



Effectiveness of Combined Lecture and Small-Group Training on Blood Pressure Measurement Technique Among Community Volunteers

Zulfa Khairunnisa Ishan^{1*}, Syarifah Nurul Yanti Rizki Syahab Assegaf², Asmaurika Pramuwidya³, Rifa Amalia Putri⁴, Muhammad Dikas Arqaf⁵

¹Medical Education and Bioethics Department, Faculty of Medicine, Universitas Tanjungpura, Indonesia

²Pharmacology Department, Faculty of Medicine, Universitas Tanjungpura, Indonesia

³Community Medicine Department, Faculty of Medicine, Universitas Tanjungpura, Indonesia

^{4,5}Bachelor of Medicine Study Program, Faculty of Medicine, Universitas Tanjungpura, Indonesia

Email: zulfakhairunnisa.i@medical.untan.ac.id^{1*}, nurulyanti@medical.untan.ac.id², asmaurika.p@medical.untan.ac.id³, rifaamaliaptr@gmail.com⁴, muhammaddikas149@gmail.com⁴

*Corresponding author: zulfakhairunnisa.i@medical.untan.ac.id

Abstract. Hypertension is a major non-communicable disease, particularly challenging in regions with extensive service areas. Community health volunteers are essential for prevention and management through blood pressure measurement. Existing training programs focus primarily on knowledge, highlighting the need to integrate cognitive learning with small-group skills practice to enhance practical competencies and community-based hypertension control. A quasi-experimental design with a pretest–posttest design was conducted to evaluate the effectiveness of combined lecture and small-group training. Knowledge was assessed before and after training, while skills were evaluated post-intervention. Thirty volunteers from the Public Health Center Selakau participated. The results showed that knowledge of blood pressure measurement improved significantly, with pretest scores of 74.67 ± 16.34 rising to posttest scores of 90.00 ± 10.50 ($p < 0.005$). Posttest evaluation of practical skills showed a mean score of 80.93 ± 13.35 , indicating proficient performance in most assessed items. Combined lecture and small-group training effectively enhanced both knowledge and practical skills of community health volunteers in blood pressure measurement. Integrating cognitive learning with hands-on practice strengthens theoretical understanding and field competencies, supporting more effective community-based hypertension control programs.

Keywords: Blood Pressure; Community Volunteers; Hypertension; Skills Training; Small-Group Training.

1. INTRODUCTION

Hypertension is classified as a non-communicable disease and remains a major public health problem in Indonesia due to the continuously increasing number of affected individuals. According to the 2023 Indonesian Health Survey (Survei Kesehatan Indonesia/SKI), the prevalence of hypertension among individuals aged over 18 years based on blood pressure measurements reached 30.8%, while the prevalence based on diagnosis by health professionals was recorded at only 8.6%. This discrepancy indicates that a substantial number of hypertension cases remain clinically undetected (Kementerian Kesehatan Republik Indonesia, 2023). In West Kalimantan Province, the prevalence of hypertension based on blood pressure measurements among individuals aged over 18 years was reported at 36.99%. Kubu Raya Regency also showed a high prevalence (35.63%). An even more significant condition was found in Selakau District, Sambas Regency, where the prevalence of hypertension among residents aged over 15 years, based on blood pressure measurements, reached 64.8% in 2023. This high prevalence indicates that hypertension constitutes a major public health problem in Selakau District and requires special attention (Dinas Kesehatan Provinsi Kalimantan Barat,

2024). The extensive service area and geographical conditions pose significant challenges to achieving optimal hypertension control. The high prevalence of hypertension within the working area of Puskesmas Selakau potentially increases the risk of serious complications, such as cardiovascular disease, stroke, and kidney disorders, if not managed appropriately. Therefore, integrated and sustainable hypertension control efforts are urgently needed to reduce the impact of this disease (Asseggaf & Ulfah, 2022)

Hypertension is defined as a persistent elevation of arterial blood pressure, with systolic blood pressure values ≥ 140 mmHg and/or diastolic values ≥ 90 mmHg. It results from pathological changes in vascular smooth muscle and may progress asymptotically, increasing the risk of various vascular complications. Hypertension is classified by severity based on blood pressure levels and by etiology into primary and secondary forms. Primary hypertension accounts for approximately 90% of cases and is commonly associated with lifestyle factors, whereas secondary hypertension arises from identifiable conditions such as renal, thyroid, or adrenal disorders. Variants such as white-coat and masked hypertension emphasize the need for repeated blood pressure measurements. Hypertension develops through a multifactorial process involving both modifiable and non-modifiable risk factors, highlighting the importance of lifestyle interventions and community-based prevention strategies (Kementerian Kesehatan Republik Indonesia, 2024).

Hypertension control should not rely solely on formal healthcare services provided at health facilities but requires a comprehensive approach that actively involves community elements, particularly community health volunteers (kader kesehatan). In the control of non-communicable diseases, particularly hypertension, community health volunteers play important roles in promotive and preventive activities, including health education, blood pressure monitoring, medication adherence reminders, and assistance for patients and their families. Their close relationship with the community enables more intensive and continuous communication, thereby increasing patients awareness and adherence to hypertension treatment (Kementerian Kesehatan Republik Indonesia, 2021). Evidence from Toru et al., (2025) demonstrated that blood pressure measurement training significantly influenced knowledge and behaviors related to early detection and hypertension control efforts.

Nevertheless, the effectiveness of community health volunteers largely depends on their level of knowledge and skills. To date, existing training programs for volunteers have predominantly emphasized theoretical material and have not been optimally accompanied by skills evaluation through hands-on practice in small groups. As a result, improvements in volunteers' knowledge have not been fully translated into the practical skills required for field

implementation. For community health volunteers, small-group learning is particularly valuable, as it fosters confidence, leadership, and teamwork skills which are essential for delivering community-based health services but are rarely emphasized in training programs. This gap highlights the need to integrate cognitive learning with small-group skills training to strengthen community health volunteers' blood pressure measurement competencies in community-based hypertension control (Rajput & Brahmhatt, 2022).

2. METHODS

This study employed a quasi-experimental design with a pretest–posttest approach to assess difference in knowledge and posttest-only assessment to evaluate the blood pressure measurement skills. The study sample consisted of 30 community health volunteers at the Public Health Center (Puskesmas) Selakau, Sambas Regency, West Kalimantan Province. Inclusion criteria were community health volunteers registered at Puskesmas Selakau who were willing to fully participate and attend the entire training session. The exclusion criteria was person unwillingness to participate in the research.

The intervention on the research consisted of the combination between lecture and small-group training on blood pressure measurement. Initially, a lecture-based session focusing on blood pressure measurement was conducted to stimulate and enhance the participants' knowledge. It was followed by one-hour hands-on blood pressure measurement training conducted in five small groups, each comprising six participants and supervised by one facilitator. The small-group training focused on increasing the attachment of knowledge and skills regarding blood pressure measurement. Prior to the intervention, participants completed a pretest consisting 10 multiple-choice questions (MCQs) assessing knowledge on blood pressure measurement.

After the intervention, the same 10 MCQs were administered as a posttest. In addition, facilitators assessed the participants' blood pressure measurement skills using structured rubrics consisting of nine assessment components. Each component was scored as follows: 0 if the participant did not perform the skill; 1 if the skill was performed with a significant error; and 2 if the skill was performed correctly. Following data collection, univariate analysis was conducted to describe the participant characteristics, and descriptive analysis was used to summarize the blood measurement skills assessment. Bivariate analysis was utilized to examine differences in knowledge scores before and after the intervention. Data normality was tested using the Shapiro-Wilk test. For normally distributed data, a Paired T-Test was applied.

3. RESULTS AND DISCUSSIONS

Based on the research, a total of 30 participants registered as community health workers at Puskesmas Selakau, from 11 different villages around Selakau subdistrict, with each village sending their two to three representatives. All of the community health workers who attended the training are willing to participate as respondents. The participants consisted of all females with mostly more than 35 years old (66.67%) and graduated from senior high school (46.67%) as seen at Table 1.

Table 1. Respondent Characteristics.

Characteristics	n	%
Age		
≤35 years	10	33.33
>35 years	20	66.67
Educational Attainment		
Primary School	3	10.00
Junior High School	9	30.00
Senior High School	14	46.67
Vocational High School	3	10.00
Bachelor's Degree	1	3.33
Gender		
Female	30	100

Source: Primary Data

Table 2. Level of Knowledge on Blood Pressure Measurement.

Assessment	Knowledge		Skills
	Pretest	Posttest	
Descriptive analysis			
Mean ± Standard Deviation	74.67 ± 16.34	90.00 ± 10.50	80.93 ± 13.35
Median	80	90	83.33
Mode	80	90	88.89
Hypothesis testing			
Paired T-Test	p value=0.00		

Source: Primary Data

Based on the Shapiro–Wilk normality test, the knowledge pretest scores were normally distributed ($p = 0.379$), whereas the posttest scores were not normally distributed ($p = 0.005$). This non-normal distribution of posttest scores may be correlated with the clustering of individual scores at higher values following the intervention. As presented in Table 2, the posttest mean score was 90.00 ± 10.50 , indicating a substantial improvement compared with the pretest results. Given the non-normal distribution of posttest data, a data transformation was conducted as the first step to

continue the data analysis process (Heryana, 2023). The transformation proposed to enhance the interpretability of effect sizes in the paired t-test analysis rather than solely to achieve residual normality. In addition, the transformation did not alter the substantive interpretation of the findings and supported more reliable statistical inference (Pek et al., 2017). After data transformation, the hypothesis testing was applied using Paired T-Test.

As shown in Table 2, the mean of the posttest knowledge score (90.00 ± 10.50) was higher than the pretest score (74.67 ± 16.34). This improvement was statistically significant based on the paired t-test results ($p=0.000$), indicating that the intervention had a significant effect on participants' knowledge regarding blood pressure measurement. Knowledge serves as a fundamental basis for decision-making and action when individuals encounter health-related problems. An individual's level of knowledge is influenced by both internal and external factors, including family support, community environment, and the availability of health-related facilities and infrastructure (Iyong et al., 2020). Knowledge plays an important role in shaping skills and health-related behaviors. Through counseling and training activities, participants as community health workers are expected to enhance their understanding and apply appropriate practices to assist the community in maintaining blood pressure within normal limits. In addition, health education and training function as preventive measures for individuals at risk of hypertension (Marbun & Hutapea, 2022). In this study, the pretest was used to assess participants' baseline knowledge, while the posttest evaluated the effectiveness of the intervention. The results demonstrate that education through a combination of lecture and small-group training on hypertension and proper blood pressure measurement significantly improved participants' knowledge, as evidenced by the opaired t-test findings. These results are consistent with previous studies, Iyong et al. (2020) reported increased knowledge of balanced nutrition among students at SMP Negeri 1 Nanusa, Talaud Regency, following health counseling using the lecture method. Similarly, research conducted at SMK Regenerasi Tатели and SMK Kristen Kota Manado showed a significant increase in adolescents' knowledge levels after counseling (Piri et al., 2019). Collectively, these findings reinforce the role of educational and counseling activities in improving knowledge levels. It also suggests that active learning approaches, particularly small group learning, facilitate stronger engagement with theoretical concepts. Small group learning provides opportunities for participants to collaborate with peers under the guidance of a facilitator. The key components of effective small-group learning include active participation, face-to-face interaction, and engagement in meaningful learning activities (Burgess et al., 2020). All of these elements were incorporated into the intervention implemented in this study, which may explain the observed improvement in participants' knowledge levels.

Table 3. Blood pressure measurement skills assessment analysis.

Items	Scores					
	0		1		2	
	n	%	n	%	n	%
Preparation and checking the equipment	0	0	4	13.33	26	86.66
Putting pressure cuff to patient's arm	0	0	8	26.66	22	73.33
Palpating radial artery and pumping the inflation bulb until the radial pulse is no longer palpable	0	0	12	40.00	18	60.00
Pumping the inflation bulb by the 30 mmHg beyond the point of the radial pulse is impalpable	2	6.66	12	40.00	16	53.33
Placing the diaphragm of stethoscope over the medial antecubital fossa	0	0	15	50.00	15	50.00
Deflating the cuff in a slow and controlled manner	0	0	12	40.00	18	60.00
Determining the systolic and diastolic pressure by listening to Korotkoff sounds	1	3.33	15	50.00	14	46.66
Releasing the cuff	1	3.33	8	26.66	21	70.00
Reporting the measurement results	1	3.33	7	23.33	22	73.33

Source: Primary Data

Similar to the participant's knowledge, skills for blood pressure measurement shows 80.93+13.35 as mean scores on Table 2. A detailed breakdown of the skills assessment is presented in Table 3. The majority of respondents achieved a score of 2, which indicates correct and in accordance with established guidelines. The highest scores were observed for equipment preparation and initial examination, with 86.66% of respondents (n = 26) scoring 2, indicating a strong understanding of essential preparatory steps prior to measurement. Similarly, the final stages of the procedure, including reporting results, demonstrated a high proportion of correct performance, with 73.33% of respondents scoring 2, reflecting a good overall comprehension of the measurement process. This level of performance may be attributed to the community health volunteers' prior exposure to training materials and familiarity with blood pressure measurement and interpretation in field settings. These findings are consistent with the study by (Sabu et al., 2021), who reported significant improvements in blood pressure measurement skills among Youth Red Cross students following training, underscoring the critical role of training in enhancing practical competencies.

Nevertheless, some respondents demonstrated adequate knowledge and skills performing the correct steps for measuring blood pressure, particularly in technical aspects such as using the sphygmomanometer. Similarly, (Sabu et al. (2021) reported that some students were able to follow

complete guidelines, although gaps were observed in areas such as cuff size selection, patient positioning, and cuff deflation rate. On the other hand, several items scored lower scores, indicating that some respondents did not achieve the maximum score in this study. For instance, in detailed technical steps such as determining systolic and diastolic pressure using Korotkoff sounds and inflating the cuff to 30 mmHg above the pulse point, some respondents still demonstrated suboptimal skills by score 0 and 1. This aligns with findings from Younis et al. (2024), who reported that nurses often performed poorly in inflating the cuff above the radial pulse before starting auscultation. These results suggest that while general understanding of blood pressure measurement was adequate, more complex technical skills require further training. Future educational programs should therefore focus on these technical aspects and ensure comprehension of the underlying principles and factors that may influence blood pressure readings.

Overall, the combined lecture and small-group training proved effective in enhancing community health volunteers' knowledge and skills in blood pressure measurement. Paired t-test results showed $p < 0.005$, and posttest mean skill scores exceeded 80, indicating that integrating cognitive learning with practical exercises strengthened both theoretical understanding and practical competencies. The learning strategies employed likely contributed to engagement, skill retention, and application in real-world settings. However, as this study was conducted at a single Puskesmas with a relatively small sample, the findings may have limited generalizability. Future research should include larger and more diverse samples of community health volunteers across different regions to better evaluate the effectiveness of such training in varied healthcare contexts.

4. SUMMARY

The combined lecture and small-group training effectively improved blood pressure measurement knowledge and skills among community health volunteers, enhancing both theoretical understanding and practical competencies. Future research should involve larger and more heterogeneous samples to further validate the effectiveness of this approach. Additionally, broader implementation and rigorous evaluation across different geographic regions and healthcare settings are necessary to establish its generalizability and scalability.

ACKNOWLEDGEMENTS

The authors sincerely thank Puskesmas Selakau for granting permission to conduct this study and the community health volunteers for their valuable participation. Appreciation is also extended to all individuals who contributed to the successful completion of this research.

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