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Research Article

Community Service: Education and Health Screening for Hypertension Prevention in Bontokanang Village, Galesong District, Takalar Regency, South Sulawesi, Indonesia

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Abstract

Hypertension remains a major global public health challenge and is a leading modifiable risk factor for cardiovascular diseases, including stroke, coronary artery disease, and heart failure. In rural communities, limited healthcare access and low health literacy contribute to delayed diagnosis and poor blood pressure control. Community-based education and screening programs have therefore become important strategies to improve awareness, support early detection, and encourage preventive health behaviors.

This community service program was conducted in 2026 in Bontokanang Village, Galesong District, Takalar Regency, South Sulawesi, Indonesia, from May 23 to May 28. The program involved 57 community participants and applied a participatory community-based approach. Intervention activities included structured health education, blood pressure screening, risk factor assessment, individualized counseling, and referral services. Educational sessions focused on hypertension risk factors, healthy lifestyle modification, dietary management, physical activity, smoking cessation, and the importance of regular blood pressure monitoring.

Screening results showed that 21 participants (36.8%) were classified as prehypertensive and 14 participants (24.6%) met the criteria for hypertension. Among participants with hypertension, most had not previously undergone routine blood pressure assessment. Following the intervention, participants demonstrated improved understanding of hypertension prevention and increased awareness regarding modifiable risk factors. In addition, many participants expressed willingness to adopt healthier lifestyle behaviors, including reducing salt intake and increasing physical activity.

In conclusion, the program demonstrated that community-based education and health screening interventions can effectively improve hypertension awareness, facilitate early detection, and promote preventive behaviors in rural communities. Strengthening similar interventions through collaboration with local healthcare services may contribute to reducing the long-term burden of hypertension and cardiovascular disease in South Sulawesi, Indonesia.

More Information

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Abbreviation: ACC: American College of Cardiology; AHA: American Heart Association; BMI: Body Mass Index; BMJ: British Medical Journal; CBPA: Community-Based Participatory Approach; GBD: Global Burden of Disease; JAMA: Journal of the American Medical Association; NCD: Non-Communicable Disease; PLoS: Public Library of Science; WHO: World Health Organization

Situational analysis

Hypertension remains a major public health problem because of its strong association with cardiovascular disease, stroke, heart failure, and chronic kidney disease. Its asymptomatic progression frequently delays diagnosis and treatment, increasing the risk of severe complications and premature mortality [3,5,14].

In Indonesia, hypertension is one of the leading non-communicable diseases contributing to morbidity and mortality. National surveys have reported increasing hypertension prevalence, particularly among adults living in rural and coastal communities. In South Sulawesi Province, hypertension remains a significant public health concern due to high salt consumption, smoking prevalence, limited physical activity, and inadequate preventive health practices.

Takalar Regency, South Sulawesi, Indonesia, faces multiple challenges related to hypertension prevention and control. Rural communities in this area often experience limited access to routine health screening, shortages of healthcare resources, and inadequate long-term monitoring services. Geographic barriers and socioeconomic limitations further

reduce healthcare utilization, resulting in delayed diagnosis and poor blood pressure control among community members.

Bontokanang Village in Galesong District reflects these local challenges. Preliminary observations and discussions with local health cadres indicated that awareness regarding hypertension risk factors and prevention strategies remained limited among residents. Routine blood pressure monitoring was uncommon, and several residents reported seeking healthcare services only after symptoms became severe. In addition, frequent consumption of high-salt foods and low physical activity levels may contribute to increased hypertension risk within the community.

Limited health literacy also affects hypertension prevention efforts in the village. Residents often have insufficient understanding regarding the asymptomatic nature of hypertension, the importance of routine screening, and the role of lifestyle modification in disease prevention. These conditions may contribute to delayed diagnosis, poor treatment adherence, and inadequate long-term blood pressure control. Similar findings have been reported in rural populations where educational limitations and reduced healthcare access negatively influence preventive health behavior [10,19].

Community-based interventions have demonstrated effectiveness in improving hypertension awareness, promoting healthy lifestyle behaviors, and facilitating early detection through routine screening programs. Previous studies have shown that educational interventions combined with blood pressure screening can improve knowledge, increase participation in preventive care, and support better hypertension management outcomes [1,6]. Integrated approaches involving counseling, lifestyle education, and regular monitoring have also been associated with reductions in blood pressure and improved cardiovascular health behaviors [2,16].

Considering these local conditions, community-based hypertension prevention activities are needed to improve awareness, support early detection, and encourage preventive health behaviors among residents. Educational interventions combined with blood pressure screening and referral mechanisms may help reduce undiagnosed hypertension and strengthen early management efforts in rural communities. Involving community leaders and local health volunteers may also improve program participation and sustainability.

Therefore, this community service program was conducted to improve hypertension awareness, identify individuals with elevated blood pressure through community screening, and promote preventive lifestyle behaviors among residents of Bontokanang Village, Galesong District, Takalar Regency, South Sulawesi, Indonesia.

Methods of community service

This community service program applied a community-based participatory approach (CBPA) and was conducted in 2026 from May 23 to May 28 in Bontokanang Village, Galesong District, Takalar Regency, South Sulawesi, Indonesia. The CBPA approach promoted active community involvement during the planning, implementation, and evaluation phases. This strategy ensured that the intervention remained culturally appropriate, contextually relevant, and sustainable. The program focused on hypertension prevention through integrated education, screening, and early intervention activities.

Before implementation, the team coordinated with village authorities, community leaders, and local health cadres to obtain approval and support community mobilization. The team also conducted socialization activities to inform residents about the program objectives, schedule, and benefits. Activities took place in accessible public locations, including village halls and community gathering spaces, to encourage broad participation.

Participants

A total of 57 residents voluntarily participated in the program. Recruitment used open invitations distributed through community announcements and local communication networks. Eligible participants included adult residents willing to attend educational and screening activities. The program did not apply strict exclusion criteria because it aimed to reach a broad community population, including individuals with and without a history of hypertension.

Participants represented diverse age groups, genders, and socioeconomic backgrounds, reflecting the demographic profile of the village. Before participation, facilitators obtained verbal informed consent from all participants. The team maintained confidentiality during health assessments and counseling sessions.

Intervention components

The intervention consisted of three integrated components: health education, health screening, and counseling with referral services.

1. Health education

Health education aimed to improve participants' understanding of hypertension prevention, risk factors, and disease management. Facilitators delivered sessions using interactive methods to increase participation and comprehension.

Educational topics

The sessions covered:

- Definition and pathophysiology of hypertension
- Modifiable and non-modifiable risk factors

- Signs, symptoms, and complications of uncontrolled hypertension
- Preventive strategies, including reduced salt intake, balanced nutrition, regular physical activity, weight control, and smoking cessation
- Importance of routine blood pressure monitoring and treatment adherence

Delivery methods

Facilitators used several teaching methods:

- Structured lectures using simple language
- Interactive discussions and question-and-answer sessions
- Printed educational materials, including leaflets and brochures

The team also used visual aids, charts, and culturally relevant examples to improve understanding among participants with different educational backgrounds.

2. Health screening

The screening component identified participants at risk for hypertension and provided baseline health information.

Blood pressure measurement

Trained personnel measured blood pressure using calibrated digital sphygmomanometers. Participants rested for at least five minutes before measurement. Measurements were taken in a seated position with the arm supported at heart level. Facilitators repeated measurements when initial readings were elevated.

The team classified blood pressure results into normal, prehypertension, and hypertension categories according to clinical guidelines. Participants received immediate explanations regarding their results.

Body mass index assessment

The team measured body weight and height using standardized equipment to calculate Body Mass Index (BMI). BMI values were categorized as underweight, normal weight, overweight, or obese according to international standards. This assessment helped identify obesity-related hypertension risks.

Risk factor assessment

Participants completed a brief structured questionnaire assessing:

- Smoking status
- Dietary habits, especially salt and fat intake
- Physical activity patterns
- Family history of hypertension or cardiovascular disease

The results helped identify high-risk individuals and supported individualized counseling.

3. Counseling and referral

The counseling and referral component provided individualized recommendations and facilitated access to healthcare services.

Individual counseling

Participants received counseling based on their screening results. Counseling focused on:

- Interpretation of blood pressure and BMI findings
- Identification of personal risk factors
- Lifestyle modification strategies, including diet, exercise, and smoking cessation
- Stress management and long-term behavior maintenance

Facilitators encouraged participants to set realistic health goals and involve family members in lifestyle changes.

Referral services

Participants with significantly elevated blood pressure received referrals to nearby primary healthcare facilities for further evaluation and management. Facilitators coordinated referral pathways with local health centers to support continuity of care. Each referred participant received written referral guidance.

Data collection and analysis

The team systematically collected demographic and clinical data throughout the program. Data included age, gender, blood pressure measurements, BMI values, and identified behavioral risk factors.

Facilitators recorded all information using standardized forms and verified data accuracy through cross-checking procedures.

Data analysis

The study used descriptive analysis to summarize participant characteristics and screening outcomes. Quantitative data were presented as frequencies, percentages, and mean values.

The analysis examined:

- Distribution of blood pressure categories
- Prevalence of smoking, obesity, and physical inactivity
- Participant attendance and engagement levels

The team also documented qualitative observations from discussions and counseling sessions to better understand community perceptions and behavioral patterns.

Ethical considerations

This community service program received ethical approval from the Health Research Ethics Committee of Palu Health Polytechnic, Ministry of Health, Republic of Indonesia, with Ethical Clearance Number: 5419/EC/PP/2016. The program was conducted in accordance with ethical principles involving voluntary participation, informed consent, confidentiality, and participant privacy protection throughout the implementation process.

Program evaluation

The evaluation assessed attendance rates, participant engagement, and screening outcomes. Facilitators also collected informal participant feedback regarding program usefulness and satisfaction.

Most participants reported that the educational sessions and free health screening were beneficial and relevant to their health needs. High attendance and active participation indicated strong community acceptance of the intervention.

Sustainability considerations

The program involved local stakeholders, including community leaders and health volunteers, to support sustainability. The team left educational materials with community representatives to support ongoing health promotion activities. Recommendations were also provided to local health authorities to integrate similar hypertension prevention activities into routine community health programs.

Overall, the program combined education, screening, and counseling within a participatory framework to strengthen hypertension prevention efforts in the community. This approach supported effective implementation, active community involvement, and early identification of hypertension risk factors in a rural population.

Results of community service

The community service program conducted in Bontokanang Village from May 23 to May 28 was implemented successfully with participation from all 57 registered residents, resulting in a participation rate of 100%. Attendance remained stable throughout the intervention period, indicating strong participant engagement in hypertension prevention and early detection activities. The participatory approach facilitated direct interaction between facilitators and participants and supported hypertension-related knowledge transfer.

All planned intervention components, including health education, blood pressure screening, and individualized counseling, were implemented according to schedule. Educational sessions used interactive discussions that encouraged participants to ask questions and discuss lifestyle-related hypertension risk factors (Table 1).

Key findings

One of the primary outcomes observed during the program was improved participant understanding regarding hypertension prevention and risk factors. Before the intervention, 38 participants (66.7%) demonstrated limited knowledge regarding hypertension risk factors, asymptomatic progression, and potential complications. Following the educational intervention, 49 participants (86.0%) were able to correctly identify major modifiable risk factors such as excessive salt intake, smoking, physical inactivity, obesity, and unhealthy dietary habits. In addition, 52 participants (91.2%) recognized the importance of routine blood pressure monitoring for early detection and prevention of complications.

The screening component identified elevated blood pressure levels among a considerable proportion of participants. Of the 57 participants screened, 21 individuals (36.8%) were classified as having prehypertension, while 14 individuals (24.6%) met the criteria for hypertension based on standard blood pressure classifications. Among participants classified as hypertensive, 10 individuals (71.4%) reported no previous diagnosis or routine blood pressure assessment. These findings demonstrate the presence of undiagnosed hypertension within the community.

Educational and counseling sessions also improved participants' understanding of lifestyle modification strategies for hypertension prevention and management. Following the intervention, 46 participants (80.7%) expressed willingness to reduce salt consumption, 41 participants (71.9%) planned to increase physical activity, and 37 participants (64.9%) intended to reduce tobacco use or avoid smoking exposure. In addition, 44 participants (77.2%) reported that the educational materials were practical and applicable to their daily lives.

Table 1: Demographic Characteristics of Participants (n = 57).

Characteristics	Frequency (n)	Percentage (%)
Gender		
Male	24	42.1
Female	33	57.9
Age Group (years)		
18–35	14	24.6
36–50	23	40.4
>50	20	35.0
Smoking Status		
Current smoker	18	31.6
Non-smoker	39	68.4
Physical Activity		
Physically active	22	38.6
Low physical activity	35	61.4
Frequent High-Salt Consumption	43	75.4

Community engagement during educational sessions remained high throughout the program. During group discussions, 50 participants (87.7%) actively contributed by asking questions, sharing experiences, or responding to facilitator prompts. The use of simple language, visual materials, and culturally appropriate communication improved participant comprehension across different educational backgrounds. Local community leaders also contributed to participant engagement and program acceptance.

Screening outcomes

Blood pressure screening used standardized measurement procedures to ensure consistency and reliability. Among the 57 participants screened, 22 individuals (38.6%) had normal blood pressure measurements, 21 participants (36.8%) were categorized as prehypertensive, and 14 participants (24.6%) were classified as hypertensive. The mean systolic blood pressure was 136.4 mmHg, while the mean diastolic blood pressure was 86.7 mmHg (Table 2).

Participants identified with elevated blood pressure received individualized counseling immediately after screening. Counseling focused on lifestyle modification, routine monitoring, medication adherence for previously diagnosed individuals, and recommendations for further medical evaluation. A total of 35 participants (61.4%) received counseling related to blood pressure management and cardiovascular risk reduction.

Referral recommendations were provided to all hypertensive participants. Specifically, 14 participants (24.6%) were advised to seek follow-up evaluation at the nearest primary healthcare facility for confirmation of diagnosis and ongoing management. Participants were also encouraged to involve family members in supporting dietary modification, physical activity, and adherence to recommended lifestyle changes.

The combined prevalence of prehypertension and hypertension reached 61.4% (35 of 57 participants), indicating a substantial burden of elevated blood pressure within the community. These findings support the need for regular blood pressure monitoring and continuous community-based hypertension prevention programs in Bontokanang Village.

Additional observations

Baseline knowledge regarding hypertension varied among participants. Before the intervention, only 19 participants (33.3%) demonstrated adequate understanding of hypertension risk factors and preventive measures, while 38 participants (66.7%) had limited knowledge regarding disease prevention and management. These findings indicate the need for tailored educational approaches in rural populations.

Table 2: Blood pressure screening outcomes and follow-up interventions (n = 57).

Variables	Frequency (n)	Percentage (%)
Blood pressure classification		
Normal	22	38.6
Prehypertension	21	36.8
Hypertension	14	24.6
Participants Receiving Counseling	35	61.4
Participants referred to healthcare facilities	14	24.6
Previously undiagnosed hypertension cases	10	71.4*

*Percentage calculated from participants classified as hypertensive (n = 14).

Dietary habits emerged as a major behavioral risk factor during discussions and counseling sessions. Approximately 43 participants (75.4%) reported frequent consumption of high-salt foods, including salted fish, instant foods, and preserved products commonly consumed within the community. Educational sessions emphasized gradual and culturally acceptable dietary modification strategies.

Social support also influenced participants' willingness to adopt healthier behaviors. During group discussions, 39 participants (68.4%) expressed interest in participating in future community-based health activities with family members or neighbors. This finding highlights the potential role of peer support in sustaining lifestyle modification efforts.

Overall impact

Overall, the intervention achieved its primary objectives related to hypertension awareness, early detection, and promotion of preventive health behaviors. The integration of health education, screening, and individualized counseling effectively identified previously undiagnosed hypertension cases and improved participant understanding regarding cardiovascular risk prevention. The 100% participation rate demonstrates the feasibility of community-based hypertension interventions in rural settings.

The program also contributed to community empowerment by improving participants' ability to recognize hypertension risk factors and adopt preventive behaviors. Increased awareness regarding blood pressure monitoring, dietary modification, physical activity, and smoking reduction indicated positive behavioral intentions following the intervention. These outcomes support the effectiveness of integrated community-based hypertension prevention programs in resource-limited settings.

In conclusion, the findings demonstrate that integrated educational and screening interventions can improve hypertension awareness, facilitate early identification of elevated blood pressure, and encourage preventive behavioral changes among rural populations. Continued implementation of similar community-based programs, combined with structured follow-up and collaboration with primary healthcare services, may contribute to long-term improvements in hypertension prevention and cardiovascular health outcomes.

Discussion

The findings of this community service activity are

consistent with evidence showing that community-based interventions improve hypertension awareness, early detection, and blood pressure control. In this program, integrated health education, blood pressure screening, and individualized counseling improved participants' knowledge and awareness regarding hypertension prevention. This finding aligns with previous studies reporting that integrated community interventions positively influence health behaviors and cardiovascular outcomes [1,6,16]. The increase in participant awareness indicates that short-term interventions can improve public understanding of chronic disease prevention when delivered appropriately.

Health education served as a key component of the intervention. Educational sessions provided culturally appropriate information regarding hypertension risk factors, diet, physical activity, and routine monitoring. This approach is particularly important in rural settings, where limited healthcare access frequently contributes to delayed diagnosis and inadequate disease management. Interactive discussions encouraged participants to ask questions, share experiences, and clarify misconceptions. Participatory learning methods have been shown to improve knowledge retention and support behavioral change in chronic disease prevention [16].

The screening component also played an important role in identifying participants at risk of hypertension. Blood pressure measurement and risk factor assessment enabled early detection of previously undiagnosed prehypertension and hypertension cases. Because hypertension frequently progresses without symptoms, early screening is essential to prevent delayed diagnosis and complications. Integrating screening activities into community settings reduced access barriers and encouraged participation among residents who rarely accessed healthcare facilities. Previous studies similarly reported that community-based screening programs improve hypertension detection and disease management outcomes [1,6].

The counseling and referral components strengthened the intervention by providing follow-up recommendations for participants with elevated blood pressure. Counseling sessions provided individualized recommendations based on participants' risk factors and health conditions. This personalized approach supported lifestyle modification and encouraged adherence to medical recommendations. Referral to primary healthcare services also strengthened continuity of care by linking community-based interventions with formal healthcare systems. Similar integration has been recognized as an important factor in long-term hypertension management [2,15].

Community-based interventions may also provide cost-effective and scalable approaches for hypertension prevention in low-resource settings. Rural healthcare systems in Indonesia often experience limitations related to infrastructure, workforce, and funding. Community-based programs address these constraints by utilizing local resources and community participation while minimizing dependence on advanced healthcare infrastructure. Previous evidence indicates that interventions involving community health workers and non-physician personnel can improve blood pressure outcomes at relatively low cost [8,17]. The successful implementation of this program in Bontokanang Village suggests that similar interventions may be replicated in other rural communities with comparable characteristics.

The program also emphasized the importance of modifying behavioral and lifestyle-related risk factors. Participants received education regarding excessive salt intake, physical inactivity, smoking, and unhealthy dietary habits as major modifiable contributors to hypertension. Although behavioral change is difficult to achieve, repeated health education and counseling may gradually influence lifestyle practices. Positive participant responses following the intervention indicate the potential effectiveness of community-based education in supporting healthier lifestyle behaviors. This finding is important because lifestyle modification remains a cornerstone of hypertension prevention and management [16].

The social dimension of the intervention also contributed to participant engagement. Community-based programs encourage collective participation and peer support. High engagement during educational sessions reflected strong community interest in health promotion activities. Social interaction during group discussions may strengthen motivation for behavioral change through shared learning experiences. In addition, involvement of community leaders and local stakeholders appeared to improve program acceptance and participation.

Despite these positive findings, several limitations should be acknowledged. First, the six-day intervention period limited evaluation of long-term outcomes related to blood pressure control and sustained behavioral change. Although improvements in awareness and behavioral intention were observed, long-term sustainability could not be assessed. Longitudinal follow-up is therefore necessary to evaluate continued adherence to lifestyle modification and referral outcomes.

Second, the study primarily used descriptive analysis, which limited causal interpretation of intervention effectiveness. Future studies should incorporate pre- and post-intervention assessments or controlled study designs to strengthen evaluation of program impact. In addition, the relatively small sample size of 57 participants may limit generalizability to broader populations.

Third, measurement bias may have affected blood pressure assessment and self-reported behavioral data.

Despite standardized procedures, variations in measurement conditions and participant reporting may have influenced data accuracy. Future interventions should incorporate more standardized protocols and objective indicators when possible.

Another limitation was the absence of detailed socioeconomic and demographic analysis. Variables such as educational level, occupation, income, and cultural practices may influence hypertension risk and intervention outcomes. Future studies should incorporate these variables to better understand determinants of hypertension and intervention effectiveness in rural populations.

Several recommendations may improve the sustainability and long-term impact of similar interventions. First, integration between community-based programs and primary healthcare systems should be strengthened to improve continuity of care. Collaboration with local healthcare providers may facilitate follow-up monitoring and management for individuals identified with elevated blood pressure. Second, training community health workers to conduct education and screening activities may expand program reach and sustainability [8,17].

Third, regular follow-up sessions and periodic screening programs are needed to reinforce behavioral change and maintain community engagement. Digital health tools, including mobile reminders, may further support adherence to lifestyle modification and follow-up recommendations.

Finally, future hypertension prevention programs should adopt broader multi-sectoral collaboration involving local government, educational institutions, and community organizations. Such collaboration may strengthen health promotion initiatives related to nutrition, physical activity, and tobacco control. Addressing social determinants of health remains essential for reducing hypertension prevalence and improving long-term population health outcomes [2,15].

In conclusion, this community service activity demonstrates that community-based education, screening, and counseling interventions can improve hypertension awareness and facilitate early detection among rural populations. The program improved participant knowledge, identified individuals with elevated blood pressure, and encouraged preventive behavioral changes. Despite several limitations, the findings provide useful evidence for future community-based hypertension prevention programs. Sustained collaboration between community stakeholders and healthcare systems is necessary to support long-term hypertension control and cardiovascular health improvement.

Conflict of interest: The author declares that there are no conflicts of interest related to the implementation, analysis, or publication of this community service program.

Data availability statement: The data supporting the findings of this study are available from the corresponding author upon reasonable request. The data are not publicly available due to participant confidentiality and ethical considerations.

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