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# Home Care Improves Knowledge, Attitude, Practice and Blood Pressure Control in Hypertensive Patients: Exploring the Expanded Role of Community Pharmacists

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**ABSTRACT:** Hypertension remains a leading cause of morbidity and mortality. This study aimed to evaluate the impact of community pharmacists-provided home care on knowledge, attitude, practice (KAP) and blood pressure (BP) control of hypertensive patients. A quasi-experimental study was conducted in two pharmacies in Banten involving hypertensive patients regularly refilling prescriptions. Patients in Pharmacy A were assigned in the intervention group (IG), whilst those in Pharmacy B in the control group (CG). IG received home care in addition to standard care. Questionnaires to assess KAP were distributed at the initiation and end of the study. BP was measured monthly. A total of 110 patients (60 in IG vs 50 in CG) were enrolled. At baseline there was no significant difference in demographic and clinical characteristics. Post-intervention, proportion of patients with 'good' knowledge was considerably higher in IG (100%) vs 2.0% in CG, IG demonstrated 'very ideal' attitude compared to 'less ideal' in CG, IG performed 'good' practice as opposed to 'fair' practice in CG. The decrease of systolic BP in IG was significantly greater (14.8 mmHg) vs 1.8 mmHg in CG. In conclusion, expanded role of community pharmacists in providing home care improves KAP and BP control in hypertensive patients.

**Keywords:** **home care; community pharmacist; hypertension; knowledge; attitude; practice.**

## Introduction

Hypertension remains a crucial public health challenge in many nations. Global prevalence of hypertension is 26.4% which accounts for 1.1 billion people with more than half of the cases are documented in low- and middle-income countries. The prevalence increases considerably every year and the number is estimated to reach more than 1.56 billion by 2025 [1]. Likewise, an increased trend in the prevalence of hypertension has been uncovered in Indonesia. According to Indonesian Basic Health Survey in 2018 the prevalence of hypertension was 34.1% [2], rising from 25.8% in 2013 [3].

Evidence-based treatment for hypertension is well-defined and widely disseminated, yet management of hypertension remains sub-optimal. It has been evident that fewer than 1 in 5 hypertensive patients have adequately managed blood pressure (BP). Undoubtedly, hypertension becomes a prime risk factor for cardiovascular diseases which are attributable to leading causes of morbidity and premature mortality. It is estimated that hypertension may give rise nine million deaths annually across the globe [4]. Hypertension is also associated with high healthcare costs and it becomes a significant economic burden for patients, communities and public health system in many countries with 57 million disability-adjusted life years [5].

It has been clearly defined that hypertension ranks as the most prevalent modifiable risk factors for development of cardiovascular diseases and it often co-exists with other major risk factor. Proper management of hypertension requires identification and modification of risk factor to slow the development of resultant complications. On the ground that hypertension is a chronic progressive disease, management of hypertension should be comprehensive to include multiple aspects of prevention, detection, treatment and control of this condition [6].

The increasing prevalence of hypertension is attributable to multifaceted determinants including lack of understanding of disease. Most hypertensive people are not aware of their condition or have a low level of health literacy.

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Low health literacy has been reported in many countries [7-10]. Inadequate patient education may lead to non-adherence and uncontrolled blood pressure. Patient health education is a key component in the programs and interventions designed to control hypertension. Therefore, burden associated with hypertension might be reduced by improving health literacy among patients with hypertension [12].

Information on patients' knowledge and awareness of hypertension may represent the extent of their health literacy [13]. Consequently, assessment and understanding of knowledge, attitude and practice (KAP) factors in chronic diseases like hypertension are essential. The knowledge, perception and attitude of people toward their disease have a significant role in changing lifestyle including risk factor modification. Existing literatures have underlined patients' knowledge, attitude and healthy lifestyle practice are vital determinants of blood pressure control. Poor KAP are associated with deleterious ramifications on patients' overall health [14]. Knowledge about hypertension is essential for achieving the desired treatment goal. Adequate knowledge related to disease and treatment has a potential impact on the patients' positive attitude and further will be transformed into desired practices [15]. Implementation of desired practices will be vital in improving BP control and containing morbidity and mortality. Information on KAP of patients is essential to formulate effective educational-based preventive and control measures as the patients need to adopt long-term healthy lifestyle and medication adherence. In addition, KAP-related information may implicate on development of potential program for public health education [16].

Weak community-based health education program is considered one of crucial determinants of poor knowledge [17]. Community pharmacists are uniquely positioned to have central roles to empower patients through provision of patient-centered services including home care. According to American Society of Health-System Pharmacists, home care provided by pharmacist is defined as provision of pharmaceutical care for patients in their residences in addition to regular clinical services provided by pharmacists [18]. Community pharmacists have wide opportunities to improve patients' health literacy as the pharmacists are easily accessible leading to high likelihood to have vigorous interaction and strong relationship with patients [19].

In Indonesia, home care conducted by community pharmacists have not been widely implemented despite the existence of guidance on home pharmacy care. Further, little study has been undertaken to evaluate the prevalence of home care services and their impact on patient care. Evidence supporting the role of pharmacists in hypertension management has been well established. To date, nonetheless, limited studies have been conducted particularly in less developed countries to justify the contribution of home care services delivered by community pharmacists. In the context of Indonesia, scant literature can be retrieved to determine the impact of community pharmacist-served home care. This fact is intriguing as the Guidance of Home Pharmacy Care has been stipulated by Ministry of Health since 2008 [20]. Further, Standard of Pharmaceutical Care in Community Pharmacy has been set forth in 2016 explicitly emphasizing home care as part of clinical services delivered by pharmacists in community setting [21]. The publication of the aforementioned guidelines has underlined the recognition of Indonesian Government toward the potential role of pharmacists to undertake home care in addition to their established services. Therefore, this study aimed to evaluate the impact of community pharmacists-provided home care on KAP and BP control of hypertensive patients.

# Methods

## Study Design and Patient Selection

A quasi-experimental three-month study (December 2018 – February 2019) with a repeated measure design was used to compare the pre-and post-test assessment. The study was conducted in two pharmacies in Banten (Pharmacy A and Pharmacy B). The two study pharmacies were located in the same district and managed by the same company. This research is a part of pilot study to add home care as additional clinical service provided by the study pharmacies. Home care service has yet been included as the routine clinical service in the study pharmacies at the time of the study. Purposive sampling technique was applied in which hypertensive patients in Pharmacy A were assigned in the Intervention group (IG) and those in Pharmacy B were included in the control group (CG).

It was assumed that the proportion of controlled hypertensive patients in the control group at the end point would not change with respect to the baseline ( $\pi$= 0.20) and that it would increase by 30% in the intervention group ($\pi$ = 0.50). A two-tailed test for comparing two binomial proportions was applied by taking into account the following assumptions: a type II error of 20% (=0.80) and an a priori level of significance set at 0.05. The resulting estimated sample size was 38 patients in each group (76 patients in total). To improve the power of the study, all patients who met the inclusion criteria were recruited as

**Table 1.** Baseline socio-demographic characteristics of study participants [24]

| Characteristics | Intervention Group (N=60) No. (%) | Control Group (N=50) No. (%) | P-value |
|---|---|---|---|
| **Age (years)** | | | **0.080*** |
| 26-40 | 44 (73.3) | 43 (86.0) | |
| 41-50 | 12 (20.0) | 7 (14.0) | |
| >50 | 4 (6.7) | 0 | |
| Mean ± SD | 37.87± 7.49 | 36.16 ± 4.87 | |
| **Gender** | | | **0.945*** |
| Male | 29 (48.3) | 24 (48.0) | |
| Female | 31 (51.7) | 26 (52.0) | |
| **Education Level** | | | **0.418*** |
| Middle school | 5 (8.3) | 0 | |
| Secondary | 31 (51.7) | 29 (58.0) | |
| Tertiary | 24 (40.0) | 21 (42.0) | |
| **Employment Status** | | | **0.510*** |
| Employed or self-employed | 36 (60.0) | 34 (68.0) | |
| Unemployed | 24 (40.0) | 16 (32.0) | |
| **Physical Activity#** | | | **0.034*** |
| Physically active | 10 (16.7) | 2 (4.0) | |
| Physically inactive | 50 (83.3) | 48 (96.0) | |
| **Smoking Status** | | | **0.755*** |
| Active Smoker | 27 (45.0) | 22 (44.0) | |
| Non-smoker | 33 (55.0) | 28 (56.0) | |
| **Salt Consumption** | | | **0.340*** |
| Follow salt restriction guidance | 0 | 0 | |
| No restriction | 60 (100) | 50 (100) | |
| **Duration of hypertension (years)** | | | **0.151*** |
| 1-5 | 48 (80.0) | 45 (90.0) | |
| >5 | 12 (20.0) | 5 (10.0) | |
| Mean ± SD | 1.2 ± 0.40 | 1.1 ± 0.3 | |

# = Physically active was defined if patients reported taking exercise at least 30 minutes at least 5 days a week

* = statistical analysis used Chi-Square test

the participants. The inclusion criteria were hypertensive adult patients with/without any comorbidity who regularly refilled their prescriptions in the study pharmacies, lived in the catchment area of the study pharmacies ( ≤ 10 km) and gave their consent to participate in the study. Pregnant and lactating women, and patients with mental impairment were excluded. The study has been approved by Ethics Committee from University of National Development "Veteran" Jakarta (No: B/1665/I/2019/KEPK). Patients had right to decline from the study at all time and their confidentiality was maintained throughout the study.

## Study Instrument and Data Collection

Patients in IG received home care provided by community pharmacists in addition to standard care. Community pharmacists delivering home care service had received training to do this service. Standard care consisted of basic drug information and monthly BP measurement

during patient encounter in the study pharmacies to refill their prescription. Home care service included comprehensive health education (hypertension etiology, pathophysiology, complication, medications, medication adherence and healthy lifestyle), medication use review and monthly ambulatory BP measurement. Health education was given verbally assisted with flipchart presenting informative and interactive content. Home care was given to IG on month 1, 2 and 3 of the study. BP target was defined according to Joint National Committee's Eight Hypertension Guidelines. The BP target was SBP < 140 mmHg and DBP < 90 mmHg among patients younger than 60 years and a BP goal of SBP < 150 mmHg and DBP < 90 mmHg in the older population ≥ 60 years [22].

A set of questionnaire was adopted from Rashidi et al's study [23] to assess patients' KAP. The questionnaire was piloted in 30 hypertensive patients in a non-study pharmacy prior to data collection to assure validity and reliability of the questionnaire. Validity of the questionnaire was determined valid as shown by validity coefficient value of 0.30 and test-retest reliability was considered adequate (Cronbach's alpha = 0.75). The questionnaire comprised of four parts. Part 1 included questions related to patients' socio-demographics (age, gender, educational level, employment status, physical activity, smoking status and salt consumption) and clinical characteristics (duration of hypertension, medication profile). Part 2 consisted of 8 hypertension-related questions with 'yes' and 'no' answer choices to assess patients' knowledge regarding hypertension. Knowledge level of patients were rated using scores ranging from 0-100 and patients were categorized into three ranks: good knowledge (score of 75-100), fair (55-74) and poor (<55). Part 3 comprised of 9 questions to rate patients' attitude using likert scales ('strongly agree', 'agree', 'disagree', 'strongly disagree') with the score of each question ranging from 1-4. Answer from each question was summed-up to get the total attitude score. The total scores of attitude were divided with the highest possible score (36). Based on attitude score, patients were classified into 'very ideal' attitude (score of 80-100%), 'ideal' (60-79.99%), 'fair' (40-59.99%), 'less ideal' (20-39.99%) and 'very less ideal' (0-19.99%). There were 8 questions with 'yes' or 'no' answer to assess patients' level of practice toward hypertension in Part 4 of the questionnaire. Each correct answer was assigned the score of 12.5 point with 0 point for incorrect answer. Practice level of patients were rated using scores ranging from 0-100 and patients were categorized into three ranks: good practice (score of 75-100), fair (55-74) and poor (<55). Researcher-administered KAP questionnaire was distributed to each participant at the initiation and end of the study.

## Data Analysis

Data were analyzed using IBM SPSS Statistics for Windows (version 22.0). Categorical data were presented as number and percentage, whilst continuous data were presented as mean and standard deviation (SD). Chi-Square test was used to compare categorical data. Continuous data i.e. systolic BP and diastolic BP between IG and CG were compared using Mann-Whitney test. BP

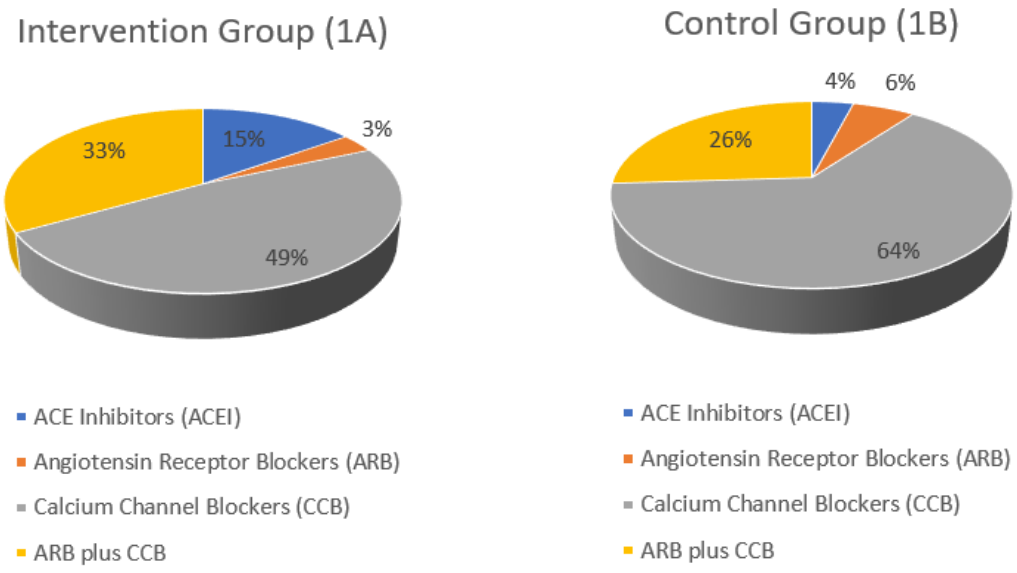


**Figure 1.** Profile of hypertensive medications in intervention group (1a) dan control group (1b)

difference between baseline and post-intervention in each group was analyzed using Wilcoxon test. A p-value < 0.05 was considered statistically significant.

## Result and Discussion

There were 110 patients enrolled in this study (60 in IG and 50 in CG). Both groups were comparable with respect to socio-demographic characteristics (Table 1). It can be seen in Table 1 that patients aged 26-40 years accounted for the commonest patient population in our study. This finding is quite interesting as peak employment productivity tends to occur in this age group [25] From gender perspective, no discernible trend seen as the proportion of both sexes was similar in either group. Among the respondents, more than half had secondary educational level and were employed. With respect to lifestyle, both groups yet adopted healthy lifestyle as most patients reported little physical activity and none followed salt restricted diet. Majority of patients had been diagnosed with hypertension less than five years.

Similar profile of antihypertensive agents used by both groups was observed (see Figure 1). As described in Figure 1, the majority of patients in the two groups took single anti-hypertensive agent with calcium channel blocker as the most frequent anti-hypertensive class prescribed. It was documented that just over a quarter of patients required additional medications to control their BP indicating inadequacy of single medication to achieve the desired BP.

Data related patients' KAP are detailed in Table 2. At baseline, there was no significant difference in the level of patients' knowledge with all patients having low level of knowledge. The results demonstrated that the standard pharmacy service (i.e. drug information service and monthly BP measurement) during monthly patient encounter was unable to improve patients' KAP. Limited time spent by pharmacists during patient encounter and reliance on one method (oral communication only to convey information to patients might be responsible for the low level of KAP in both study groups. After provision of home care for three months, all IG patients demonstrated a significant rise in knowledge level. By contrast, knowledge of patients receiving standard care remained steady. It is interesting to note that baseline knowledge level in the present study was not in accordance with that of some countries as those studies reported moderate level of knowledge regarding hypertension [13,14,23]. This finding provided evidence highlighting the need for reviewing the existing clinical services in community pharmacists as the standard services were not able to improve patients' health literacy. Further, this fact may point out the issue related to inadequacy of public health education particularly pertinent to hypertension.

Consistent with our finding, two studies in Yogyakara conducted by Puspito et al [26] and Widyastuti et al [27] observed an increasing trend in knowledge level of patients receiving health education through home pharmacy care.

**Table 2.** Knowledge, attitude and practice of hypertensive patients before and after intervention

| Variables | Intervention Group (N=60) No. (%) | | Control Group (N-50) No. (%) | |
|---|---|---|---|---|
| | Baseline | Post-Intervention | Baseline | Post-Intervention |
| **Level of Knowledge** | | | | |
| Poor | 60 (100) | 0 | 50 (100) | 48 (96.0) |
| Fair | 0 | 0 | 0 | 0 |
| Good | 0 | 60 (100)* | 0 | 2 (4.0) |
| **Attitude Score (%)** | 39.86 | 97.22* | 32.26 | 32.68 |
| **Practice** | | | | |
| Poor | 60 (100) | 0 | 50 (100) | 50 (100) |
| Fair | 0 | 0 | 0 | 0 |
| Good | 0 | 60 (100)* | 0 | 0 |

* = statistically significant different between pre-and post-test
Knowledge level = poor knowledge (<55%), fair (55-74%), good (75-100%)
Attitude level = very less ideal (0-19.99%), less ideal (20-39.99%), fair (40-59.99%), ideal (60-79.99%), very ideal (80-100%)
Practice level = poor practice (<55%), fair (55-74%), good (75-100%)

Conversely, a study in Malang by Illahi et al study [28] found no significant difference in level of knowledge in patients with home pharmacy care compared with their control counterpart. This conflicting result might be due to the nature of the aforementioned study in which patients in control group received counselling as part of standard care. Counseling provided in both groups were proven effective to increase patients' health literacy. In addition, distinction in educational attainment and the tool for knowledge assessment might implicate on different results.

In relation to patients' attitude, patients in both groups had 'less ideal' attitude toward hypertension before intervention and this figure stabilized in CG post-intervention. However, patients receiving home care showed an upward trend in attitude rating as they demonstrated on average 'very ideal' attitude correlating well with improved knowledge level. It implied that attitude had positive correlation with knowledge level as revealed in an earlier study [29]. Regarding implementation of positive practices supporting hypertension management, all patients had poor practice during the initiation of the study which was consistent with other studies[16-29]. Home care service was likely to influence patients to have positive practices as IG patients reported good practice at the end of the study. Conversely, there was no change seen among patients in CG. The results also supported the existing literature signifying the strong correlation between KAP in which patients with good knowledge would have positive attitude and practice toward hypertension [29,30]. Findings of patients' KAP in present study can be used to design more specific hypertension educational and patient's self-management program.

Table 3 outlines baseline and changes of systolic BP and diastolic BP in the two groups. From baseline, SBP decreased by 14.9 mmHg in IG and 1.8 mmHg in CG. Significant SBP reduction was only observed in IG. The difference of SBP between the two groups at the final measurement was 11.4 mmHg ($p<0.001$). With respect to DBP, DBP declined significantly from baseline in each group. Post-intervention, the difference in change of DBP between both groups was 2.6 mmHg ($p<0.001$). This figure showed that community pharmacists through home service can significantly decrease SBP approaching the targeted BP (<140 mmHg). Nonetheless, it is worth noting that patients with standard care were able to improve DBP in similar extent to those receiving home care signifying the impact of home care largely on SBP. The reduction of SBP particularly in IG was clinically meaningful. A meta-analysis of 30 clinical trials uncovered that 5 mmHg reduction in SBP may lower the risk of cardiovascular events by 25-30% [31] In line with our finding, other Indonesian studies also demonstrated beneficial impact on BP improvement after provision of community pharmacist-directed health education through home visit [27,28,32,33]. Home care studies conducted overseas in USA [7,34], Canada [35], Australia [36] and less developed countries [17,29,37] also revealed similar findings on BP improvement.

Moultry et al in USA showed that home care can improve patients' knowledge regarding hypertension, reduce non-adherence and SBP [34]. A study in Australia

**Table 3.** Systolic and diastolic blood pressure of the study patients

| Variables | Intervention Group (N=60) | Control Group (N=50) |
|---|---|---|
| **Mean Systolic Blood Pressure (mmHg)** | | |
| Baseline | 157.5 | 155.8 |
| One-month post intervention | 148.3 | 154.8 |
| Two-month post-Intervention | 142.6 | 154.0 |
| BP Difference Within Group (p-value) | -14.9 (<0.001*) | -1.8 (0.072*) |
| **Mean Diastolic Blood Pressure (mmHg)** | | |
| Baseline | 83.3 | 86.2 |
| One-month post intervention | 81.3 | 83.6 |
| Two-month post-Intervention | 80.2 | 82.8 |
| BP Difference Within Group (p-value) | -3.1 (<0.001*) | -3.4 (0.01*) |

*BP difference between two-month post intervention and baseline BP. Statistical analysis was conducted using Wilcoxon test

by Hussainy et al found that home medicine review by pharmacists to patients with chronic diseases including hypertensive patients can improve medication adherence in 90% patients and BP with more than half of the patients shifting their practice to positive direction [36]. Home care by pharmacists for hypertensive patients in Brazil showed that this service can improve BP, reduce cardiovascular risk and enhance medication adherence [37]. The beneficial impact of home care can be expanded further to improve a variety of patient outcomes including decreased medication misadventure, decreased healthcare utilization and improved quality of life [35,38,39]. Additionally, impact of home care on patient outcomes related to financial implications have been uncovered in some studies. Two American studies demonstrated that the provision of home care by pharmacist may reduce healthcare cost as this service can save approximately US$ 293.30 for each drug-related problems identified and resolved by pharmacists during home care visit. Likewise, other studies in Canada uncovered the benefit of home care to decrease costs to the health system [40,41].

These findings revealed important implications to public health system in many countries as hypertension has been a prime risk factor for cardiovascular diseases. At baseline, KAP level of patients and BP control in both groups of our study was less satisfactory signifying the need for more tailored and innovative drug information service and effective public health education programs such as provision of home care. Our study also highlighted the valuable contribution of community pharmacists through provision of home care. Community pharmacists can empower patients to improve their health literacy. Well-informed patients are likely to adhere with their medications and implement healthy lifestyle as the part of comprehensive hypertension management [42].

The strength of this study was the thoroughness of information given during home visit using combined communication approaches i.e. interactive discussion supported with flipchart as educational tool. Several limitations need to be acknowledged in this study. This study was conducted in two community pharmacies in a certain district diminishing the ability to generalize the findings. Another limitation is the difficulty in drawing accurate comparisons with other home care studies due to considerable variations in design, duration, sampling size, methodology and patients' characteristics. However, home care service provided in the present study was conducted in accordance with the Standards of Pharmaceutical Care in Community Pharmacy by Indonesian Ministry of Health so the results would be comparable with those undertaken in Indonesian settings. In addition, the results of this study were valid and representative due to the use of pre-validated questionnaires and adequate sample size estimation.

## Conclusion

Home care provided by community pharmacists improves KAP and BP control among patients with hypertension. This study generates the evidence to reinforce the expanded role of community pharmacists as part of chronic disease management team to deliver home care service.

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