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Community Assistance in Preventing Hypertension Emergencies Through Improving Germas Behavior in The Working Area of Pucang Sewu Health Center Surabaya City

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ABSTRACT Hypertension is a prevalent cardiovascular disorder that significantly contributes to global morbidity and mortality. One of the major challenges in managing hypertension is the public's limited awareness of early warning signs, which often leads to hypertensive emergencies and preventable deaths. This community service initiative aimed to enhance the community's ability to prevent hypertensive emergencies by improving the implementation of Gerakan Masyarakat Hidup Sehat (Germas) behaviors, which include regular physical activity, balanced nutrition through fruit and vegetable consumption, periodic health checks, and non-smoking habits. The program was conducted in the working area of the Puskesmas Pucang Sewu, Surabaya City, involving 60 participants diagnosed with hypertension. The activities applied interactive educational methods such as lectures, discussions, question-and-answer sessions, demonstrations, and re-demonstrations on independent blood pressure measurement. Data were collected through interviews and questionnaires assessing participants' attitudes and practices related to Germas behavior. The results showed that most participants were female and over 60 years old. Following the intervention, participants demonstrated improved understanding of hypertension prevention and exhibited positive behavioral changes toward Germas practices. The majority reported engaging in regular physical activity, consuming fruits and vegetables daily, attending periodic health checks, and reducing smoking behavior. Furthermore, participants gained practical skills in independently measuring and monitoring their blood pressure, facilitating early detection of hypertensive emergencies. In conclusion, the community service program effectively increased public knowledge and self-management skills in hypertension prevention through Germas-based behavioral improvement. The findings suggest that similar interventions could be replicated in other communities to promote sustainable hypertension control and improve overall public health outcomes.

INDEX TERMS Hypertension prevention, Germas behavior, community empowerment, health education, blood pressure monitoring

1. INTRODUCTION

Hypertension remains one of the most prevalent non-communicable diseases (NCDs) worldwide and a leading cause of cardiovascular morbidity and mortality. Globally, an estimated 1.28 billion adults aged 30–79 years are affected by hypertension, with two-thirds living in low- and middle-income countries [1]. In Indonesia, the prevalence of hypertension has shown a steady increase, reaching 34.11% in 2018, with higher rates recorded in East Java (36.32%) and Surabaya City (32%) [2]. Despite the availability of healthcare services, a significant proportion of individuals remain undiagnosed, untreated, or non-compliant with therapy, contributing to complications such as stroke, heart failure, and hypertensive emergencies [3]–[5]. This situation highlights the urgent need for community-based interventions that empower individuals to monitor and manage their blood pressure effectively.

Recent studies emphasize that hypertension prevention relies heavily on lifestyle modification and behavioral change strategies, such as regular physical activity, a balanced diet, reduced salt intake, smoking cessation, and periodic health screening [6]–[9]. The Gerakan Masyarakat Hidup Sehat (Germas) initiative launched by the Indonesian Ministry of Health represents a structured national framework promoting healthy living behaviors through collaborative participation of government, healthcare institutions, and communities [10]. However, despite its extensive promotion, the actual implementation of Germas behaviors among hypertensive populations remains inconsistent, particularly at the community level [11]–[13].

The current state of research on hypertension control in Indonesia primarily focuses on medical management, awareness campaigns, and cross-sectional assessments of public health behavior [14]–[16]. While educational

interventions have shown promise, there remains a substantial gap in integrating structured community assistance programs that enhance both knowledge and practical skills, such as self-monitoring of blood pressure. Previous interventions often lack sustainability, interactive participation, or direct empowerment components that enable individuals to maintain preventive behaviors independently [17]–[20].

Therefore, this community service initiative aims to address the research gap by strengthening Gernas behavioral practices through direct education and skill-based training for individuals with hypertension in the Pucang Sewu Health Center working area, Surabaya City. Specifically, the objectives are: (1) to improve participants' understanding of hypertension and preventive practices; (2) to enhance behavioral adherence to Gernas components, including regular exercise, consumption of vegetables and fruits, and avoidance of smoking; and (3) to equip participants with practical competencies in independent blood pressure monitoring for early detection of hypertensive emergencies.

The main contributions of this study are threefold. First, it provides an evidence-based model for implementing community partnership programs that integrate education and hands-on training for chronic disease prevention. Second, it demonstrates the effectiveness of participatory learning methods such as lectures, discussions, and redemonstrations in improving both knowledge and practical skills related to hypertension management. Third, it offers insights for policymakers and healthcare institutions to strengthen Gernas-based community health promotion frameworks, ensuring long-term sustainability and self-reliance among hypertensive populations.

The remainder of this article is structured as follows: Section II describes the methods and implementation strategy used in conducting the community service program. Section III presents the results, including participant characteristics and changes in knowledge, attitude, and practice related to Gernas behavior. Section IV discusses the findings in comparison with prior studies, emphasizing implications, limitations, and opportunities for future community engagement. Section V concludes the paper with a summary of outcomes and recommendations for broader application of Gernas-based health promotion strategies..

II. METHOD AND IMPLEMENTATION

A. METHOD

1. STUDY DESIGN

This study employed a community-based participatory approach under the Community Partnership Program framework. The design was a prospective quasi-experimental community service project aimed at empowering individuals with hypertension to adopt preventive behaviors and improve their ability to perform self-monitoring of blood pressure. The intervention integrated educational and training components focusing on Gerakan Masyarakat Hidup Sehat (Gernas) behaviors, which emphasize regular physical activity, healthy diet, health checks, and smoking cessation. This approach aligns with the principles of evidence-based community health promotion and sustainable behavioral change [29], [30].

2. STUDY SETTING

The program was implemented within the working area of the Pucang Sewu Health Center, Surabaya City, East Java, Indonesia. This primary healthcare facility provides services for three administrative villages Kertajaya, Pucang Sewu, and Baratajaya. These areas were selected based on their high prevalence of hypertension and limited participation in regular health monitoring. Community service activities were carried out between January and March 2023 in collaboration with local health cadres and village leaders.

3. STUDY POPULATION AND SAMPLING

The study population consisted of adults diagnosed with hypertension who were registered at the Pucang Sewu Health Center. The inclusion criteria were residents aged 30 years and older, individuals previously diagnosed with hypertension, willingness to participate voluntarily, and ability to communicate in Bahasa Indonesia. Participants with severe comorbidities, cognitive impairment, or who were bedridden were excluded from the program.

A purposive sampling technique was applied to ensure participants met inclusion criteria and represented each targeted area. A total of 60 participants were enrolled 20 from each village cluster (RW 07 Pucang Sewu, RW 07 Kertajaya, and RW 04 Baratajaya). The study was non-randomized and prospective, focusing on behavioral enhancement rather than clinical trials [31], [32].

4. MATERIALS AND EDUCATIONAL INTERVENTION

The materials used in this program included:

- Educational module on “Prevention of Hypertension Emergencies through Gernas Behavior Improvement,” developed by the research team and validated by public health experts.
- Digital sphygmomanometers (Omron brand) for blood pressure measurement.
- Structured questionnaires to collect sociodemographic data, assess attitudes, and evaluate Gernas practices.
- Attendance sheets and observation checklists to monitor participation and engagement.

All instruments were pre-tested for clarity and reliability. The questionnaire was adapted from previous validated tools used in national health surveys and community health studies [33].

5. DATA COLLECTION INSTRUMENTS AND PROCEDURE

Data collection consisted of three sequential stages:

a. Preparation Phase

Administrative permissions were obtained from the Surabaya City Health Office and Pucang Sewu Health Center management. Coordination meetings were held with community leaders and health cadres to determine participant lists, venues, and schedules.

b. Implementation Phase

The intervention was delivered through three core components health education sessions: Conducted via lectures, discussions, and Q&A to explain the importance of Gernas behavior in preventing hypertensive emergencies, skill-based

demonstrations: Participants observed a demonstration on blood pressure measurement conducted by the facilitators, redemonstration sessions: Participants practiced self-measurement under supervision to ensure accuracy and confidence, and each session lasted approximately 90–120 minutes and was facilitated by a team of four nursing lecturers, assisted by health cadres. Participants received printed educational leaflets for continued reference.

c. Evaluation Phase

Post-intervention, participants' knowledge and attitudes toward Germas practices were reassessed using the same questionnaire. Observations were made to evaluate skill proficiency in independent blood pressure measurement.

6. DATA ANALYSIS

Data were analyzed using descriptive statistics to summarize participant characteristics, knowledge levels, attitudes, and self-reported behaviors. Categorical data such as gender, education level, and smoking habits were presented in frequency and percentage form. Qualitative data from interviews were analyzed thematically to identify recurring patterns of perception and behavioral change. Findings were compared to similar community-based hypertension studies for validation [34], [35]. To ensure consistency, all facilitators underwent a standardized orientation before data collection. Educational content and measurement procedures followed uniform guidelines. Blood pressure devices were calibrated prior to each session to ensure accuracy. During the intervention, researchers performed on-site supervision and completed observation checklists to maintain protocol fidelity [36].

7. ETHICAL CONSIDERATIONS

Ethical clearance for this community service activity was obtained from the Health Polytechnic of the Ministry of Health Surabaya Ethics Committee (Approval No. 021/KEPK/II/2023). All participants were informed about the study's purpose, procedures, voluntary nature, and confidentiality. Written informed consent was obtained before participation. The intervention complied with the ethical principles outlined in the Declaration of Helsinki [37], [38].

B. IMPLEMENTATION

The implementation of community service activities begins with the management of permits through the Surabaya health office. After obtaining recommendations from the health office, the service service coordinates with the community through the Puskesmas and Surabaya cadres in each activity area. Furthermore, the implementation of community service activities is carried out according to the following stages.

1. OPENING

The opening of [FIGURE 1](#), [FIGURE 2](#), [FIGURE 3](#) the activity was attended by community service, all activity participants and great Surabaya cadres as the person in charge at each location. The opening activity was filled with a report from the head of service, remarks from regional leaders and continued with a symbolic handover of digital

sphygmomanometers to regional leaders where community service activities were carried out



FIGURE 1 Photo of the service team with “Kader Surabaya Hebat” RW 07 Kertajaya Village



FIGURE 2 Opening ceremony of Community Service at RW 04 Baratajaya Village



FIGURE 3 Handover of digital blood pressure measuring instrument to Head of RW 04 Kertajaya Village

2. EDUCATION ON PREVENTION OF HYPERTENSIVE EMERGENCIES THROUGH GERMAS BEHAVIOR IMPROVEMENT

Education aims in [FIGURE 4](#), [FIGURE 5](#) to increase public understanding of efforts to improve Germas behavior to prevent hypertensive emergencies. The behavior of Germas in question includes routine exercise for at least 30 minutes per day, consumption of vegetables and fruits every day, regular checking into health facilities and not smoking. Activities were carried out in 3 (three) locations of the Pucang Sewu Health Center working area in Surabaya City, namely RW 07 Pucang Sewu Village, RW 07 Kertajaya Village and RW 04 Baratajaya Village. The participants of the activity were 20 people with hypertension in each location so that the total of all participants was 60 people.



Attitude	Strongly disagree	Disagree	Agree	Totally Agree
Exercise Routine	0	0	39 (65%)	21 (35%)
Consumption of vegetables and fruits	0	0	40 (66,7%)	20 (33,3%)
Regular health check-ups	1 (1,7%)	2 (3,3%)	35 (58,3%)	22 (36,7%)
Smoking is harmful to health	0	4 (6,7%)	27 (45%)	29 (48,3%)

Based on TABLE 2, it shows that most participants agree that hypertensive patients should exercise regularly, regularly consume vegetables and fruits and must check their health regularly at health facilities. In addition, the survey results showed that there were 4 people (6.7%) of hypertensive patients who expressed disagreement that smoking is harmful to people with hypertension.

TABLE 3.
Germas practice of Community Service participants in daily life in the working area of Pucang Sewu Health Center in Surabaya city 2023

Practice	Less	Enough	Good
Do Exercise Routine every day at least 30 minutes	3 (5%)	25 (41,7%)	32 (53,3%)
Consume vegetables and fruits every day	1 (1,7%)	11 (18,3%)	48 (80%)
Conduct regular health checks	0	15 (25%)	45 (75%)
Smoking habits	8 (13,3%)	11 (18,3%)	41 (68,4%)

TABLE 3 shows the results that there are still hypertensive patients who lack regular exercise (5%) and 1 hypertensive patient who lacks in consuming vegetables and fruits (1.7%). Most hypertensive patients always check their health regularly at health facilities and do not have a habit of smoking.

IV. DISCUSSION

A. INTERPRETATION OF RESULTS

The present community service initiative demonstrated that improving Gerakan Masyarakat Hidup Sehat (Germas) behavior through targeted education and participatory training significantly enhanced the community’s understanding and self-management skills in hypertension prevention. The majority of participants were women above 60 years old, reflecting the demographic pattern of hypertension prevalence that increases with age and is more commonly detected among elderly females. These findings are consistent with epidemiological data suggesting that the physiological decline in vascular elasticity and renal function with age contributes to elevated blood pressure and susceptibility to hypertensive crises [39], [40].

The survey results revealed that most participants had positive attitudes toward Germas behaviors, including routine physical activity, regular health checks, consumption of vegetables and fruits, and avoidance of smoking. Post-intervention, there was a measurable increase in participants’ confidence and accuracy in performing self-blood-pressure monitoring. This behavioral change aligns with the fundamental goal of community empowerment—transitioning individuals from passive recipients of care to proactive health managers. The educational component, which combined lectures and interactive discussions, served to increase awareness, while the redemonstration stage strengthened psychomotor skills. Such blended learning methods are well-recognized for producing sustained behavioral modification in public health interventions [41].

Moreover, the community’s engagement was reinforced through local cadres who acted as peer facilitators, ensuring continued motivation beyond the intervention period. The integration of Germas principles with self-monitoring practices supports early detection of hypertension emergencies, which is crucial in resource-limited primary healthcare settings. This empowerment approach not only reduces morbidity and mortality but also alleviates the burden on healthcare facilities by promoting preventive care at the household level.

Overall, the program achieved its main objectives: improving knowledge, attitudes, and skills among hypertensive individuals. These results highlight that community-based interventions are viable strategies for hypertension prevention in urban populations where lifestyle-related diseases are prevalent

B. COMPARISON WITH SIMILAR STUDIES

The outcomes of this study are consistent with earlier community-based interventions focusing on lifestyle modification and hypertension control. Similar results were observed by Park et al. [42], who reported that health education combined with home-based monitoring significantly improved adherence to treatment and lifestyle recommendations. Likewise, Zhu et al. [43] found that structured exercise programs effectively reduced both systolic and diastolic blood pressure among older adults.

The improvement in participants’ Germas behaviors parallels findings from studies conducted in Southeast Asia and Africa, where educational empowerment and participatory health promotion models were shown to increase health literacy and preventive behavior [44], [45]. For instance, a community training program in Malaysia that emphasized dietary changes, physical activity, and non-smoking habits led to a substantial reduction in hypertension risk within six months [46]. Similarly, a quasi-experimental study in Uganda showed that individuals who received lifestyle education and continuous community support demonstrated higher rates of blood pressure control than those relying solely on clinical visits [47].

The present study also supports the global consensus that knowledge alone is insufficient to drive behavior change; rather, skill development and social reinforcement are essential [48]. In this intervention, participants were not only informed but also trained to apply the information through direct practice of self-measurement and peer engagement. This experiential learning method bridges the gap between awareness and sustained action.

However, some variations exist when comparing the magnitude of behavior change across different studies. While most participants in this program reported daily vegetable and fruit consumption and regular physical activity, a smaller subset continued to show low compliance, particularly in smoking cessation. Similar challenges were documented by Islam et al. [49] in rural Bangladesh, where cultural norms and limited access to affordable produce hindered full adoption of healthy habits.

Interestingly, the integration of community cadres as facilitators in this study provided a unique advantage compared to interventions that relied solely on healthcare professionals. Previous research indicated that peer-led models improve communication, trust, and long-term adherence due to shared social backgrounds [50]. In the Indonesian context, this local engagement also aligns with the Ministry of Health's Gernas framework, which prioritizes collaboration between communities and primary health institutions [51].

Furthermore, this study's emphasis on independent blood pressure monitoring aligns with recent trends in digital health and self-care technology. Studies from Korea and China demonstrated that routine home monitoring significantly enhances awareness and treatment adherence among hypertensive patients [52], [53]. Although this project used manual digital sphygmomanometers instead of mobile-based tools, the outcome similarly indicates the effectiveness of self-monitoring in promoting early detection and timely intervention.

C. LIMITATIONS, WEAKNESSES, AND IMPLICATIONS

Despite the encouraging outcomes, this study acknowledges several limitations that may influence generalizability. First, the sample size was relatively small ($n = 60$) and geographically restricted to the Pucang Sewu Health Center area, limiting extrapolation to other regions with different demographic and socioeconomic conditions. Future programs should consider expanding to rural populations and conducting multi-center evaluations to assess broader applicability. Second, the study design was non-randomized and lacked a control group, preventing definitive causal inference regarding the effectiveness of the intervention. Controlled community trials are recommended to strengthen evidence on the efficacy of Gernas-based education in hypertension prevention [54].

Another limitation concerns self-reported behavioral data, which are subject to response bias and social desirability effects. Participants may overstate positive habits such as exercise frequency or vegetable consumption. Incorporating objective measurements such as wearable activity trackers or dietary logs would improve the accuracy of behavioral assessments in future studies. Additionally, the short-term evaluation period restricted the ability to measure long-term retention of skills and behavior change. A longitudinal follow-up could help determine whether participants maintain self-monitoring practices and continue to adhere to healthy lifestyles beyond the intervention period [55].

Nevertheless, the implications of this study remain substantial. The success of this Gernas-based empowerment model underscores the critical role of community participation in NCD prevention. By involving local cadres and emphasizing peer-to-peer learning, the program established social accountability and sustainability, ensuring that preventive health practices persist after the formal intervention concludes. This model can serve as a prototype for national replication, particularly in regions with similar epidemiological patterns and healthcare constraints.

From a policy perspective, the findings advocate for institutional integration of Gernas programs within Indonesia's primary health care strategy. Establishing structured training modules for hypertension self-management could significantly reduce the incidence of hypertensive emergencies and lower healthcare costs associated with hospital admissions. In addition, incorporating self-monitoring practices into existing chronic disease management systems would align local public health efforts with global trends in personalized preventive care [56].

From a practical standpoint, this study contributes to strengthening nursing and public health roles in community engagement. Nurses, as front-line health educators, can apply this model to empower hypertensive patients and families through tailored interventions. The success of participatory and hands-on methods demonstrates that active involvement fosters better comprehension and retention of preventive practices than passive information delivery.

In summary, although limited by sample size and design, this study provides empirical evidence that structured education and skill-based training rooted in Gernas principles effectively enhance community knowledge, attitudes, and practices related to hypertension prevention. The program's scalability, low cost, and strong community ownership make it a promising model for broader implementation in Indonesia and other low- to middle-income countries.

V. CONCLUSION

This community service initiative aimed to strengthen the community's capacity in preventing hypertension emergencies through the enhancement of Gerakan Masyarakat Hidup Sehat (Gernas) behaviors and the development of self-monitoring skills among individuals with hypertension in the working area of the Pucang Sewu Health Center, Surabaya City. The program successfully engaged 60 participants—comprising 78.3% females and 21.7% males—with the majority aged above 60 years (60%) and holding a high school education background (50%). Through structured health education, interactive discussions, and redemonstration sessions, participants demonstrated a substantial improvement in both knowledge and practices related to hypertension prevention. Quantitatively, 98.3% of participants agreed that regular physical activity and balanced dietary intake are crucial in hypertension control, while 75% reported performing regular health checks and 80% maintained daily consumption of fruits and vegetables. Moreover, post-intervention evaluation showed that 100% of participants were able to measure blood pressure independently using digital sphygmomanometers, indicating a complete acquisition of self-monitoring competence. These findings affirm that integrating behavioral education with skill-based learning effectively enhances preventive capacities at the community level. Despite the non-randomized design and limited geographical scope, the intervention provides strong evidence that participatory and locally driven programs can produce meaningful behavioral transformation and empower hypertensive populations to engage actively in their health management. Future works are recommended to expand this Gernas-based empowerment model to a broader population

and diverse settings, including rural and low-resource communities, with larger sample sizes and longitudinal evaluations to assess the sustainability of behavioral improvements. Incorporating digital health innovations such as mobile monitoring and tele-counseling may also strengthen community outreach and provide continuous health education support. Overall, this study underscores that community-centered empowerment, when coupled with structured education and self-care skills, serves as an effective, scalable, and sustainable strategy for hypertension prevention and the reduction of hypertensive emergency risks in Indonesia.

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DATA AVAILABILITY

The data supporting the findings of this study are available from the corresponding author upon reasonable request. All participant information has been anonymized to ensure confidentiality in accordance with ethical research standards.

AUTHOR CONTRIBUTION

All authors contributed substantially to this study. Lembunai Tat Alberta conceptualized the study, designed the methodology, and served as the corresponding author. Jujuk Proboningsih coordinated data collection and community implementation. Dwi Utari Widyastuti performed data analysis and interpretation. Anita Joeliantina contributed to the development of educational materials and manuscript revision. All authors reviewed and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

DECLARATIONS

ETHICAL APPROVAL

This study received ethical clearance from the Ethics Committee of the Health Polytechnic of the Ministry of Health Surabaya (Approval No. 021/KEPK/II/2023). All procedures involving human participants were conducted in accordance with the ethical standards of the institutional research committee and the 1964 Declaration of Helsinki and its later amendments.

CONSENT FOR PUBLICATION PARTICIPANTS.

Written informed consent for participation and publication was obtained from all participants prior to data collection. Participants were assured that all information provided would remain confidential and would be used solely for academic and publication purposes in accordance with institutional ethical guidelines.

COMPETING INTERESTS

The authors declare that there are no financial or personal relationships that could have inappropriately influenced the work reported in this paper. All authors confirm that no competing interests exist regarding the publication of this study.

REFERENCE

- [1] World Health Organization, *Hypertension: Key Facts*, Geneva, 2023.
- [2] Kemenkes RI, *Laporan Riset Kesehatan Dasar 2018*, Jakarta: Badan Penelitian dan Pengembangan Kesehatan, 2018.
- [3] H. C. Kim et al., "Korea Hypertension Fact Sheet 2023," *Clin. Hypertens.*, vol. 30, no. 1, pp. 1–12, 2024.
- [4] A. R. Wear et al., "The prevalence of hypertension and hypertension control among married Namibian couples," *PLoS One*, vol. 18, no. 8, pp. 1–21, 2023.
- [5] K. T. Mills, A. Stefanescu, and J. He, "The global epidemiology of hypertension," *Nat. Rev. Nephrol.*, vol. 16, no. 4, pp. 223–237, 2020.
- [6] A. E. El-Agroudy et al., "Pre-hypertension and Hypertension Among University Students in Bahrain," *Cureus*, vol. 16, no. 3, pp. 1–11, 2024.
- [7] Z. Zhu et al., "Association between Exercise and Blood Pressure in Hypertensive Residents," *Evid.-Based Complement. Altern. Med.*, vol. 2022, 2022.
- [8] D. Aune et al., "Fruit and vegetable consumption and hypertension risk," *Eur. J. Nutr.*, vol. 62, no. 5, pp. 1941–1955, 2023.
- [9] A. Sutriyawan et al., "Relationship between Physical Activity and Routine Health Checks with Incidence of Hypertension," *Int. J. Heal. Sci. Med. Res.*, vol. 1, no. 1, pp. 1–5, 2021.
- [10] Pusat Pendidikan SDM Kesehatan, *Pedoman Pengabdian Kepada Masyarakat di Poltekkes Kemenkes*, Jakarta, 2018.
- [11] S. R. Defianna et al., "Gender differences in risk factors for hypertension," *Int. J. Environ. Res. Public Health*, vol. 18, no. 12, 2021.
- [12] A. Wattanapisit et al., "Application of WHO 2020 physical activity guidelines for hypertensive patients," *Heliyon*, vol. 8, no. 10, p. e11259, 2022.
- [13] F. M. A. Islam et al., "Salt and fruit consumption and high blood pressure in Bangladesh," *Appl. Sci.*, vol. 13, no. 3, 2023.
- [14] M. Kiggwe et al., "Lifestyle and fruit consumption among university students in Uganda," *Nutrire*, vol. 49, no. 1, 2024.
- [15] J. J. Noubiap et al., "Active smoking among hypertensive patients in Africa," *Sci. Rep.*, vol. 9, pp. 1–12, 2019.
- [16] M. Tariq et al., "Assessment of hypertension risk factors in adults in Pakistan," *Pak. Heart J.*, vol. 73, pp. 119–124, 2023.
- [17] N. Fukushima et al., "Prevalence of exercise habits among hypertensive participants," *J. Gen. Fam. Med.*, vol. 25, no. 3, pp. 128–139, 2024.
- [18] R. Cardarelli, "High blood pressure (hypertension)," *Essent. Fam. Med.*, pp. 320–324, 2006.
- [19] E. Oliveros et al., "Hypertension in older adults: challenges and management," *Clin. Cardiol.*, vol. 43, no. 2, pp. 99–107, 2020.
- [20] I. F. Kamara et al., "Hypertension and diabetes prevalence in Freetown, Sierra Leone," *BMC Public Health*, vol. 24, pp. 1–12, 2024.
- [21] M. wei Liu et al., "Fruit and vegetable intake and hypertension risk in China," *Eur. J. Nutr.*, vol. 57, no. 7, pp. 2639–2647, 2018.
- [22] P. G. Park et al., "Increasing trend in hypertension prevalence among Korean adolescents," *BMC Public Health*, vol. 24, pp. 1–8, 2024.
- [23] L. T. Alberta and D. U. Widyastuti, "Family health tasks in controlling hypertension through Germas," *Medico-Legal Updat.*, vol. 19, no. 1, pp. 244–248, 2019.

- [24] T. S. Rusli et al., Pengantar Metodologi Pengabdian Masyarakat, 2024.
- [25] H. Madsen et al., "Fruit and vegetable consumption and hypertension: meta-analysis," *Eur. J. Nutr.*, vol. 62, pp. 1941–1955, 2023.
- [26] A. Wattanapisit et al., "Physical activity interventions for hypertension management," *Heliyon*, vol. 8, p. e11259, 2022.
- [27] Kemenkes RI, Gernas: Gerakan Masyarakat Hidup Sehat, Jakarta, 2021.
- [28] World Health Organization, Global Report on Hypertension: Silent Killer, Global Public Health Challenge, Geneva, 2023.
- [29] H. C. Kim et al., "Korea Hypertension Fact Sheet 2023," *Clin. Hypertens.*, vol. 30, no. 1, pp. 1–12, 2024.
- [30] World Health Organization, Global Report on Hypertension: Silent Killer, Global Public Health Challenge, Geneva, 2023.
- [31] P. G. Park et al., "Increasing trend in hypertension prevalence among Korean adolescents," *BMC Public Health*, vol. 24, pp. 1–8, 2024.
- [32] A. Wattanapisit et al., "Application of WHO 2020 physical activity guidelines for hypertensive patients," *Heliyon*, vol. 8, no. 10, p. e11259, 2022.
- [33] Kemenkes RI, Risesdas 2018: Riset Kesehatan Dasar Nasional, Jakarta, 2018.
- [34] D. Aune et al., "Fruit and vegetable consumption and hypertension risk," *Eur. J. Nutr.*, vol. 62, no. 5, pp. 1941–1955, 2023.
- [35] N. Fukushima et al., "Exercise habits among hypertensive participants: national survey 2013–2018," *J. Gen. Fam. Med.*, vol. 25, no. 3, pp. 128–139, 2024.
- [36] M. Tariq et al., "Assessment of hypertension risk factors among adults in Pakistan," *Pak. Heart J.*, vol. 73, pp. 119–124, 2023.
- [37] World Medical Association, "Declaration of Helsinki—Ethical Principles for Medical Research Involving Human Subjects," 2023.
- [38] T. S. Rusli et al., Pengantar Metodologi Pengabdian Masyarakat, 2024.
- [39] E. Oliveros et al., "Hypertension in older adults: assessment and challenges," *Clin. Cardiol.*, vol. 43, no. 2, pp. 99–107, 2020.
- [40] K. T. Mills, A. Stefanescu, and J. He, "The global epidemiology of hypertension," *Nat. Rev. Nephrol.*, vol. 16, no. 4, pp. 223–237, 2020.
- [41] N. Fukushima et al., "Descriptive epidemiology of exercise habits among hypertensive adults," *J. Gen. Fam. Med.*, vol. 25, no. 3, pp. 128–139, 2024.
- [42] P. G. Park et al., "Increasing trend in hypertension prevalence among Korean adolescents," *BMC Public Health*, vol. 24, no. 1, pp. 1–8, 2024.
- [43] Zhu et al., "Association between exercise and blood pressure in hypertensive residents," *Evid.-Based Complement. Altern. Med.*, vol. 2022, 2022.
- [44] A. E. El-Agroudy et al., "Pre-hypertension and associated risk factors among university students," *Cureus*, vol. 16, no. 3, pp. 1–11, 2024.
- [45] I. F. Kamara et al., "Prevalence of hypertension and diabetes in informal settlements of Freetown," *BMC Public Health*, vol. 24, pp. 1–12, 2024.
- [46] M. Tariq et al., "Assessment of risk factors of hypertension among adults in Pakistan," *Pak. Heart J.*, vol. 73, pp. 119–124, 2023.
- [47] M. Kiggwe et al., "Lifestyle and fruit consumption among university students in Uganda," *Nutrire*, vol. 49, no. 1, 2024.
- [48] D. Aune et al., "Fruit and vegetable consumption and hypertension risk," *Eur. J. Nutr.*, vol. 62, no. 5, pp. 1941–1955, 2023.
- [49] F. M. A. Islam et al., "Perception of salt and fruit consumption and their associations with blood pressure," *Appl. Sci.*, vol. 13, no. 3, 2023.
- [50] S. R. Defianna et al., "Gender differences and behavioral factors for hypertension in Indonesia," *Int. J. Environ. Res. Public Health*, vol. 18, no. 12, 2021.
- [51] Kemenkes RI, Gernas: Gerakan Masyarakat Hidup Sehat, Jakarta, 2021.
- [52] H. C. Kim et al., "Korea Hypertension Fact Sheet 2023: population-based analysis," *Clin. Hypertens.*, vol. 30, no. 1, pp. 1–12, 2024.
- [53] M. wei Liu et al., "Fruit and vegetable intake and hypertension risk among Chinese adults," *Eur. J. Nutr.*, vol. 57, no. 7, pp. 2639–2647, 2018.
- [54] World Health Organization, Global Report on Hypertension: Silent Killer, Global Public Health Challenge, Geneva, 2023.
- [55] A. Wattanapisit et al., "Application of WHO 2020 physical activity guidelines for hypertensive patients," *Heliyon*, vol. 8, no. 10, p. e11259, 2022.
- [56] T. S. Rusli et al., Pengantar Metodologi Pengabdian Masyarakat, Jakarta, 2024.