

ORIGINAL ARTICLE

The Effect of a nurse's home visit intervention on knowledge, dietary salt adherence, and blood pressure in hypertensive patients at primary health care

Setyoadi^a * | Dewi Sari Wahyuni^b | Amartasari Cika Kumalasari^b | Ayuntyas Habibah^b | Akhsinadya Farida^b | Baroya Hipmi^b | Ferinasmara Anaa Ambarwati^b | Mufida Ragil Ghaida^b | Azizah Putri Annisa^b | Wulandari Aanadita Nabila^b | Wati Farida Imaniar^b | Oktavia Nanda Insani^b | Dina Dewi Sartika Lestari Ismail^a

^a Department of Nursing, Faculty of Health Sciences, University of Brawijaya, Malang

^b Resident of the Nurse Professional Education Program, Faculty of Health Sciences, University of Brawijaya, Malang

* Corresponding Author: setyoadi@ub.ac.id

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ABSTRACT

Introduction: Home visit is one of the primary health care programs aimed at families with chronic health problems in an effort to change healthy behavior and improve the quality of life of patients. **Objectives:** This study aims to determine the effect of a nurse's home visit intervention on knowledge, dietary salt adherence, and blood pressure in hypertensive patients at primary health care (Puskesmas) Dau District. **Methods:** This research is quantitative research using a quasi-experimental method. The design used in this research is using one group pre-test post-test design. The sample in this study were 69 people in two areas, namely the hamlet of Kunci and Hamlet of Princi who suffered from hypertension. The sampling technique used was purposive sampling with the inclusion criteria of families with hypertension, living with family members, able to read and write, and willing to be respondents. Home-visit interventions were carried out for 7 weeks with interventions in the form of counselling on the concept of hypertension, diet, medicines, physical activity, and stress management as well as monitoring during the home-visit period. Data were analyzed using the nonparametric Wilcoxon difference test and the parametric dependent t test. **Results:** Statistical test results on the knowledge variable using the paired t-test showed a sig. 0.01 which means there is a significant change after the intervention. In the dietary salt adherence variable using the Wilcoxon rank test it was found that there was an increase from pre-intervention to post-intervention with an average increase of 24.00. Meanwhile, the systolic and diastolic blood pressure variables show a significant change with the sig. 2-tailed 0.01. **Conclusions:** From the results of this study, it can be concluded that there is an effect of the Nurse's home-visit intervention on knowledge, dietary salt adherence and blood pressure in hypertensive patients.

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1. Introduction

Hypertension or high blood pressure is one of the important factors triggering non-communicable diseases which are the biggest cause of death in the world (Zhou et al., 2021). The incidence of hypertension worldwide continues to increase where according to data from Ministry of Health 2023 there were 22% of the total population in the world. In Indonesia, in 2023 the prevalence of hypertension was 34.1% which experienced an increase of 8.3% from 2019 (Kemenkes RI, 2023). In East Java in 2019 it was known that there were around 25% of people with hypertension (Dinas Kesehatan Provinsi Jawa Timur, 2020). In Malang City, hypertension is included in the top 10 list of diseases with the most incidents. Increased blood pressure that lasts for a long time (persistent) can cause damage to the kidneys (kidney failure), heart (coronary

heart disease) and brain (causing stroke), if not detected early and receive adequate treatment (Dinkes, 2023).

Hypertension can be caused by several factors, including heredity, obesity (overweight), excess sodium intake, dyslipidemia, lack of physical activity, and vitamin D deficiency (Wójcik & Kozioł-Kozakowska, 2021). According to research conducted by Wismoyo et al. were 37.3% of respondents experienced stress, 70.5% of respondents had a smoking habit, 1.4% of respondents had a habit of consuming alcohol, 75% respondents consume foods high in salt, and 63.6% of respondents have low physical activity (Wismoyo et al, 2021).

Hypertension becomes a serious threat if not treated thoroughly. The impact or complications of hypertension will arise and worsen a person's condition if treatment and prevention are not carried out as well as monitoring of hypertension sufferers (WHO, 2023). This handling needs to be done by collaborating between residents and the health service in order to achieve optimal goals (Mills et al., 2020). The Primary Health Care (Puskesmas) plays an important role as a level 1 health facility that is present in the community and has a more specific coverage area to smaller areas so that it is expected to be able to carry out integrated handling of the community in the area of care (Arsyad et al., 2022). In addition, one of the government programs launched through the health center is the handling of Non-Communicable Diseases (PTM) (Sutantri et al., 2023). In addition to the active role of residents in carrying out self-management related to hypertension they suffer from, health services, especially nurses are also expected to play an active role in providing health services, especially monitoring and evaluating patients with hypertension (Dineen-Griffin et al., 2019). One form of monitoring and evaluation that can be carried out by nurses is by conducting home visits (Ma et al., 2021).

Home Visit is a form of health service or intervention in the form of monitoring and evaluation which is carried out by visiting the homes of people with hypertension (Konlan et al., 2021). The provision of home visit interventions is carried out by following the stages of nursing care starting from the assessment stage to the evaluation stage (Karam et al., 2021). Research stated that until now, routine home visits have not been carried out by many health workers, especially nurses because of the limited human resources owned by health care institutions (Hussien et al., 2021). This condition is supported by the results of the Basic Health Survey of the Ministry of Health of the Republic of Indonesia which shows that 97.7% of patients with chronic diseases have not received home visit services, so it is necessary to develop home visit health service efforts to increase service coverage (Widayanti et al., 2020). In this case, people with hypertension will be given health education and monitoring will be carried out related to knowledge of hypertension, dietary salt adherence, and blood pressure control through home visits. Therefore, researchers are interested in conducting research on the effect of nurse's home-visit intervention on knowledge, dietary salt adherence, and blood pressure in hypertensive patients in Dau District.

2. Methods

2.1 Design

This research is a quasi-experimental study with a one group pre-test post-test design. This study aims to determine the effectiveness of home visits on knowledge, adherence to a low blood diet and blood pressure in hypertensive patients. This research was conducted in two villages in the primary health service area of Dau District, Malang, Indonesia. The study was conducted over a period of 7 weeks with visits to each house once a week.

2.2 Participant

The study population was residents of two villages in the working area of primary health services (Puskesmas) in Dau district with a total population of 497 families. Based on data from the coordinator of the Posyandu for the Elderly, it was found that 95 families with hypertension suffered from hypertension. Based on the results of calculating the sample size using the sample determination table developed by Stephen Isaac and Willian B. Michael (1981), 75 samples were

obtained. During the research process there were 6 families who dropped out, so the sample that followed until the end was 69 families. Sampling was carried out using purposive sampling technique, where sampling was carried out on the basis of the researcher's considerations. The inclusion criteria for respondents were hypertension sufferers who were members of the Posyandu for the Elderly, able to read and write, undergoing treatment, and willing to act as respondents. Exclusion criteria are hypertension sufferers who suffer from other diseases such as diabetes mellitus, heart disease and gout.

2.3 Intervention

The intervention process was carried out by conducting home visits where each researcher intervened in six families with hypertension. The intervention process was carried out for seven weeks using a hypertension treatment module that had been prepared previously and a common perception of the intervention process had been carried out. In the first week, pre-intervention data was collected using questionnaires, salt diet compliance observation sheets, and blood pressure measurements. Furthermore, patients are given education regarding the meaning, etiology, pathophysiology, signs and symptoms, diagnosis of hypertension, and complications of hypertension. In the second week, families were given education regarding sources of salt in food, the recommended amount of table salt, the effect of salt on hypertension, and how to increase compliance with salt use. From the third week to the seventh week, salt diet compliance monitoring was carried out by visiting the house twice a week using an observation sheet for salt diet compliance and questions and answers were conducted with patients regarding complaints and problems experienced during hypertension treatment. At the end of the seventh week, post-intervention measurements were carried out on the level of knowledge using a questionnaire, adherence to a salt diet using a questionnaire, and measuring blood pressure.

2.4 Instruments

This research uses modules, leaflets and posters as media to provide education about the concept of hypertension and hypertension management. The measuring tool used to measure knowledge of hypertension uses a questionnaire consisting of 20 question items with true and false choices (Upoyo et al., 2021). Measuring adherence to a salt diet uses a monitoring sheet which is evaluated twice a week for five weeks. Monitoring salt diet compliance was carried out by asking whether respondents consumed $< \frac{1}{2}$ tsp salt/day (Sohawon, 2017). Blood pressure is measured using a digital sphygmomanometer, and the measurement results are written on a blood pressure observation sheet.

2.5 Data analysis

Univariate data analysis was performed using the SPSS (Product and Service Solution Statistics) 25.0 for windows application. Data analysis for non-parametric data (compliance with low salt diet) using Wilcoxon. Statistical analysis for parametric data (knowledge and blood pressure) using paired t-test.

3. Results and Discussion

3.1 Result

Table 1. Demographic Characteristics

Variable	Frequency	Cumulative Percent
Gender		
Male	23	33.3
Female	46	66.7
Education		
No School	5	7.2
Elementary School	47	68.1
Junior Hight School	11	15.9
Senior Hight School	6	8.7

Occupational				
Labor	16		23.2	
Self-employed	16		23.2	
Unemployment	37		53.6	
	Mean	SD	Min	Max
Age	49.55	13.096	23	77

Table 1. Illustrates the distribution of the characteristics of hypertension sufferers, it was found that the majority were female, namely 46 people (66.7%). The most recent education of hypertension sufferers was that they graduated from elementary school as many as 47 people (68.1%), and most did not work, namely 37 people (53.6%) because the majority of hypertension sufferers who were female were housewives. ladder.

Table 2. Comparison of Pre-Intervention and Post-Intervention Hypertension Knowledge

	Mean (SD)	Std. Error Mean	N	Percent	Correlation	Sig.	Sig (2-tailed)
Knowledge							
Pre-test	44.17 (11.531)	1.388	69	100.00	0.497	0.000	0.000
Post-test	83.28 (10.082)	1.214	69	100.00			

Table 2. Respondents' knowledge during the pre-intervention obtained an average value of 44.17, while the knowledge of post-intervention respondents obtained an average value of 83.28. This shows that the average post-intervention score is higher than the pre-intervention. The distribution of the data obtained pre-intervention was 11.531 with a standard error of 1.388, while the distribution of data obtained from the post-intervention was 10.082 with a standard error of 1.214. Based on the output above, it can be seen that the correlation value is 0.497 with a significance value of 0.000. Based on the results of the analysis, it can be concluded that there is a significant difference in patient knowledge between before and after the intervention (0.000<0.05).

Table 3. Comparison of Pre-Intervention and Post-Intervention Salt Diets

Variable	Pre Intervention Diet Compliance		Post Intervention Diet Compliance		Mean	Asymp. Sig. (2-tailed)
	Frequency	Percent	Frequency	Percent		
Yes	12	17.4	57	82.6	24.00	0.000
No	57	82.6	12	17.4		

Table 3. The results of the analysis found that after the home visit intervention regarding salt diet post-test results in hypertensive patients as many as 82.6% people experienced a decrease in salt consumption from the pre-test. Data the pre-test, it was found that out of 69 people suffering from hypertension in the two working areas of the Primary Health Service, only 12 (17.4%) people adhered to a salt diet while 57 (82.6%) other people did not adhere to a salt diet for hypertension by consuming more than half a teaspoon of salt per person per day. After being given the home visit intervention, the post test scores showed an increase in results, namely 57 (82.6%) people with hypertension adhered to the salt diet and 12 (17.4%) other people did not adhere to the hypertensive salt diet. So that it was found an increase in adherence to dietary salt in hypertensive patients with an average increase value of 24.00. The results of the analysis show a significance value of 0.00 which is less than 0.05, meaning that home visits have a positive effect on increasing adherence to dietary salt.

Table 4. Comparison of Pre-Intervention and Post-Intervention Blood Pressure

	Mean (SD)	Std. Error Mean	N	Percent	correlation	Sig.	Sig (2-tailed)
Systolic Blood Pressure							
Pre-test	149.28 (12.196)	1.468	69	100.00	0.483	0.000	0.000
Post-test	138.48 (15.299)	1.842	69	100.00			
Dyastolic Blood Pressure							
Pre-test	93.12 (8.622)	1.038	69	100.00	0.395	0.001	0.000
Post-test	85.22 (8.33)	1.003	69	100.00			

Table 4. Shows a decrease in the average systolic blood pressure after the intervention from 149.28 to 138.48. Diastolic blood pressure before the home visit had an average value of 149.28 out of 69 data, while diastolic blood pressure after the home visit had an average value of 138.48 out of 69 data. The distribution of data obtained before the home visit was 12,196 with a standard error of 1,468, while after the home visit the distribution of data was 15,299 with a standard error of 1,842. Based on the output above, it is known that the correlation coefficient is .483 with a significance value of 0.000. So, it can be said that there is a relationship between pre home visit and post home visit diastolic variables ($0.000 < 0.05$). The results of the paired t test showed that the intervention showed a significant difference between pre-test and post-test diastolic blood pressure ($.000 < p = .01$).

Similar to diastolic blood pressure, the average diastolic blood pressure decreased after the intervention from 93.12 to 85.22. Diastolic blood pressure before the home visit had an average value of 93.12 out of 69 data, while diastolic blood pressure after the home visit had an average value of 85.22 out of 69 data. The distribution of data obtained before the home visit was 8,622 with a standard error of 1,038, while after the home visit the distribution of data was 8,333 with a standard error of 1,003. Based on the output above, it is known that the correlation coefficient is .395 with a significance value of .001. So, it can be said that there is a relationship between pre home visit and post home visit diastolic variables ($.001 < p = .01$). The results of the paired t test showed that the intervention showed a significant difference between the pre-test and post-test diastolic blood pressure ($.000 < p = .01$).

3.2 Discussion

Age frequency distribution is in the range of 23 to 77 years with a range of 54 years. This shows that the older you are, the greater the risk of developing hypertension. As you get older, structural and functional changes occur in the vascular system which can cause an increase in blood pressure. According to Fauziah the changes that occur include atherosclerosis, loss of elasticity of connective tissue, and decreased relaxation of vascular smooth muscle (Fauziah et al, 2021). These changes will affect the ability of the aorta and large arteries to accommodate the volume of blood pumped by the heart so that there will be a decrease in cardiac output and an increase in peripheral resistance. In addition, the older the age, the ability to understand, grasp, and mindset will decrease (Urruticoechea et al., 2021).

The most common gender distribution is 66.7% (46 people) women. Women have suffer from hypertension after menopause (after 45 years of age) due to a decrease in the the hormone estrogen which affects levels of Hight Density Lipoprotein (HDL) causing hypertension and thickening of blood vessels or atherosclerosis (Ryczkowska et al., 2023).

The highest distribution of education is 68.1% with the last elementary school (SD) education or equivalent. The level of education will affect one's level of knowledge and one's ability to receive information. The level of a person's education level determines his knowledge, attitudes and behaviour (Pratiwi et al., 2022).

The results of the distribution of work frequency at most show 53.6% not working. Many people with hypertension do not work or are housewives, this happens due to a lack of physical

activity so that the heart rate tends to be higher so that the heart muscle has to work harder with each contraction. The harder and more often the heart muscle pumps, the greater the pressure on the arteries, thereby increasing blood pressure (Nystoriak & Bhatnagar, 2018). In addition, someone who is not working also rarely interacts with other people so that cognitive information sources are also few.

Based on the results of the study, it showed differences in the level of knowledge of respondents before and after the home visit, namely the average value from 44.17 (SD: 11,531) to 83.28 (SD: 10,082), thus indicating an increase in the average value of 39.11. The results of this study are in accordance with the main objectives of health education on the concept of hypertension, namely to increase knowledge, ability to self-care of hypertensive sufferers and then to develop skills in medication adherence, monitoring every day and being able to make decisions if there is a change in clinical signs and symptoms (Gusty et al., 2022). The knowledge provided in this study was about the pillars of hypertension management, namely conducting health education on low-salt diet management, carrying out routine physical activity, one of which was brisk walking, stress management and the use of pharmacological drugs (Rahimi & Nkombua, 2022). The media used in providing health education is in the form of posters.

Education through home visits provides more opportunities for nurses to communicate therapeutically with patients, including their families (Blake & Blake, 2019). Through home visits nurses are also better able to show caring responses, focus on clients, give clients longer time to ask questions, and foster a sense of trust in clients, including their families (Gusty et al., 2022).

Based on the results of the Paired Sample T Test statistical test, the significance value in the pre-test and post-test was 0.000 ($p < 0.05$), meaning that there was a significant change from pre-test to post-test, namely an increase in the average value. The correlation coefficient value between the pre and post-test is 0.497. The magnitude of the correlation indicating a moderate level of closeness but there is still a significant relationship. It can be concluded that providing health education through home visits to people with hypertension can increase their knowledge significantly (Pristianty et al., 2023).

The results of the Wilcoxon test showed an increase in adherence to dietary salt before and after home visits. Obtained an increase of 65.2% seen from the pre-test 17.4% and post-test 82.6% of dietary adherents with p value $0.000 < 0.05$ which means there is a significant difference in the score of dietary salt adherence before and after after home visits. Home visits by providing counselling and monitoring will increase knowledge and motivation to carry out healthy living behaviour, especially adherence to a salt diet (Ojangba et al., 2023).

According research with the title the effect of health education on dietary compliance in patients with hypertension in the working area of Yogyakarta Health Centre, it was found that there was a significant increase in dietary compliance after being given health education (Adriouch et al., 2017). According to another study, it has the same results, that is, there is an effect of health education on dietary compliance in hypertensive patients, which increased by 20% from 18 respondents who adhered to the diet to 24 respondents who adhered to a diet with p value = 0.000 (Kurniawati, 2019). The level of education affects a person's compliance, the lower the education, the more disobedient they will be, because education will influence the ability to receive information which will later develop behaviour in a person (Paczkowska et al., 2021). Based on previous research, it is stated that there is a significant relationship between level of education and dietary compliance with p value = 0.03 and there is a significant relationship between knowledge and dietary compliance. With a p value = 0.022 (Dewi, 2019). After the home visit, there was an increase in adherence to the salt diet from those who like to eat salty foods and often add salt to the food they are going to consume, now they have changed to consuming salt <1.5-2.3 grams/day (Utari et al., 2021).

The results of the pre-post systolic blood pressure t-test showed a sig. 0.000 and pre and post diastolic blood pressure has a Sig value of 0.000. This means that there is a significant influence on the intervention given. The intervention in this study used a home visit strategy carried out for seven weeks which included hypertension education and a salt diet, then blood pressure monitoring (McManus et al., 2021). Interventions in the form of counselling are used to increase knowledge and awareness related to hypertension (Xia et al., 2022). Health education is

a process that is carried out or carried out to change and improve on how to maintain and improve their health towards a better direction (Gorlin & Békés, 2021). Counselling given to respondents as well as monitoring of the lifestyle of respondents (Znyk et al., 2019). The topics of counselling provided are in accordance with the pillars in the management of hypertension, namely the concept of hypertension, hypertension diet, medication, and stress management (Altawili et al., 2023).

A low-salt diet is an effort to control hypertension (Kim et al., 2024). The cause that increases hypertension is a bad diet, such as consuming more than one teaspoon of salt every day (Irianto & PH, 2022). In this journal, the intervention given to respondents is health education about a low-salt diet and dietary salt monitoring. The results of a decrease in systolic blood pressure between pre-post were 10.79 ± 14.23 and diastolic 7.89 ± 9.33 . The results in accordance with research study regarding adherence to a salt diet showing changes in systolic and diastolic blood pressure. The change in systolic pressure before and after was 37.56 ± 18.16 and the change in diastolic pressure was 17.29 ± 10.17 (Mak et al., 2013).

The next intervention is counselling on physical activity in the form of brisk walking and its monitoring. The advantages of brisk walking are that it can increase the maximum capacity of the heart rate, stimulate muscle contraction, breakdown of glycogen and increase tissue oxygen. This exercise can also reduce plaque formation by increasing the use of fat and increasing the use of glucose (Pinckard et al., 2019). In another study on physical activity, namely brisk walking which was carried out for 2 weeks, the result was a decrease in blood pressure both systolic and diastolic. Systolic pressure before and after the intervention were 153.24 ± 2.98 and 148.19 ± 4.29 . Meanwhile, the diastolic pressure before and after the brisk walking intervention were 94.48 ± 3.31 and 90.05 ± 3.51 (Harun et al., 2022). The results of this study are in line with the results, namely a decrease in systolic and diastolic blood pressure with a Sig value of 0.000, which can be interpreted as brisk walking has an effect on blood pressure in hypertensive patients. Compliance in treatment is defined as the behavior of patients who obey all advice and instructions recommended by health workers as the main condition for achieving successful treatment (Adriouch et al., 2017). Supporting research for the results of this article related to adherence and treatment patterns in hypertensive patients stated that there was a decrease in systolic blood pressure of 5.97 ± 12.31 and systolic blood pressure of 13.37 ± 5.20 . the higher the level of compliance, the greater the average reduction in systolic and diastolic blood pressure (Del Pinto et al., 2021).

Even though the results of the study showed a significant decrease in blood pressure, it is possible that respondents still felt other symptoms of hypertension such as dizziness, palpitations and difficulty sleeping (Kowalski et al., 2023). Therefore the application of interventions given to hypertension respondents in the form of hypertension drug therapy, administration of a low salt diet, low cholesterol diet, cessation of smoking habits, and provision of stress management techniques are continuously practiced and monitored (Palmer et al., 2018).

Based on the explanation above, the intervention in the form of home visits is carried out to give effect through counselling on health education related to hypertension and monitoring which can be an indicator of changes in the lifestyle of respondents related to hypertension (Tam et al., 2020). The knowledge gained can increase awareness of the condition of hypertension so that individuals can independently prevent complications that occur through good lifestyle changes (Charchar et al., 2024). Also, it is hoped that it can be applied in everyday life for both people with hypertension and can be a preventive measure for those who are at risk or not. Based on this statement it can be concluded that there is an effect of the Nurse's home-visit intervention on knowledge, dietary salt adherence and blood pressure in hypertensive patients.

4. Conclusion

Research on the effect of home visits on knowledge, adherence to a salt diet, and blood pressure shows positive results. Home visits have proven effective in increasing patient knowledge about hypertension, including the causes and impacts of uncontrolled high blood

pressure. Patients also become more aware of the importance of reducing salt intake and how to read food labels to avoid excessive salt consumption. In addition, home visits help improve patient compliance with a low-salt diet thanks to the direct supervision and support provided by health workers. Consistent monitoring and ongoing education during home visits facilitates patients to maintain necessary dietary changes. The study results also showed that patients who received home visits experienced significant reductions in blood pressure compared to those who did not receive this intervention. Adherence to prescribed treatment also increased through home visits, which contributed to lower blood pressure. Overall, home visits as an intervention can have a significant positive impact on hypertension management, so they can be an important part of a more effective hypertension management strategy.

Ethics approval and consent to participate

Ethical clearance gets approval from the ethics team of the Faculty of Medicine, University of Brawijaya No. 021/EC/KEPK/S1-PSIK/2020

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