Article

Empowerment Education to Increase Medication Adherence among Older People with Hypertension in Rural Areas in Indonesia*

Article derived from master's thesis: "Empowerment Education to Increase Medication Adherence Among Older People with Hypertension in Rural Areas in Indonesia," submitted to the master program of nursing at Hasanuddin University (https://repository.unhas.ac.id/id/eprint/39547/).

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Theme: Health promotion

Contribution to the field: The findings of this study contribute to intervention design grounded in empowerment education theory and the active involvement of participants in the learning process. In addition, this study proves that empowerment education theory could be applied to hypertensive older people in rural areas.

Abstract

Introduction: Empowerment is one of the effective approaches to promoting health behavior change and improving medication adherence in older people. **Objective:** We aimed to investigate the effectiveness of empowerment education in enhancing medication adherence among older people with hypertension. **Methods:** We used a quantitative approach with a quasi-experimental design. Older people with hypertension were randomly divided into an intervention group (n=22) that received empowerment education and a control group (n=22) that received standard care from the health center. The empowerment education program included information about hypertension, the importance of medication adherence, and techniques to manage hypertension through lifestyle modification. Medication adherence was measured using the Morisky Medication Adherence Scale-8 (MMAS-8) questionnaire. **Statistical Analysis:** To determine blood pressure and the category of compliance with taking geriatric medication from pre-, post-test, and follow-up in the intervention and control groups (within-subject), the Friedman Test post hoc and the Wilcoxon test were conducted. To determine the difference in blood pressure and the category of compliance with taking geriatric medication from pre, post-test, and follow-up between the intervention group and control group (between-subject), the Mann-Whitney Test was conducted, and to assess the strength of the effect size, the Cohen Effect Size test was applied. **Results:** Medication adherence in the intervention group showed a significant increase in adherence ($p = 0.000$) with a moderate effect size ($d > 0.5$). Meanwhile, medication adherence in the control group was not significant ($p = 0.392$). **Conclusion**: This intervention can be an option for nurses to help hypertensive older people improve their medication adherence and, in turn, their quality of life.

Keywords (Source: DeCS)

Empowerment Education; Hypertension; Medication Adherence; Elderly; Rural Area

Educación para el empoderamiento para incrementar la adherencia a la medicación entre pacientes de la tercera edad con hipertensión en zonas rurales de Indonesia*

Artículo derivado de la tesis de maestría: «Educación empoderadora para aumentar la adherencia a la medicación entre las personas mayores con hipertensión en las zonas rurales de Indonesia», presentada al programa de maestría en enfermería de la Universidad Hasanuddin. Disponible en: https:// repository.unhas.ac.id/id/eprint/39547/

Resumen

Introducción: El empoderamiento es uno de los enfoques más efectivos para promover comportamientos saludables y mejorar la adherencia a la medicación de las personas mayores. **Objetivo:** Apuntamos a investigar la efectividad de la educación para el empoderamiento para mejorar la adherencia a la medicación de las personas mayores con hipertensión. **Materiales y métodos:** Usamos un enfoque cuantitativo con un diseño cuasiexperimental. Las personas mayores con hipertensión fueron divididas al azar en un grupo de intervención (n=22), que recibió educación para el empoderamiento y un grupo de control (n=22), que recibió los cuidados estándar del centro médico. El programa de educación para el empoderamiento incluyó información sobre la hipertensión, la importancia de la adherencia a la medicación y técnicas para manejar la hipertensión a través de modificaciones del estilo de vida. La adherencia a la medicación se midió usando el cuestionario de la Escala Morisky de Adherencia a la Medicación-8 (NMAS-8, por sus siglas en inglés). **Análisis estadístico:** Para determinar la presión arterial y la categoría de conformidad con la toma de medicamentos geriátricos del pre- y postest, y del seguimiento entre el grupo de intervención y el grupo de control (entre sujetos), se realizó el test Mann-Whitney, y para determinar la fuerza del efecto del tamaño se aplicó la prueba del Tamaño del Efecto de Cohen. **Resultados:** La adherencia a la medicación en el grupo de intervención mostró un incremento significativo (p = 0,000) con un tamaño del efecto moderado (d > 0,05). Por su parte, la adherencia en el grupo de control no fue significativa (p=0,392). **Conclusiones:** Esta intervención puede ser una opción para que las enfermeras ayuden a los adultos mayores a mejorar su adherencia a la medicación y, en consecuencia, su calidad de vida.

Palabras clave (Fuente DeCS)

Educación para el empoderamiento; hipertensión; adherencia a los medicamentos; ancianos; medio rural.

Educação para o empoderamento visando aumentar a adesão à medicação entre pacientes idosos com hipertensão em zonas rurais da Indonésia*

Artigo derivado da tese de mestrado: "Educação empoderadora para aumentar a adesão à medicação entre idosos com hipertensão em áreas rurais da Indonésia", apresentada ao programa de mestrado em enfermagem da Universidade Hasanuddin. Disponível em: https://repository.unhas.ac.id/id/eprint/39547/

Resumo

Introdução: O empoderamento é uma das abordagens mais eficazes para promover comportamentos saudáveis e melhorar a adesão à medicação em pessoas idosas. **Objetivo:** investigar a eficácia da educação para o empoderamento na melhoria da adesão à medicação em pessoas idosas com hipertensão. **Materiais e métodos:** Utilizamos uma abordagem quantitativa com um delineamento quase experimental. Pessoas idosas com hipertensão foram divididas aleatoriamente em um grupo de intervenção (n = 22), que recebeu educação de empoderamento, e um grupo controle (n = 22), que recebeu o cuidado usual do centro médico. O programa de educação para o empoderamento incluiu informações sobre a hipertensão, a importância da adesão à medicação e técnicas para controlar a hipertensão por meio de modificações no estilo de vida. A adesão à medicação foi medida usando o questionário Morisky Medication Adherence Scale-8 (MMAS-8). **Análise estatística:** Para determinar a pressão arterial e a categoria de conformidade de adesão à medicação geriátrica pré e pós-teste, bem como a comparação entre o grupo de intervenção e o grupo controle (entre os participantes), utilizou-se o teste de Mann-Whitney; para estimar o tamanho do efeito, aplicou-se o coeficiente d de Cohen. **Resultados:** A adesão à medicação no grupo de intervenção indicou um aumento significativo (p = 0,000) com tamanho de efeito moderado (d > 0,05). Por sua vez, a adesão ao grupo controle não foi significativa (p = 0,392). **Conclusões:** Esta intervenção pode ser uma opção para que enfermeiros auxiliem idosos a melhorar a adesão à medicação e, consequentemente, a qualidade de vida.

Palavras-chave (Fonte DeCS)
Educação para o empoderamento; hipertensão; adesão à medicação; idosos; zona rural.

Introduction

An estimated 1.28 billion adults aged 30-79 years worldwide suffer from hypertension, with most of them living in low- and middle-income countries (1). In Southeast Asian countries, the prevalence of hypertension has risen sharply over the past two decades to around 36 % (2), the evidence on whether blood pressure and hypertension are higher in rural areas (3). In individuals over 60 years, the prevalence of hypertension reaches about 60 % of the total population (4). The same trend is also found in Indonesia. According to the Indonesian Basic Health Research, in 2018, the highest prevalence of hypertension in Indonesia was found in the older population category, which was 69.53 % at the age of 75 years and over, 63.22 % at the age of 65-74 years, and 55.23 % at the age of 55-64 years (5). This indicates that hypertension in older people is a significant health problem that requires special attention and appropriate treatment to prevent complications that can negatively affect their quality of life.

There are many methods available for managing hypertension in older people, including dietary modifications, physical exercise, and pharmacological therapy through the administration of medication. However, hypertension management in older people is still suboptimal. Even in developed countries, only 29 % to 50 % of patients control their blood pressure (6). Several studies have found that the prevalence rate of hypertension awareness, treatment, and control is much lower in rural areas compared to urban areas due to a lack of knowledge about hypertension and the availability of health services (7-9). Another possibility is using complementary and alternative medicine as part of self-management, which is prevalent in rural areas. One way to control hypertension is by taking medication regularly as prescribed by medical practitioners. Medication adherence can be defined as the process by which patients take their medication as prescribed (10). Low adherence causes a person to experience resistance to hypertension (11, 12). In older people, the use of antihypertensive medication has led to reduced overall cardiovascular disease, morbidity, and mortality rates in those with high blood pressure (12). Therefore, older people need to understand and follow regular treatment to control hypertension so that they can improve their quality of life and reduce the adverse effects of high blood pressure.

Despite its many benefits, medication adherence rates in older people remain low. A study in one Southeast Asian country reported that more than half of the older population living in Singaporean communities had poor medication adherence, highlighting the need to address the knowledge deficit about their medications (13). Other parts of Asia show a similar incidence, with South Asia (48 %) followed by East Asia (45%) and the Middle East (41 %) (14). Non-adherence to treatment programs impacts those suffering from non-communicable diseases (NCDs) (12). Patients with poor adherence to antihypertensives are at greater risk for coronary disease, cerebrovascular disease, and chronic heart failure (15). The main cause of

uncontrolled blood pressure in older people is both intentional and unintentional medication nonadherence (16). Older people with chronic diseases generally show lower levels of medication adherence than other adult patients. In the case of older people with hypertension, treatment adherence is often low due to various factors, such as drug side effects, physical limitations, and decreased cognitive function (17). This results in more severe complications and impacts on the quality of life for older people, including increased morbidity, mortality, and additional costs for the healthcare system (18, 19). Therefore, older adults with hypertension require appropriate interventions and a focus on compliance issues that can improve their self-care ability, including medication adherence (20).

Several intervention studies have reported a positive effect on improving medication adherence in older adults with hypertension. These studies have been conducted with behavioral feedback interventions (21) and self-management education tailored to health literacy (6). However, these two studies were not conducted face-to-face, so there is a possibility of unrealistic medication adherence reporting from respondents. Nurses play an essential role as educators in helping patients improve their understanding.

Nurses can provide relevant information through health education programs and empower patients to change their behavior (22, 23). Empowerment education is a concept that explains the social process where there is a demonstration of acceptance, admiration, promotion, development, and improvement of individual abilities to meet their demands and solve their problems (24). Using the empowerment education approach will make older people feel involved, thereby facilitating various developments in their lives, both in terms of health and life (25). A study conducted by Irwan et al. (26) in Indonesia reported that educational training without support and motivation when implementing the desired behavior was insufficient to maintain compliance in self-care, as evidenced by the increase in dietary salt concentration in the control group. Therefore, it is crucial to help older adults overcome challenges and motivate them to adhere to self-care practices.

Several studies reported that empowerment education significantly improved the self-care behavior of patients with heart failure and reduced the frequency and duration of hospitalization in Iran (27). However, in this study, there were differences in intervention treatment; some respondents who faced obstacles were contacted via telephone. In contrast, others were engaged in a face-to-face manner, resulting in some respondents not always accurately reporting self-care; furthermore, according to Shin et al. (28), in South Korea, empowerment education is effective for older people to take a proactive role in managing chronic diseases, and according to Thojampa et al. (25), the empowerment education process stimulates health behavior changes that

can lead older people in Thailand to have a good quality of life and longevity. However, these two studies did not focus on medication adherence in older adults with hypertension.

As proposed by Funnell & Anderson (23), empowerment education for patients shows that research on behavior change indicates that interventions focusing on patients and using a collaborative approach, supported by adult education and informed decision-making, effectively promote behavior change. Empowerment education in older people aims to increase their independence and confidence through promotion and education. This program introduces ways to prevent and control disease and provides appropriate self-care skills. In addition, the program encourages activities that help older people play a more active role in maintaining health.

This study aims to determine how empowerment education affects the improvement of medication adherence in older adults with hypertension. We expect an increase in older people's knowledge about medication adherence, enhancing compliance with taking medication, and the clinical results to be seen in the controlled blood pressure of older adults with hypertension.

Material and Methods

Design

This study used a quasi-experimental pre- and post-test design with a control group to evaluate the intervention in two groups. The groups in this study were divided into an intervention group and a control group. The intervention group received empowerment education, followed by a two-month follow-up, while the control group received only standard education from the health center. All participants in this study had their blood pressure measured four times—before the intervention and one week, one month, and two months after the intervention.

Participant Recruitment

This study was conducted in Jeneponto District, one of the districts in Eastern Indonesia, which is identified as an area with the highest prevalence of hypertension patients based on the 2018 Indonesia Basic Health Research (29). This study took place at a rural health center with a high incidence of hypertension among older people. Participants in this study were selected based on the following inclusion criteria:

1. ≥60 years old and cooperative (responding to officers and with good communication abilities)
2. Live and reside in the study area
3. Outpatient
4. Diagnosed with hypertension by a doctor at a health center/clinic/hospital

5. Without a secondary diagnosis
6. Older people who have consumed antihypertensive drugs for the last 2 months according to the dose given by the doctor

The older people who were not willing to become participants, older people who had just started treatment, and older adults with terminal illnesses, decreased awareness, and decreased cognitive abilities were excluded from this study. Older people who did not attend one activity session or could not be found during the home visit were included in the dropout criteria for this study.

We identified 44 eligible participants in this study. We divided all participants into two groups by randomization through the website https://randomteamgenerator.github.io/. All participants who met the inclusion criteria were given a respondent code and then entered into a randomized generator that automatically divided participants into two groups, resulting in the intervention group (n = 22) and the control group (n = 22). The flow chart of participants in this study is presented in Figure 1.

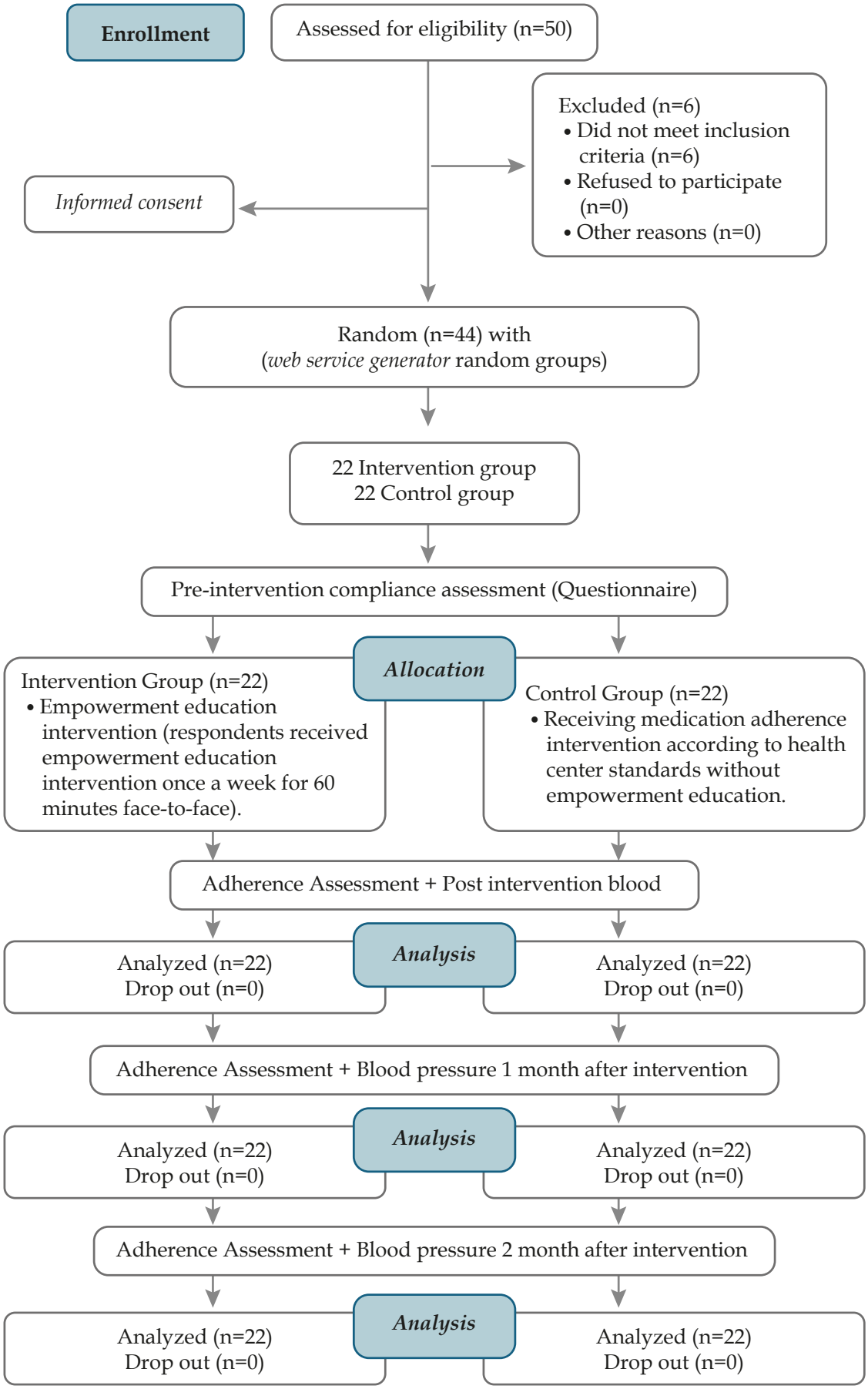
Data Collection

Before the intervention, data were collected by inviting participants who fit the inclusion criteria, ensuring that all participants in this study were homogeneous to avoid research bias. Researchers collected data on older adults with hypertension in Jeneponto Regency from the geriatric program manager at the Public Health Centre. Furthermore, the researchers conducted a direct survey at the location where the research would be undertaken. Data on participants involved in the study were collected during the Monthly Health Check-up for older people. Then, all participants who met the inclusion criteria had their blood pressure measured and were asked to answer demographic and compliance questionnaires. One week after the intervention, participants answered the compliance questionnaire again and underwent blood pressure measurements. Likewise, one month and two months after the intervention, participants completed the compliance questionnaire and measured their blood pressure. The results were derived based on data collection during the period from September 2023 to January 2024.

Instrument

The participant demographic questionnaire instrument was used to determine the characteristics of the participants and to assess the medication adherence of older people using the Morisky Medication Adherence Scale 8 (MMAS-8) questionnaire by Morisky et al. (30) and adapted into Indonesian. It consists of 8 short questions with the following measurement results: scores of 8 indicate high compliance; scores between 6-7 indicate moderate compliance, and scores between 0-5 indicate low

Figure 1. Consort Diagram



Source: Prepared by the authors.

compliance (31). All data were categorized with a score of 3 indicating low adherence, 2 indicating moderate adherence, and 1 indicating high adherence. Participants were accompanied by researchers while answering the questionnaire. Researchers first explained the purpose of completing the questionnaire before distributing it. They assured the participants that the answers provided were confidential between the participants and the researcher, and that their health services would not be affected.

Blood pressure measurements were taken using an OMRON HEM-7121-J portable sphygmomanometer with units of mmHg each. All data were collected before the intervention and one week, one month, and two months after the intervention.

Data Analysis

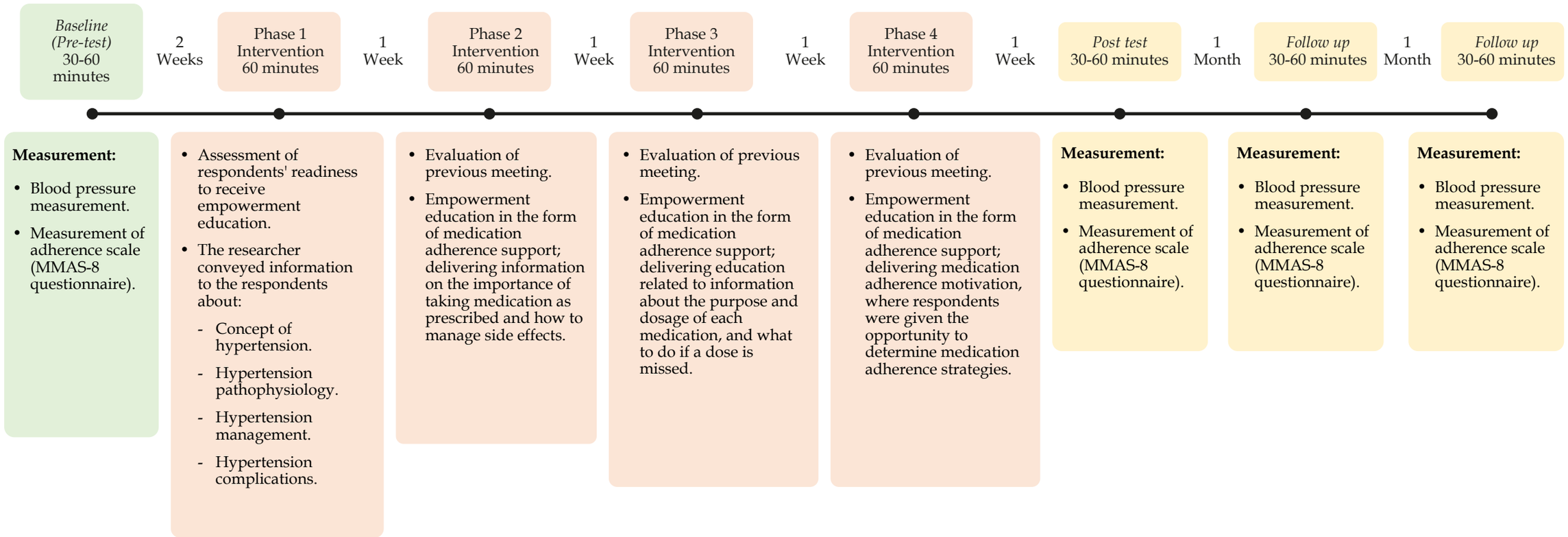
Univariate analysis is used to explain the characteristics of each variable (32). In this study, researchers analyzed the data on participant characteristics based on initials, age, gender, education history, occupation, language used, medication adherence scores, and blood pressure.

To determine blood pressure and the category of compliance with taking geriatric medication from pre-, post-test, and follow-up in the intervention and control groups (within-subject), the Friedman Test post hoc and Wilcoxon test were conducted. To determine the difference in blood pressure and the category of compliance with taking geriatric medication from pre-, post-test, and follow-up between the intervention group and control group (between-subject), the Mann-Whitney Test was conducted, and to assess the strength of the effect size, the Cohen Effect Size test was performed.

Intervention

The intervention group in this study was given empowerment education in the form of medication adherence support regarding the concept of hypertension, the importance of taking medication as prescribed, the way to manage side effects, the purpose and dosage of each medication, and what to do if a dose is missed, as well as motivation for medication adherence where respondents were allowed to determine strategies to improve drug adherence. This was followed by monthly meetings and follow-ups for two months. We applied the empowerment education model by repeating important points about medication adherence, evaluating the understanding of older people in each session, and showing strategies to improve medication adherence, as outlined in a booklet. Furthermore, we followed-up through monthly meetings held for two months. The program implementation process is shown in Figure 2, and the practical guide of empowerment education, in Table 1.

Figure 2. Intervention Program Implementation Process



Source: Prepared by the authors.

Table 1. Practical Guide of Empowerment Education

FIRST WEEK SESSION 1	Greet the patient and introduce yourself *("Assalamu'alaikum, Mr./Mrs., my name is ...").* Open the conversation and ask about the patient's condition *("How are you feeling today?").* Show attentiveness to the patient *("Have you taken your medication?").* Provide information related to the patient's illness *(Explanation about hypertension – material is available in the booklet).* Listen actively and demonstrate empathy regarding any difficulties or problems faced by the patient, with reflection on past experiences and identification of feelings *("What has been the most difficult challenge you have faced during your treatment?").* *("Please tell me more, could you give an example?").* Offer recognition and encouragement before closing the session *("You have done really well in undergoing your treatment. Please stay motivated...").* Arrange the next appointment *("Would you be willing if I visit again next week, on ... at ...?").*
SECOND WEEK SESSION 2	Greet the patient *("Assalamu'alaikum, Mr./Mrs.").* Show concern *("How are you today? Have you eaten? Did you take your medication last night?").* Evaluate the previous session *("Do you still remember what we discussed in our last meeting?").* Ask 1-2 follow-up questions about the material discussed in the previous session (material available in the booklet). Provide information about the importance of taking medication as prescribed and how to manage possible side effects *(Explanation on this topic – material available in the booklet).* Identify the patient's feelings *("What are your thoughts about this?").* Listen and show empathy if there are obstacles or problems faced *("So far, have you experienced any difficulties with your treatment?").* Offer recognition and encouragement before closing the session *("You are doing great, please keep up the spirit. You are strong and determined to get better; I believe you can do this.").* Arrange the next appointment *("Would you be willing if I visit again next week, on ... at ...?").*

THIRD WEEK SESSION 3	Greet the patient *("Assalamu'alaikum, Mr./Mrs.").* Show concern *("How are you today? Have you eaten? Did you take your medication last night?").* Evaluate the previous session *("Do you still remember what we discussed in our last meeting?")* Ask 1-2 follow-up questions about the material discussed earlier (material available in the booklet). Provide information on the purpose of each medication, how to take it, and what to do if a dose is missed *(Explanation on this topic – material available in the booklet).* Identify the patient's feelings *("What do you think about this? Is there anything you would like to share?").* Listen actively and show empathy regarding problems faced, while helping the patient develop a plan of action and commitment to treatment adherence *("In our last meeting, you mentioned some challenges. What would you like to improve in order to manage your treatment better?").* *("Who can support you at this moment?").* *("We have discussed some tips for adherence; what actions will you take, when will you start, and how confident are you in doing so?").* Offer solutions or practical tips related to medication adherence (materials available in the booklet). Offer recognition and encouragement before closing the session *("You have been doing wonderfully well in continuing your treatment. Please stay motivated.").* Arrange the next appointment *("Would you be willing if I visit again next week, on ... at ...?")*
FOURTH WEEK SESSION 4	Greet the patient *("Assalamu'alaikum, Mr./Mrs.")* Show concern *("How are you today? Have you eaten? Did you take your medication last night?")* Evaluate the previous session *("Do you still remember what we discussed in our last meeting?")* Ask 1-2 questions related to the previous session (material available in the booklet). Provide information about motivation for medication adherence *(Explanation on this topic – material available in the booklet).* Identify the patient's feelings *("What do you think about this? Is there anything you would like to share?").* Listen empathetically to the patient's difficulties and evaluate progress *("In the last session, we discussed tips for adherence. Have you started applying any of them? What obstacles did you face? After today's session, what do you plan to do next?").* Offer recognition and encouragement before closing the session *("You have been outstanding in continuing your treatment and participating in these sessions. You have shown remarkable improvement, as reflected in your consistent medication use and the reduction in your blood pressure readings. Please continue like this, stay motivated!").*

Source: Prepared by the authors.

Results

Participant Characteristics

A total of 44 participants (100%) were analyzed. The characteristics of participants in each group are summarized in Table 2. There was no significant difference between the two groups based on the demographic characteristics.

Table 2. Demographic Characteristics of Respondents

Variable	Group				p
	Intervention (22)		Control (22)		
Age Mean (±SD)	70.0 (±5.13)		68.95 (±3.12)		0.617[a]
	n	**%**	**n**	**%**	
Gender Male Female	 6 16	 13.6 36.4	 2 20	 4.5 45.5	0.118[b]
Education Elementary School Junior High School Senior High School Diploma /University	 14 3 4 1	 31.8 6.8 9.1 2.3	 13 5 4 0	 29.5 11.4 9.1 0.0	0.674[b]
Occupation Self-employed Retired Farmer Domestic	 0 2 7 13	 0.0 4.5 15.9 29.5	 3 1 4 14	 6.8 2.3 9.1 31.8	0.242[b]
Language Indonesian Language Local Language	 13 9	 29.5 20.5	 15 7	 34.1 15.9	0.531[b]
Adherence Score (Pre-intervention) Low Compliance Medium Adherence High Compliance	 14 8 0	 46.7 66.7 0.0	 16 4 2	 53.3 33.3 100	0.177[b]
Blood Pressure (Pre-intervention) Mean (±SD) Blood Pressure Systole Diastole Blood Pressure	 153.18 (±11.70) 92.73(±8.82)		 150 (±11.54) 88.64 (±8.33)		 0.191[a] 0.105[a]

[a]Mann Whittney Test, [b]Chi Square Test.

Source: Prepared by the authors.

Table 3 shows that the difference in medication adherence categories between the control and intervention groups was significant ($p < 0.05$) at week 1, month 1, and month 2, after empowerment education.

Table 3. Differences in Adherence Score Categories between Intervention and Control Groups (Within Subject)

Variable	Pre-intervention		Post Intervention		Follow Up 1 (1 month after intervention)		Follow Up 2 (2 months after intervention)		*p*[ǂ]
	Median (Min-Max)	Mean Rank	Median (Min-Max)	Mean Rank	Median (Min-Max)	Mean Rank	Median (Min-Max)	Mean Rank	
Intervention Adherence Score (n=22)	3 (3-2)	3.75	2 (1-2)	2.09	2 (1-2)	2.11	2 (1-2)	2.05	0.000
Control Adherence Score (n=22)	3 (1-3)	2.52	3 (1-3)	2.34	3 (1-3)	2.61	3 (1-3)	2.52	0.392

[ǂ] The Friedman Test was conducted after the Wilcoxon Signed Ranks Test. The p-value in the Wilcoxon post hoc intervention group, pre- vs. post-intervention, was 0.000; pre vs. 1 month after the intervention was 0.000; and pre vs. 2 months after the intervention was 0.000. While the p-value in the Wilcoxon post hoc control group, pre- vs. post-intervention was 0.317; pre vs. 1 month after the intervention was 0.564; and pre vs. 2 months after the intervention was 1.000.

Source: Prepared by the authors.

Table 4 shows that systolic and diastolic blood pressure exhibited significant values ($p < 0.05$). For both systolic and diastolic blood pressure variables, the mean ± standard deviation score in the intervention group from before the intervention, 1 week after, 1 month after, and 2 months after the intervention significantly decreased compared to the control group which did not experience significant changes and tended to stagnate.

Table 4. Difference in Mean Blood Pressure Scores between Intervention and Control Groups (Within Subject)

Variable	Pre-intervention	Post Intervention	Follow Up 1 (1 month after intervention)	Follow Up 2 (2 months after intervention)	*p*[ǂ]
	Mean (±SD)	Mean (±SD)	Mean (±SD)	Mean (±SD)	
Intervention Group Systolic Blood Pressure	153.18 (±11.70)	149.09 (±13.06)	148.64 (±11.25)	145.91 (±9.08)	0.018
Diastolic Blood Pressure	92.73 (±8.82)	84.09 (±9.08)	86.36 (±7.27)	83.18 (±8.39)	0.000
Control Group Systolic Blood Pressure	150 (±11.54)	155 (±13.71)	160.45 (±14.95)	160.45 (±11.30)	0.000
Diastolic Blood Pressure	88.64 (±8.33)	88.18 (±10.06)	91.36 (±10.82)	89.55 (±8.89)	0.524

[ǂ] The Friedman Test was conducted after the Wilcoxon Signed Ranks Test. The p-value in systole blood pressure of the intervention group after Wilcoxon pre- vs. post-intervention was 0.227; pre- vs. 1 month after intervention was 0.084; pre- vs. 2 months after intervention was 0.18. The p-value on diastole blood pressure of the intervention group, pre- vs. post-intervention was 0.001; pre- vs. 1 month after the intervention was 0.14; pre- vs. 2 months after the intervention was 0.004. The p-value in systole blood pressure of the Wilcoxon post hoc control group pre- vs. post-intervention was 0.025; pre- vs. 1 month after the intervention was 0.008; pre- vs. 2 months after the intervention was 0.003. The p-value on diastole blood pressure of the control group pre- vs. post-intervention 0.871; pre- vs. 1 month after intervention was 0.236; pre- vs. 2 months after intervention was 0.674.

Source: Prepared by the authors.

Table 5 shows the comparison of the two groups over time, where the control group did not show significant results ($p > 0.05$) for the measured variables, while in the intervention group, all variables showed significant numbers ($p < 0.05$).

Table 5. Mean Difference between the Intervention and Control Groups (Between Subjects)

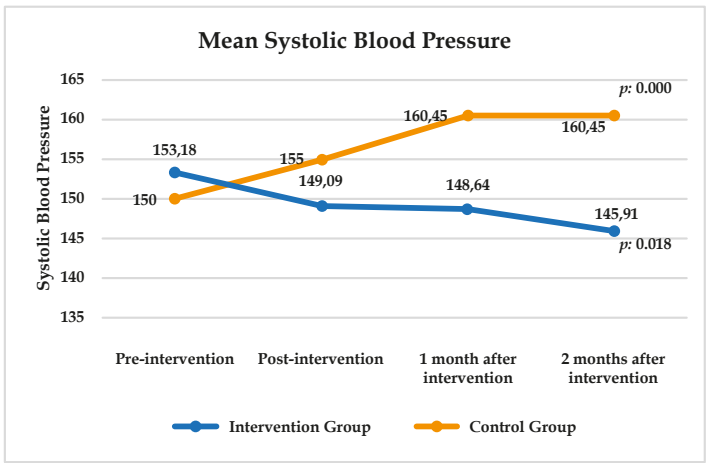
Variable	Pre Intervention			Post Intervention				Follow Up 1 (1 month after intervention)				Follow Up 2 (2 months after intervention)			
	Median (Min-Max)			Median (Min-Max)				Median (Min-Max)				Median (Min-Max)			
	Intervention (n=22)	Control (n=22)	p‡	Intervention (n=22)	Control (n=22)	p‡	Z(ES)§	Intervention (n=22)	Control (n=22)	p‡	Z(ES)§	Intervention (n=22)	Control (n=22)	p‡	Z(ES)§
Adherence Score	5 (1-7)	4 (1-8)	0.569	6.50 (6-8)	4 (1-8)	0.000	-3.734 (0.56)	7 (6-8)	5 (1-8)	0.000	-4.409 (0.66)	7 (6-8)	4 (1-8)	0.000	-4.035 (0.60)
Systolic Blood Pressure	150 (130-180)	150 (140-180)	0.191	150 (130-170)	150 (140-190)	0.228	-	150 (130-170)	155 (130-190)	0.013	-2.478 (0.37)	150 (130-160)	160 (140-190)	0.000	-4.093 (0,62)
Diastolic Blood Pressure	90 (70-110)	90 (70-110)	0.105	85 (70-100)	90 (70-110)	0.149	-	90 (70-100)	90 (70-110)	0.066	-	80 (70-100)	90 (70-110)	0.011	-2.530 (0.38)

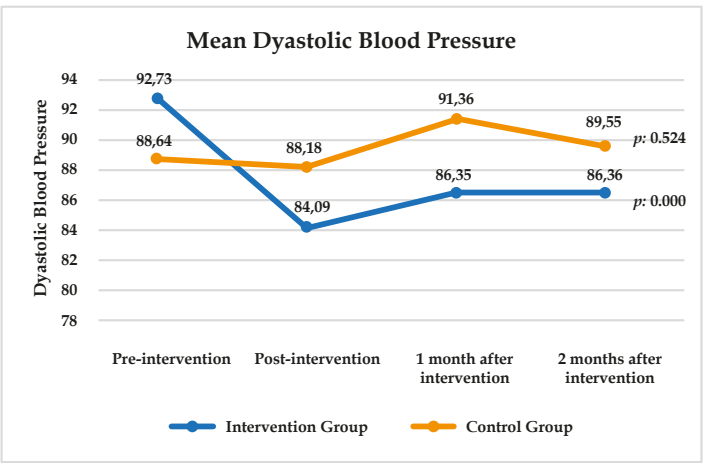
‡*Mann Whitney Test*, §*Cohen effect size*

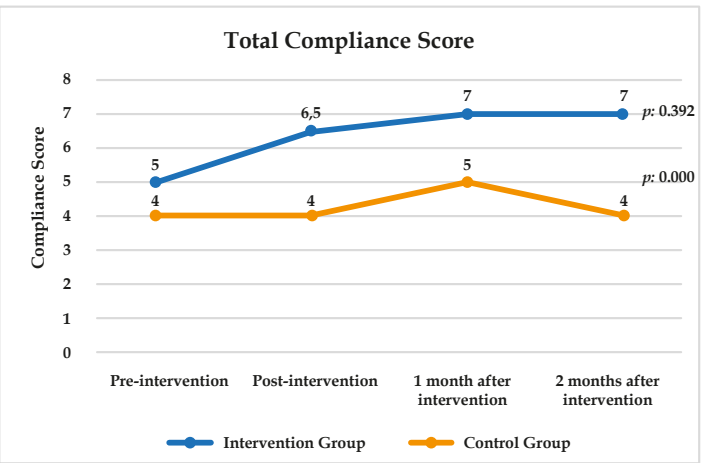
Source: Prepared by the authors.

Figure 3 presents three graphics depicting changes in adherence scores and blood pressure measurements of respondents from both groups.

Figure 3. Adherence Categories and Mean Blood Pressure between the Two Groups before and after Intervention







Source: Prepared by the authors.

Discussions

This study shows that empowerment education interventions, accompanied by routine follow-ups, affect medication adherence and blood pressure control in older adults with hypertension.

Medication adherence among older adults with hypertension in both groups, before and after empowerment education intervention

The findings of this study indicate that there is a statistically significant difference in adherence scores using the MMAS-8 questionnaire in the intervention group before and after the empowerment education intervention, both one month after and two months post-intervention. Meanwhile, the control group showed no significant difference in compliance scores before and after the intervention. This means that the empowerment education intervention, carried out over four sessions, each lasting approximately 60 minutes, with a total intervention time of four weeks, can improve the compliance of older adults with hypertension in taking medication.

Programs and services for older people have been implemented in Indonesia. However, they have not met their health information needs, especially in rural areas where some of these needs focus more on health promotion and disease prevention (33). As for this study, the intervention provided in the form of patient-focused empowerment education is an approach that delivers patient education. Empowerment education is also a patient-oriented approach or collaborative care, where healthcare providers and patients make decisions together (34). According to Funnell et al. (35), empowerment can help patients identify internal problems and improve their self-management capabilities through relevant actions. This patient-centered approach respects patients' decision-making and related actions, increases their autonomy, and allows them to assume appropriate responsibilities while receiving regular education.

In line with the study conducted by Cheng et al. (36), it has been proven that empowerment education can improve self-management, self-efficacy, and quality of life, with components also including medication adherence. Thojampa et al. (25) reported that older adults can manage their health successfully, and by improving their capabilities, older adults will feel more confident in achieving their goals for good health. Patient confidence is an important consideration for improving medication adherence. The main reasons for non-adherence are negative perceptions toward prescribed medication (37). During the initial screening, it was found that most older adults with hypertension lacked an understanding of the consequences of non-adherence to taking antihypertensive drugs, how to apply them, and the benefits of adhering to medications. Therefore, regular and comprehensive education is very important so that the application of lifestyle in relation to adherence to taking medication can run continuously.

The other variable in this study is blood pressure, not as the main outcome but as additional or complementary data. The results show positive outcomes, with systolic and diastolic blood pressure having decreased, clinically visualized through the average blood

pressure graph. This indicates that the empowerment education intervention is one of the interventions that can control blood pressure. Those who have a good level of treatment adherence have more controlled blood pressure than those who are not adherent (12, 38). However, other factors must still be considered because blood pressure has factors that can affect it (26). Some literature shows that older adults with hypertension and good medication compliance achieve positive effects, such as blood pressure control (12), and empowerment strategies can effectively manage blood pressure (39). In line with this study, the group that received the empowerment education intervention showed a positive change in medication adherence scores, followed by a decrease in blood pressure over time. Likewise, research conducted in Korea empowering older adults with hypertension showed a decrease in systolic blood pressure (28).

As a professional nurse involved in the empowerment education process, the role of nurses is very important in supporting older people. Nurses make a significant contribution to the empowerment education process by encouraging older people to feel able to make their own decisions, overcome problems, seek sources of knowledge, and choose the right solutions. Nurses help older adults take control of their lives, improve their self-esteem, and change their mindsets, beliefs, and expectations. In addition, nurses also motivate older people to recognize their important values.

Follow-up medication adherence of older adults with hypertension after Empowerment Education Intervention

The findings of this study indicate that there are statistically significant differences in adherence scores and blood pressure scores in the intervention group before and after the empowerment education intervention, both one month and two months post-intervention. However, the strength of the effect size is moderate; nevertheless, there are changes in adherence scores and mean blood pressure over time. Empowerment education in this study helps older adults with hypertension change their attitudes and behaviors, improving adherence to taking medication. The average score of older people after participating in the empowerment education shows positive results, indicating that empowerment helps them control their lives, choose appropriate health management methods, and plan to achieve goals independently one month after and two months after the intervention.

Gibson (40) suggests empowerment as a process between individuals, where the steps in the process are interconnected and can be rearranged. The empowerment process helps older people understand and control their health, choose appropriate methods, and improve their self-esteem. By understanding the

factors involved, older adults can change their behavior to achieve their desired health goals. Nurses, as healthcare providers, play an essential role in educating patients to deepen their understanding of their health conditions and the therapeutic interventions they receive (41, 42).

This aligns with research by Dianati et al. (27) that states that the effect of an empowerment education program, which includes weekly face-to-face sessions during the first month, as well as monthly follow-ups for six months, is effective in improving self-care behaviors in people with heart failure in Iran. Patient education and counseling regarding hypertension, treatment needs, and side effects are important for maximizing positive beliefs and improving treatment adherence (38). A lack of knowledge about drug use and various misleading perceptions about hypertension management have resulted in inappropriate drug use, especially in medication adherence among community-dwelling hypertensive patients (43). Similarly, a study conducted by Rajpura & Nayak (42) found that there is a collective influence of disease perception, treatment beliefs, and disease burden on treatment adherence in older people suffering from hypertension. The most effective educational interventions are individualized, repeated, and delivered at the time of a new diagnosis (44, 45). Empowerment education has been proven effective in blood pressure management, and research shows that patients who participate in empowerment programs achieve better health outcomes, including improved blood pressure control due to an increased understanding of hypertension, the importance of undergoing treatment, and adopting a healthy lifestyle (46). The implementation of empowerment education in this study was welcomed by respondents, as people with hypertension felt it was easier to get information related to the treatment they were undergoing, especially concerning negative perceptions related to taking antihypertensive drugs.

Research Limitations

At the time of the study, researchers could not control other factors, such as the role of family, that could affect respondents' treatment compliance. Some respondents did not always implement the intervention according to the agreed-upon time because other patient activities required repeated time commitments. However, the timing (day) of the intervention was conducted appropriately based on each respondent's schedule.

Blood pressure checks are conducted only once during each examination, allowing blood pressure to fluctuate throughout the day due to various factors. The booklet used in this study has not undergone expert testing, so it is uncertain whether it is of good quality and valid for its intended purpose. However, this booklet complies with the criteria for writing health information media for older people and uses valid references.

Conclusion

The empowerment education intervention provides changes in the total medication adherence score and systolic blood pressure score, which tend to decrease in older adults with hypertension. The findings of this study can provide evidence in the literature that empowerment education can improve medication adherence in older adults with hypertension. Based on these findings, this intervention can be an option for nurses in health agencies, especially health centers, to apply to older adults with hypertension. By maintaining medication adherence, older people can improve their quality of life and reduce the adverse effects caused by hypertension.

Relevance for Clinical Practice

Attention and commitment in providing nursing care for older people with hypertension are crucial to maintaining medication adherence and preventing serious complications such as heart failure, stroke, and even death. Pharmacological therapy is vital and must be administered to manage hypertension. However, the implementation of combined interventions to ensure adherence is equally important; one such intervention is empowerment education. Therefore, based on the findings of this study, empowerment education for older people with hypertension can be recommended to nurses in healthcare facilities. Furthermore, this intervention may be expanded to involve family members or caregivers for a long-term perspective.

Despite these promising results, this study has certain limitations, including a relatively small sample size and a limited geographical scope, which require caution when generalizing the findings. In addition, external factors such as family support, socioeconomic status, and cultural variations were not fully explored. However, the study's strengths lie in its intervention design grounded in empowerment education theory, the active involvement of participants in the learning process, and the use of valid instruments to assess medication adherence. These aspects add considerable value to the quality of the findings.

For future research, studies with larger sample sizes and conducted across diverse healthcare settings are needed to enhance the generalizability of results. Subsequent research could also explore the role of families and caregivers in supporting medication adherence among older people with hypertension, as well as evaluate the long-term impact of empowerment education on quality of life and the incidence of complications. Moreover, the integration of health technology, such as digital applications for monitoring adherence, may represent an innovative approach worthy of further investigation.

Authorship Statement

The authors conducted this study by upholding a scientific attitude and adhering to research ethics while referencing the ethical principles in research activities. All participants in this study were given informed consent, which provided an overview of the purpose of the study, procedures, risks, benefits, confidentiality of participant data, the right to refuse participation, and the right to withdraw before or during the study.

Ethics Statement

This study was conducted after obtaining an ethical permit from the Ethics Committee of Hasanuddin University with the ethical number 4945/UN4.14.1/TP.01.02/2023. This study was performed in line with the principles with the principles of the Declaration of Helsinki.

Conflict of Interest

The authors declare no conflict of interest for this work.

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