

ASSOCIATION BETWEEN ADHERENCE TO HYPERTENSION MEDICATION AND SELF-MANAGEMENT AMONG HYPERTENSION PATIENTS IN PUSKESMAS MAGELANG TENGAH MAGELANG: A CROSS-SECTIONAL SURVEY

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Received: 15 Apr 2025, Revised and Accepted: 05 Jul 2025

ABSTRACT

Hypertension, a leading global health concern, is particularly prevalent among the older adult population. It is defined as persistently elevated arterial blood pressure, with readings of 140/90 mmHg or higher. This study was investigated whether adherence to hypertension medication is associated with self-management among patients with hypertension in Puskesmas Magelang Tengah, Magelang, who participated in the Program Pengelolaan Penyakit Kronis (Prolanis) and Program Rujuk Balik (PRB) Programs. We undertook a cross-sectional study by using questionnaires to explore demographic characteristics, adherence to hypertension medication (Morisky Green Levine Medication Adherence Scale/MGLS), and self-management (Persian Hypertension Self-Management Questionnaire/PHSMQ). The Spearman's Rank test was used to investigate the association between adherence to hypertension medication and self-management among hypertension patients. Most participants were at an intermediate level of adherence to hypertension medication (47.2%) and had low self-management of Hypertension medication (60.4%). Based on Spearman's Rank test, there was no significant association between adherence to hypertension medication and self-management among hypertension patients. Future research should investigate the role of other factors related to self-management in patients with hypertension, such as health literacy, motivation, and social support. These factors could provide deeper insights into how adherence and other components of self-management interact with one another.

Keywords: Hypertension, Indonesia, Prolanis, PRB, Self-management

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INTRODUCTION

Hypertension, a leading global health concern, is particularly prevalent among the older adult population. It is defined as persistently elevated arterial blood pressure, with readings of 140/90 mmHg or higher. As people age, the risk of developing hypertension increases due to factors such as vascular stiffness, hormonal changes, and cumulative exposure to lifestyle-related risks. Globally, hypertension affects approximately 1.28 billion adults, with the prevalence significantly higher among individuals aged 60 and above. Studies estimate that over 60% of older adults worldwide suffer from hypertension, making it one of the primary causes of morbidity and mortality in this age group WHO [1].

In Asia, the prevalence of hypertension among older adults is a growing concern. Rapid urbanization, dietary changes, and an increasingly sedentary lifestyle have contributed to the rise of hypertension in this region. Recent data indicate that around 13.6% to 47.9% of older adults in Asian countries, including China, Japan, Indonesia, and India, have hypertension [2]. This trend is expected to continue as the population ages and lifestyle factors predisposing individuals to high blood pressure become more prevalent. In addition,

In Indonesia, Hypertension among older adults is also a significant public health issue. According to the Ministry of Health of the Republic of Indonesia, over 60% of individuals aged 60 y and older are hypertensive, with many cases undiagnosed or poorly managed [3]. Despite the availability of effective medications to control blood pressure, many older adult hypertension patients do not adhere to their prescribed treatment regimens, leading to poor health outcomes. Medication adherence refers to the extent to which patients take their medications as prescribed, and poor adherence can result in uncontrolled blood pressure, increasing the risk of stroke, heart disease, and kidney failure [4]. Another study found that among hypertension patients, non-adherence to hypertension

medication was more prevalent in low-to-middle-income countries and non-Western countries [5].

Several factors influence medication adherence in older adult patients with hypertension. Socio-demographic, patient-related, treatment-related, disease-related, and healthcare service-related can all reduce medication adherence. Furthermore, social and economic factors, such as limited access to health care, low health literacy, and insufficient support from caregivers, exacerbate the problem [6]. Ho, Nguyen [7] also found that hypertension patients with higher education-related beliefs about medication had higher hypertension knowledge and better medication adherence. Addressing these barriers through patient education, simplified treatment plans, and support systems is crucial for improving health outcomes among older adults with hypertension.

Self-management refers to an individual's ability to take an active role in managing their health, particularly in chronic conditions such as hypertension. Effective self-management encompasses a range of behaviors, including adhering to medication regimens, maintaining a balanced diet, engaging in regular physical activity, monitoring blood pressure, and managing stress. For older adult patients, self-management is influenced by factors such as well-being, family function, sex, educational level, age, and social environment [8].

In Indonesia, the government has a program aimed at improving the quality of life for patients with chronic conditions, particularly those with Diabetes and Hypertension, through disease management. This program is called Program Pengelolaan Penyakit Kronis (Prolanis), or chronic disease management program [9]. Prolanis is an integrated program specifically designed for primary care health services. In Prolanis, patients, health care providers, and the national health insurance agency (Badan Penyelenggara Jaminan Sosial Kesehatan/BPJS Kesehatan) are actively involved. Enrolment in Prolanis is voluntary, and there are several benefits for patients with

hypertension who register for Prolanis. Patients can benefit from various services, including monthly medical consultations, reminders about healthcare visits, health education, home visits, and monthly health status monitoring [10]. Another program for chronic disease patients is Program Rujuk Balik (PRB), a reverse referral program. This program is for patients in secondary care health services whose condition is stable and could be referred to primary care health services [9]. In primary care health services, they will get monthly medication services and medical consultations. Thus, patients with chronic diseases could have easier access to medication, reduced waiting times, and improved relationships between doctors and patients. Because of this, PRB patients are required to register in Prolanis [10].

After being implemented in 2014, Prolanis had some impacts on patients with hypertension. Healthcare providers have found that patient satisfaction with medical services is improving. Patients also have opportunities to socialize with others who have the same condition [9]. Another study found that participation in Prolanis was associated with increased self-efficacy among patients with hypertension [11]. A survey conducted at Puskesmas Somba Opu also found that participation in Prolanis had a significant positive association with self-management among older adult patients with hypertension [12]. On the other hand, a study in Minggir District found no significant association between treatment adherence and clinical outcomes of hypertension among patients who attended Prolanis [13]. In line with the previous study, an interview conducted in one of Puskesmas in Karanganyar found that some patients with hypertension who attend Prolanis still have low self-management [14].

However, self-management among older adults with hypertension faces numerous challenges. Cognitive decline, limited health literacy, and a lack of motivation can hinder patients' ability to consistently engage in self-management behaviors. Furthermore, socioeconomic factors, such as lower levels of education and lower income, complicate self-management efforts in older people [15]. In Indonesia, cultural factors, inadequate education, and limited healthcare resources further hinder the self-management of hypertension [3]. Therefore, using a cross-sectional study, we aimed to explore whether adherence to hypertension medication is associated with self-management among patients with hypertension in Puskesmas Magelang Tengah who participated in the Prolanis and PRB program. Based on previous studies, we also assumed a positive association between adherence to hypertension medication and self-management among patients with hypertension in Puskesmas Magelang Tengah.

Methods

Design and sample

This research employed a cross-sectional study design. A cross-sectional study would emphasize the measurement of independent and dependent variable data collected at one point in time [16]. The population in this study consisted of all patients with hypertension who visited Prolanis in November 2024 at Puskesmas Magelang Tengah. We applied the following inclusion criteria: patients with hypertension who joined the Prolanis program and PRB Program in Puskesmas Magelang Tengah and were willing to participate in the research and could communicate in Bahasa Indonesia. In this study, the sample size consisted of 52 participants, with an effect size of 0.5 and a power of 0.80. However, 53 patients actively joined this program. We recruited 53 participants from the target population. During the data cleaning process, no questionnaires were excluded due to data duplication or missing data. A total of 53 participants were recruited and analyzed.

Data collection

The data were collected using written questionnaires. Next, after the ethics committee admitted the authorization, the researcher contacted the head of Puskesmas Magelang Tengah. Participants

were requested to read the informed consent form and complete questionnaires. Any commitment made by participants to fulfill the questionnaire form would not impact their medication program, and respondent rights were protected.

Instruments

The researchers developed a questionnaire that collected demographic data. It was used to identify the patient's age, gender, occupation, duration of hypertension, health insurance status, comorbidities, and medication. The self-reported adherence to hypertension medication consisted of 4 questions using the Morisky Green Levine Medication Adherence Scale (MGLS) [17, 18]. The MGLS Bahasa Indonesia version had a total score ranging from 0 to 4, indicating high adherence (MGLS score 0), intermediate adherence (MGLS score 1 or 2), and low adherence (MGLS score ≥ 3) [19]. The MGLS Bahasa Indonesia version demonstrated good reliability, as indicated by Cronbach's Alpha of 0.634 [18]. This study used the Persian Hypertension Self-Management Questionnaire (PHSMQ) [20, 21]. The range of values is 1 to 155, with the higher score indicating better self-management. When the score is higher than the mean of the participants, it is categorized as high self-management, and vice versa. The PHSMQ Bahasa Indonesia version demonstrated good reliability, with a Cronbach's Alpha of 0.707 [20].

Data analyses

SPSS 22 was used for the data analyses. Descriptive statistical methods (i. e., percentages, means, and standard deviations) were used to describe the demographic characteristics, adherence to hypertension medication, and self-management among patients with hypertension. The Spearman Rank Test was used to analyze the association between adherence to hypertension medication and self-management among patients with hypertension. Statistical significance was inferred at $p < 0.05$.

Ethics consideration

This research was authorized by the Health Research Ethical Committee of the Universitas Muhammadiyah Magelang (ethical approval no. 017/KEPK-FIKES/II.3. AU/F/2024). Informed consent was obtained from participants, along with the self-reported questionnaire, which explained that participation was voluntary. Participants who were willing to participate in this research signed the informed consent form. The researcher assisted illiterate participants in reading the informed consent and the self-report questionnaire.

RESULTS

Study participants characteristics

Table 1 shows the characteristics of the 53 participants. Around 28 (52.8%) participants were in the 60-70 age group, and 42 (79.2%) were female. All participants (100%) were using BPJS Kesehatan (Badan Penyelenggara Jaminan Sosial Kesehatan)/Indonesian National Health Insurance to cover their health expenses. Among the participants, the duration of hypertension was 1-5 y and 6-10 y in 30 (56.6%) and 17 (32.1%) cases, respectively. Regarding adherence to hypertension medication, 25 (47.2%) of participants had an intermediate level of adherence. Around 32 (60.4%) of participants had low self-management skills related to hypertension medication.

Bivariate analysis between adherence to hypertension medication and self-management

Table 2 shows the bivariate analysis results for adherence to hypertension medication and self-management of hypertension in patients. Based on Spearman's Rank Test, there was no significant association between adherence to hypertension medication and self-management of hypertension in patients (p -value = 0.090 and Spearman's Coefficient = 0.235). This means that the association between hypertension medication and self-management of hypertension in patients was weak.

Table 1: Participant characteristics (n=53)

Variable	Frequency (n)	Percentage (%)
Age		
49-59 y old	11	20.8
60-70 y old	28	52.8
71-81 y old	14	26.4
Sex		
Male	11	20.8
Female	42	79.2
Job		
Pensioner	21	39.6
Private Worker	3	5.7
Housewife	29	54.7
Health Insurance		
BPJS Kesehatan*	53	100
Other Insurance	0	0
Duration of Hypertension		
1-5 y	30	56.6
6-10 y	17	32.1
>10 y	6	11.3
Comorbid		
1 comorbid	24	45.3
2 comorbid	20	37.7
3 or more comorbid	9	17.0
Medication		
No Medicine	1	1.9
1 Medicine	11	20.8
2 Medicine	15	28.3
3 or More Medicine	26	49.0
Adherence to Hypertension Medication (Mean: 0.69 and SD±0.93)		
Low	5	9.4
Intermediate	25	47.2
High	23	43.4
Self-Management (Mean: 55.72 and SD±12.85)		
Low	32	60.4
High	21	39.6

Note: *BPJS Kesehatan= Badan Penyelenggara Jaminan Sosial Kesehatan

Table 2: Bivariate analysis between adherence to hypertension medication and self-management

Variables	Self-management patient hypertension				Total		p	R*
	Low		High		Σ	%		
	n	%	n	%				
Adherence to hypertension medication								
Low	4	80	1	20	5	100	.090	.235
Intermediate	17	68	8	32	25	100		
High	11	47.8	12	52.2	23	100		

Note: *R = strength thresholds

DISCUSSION

This study found a gender imbalance in participant characteristics. 42 of the 53 participants were female (79.2%). However, this finding aligns with a previous study from Depok Jaya Health Center, Indonesia, which involved 19 female participants (63.3%) [11]. Another study, conducted at Minggir Health Center in Indonesia, involved 56 female participants (70.9%) [13]. This gender imbalance is related to the hormonal process during menopause. During menopause, there were some hormonal changes, and one of them was estrogen. The lower estrogen level prevents the body from producing high-density lipoprotein (HDL), which increases the risk of vessel damage and atherosclerosis. As a result, blood tension increases and could trigger hypertension [22, 23]. A study in India also found that the prevalence of hypertension was higher in females than in males [24].

This study found that 25 (47.2%) and 23 (43.4%) participants were in the intermediate and high categories regarding adherence to hypertension medication. This finding aligns with a previous study that found that among patients with hypertension in the hospital's outpatient department, most participants were in the high and

intermediate categories for adherence to hypertension medication [25]. On the other hand, a study in Sidoarjo had 65 (100%) participants in intermediate/moderate categories for adherence to hypertension medication [26]. Most participants in all studies fell into the intermediate and low categories of adherence to hypertension medication. It could happen because participants felt healthy, took traditional medication, forgot to take the medication, and were afraid of the side effects of the medication [25].

This study showed that 32 (60.4%) and 21 (39.6%) participants were in the low and high categories, respectively, regarding self-management of hypertension. More than 50% of participants were in low categories of self-management of hypertension; this could be due to various reasons. A qualitative study in Indonesia found a low rate of self-management of hypertension among older adults because of some problems, such as inadequate knowledge about hypertension, hypertension is considered a common condition, difficulty in changing behavior, lack of family support, financial issues, perception of drug side effects, and consumption patterns of taking medication [27]. Physical limitations could be another reason for lower self-management in older adult patients. A cross-sectional

study in Indonesia found that physical limitations in older adults contributed to lower access to healthcare services [28].

Hypertension management, patient adherence, and self-management are commonly studied factors in achieving optimal health outcomes. However, this study's findings demonstrate no significant relationship between taking patient adherence and self-management in patients with hypertension at Puskesmas Magelang Tengah. These results challenge some of the assumptions in the literature regarding the roles of these two components in managing chronic conditions.

First, it is essential to clarify the definitions of adherence and self-management. Adherence typically refers to how patients follow prescribed treatments, including taking medications as directed, attending follow-up appointments, and adhering to lifestyle changes. In contrast, self-management encompasses a broader range of patient-driven activities, including self-monitoring blood pressure, managing stress, engaging in physical activity, and dietary modifications [29].

In previous studies, adherence to antihypertension medication has been identified as a critical factor in achieving blood pressure control [30]. Similarly, self-management behaviors have been linked to improved health outcomes in patients with hypertension [31]. However, our findings suggest that in this specific population, adherence and self-management may not have a direct correlation. There are several possible explanations for this.

One reason for the lack of a significant relationship could be the complexity of Hypertension management itself. Patients might adhere to their medication regimens but neglect other self-management practices, such as regular physical activity or dietary modifications, which can affect the overall effectiveness of self-management efforts. On the other hand, patients who engage in self-management behaviors but do not adhere to prescribed medications may not achieve optimal control over their blood pressure. This complexity can obscure the relationship between these two factors. A study in Indonesia identified eight themes related to self-management problems among older adult patients with hypertension. The eight themes are complaints related to aging and hypertension, knowledge and beliefs about hypertension, behavior changes following a hypertension diagnosis, disease management support, and access to health services for older adults, the need to manage hypertension in older adults, hypertension self-management behaviors, and compliance with medication [27]. The themes align with another study, which found that 43.3% of hypertension patients had limited knowledge of hypertension management [32]. Knowledge about hypertension influences the management of hypertension by patients [33, 34]. If the knowledge is low, it may lead to a low awareness of their condition and poor management of Hypertension. Healthcare providers in Prolanis should highlight it to evaluate patients' knowledge about their condition. Thus, they can arrange proper interventions to improve patient's knowledge.

Another possible explanation is support systems. Patients with higher self-efficacy and access to health education are more likely to engage in self-management activities. However, they may still face challenges in adhering to medication due to forgetfulness, side effects, or the perceived burden of long-term treatment [35]. Another study also found that Hypertension management among older adults was influenced by family support. Once the older adults see a lack of family support, they might have worse hypertension management. It also found that some older adults with hypertension still engaged in risky behavior, such as less consumption of fiber, drinking coffee, and lack of physical exercise. These behaviors are influenced by their self-management of hypertension [27]. Thus, while adherence and self-management are essential components of hypertension management, they may sometimes operate independently of each other.

On the other hand, self-management for high blood pressure is not only related to the patient's behaviors but also influenced by social, cultural, and individual factors [36, 37]. Thus, patients' interaction with their environment, including local values, family, and accessibility to healthcare, influences their perception of their health [38, 39]. A study in Magelang found an association between family support and

healthcare providers and the frequency of Prolanis visits [40]. Another study found that the health education patients received in Prolanis was associated with adherence to hypertension medication [41].

Additionally, psychosocial factors such as stress, anxiety, and depression can negatively affect both adherence and self-management, albeit in different ways. These negative emotions may contribute to the etiology of Hypertension [42]. For instance, stress can impair a patient's ability to follow medical advice while also encouraging active engagement in self-monitoring behaviors [43]. A study in Indonesia found that Hypertension was less common among individuals who did not experience anxiety [44]. Therefore, these variables could serve as confounding factors, complicating the relationship between adherence and self-management.

Lastly, it is essential to consider the limitations of this study. The cross-sectional nature of the data collection provides only a snapshot of patient behaviors at a single point in time. This study was also done with a small sample size. Thus, the result could not be generalized to other populations. Longitudinal studies with large sample sizes might better capture the dynamic relationship between adherence and self-management, especially as patients' health conditions and treatment plans evolve.

In conclusion, while adherence and self-management are critical elements in hypertension care, the study's lack of a significant relationship suggests that these components may function independently rather than synergistically in specific patient populations. Future research should explore the interplay of these factors over time and investigate additional variables, such as psychological well-being and health literacy, that may influence adherence and self-management in patients with hypertension.

Recommendations

This study has several limitations. First, the cross-sectional design limits the ability to infer causality between patient adherence and self-management. Future research should consider conducting longitudinal studies to better understand how adherence and self-management behaviors evolve. Second, the study relied on self-reported measures of adherence and self-management, which may introduce reporting biases. Future studies could benefit from more objective measures, such as electronic medication monitoring or health outcomes data [35]. Ultimately, future research should explore the role of additional factors related to self-management in patients with hypertension, including health literacy, motivation, and social support. These factors could provide deeper insights into how adherence and other components of self-management interact with one another.

ACKNOWLEDGMENT

The authors thank the Directorate of Research, Technology, and Community Service, Ministry of Education, Republic of Indonesia, for funding this research and all participants for their contributions to the study.

AUTHORS CONTRIBUTIONS

Nurul Purborini (NP), Nurfina D Kartikawati (NDK), Nurul Hidayah (NH), Endah R Arumi (ERA), Fitriana Yulastuti (FY), Conception and design of the study: NP, NDK, NH, ERA, FY, Acquisition of data: NP, NDK, Analysis and/or interpretation of data: NP, NH, Drafting the manuscript: NP, NH, ERA, Revising the manuscript critically for important intellectual content: NP, NDK, NH, FY

CONFLICT OF INTERESTS

Declared none

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