

THE EFFECT OF HOME PHARMACY CARE EDUCATION ON BLOOD PRESSURE CONTROL AND KNOWLEDGE LEVEL OF HYPERTENSIVE PATIENTS AT KENDALSARI PUBLIC HELATH CENTRE MALANG

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ABSTRACT

Hypertension is one of the ten most common degenerative diseases and has a high mortality rate. In 2020, the prevalence of hypertension in Malang City reached 35,641 cases. The role of pharmacists as caregivers in home pharmacy care can help to control hypertension and reduce morbidity. The main objective of this study was to determine the effect of home pharmacy care on hypertension patients' knowledge and blood pressure management. This study used a quantitative experimental design with a Randomized Control Trial method, with a total of 34 respondents divided into 2 groups: the control group and the test group of 17 respondents each. Using an accidental sampling technique. The research location was Kendalsari Public Health Centre Malang in August 2023. Blood pressure data were measured using a tensimeter, and knowledge level data were obtained using a knowledge questionnaire. Data analysis was performed using paired and pooled t-tests. The results of the analysis of the effect of home pharmacy care on the level of patient knowledge about hypertension with a significance value (2tailed) $p = 0.000$, and analysis of the effect of home pharmacy care on systolic and diastolic blood pressure with a significance value (2tailed) $p = 0.030$. The results of this study concluded that home pharmacy care for hypertensive patients had a positive effect on blood pressure control and increased knowledge at the Kendalsari Public Health Center, Malang.

Keywords: Home pharmacy care, hypertension, blood pressure control, knowledge level.

INTRODUCTION

High blood pressure, also known as hypertension, is often considered a silent killer. A person is considered to have hypertension if their blood pressure exceeds the normal value of 140/90 mmHg (Murwani *et al.*, 2023). Worldwide, high blood pressure is a common disease in adults and children. Risk factors for hypertension include genetic factors, the environment, and bad habits. Risk factors for cardiovascular disease (CVD) include heart disease, vascular disease, stroke, and kidney failure (Bakris & Sorrentino, 2017).

According to the World Health Organization (WHO), the prevalence of hypertension in 2020 was 1.28 billion people in the world. Two-thirds of these are in low-moderate-income developing countries, one of which is Indonesia. WHO estimates that the prevalence of hypertension will continue to increase by 29% by 2025 (WHO, 2023). Similarly, in Indonesia, the rate of hypertension increased from 25.8% in 2013 to 34.1% in 2018 (Risksedas, 2018). Based on the results of Basic Health Research in 2018, the incidence of hypertension in East Java Province increased significantly from 26.4% in 2013 to 36.3% in 2018 (Dinas Kesehatan Provinsi Jawa Timur, 2022). In 2020, the prevalence of hypertension in East Java, especially in Malang City, ranked second with 35,641 cases (Dinas Kesehatan Kota Malang, 2021).

Previous research has shown that home pharmacy care affects patient compliance when taking medication, and can also control patient blood pressure (Gibran *et al.*, 2021). Likewise, research conducted at Gamping Health Centre II shows that individuals with hypertension in community health centers can benefit from home pharmacy care explanations and can significantly reduce high systolic and diastolic values (Utami *et al.*, 2019). However, in practice, Indonesians apply less home pharmacy care because there are still obstacles, one of which is the lack of information on how to implement it. This observation was designed to examine the effect of home pharmacy care on the level of knowledge and monitoring of systolic blood pressure in patients with hypertension.

RESEARCH METHODS

Tools And Materials

Microsoft Excel was used to collect data, Statistical Product and Service Solutions (SPSS) software version 25 was used for data analysis, and a tensimeter was used to measure the blood pressure of hypertensive patients. A questionnaire was used to assess the level of knowledge of hypertensive patients, and leaflet media was used to educate patients. This questionnaire consisted of 12 questions: the patient's knowledge about the use of drugs, the name of drugs that are consumed regularly, the dose, the timeliness of drug consumption, the method of use, the mechanism of the drug, the number of drugs consumed, the use of drugs regularly, the consequences if not compliant, drug interactions, the behavior that must be carried out if you miss taking the drug, and the rules for storing drug preparations. In this questionnaire, reliability and validity tests were carried out for our questionnaire validity data as follows: statement no. 1 correlation value of 0.003; statement no. 2 correlation value of 0.000; statement no. 3 correlation value of 0.003; statement no. 4 correlation value 0.000; statement no. 5 correlation value 0.000; statement no 6 correlation value 0.000; statement no 7 correlation value 0.001; statement no 8 correlation value 0.004; statement no 9 correlation value 0.003; statement no 10 correlation value 0.000; statement no 11 correlation value 0.000; and statement no 12 correlation value 0.000. The correlation values of all statements in the questionnaire met the correlation value (sig. (2-tailed) < with a significance level (α) of 0.05. Thus, all statements in the questionnaire were declared to be valid. The reliability test value (Cronbach alpha) is 0.847. The questionnaire is declared reliable if the Cronbach's alpha value obtained is greater than the alpha coefficient of 0.6.

Type of Research

This was a quantitative experimental study using a Randomized Controlled Trial (RCT) method. An RCT is a research design that involves randomizing research participants into two groups: an intervention group and a control group. By comparing the control group that did not receive home pharmacy care education and the intervention group that received the education, we can see the effect of providing home pharmacy care education.

Research Population and Sample

Hypertensive patients in the outpatient clinic of Kendalsari Health Center, Malang, were used as the study population. The sample size was determined using the Slovin formula with a known population of 50 patients with hypertension, and a sample size of 34 patients without comorbidities was obtained. The 34 patients were divided into 2 groups: 17 in the control group and 17 in the test group. Sampling techniques use accidental sampling because they describe the actual situation better.

Research Procedure

1. In the intervention group on day 1: a). The researcher visited the patient's house, introduced himself, and explained the purpose and objectives of the study. b). Blood pressure measurements and results were also recorded. c). Questionnaires were administered as a pretest. d). Providing Home pharmacy care education using leaflets. The education provided includes the definition of hypertension, classification of

- hypertension, signs and symptoms of hypertension, causes of hypertension, complications of hypertension, prevention of complications of hypertension, schedule of taking medication and its dosage, tips for maintaining compliance with taking medication, explanation of the benefits if the patient complies with taking medication, and the consequences if the patient is not compliant in taking medication. On day 7: a). The researcher then returned to the patient's home. b). Blood pressure was measured and the results were read to determine whether the blood pressure had improved. c). A questionnaire was administered as a posttest. d). Inform the patient at the last visit.
2. In the control group on day 1: a). The researcher visited the patient's house, introduced himself, and explained the purpose and objectives of the study. b). Blood pressure measurements and results were also recorded. c). Providing a questionnaire as a pre-test. On day 7: a). The researcher then returned to the patient's home. b). Blood pressure measurements were taken again, and the results were recorded. c). Questionnaires were administered as a post-test. d). Inform the patient at the last visit.

Data Analysis

To determine the effect of home pharmacy care on blood pressure control and knowledge level, data were analyzed using paired T-Test and Pooled T-Test using SPSS. The paired T-Test was used to test the values obtained in each group. The pooled t-test was used to see the effect and compare values between groups. If the data were not normally distributed, Wilcoxon test was used. The hypothesis was accepted if the significance was <0.05 , then the hypothesis was rejected if the significance was > 0.05 , while for the Wilcoxon test, the hypothesis was accepted if the significance was <0.05 , and the hypothesis was rejected if the significance was > 0.05 (Wardianto, 2023).

Research Ethics

This research obtained ethical clearance from the Health Research Ethics Committee Institute of Health Science Strada Indonesia with the number 3907/KEPK/VII/2023.

RESULTS AND DISCUSSION

Description of Respondent's characteristics

The results of the study on the effect of home pharmacy care education on blood pressure control and knowledge level of hypertensive patients at Kendalsari Public Health Center Malang are presented in [Table I](#).

Table I. Characteristics of Respondents

Characteristics Of The Sample	Intervention Group		Control Group	
	N	%	N	%
Gender				
Male	5	29	1	6
Female	12	71	16	94
Age				
36-45 Years old	1	6	1	6
46-55 Years old	4	24	1	6
56-65 Years old	5	29	8	47
≥ 65 Years old	7	41	7	41
Education				
SD	1	6	10	59
SMP	5	29	4	23
SMA	9	53	3	18
Higher Education	2	12	0	0

Work				
Not Working	1	6	1	6
IRT	9	53	8	47
Self-employed	4	23	5	29
Private Employee	2	12	3	18
Advocate	1	6	0	0
Long Time Sick				
< 1 Year	2	12	1	1
1-10 Year	13	76	15	88
11- 20 Year	2	12	0	0
> 20 Year	0	0	1	6

Table I, based on gender, shows that the largest percentage in the control group was 16 respondents (94%) female, and in the test group was 12 respondents (71%) female. Previous studies have shown that increased renin release, which can lead to increased blood pressure, occurs when the estrogen-to-androgen ratio decreases in older women (Utami *et al.*, 2019). This is also supported by other studies that state that High-Density Lipoprotein (HDL) levels in the blood protect against cardiovascular disease in women because of estrogen, but estrogen levels decrease during menopause, making women more susceptible to cardiovascular disease (Pramestutie & Silviana, 2016). Based on the age category, the largest percentage in the control group was at the age of 56-60 years as many as 8 respondents (47%) out of a total of 17 respondents. In the intervention group, the largest percentage was at the age of ≥ 65 years, with as many as 7 (41%) out of a total of 17 respondents. Previous research has shown that blood pressure rises with age, at the age of >60 years with a blood pressure $> 140/90$ mmHg. This is because of the impact of degeneration on people whose age increases (Suciana *et al.*, 2020). This is also supported by other studies that state that postmenopausal women, especially those over 56 years of age, have an increased risk of developing hypertension (Sundari & Bangsawan, 2015). Based on education, the largest percentage in the control group was the elementary level of 10 respondents (59%) from a total sample of 17 respondents. Meanwhile, for the intervention group, the largest percentage of high school education was 9 respondents (53%) from a total sample of 17 respondents. A previous study found that hypertension is strongly associated with education. The increased risk of hypertension in low-educated people is due to a lack of understanding, in contrast to someone with higher education, who absorbs information more quickly (Mujahidah & Supadmi, 2023). According to another study, the knowledge of children with primary education and no schooling is lower than that of students with higher education (Sundari & Bangsawan, 2015).

Based on occupation, the majority of patients in the intervention group were housewives, 9 respondents (53%). In the control group, the largest percentage was of housewives, with 8 respondents (47%). Consistent with other studies, 76.5% of women at the Gang Aut Health Center in Bogor suffer from hypertension because they are prone to stress (Andini *et al.*, 2019). Other studies have also stated that because they are too busy with their homes and families to worry about their health, they are more prone to hypertension (Suseno, 2017). The distribution of patients based on the duration of hypertension showed that 15 patients (88%) of the total sample of 17 respondents belonged to the control group. This group included patients diagnosed with hypertension between one and ten years. For the intervention group, the largest percentage was hypertensive patients for 1–10 years, with 13 (76%) of the total sample of 17 respondents. In line with other studies, which showed that the longer a person suffers from hypertension, the greater the likelihood of anxiety levels (Yuniartika & Bima Murti, 2020).

Table II. Characteristics of Respondents Based on Blood Pressure

Blood Pressure	Intervention Group		Control Group	
	Day 1	Day 7	Day 1	Day 7
Controlled*	12 (71%)	14 (82%)	10 (59%)	7 (41%)
Uncontrolled*	5 (29%)	3 (18%)	7 (41%)	10 (59%)

* **Controlled blood pressure** of patients aged ≥ 60 years: $< 150/90$ mmHg. Patients < 60 years of age = $< 140/90$ mmHg. ** **Uncontrolled blood pressure** Patient age ≥ 60 years = $> 150/90$ mmHg. Age < 60 years = $> 140/90$ mmHg.

Based on **Table II**, which shows the blood pressure picture of hypertensive patients at Kendalsari Public Health Center, Malang, Five respondents (29%) did not experience controlled blood pressure on the first day, but most patients (sixteen out of seventeen people, or 94%) experienced an increase in the category of controlled blood pressure on the seventh day. As for controlled blood pressure on day 1, as many as 12 respondents (71%) and on day 7, as many as 16 respondents (94%). This study is also in line with previous research, which states that 100% of patients had uncontrolled blood pressure at pretest, but at post-test, this figure decreased to 86% (Oktaviani *et al.*, 2020). Uncontrolled blood pressure is caused by several factors, including old age, genes prone to hypertension, excess body fat, and inactivity. The convenience of fast food has led individuals to reduce their consumption of fresh produce and fiber, whereas the intake of processed foods that are high in salt, fat, sugar, and calories has increased (Andini *et al.*, 2019). Other studies have also stated that diet, exercise, knowledge, family support, and the role of health workers are factors that affect blood pressure control (Hidayati L, 2018). Based on the above research, the researcher assumed that uncontrolled blood pressure can be caused in several ways, such as irregular diet, non-compliance when taking medication, and an unhealthy lifestyle. Therefore, the researcher advised hypertensive respondents to regularly check themselves at the nearest health service to determine whether their blood pressure was controlled.

Table III. Characteristics of Respondents Based on Knowledge Level

Knowledge Level	Intervention Group		Control Group	
	Day 1	Day 7	Day 1	Day 7
Good ≥ 76 -100%	5 (29%)	17 (100%)	2 (12%)	3 (18%)
Fair 60 - 75%	9 (53%)	0	10 (59%)	10 (59%)
Less $\leq 60\%$	3 (18%)	0	5 (29%)	4 (23%)

Based on **Table III** Data on the level of knowledge of the intervention group on day 1 showed that 29% of the respondents had good knowledge, 53% had sufficient knowledge, and 18% had low knowledge. On day 7, 17 respondents (100%) had a very good level of knowledge. In the control group on day 1, 2 respondents (12%) had good knowledge, 10 (59%) had sufficient knowledge, as well as 5 people (29%) had poor knowledge. On day 7, respondents had good knowledge of 3 people (18%), sufficient understanding of 10 people (59%), and less understanding of 4 people (23%). This is in line with previous research, which revealed that 48.7% of respondents did not know anything about hypertension, and the lack of understanding of respondents was related to their ability to remember hypertension counseling information. Memory decreases with age, leading to significant errors in answering the questionnaires (Utomo, 2017). However, some studies have shown that people with higher education are better able to receive information about hypertension and tend to face problems with a calmer mind (Utaminigrum *et al.*, 2017). Based on the research above,

the researcher assumed that a person's lack of knowledge about hypertension is due to several factors, such as level of education and experience.

Table IV. Analysis of Home Pharmacy Care on Knowledge Level

Knowledge Level	Day 1			Day 7			N	p*
	Mean	SD	SE	Mean	SD	SE		
Intervention Group	34.8235	6.83955	1.65883	43.5882	3.16344	.76725	17	0,000
Control Group	31.2941	4.76661	1.15607	32.7059	5.54262	1.34428	17	0,093

Statistical Analysis: *Paired T-test

In **Table IV**, the analysis used to see the different values of home pharmacy care on the level of knowledge at Kendalsari Public Health Center Malang is a paired sample t-test statistical test, which will look for differences in the pretest and post-test in each group. Based on the paired t-test in the control group before and after observation, the significance (2tailed) $p = 0.093$, which means $p > \alpha (0.05)$; therefore, it is said that there is no significant difference in the level of knowledge between the control group before and after the research. It can be concluded that without the home pharmacy care intervention, the control group before and after treatment was not significantly different. The results of the paired T-test for the intervention group before and after the research obtained a large significance (2tailed) $p = 0.000$, meaning $p < \alpha (0.05)$, meaning that there was a significant difference in the level of knowledge between the intervention group before and after the research. It can be concluded that the intervention in the form of home pharmacy care for the intervention group before and after influenced the level of knowledge of respondents. This statement is comparable to previous research on hypertension showing that learning the definition, symptoms, causes, and classification of hypertension and knowing which foods to avoid can have a significant impact on lowering blood pressure (Istiqomah *et al.*, 2022).

Table V. Analysis of the Effect of Home Pharmacy Care on Knowledge Level

Knowledge Level	Intervention Group			Control Group			N	p**
	Mean	SD	SE	Mean	SD	SE		
Day 1	34.8235	6.83955	1.65883	31.2941	4.76661	1.15607	17	0,091
Day 7	43.5882	3.16344	.76725	32.7059	5.54262	1.34428	17	0,000

Statistical Analysis: ** Pooled T-test

Based on **Table V**, the analysis of the effect of providing home pharmacy care interventions on the level of knowledge was carried out using a pooled T-Test of the control group and the intervention group before and after the study. From the intervention and control groups before the study, the significance value (2tailed) $p = 0.091$, meaning that $p > \alpha (0.05)$, after comparing the increase in knowledge of the intervention group and the control group, it was concluded that there was no significant difference between the two groups. In the intervention group as well as the control group after observation, the significance value (2tailed) $p = 0.000$, meaning $p < \alpha (0.05)$, meaning that there is a significant difference in this study that has increased the understanding of the control group as well as the test group. The intervention group may have gained more knowledge after day 1 because of the home pharmacy care that they received. This is in line with other studies that state that home pharmacy care improves patients' understanding of oral antihypertensive drugs. The lack of

home pharmacy care instructions may also explain the lack of understanding of the control group patients (Illahi *et al.*, 2019).

Table VI. Analysis of Home Pharmacy Care on Blood Pressure

Group		Mean	SD	SE	N	P*
Intervention group						
Blood pressure	Systolic day 1	144.06	11.568	2.806	17	0,026
	Systolic day 7	137.65	12.088	2.932	17	
	Diastolic day 1	81.8235	12.40078	3.00763	17	0,028
	Diastolic day 7	78.1176	11.09551	2.69106	17	
Control Group						
Blood pressure	Systolic day 1	149.06	15.766	3.824	17	0,514
	Systolic day 7	147.12	12.257	2.973	17	
	Diastolic day 1	81.000	11.74202	2.84786	17	0,093
	Diastolic day 7	79.000	10.03120	2.43292	17	

Statistical Analysis: *Paired T-test

The research analysis used to determine the different values of home pharmacy care on blood pressure control at Kendalsari Public Health Center Malang was a paired sample T-test statistical test, as shown in Table VI. Based on the paired t-test of the control group before and after the study, the significance of systolic (2tailed) $p = 0.514$ and $p = 0.093$ for diastolic, which means $p > \alpha (0.05)$, so it is said that there was no significant difference in blood pressure control by the control group during the study. The significance value (2-tailed) $p=0.027$ of the intervention group before and after the study indicated that there was a significant difference in blood pressure control between the intervention group before and after the intervention ($p=0.05$). This is consistent with previous research, which states that in the treatment group, there was a decrease in systolic blood pressure from 152 mmHg to 129 mmHg, whereas no significant decrease in blood pressure was observed in the control group (Mujahidah & Supadmi, 2023).

Table VII. Analysis of the Effect of Home Pharmacy Care on Blood Pressure

Blood pressure		Intervention group			Control Group			N	p**
		Mean	SD	SE	Mean	SD	SE		
Day 1	Systolic	144.0588	11.567	2.805	149.05	15.765	3.6823	3	0,30
			58	55	88	75	76	4	0
Day 1	Diastolic	82.000	13.711	3.664	81.000	10.809	2.4170	3	0,81
			31	50		35	4	4	8
Day 7	Systolic	137.6471	12.087	2.931	147.11	12.257	2.9727	3	0,03
			91	75	76	05	7	4	0
Day 7	Diastolic	78.1176	11.095	2.691	79.000	10.031	2.4329	3	0,03
			51	06	0	20	2	4	0

Statistical Analysis: ** Pooled T-test

Table VII shows the results of the T-Test pooled difference test between the control group and the intervention group at post-test and pre-test to determine the impact of home pharmacy care on blood pressure control. In the intervention group as well as the control group before the pretest, the systolic significance value (2tailed) was $p = 0.300$ and $p = 0.818$ for diastolic, which means $p > \alpha (0.05)$; therefore, there was no significant difference in blood pressure control between the intervention group and the control group before the pretest. This is also consistent with research conducted at the Gamping Health Center that the possible reasons for not finding changes in blood pressure in the control group are patients feeling better without antihypertensive drugs and those who do not make lifestyle changes even though their blood pressure targets have been met (Chaerul *et al.*, 2019). When hypertensive patients are told that their blood pressure is within the normal range, they will stop taking the medication because they no longer need it. After speaking with the study respondents, the researcher concluded that the best approach to hypertension is to keep blood pressure under control by taking hypertension medication regularly and adopting a healthy lifestyle. In the intervention group and the control group at post-test, the significance value was $p = 0.030$ (2-tailed) for systolic blood pressure and diastolic $p = 0.05$. This means that there was a significant difference in blood pressure control. This study is in line with previous research where home pharmacy care provided by pharmacists has a positive effect on the compliance of the intervention group and can reduce high systolic blood pressure and diastolic blood pressure so that it can reach the optimal value of 140/90 mmHg (Damayanti *et al.*, 2022). This is also supported by other studies showing that structured education can significantly reduce blood, and education can also be used as an intervention to control hypertension (Khomaini *et al.*, 2017).

Home Pharmacy care has proven effective in increasing the level of knowledge and blood pressure control in hypertensive patients at Kendalsari Health Center Malang. Based on the Paired T-Test in the control group, there was no significant difference between day 1 and day 7. In the intervention group, there was a significant difference between days 1 and day 7. Similarly, the Pooled T-Test on day 1 between the control and intervention groups did not show a significant difference. On day 7, a significant difference was observed between the control and intervention groups.

CONCLUSIONS

The conclusion drawn from this study is that home pharmacy care has a positive effect on blood pressure control and increases knowledge of hypertensive patients at the Kendalsari Public Health Center, Malang.

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