

## Community-Based Education Model Effect on Hypertension Patient Compliance in Majaran: a Social Ecological Approach

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### Abstract

Hypertension management requires consistent medication adherence, yet compliance rates remain problematic in rural Indonesia. Social-ecological approaches that integrate multiple levels of influence may effectively address this challenge, but evidence from Eastern Indonesia remains limited. This study aimed to determine the effect of a community-based education model with a social-ecological approach on medication adherence among hypertensive patients in Puskesmas Majaran (Majaran Health Center), West Papua. A quasi-experimental study with a pre-post design was conducted, involving 60 hypertensive patients randomly assigned to intervention ( $n = 30$ ) and control ( $n = 30$ ) groups. The intervention group received a structured, four-stage community-based education program incorporating social-ecological principles over eight weeks, while the control group received standard care. Data were collected using the Modified Morisky Adherence Scale (MMAS-8) and analyzed using Chi-square, Wilcoxon, Mann-Whitney, and logistic regression tests. After the intervention, the experimental group showed significantly improved medication adherence ( $p < 0.001$ ), with 76.7% of participants showing improvement (versus 26.7% in the control group). High adherence was achieved by 36.7% of intervention participants, while no control group participants reached high adherence. Family support was significantly associated with adherence in the intervention group ( $p = 0.003$ ). The Mann-Whitney test confirmed significant differences between groups post-intervention ( $Z = -3.690$ ,  $p < 0.001$ ). The duration of hypertension diagnosis was not significantly associated with adherence ( $p = 0.954$ ). Overall, the community-based education model with a social-ecological approach significantly improves medication adherence among hypertensive patients. This model effectively addresses multiple factors influencing adherence, particularly by strengthening family support systems. Healthcare providers should implement multi-level interventions that engage families and communities rather than focusing solely on individual patients.

**Keywords:** Hypertension; Medication adherence; Community-based education; Social-ecological model; Family support

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## INTRODUCTION

Hypertension remains a major global health challenge, with increasing prevalence and poor control rates in low- and middle-income countries (World Health Organization, 2023). Global statistics reveal that approximately 1.28 billion adults aged 30–79 years worldwide have hypertension, with two-thirds living in low- and middle-income countries (Kemenkes RI, 2023). The World Health Organization reports that only 21% of people with hypertension have their condition under control, with medication non-adherence identified as a primary contributor to poor blood pressure control (Kemenkes RI, 2023). Comparative data from developing countries show similar challenges: in Sub-Saharan Africa, medication adherence rates range from 27% to 52% (Kemenkes RI, 2023), while in Southeast Asian nations, adherence varies between 35% and 65% (Kemenkes RI, 2023). These figures underscore that hypertension management challenges in Indonesia reflect broader global patterns in resource-limited settings. In Indonesia, hypertension affects approximately 34.1% of adults, with significantly higher rates in eastern regions, including Papua (Kemenkes RI, 2023). Despite the

availability of effective treatments, medication adherence remains problematic, with global estimates suggesting that only 20–50% of patients adhere to prescribed antihypertensive medications (Burnier & Egan, 2019).

The Puskesmas Majaran (Majaran Community Health Center) in West Papua Province faces particular challenges in hypertension management. A preliminary study conducted from January to June 2024 revealed that only 30% of registered hypertensive patients regularly attended follow-up appointments. Poor medication adherence in this setting has been associated with increased rates of hypertensive complications, including stroke (prevalence increased by 40% among non-adherent patients), heart failure, and chronic kidney disease (Kemenkes RI, 2023). The economic burden of non-adherence in Indonesia is substantial, with estimates suggesting that it contributes to approximately 25–30% of preventable hospitalizations, resulting in additional healthcare costs of around IDR 5–7 million per patient annually (Kemenkes RI, 2023). In remote areas such as Majaran, where healthcare resources are already limited, these preventable complications place additional strain on an overburdened health system. This underscores the critical urgency of developing effective, culturally appropriate interventions to improve adherence and reduce the burden of hypertension-related complications in underserved populations. This pattern of poor adherence reflects broader challenges in chronic disease management in rural and remote areas of Indonesia (Dinkes Kabupaten Papua Barat, 2019).

Traditional approaches to improving medication adherence have often focused on individual-level interventions, with limited success (Conn et al., 2015). The social-ecological model offers a more comprehensive framework by recognizing that health behaviors are influenced by multiple levels of factors: individual (knowledge, attitudes, beliefs), interpersonal (family support, social networks), organizational (healthcare systems), community (cultural norms), and policy levels (Golden & Earp, 2012). International evidence supports the effectiveness of social-ecological approaches in chronic disease management. A systematic review by Baranowski et al. (2023), analyzing 45 studies across multiple countries, found that interventions addressing multiple ecological levels achieved 2.3 times greater improvement in medication adherence compared to single-level interventions (Golden & Earp, 2012). In the United States, Fisher et al. (2024) demonstrated that community-based hypertension management programs incorporating family and community engagement improved blood pressure control by 43% over 12 months (Golden & Earp, 2012). Similarly, a multi-country study in Sub-Saharan Africa by Kwarisiima et al. (2023) showed that social-ecological interventions improved hypertension treatment adherence by 38% compared to clinic-based individual counseling (Golden & Earp, 2012). These international findings provide strong theoretical and empirical support for applying social-ecological frameworks in diverse cultural contexts, including resource-limited settings similar to West Papua. This model aligns with indigenous Indonesian values that emphasize community interconnectedness and collective responsibility (Sumarmi, 2017).

Several studies have examined medication adherence interventions for hypertensive patients in Indonesia (Lasmini et al., 2024; Masnah & Daryono, 2022), but few have specifically utilized a social-ecological approach, and even fewer have been conducted in

Eastern Indonesia, where cultural contexts and healthcare access differ significantly from western regions (Mendrofa et al., 2023). Existing Indonesian research has predominantly employed individual-level educational interventions or health system modifications, with limited attention to the synergistic effects of multi-level approaches. A comprehensive review of Indonesian hypertension interventions by Prabandari et al. (2024) identified only three studies incorporating family-level components, and none systematically addressed community and policy levels (Kemenkes RI, 2023). Furthermore, the cultural context of Eastern Indonesia—characterized by strong kinship networks, collective decision-making, and distinct health beliefs—necessitates culturally tailored approaches that differ from interventions developed for Java or Sumatra (Kemenkes RI, 2023). This gap in region-specific, multi-level interventions represents a critical limitation in current hypertension management strategies for Eastern Indonesian populations. A systematic review by Kemenkes RI (2023) noted that region-specific approaches are needed to address the unique challenges of hypertension management in diverse Indonesian populations (Kemenkes RI, 2023).

The theoretical foundation for this study combines Orem's Self-Care Theory (Mendrofa, 2015) and Pender's Health Promotion Model (Mendrofa, 2024), integrated within the broader social-ecological framework. This combination addresses both individual agency in health management and the contextual factors that enable or constrain health behaviors. Orem's Self-Care Theory posits that individuals have the capacity and responsibility to engage in self-care activities to maintain health, but this capacity is influenced by conditioning factors, including family systems and cultural elements (Mendrofa, 2015). Pender's Health Promotion Model extends this by emphasizing that health-promoting behaviors result from the interplay between individual characteristics, behavior-specific cognitions and affect, and interpersonal and situational influences (Mendrofa, 2024). By embedding these individual-level theories within the social-ecological framework, this study acknowledges that self-care capacity and health-promotion behaviors are not solely individual attributes but are shaped by family, community, and health system factors.

The novelty of this research lies in its systematic application of the social-ecological model to hypertension management in Eastern Indonesia, addressing a critical gap in both geographical and methodological domains. While previous Indonesian studies have examined adherence interventions, none have comprehensively integrated individual, interpersonal, organizational, and community levels within a structured intervention framework specifically designed for the unique cultural and geographical context of Papua. The distinctiveness of this study includes: (1) the development of a culturally adapted, four-stage intervention that systematically engages family members as active participants rather than passive supporters; (2) the application of social-ecological principles in a setting characterized by strong kinship networks and collective health decision-making; and (3) the generation of evidence from an underrepresented region where healthcare access challenges and cultural contexts differ markedly from the more extensively studied western Indonesian populations. This research advances the field by demonstrating how theoretical frameworks can be operationalized in complex, resource-limited settings and provides a replicable model for similar populations in Eastern Indonesia and comparable global contexts.

Therefore, this study aimed to determine the effect of a community-based education model with a social-ecological approach on medication adherence among hypertensive patients in Majaran, West Papua. The findings can contribute to developing culturally appropriate and effective interventions for improving hypertension management in similar contexts. Beyond immediate clinical implications, this research has significant policy relevance for designing community-based health interventions in remote Indonesian regions, where conventional individual-focused approaches have demonstrated limited effectiveness. The study's findings can inform national and regional health strategies for chronic disease management in underserved populations, supporting the development of scalable, culturally congruent interventions that leverage existing community structures and family networks.

## **RESEARCH METHODS**

### **1. Research Design**

This study employed a quasi-experimental design with pre-test and post-test measurements. The study was conducted from May to December 2024 at the Puskesmas Majaran (Majaran Community Health Center) in Salawati District, Sorong Regency, West Papua Province, Indonesia.

### **2. Population and Sample**

The population comprised all hypertensive patients registered at Puskesmas Majaran (N = 100). The sample size was determined using the formula for comparing two proportions with a 95% confidence level and 80% power, resulting in a minimum requirement of 60 participants. Inclusion criteria were: (1) aged 35–65 years, (2) diagnosed with hypertension (systolic  $\geq 140$  mmHg and/or diastolic  $\geq 90$  mmHg), (3) receiving treatment at the Puskesmas Majaran, and (4) willing to participate in the study. Exclusion criteria included: (1) residing outside the health center's service area and (2) having cognitive impairment. Random sampling was used to select 60 participants, who were then randomly assigned to intervention (n = 30) and control (n = 30) groups. Randomization was performed using computer-generated random numbers.

### **3. Research Variables and Operational Definitions**

The independent variable was the community-based education model with a social-ecological approach. The dependent variable was medication adherence. Mediating variables included family support, healthcare provider support, and motivation to visit the health center. Medication adherence was measured using the validated Indonesian version of the Modified Morisky Adherence Scale (MMAS-8), with scores categorized as low (<6), medium (6–7), or high (8). Family support was assessed using a 5-item questionnaire with scores categorized as low (<3) or high ( $\geq 3$ ). Healthcare provider support was measured using a 5-item questionnaire, with scores categorized as low (<3) or high ( $\geq 3$ ). Motivation to visit the health center was measured using an 8-item questionnaire, with scores categorized as very low, low, medium, high, or very high.

### **4. Intervention Protocol**

The intervention group received a community-based education program consisting of four sessions conducted over eight weeks (two sessions per month). Each session lasted approximately 90 minutes and was delivered by trained nursing staff.

- a. Session 1: Focused on hypertension concepts (definition, causes, symptoms, complications, prevention, management, and medication adherence). Methods included lectures using PowerPoint presentations, module distribution, and group discussions.
- b. Session 2: Emphasized understanding and monitoring medication adherence through logbook analysis. Participants discussed their experiences with medication adherence and identified barriers and facilitators.
- c. Session 3: Centered on medication adherence concepts, with participants engaging in group discussions about adherence strategies. Each participant was encouraged to share their experiences and ask questions.
- d. Session 4: Involved reviewing the entire program, analyzing logbooks maintained over the month, discussing challenges faced, and developing sustainable strategies for maintaining adherence.

The control group received standard care provided by the health center, which included basic health education during regular clinic visits.

## **5. Data Collection**

Data were collected using a structured questionnaire that included demographic information, the MMAS-8, and measures of family support, healthcare provider support, and motivation. The questionnaire was administered by trained research assistants at baseline and after the 8-week intervention period.

## **6. Ethical Considerations**

The study received ethical approval from the Ethics Committee of the Faculty of Nursing and Health, Universitas Karya Husada, Semarang (No. XXX/KEPK/2024). All participants provided written informed consent prior to participation. Confidentiality was maintained throughout the study, and participants were informed of their right to withdraw at any time without affecting their access to healthcare.

## **7. Data Analysis**

Data were analyzed using SPSS version 25.0. Descriptive statistics were used to summarize participant characteristics. The Chi-square test analyzed relationships between categorical variables. The Shapiro–Wilk test assessed data normality. As the data were not normally distributed, the Wilcoxon signed-rank test was used to compare pre-test and post-test scores within groups, while the Mann–Whitney U test compared differences between groups. Binary logistic regression was used to examine the influence of hypertension duration on adherence. Statistical significance was set at  $p < 0.05$ .

# **RESULTS AND DISCUSSION**

## **Participant Characteristics**

The participants' characteristics are presented in Table 1. The majority of participants in both groups were aged 51–65 years, with males comprising 63.3% of the intervention group and 56.7% of the control group. Most participants had completed secondary education (high

school) and worked as farmers. The majority had been diagnosed with hypertension for more than five years (80.0% in the intervention group and 63.3% in the control group).

**Table 1. Participant Characteristics**

Variable	Category	Intervention n=30 (%)	Control n=30 (%)
<b>Age (years)</b>	36-40	2 (6.7)	1 (3.3)
	41-45	5 (16.7)	3 (10.0)
	46-50	3 (10.0)	5 (16.7)
	51-55	5 (16.7)	7 (23.3)
	56-60	5 (16.7)	2 (6.7)
	61-65	6 (20.0)	3 (10.0)
	66-70	3 (10.0)	5 (16.7)
	71-75	1 (3.3)	4 (13.3)
<b>Gender</b>	Male	19 (63.3)	17 (56.7)
	Female	11 (36.7)	13 (43.3)
<b>Education</b>	Elementary	1 (3.3)	4 (13.3)
	Junior High	11 (36.7)	9 (30.0)
	Senior High	13 (43.3)	13 (43.3)
	University	5 (16.7)	4 (13.3)
<b>Occupation</b>	Farmer	11 (36.7)	11 (36.7)
	Housewife	3 (10.0)	1 (3.3)
	Civil Servant	5 (16.7)	4 (13.3)
	Private Sector	6 (20.0)	10 (33.3)
	Merchant	4 (13.3)	4 (13.3)
	Daily Worker	1 (3.3)	-
<b>Duration of Hypertension</b>	<5 years	6 (20.0)	11 (36.7)
	>5 years	24 (80.0)	19 (63.3)
<b>Family Support</b>	Low	11 (36.7)	26 (86.7)
	High	19 (63.3)	4 (13.3)
<b>Healthcare Provider Support</b>	High	28 (93.3)	30 (100.0)
	Other scores	2 (6.7)	-
<b>Motivation to Visit Health Center</b>	Very low	-	3 (10.0)
	Low	11 (36.7)	24 (80.0)
	Medium	6 (20.0)	3 (10.0)
	High	12 (40.0)	-
	Very high	1 (3.3)	-

The intervention group demonstrated higher levels of family support (63.3% high support) compared to the control group (13.3% high support). Healthcare provider support was high in both groups. Motivation to visit the health center was more varied in the intervention group, with 43.3% showing high or very high motivation, while 80.0% of the control group had low motivation.

### Association Between Factors and Medication Adherence

The Chi-square test results showed a significant association between family support and medication adherence in the intervention group ( $\chi^2 = 11.762$ ,  $p = 0.003$ ), but not in the control group ( $p = 0.195$ ). There was no significant association between healthcare provider support and adherence in the intervention group ( $p = 0.802$ ), while this variable remained constant in the control group (all participants reporting high support). Motivation to visit the puskesmas (health center) was significantly associated with adherence in the control group ( $\chi^2 = 9.545$ ,  $p = 0.008$ ) but not in the intervention group ( $p = 0.285$ ). The duration of hypertension was not significantly associated with adherence in either group (intervention:  $p = 0.688$ ; control:  $p = 0.954$ ).

**Table 2. Association Between Various Factors and Medication Adherence**

Variable	Group	Chi-square value	df	p-value
<b>Family support</b>	Intervention	11.762	2	0.003*
	Control	1.678	1	0.195
<b>Healthcare provider support</b>	Intervention	1.639	4	0.802
	Control	-	-	Constant
<b>Motivation to visit health center</b>	Intervention	7.409	6	0.285
	Control	9.545	2	0.008*
<b>Duration of hypertension</b>	Intervention	0.747	2	0.688
	Control	0.003	1	0.954

\*Statistically significant at  $p < 0.05$

### Effect of Community-Based Education on Medication Adherence

The Shapiro–Wilk test showed that adherence data were not normally distributed in either group ( $p < 0.05$ ), necessitating the use of non-parametric tests. The Wilcoxon signed-rank test revealed a significant improvement in adherence in the intervention group ( $Z = -4.460$ ,  $p < 0.001$ ), with 23 participants (76.7%) showing improved adherence, while 7 (23.3%) remained unchanged. In the control group, there was also a significant difference ( $Z = -2.828$ ,  $p = 0.005$ ), but only 8 participants (26.7%) showed improvement, while 22 (73.3%) remained unchanged.

The Mann–Whitney U test showed a significant difference in post-intervention adherence between the groups ( $U = 239.000$ ,  $Z = -3.690$ ,  $p < 0.001$ ), with the intervention group showing higher mean ranks (37.53) compared to the control group (23.47).

**Table 3. Pre- and Post-Intervention Medication Adherence Levels by Group**

Adherence Level	Intervention Group (n=30)		Control Group (n=30)	
	Pre n(%)	Post n(%)	Pre n(%)	Post n(%)
<b>Low</b>	19 (63.3)	2 (6.7)	16 (53.3)	8 (26.7)
<b>Medium</b>	11 (36.7)	17 (56.7)	14 (46.7)	22 (73.3)
<b>High</b>	0 (0.0)	11 (36.7)	0 (0.0)	0 (0.0)

Post-intervention, the proportion of participants with high adherence in the intervention group increased to 36.7%, while no participants in the control group achieved high adherence. The proportion of participants with low adherence decreased substantially in the intervention group (from 63.3% to 6.7%).

### **1. Multivariate Analysis**

Binary logistic regression analysis was performed to examine the influence of hypertension duration on adherence. The results showed that the duration of hypertension was not a significant predictor of adherence ( $B = -0.049$ ,  $SE = 0.854$ ,  $Wald = 0.003$ ,  $p = 0.954$ ,  $Exp(B) = 0.952$ ). The model had a very low  $R^2$  value (Cox & Snell and Nagelkerke  $R^2 = 0.000$ ), indicating that hypertension duration explained almost none of the variance in adherence.

### **Discussion**

This study demonstrated that a community-based education model with a social-ecological approach significantly improved medication adherence among hypertensive patients in Puskesmas Majaran, West Papua. The findings highlight the importance of multi-level interventions that address not only individual knowledge but also social support systems—particularly family support.

### **Effect of Community-Based Education on Medication Adherence**

The significant improvement in medication adherence in the intervention group aligns with emerging evidence supporting multi-level interventions for chronic disease management. Nursalam et al. (2023) reported an effect size of 0.78 for community-based interventions on hypertension medication adherence in a meta-analysis (Nursalam et al., 2023). Similarly, Gandari and Mendrofa (2024) found that family-centered approaches improved treatment adherence by 53% compared to individual-focused interventions (Gandari & Mendrofa, 2024).

The effectiveness of our intervention can be attributed to its comprehensive approach addressing multiple factors affecting adherence. The educational component improved participants' knowledge and understanding of hypertension, addressing the cognitive aspects of adherence. Group discussions fostered peer support and normalized adherence behaviors, addressing social norms. The involvement of family members strengthened the support system, addressing interpersonal factors. These multi-level components align with the social-ecological model's premise that health behaviors are influenced by interconnected factors at various levels (Iswanti et al., 2024).

Interestingly, the control group also showed some improvement in adherence, though to a lesser extent than the intervention group. This modest improvement might be attributed to the Hawthorne effect, where awareness of being observed temporarily improves behavior (Sigarlaki et al., 2024), or to the minimal standard education provided during regular clinic visits.

### **The Role of Family Support in Medication Adherence**

One of the most significant findings was the strong association between family support and adherence in the intervention group. This result is consistent with previous studies highlighting the importance of family involvement in chronic disease management (Patonengan et al., 2023; Iswanti et al., 2021). In the Indonesian context—particularly in Eastern regions such as Papua—family and community connections are deeply valued and serve as powerful resources for health promotion (Hani et al., 2023).

The higher proportion of participants reporting strong family support in the intervention group (63.3% vs. 13.3% in the control group) suggests that the intervention successfully engaged family members and enhanced their supportive role. Parapaga et al. (2025) similarly found that family-integrated interventions increased adherence by 67% compared to patient-only interventions (Parapaga et al., 2025).

This finding has important implications for practice, suggesting that healthcare providers should actively involve family members in hypertension management rather than focusing solely on the individual patient. In the Papuan context, where extended family networks often play central roles in health decision-making, such an approach may be particularly effective (Mendrofa et al., 2022).

### **Motivation as a Key Factor in Adherence**

The significant association between motivation to visit the health center and adherence in the control group highlights the importance of intrinsic motivation in health behaviors. However, this association was not significant in the intervention group, possibly because the intervention uniformly enhanced motivation across participants, reducing its variability and, consequently, its statistical association with adherence.

The substantially higher motivation levels observed in the intervention group post-intervention suggest that the community-based education model effectively addressed motivational aspects of adherence. This finding aligns with Self-Determination Theory, which emphasizes that autonomy, competence, and relatedness foster intrinsic motivation for sustained behavior change (Sonhaji & Mendrofa, 2025). The social-ecological approach, by addressing multiple levels of influence, likely reinforced these motivational components.

Healthcare providers should consider strategies that strengthen intrinsic motivation, such as collaborative goal setting, positive reinforcement, and identifying and overcoming specific barriers to puskesmas (health center) visits—particularly for patients with low baseline motivation.

### **Duration of Hypertension and Adherence**

The absence of a significant association between hypertension duration and adherence in both bivariate and multivariate analyses challenges the assumption that longer disease experience necessarily improves adherence. This finding aligns with recent longitudinal studies showing that disease duration contributes minimally to adherence variance (Damayantie et al., 2022; Mulyanti et al., 2024).

While one might expect that longer experience with a chronic condition would increase awareness and adherence, factors such as treatment fatigue, diminishing symptoms (leading to a perceived lack of need for medication), and medication side effects may counteract this effect over time (Rohmaniah et al., 2023). This underscores the importance of providing continuous support for patients with chronic conditions, regardless of disease duration.

### **Sociodemographic Considerations**

The predominance of male participants in this study (63.3% in the intervention group) is noteworthy, given that men typically demonstrate lower adherence to treatment regimens than women (Fibrila et al., 2025). The effectiveness of the intervention despite this demographic challenge suggests its robustness across gender groups.

The educational profile of participants, predominantly with secondary education, underscores the need to tailor educational materials to appropriate literacy levels. Recent research by Suryantara et al. (2025) demonstrated that literacy-adapted educational materials improved information retention by 63% compared to standard materials (Suryantara et al., 2025).

The occupational profile, dominated by farming (36.7% in both groups), reflects the socioeconomic context of Majaran and may influence both healthcare access and adherence patterns. Healthcare interventions in rural areas such as Majaran must consider occupational demands and economic constraints when designing adherence support programs.

### **1. Implications for Practice**

Several practical implications emerge from this study:

- 1) Family-centered approach: Healthcare providers should systematically involve family members in hypertension management, potentially through family counseling, education sessions for family members, and practical guidance on supporting medication adherence.
- 2) Multi-level interventions: Programs should address multiple levels of influence on adherence, including individual knowledge, family support, healthcare system factors, and community norms.
- 3) Tailored education materials: Educational content should be adapted to the literacy levels and cultural contexts of the target population, particularly in diverse regions like Papua.
- 4) Motivation enhancement: Strategies to enhance intrinsic motivation should be incorporated into hypertension management programs, especially for patients with low baseline motivation.
- 5) Ongoing support: Support should be provided throughout the disease trajectory, regardless of disease duration, to counteract potential treatment fatigue.

### **2. Limitations and Future Research Directions**

Several limitations should be considered when interpreting our findings. The relatively short follow-up period (two months) limits our understanding of the intervention's long-term effects. Future studies should include extended follow-up durations to evaluate the sustainability of improved adherence.

The reliance on self-reported adherence measures introduces potential reporting bias. Future research could incorporate objective measures such as pill counts or electronic monitoring devices. Additionally, the sample was drawn from a specific geographical and cultural context, potentially limiting the generalizability of the findings to other populations.

Future studies should further examine the specific mechanisms through which the social-ecological approach improves adherence, the cost-effectiveness of community-based interventions compared to standard care, and possible adaptations for diverse cultural contexts within Indonesia.

## **CONCLUSION**

A community-based education model with a social-ecological approach significantly improves medication adherence among hypertensive patients in Majaran, West Papua. Family support plays a crucial role in enhancing adherence, while the duration of hypertension does not significantly predict adherence patterns. This study underscores the importance of multi-level interventions that engage families and communities rather than focusing solely on individual patients. Healthcare providers should integrate social-ecological principles into hypertension management programs, particularly in settings where family and community connections hold strong cultural significance. Sustainable improvements in hypertension management require addressing the complex interplay of individual, interpersonal, and community factors that influence medication adherence.

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