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IMPACT OF HOME PHARMACY CARE ON MEDICATION ADHERENCE IN HYPERTENSIVE PATIENTS: A QUASI-EXPERIMENTAL STUDY

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ABSTRACT

Background: Medication adherence to long-term therapy for chronic diseases in developing countries remains below 50%, including in Indonesia. Improving adherence requires enhanced pharmaceutical care, one approach of which is Home Pharmacy Care delivered through home visit services. **Objective:** This study aimed to evaluate differences in medication adherence among hypertensive patients before and after the implementation of Home Pharmacy Care at Karya Prima Pharmacy, Denpasar. **Methods:** This study employed a quasi-experimental design using a control group approach with purposive sampling. The first group was the intervention group receiving Home Pharmacy Care, consisting of home visits, medication counselling, hypertension education, and lifestyle modification advice. The second group was the control group receiving standard pharmacist-provided drug information services in the pharmacy. Data on medication adherence were collected during the fourth week for both groups. The study was carried out from February to April 2024. Medication adherence was measured using the pill count method. **Results:** The findings indicated that patients in the intervention group achieved full adherence (100%) at the post-intervention assessment, whereas the control group showed a considerably lower post-test adherence rate of 27%. Statistical analysis demonstrated a significant increase in adherence in the intervention group (p=0.0049), while no significant change was identified in the control group. Further analysis using the independent t-test confirmed significant differences in adherence between the two groups following the post-test (P=0.001). **Conclusion:** The implementation of Home Pharmacy Care was associated with a significant improvement in medication adherence among hypertensive patients compared with conventional pharmacy services at Karya Prima Pharmacy, Denpasar.

Keywords: Community Pharmacy; Home Pharmacy Care; Hypertension; Medication Adherence; Pharmaceutical Care

INTRODUCTION

Hypertension is a major public health problem worldwide and a leading risk factor for cardiovascular disease. The World Health Organization estimated that 1.13 billion people were living with hypertension in 2022, with the prevalence projected to increase by nearly 80% by 2025, particularly in developing countries[1]. In Indonesia, the

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2018 Basic Health Research (Riskesdas) reported a hypertension prevalence of 34.1% among adults aged 18 years and older[2]. In Bali Province, the prevalence increased from 19.9% in 2013 to 30.0% in 2018, indicating a growing regional health burden[2].

Despite the availability of effective antihypertensive therapy, medication adherence among patients with chronic diseases in developing countries remains below 50%[3]. Poor adherence to long-term treatment is associated with inadequate blood pressure control and an increased risk of complications. The Healthy People 2010 initiative emphasizes the need for more comprehensive, patient-centered strategies to achieve optimal blood pressure management beyond the conventional healthcare setting[4]. In Indonesia, community pharmacists play an important role in supporting medication adherence as part of patient-oriented pharmaceutical care. This role is regulated by the Regulation of the Minister of Health of the Republic of Indonesia No 73 of 2016 concerning Standards of Pharmaceutical Services in Pharmacies, which highlights medication counselling, monitoring of drug therapy, and adherence support[5]. In line with this regulation, Home Pharmacy Care represents an extension of community pharmacy services through home visits, particularly for patients with chronic conditions such as hypertension.

Previous studies have shown that Home Pharmacy Care can improve patients' understanding of their disease and support adherence to long-term therapy. Permatasari (2016) reported a significant improvement in medication adherence among chronic disease patients receiving Home Pharmacy Care (p-value = 0.0002)[6]. One method commonly used to assess adherence in this service is the pill count method, which applies to various chronic diseases requiring long-term treatment.

In Bali, where hypertension prevalence is elevated due to lifestyle factors like high salt consumption, research on Home Pharmacy Care remains underdeveloped, particularly in how it could augment the standard clinic-based management through BPJS (*Badan Penyelenggara Jaminan Sosial)* collaborations. Patients typically manage their hypertension in BPJS-affiliated clinics, receiving subsidized blood pressure monitoring and medications, yet home pharmacy intervention, such as pharmacy home care for adherence counselling and personalized education. A primary gap is the absence of robust evidence on the integration of BPJS systems, including cost-effectiveness and outcomes for Balinese patients. Therefore, this study aimed to evaluate the difference before and after the implementation of Home Pharmacy Care among hypertensive patients at Karya Prima Pharmacy, Denpasar, a community pharmacy collaborating with BPJS Kesehatan.

METHODS

1. Participants

This research used a quasi-experimental study design with a control group in a community pharmacy, which was implemented from February to April 2024. Participants were hypertensive patients attending Karya Prima Pharmacy, Denpasar, who met the inclusion and exclusion criteria. Inclusion criteria were uncontrolled blood pressure, age ≥ 25 years, willingness to participate, and receipt of single or a maximum of two combination antihypertensive therapies. Exclusion criteria included comorbid conditions, use of other blood pressure agents (including herbal products).

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2. Subject Intervention

The patients were divided into two groups. The first group was the intervention group receiving Home Pharmacy Care, consisting of home visits, medication counselling, hypertension education, and lifestyle modification advice, including the implementation of the Dietary Approaches to Stop Hypertension (DASH) diet and recommendations for increased physical activity. The second group was the control group receiving standard pharmacist-provided drug information services in the pharmacy. Data on medication adherence were collected during the fourth week for both groups.

3. Outcomes Measures

Medication adherence was assessed using the pill count method. Adherence was calculated as the proportion of medication consumed relative to that prescribed and expressed as a percentage. An adherence rate of ≥ 80% was classified as adherent, while < 80% was classified as non-adherent.

4. Sample Size

Sampling was conducted using purposive non-probability sampling. A total of 22 patients were enrolled, with 11 participants in each group.

5. Statistical Analysis

Data adherence was analyzed using the paired t-test and the independent t-test.

6. Ethical Considerations

This study was approved by Ethics Committee No. 02.0393/UNBI/EC/IV/2024, issued by Universitas Bali International. Home Pharmacy Care was supported by Pharmaceutical Service Guideline and form data, which documented pharmacist visits and patient progress in a clear and patient-friendly format.

RESULTS

The age distribution showed that uncontrolled hypertension was most prevalent among pre-elderly respondents aged 40-49 years (45.5% of the intervention group and 72.7% of the control group).

Table 1. Characteristics of Respondents

Characteristic	Intervention		Control	
	F (n)	P (%)	F (n)	P (%)
Age (year)				
40 – 49 years	5	45.5	8	72.7
50 – 59 years	3	27.3	2	18.2
60 – 69 years	3	27.3	1	9.1
Gender				
Male	4	36.4	5	45.5
Female	7	63.6	6	54.5
Education Level				
Primary School	3	27.3	2	18.2
Junior High School	3	27.3	4	36.4
Senior High School	4	36.4	5	45.5
University	1	9.1	0	0
Occupation				
Housewife	4	36.4	5	45.5
Entrepreneur	2	18.2	3	27.3
Private Employee	1	9.1	1	9.1
Retired	1	9.1	0	0
Other	3	27.3	2	18.2
Grade Hypertension				
Stage 1	10	90.9	9	81.8
Stage 2	1	9.1	2	18.2
Number of Medications				
Monotherapy	9	81.8	8	72.7
Combination therapy	2	18.2	3	27.3
Name of Medicine				
Captopril	3	27.3	2	18.2
Amlodipine	6	54.5	6	54.5
Amlodipine + Captopril	2	18.2	3	27.3
Duration of Hypertension				
1 – 6 months	4	36.4	3	27.3
7 – 12 months	2	18.2	3	27.3
2 – 7 months	5	45.5	4	36.4
>7 months	0	0	1	9.1

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This finding is consistent with previous studies reporting a significant association between stress levels and hypertension prevalence in pre-elderly[7]. Female participants made up most of the respondents (63.6% of the intervention group and 54.5% of the control group).

Table 2 describes medication adherence in the intervention and control groups after the implementation of Home Pharmacy Care (HPC). At baseline, non-adherence predominated in both groups based on pill count assessment. In the intervention group, pharmacist-led HPC resulted in complete adherence at post-test. In contrast, the control group showed only a minor improvement, with most patients remaining non-adherent. Overall, these findings indicate that Home Pharmacy Care is effective in improving medication adherence among patients with hypertension.

Table 2. Respondents' Adherence

Adherence	Intervention				Control			
	Pre-test		Post-test		Pre-test		Post-test	
	n	%	n	%	n	%	N	%
Non-Adherence (<80%	8	73	0	0	9	82	8	73
Adherence (>80%)	3	27	11	100	2	18	3	27

Assumption testing was performed prior to comparative analysis. Normality of adherence data at pre-test and post-test in both the intervention and control groups was confirmed using the Shapiro–Wilk test ($p > 0.05$). Homogeneity of variance between groups was assessed with Levene's test, showing homogeneous variances at pre-test ($p = 0.079$ and 0.076) and post-test ($p = 0.421$ and 0.119), thus fulfilling the requirements for parametric analysis. Table 3 shows that in the control group, no significant differences in medication adherence were observed between pre-test and post-test a *p*-value of 0.447. This indicates that adherence remained unchanged during the study period, likely due to the absence of Home Pharmacy Care. As shown in Table 3, the dependent *t*-test revealed a significant improvement in medication adherence in the intervention group. The comparison between pre-test and post-test yielded a *p*-value of 0.0049 below the 0.05 significance level.

Table 3. Pair t-test, pre-test, and post-test for each group

Group	t-value	df	P=value*
Intervention Pre-Test Post-Test	3.59	11	0.0049
Control Pre-Test Post-Test	0.792	11	0.447
*significant 0.05			

Table 4. Comparison of Pretest and Posttest Scores Between Intervention and Control Groups

Variable	t-value	df	P=value*
Pre-test Intervention Control	0.685	20	0.501
Post-test Intervention Control	0.380	20	0.001
*significant 0.05			

DISCUSSION

Previous studies have reported a close association between sex and hypertension prevalence, noting that menopausal hormonal changes, particularly reduced estrogen levels, are linked to increases in blood pressure[8]. In terms of occupation, hypertension was most frequently observed among housewives, representing 36.4% of the intervention group and 45.5% of the control group. The unemployed have been shown to have a 1.42-fold higher risk of hypertension. The absence of formal employment, including housework, may contribute to a higher risk of hypertension through increased stress exposure[9].

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Most respondents were classified as having grade 1 hypertension, with the intervention group showing a slightly higher prevalence than the control group (as shown in Table 1). In terms of medication use, monotherapy was the predominant approach in both groups, although it was more common in the intervention group. Among the medications prescribed, amlodipine was the most frequently used in both groups. These results align with the findings of Hastuti, who reported that single-agent antihypertensive therapy, particularly from the calcium channel blocker class, remains the most commonly utilized treatment for managing hypertension[10]. The duration of hypertension was most commonly between 2 and 7 years in both groups, with a slightly higher proportion in the intervention group than the control group. A longer disease duration may affect medication adherence, as patients with a prolonged history of hypertension tend to be less consistent in taking their medication, which may lead to suboptimal treatment outcomes and inadequate disease control[11].

1. Impact of Home Pharmacy Care Service on Medication Adherence among Patients with Hypertension

These findings are consistent with those reported by Utaminingrum et al., in which 34 of 35 patients who received an intervention were adherent, while only one patient was non-adherent. In contrast, in the control group without intervention, adherence was observed in 21 patients, whereas 14 patients remained non-adherent[12]. Pharmacist-led education and counselling delivered through Home Pharmacy Care improve patients' understanding of hypertension and treatment. Therapeutic approach may enhance medication adherence by providing support, monitoring, and an opportunity for patients to discuss concerns related to their therapy.

For a small community pharmacy such as Karya Prima Pharmacy, sustaining Home Pharmacy Care after the study period required practical and cost-efficient strategies, particularly given the limited staff. The service may be targeted to high-risk hypertensive patients and integrated into routine counselling to minimize additional workload. Flexible scheduling using existing pharmacy personnel and continued collaboration with BPJS Kesehatan may support long-term implementation.

2. Comparison of Medication Adherence in Hypertensive Patients Receiving Home Pharmacy Care

These findings indicate a significant difference in adherence before and after pharmacist-led Home Pharmacy Care. The largest improvement occurred during the second measurement stage, suggesting a cumulative effect of the intervention. This result is consistent with previous findings reporting significant adherence improvement following Home Pharmacy Care interventions[13]. Improved adherence may contribute to better blood pressure control and reduced risk of hypertension-related complications.

Limited patient education and counseling at the pharmacy, mainly restricted to basic drug information because of time constraints and high patient volume, may have contributed to this finding. Similar results were reported by Ariyani et al[14], who found no significant change in adherence in the control group ($p > 0.05$). These findings emphasize the importance of pharmacist-led Home Pharmacy Care in improving adherence among patients with hypertension. Despite considerable challenges, home pharmacies remain influential in supporting the health of older adults with chronic diseases[15]. Clinical

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services provided by pharmacists to hypertensive patients effectively improve treatment outcomes, and the services provided by pharmacists contribute significantly to improved health outcomes[16].

Pharmacist-led interventions have been reported to influence patients' attitudes toward therapy and to improve medication adherence[17]. Accordingly, pharmaceutical care should incorporate targeted pharmacist interventions to support adherence. Improved adherence may help reduce the risk of complications, limit healthcare costs related to disease progression, maintain blood pressure within controlled ranges, enhance therapeutic outcomes, and improve patients' quality of life by promoting healthier and more productive daily activities. Home pharmacy services involve the provision of individualised and continuous pharmaceutical care at patients' homes, focusing on medication evaluation, education, and safe drug use to improve adherence and therapeutic effectiveness[18]. This includes medication evaluation and patient education, efforts to enhance medication adherence, and measures to ensure the safe and appropriate storage and use of drugs, thereby improving treatment outcomes[19]. Pharmacists play a vital role in improving clinical outcomes in chronic conditions, including hypertension[20].

This study has several limitations. This study is the relatively small sample size, which may limit the generalizability of the findings. As the study was conducted in a single BPJS-affiliated community pharmacy, the results may not fully represent hypertensive patients in other pharmacies or healthcare setting within BPJS system. Therefore, the findings should be interpreted cautiously, and futher studies involving larger sample and multiple community pharmacies are recommended to improve external validity.

CONCLUSION

In conclusion, Home Pharmacy Care implemented in a BPJS-affiliated community pharmacy shows potential to support hypertension management. Despite the study's limitations, these findings provide preliminary evidence for integrating Home Pharmacy Care into community pharmacy services within the BPJS system.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this article.

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