

The Effect of Online Group Education on Promoting Knowledge, Motivation, Self-Efficacy, Self-Care Behaviors and Preventing Uncontrolled Blood Pressure in Hypertensive Patients: A Quasi-Experiment Study

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Arif Setyo Upoyo¹ , Yunita Sari¹, Agis Taufik¹, Akhyarul Anam¹ and Ani Kuswati²

Abstract

Introduction: Hypertensive patients may lack time to visit clinics and attend educational sessions, resulting in poor blood pressure control. Uncontrolled blood pressure in people with hypertension can increase the risk of heart disease and stroke.

Objective: The specific purpose of this study was to determine the effect of online group education on knowledge, motivation, self-efficacy, self-care behavior, and blood pressure control of hypertensive patients.

Method: The research method used a quasi-experiment method. The subjects were hypertensive patients in Indonesia. The sampling technique used was cluster random sampling. Total sampling consisted of 96 participants, consisting of 48 intervention groups and 48 control groups. The inclusion criteria in the study were patients with primary hypertension who were willing to become research respondents. The exclusion criteria in this study were respondents who were sick and unable to follow therapy, had hearing problems, and had complications of other diseases (kidney disease, heart disease, diabetes mellitus, and stroke). Data collection methods include observation. The instruments used were the HKLS, HBP-SCP questionnaire, and Sphygmomanometer digital.

Result: Data analysis using repeated ANOVA and Friedman tests. There was a significant decrease in systolic ($p < .001$) and diastolic ($p = .001$) blood pressure and an increase in knowledge ($p < .001$), motivation ($p < .001$), self-efficacy ($p < .001$), and self-care behavior ($p < .001$) in the intervention group.

Conclusion: Online group education effectively reduces blood pressure and increases self-care behaviors in hypertensive patients.

Keywords

group, hypertension, online education, blood pressure, self-care behavior

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Introduction

Hypertension is one of the main causes of cardiovascular diseases (CVD). WHO (2023) explains that the estimate of hypertension sufferers worldwide continues to grow reaching 1.28 billion people aged 30–79 years and around 79% of them cannot control their hypertension. In Indonesia, the prevalence of hypertension also increases every year. Based on the Basic Health Research (Riskesdas) in 2013, the prevalence

¹Department of Nursing, Faculty of Health Sciences, Universitas Jenderal Soedirman, Purwokerto, Jawa Tengah, Indonesia

²Department of Nursing, Poltekkes Kemenkes Semarang, Semarang, Jawa Tengah, Indonesia

Corresponding Author:

Arif Setyo Upoyo, Department of Nursing, Faculty of Health Sciences, Universitas Jenderal Soedirman, Jl. dr. Soeparno Karangwangkal Purwokerto 53123, Jawa Tengah, Indonesia.
Email: afkarfadholi@gmail.com



of hypertension was 25.8%, while in Riskesdas 2018 it increased to 34.1% of the population. Data obtained from the Banyumas Regency Health Office in 2018 showed that there were several subdistricts with a high incidence of hypertension, namely the Sumbang Subdistrict and the East Purwokerto Subdistrict.

The problems faced by people with hypertension are lack of knowledge and lack of awareness about hypertension, lack of self-care behaviors, and uncontrolled blood pressure (Chow, 2013; Singh, 2017; Yaqoob et al., 2022). The prevalence of uncontrolled hypertension in Indonesia is high. The results of research by Yusuf, Nawi & Ailiana (2022), stated that the prevalence of uncontrolled hypertension in Indonesia was 71.8%. Uncontrolled blood pressure in people with hypertension can cause complications such as heart attack, chronic kidney disease, and stroke (Meelab et al., 2019).

One of the efforts to improve knowledge, motivation, self-efficacy, and self-care behavior is through education. Education to improve self-care behaviors that exist is mostly through face-to-face meetings in clinics, health centers, and hospitals. Hypertensive patients may lack time to visit clinics and attend educational sessions; therefore, it is necessary to develop online education in hypertension groups.

Review of Literature

Self-care behaviors for hypertensive patients are a form of effort for patients to be able to optimize their health by controlling and managing signs and symptoms that may appear, preventing complications, and minimizing disturbances in body functions (Gusty and Merdawati 2020). Self-care behaviors in hypertensive patients include a low-salt diet, taking medication, doing physical activity, not smoking, controlling weight, and also not consuming alcohol (Konlan and Shin 2023). The implementation of good self-care can improve the quality of life of patients and also reduce the risk of complications both in the heart, kidneys, blood vessels, and others (Wilandika 2019). Factors that cause uncontrolled blood pressure based on lack of self-care behaviors among hypertensive patients include: smoking habits, excessive salt consumption, lack of physical activity, alcohol consumption, obesity, and noncompliance with therapy. Smoking habits have a significant effect on the incidence of uncontrolled hypertension with an odd ratio of 1.2–3.93 (Cordero et al. 2011; Yang et al., 2014; Tesfaye et al., 2017). Excessive salt consumption can also increase the risk of uncontrolled hypertension with an odd ratio of 2.77 (Goverwa et al., 2014) and an odd ratio of 1.5 (Yang et al., 2014). Lack of physical activity can increase the risk of uncontrolled hypertension with an odd ratio of .8 (Yang et al., 2014).

One of the efforts to improve self-care behavior is through education. Education to improve self-care behaviors that exist is mostly through face-to-face meetings in clinics, health centers, and hospitals. Hypertensive patients may

lack time to visit clinics and attend educational sessions, therefore it is necessary to develop telehealth. Telehealth innovation has grown quickly, leading to an increased emphasis on telehealth in clinical and educational contexts. Nurses may take the lead in incorporating telehealth education into health professions and curricula as more professions accept telehealth as a significant mode of health care delivery (Rutledge et al., 2021). Through the use of telemedicine, nursing practitioners have made significant progress in providing appropriate patient. Acknowledging the value of telemedicine also means supporting independent research to assess telehealth's effectiveness before, during, and after the epidemic. Better nursing information system design and development, as well as AI-assisted telehealth system development, are also in high demand as a way to remotely manage patients' health effectively who suffer from mental illnesses, chronic diseases, and other conditions (Wu Y., 2021).

The specific objective of this study was to determine the effect of online group education on knowledge, motivation, self-efficacy, self-care behavior, and blood pressure of hypertensive patients and compare them to the control group.

Methods

Design

The study used a quasi-experiment research design: pretest and posttest with control group design to examine the effect of online group education on blood pressure, knowledge, motivation, self-confidence, and self-care behavior of hypertensive patients. The intervention group received education through What's Up (WA) groups for four sessions, each session for approximately 50 min. The participants in each group amounted to 8–12 hypertensive patients: session 1 about the importance of hypertension groups, session 2 on hypertension and its complications, session 3 on healthy lifestyle for people with hypertension, and session 4 about monitoring blood pressure and lifestyle for people with hypertension. Education by Nurse is made in the video. The discussion was conducted through the WA group. Measurements of knowledge, motivation self-care behaviors, and blood pressure were taken before the intervention, 1 week after, and one month after the intervention. Questionnaire using paper form. The control group received treatment as usual. The research was conducted from January to August 2022.

The instruments used in the study were Sphygmomanometer digital, Hypertension Knowledge-Level Scale (HKLS), and High Blood Pressure Self-care Profile (HBP-SCP) questionnaires which included motivation, self-efficacy, and behavior. HKLS was developed by Erkoc (2012). The Hypertension Knowledge-Level Scale (HKLS) is used to measure knowledge. It was translated into Indonesian version by Ernawati et al. (2020). The questionnaires had been translated and validated in Bahasa Indonesia with good reliability. The

HKLS questionnaire had a Cronbach alpha coefficient of .758 for hypertension and .858 for nonhypertension. Both groups of respondents had statistically significant discriminative validity test results (Ernawati, Fandinata & Permatasari, 2020). HBP-SCP was developed by Han (2014) and translated into an Indonesian Version and tested for reliability and validity (Upoyo et al. 2021). The content validity index of the HBP-SCP questionnaire was 0.963 with an internal consistency reliability coefficient ranging from 0.911 to 0.955 and p value $\leq .05$ (Upoyo et al., 2021).

HKLS consists of 22 questions, if the correct answer is given a score of 1, and if incorrect it is scored 0. HBP-SCP (motivation, self-efficacy, and behavior) consists of 20 questions each, the lowest score is 20, and the highest score is 80.

Research Question

Based on the review, the question of the research was formulated whether online group education in hypertensive groups can increase knowledge, motivation, self-efficacy, and self-care behavior and reduce blood pressure in hypertensive patients.

Sample

The research setting was in community, urban, and rural areas. This study was conducted in Sumbang and East Purwokerto subdistricts, which are subdistricts with a high prevalence of hypertension (11,943 patients) in Banyumas Regency, Indonesia. The population in this study used the target population, namely primary hypertension patients in Sumbang and East Purwokerto subdistricts, Banyumas Regency. The sampling technique in the study was cluster random sampling with 96 participants consisting of 48 intervention groups and 48 control groups. The sample was calculated with the sample formula for the treatment. It got a minimum of 40 for each group and was added 20% for each group, so each group totals 48.

Inclusion/Exclusion Criteria

The inclusion criteria in the study were patients with primary hypertension with uncontrolled blood pressure, and willing to become research respondents. Uncontrolled hypertension is blood pressure more than 140/90 mmHg. Primary hypertension is not caused by complications. The exclusion criteria in this study were respondents who were sick and unable to follow therapy, had hearing problems, and had complications of other diseases (kidney disease, heart disease, diabetes mellitus, and stroke).

Institutional Review Board Approval

The ethical principles in this study include informed consent, beneficence, nonmaleficence, confidentiality, and justice.

Informed consent is the consent of the research subject to take part in the study after being given a complete explanation, and this consent is free without any pressure. Beneficence is implementing research with minimal risk and maximum benefit. Nonmaleficence is research that is free from dangers that threaten the safety of respondents. Confidentiality is ensuring the confidentiality of all information provided and not disclosed in public. Justice is applying the principle of fairness to all respondents. The research has received ethical approval from the Ethics Commission of the Faculty of Health Sciences, Jenderal Soedirman University No. 419/EC/KEPK/V/2021.

Statistical Analysis

Analysis data used chi-square and independent t test to determine the differences in respondent characteristics between the control group and the intervention group. Meanwhile, to determine the difference in blood pressure, knowledge, motivation, and self-care behavior for three measurements using repeated ANOVA and Friedman tests after homogeneity and residual value normality tests. The results of the test were systole 0.482, diastole 0.234, knowledge 0.001, motivation 0.215, self-efficacy 0.007, and behavior 0.015. The statistical software used SPSS 16.

Results

Sample Characteristics

Table 1 describes the characteristics of respondents in terms of age, gender, education, occupation, income, and health insurance. Based on the table, it is known that the average age of respondents is >55 years old. The majority were female in both the control group (93.75%) and intervention group (66.67%). Respondents were mostly low educated with an elementary school education level of 91.67% in the control group and 45.83% in the intervention group. Respondents who are actively working are more than not working, 62.5% (control group) and 56.25% (intervention group) but have an income category that is below the Regional Minimum Wage (UMR). The majority of respondents had health insurance, 93.75% in the control group and 91.25% in the intervention group. There was only one respondent in the intervention group who lived alone. Most respondents in the intervention group had no history of diabetes mellitus (77.08%), no history of heart disease (89.58%), no history of kidney disease (97.92%), and no history of high cholesterol (83.23%). Respondents in the control group were more in adherence with treatment (52.08%) than the intervention group (35.42%).

Following the results of data analysis, there are several characteristics of respondents that have significant differences between the control and intervention groups because they have a p value $< .05$. These characteristics are gender

Table 1. Characteristics of Respondents.

Variable	Control group (n = 48)		Intervention group (n = 48)		p
	f(%)	Mean (SD)	f(%)	Mean (SD)	
Age		57.06 (5.21)		55.73 (11.08)	.453
Gender					
Male	3 (6.25)		16 (33.33)		.002
Female	45 (93.75)		32 (66.67)		
Education level					
Primary school	44 (91.67)		22 (45.83)		<.001
Junior high school	4 (8.33)		16 (33.33)		
Senior high school	0 (0)		10 (4.8)		
Job					
Active	18 (37.5)		21 (43.75)		.678
No active	30 (62.5)		27 (56.25)		
Payment					
<Minimum payment	48 (100)		25 (52.08)		<.001
≥ Minimum payment	0 (0)		23 (47.92)		
Health assurance					
No	3 (6.25)		9 (18.75)		.120
Yes	45 (93.75)		39 (91.25)		
Stay at home					
Alone	0 (0)		1 (2.08)		>.999
With family	48 (100)		47 (97.92)		
BMI		27.02 (3.84)		24.67 (4.01)	.004
History of hypertension in family					
Yes	26 (54.17)		19 (39.58)		.220
No	22 (45.82)		29 (60.42)		
History of DM					
Yes	11 (22.92)		11 (22.92)		>.999
No	37 (77.08)		37 (77.08)		
History of high cholesterol					
Yes	11 (22.92)		8 (16.67)		.609
No	37 (77.08)		40 (83.23)		
History of heart disease					
Yes	2 (4.17)		5 (10.42)		.435
No	46 (95.83)		43 (89.58)		
History of renal disease					
Yes	0 (0)		1 (2.08)		>.999
No	48 (100)		47 (97.92)		
Adherence of taking hypertension drugs					
No	23 (47.92)		31 (64.58)		.149
Yes	25 (52.08)		17 (35.42)		

($p = .002$) and education level ($p < .001$). In addition, significant differences were also found in the characteristics of income ($p < .001$) and BMI ($p = .004$).

Research Question Results

The effect of online group education on blood pressure, knowledge, motivation, self-efficacy, and self-care behavior is described in Table 2. Based on the table, it is known that there is a significant effect on reducing systolic ($p < .001$) and diastolic ($p = .001$) blood pressure due to online group discussion and increasing knowledge ($p < .001$) in the intervention

group. Furthermore, online group discussion in the intervention group also influenced motivation ($p < .001$), self-efficacy ($p = .001$), and self-care behavior ($p < .001$) significantly.

Discussion

Respondent Characteristics

The characteristics of the respondents were 55 years old on average in the intervention group, while in the control group 56 years, but there was no significant difference in the average age between the intervention group and the control group. Based on age, the respondents were classified

Table 2. Effect of Online Group Education on Blood Pressure, Knowledge, Motivation, Self-Efficacy, and Self-Care Behavior.

Variable	Control group (n = 48)				Intervention group (n = 48)				p
	Pretest (Mean-SD)	Posttest 1 (Mean-SD)	Posttest 2 (Mean-SD)		Pretest (Mean-SD)	Posttest 1 (Mean-SD)	Posttest 2 (Mean-SD)		
Blood pressure	154.77 (15.39)	152.79 (19.26)	156.44 (18.21)		153.48 (24.31)	149.25 (21.96)	143.02 (20.00)		<.001*
Systole Diastole	91.96 (9.48)	93.33 (12.49)	93.81 (10.59)		90.31 (13.75)	87.75 (14.18)	85.79 (11.95)		.001*
H-KLS	16.15 (3.72)	17.5 (3.52)	16.92 (3.58)		18.12 (2.28)	19.88 (1.69)	20.17 (1.73)		<.001**
Motivation	56.96 (4.82)	56.69 (7.61)	56.04 (5.18)		62.90 (6.50)	66.94 (7.04)	68.42 (7.22)		<.001*
Self-efficacy	52.31 (7.14)	50.15 (7.11)	50.62 (6.89)		57.50 (6.58)	59.79 (7.72)	61.35 (7.19)		.001**
Self-care behavior	49.31 (8.09)	47.33 (7.48)	47.33 (7.48)		49.52 (7.84)	58.62 (9.96)	61.10 (7.98)		<.001**

Note : *Repeated measure ANOVA, **Friedman test

as elderly. Old age is at risk of hypertension. This is related to changes in the structure of arteries that experience thickening of the vascular wall or arteriosclerosis in the elderly. Ostchega et al. (2020) stated that with increasing age, the prevalence of hypertension patients is increasing. However, other studies show that internet users in the elderly to find health information and establish communication continue to increase. In addition, digital solutions are an important way in the COVID-19 era so that health communication, healthy lifestyle promotion, and disease prevention can be improved (Cao et al., 2022).

The majority (95%) of gender in both groups was female. The prevalence of hypertension in women increases after menopause. Clinical studies generally mention that men are more at risk of developing hypertension in premenopausal women, but at the same age during post-menopause, women experience the development of isolated systolic hypertension with an inefficient therapeutic response (Tasić, Tadić & Lozić, 2022). This occurs because sex chromosome differences in men and women cause different vascular aging, generally female chromosomes have a better way of preventing vascular aging but complex causes such as the existence of different sociocultural behaviors also cause women to tend to have more hypertension (Bruno et al., 2023).

The level of education in both groups did not show significant differences with the majority of respondents having elementary school education. Education can affect behavior, low education tends to have poor health behavior caused by lack of knowledge or wrong health perceptions. Low perception and lack of awareness of the occurrence of complications and lack of education are significant to the incidence of uncontrolled hypertension (Goverwa et al., 2014; Tesfaye et al., 2017; Yaqoob et al., 2022). Another study also concluded that the risk of hypertension is higher and hypertension control is worse in individuals who have an education level at the primary school level or below (Sun et al., 2022).

Participants' occupations were mostly unemployed and farmers. Not working may indicate a lack of activity. Lack of activity can increase energy reserves in the body in the form of fat which can increase body weight. On average, respondents in both the intervention and control groups had a BMI of 26, which means they were overweight. Obesity significantly affects the incidence of uncontrolled hypertension (Cordero et al., 2011; Goverwa et al., 2014; Yang et al., 2014; Hall et al., 2019). Most of the participants are also farmers because they live in rural areas. Working as a farmer who lives in a hot location such as Sumbang and is exposed to the effects of using agricultural materials such as pesticides can increase the risk of hypertension (Prihartono et al., 2022).

The majority of respondents earn below the minimum wage, have health assurance, are married, and live with family. Low income can affect health behavior because low-income people will prioritize basic needs over other needs. Hypertension treatment is also related to economic burden,

when the burden is higher, the quality of health becomes worse, but living with more than three family members can have a positive impact on physical function in people with hypertension (Xiao, M. et al., 2019). The existence of BPJS can increase accessibility to health services to reduce barriers due to low economic levels. The type of rural Indonesian community is an extended family, this can have a positive impact on health behavior, especially in the elderly because it can be a social support. The results of several studies state that social support increases compliance with the use of anti-hypertensive drugs (Criswell, 2010; Pan et al., 2021).

Effect of Online Peer Group Education on Blood Pressure, Knowledge, Motivation, Self-Efficacy, and Behavior

The results showed that in the intervention group, both systolic and diastolic blood pressure decreased significantly, while in the control group, blood pressure decreased but not significantly. In the intervention group, knowledge, self-efficacy, motivation, and behavior increased significantly, while in the control group, knowledge also experienced a significant increase, but the variables of self-efficacy, motivation, and behavior tended to decrease. Based on this, peer group education is effective in reducing blood pressure and increasing knowledge, motivation, and self-care behavior in hypertension groups.

In the intervention group, blood pressure decreased from an average systolic of 153.48 mmHg to 143.02 mmHg. Diastolic blood pressure also decreased from an average of 90.31 mmHg to 85.79 mmHg. Based on the data analysis test, it showed a significant decrease in blood pressure ($p = .001$). The decrease in blood pressure is related to changes in behavior. In the intervention group, self-care behavior tended to increase. Behavioral changes include reducing salt in the diet, reducing fat consumption, increasing exercise activities, and performing stress management. These are behaviors that can be modified in hypertensive patients to prevent stroke (Goldstein et al., 2006; Huang, 2008; Tyson, 2012; Kokubo, 2014; Umemura, S. et al. 2019). Such effective interventions can prevent the severity of hypertension, reduce blood pressure, reduce the drugs needed in blood pressure control, and increase the effect of antihypertensive drugs (Carey, R. M. et al., 2021).

Uncontrolled blood pressure in hypertension can be caused by high salt consumption, high fat consumption, and lack of exercise or activity. Excessive salt consumption increases the risk of uncontrolled hypertension by 2.77 times (Goverwa et al., 2014). The results of another study stated that it increased the risk by 1.5 times (Yang et al., 2014). High blood cholesterol levels also significantly affect the incidence of uncontrolled hypertension (Kapoor et al., 2021). Inactivity can lead to overweight or obesity. Obesity significantly affects the incidence of uncontrolled

hypertension (Cordero et al., 2011; Goverwa et al., 2014; Yang et al., 2014; Hall et al., 2021). In addition, it is estimated that 65%–78% of primary hypertension cases are at least contributed by obesity (Shariq & McKenzie, 2020).

Modified behaviors in participants include dietary changes by reducing salt and fat consumption and activity or exercise and stress management. Diet serves to control fat levels in the blood to prevent arteriosclerosis that causes hypertension. Regular exercise can reduce blood pressure in hypertensive patients. It is associated with increased high-density lipoprotein cholesterol and decreased body weight, body mass index, body fat percentage, insulin resistance, systemic vascular resistance, plasma noradrenaline activity, and plasma renin (Health Ministry of Indonesia, 2013). Stress management serves to reduce psychological stress so that it can reduce blood pressure. Research results state that psychological stress can increase systolic blood pressure (Mucci et al., 2016; Liu et al., 2017; Tomitani et al., 2021).

The results also showed that the knowledge of the intervention group increased significantly. This shows that education is effective in increasing the knowledge of hypertensive patients. Health education about the risks and benefits of behavior change can increase knowledge is one of the foundations of behavior change (Bandura, 2004). Online group discussions are given directly by experts by presenting reliable information so that the intervention group can be confident in the knowledge provided. Belief in accurate knowledge provides a greater willingness to choose the right action for people with hypertension (Bruine et al., 2023).

Self-efficacy in the intervention group also showed a significant increase, this shows that peer group education is effective in increasing the self-efficacy of hypertensive patients. Knowledge gained in education, the existence of role models in the group, and reinforcement on the success in achieving educational goals can increase the self-efficacy of hypertensive patients. Increasing self-efficacy in health behavior change according to Bandura (1998) can be through observational learning, mastery experience, improving physical and emotional conditions, and verbal persuasion. Providing verbal persuasion with positive support can also increase a person's confidence and self-efficacy (Stevenson, 2014). Self-efficacy achieved after self-care education can encourage sufferers to achieve desired outcomes by undergoing self-care programs and visiting care centers (Darvishpour, Mansour-Ghanaei & Mansouri, 2022).

Online group education effectively increases the motivation of hypertensive patients as shown by a significant increase in motivation in the intervention group. Motivation is a dynamic inner process that produces internal forces that energize and direct individuals to choose preferred behaviors and try to meet predetermined goals. Motivation can be influenced by internal and external factors. Motivation can increase due to increased self-awareness of the risks involved in education. Motivation also increases due to the role of the group. The results of research by Tezci et al. (2015) show that there is a

positive correlation between the level of external motivation, internal motivation, and motivation for the value of individual subjects who receive sufficient social support from their environment. Other studies also say emotional well-being can occur when motivation is successfully built and is very effective for supporting learning and personal development (Latorre-Coscolluela et al., 2022).

Online group education is also effective in increasing the self-care behavior of hypertensive patients as indicated by a significant increase in self-care behavior in the intervention group. The increase in self-care behavior in the intervention group can be due to increased knowledge, self-efficacy, and motivation after peer group education is implemented in the hypertension group. With knowledge, self-efficacy, and motivation, self-care behavior will increase. Knowledge about health risks and benefits is related to the behavior part as an initial condition for change (Bandura, 2004). Self-efficacy is related to behavior as evidenced by the results of Findlow's research (2012) which states that self-efficacy is significantly associated with increased medication compliance, low salt diet, physical activity, nonsmoking behavior, and weight management in patients with hypertension. Groups also have an influence on changes in self-care behavior. The existence of a group in education can be a support system that acts as a facilitator, sharing place, role model, monitoring, and motivator for hypertension group members. According to research by Pardo et al. (2016), peer support is a strategy that has a beneficial effect on preventing the risk of cardiovascular disease. This is also evidenced by the results of research by Criswell (2010) which states that social support increases compliance with the use of anti-hypertensive drugs and Shaya (2013) which states that social networks in hypertension groups have a significant effect on reducing systolic and diastolic blood pressure. The results of this study are also in line with research by Meredith et al. (2020) which states that group education programs have succeeded in becoming an effective way of treating patients so that blood pressure decreases and hypertensive patients achieve personal behavior change.

Strengths and Limitations

The study used a quasi-experimental design measuring knowledge, motivation, self-efficacy, self-care behavior, and blood pressure of hypertensive patients. The limitations of this study are the limited number of samples with each group totaling 48. There are significant differences in gender, education level, income, and BMI between the control and intervention groups because of randomization that may affect the results of the study.

Implications for Practice

The application of this research for nurses is that nurses can use this research as a basis for developing online education methods in the hypertension group.

Conclusions

Online group education effectively reduces blood pressure and increases knowledge, motivation, self-efficacy, and self-care behavior in hypertensive patients. For further research, it is necessary to develop online health education methods for a wider web-based community.

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Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.


Ethical Approval

The research has received ethical approval from the Ethics Commission of the Faculty of Health Sciences, Jenderal Soedirman University No. 419/EC/KEPK/V/2021.

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ORCID iD

Arif Setyo Upoyo  <https://orcid.org/0000-0002-2204-5141>

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