

Home pharmacy care program in community pharmacy to improve outcome of hypertension: A quasi-experimental study

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ABSTRACT

Home Pharmacy Care (HPC) is a program implemented by the Ministry of Health of the Republic of Indonesia to deliver the highest quality healthcare services to individuals dealing with degenerative conditions, such as hypertension. This study sought to assess the effectiveness of HPC intervention in hypertensive patients in Denpasar, Bali, Indonesia. From March to June 2024, this investigation implemented a quasi-experimental pre-and post-design with control in a community pharmacy. A purposive sampling technique was employed to select 100 patients with hypertension, who were distributed into two groups. The intervention group was provided with HPC, which consisted of a medication reminder card, education on hypertension, home blood pressure monitors, and hypertension control. Patients in the control group received standard care. The study included adult patients with essential hypertension without comorbidities aged 18 years or older, who were prescribed fewer than two antihypertensive medications and agreed to participate by signing informed consent. Blood pressure (BP) was measured before the study and at weeks 4, 8, and 12 during the study period. Data analysis was conducted using SPSS with ANOVA for repeated measures, Mann-Whitney, and chi-square tests. It was found that the decrease in SBP in the intervention group ($D \pm SD$ 13.06 $\pm$ 6.14) was better than that in the control group ($D \pm SD$ 3.32 $\pm$ 5.35). Similarly, the reduction in DBP in the intervention group ($D \pm SD$ 7.64 $\pm$ 4.25) was better than that in the control group ($D \pm SD$ 5.06 $\pm$ 4.69). The effect of HPC on blood pressure showed a significant difference ($P=0.00$), and 56% of the patients in the HPC group had controlled BP. Our study demonstrated that the implementation of HPC in community pharmacies for hypertensive patients can significantly aid them in managing their blood pressure, thereby reducing the cardiovascular risks associated with hypertension. Additionally, the potential to improve patient satisfaction with pharmacist-provided care exists through the effective implementation of HPC.

Keywords:

home pharmacy care, blood pressure, hypertension

Citation:

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INTRODUCTION

Frequently referred to as "the silent killer," hypertension is a substantial global health issue. According to the World Health Organization (WHO), nearly half of all adults with hypertension are unaware of it, and only 20% have it under control. This makes it the leading cause of premature death globally, including in Indonesia. Hypertension is a major contributor to cardiovascular disease, accounting for 51% of deaths among Chronic Kidney Disease (CKD) and End-Stage Renal Disease (ESRD) patients. Uncontrolled high blood pressure significantly increases the risk of chronic kidney disease (CKD) progressing to end-stage renal disease, cardiovascular disease (CVD), and mortality.¹ Increased sympathetic activity, an activated RAAS, and resistant hypertension are often accompanied by these disorders. Additionally, activation of the sympathetic nervous system increases insulin resistance and risk of T2DM.² As a critical comorbidity, it necessitates careful management and attention from various healthcare professionals, including pharmacists. To address this, the Ministry of Health (MoH) introduced the Home Pharmacy Care (HPC) program in 2008³ to provide optimal health services, particularly for elderly patients with degenerative diseases such as hypertension.

The prevalence of hypertension in low- and middle-income countries is increasing steadily. In Indonesia, it increased from 25.8% in 2013 to 34.1% in 2018.^{4,5} According to Statistics Indonesia, the prevalence of hypertension among the 18-year-old population was 34.1% in 2018. The highest prevalence was observed among the elderly, particularly in the age groups of 55-64 years (55.23%), 65-74 years (63.22%), and over 75 years (69.53%). These findings indicated that hypertension constitutes a significant public health issue among the elderly population in Indonesia. In Bali Province, hypertension data in 2018 reached 30.0%, a

significant increase from the 19.9% recorded in 2013. The primary factors in managing blood pressure are adherence to the prescribed treatment and the appropriate number and dosage of antihypertensive medications.⁶ Adherence to medication poses a challenge in the management of hypertension. A systematic review and meta-analysis reported that only 45.2% of hypertensive patients adhere to their treatment.⁷ The government has made efforts to reduce complications, including *PROLANIS* activity, namely the chronic disease management program.⁸ Pharmacists require drug-related interventions to provide services to the community.⁹ In primary care settings, home pharmacy care can be used as an intervention to improve patient adherence to medication. Previous research has shown that home pharmacy care can enhance medication adherence as well as improve knowledge, treatment compliance, clinical outcomes, and quality of life for patients with hypertension.^{9,10}

In Australia, pharmacy services administered at the patient's residence are referred to as "Home Medication Review (HMR)," a term distinct from that employed in Indonesia. HMR is designed to enhance the quality of medication and improve patient health through healthcare collaboration, while HPC can be conducted by pharmacists or doctors as needed.^{11,12} HMR implementation can be carried out for a minimum of 3 months. Pharmacists can intervene in DRPs for patients and doctors. At the end of HMR, the number of DRPs decreased significantly, and the patient's quality of life improved.¹³ Implementation of HMR will overcome problems resulting from polypharmacy and prevent the adverse effects of treatment. HMR has been proven to increase the success of therapy and prevent premature death in patients.¹⁴ In implementing HMR, pharmacists can significantly identify Drug Related Problems (DRPs). The most common DRPs are drug interactions, adverse drug

reactions, drug addiction, inappropriate drug use, patient noncompliance, untreated indications, dose discrepancies, and use of expired drugs.¹⁵ HMR imaging is performed in the outpatient population because monitoring can be performed during treatment at home. Patients with HMR have chronic diseases, nervous system disorders, and blood disorders. Patients feel comfortable undergoing HMR because they do not have to go to a health facility to obtain health services, so patients generally accept the HMR program.^{16,17}

Providing pharmaceutical care to patients with hypertension can aid in managing their blood pressure, thereby reducing the cardiovascular risks associated with hypertension.¹⁸ Uncontrolled blood pressure after receiving Pharmaceutical Care was improved, and there was a significant decrease in blood pressure ($p=0.000$) in the intervention group.⁹ Both the control groups ($p=0.000$) and intervention groups ($p=0.004$) showed statistically significant differences in systolic blood pressure, whereas no significant difference was observed in diastolic blood pressure between the groups. Furthermore, the groups did not differ in their ability to meet blood pressure goals.¹⁹ Based on this, the study aims to complement previous research by providing HPC services to a larger sample and a longer period, with direct involvement from community pharmacists, to evaluate the effects of HPC interventions on patients with uncontrolled hypertension in Denpasar, Bali, Indonesia.

METHODOLOGY

This study was approved by Ethics Committee No. 01.032/UNBI/EC/II/2024, issued by Universitas Bali Internasional. This research is a pilot study using a quasi-experimental pre- and post-design with control in a community pharmacy, which

was implemented from March to June 2024. The subjects were 100 patients with uncontrolled hypertension chosen using a purposive sampling technique and divided into two groups. The intervention group was selected from the Denpasar area. The inclusion criteria for the study included adult patients aged 60 years or older diagnosed with essential hypertension without comorbidities. The target for patients under 60 years of age was $<140/90$ mmHg, whereas for those 60 years and older, it was $<150/90$ mmHg. The eligible patients received intervention after providing informed consent.

Patients were prescribed fewer than two antihypertensive medications and agreed to participate by signing informed consent. The intervention group received HPC, which included standard care about the frequency and duration of medication, home blood pressure monitors, education about hypertension, education on controlling hypertension, and a medication reminder card. The control group received standard care but did not receive home monitors. Blood pressure was measured using the OMRON Upper Arm Blood Pressure Monitor Model HEM-7121J. Data were collected using the HPC form developed by the Ministry of Health of the Republic of Indonesia. Blood Pressure was measured before the study and at weeks 4, 8, and 12 during the study period. SPSS was used to analyse the data using the chi-square test, Mann-Whitney test, and repeated measures analysis of variance. Ethical approval was obtained from the ethics committee of Universitas Bali Internasional with number 01.032/UNBI/EC/II/2024 on 25 February 2024.

RESULTS

Table 1 presents the demographic and clinical characteristics of the 100

patients who participated in the study. Age, sex, family history of hypertension, smoking status, and alcohol consumption were homogeneous for all variables ($p > 0.05$). There were no significant differences between the groups at the beginning. The

mean age of the 100 participants was 56 years (SD 3.04), and the majority were male (57%). Family history of hypertension, smoking status, and alcohol consumption were higher in the HPC group than in the control group.

Table 1. Demographic and baseline factors of the studied patients

Variable	Control group (n=50)	Intervention group (n=50)	p-value
Age (year), mean (SD)	55 $\pm$ 4.48	56 $\pm$ 3.04	0.146 ^a
Gender, n (%)			
Females	20	23	0.685 ^b
Males	30	27	
Family history of hypertension	35	40	0.248 ^b
Smoking status	20	25	0.315 ^b
Alcoholic consumption	20	23	0.545 ^b

^a Mann-whitney^bChi-Square

Table 2 summarizes the changes in blood at all time points in the HPC and control groups. Before the intervention, all patients had uncontrolled blood pressure. There was a significant decrease in systolic and diastolic blood pressure in the HPC ($p=0.0001$) and control groups ($p=0.0001$). Figure 2 shows the average systolic and

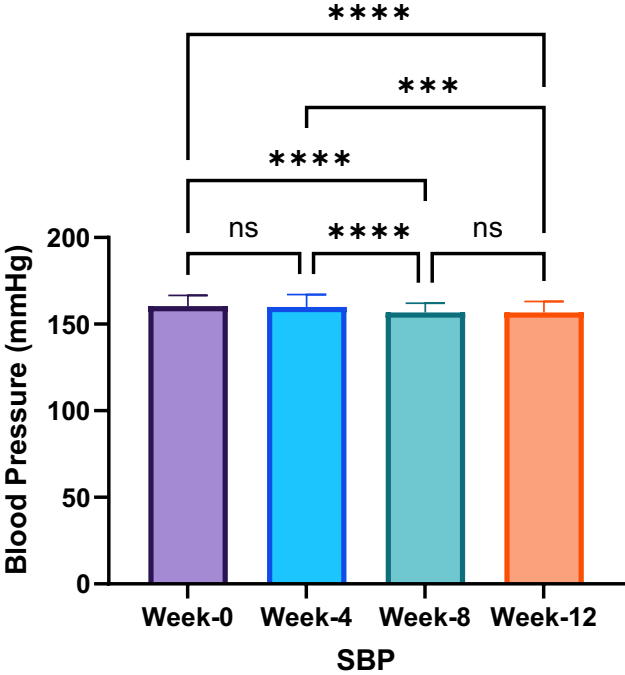
diastolic blood pressure differences in each group. The changes in systolic blood pressure at W0-W4 ($p=0.8446$) and W8-W12 ($p=0.999$) were insignificant. The changes in diastolic blood pressure in the control group W0-W4 ($p=0.3702$) were also insignificant.

Table 2. Comparison of systolic and diastolic blood pressure at baseline and three follow-up

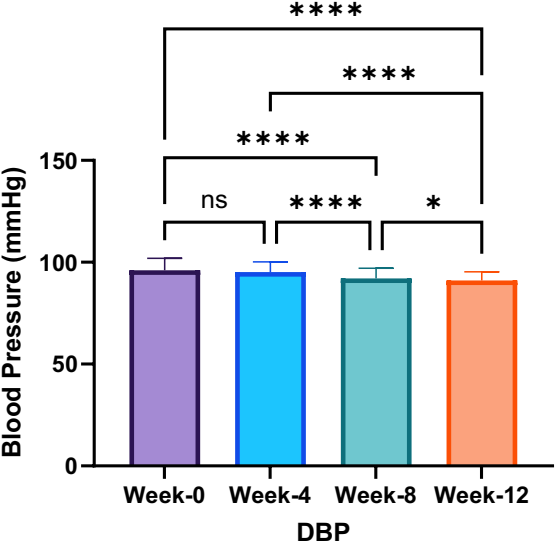
		Mean (SD)				D± SD (W0-W12)	Within group p- value ^a
	N	W0	W4	W8	W12		
Systolic Blood Pressure							
HPC group	50	155.74 ± 7.18	147.56 ± 5.53	144.68 ± 5.57	142.68 ± 4.96	13.06 ± 6.14	0-0001
Control group	50	160.1 ± 6.18	159.94 ± 7.18	156.8 ± 5.30	156.78 ± 6.12	3.32 ± 5.35	0-0001
Diastolic Blood Pressure							
HPC group	50	90.56 ± 7.19	84.92 ± 6.60	84.02 ± 6.48	82.92 ± 5.52	7.64 ± 4.25	0-0001
Control group	50	96.06 ± 5.92	95.16 ± 5.07	92.12 ± 4.93	91 ± 4.34	5.06 ± 4.69	0-0001

^aRepeated measures

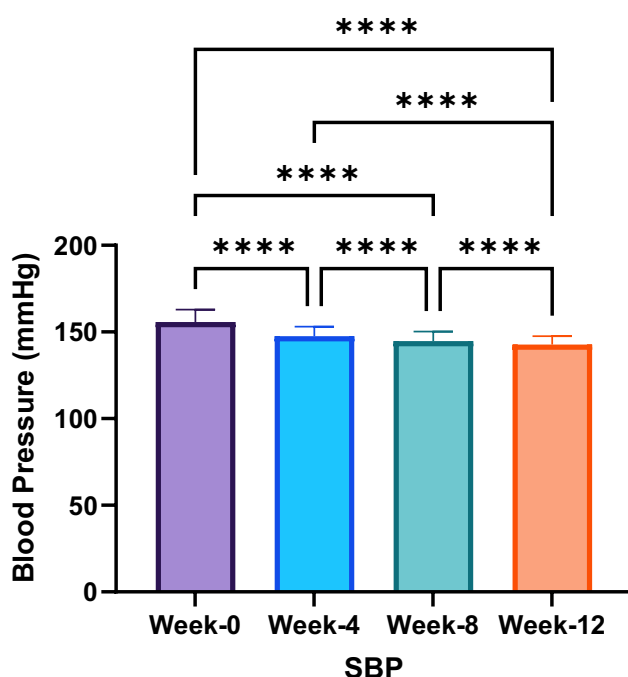
A



B



C



D

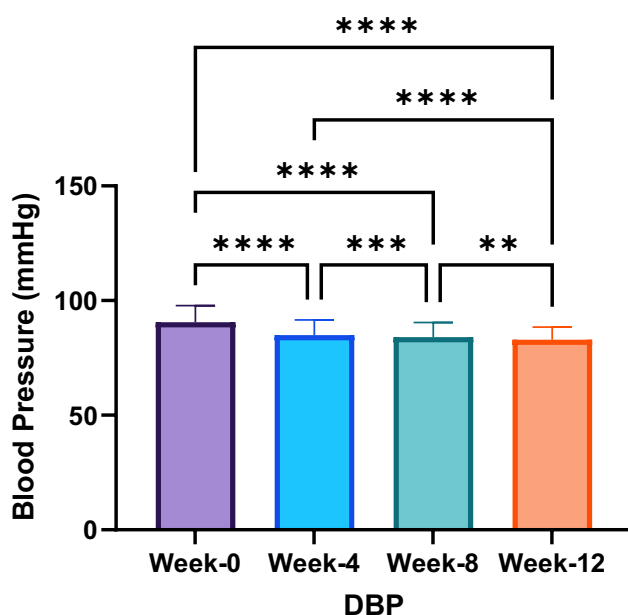


Figure 1. Comparison blood pressure every week in HPC and control groups

(A) Systolic blood pressure in control group in W0-W4, W0-W8, W0-W12, W4-W8, W4-W12, W8-W12

(B) Diastolic blood pressure in control group in W0-W4, W0-W8, W0-W12, W4-W8, W4-W12, W8-W12

(C) Systolic blood pressure in HPC group in W0-W4, W0-W8, W0-W12, W4-W8, W4-W12, W8-W12

(D) Diastolic blood pressure in HPC group in W0-W4, W0-W8, W0-W12, W4-W8, W4-W12, W8-W12

SBP (systolic blood pressure)

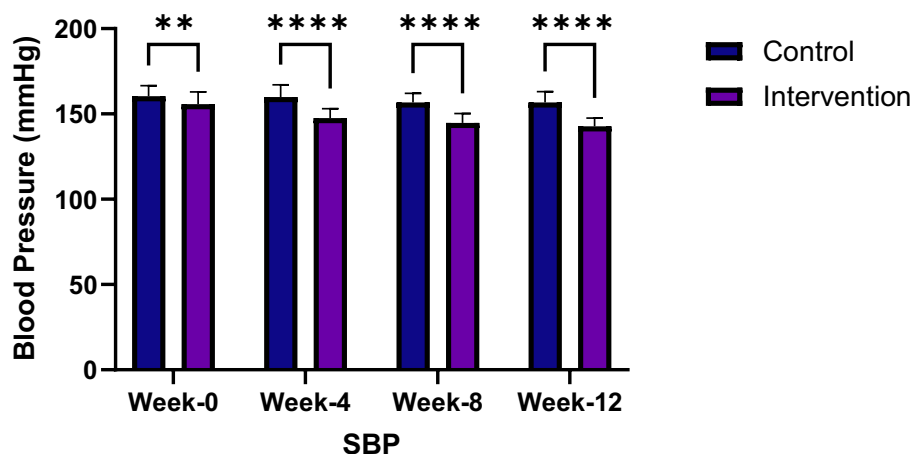
DBP (diastolic blood pressure)

P value were calculated with ANOVA repeat measured. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.005$; **** $p < 0.001$; n-s(not significant)

Patients in the intervention group had lower blood pressure after receiving HPC from pharmacists. Patients who use HPC can learn more about their illnesses than they did before. This program improves patient understanding, which ultimately changes their behaviour, helps them better understand their health conditions, dispels disease-related myths, and improves their eating habits. Figure 2 depicts the significant differences in average systolic and diastolic blood pressures between the two groups. These differences were observed every week.

Both the intervention and control groups experienced a significant decrease in blood pressure readings ($P < 0.05$) between baseline and three follow-up home pharmacy care visits. A familial history of hypertension was present in the majority of the individuals. After the implementation of pharmaceutical care, more patients began exercising regularly, two patients quit smoking, and others followed alcohol moderation guidelines. Many patients became more aware of the need for salt restriction and adhered well to it.

A



B

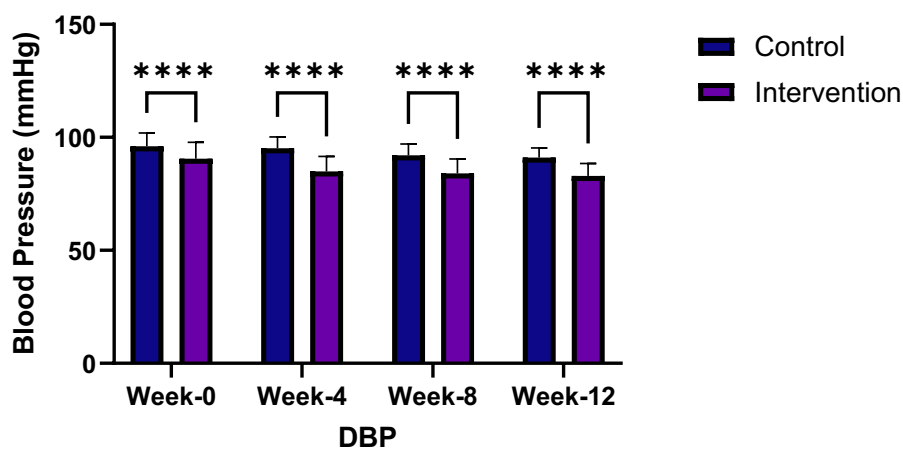


Figure 2. Comparison systolic and diastolic blood pressure in HPC and control group

(A) Compared systolic blood pressure baseline with follow-up HPC visit

(B) Compared diastolic blood pressure baseline with follow-up HPC visit

P value were calculated with ANOVA repeat measured. ** $p < 0.01$; **** $p < 0.001$

Table 3 shows the differences in blood pressure control between the HPC and control groups ($P = 0.000$). In the HPC

group, 56% of patients had controlled blood pressure, while in the control group, the percentage was 0%.

Table 3. Effect of HPC on blood pressure at Week 12

Variable	BP W12 (<150/90 mmHg)		BP W12(>150/90 mmHg)		P-value
	N(patient)	%	N(patient)	%	
GROUP Control	0	0	50	100	0.000
Intervention	28	56	22	44	

DISCUSSION

It can be concluded that increased interaction between patients and pharmacists helped raise awareness of the importance of drug therapy management, including adherence, and improved patient knowledge. In this study, the patients were classified as elderly, meaning the family plays a crucial role in therapy success. The entire family could actively participate in the patient's medication schedule through the HPC program and understand their condition. Economic factors are also essential, and the cost of HPC is subject to variation based on regional policies under the Ministry of Health's regulations. This implies that the expenses may vary from one region to another. Consequently, it is imperative to communicate this feedback to the government. The program cost could potentially be incorporated into the PROLANIS program in the future, given the benefits of HPC. Research conducted over several decades in developed countries shows that there are limitations in terms of the provision and compensation of HMR services in developing countries. For poor parents, HMR services may be more important than financial issues, especially in developing countries where parents live with their families in the community.²⁰

Both the intervention and control groups showed significant reductions in blood pressure readings ($p = 0.0001$). We continued our analysis over the weeks and found that in the control group, there was no significant decrease in SBP at W0-W4

($p = 0.8446$) and W8-W12 ($p = 0.999$). Similarly, DBP showed no significant decrease between W0-W4 ($p = 0.3702$). In this study, the control group did not experience consistent reductions because patients received limited information from primary healthcare. Furthermore, patients rarely received assistance from their families, as some independently visited primary healthcare facilities. Conversely, the HPC group revealed significant reductions in both the SBP and DBP. Community pharmacies that supplied HPC were capable of interacting with patients and their families, which enabled pharmacists to assist patients in achieving their therapeutic objectives.

As shown in Figure 2, while blood pressure decreased in both groups, the reduction was notably more significant in the intervention group than in the control group. Several previous studies have shown that pharmacist interventions influence knowledge levels, self-efficacy, compliance, and clinical outcomes.⁹ Clinical services provided by pharmacists to hypertensive patients effectively improve treatment outcomes and the services provided by pharmacists contribute significantly to improved health outcomes¹⁶.

Pharmacist interventions in primary healthcare through home pharmacy care represent a form of clinical pharmacy service aligned with pharmacy service standards. These interventions aim to benefit patients by ensuring medication safety, effectiveness, and cost-efficiency;

enhancing their understanding of drug management and usage; preventing adverse drug reactions; and addressing specific drug related issues.²¹ Previous research highlighted the positive outcomes of home pharmacy care interventions, including improved medication adherence, increased knowledge, better clinical outcomes, and enhanced quality of life.^{9,22,23} Although a positive trend was observed, HPC (Home Pharmacy Care) did not significantly impact clinical outcomes but did influence adherence in the current study. A combination of internal and external factors affects blood pressure control. Age, marital status, salt intake, coffee consumption, stress levels, and the use of antihypertensive medications have been identified as factors that are associated with blood pressure regulation in studies.^{24,25}

The factors contributing to the failure to normalize blood pressure are highly complex. These include the absence of health insurance, limited access to healthcare services, lack of facilities for routine monitoring, and inaccurate measurements or undiagnosed high blood pressure without symptoms are major obstacles to diagnosing hypertension, along with a general lack of awareness about the condition. Other factors include clinician therapeutic inertia (such as not treating asymptomatic hypertension, delaying treatment initiation, or not intensifying therapy when blood pressure remains above the target) as well as insufficient patient education.¹⁹ Pharmacists play a vital role in improving clinical outcomes in chronic conditions, including hypertension.²⁶ Pharmacist-led interventions have proven effective in improving blood pressure management and medication adherence through education, counseling, or a combination of these approaches.^{27,28,29} Among patients with hypertension, verbal educational interventions can improve health literacy and medication adherence.

Regular verbal education not only fosters patient engagement and active participation but also enhances medication literacy and adherence.^{30,31}

This study aligns with previous research demonstrating that home pharmacy care provided by pharmacists positively impacts adherence in the intervention group and effectively lowers high systolic and diastolic blood pressure, achieving an optimal value of 140/90 mmHg.³² Other studies have similarly demonstrated that structured education can significantly lower blood pressure and act as an effective intervention for managing hypertension.³³ Pharmacist medication reviews are implemented differently in different nations. For example, the UK and New Zealand use Medicine Use Review (MUR), the US uses Medication Therapy Management (MTM), and Australia and Malaysia practice Home Medication Review (HMR). In the case of MUR, consultations occur at community pharmacies, while MTM reviews are conducted in various healthcare settings. On the other hand, HMR reviews take place at the patient's home, similar to Home Pharmacy Care (HPC) in Indonesia. However, in Malaysia, the government's MO/FMS requests the HMR service. In contrast, in Australia, it can be ordered by the patient's general practitioner, community pharmacist, accredited pharmacist, patients, or caregivers. According to Rosli et al. (2021),³⁴ HPC was Indonesia's first public-private partnership program to positively impact specific clinical outcomes. HPC could be a potential model for collaboration with the Ministry of Health (MOH) or integration with the *Prolanis* program or the *Program Rujuk Balik* (PRB), which supports existing government initiatives. A certain amount of money should be set aside for the HPC service's implementation.

This study has several limitations. In Indonesia, the presence of diverse ethnic groups and religions results in variations in patient characteristics, which may limit the direct application of HPC research findings in Denpasar. Furthermore, community pharmacists were the only ones with access to patient profiles; as a result, they were forced to conduct HPC sessions with little assistance from the researchers. In the future, an integrated online patient database that community pharmacists and other healthcare providers can access could enhance access to the medical needs of individual patients and enable HPC to work with the *Jaminan Kesehatan Nasional* (JKN). Lastly, future research could look at more frequent interactions between community pharmacists and patients with uncontrolled hypertension, and a shorter follow-up interval than the three months suggested in this study.

CONCLUSION

The implementation of HPC for hypertensive patients can significantly assist them in managing their blood pressure, thereby reducing the cardiovascular risks associated with hypertension. The effective implementation of HPC also has the potential to enhance patient satisfaction with pharmacist-provided care.

AUTHOR CONTRIBUTION

DAPSD: Conceptualization, Methodology, Supervision, Visualization, Writing-original draft, Project Administration, Validation, Writing-reviewing and editing, Investigation and Funding acquisition. NPASN: Conceptualization, Methodology, Supervision, Visualization, Writing-original draft, Project administration and Validation. PYBS: Conceptualization, Methodology, Supervision, Visualization, Writing-original draft, Writing-reviewing

and editing, Investigation and Funding acquisition.

CONFLICTS OF INTEREST

All authors state that there is no conflict of interest

ETHICAL CONSIDERATION

This study was approved by the Universitas Bali Internasional Ethics Commission (number: 01.032/UNBI/EC/II/2024), on 5 February 2024. All participants signed a confidential consent form before the study began.

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