



**THE EFFECT OF EMPOWERING HEALTH CADRES THROUGH WHATSAPP  
ON THE KNOWLEDGE AND SKILLS OF HEALTH CADRES IN HYPERTENSION  
MANAGEMENT**

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**ABSTRACT**

Hypertension remains one of the leading causes of global mortality, affecting approximately 1.28 billion adults worldwide, yet only 21% successfully manage to control their blood pressure. This highlights the urgent need for community-based strategies, particularly through the empowerment of health cadres. Digital health education interventions—such as those utilizing WhatsApp—are considered promising for enhancing cadres' competencies in hypertension management. The aim of this study was to determine the effect of empowering health cadres through Whatsapp on the knowledge and skills of cadres in hypertension management. This study employed a quasi-experimental design with a pretest-posttest control group approach. The first phase involved the development of a training module informed by a literature review, field study, and expert consultation. Data collection was done using purposive sampling with inclusion and exclusion criteria, a total of 60 respondents, 30 intervention and control groups each. In the second phase, an intervention was conducted involving 60 health cadres (30 in the intervention group and 30 in the control group) within the jurisdiction of Tateli public health care, delivered via WhatsApp. Data were analyzed using the Wilcoxon Signed Rank Test and the Mann-Whitney U Test, with a significance level set at  $p < 0.05$ . The findings revealed a statistically significant improvement in both knowledge and skills among cadres in the intervention group. Knowledge increased from moderate (90%) to good (73.3%), and skills from moderate (90%) to good (93.3%), with  $p < 0.001$ . No significant changes were observed in the control group. WhatsApp-based educational interventions are effective in improving health cadres' knowledge and skills in hypertension management. Given its accessibility, affordability, and practicality, WhatsApp serves as a strategic and sustainable tool for ongoing cadre training in the prevention and control of non-communicable diseases at the community level.

Keywords: cadre empowerment; health education; hypertension; noncommunicable diseases; telehealth

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**INTRODUCTION**

Hypertension is a health issue that has received serious attention both nationally and globally, and is one of the main focuses of disease control programmes in Indonesia. The increase in the prevalence of cardiovascular diseases, such as heart disease, stroke, and diabetes mellitus, which are complications of hypertension, reinforces the urgency of addressing this condition (Indonesian Ministry of Health, 2020). According to the 2023 Indonesian Health Survey (SKI), the prevalence of hypertension among Indonesians aged 18 years and older reached 30.8%, equivalent to 3 out of 10 people suffering from hypertension. This data indicates that the implementation of the Non-Communicable Disease Control Programme (PTM) has not had a significant impact on reducing the incidence of hypertension.

One of the efforts to control hypertension that has been initiated by the government is the establishment of Integrated Coaching Posts (Posbindu) for NCDs, which maximises the role of health cadres as the spearhead of public health services. Health cadres play an important role in providing education and information on promotive and preventive health (Ministry of Health,

2018). However, the success of this programme is highly dependent on the knowledge and skills of the cadres, which unfortunately are not yet evenly distributed. In the Tateli Community Health Centre (Puskesmas) working area, only a small number of the 60 health cadres have received training. In addition, of the 12 villages that are part of the working area, only a few have active Posbindu PTM (Tateli Community Health Centre, 2023). The prevalence of hypertension in the Tateli Community Health Centre working area continues to increase, with a total of 906 patients recorded in 2023. This finding is in line with Riskesdas (2018) data, which shows that North Sulawesi ranks 10th nationally in terms of hypertension cases, with a prevalence of 33.12%. Globally, the WHO (2023) estimates that 1.28 billion adults aged 30–79 years suffer from hypertension, but only 21% are able to control their blood pressure effectively.

A preliminary study conducted by researchers in June 2024 showed that the role of cadres at the PTM Posbindu in the Tateli Community Health Centre was not yet optimal. This was influenced by the cadres' workload, which was focused on posyandu activities, limited training, limited facilities, and the fact that PTM Posbindu had not yet been established in several villages. Meanwhile, the education provided to hypertensive patients is still largely verbal or through leaflets, which is not yet fully effective in improving hypertension management skills. The impact of hypertension is multidimensional, encompassing physical, psychological, social, spiritual, and economic aspects. Serious complications such as stroke, heart attack, and diabetes mellitus increase the risk of morbidity and mortality (Ministry of Health, 2020). Various national campaigns such as the CERDIK and PATUH programmes have been implemented, but challenges such as limited resources, access to healthcare services, and a lack of social support remain obstacles in efforts to control hypertension (Unger et al., 2020; Mbuthia et al., 2022).

In this context of limitations, empowering community health cadres is a potential strategy (Gamage et al., 2020). As representatives of the local community, cadres are in a strategic position to drive change, provided they are supported with training and effective communication media. One relevant innovation is the use of WhatsApp Group applications, which have become part of the daily lives of people of all ages and backgrounds (Okvireslian, 2021). Technology-based health education interventions or mobile health (mHealth) have demonstrated effectiveness in lowering blood pressure and improving self-management among hypertensive patients in various international studies (Li et al., 2019; Tang et al., 2018). However, the limited literature on the effectiveness of interventions involving health cadres in the context of primary care, especially in rural and low-income areas, remains a research gap (Ingenhoff et al., 2022).

Previous studies have also shown that health education by cadres has a positive impact on community hypertension management (Augustovski et al., 2018; Vedanthan et al., 2019). Therefore, the author felt it necessary to conduct research on the effect of empowering health cadres through WhatsApp Groups on increasing cadres' knowledge and skills in hypertension management as an effective, affordable, and sustainable innovative effort. This study aims to empower health cadres to improve their knowledge and skills in managing hypertension in the community using WhatsApp.

## **METHOD**

This type of research is quantitative research with a quasi-experimental design using a pretest-posttest with control group design. This research was conducted in two stages. The first stage involved the development of a health cadre empowerment guidance module based on literature studies and field studies. The second stage involved the implementation of interventions and measurement of the impact of health cadre empowerment through WhatsApp Groups on the cadres' ability to manage hypertension. (See Table 2 in the appendix for the stages of the health cadre training programme). The population in this study consisted of all health cadres in the Tateli Community Health Centre working area, numbering 60 people. The sample in this study consisted

of 60 respondents, divided into two groups: an intervention group and a control group, each consisting of 30 people. The sampling technique used total sampling, with predetermined inclusion and exclusion criteria.

Data analysis was performed using univariate and bivariate methods. Univariate analysis was used to describe the frequency distribution of respondent characteristics. Bivariate analysis used the paired t-test to examine differences in the average knowledge and skills of health cadres before and after the intervention, with a significance level of  $p < 0.05$ . The researchers have obtained an ethical approval certificate with number 2998-KEPK from the Nursing Research Ethics Committee (KEPK) of the Faculty of Nursing, Airlangga University.

## RESULT

The results of phase 1 of the research, namely the development of the module, were obtained through literature studies, field studies in the Tateli Community Health Centre working area, and expert consultations. The results of these three studies were used to develop and refine the module for empowering health cadres through WhatsApp in hypertension management. The literature study covered 15 articles from reputable databases using keywords related to health cadres, hypertension, empowerment, and mHealth.

Phase 2 research results: Respondent characteristics

Table 1.  
Respondent characteristics (n= 60)

Characteristics	Category	Intervention group		Control group		<i>p-value</i>
		f	%	f	%	
Age	21-30 years	2	6,7	4	13,3	0,324
	31-40 years	8	26,7	5	16,7	
	41-50 years	15	50,0	12	40,0	
	>50 years	5	16,7	9	30,0	
Gender	Male	10	33,3	11	36,7	0,598
	Female	20	66,7	19	63,3	
Education	Junior High School	2	6,7	3	10,0	0,189
	High School	25	83,3	22	73,3	
	Diploma	2	6,7	3	10,0	
	Bachelor's Degree	1	3,3	2	6,7	
	Master Degree	0	0,0	0	0,0	
Religion	Islam	6	20,0	7	23,3	0,539
	Christianity	24	80,0	23	76,7	
Marital status	Married	29	96,7	28	93,3	0,242
	Unmarried	0	0,0	0	0,0	
	Widow/Widower	1	3,3	2	6,7	
Occupation	Housewife	26	86,7	25	83,3	0,144
	Self-employed	3	10,0	3	10,0	
	Farmer	0	0,0	2	6,7	
	Civil servant	1	3,3	0	0,0	
Income	< Minimum Wage	28	93,3	27	90,0	0,358
	≥ Minimum Wage	2	6,7	3	10,0	
Length of Employment	1 year	8	26,7	7	23,3	0,442
	2 Years	6	20,0	6	20,0	
	3 Years	2	6,7	4	13,3	
	4 Years	1	3,3	1	3,3	
	5 Years and Above	13	43,3	12	40,0	

The analysis of the characteristics of the intervention group showed that the majority of respondents were aged 41–50 years (50.0%), female (66.7%), had a high school education or equivalent

(83.3%), had worked for more than 5 years (43.3%), were mostly married (96.7%), had an income below the minimum wage (93.3%), and were housewives (86.7%). In the control group, the majority were also aged 41–50 years (40.0%), female (63.3%), had a high school education or equivalent (73.3%), were Muslim (76.7%), were married (93.3%), and had an income below the minimum wage (90.0%). The homogeneity test showed that all respondent characteristics in both groups had a p-value > 0.05, indicating that the respondent characteristics were homogeneous and could be validly compared in further analysis.

Table 2

Results of the evaluation of health cadre empowerment through WhatsApp on the knowledge of health cadres in hypertension management

Knowledge	Intervention group				Control group			
	Pretest		Post Test		Pretest		Post Test	
	n	%	n	%	n	%	n	%
Insufficient	3	10,0	0	0,0	6	20,0	8	26,7
Adequate	27	90,0	8	26,7	24	80,0	22	73,3
good	0	0,0	22	73,3	0	0,0	0	0,0
Total	30	100	30	100	30	100	30	100
Normality Test	0,030		0,007		0,001		0,004	

The results showed a significant increase in the knowledge level of cadres in the intervention group compared to the control group. Before the intervention, the majority of knowledge was in the adequate (90.0%) and poor (10.0%) categories. After the intervention via WhatsApp, there was an increase to 73.3% in the good category and 26.7% in the adequate category. The normality test showed that the data was not normally distributed ( $p < 0.005$ ), so the analysis used the Wilcoxon Signed Rank Test and Mann Whitney Test. The test results showed that empowering cadres through WhatsApp significantly increased their knowledge and skills in hypertension management.

Table 3

Results of the evaluation of health cadre empowerment through WhatsApp on the skills of cadres in hypertension management

Skill	Intervention group				Control group			
	Pretest		Post Test		Pretest		Pretest	
	n	%	n	%	n	%	n	%
Insufficient	3	10,0	0	0,0	10	33,3	4	13,3
Adequate	27	90,0	2	6,7	20	66,7	26	86,7
good	0	0,0	28	93,3	0	0,0	0	0,0
Total	30	100	30	100	30	100	30	100
Normality Test	0,000		0,005		0,000		0,000	

Prior to the intervention, the skills of cadres in the intervention and control groups were mostly in the poor and adequate categories. After the intervention, the skills of cadres in the intervention group increased significantly to adequate (6.7%) and good (93.3%), while the control group did not show any significant improvement. The Wilcoxon Signed Rank test showed a significant increase in skills in the intervention group ( $p < 0.05$ ), while the control group was not significant. The Mann Whitney test showed a significant difference between the intervention and control groups after the intervention. These results prove that empowering health cadres through WhatsApp is effective in improving cadre skills in hypertension management.

Table 4

Testing the effect of empowering health cadres through WhatsApp groups on the knowledge of health cadres (n 60)

Variabel	Kelompok	Pretest (Mean ± SD)	Posttest (Mean ± SD)	Nilai Δ	P value
Knowledge	Intervention	12,53±2,713	20,33±1,647	7,8	<0,001 *
	Control	12,90±2,040	15,80±1,518	2,9	0,320 *
P value		0,550**	<0,001**		

Note: \* Test Wilcoxon Signed Rank \*\* Uji Mann Whitney

Wilcoxon Signed Rank analysis showed that in the intervention group there was a significant increase in knowledge levels before and after the intervention ( $p = 0.000$ ), while in the control group there was no significant difference ( $p > 0.05$ ). The Mann Whitney test showed that before the intervention, there was no difference in knowledge between groups ( $p > 0.05$ ), but after the intervention there was a significant difference ( $p < 0.05$ ). The delta value of knowledge change was higher in the intervention group ( $\Delta = 7.8$ ), which indicates that the empowerment intervention through WhatsApp was effective in increasing cadres' knowledge in hypertension management compared to the control group.

Table 5  
Testing the effect of empowering health cadres through WhatsApp groups on the skill of health cadres (n 60)

Variabel	Kelompok	Pretest (Mean ± SD)	Posttest (Mean ± SD)	Nilai Δ	P value
Keterampilan	Intervensi	10,50±1,656	16,47±1,676	5,97	<0,001 *
	Kontrol	11,37±1,771	12,07±1,048	0,7	0,402 *
<i>P value</i>		0,520**	<0,001**		

Note: \* Test *Wilcoxon Signed Rank* \*\* Uji *Mann Whitney*

The Wilcoxon Signed Rank analysis results showed a significant increase in skills in the intervention group before and after the intervention ( $p < 0.001$ ), while the control group showed no significant change ( $p > 0.05$ ). The Mann Whitney test showed no significant difference in skills in the pre-test between groups ( $p > 0.05$ ), but after the intervention there was a significant difference ( $p < 0.05$ ). Delta analysis showed a greater increase in skills in the intervention group ( $\Delta = 5.97$ ), proving that the empowerment intervention through WhatsApp was effective in improving the skills of cadres in hypertension management.

## DISCUSSION

### The Effect of Health Cadre Empowerment on Hypertension Management Knowledge

Research shows that health cadres' knowledge of hypertension—including its definition, causes, symptoms, management, and treatment—is in the good category. Univariate tests show that empowerment interventions via WhatsApp have a significant effect on increasing the knowledge of cadres in the intervention group. In contrast, the control group did not show any significant changes because they had previously received education from health workers at the Tateli Community Health Centre. WhatsApp as an educational medium offers interactive features such as chat, video calls, and material sharing that support the learning process. This intervention effectively increases cadres' awareness and understanding of managing hypertension, in line with the findings of He et al. (2017) that cadres are able to guide patients and families through healthy lifestyle education and digital blood pressure monitoring.

Knowledge is a key element in shaping the attitudes and behaviours of cadres in the practice of hypertension management (Abila & Kantola, 2013; Yang et al., 2014). Analysed and organised knowledge enables cadres to make appropriate decisions in health services (Sopiah & Sangaji, 2018). Awareness of knowledge is formed through cognitive and affective processes influenced by experience, education, and social interaction (Alligood, 2017; Dwinger et al., 2020). Adequate knowledge among cadres supports their ability and motivation in managing hypertension in the community. Conversely, a lack of knowledge can hinder the effectiveness of cadres' actions in the field. Thus, empowering cadres through WhatsApp-based training has been proven to increase knowledge as a foundation for managing hypertension, while strengthening the role of cadres in the community health care system.

### The Effect of Empowering Health Cadres on Hypertension Management Skills

Health workers' skills in hypertension management, such as blood pressure measurement according to procedures (preparation of equipment, patient condition and position, and measurement

protocols), are indicators of their professionalism. The results of this study indicate that empowering health workers through WhatsApp significantly improved their skills in the intervention group. In contrast, the control group did not show significant improvement due to the lack of training they received.

Skills are one of the determining factors for individual success (Susianta, 2021). Cadres are considered skilled if they are able to carry out tasks in accordance with Standard Operating Procedures (Raffa et al., 2020). Competence, according to Becker et al., in Elizar & Tanjung (2018), is a combination of knowledge, skills, and attitudes that directly influence work behaviour. The research by Nguyen-Huynh et al. (2022) also confirms that training improves cadres' skills in health services. Limited experience can reduce cadres' technical and non-technical abilities (Abel et al., 2023). Skills include technical, human, and conceptual skills that support work effectiveness.

Cadres with good knowledge and skills will be more confident and professional. Powers et al., (2019) state that education improves the quality of cadres' contributions to the community. This is supported by Chan et al., (2019), who emphasise the importance of motivation and self-capacity in producing superior work performance. Therefore, improving skills through WhatsApp-based empowerment is a strategic step in strengthening the role of cadres as the spearhead of non-communicable disease control, while also supporting the success of health programmes at the community level.

## **CONCLUSION**

The conclusion of this study shows that empowering health cadres through WhatsApp has a significant effect on improving their ability to manage hypertension. The results of the intervention show a very significant improvement in the knowledge and skills of health cadres, where knowledge and skills that were initially in the adequate category improved to the good category after the intervention. These findings prove that digital education and training through WhatsApp is an effective and relevant method in efforts to strengthen the role of health cadres in the community.

Based on these results, this intervention needs to be developed more broadly because it has been proven to provide direct benefits to health cadres in improving their capacity. The Health Office and Community Health Centres are expected to use the results of this study as a basis for formulating digital-based policies that support health promotion and cadre empowerment, including strengthening infrastructure, sustaining collaboration, providing ongoing training, offering timely incentives, and implementing innovative training methods to improve cadre motivation and performance.

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