a*]
Duration of illness, years	≥5	46	60.5	30	39.5	0.630[b]	49	74.2	17	25.8	0.185[b*]
	1 - < 5	84	64.1	47	35.9		96	82.1	21	17.9	
	< 1	13	72.2	5	27.8		35	70.0	15	30.0	
Comorbid	With comorbids	45	68.2	21	31.8	0.437[b]	41	74.5	14	25.5	0.716[b]
	No comorbids	98	61.6	61	38.4		139	78.1	39	21.9	
Number of antihypertensive drugs	2	16	53.3	14	46.7	0.296[b]	26	83.9	5	16.1	0.475[b]
	1	127	65.1	68	34.9		154	76.2	48	23.8	

[a]mann-whitney, [b]Chi square, [c]Independen T-test, * Shows a variable entered in a multivariate test

Table 6. Results of logistic regression analysis of medication adherence in urban and rural areas

Urban				Rural		
Variables	n (=225)	OR (95% C.I.)	*p*	n (=233)	OR (95% C.I.)	*p*
Working status						
Retired/not working	84	1				
Working	141	4.787 (2.149 – 10.663)	0.000			
Social support						
Low	102	1		145	1	
High	123	5.054 (2.370 – 10.775)	0.000	88	4.696 (2.045-10.783)	0.000
Diseases knowledge						
Low	110	1		159		
High	115	6.558 (3.098 – 13.880)	0.000	74	12.555 (5.429-29.034)	0.022
Education						
Primary and below				95	1	
High/middle school				97	3.290 (1.186 – 9.130)	0.000
Bachelor and above				41	12.871 (3.986 – 41.562)	0.000

areas, namely 48.9% in urban areas and 68.2% in rural areas. The average score in both areas is at a low level.

Most patients used a single antihypertensive drug in urban and rural areas (86.7%). Duration of illness was between 1 - < 5 years, 58.2% in urban and 50.2% in rural areas. However, the percentage of patients with a duration of illness < 1 year was higher in rural than urban areas. Most patients had no comorbidities, 70.7% in urban and 76.4% in rural areas, with uncontrolled blood pressure at 73.8% in urban and 73.0% in rural areas.

There is a differences between urban and rural areas with the level of medication adherence (p=0.002). Patients in urban areas are 1.947 times more likely to adhere to medication than hypertensive patients in rural areas to comply. The level of adherence is better in urban areas than in rural areas. This finding is consistent with the results of previous studies in China [12]. The prevalence of medication adherence in this study was low in both urban and rural areas and is consistent with previous findings [10,12,23,24]. Differences in socioeconomic, therapeutic and clinical characteristics may cause differences in treatment adherence. Regional, economic and cultural differences between rural and urban areas can lead to differences in adherence to treatment of hypertension sufferers between rural and urban residents. Knowing and understanding village-urban differences in treatment adherence and their influencing factors is an essential step in determining targeted strategies to increase adherence of people with hypertension in different places of residence [25,26]. Patients in urban areas do not adhere to treatment because they forget to take their medication. In contrast, if they feel healthier in rural areas, they sometimes stop taking medication. Previous studies have also reported forgetting to take medication as a cause of non-adherence in addition to multiple daily doses, financial constraints and side effect [27]. Reasons for non-compliance including forgetfulness, drugs side effects, shortage of drugs, poly pharmacy and the asymptomatic nature of hypertension [28].

In urban areas, the variables of working status, monthly income, social support and level of knowledge are included in the multivariate analysis. In rural areas, the variables were education, working status, monthly income, distance from home to health care facilities, social support, level knowledge and duration of illness were included in the multivariate analysis.

Logistic regression test results show in urban areas, patients who work are 4.787 times more likely to have high adherence than patients who are not working/retired to comply. Patients with high social support are 5.054 times more likely to have high medication adherence than patients with low social support, and patients with a high level of knowledge are 6.558 times more likely to have high medication adherence than patients with a low level of knowledge. In contrast to rural areas, patients with middle/high school education are 3.290 times more likely to have high adherence than those with primary or below education to comply, patients with bachelor or above education are 12.871 times more likely to have high adherence than patients with primary and below education for hypertensive patients with good social support is 4.696 times more likely to have high medication adherence than patients with poor social support to comply. Patients with a high level of knowledge are 12.555 times more likely to have high medication adherence than patients with a low level of knowledge to comply.

Social support and level of knowledge are factors that are significantly related to compliance both in urban and rural areas. Knowledge is most related to medication adherence in urban, whereas education and knowledge are most related to rural areas. Previous studies have confirmed that treatment adherence positively increases with increased social support for hypertensive patients [29]. Patient knowledge about hypertension is a determinant of good adherence in hypertensive patients [30]. Differences in education levels may be the reason for different adherence. Urban residents tend to be more educated than rural residents and have more knowledge about hypertension [25]. This study found that working patients tended to be more compliant with treatment, unlike previous research [31]. One study reported that in addition to social support,

age, household income, duration of diagnosis, the number of antihypertensive tablets taken in each dose, and the frequency of taking medication every day, were related to medication adherence [23]. Several factors in this study followed previous studies that knowledge, beliefs and attitudes, mental-personality traits, culture and lifestyle, access to health services, individual internal incentives, family support, and support from health care providers influence adherence to hypertensive patients [32].

Studies of medication prevalence and adherence help explain the determinants of adherence models. Static variables may not change with intervention, but behavioural and dynamic variables are very likely to receive the intervention [11]. In this study, both in urban and rural areas, adherence was influenced by social support and level of knowledge, which are dynamic variables, so interventions can be carried out to increase patient adherence to treatment.

Interventions to improve medication adherence in hypertensive patients can be carried out at the doctor, patient, drug therapy, and healthcare system levels [33]. Collaborating between doctors, nurses, and pharmacists, self-management with a simple system, using reminders, having group sessions, instruction combined with motivational strategies, health system support for monitoring, and financially supporting collaboration between healthcare providers, nurses and pharmacists) can help patient adherence [34]. The use of technology can have a positive impact on supporting hypertension self-management, particularly in medication adherence [35].

The limitations of the first study were the small number of samples and the sampling method, which was not randomized. Secondly, compliance, social support and knowledge used a self-reported questionnaire which could lead to memory bias—a small of the possible influencing factors. Future research needs to be conducted in a larger random sample and involves other variables that affect medication adherence.

5 Conclusion

Most patients are non-adherent to treatment in urban and rural areas. Hypertensive patients in urban areas have better adherence than rural patients in this study. The factors most related to medication adherence in urban areas were employment status, social support, and knowledge about hypertension. Education, social support, and knowledge were the factors most related to adherence in rural areas. Our study provides insights into medication adherence in hypertensive patients and related factors for urban and rural Indonesian populations. Stakeholders and health professionals can consider our findings to develop health programs. Social support and level of knowledge are dynamic behavioural factors, so intervention strategies involving family and health worker support, as well as providing education using appropriate methods, should be considered in this population.

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Conflict Interests

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