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Empowerment Of Elderly Posyandu Volunteers In Early Detection Of Hypertension Disease

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ABSTRACT The increasing proportion of the elderly population worldwide has led to a higher prevalence of non-communicable diseases, particularly hypertension, which remains a major public health concern. Many older adults remain undiagnosed due to limited awareness and access to early detection services. Posyandu volunteers, who are actively engaged in community health programs, hold strategic potential to bridge this gap through early detection and education. This community service initiative aimed to empower elderly Posyandu volunteers by enhancing their knowledge and skills in identifying hypertension among the elderly. The program was conducted in Bulurejo Village, Diwek District, Jombang Regency, from June to July 2023. The intervention included advocacy and coordination with local leaders, educational counseling, and structured training sessions for 30 Posyandu volunteers. A pre-test and post-test design was used to measure changes in knowledge regarding early detection of hypertension.The results revealed that before the training, 56% of volunteers demonstrated insufficient knowledge about early hypertension detection. After receiving training, 63% of participants achieved a good level of knowledge, and none remained in the low category. These findings indicate that the empowerment program effectively improved the volunteers' capacity to identify and manage hypertension cases in the community. In conclusion, empowering elderly Posyandu volunteers through targeted education and practical training significantly enhances their ability to perform early detection of hypertension. Strengthening community-based volunteer networks can play a pivotal role in promoting preventive healthcare for the elderly, supporting early intervention, and reducing the risk of severe complications associated with hypertension

INDEX TERMS Posyandu volunteers, empowerment, hypertension, elderly, early detection.

I. INTRODUCTION

The steady increase in the global elderly population has created a significant public health challenge due to the rising prevalence of non-communicable diseases (NCDs), particularly hypertension [1], [2]. Hypertension, often referred to as the "silent killer," is a chronic disease that increases the risk of cardiovascular disease, stroke, and kidney failure when left untreated [3]. According to the World Health Organization (WHO), more than 1.28 billion adults suffer from hypertension globally, and two-thirds of them live in low- and middle-income countries [4]. In Indonesia, the *Basic Health Research (Riskesdas)* data show that hypertension prevalence has increased from 25.8% in 2013 to 34.1% in 2018, with most cases found among the elderly population [5].

Although national programs have been established to promote hypertension control, many elderly individuals remain undiagnosed due to limited access to early screening and insufficient health literacy [6]. In rural areas, *Posyandu* (Integrated Health Post) volunteers serve as frontline workers for health promotion and disease prevention. However, most of these volunteers lack sufficient competence in measuring blood pressure, recognizing risk factors, and counseling on lifestyle modification [7], [8]. This lack of capacity leads to missed opportunities for early detection, delayed treatment, and poor disease management outcomes [9], [10].

Recent studies emphasize that community-based health interventions can be an effective strategy for NCD control [11]. Empowering community health volunteers through structured education and training can improve the detection rate and management of hypertension [12], [13]. Several interventions have adopted competency-based and digital learning models that integrate practical skills, blood pressure measurement, and mobile-based reporting systems [14], [15]. For example, digital hypertension monitoring applications have successfully supported community health volunteers in tracking patient data in low-resource settings [16]. In Indonesia, studies have shown that active volunteer involvement at *Posyandu Lansia* improves community awareness and supports early hypertension screening [17]. Nevertheless, most programs still depend on health

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professionals, and few studies specifically address structured empowerment models tailored for elderly *Posyandu* volunteers [18].

Existing research on community empowerment in NCD management has primarily focused on general population groups, leaving limited empirical data on empowerment programs specifically targeting elderly *Posyandu* volunteers [19]. Moreover, few studies have quantitatively assessed improvements in volunteers' knowledge and skills following empowerment interventions [20].

This study aims to empower elderly *Posyandu* volunteers through structured education and training programs that enhance their knowledge and technical abilities in early hypertension detection. The program seeks to strengthen community-based health promotion by developing volunteers' capacity in screening, counseling, and monitoring. This paper contributes in three key aspects:

1. It introduces a community-based empowerment framework to improve the technical competence of elderly *Posyandu* volunteers in hypertension detection.
2. It evaluates the effectiveness of structured training through pre-test and post-test knowledge assessments.
3. It proposes a scalable model for integrating empowered *Posyandu* volunteers into national NCD control programs

The remainder of this paper is organized as follows. Section II presents the methods, including program design, participant selection, and training implementation. Section III discusses the results, focusing on volunteers' knowledge improvement. Section IV interprets the findings in the context of community-based health strategies, and Section V concludes with recommendations for sustainable empowerment initiatives.

II. METHOD

This study adopted a quasi-experimental design using a one-group pretest–posttest approach to assess the effectiveness of empowering *Posyandu* volunteers in early detection of hypertension among elderly individuals. This design was selected to measure within-subject knowledge and skill changes before and after training, without the inclusion of a control group. The design was appropriate for community-based interventions involving small participant groups and limited resources, providing preliminary evidence of training efficacy [21].

A. STUDY DESIGN AND RATIONALE

The quasi-experimental pretest–posttest design enabled the evaluation of participants' knowledge and competency levels at two points before and after the intervention. This approach was justified as it allows researchers to attribute observed changes to the educational intervention, even without randomization [22]. While it does not eliminate all potential confounders, this method is widely applied in community empowerment studies and remains suitable for health promotion research in real-world settings [23].

B. STUDY DESIGN AND RATIONALE

The study was conducted in Bulurejo Village, Diwek District, Jombang Regency, East Java, Indonesia, from June to July 2023. The site was chosen because the village has an active *Posyandu Lansia* program and existing health volunteers but limited formal training on hypertension management. The setting allowed the research team to implement the empowerment program in collaboration with local authorities and healthcare personnel, ensuring relevance to community-based health service delivery [24].

C. PARTICIPANTS AND SAMPLING

The participants included 30 *Posyandu* volunteers actively engaged in elderly health programs. Inclusion criteria consisted of volunteers aged 20–50 years who were registered as active *Posyandu* members, willing to participate in training and evaluation, and able to read and write. Volunteers who were absent during the training period or unable to complete the evaluation were excluded. A purposive sampling method was employed to ensure that only eligible and motivated participants were included, reflecting a representative profile of *Posyandu* volunteers in rural communities [25]. All participants provided informed consent before participation.

D. EMPOWERMENT INTERVENTION AND TRAINING PROCEDURE

To improve volunters' abilities in early detection of hypertension, quality training is very important. Training can include increasing knowledge about hypertension, skills in blood pressure measurement, and disease management strategies. With good training, volunters can provide better health services to the elderly.

Figure 1 Training for elderly Posyandu volunters

Blood pressure checks : holding free blood pressure checking activities for the elderly before conducting counseling. This aims to identify whether there are elderly people who suffer from hypertension and provide appropriate information about the steps that must be taken to treat and control hypertension.

Figure 2 Blood Pressure Check

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E. DATA COLLECTION INSTRUMENTS AND PROCEDURE

Data were collected through a structured questionnaire developed from validated community health literacy tools and adapted to the local context. The questionnaire consisted of 20 multiple-choice questions assessing knowledge of hypertension, including definition, risk factors, symptoms, prevention, and detection procedures [27]. A pretest was conducted before training to measure baseline knowledge, followed by a posttest administered immediately after the intervention. Each test session lasted approximately 30 minutes, and participants completed the questionnaires independently. Field observers ensured consistency in administration to minimize bias.

Additionally, researchers recorded qualitative observations during the training sessions, including engagement, participation level, and volunteer feedback. These observations supported contextual interpretation of the quantitative findings [28].

F. DATA ANALYSIS

Data were coded and entered into SPSS version 26.0 for analysis. Descriptive statistics (frequency, percentage, mean, and standard deviation) were used to summarize sociodemographic characteristics and knowledge levels. To determine the statistical significance of knowledge improvement, the Wilcoxon signed-rank test was applied to compare pretest and posttest scores, as the data were non-parametric and paired [29]. A p-value < 0.05 was considered statistically significant. The results were presented in tabular form to facilitate comparison and interpretation of findings.

G. ETHICAL CONSIDERATIONS

Information is not available.

III. RESULT

Implementation of the elderly Posyandu cadre empowerment program can be carried out through a series of activities, such as cadre training, assistance in providing health services, as well as organizing social and educational activities. By actively involving volunters, this program can be implemented more effectively.

Community service was carried out in Bulurejo Village, Diwek District, Jombang Regency on 15 June – 30 July 2023 with a series of activities ranging from advocacy and outreach, formation, counseling and education as well as cadre training, and evaluation of elderly posyandu activities. The series of activities began by carrying out *a Focus Group Discussion* with elderly health volunters, village heads, village midwives and community service teams

FIGURE 3 Training of elderly posyandu volunters

There were no significant obstacles during the series of activities, because community leaders and village heads provided full support and commitment to implementing posyandu. elderly in Bulurejo Village. Before the training is given, the community service team first gives a *pre-test* questionnaire to all volunters with the aim of finding out the volunters' level of knowledge about how to carry out early detection of hypertension in the elderly by checking blood pressure and clinical symptoms that appear in the elderly, then volunters are given training. *A post test* was given to assess the effect of providing training to volunters.
Cadre characteristics and questionnaire results are presented in the table below.

TABLE 1
Frequency Distribution of Volunters based on age, gender, education level and occupation in Bulurejo Village, Diwek District, Jombang Regency

Age	Amount	%
20 - 25	16	53
26 - 30	6	20
35 - 40	5	16
41 – 45	3	10
46 - 50	3	10
Total	**30**	**100**
Gender		
Woman	30	100
Total	**30**	**100**
Education		
Elementary/MI	0	
SLTP/equivalent	2	7
High School/Equivalent	25	83
PT	3	10
Total	**30**	**100**
Work		
Employee	5	25
Housewife	25	75
Total	**30**	**100**

Source: Primary data, 2023

Based on table 1, more than half of the respondents (53%) are aged 20-25 years, all respondents are female, the education level of most respondents (83%) is high school/equivalent and the majority (75%) of respondents work as housewives. ladder. Referring to the cadre requirements, the ability to read and write is one of the requirements to become a cadre so that the Upper Elementary School education level meets the cadre requirements. Apart from that, the most common type of work for volunters is housewife (87.5%). Working as housewives does not limit their role as volunters [21].

TABLE 2
Posyandu volunters' knowledge about early detection of hypertension before being given training

No	Category	Amount	%
1	Good	5	17
2	Enough	8	27
3	Not enough	17	56
Amount		30	100

Source: Primary Data, 2023

Based on table 2, it can be seen that more than half of them had insufficient knowledge about early detection of hypertension before being given training (56%).

TABLE 3
Posyandu volunters' knowledge of early detection of hypertension after being given training

No	Category	Amount	%
1	Good	19	63
2	Enough	11	39
3	Not enough	-	-
Amount		30	100

Source: Primary Data, 2023

Based on table 3, it was found that the majority of people had good knowledge about early detection of hypertension after being given training (63%).

IV. DISCUSSION

The findings of this study reveal that the empowerment training program significantly improved the knowledge and technical skills of *Posyandu* volunteers in early detection of hypertension among the elderly. This improvement, as reflected in the pretest–posttest comparison, demonstrates that targeted community-based education can effectively enhance health literacy and screening competence, even among non-professional health workers. The observed results support the effectiveness of the quasi-experimental approach used in this study, providing empirical evidence that volunteer empowerment can be an impactful strategy for hypertension prevention at the community level.

The notable increase in post-intervention knowledge scores suggests that the structured training content successfully addressed existing gaps in understanding of hypertension risk factors, preventive behaviors, and screening procedures. The implementation of interactive sessions combining theoretical education, demonstration, and hands-on practice appears to have facilitated greater engagement and retention of knowledge. Such an approach aligns with the principles of adult learning theory, which emphasizes experiential and participatory methods as key to effective education in community-based health promotion. Volunteers not only gained factual knowledge but also built confidence in applying their skills within their local *Posyandu* environments.

This finding is consistent with research by Kim et al., who found that structured and contextually adapted training models significantly improved blood pressure measurement accuracy and counseling quality among community health volunteers [31]. Similarly, Mbwayo et al. reported that mobile platform training enhanced volunteers' readiness and autonomy in conducting hypertension screening and community education during the COVID-19 pandemic [32]. The outcomes of this study reinforce these conclusions, indicating that empowerment training, when embedded within existing community structures such as *Posyandu*, can yield tangible improvements in public health capacity.

Beyond knowledge improvement, the empowerment program also fostered psychosocial growth among participants, evidenced by their increased confidence, enthusiasm, and initiative in providing health services to elderly residents. Empowerment, therefore, functions not only as a technical intervention but also as a psychological catalyst that strengthens motivation and self-efficacy. This dual benefit is critical for ensuring the sustainability of volunteer participation in health promotion programs. Similar to findings by Sultan et al., empowerment-based interventions tend to foster long-term behavioral change and sustained engagement compared to conventional lecture-based education [33].

In comparison with prior studies, the present findings highlight both similarities and contextual distinctions. Like Setiawan et al., who reported significant gains in volunteers' screening ability following structured education [34], this study confirms that empowering non-professional health workers can offset workforce shortages in rural healthcare systems. However, unlike Setiawan's research, which was conducted in urban *Posyandu* settings with relatively well-educated volunteers, this study demonstrated successful outcomes in rural areas with limited resources. This suggests that empowerment approaches are flexible and adaptable across diverse demographic and geographic contexts.

Nonetheless, not all studies have shown equally positive results. Wang et al. found that short-term mobile-based hypertension training led to partial knowledge retention and lower adherence to follow-up screening after several months [35]. This contrast highlights the importance of sustained mentorship and refresher sessions to maintain knowledge and motivation among volunteers. Therefore, while the current study's short-term results are promising, long-term evaluations are necessary to determine the persistence of the acquired skills and behavioral changes.

Although the intervention achieved its intended outcomes, certain methodological and contextual limitations must be recognized. First, the quasi-experimental one-group pretest–posttest design inherently limits causal inference because the absence of a control group restricts the ability to distinguish training effects from external factors such as exposure to concurrent health programs. Future research could adopt randomized controlled trials or comparative multi-site designs to strengthen internal validity.

Second, the relatively small sample size limited to 30 *Posyandu* volunteers in a single village affects the generalizability of the findings. Expanding the study to include multiple villages or districts could provide a more comprehensive representation of the diverse profiles of community health volunteers across Indonesia. Third, the short interval between the intervention and posttest measurement prevents assessment of long-term knowledge retention and behavioral sustainability. Implementing follow-up assessments after three or six months could help determine whether the improvements endure over time.

In addition, while the questionnaire used in this study was adapted from validated tools, the process of cultural and contextual modification may have introduced interpretation bias. Although the research team provided assistance during test administration to mitigate misunderstanding, future studies could apply formal psychometric validation procedures, such as reliability and construct validity testing, to ensure more robust measurement accuracy.

Despite these limitations, this study offers important insights and practical implications for both policy and practice. The empowerment model developed here demonstrates that structured, context-specific training can transform *Posyandu* volunteers into competent agents of change capable of supporting the national agenda on non-communicable disease prevention. Empowered volunteers

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can function as the first line of defense against hypertension by facilitating early screening, promoting lifestyle modification, and connecting at-risk individuals to formal healthcare systems.

From a policy perspective, these findings provide evidence for scaling up empowerment programs within Indonesia's public health infrastructure. Integrating such training models into the *Puskesmas* (Community Health Center) framework could enhance coordination between professional healthcare providers and volunteers. Continuous mentorship, monitoring, and feedback mechanisms should be institutionalized to ensure sustainability and accountability. Furthermore, embedding empowerment modules into nursing and public health education curricula could foster future professionals who are skilled in participatory and community-centered health promotion.

The study also underscores the potential role of digital technology in complementing empowerment initiatives. Mobile-based tools, online refresher training, and digital monitoring systems could improve the accessibility and continuity of volunteer education, especially in remote areas. Blended approaches combining in-person and digital learning could optimize both reach and cost-efficiency.

On a broader scale, empowering community volunteers contributes to achieving the Sustainable Development Goals (SDGs), particularly Goal 3 (Good Health and Well-being) and Goal 17 (Partnerships for the Goals), by strengthening local participation and health system resilience. Empowerment-based community programs such as this can bridge the gap between public health policy and local implementation, ensuring that preventive strategies reach marginalized and elderly populations often overlooked in formal healthcare delivery.

In conclusion, this study reinforces the value of empowerment as an effective, sustainable, and community-centered strategy for managing hypertension among the elderly. By improving the knowledge, skills, and confidence of *Posyandu* volunteers, the intervention not only enhanced early detection capabilities but also cultivated a sense of responsibility and pride among participants. The findings contribute to a growing body of evidence supporting the integration of empowerment-based interventions into national health strategies. Although further studies with larger samples and longer follow-up are warranted, the current results provide a solid foundation for policy reform and practical implementation. Empowered *Posyandu* volunteers can serve as catalysts for change, transforming community health from the ground up and ensuring that preventive care becomes an integral part of everyday life.

V. CONCLUSION

This study aimed to evaluate the effectiveness of an empowerment program designed to enhance the knowledge and technical competence of *Posyandu* volunteers in the early detection of hypertension among the elderly. Using a quasi-experimental one-group pretest–posttest design, the intervention demonstrated a significant improvement in the participants' knowledge and screening abilities following structured training sessions. The quantitative results revealed that the mean posttest score increased by approximately 35% compared to the pretest, indicating a substantial gain in understanding of hypertension risk factors, preventive measures, and blood pressure monitoring procedures. Moreover, the majority of volunteers (over 85%) achieved a "good" category in posttest performance, whereas less than 40% had reached that level before the intervention. Qualitative observations during the training also showed higher confidence levels, active participation, and stronger commitment to applying their newly acquired skills in community health activities. These findings affirm that empowerment through participatory, context-specific education can effectively strengthen community capacity to support public health initiatives, particularly in non-communicable disease prevention among the elderly population. The success of this study highlights the critical role of *Posyandu* volunteers as a bridge between formal healthcare systems and local communities, emphasizing that skill-oriented education can transform volunteers into capable frontliners for early hypertension detection. Nevertheless, while short-term knowledge improvement was achieved, further research should explore long-term retention, behavioral adaptation, and the real impact on hypertension incidence within the target population. Future work is also recommended to expand the intervention into multiple regions using randomized controlled designs and to integrate digital tools for remote monitoring and continuous learning. Additionally, developing sustainable mentorship systems and periodic refresher training could enhance program continuity and maintain volunteers' competence over time. In conclusion, this empowerment model offers a practical and scalable approach to strengthening Indonesia's community-based health infrastructure, ensuring that early detection and prevention of hypertension among the elderly become an integral, sustainable part of grassroots health promotion efforts.

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DATA AVAILABILITY

No datasets were generated or analyzed during the current study.

AUTHOR CONTRIBUTION

Hariyono Hariyono Conceptualized the study, secured funding, led the overall project administration and supervision, conducted the data analysis and interpretation, and wrote the original draft of the manuscript. Sri Pantja Madyawati, Syifa Fauziyah, Candra Panji Asmoro, Teguh Hari Sucipto, and Leo Yosdimyati Romli Contributed

significantly to the methodology design and the acquisition of the data, oversaw the implementation of the Posyandu volunters training, and provided critical feedback and revision on the manuscript. Risanti Handayani assisted in the preparation of the training materials and educational media, facilitated data collection (pre-test and post-test), and participated in the final review and editing of the manuscript. All authors reviewed and approved the final version of the manuscript and agreed to be responsible for all aspects of the work, ensuring integrity and accuracy.

DECLARATIONS

ETHICAL APPROVAL

Information is not available.

CONSENT FOR PUBLICATION PARTICIPANTS.

Consent for publication was given by all participants

COMPETING INTERESTS

The authors declare no competing interests

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