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The Relationship Between Medication-Related Burden and Therapy Compliance of Hypertension Patients

Woro Supadmi, Shafira Diestra Afifa, Fiya Nailil Izzah, Rizky Gustinanda

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Abstract: Hypertension prevalence in the Special Region of Yogyakarta (31.8%) is higher than the national average (30.8%), and long-term medication use may create a burden that negatively affects adherence. This study aimed to evaluate the relationship between medication-related burden and adherence among hypertensive outpatients at Panembahan Senopati Bantul Regional Hospital and Yogyakarta City Regional Hospital. Using a cross-sectional design, 161 patients were recruited between January and February 2025. Medication-related burden was assessed with the Living with Medicines Questionnaire version 3 (LMQ-3), while adherence was measured using the Medication Adherence Rating Scale-5 (MARS-5). Most patients experienced a low burden (76.4%), followed by no burden (15.5%) and moderate burden (8.1%). Regarding adherence, 83.2% showed moderate adherence and 16.8% high adherence. Spearman's correlation analysis revealed a significant negative relationship between medication-related burden and adherence (p=0.000; Rho = -0.461). These findings suggest that a higher treatment burden reduces adherence to antihypertensive therapy, highlighting the need for strategies to minimize patient burden and improve treatment outcomes.

Introduction

Hypertension is a major public health problem, with a prevalence of 31.8% in the Special Region of Yogyakarta, higher than the national average of 30.8% (1). Beyond the disease itself, long-term pharmacological treatment for hypertension often imposes a medication-related burden (MRB), defined as the impact of medication use on daily life, well-being, and treatment adherence (2-4). Previous studies have shown that patients experiencing a high MRB are more likely to demonstrate poor adherence, resulting in uncontrolled blood pressure and an increased risk of cardiovascular complications (5). For instance, Awad *et al*. (2020) reported that MRB in geriatric hypertensive patients was strongly associated with low adherence and treatment failure (6), while Mohammed *et al*. (2016) highlighted that unaddressed MRB can negatively affect quality of life and clinical outcomes (7). Given the high prevalence of hypertension in Yogyakarta, the likelihood of MRB among patients is substantial. Therefore, identifying MRB is essential to prevent poor adherence and adverse outcomes, ensuring that patients can achieve optimal blood pressure control and improved health status.

Non-adherence to treatment is often caused by comorbidities that increase treatment complexity, the number of medications taken, and the cost of therapy (8). Hypertensive patients undergoing polypharmacy are more likely to experience higher medication burden, which in turn may lead to poor adherence. Adherence to antihypertensive therapy is a key predictor of blood pressure control and the prevention of complications (3). A study by Sinuraya (2018) found that 85.3% of hypertensive patients had low to moderate adherence, with only 14.2% showing high adherence to treatment (9). The Medication Adherence Rating Scale (MARS) can be used to measure the level of medication adherence. Previous research has shown a significant correlation between medication burden and adherence levels (r=0.404; p<0.001), indicating that individuals with poor health conditions tend to experience a higher medication burden and are less likely to adhere to their treatment regimen (6).

Given the high prevalence of hypertension in Yogyakarta and the potential risk of MRB, it is essential to investigate MRB alongside treatment adherence in this population. Previous local studies have either described MRB only in community pharmacy cases without linking it to adherence outcomes, or explored patients' intention to adhere without formally assessing MRB using validated tools. Thus, evidence from hospital-based settings examining the direct relationship between MRB and adherence among hypertensive patients remains limited. This study addresses that gap by applying the Indonesian-validated Living with Medicines Questionnaire version 3 (LMQ-3) and the Medication Adherence Rating Scale-5 (MARS-5) to quantify MRB and adherence, while also exploring patient-related factors such as education and medication supervision. Therefore, this research aims to investigate the relationship

between medication-related burden and treatment adherence in hypertensive patients at regional public hospitals in Yogyakarta, providing new insights that are directly relevant for improving clinical practice and patient outcomes.

Methodology

Types of Research

This study employed a descriptive-quantitative research design with a cross-sectional approach. Data were collected at a single point in time during January–February 2025 at Panembahan Senopati Bantul Regional Hospital and Yogyakarta City Regional Hospital. Primary data were obtained prospectively through direct patient interviews. During the interviews, respondents were asked about their experiences and perceptions regarding medication-related burden using the validated Indonesian version of the LMQ-3, and their medication adherence behaviors were assessed using the MARS-5. Secondary data were retrieved from patients' medical records, including demographic characteristics, diagnosis, comorbidities, prescribed antihypertensive medications, and treatment history.

Sample

The study population consisted of hypertensive outpatients from both hospitals. Inclusion criteria were: (1) being diagnosed with hypertension and receiving antihypertensive therapy, (2) aged ≥18 years, (3) willing to participate, and (4) able to complete the questionnaire. Exclusion criteria were: (1) patients with severe cognitive or psychiatric disorders that could interfere with reliable responses, (2) incomplete or missing medical record data, and (3) refusal to provide informed consent. The minimum required sample size was calculated using **Equation 1** proposed by Dahlan (2016) (10).

The calculation indicated that each hospital needed at least 77 participants, and the total minimum required sample was 154. Therefore, the final number of respondents (161) exceeded the minimum requirement, ensuring sufficient statistical power for the correlation analysis.

Materials

The instruments used in this study included the LMQ-3 to assess the medication-related burden, and the MARS to evaluate medication adherence. The LMQ-3 questionnaire consists of eight domains covering relationships with healthcare professionals, practical difficulties, cost burden, side effects, perceived effectiveness, concerns about medication use, impact on daily activities, and perceived control over treatment regimen changes. The Indonesian version of the LMQ-3 has been validated in a previous study, showing a Cronbach's alpha reliability score of 0.842, indicating that the instrument is valid and reliable for assessing medication burden among hypertensive patients in the Yogyakarta region (11). The blank Indonesian versions of the LMQ-3 and MARS-5 are provided as Supplementary File 1.

Data Analysis

The scoring system for the Living with LMQ-3, Visual Analogue Scale (VAS), and the MARS-5 followed the validated Indonesian versions of the instruments. For LMQ-3, total scores ranged from 41 to 205, with higher scores indicating a greater medication-related burden: no burden (41-73), low burden (74-106), moderate burden (107-139), high burden (140-172), and very high burden (173-205). The VAS had a score range of 0–10, categorized as no burden (0-2), low burden (3-4), moderate burden (5-6), high burden (7-8), and very high burden (9-10). For MARS-5, total scores ranged from 5 to 25 and were categorized as high adherence (25), moderate adherence (6-24), and low adherence (5).

$$\mathbf{n} = \left[\frac{\mathbf{Z}\alpha - \mathbf{Z}\beta}{0.5 \ln\left(\frac{1+\mathbf{r}}{1-\mathbf{r}}\right)} \right]^2 + 3$$

Equation 1 | n = minimum required sample size, Zα = 1.96 (α = 5%, two-tailed), Zβ = 0.846 (β = 20%), r = minimum correlation coefficient considered meaningful (r = 0.317) based on Zidan et al. (2018).

For the LMQ-3, responses on the five-point Likert scale were summed to obtain total scores, which were then categorized into no burden, low burden, moderate burden, high burden, and very high burden based on predetermined cut-off values. The VAS scores ranged from 0–10 and were similarly categorized according to standard thresholds. For MARS-5, adherence scores were calculated by summing the responses to the five items, producing total scores categorized into high, moderate and low adherence levels based on established cut-offs.

The collected data were coded and analyzed using IBM SPSS Statistics version 25. Descriptive statistics were applied to summarize demographic and clinical characteristics, presented as frequencies, percentages, means, and medians. The relationship between categorical patient characteristics (such as gender, education, and employment status) and medication-related burden or adherence levels was tested using the Chi-square test, while correlation between continuous scores of the LMQ-3, VAS, and MARS-5 was assessed using Spearman's rho test. A p-value of <0.05 was considered statistically significant.

Ethical Considerations

This study was approved by the Health Research Ethics Committee of Jenderal Achmad Yani University Yogyakarta (Ethical Eligibility Certificate Number: No.Skep/683/KEP/XII/2024, dated December 16, 2024). All participants were informed about the study objectives, procedures, and their rights before enrollment. Written informed consent was obtained from each participant prior to data collection. Patient anonymity and confidentiality were strictly maintained by using unique study codes instead of personal identifiers. Data were processed and analyzed in aggregate form only, ensuring that no individual patient could be identified.

Results and Discussion

Patient Characteristics

The respondents in this study were 161 patients who met the inclusion criteria. Respondent characteristics included gender, age, education, occupation, and the presence of a medication supervisor. The distribution of respondent characteristics can be seen in **Table 1**. The study consisted of 61 male patients (37.8%) and 100 female patients (62.2%). The age distribution of hypertensive patients in

Table 1. Characteristics of hypertension patients at Yogyakarta Hospital.

Characteristics	Frequency (n=161)	Presentation (%)
Gender		
Male	61	37.8%
Female	100	62.2%
Age		
18 - 45 years	15	9.3%
≥ 45 years	146	90.7%
Education level		
≤ 12 years (Elementary School-Senior High School)	83	51.5%
> 12 years (College/University)	78	48.5%
Employment status		
Employed	46	28.6%
Unemployed	115	71.4%
The Existence of Medication Supervisors		
Exist	35	21.7%
Nothing	126	78.3%

Table 2. Diagnosis of Hypertension Patients at RSUD Yogyakarta.

Diagnosis	Frequency (n=161)	Presentation (%)
1 Disease Diagnosis	63	39.1%
2 Disease Diagnosis	63	39.1%
3 Disease Diagnosis	33	20.5%
4 Disease Diagnosis	2	1.3%

Yogyakarta hospitals was predominantly ≥45 years. The risk of developing hypertension increases in postmenopausal women due to a decline in estrogen levels (12). Changes in estrogen levels influence HDL (high-density lipoprotein) concentrations, which help maintain vascular elasticity (13). In addition to menopausal factors, previous studies have reported that women tend to have higher health awareness and are more proactive in seeking medical care compared to men. This may contribute to the greater number of female respondents in this study. Furthermore, local epidemiological data in Yogyakarta have shown a higher prevalence of hypertension among women, which is consistent with our findings (14).

Regarding education level, 83 patients (51.5%) had ≤12 years of education (Elementary School-Senior High School), while 78 patients (48.5%) had >12 years of education (College/University). Higher education levels are associated with better information reception and greater knowledge, particularly regarding hypertension. Hypertension prevalence tends to be higher among those with lower educational attainment due to limited knowledge and capability to adopt healthy behaviors (15).

In terms of employment status, 115 patients (71.4%) were unemployed, and 46 patients (28.6%) were employed. This aligns with findings by Laila *et al*. (2024), which showed that the proportion of unemployed individuals (51.8%) was higher than that of employed individuals (16). Unemployed respondents may have a greater risk of hypertension due to reduced physical activity (17). A total of 126 patients (78.3%) reported not requiring assistance or supervision in their routine medication intake. When assistance was provided, it typically involved preparing the medication or providing reminders, usually by a parent, spouse, child, or other family member as presented in **Table 2.**

Analysis of the characteristics of respondents' comorbidities showed that 63 respondents (39.13%) had hypertension without comorbidities and 98 respondents (60.86%) had hypertension with comorbidities. The comorbidities experienced by respondents included diabetes mellitus (DM), chronic kidney disease (CKD), dyslipidemia, hyperthyroidism, and hyperuricemia. The majority of respondents in this study had other comorbidities, particularly diabetes and dyslipidemia. Other chronic diseases can accompany or arise simultaneously, thereby potentially worsening organ damage (18).

The recommended treatment in the hypertension management guidelines for the majority of patients is to use combination drug therapy to achieve the target blood pressure reduction (Perhi, 2019). The following is an overview of the use of antihypertensive drugs at Yogyakarta Regional General Hospital is presented in **Table 3**.

Based on the number of drugs used, there were 99 respondents (61.5%) who received combination therapy with more than one type of drug. The recommended treatment in the hypertension management guidelines for the majority of patients is to use combination drug therapy in order to achieve the target blood pressure reduction (19). However, patients on combination therapy may experience side effects that interfere with their daily activities. Research shows that the more medications a patient takes, the greater the medication burden they experience (20).

This study shows that the hypertension drug Calcium Channel Blocker (CCB) is the most widely used single therapy at 27.27%. CCB drugs function by reducing the number of calcium ions that cross the cell membranes of smooth muscle, heart muscle, and the nervous system, as well as lowering cytosolic calcium concentration, thereby reducing heart muscle contraction (21). In this study, the combination of CCB and ARB (Amlodipine and Candesartan) antihypertensive drugs was the most widely used combination therapy at Yogyakarta Regional General Hospital. Similar results were found in a study by Gultom (2022), where the combination of CCB and ARB was most widely used in patients with primary hypertension (77%). The combination of CCB and ARB antihypertensive drugs is widely used and effective in lowering blood pressure with minimal side effects compared to other combinations of hypertension drugs (18).

Medication-Related Burden

The results of the medication-related burden analysis, obtained from the LMQ-3 scores of hypertensive patients at Yogyakarta Hospital, were dominated by low burden (123 patients, 76.4%), followed by no burden (25 patients, 15.5%) and moderate burden (13 patients, 8.1%). Based on the interview results, patients were dissatisfied with the effectiveness of antihypertensive medications. Many hypertensive patients feel burdened by their treatment, with concerns about long-term medication use being a significant burden. Concerns about taking medication for a long time are a cause of non-adherence among 58 patients with

Table 3. Therapy Profile of Hypertension Patients at RSUD Yogyakarta.

Group	Drug Name	Amountn=161	%
Single Therapy (n=62)			**38,5%**
ARB	Candesartan	26	16.1%
	Irbesartan	1	0.6%
CCB	Amlodipine	27	16.8%
	Nifedipine (Adalat Oros)	1	0.6%
ACEI	Captopril	1	0.6%
	Imidapril	2	1.2%
β-*blocker*	Bisoprolol	2	1.2%
	Propranolol	1	0.6%
Diuretic	Furosemide	1	0.6%
Two Drug Combination (n=73)			**45.3%**
CCB + ARB	Amlodipine +Candesartan	27	16.8%
	Amlodipine +Irbesartan	1	0.6%
	Candesartan+Diltiazem (Herbeser)	2	1.2%
	Candesartan+Nifediphine	2	1.2%
	Valsartan+ Diltiazem (Herbeser)	1	0.6%
CCB + BB	Amlodipine + BIsoprolol	1	0.6%
	Amlodipine + Propanolol	1	0.6%
CCB + ACEI	Amlodipine + Lisinopril	3	1.9%
	Amlodipine + Imidapril	1	0.6%
CCB + *Diuretic*	Amlodipine + Furosemide	3	1.9%
ARB + *Diuretic*	Candesartan + Furosemide	5	3.1%
	Candesartan + HCT	4	2.5%
	Irbesartan + Furosemide	2	1.2%
ARB + BB	Candesartan + Bisoprolol	11	6.8%
	Candesartan + Propanolol	1	0.6%
	Valsartan + Bisoprolol	1	0.6%
ARB + *Alfa 2 receptor antagonist*	Candesartan + Klonidin	1	0.6%
ACEI + *Diuretic*	Lisinopril Furosemide	2	1.2%
	Imidapril + Furosemide	2	1.2%
BB + *Diuretic*	Bisoprolol + Furosemide	2	1.2%
Three Drug Combination (n=18)		**11.2%**	
ARB + CCB + BB	Candesartan + Amlodipine + Bisoprolol	3	1.9%
	Candesartan + Herbeser + Bisoprolol	2	1.2%
ARB + *Diuretic* + BB	Candesartan + HCT + BIsoprolol	1	0.6%
	Valsartan + Furosemide + Bisoprolol	2	1.2%
ARB + CCB + *Diuretic*	Candesartan + Amlodipine + HCT	2	1.2%
	Valsartan + Amlodipine + Furosemide	3	1.9%
ARB + CCB + *Alfa 2 Receptor agonist*	Amlodipine + Irbesartan + Klonidin	1	0.6%
BB + ACEI + *Diuretic*	Bisoprolol + Imidapril + Furosemide	1	0.6%
CCB + BB + *Diuretic*	Adalat Oros + Bisoprolol + Furosemide	1	0.6%
CCB + ACEI + *Diuretic*	Amlodipine + Imidapril + Furosemide	2	1.2%
Four Drug Combination (n=8)		**5%**	
CCB + ARB + BB + *Diuretic*	Amlodipine + Candesartan + Bisoprolol + Furosemide	4	2.5%
ARB + *Diuretic* + CCB + BB	Valsartan + Furosemide + Amlodipine + Bisoprolol	1	0.6%
ARB + *Diuretic* + CCB + *Diuretic*	Valsartan + Furosemide + Adalat Oros + Spironolakton	2	1.2%
BB + CCB + *Alfa 2 Receptor agonist +Diuretik*	Bisoprolol + Nifedipin + Klonidin + Furosemide	1	0.6%

Table 4. Medication-Related Burden in Hypertension Patients Based on LMQ-3 Scores in Hypertension Patients at Yogyakarta Hospital.

Variable	Respondents (n=161)	Percentage (%)	Minimum Value	Maximum Value	Mean	Median
Burden Category						
No burden	25	15.5				
Low burden	123	76.4	57	128	89.16	90.00
Moderate burden	13	8.1				
VAS Category						
No burden	67	41.6				
Low burden	44	27.3				
Moderate burden	24	14.9	0	10	3.83	4.00
High burden	19	11.8				
Very high burden	7	4.4				

treatment. If patients' concerns about prescribed medications exceed their needs, there is a high likelihood of non-adherence to treatment (22). The distribution of medication-related burden based on LMQ-3 scores is summarized in **Table 4.**

The results of the medication related burden analysis based on the VAS value showed that there was no burden in 67 patients (41.6%), low burden in 44 patients (27.3%), moderate burden in 24 patients (14.9%), high burden in 19 patients (11.8%) and very high burden in 7 patients (4.4%). These findings suggest that while most hypertensive patients did not perceive a significant treatment burden, a substantial proportion still experienced low to moderate levels, and a small subgroup reported high or very high levels of burden. This variation highlights the heterogeneous nature of patient experiences with antihypertensive therapy. Patients with moderate to very high burden may face greater challenges in maintaining adherence, indicating the need for targeted interventions such as medication counseling, simplification of therapy regimens, or enhanced family and healthcare provider support to improve treatment outcomes (6).

Medication Adherence

The results showed that 134 (83.2%) hypertensive patients had a moderate level of adherence (**Table 3**). This is in line with research (Oktianti & Karminingtyas, 2024) with a sample size of 79 patients, which showed that 49 patients (62.03%) had a moderate level of adherence and 30 patients (37.97%) had a high level of adherence (23). The detailed distribution of patients' medication adherence levels is presented in **Table 5**.

Medication adherence is influenced by several factors, including the patient's understanding of the timing and technical aspects of medication intake, awareness of the importance of treatment, involvement of healthcare professionals, and the patient's commitment to undergoing long-term therapy (24). The most common reason for non-adherence was patients forgetting to take their prescribed medication, which accounted for the majority of cases. Other reasons included feeling better and believing the medication was no longer necessary, concerns about potential side effects, and lack of motivation for long-term medication adherence. These findings highlight the importance of patient education and regular follow-up to address the underlying causes of non-adherence in hypertensive patients.

Poor adherence can result in uncontrolled blood pressure and an increased risk of undesirable complications. Interventions for patients with hypertension may include daily reminders to take medication at the prescribed times, encouraging them to carry their medications when traveling, providing dietary education, and promoting a healthy lifestyle (25). Taking medication as prescribed by healthcare providers can enhance adherence and lead to better treatment outcomes.

Relationship between Characteristics and Medication-Related Burden and Compliance in Hypertensive Patients at Yogyakarta Hospital

The relationship between respondent characteristics and Medication-Related Burden based on LMQ, VAS, and MARS scores experienced by hypertensive patients at Panembahan Senopati Bantul Regional Hospital is presented in **Table 6** and **Table 7**.

The analysis of the relationship between patient characteristics and LMQ, VAS, and MARS scores using Spearman's rho test showed a significant association between education level and VAS score ($p<0.05$). In this study, the education level of hypertensive patients influenced their overall perceived medication burden. Furthermore, the analysis using Chi-square test revealed a significant relationship between the presence of a medication supervisor and the patient's medication burden ($p<0.05$; OR = 0.336). Previous research has shown that a high medication burden is less likely to occur among patients who receive family support or have a medication supervisor ($p<0.05$; AOR = 0.30)(26).

Family support may come in the form of attitudes, actions, and acceptance toward the patient. Families serve as a support system, and one effective way to improve adherence to treatment is by providing emotional and practical support (27). The presence of a medication supervisor can increase the patient's motivation and willingness to take medication regularly, thereby influencing the level of perceived medication burden. In addition, consistent supervision may help reduce forgetfulness and enhance patients' confidence in managing long-term therapy, which ultimately contributes to better treatment compliance and clinical outcomes in hypertensive patients.

Table 5. Hypertension Patients' Adherence Levels at a Hospital in Yogyakarta Based on MARS-5 Scores.

Level of Adherence	Overall MARS-5 Score					
	Frequency n=161	Percentage (%)	Minimum Value	Maximum Value	Mean	Median
High Adherence	27	16.0	11	25	21.94	23.00
Moderate Adherence	134	83.2				

Table 6. Correlation of Patient Characteristics with Medication Burden, VAS, and Adherence.

Characteristic	Medication Burden (LMQ Score)	p-value	VAS Score	p-value	Adherence (MARS-5 Score)	p-value
Age*	Rho = 0.088	–	Rho = 0.390	0.068	Rho = 0.844	0.016*
Education*	Rho = 0.103	0.129	Rho = 0.188	0.017*	Rho = -0.045	0.574
Number of Medications*	Rho = 0.978	0.002*	Rho = 0.513	0.052	Rho = -0.024	0.761
Number of Diseases*	Rho = 0.280	-0.086	Rho = 0.959	0.004	Rho = 0.008	0.918

Description: *There is a significant relationship (p<0.05). *Characteristics were tested using the spearman test. **Characteristics were tested using the Chi Square test.

Table 7. Association of Patient Characteristics with Medication Burden, VAS, and Adherence.

Characteristic	Medication Burden	p-value	OR (95% CI)	VAS	p-value	OR (95% CI)	Adherence	p-value	OR (95% CI)
Gender									
Female**	Low: 34 / High: 27	0.713	1.191 (0.625–2.269)	Low: 77 / High: 23	0.339	1.514 (0.741–3.094)	Low: 82 / High: 18	0.376	0.591 (0.231–1.509)
Male**	Low: 60 / High: 40	–	–	Low: 42 / High: 19	–	–	Low: 54 / High: 7	–	–
Employment Status									
Employed**	Low: 26 / High: 20	0.899	0.899 (0.450–0.794)	Low: 37 / High: 9	0.321	1.654 (0.719–3.806)	Low: 35 / High: 11	0.106	0.441 (0.183–1.062)
Unemployed**	Low: 68 / High: 47	–	–	Low: 82 / High: 33	–	–	Low: 101 / High: 14	–	–
Medication Supervision									
Present**	Low: 27 / High: 8	0.019*	0.336 (0.142–0.798)	Low: 27 / High: 8	0.784	0.802 (0.332–1.936)	Low: 105 / High: 21	0.622	0.645 (0.206–2.021)
Absent**	Low: 67 / High: 59	–	–	Low: 92 / High: 34	–	–	Low: 31 / High: 4	–	–

Description: *There is a significant relationship (p<0.05). *Characteristics were tested using the spearman test. **Characteristics were tested using the Chi Square test.

The Relationship between Medication-Related Burden and Adherence in Hypertension Patients at Yogyakarta Hospital

The relationship between medication-related burden and therapy adherence was further tested using the non-parametric Spearman's rho test. The results of the analysis are presented in **Table 8**.

The results of the analysis showed that each domain, the overall LMQ score, and the VAS score had a significance value of p<0.05 when correlated with the MARS score, indicating a significant relationship between medication-related burden and the level of medication adherence. The correlation coefficients between the LMQ and VAS scores with the MARS score were -0.461 and -0.390 respectively, with p<0.001, demonstrating a negative correlation between medication burden and adherence. This suggests that the

Table 8. Relationship between Medication-Related Burden and Therapy Compliance of Hypertension Patients at Yogyakarta Hospital.

Variabel	*Sig. (2-tailed)*	*Rho*
Domain 1 – MARS-5 Score	0.001*	-0.259
Domain 2 – MARS-5 Score	0.000*	-0.387
Domain 3 – MARS-5 Score	0.004*	-0.227
Domain 4 – MARS-5 Score	0.009*	-0.205
Domain 5 – MARS-5 Score	0.000*	-0.333
Domain 6 – MARS-5 Score	0.000*	-0.325
Domain 7 – MARS-5 Score	0.000*	-0.336
Domain 8 – MARS-5 Score	0.005*	0.221
LMQ Score – MARS-5 Score	0.000*	-0.461
VAS Score – MARS-5 Score	0.000*	-0.390

Description: *There is a significant correlation ($p < 0.05$). *Data were analyzed using Spearman's correlation test.

higher the perceived medication burden, the lower the adherence among hypertensive patients in Yogyakarta hospitals.

These findings are consistent with the study by Zidan *et al*. (2018), which reported a significant positive correlation between LMQ and VAS scores and ARMS (Adherence to Refills and Medications Scale) scores ($p<0.0005$; $r = 0.317$ and $p<0.0005$; $r = 0.325$, respectively) among patients with chronic diseases in Qatar (2). A higher ARMS score indicates lower adherence, while a higher LMQ score indicates a greater medication burden. Therefore, it can be concluded that as the medication burden increases, adherence tends to decrease.

Similarly, a study by Awad *et al*. (2020) also found a significant association between LMQ and adherence scores ($p<0.001$), indicating that a higher medication burden negatively impacts adherence (6). According to Sav (2015), factors that may influence medication burden include patient characteristics, disease conditions (such as complications), treatment characteristics (including the number of medications and dosing schedule), family support, and the healthcare system (28).

Conclusion

Based on the LMQ-3 questionnaire, most hypertensive patients in Yogyakarta hospitals experienced a low medication-related burden (76.4%), followed by no burden (15.5%) and moderate burden (8.1%). Regarding medication adherence, the majority of respondents (83.2%) demonstrated moderate adherence, while only 16.8% showed high adherence levels. Furthermore, correlation analysis revealed a statistically significant negative relationship between medication-related burden and medication adherence, with correlation coefficients of -0.461 for LMQ-3 and -0.390 for VAS ($p<0.001$). This finding indicates that a higher medication-related burden is associated with lower adherence to antihypertensive therapy among hypertensive patients. These results highlight the importance of addressing medication-related burden in hypertension management. Interventions such as patient education, regimen simplification, and family support may improve medication adherence.

Abbreviations

LMQ-3 = Living with Medicines Questionnaire version 3; MARS-5 = Medication Adherence Rating Scale-5; VAS = Visual Analogue Scale; MRB = Medication-Related Burden; HDL = High-Density Lipoprotein; ARMS = Adherence to Refills and Medications Scale.

Declarations

Author Informations

Woro Supadmi
Corresponding Author
Affiliation: Department Community Clinical Pharmacy, Faculty of Pharmacy, Universitas Ahmad Dahlan, Yogyakarta – 55166, Indonesia.
Contribution: Conceptualization.

Shafira Diestra Afifa
Affiliation: Department Community Clinical Pharmacy, Faculty of Pharmacy, Universitas Ahmad Dahlan, Yogyakarta – 55166, Indonesia.
Contribution: Data Curation.

Fiya Nailil Izzah
Affiliation: Department Community Clinical Pharmacy, Faculty of Pharmacy, Universitas Ahmad Dahlan, Yogyakarta – 55166, Indonesia.
Contribution: Formal analysis.

Rizky Gustinanda
Affiliation: Department Community Clinical Pharmacy, Faculty of Industry Halal, Universitas Nahdlatul Ulama Yogyakarta, Yogyakarta – 55293, Indonesia.
Contribution: Investigation.

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Conflict of Interest

The authors declare no conflicting interest.

Data Availability

The unpublished data is available upon request to the corresponding author.

Ethics Statement

This study received ethical approval from the Health Research Ethics Committee of Jenderal Achmad Yani University Yogyakarta, under Ethical Eligibility Certificate Skep/683/KEP/XII/2024, dated December 16, 2024.

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Supplemental Material

The supplemental material can be found at the link: https://etflin.com/file/document/20250823052028205070641 7.docx. This supplemental file contains Table 1 (Living with Medicines Questionnaire [LMQ]) and Table 2 (Medication Adherence Report Scale-5 [MARS-5] questionnaire).

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Additional Information

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