

Implementation of Anti-Stroke Exercises to Address Stroke Prevention in Villages

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ABSTRACT

Stroke remains a leading cause of disability and death, particularly in village areas where access to health education and preventive services is limited. While physical activity is known to reduce stroke risk, structured, community-based prevention programs are rarely implemented or studied in village settings. This study evaluates the implementation of anti-stroke exercises for stroke prevention in a village in Magelang, Central Java. A qualitative descriptive approach was used. Data were collected through focus group discussions and semi-structured interviews with village residents, community health workers, and local leaders in three village villages where the anti-stroke exercise program had been introduced. Thematic analysis was used to interpret the data. Participants reported increased awareness of stroke risk factors and the importance of physical activity. The exercise sessions were generally well-received and promoted social interaction among participants. Three key points for implementing anti-stroke exercises in rural areas aimed at preventing stroke were identified: early detection, education, and community participation. The program contributed to stroke prevention efforts by raising awareness and encouraging healthier lifestyles in village communities. Community engagement and leadership played crucial roles in the success of implementation. To strengthen the program, ongoing facilitator training, integration into broader public health strategies, and government support are needed. Regular monitoring and community feedback can help sustain and scale the initiative effectively.



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INTRODUCTION

The shift in focus from non-communicable disease management in urban areas to rural villages is crucial, given the increasing prevalence of these diseases in rural populations. Magelang, located in Central Java, with a population of 1.3 million (Dinas Kependudukan dan Pencatatan Sipil Kabupaten Magelang, 2022), is facing significant challenges in terms of non-communicable diseases. The prevalence of hypertension increased year by year, with hypertension ranging from 28.586 in 2020, 43.053 in 2021, and 79.933 in 2022, and the prevalence of Diabetes Mellitus (DM) ranged from 7.642 in 2020, 10.904 in 2021, and 17.442 in 2022 (Pemerintah Kabupaten Magelang, 2022). the concerning trend of increasing hypertension and diabetes mellitus cases in Magelang. The increasing number of individuals affected by these conditions underscores the urgent need for effective management and prevention strategies in the region.

While community health centers in villages play a vital role in addressing non-communicable diseases, prioritizing health prevention becomes even more important. By focusing on prevention measures, such as promoting healthy lifestyles, encouraging regular physical activity, and raising awareness about risk factors, the burden of these diseases can be reduced. This, in turn, can lead to a decrease in disability-adjusted life years and an improvement

in healthy life expectancy for the population (Ward & Goldie, 2021). It is crucial to continue supporting and strengthening existing programs for non-communicable disease management in rural areas while also emphasizing the importance of prevention (World Health Organization, 2020). By adopting a comprehensive approach that combines treatment and prevention, the healthcare system can effectively address the challenges posed by non-communicable diseases in Magelang and similar settings.

According to recent estimates, Riskesdas account for approximately 7.04 million deaths in Indonesia attributed to non-communicable diseases, and stroke is a significant cause of death and disability in Indonesia. Stroke reached the highest with 131.8 cases of death per 100 thousand population. Second, there is the ischemic heart or the cause of heart attacks, with 95.68 cases, and Diabetes mellitus, 40.78 cases (Ministry of Health Republic Indonesia, 2023). The significant impact of non-communicable diseases, particularly stroke, ischemic heart disease, and diabetes mellitus, on the population of Indonesia (Ministry of Health Republic Indonesia, 2018). The high number of deaths attributed to these diseases underscores the urgent need for effective prevention and management strategies.

Stroke is a significant public health issue and one of the leading causes of death and disability worldwide. In village villages, where access to health services and preventive education is limited, stroke prevention efforts are often minimal or absent. Many villagers are unaware of the risk factors associated with stroke, such as hypertension, sedentary lifestyles, and poor diet. This lack of awareness, combined with limited healthcare infrastructure, contributes to high stroke incidence and poor health outcomes in these communities. Promoting regular health checks, quitting smoking, engaging in regular physical exercise, adopting a healthy diet, getting enough rest, and managing stress are all crucial components of the CERDIK program. These promotive actions can help individuals reduce their risk factors for stroke and other non-communicable diseases, ultimately leading to improved health outcomes (Ministry of Health Republic Indonesia, 2019).

By raising awareness about the importance of these preventive measures and providing resources and support for individuals to adopt healthier lifestyles, the CERDIK program has the potential to positively impact stroke prevention in Indonesia (Darmojo et al., 1990).

A study conclude that stroke can be prevented by adequately controlling the risk factors and encouraging healthy lifestyles. Efforts are needed to organize health promotion programs at the community level (Venketasubramanian et al., 2022). This highlights the importance of adequately controlling risk factors and promoting healthy lifestyles as practical means of preventing stroke. It emphasizes the importance of organizing health promotion programs at the community level, particularly in village villages. Encouraging individuals in village communities to increase their self-awareness regarding the importance of stroke prevention is a crucial step. By implementing anti-stroke exercises, the aim is not only to raise awareness but also to empower individuals at risk of stroke (Ministry of Health, Republic Indonesia, 2021).

The study's results indicate promising outcomes. In the first year of implementing anti-stroke exercises, the community health center enrolled 70 patients from at-risk populations for stroke prevention. After eight months of participation in the program, there was a significant improvement in stroke prevention behavior scores, increasing from 4.38 to 7.86. In comparison, the control group showed a smaller improvement, with scores increasing from 5.61 to 6.38. The statistical analysis indicated a significant difference between the two groups (p -value=0.03) (Erawati et al., 2023). These findings suggest that implementing anti-stroke exercises can have a positive impact on stroke prevention behaviors among at-risk populations. By actively engaging individuals in physical exercise and promoting a healthy lifestyle, communities can effectively reduce the risk of stroke.

The prevalence of non-communicable diseases in Bandongan Public Health Center in 2022, as indicated by the records, shows poor health indicators. It is estimated that 0.47% of villages have high blood pressure, 0.13% are obese, and 0.39% have diabetes mellitus (Dinas Kependudukan dan Pencatatan Sipil Kabupaten Magelang, 2022). Recognizing the growing burden of non-communicable diseases, the villages of Kalegen have implemented regular blood

pressure measurements and cholesterol checks at least once a year through the POSBINDU-PTM health service facilities. Additionally, periodic health checks are conducted on a monthly basis.

However, the implementation has been limited to early detection, and it has been reported that lack of exercise contributes to an unhealthy lifestyle. Several studies have demonstrated that anti-stroke exercises can effectively reduce blood pressure in patients with hypertension (Melati et al., 2021; Arimbi et al., 2023). Simple anti-stroke exercises is low-cost physical activities designed to reduce the risk of stroke. It have been introduced as a community-based intervention to promote healthier lifestyles. However, little is known about how such programs are implemented in village settings, how communities respond, and what challenges or benefits arise during the process. Unfortunately, in the rural villages of Kalegen, the implementation and awareness of anti-stroke exercises are lacking (Erawati et al., 2023), and they have not been adequately socialized.

The urgency of this research lies In addressing preventable stroke cases through proactive, community-centered strategies that are both accessible and sustainable in villages. There is a pressing need to understand whether anti-stroke exercise programs can be effectively adopted in these settings and what factors influence their success. This study aims to explore the implementation of anti-stroke exercise programs in village communities, examine the experiences and perceptions of participants, and identify the factors that support or hinder their adoption as a stroke prevention strategy.

METHOD

The research approach used in this study was qualitative. This study has ethical approval from the Health Research Ethics Committee of Poltekkes Kemenkes Semarang, with number 374/EA/F.XXIII/38/2025, focusing on exploring the role of the local government in Kalegen Village, Magelang District, Central Java, in the implementation of anti-stroke exercises. The study employs qualitative analysis and gathers data from various sources, including the Village Head, Public Health Center staff, Village Cadres, Community Group Leaders, and community members.

Community participation is a key factor in optimizing the implementation of anti-stroke exercises. To increase awareness of the importance of physical exercise as part of stroke prevention, policy affirmations are necessary (Nussbaum, 2011). By affirming policies that support the implementation of anti-stroke exercises and emphasizing the importance of physical activity, the community can be further encouraged and motivated to participate in stroke prevention efforts actively.

The selection of Kalegen Village as the research location was based on its representation of villages in Indonesia that face an increasing prevalence of non-communicable diseases, particularly hypertension and diabetes mellitus. The characteristics and health challenges of Kalegen Village align with the overall population at risk of stroke in village areas.

The research collected both primary and secondary data. Various techniques were employed to gather data, including observation, in-depth interviews, Focus Group Discussions (FGDs), and documentation. The study initially selected a group of individuals for examination. Direct observations were conducted, and detailed notes were taken on the activities of the people in the field over a specific period. In addition to observations, in-depth interviews were conducted with selected informants to obtain comprehensive data. The findings from observations and interviews were then supplemented with focus group discussions (FGDs) and documentary studies.

The data sources for the research, comprising 6 participants, included the Village Head, village health cadres, the public health center team, the elderly community group, the Head of the Subdistrict, and other relevant community members. These sources provided valuable insights and information for the study's analysis. The data analysis method employed in this research was qualitative analysis. This approach enables a comprehensive examination and interpretation of the collected data, providing a deeper understanding of the role of anti-stroke exercises in stroke prevention in rural villages.

RESULTS

The results of the analysis indicate that the implementation of anti-stroke exercises plays a strategic role in preventing strokes in remote villages. This happens because it contains elements of community empowerment in health prevention. These results directly touch the interests of the majority of people at risk of stroke who live in remote villages. It was found that the response of residents at risk of stroke, health cadres, non-communicable disease programs, and community leaders had resulted in high community participation. Therefore, optimizing the implementation of anti-stroke exercises is influenced by community participation.

The results of interviews with nine participants consisting of one Village Head, one Community Health Center staff, six village cadres, and one community leader, as well as community groups, show that there are three basic points in implementing anti-stroke exercises in village areas in efforts to prevent stroke, including early detection, education and community participation which can be seen in the table. 1.

Table 1. Summary of in-depth interview results

Recommendation points	Community health center staff	Village heads, community leaders, and community groups	Health cadre
Early detection	The development of non-communicable disease programs has facilitated early detection coverage by providing screening tools and strips for cholesterol, uric acid, and blood sugar levels. However, the difficulty lies in the fact that patients must travel to the Community Health Center, which is far away, or face difficulties because they have no one to accompany them.	We from the village apparatus are aware that our residents who are at risk of stroke are often afraid to have their health checked, especially blood pressure for hypertension, sugar levels for Diabetes Mellitus, and cholesterol levels for obese patients. We, the Village Head, community leaders, and community groups, greatly appreciate how early detection is carried out actively through home visits, which strengthens relationships.	Coincidentally, our health cadre is the wife of a village official who is a Diploma nursing graduate, so that the health cadres can carry out blood tests and health checks, including Basal Metabolic Index, Weight, and height, properly. Moreover, this makes it easier for us to reach early detection coverage.
Education	Educational outreach regarding the importance of physical activity and anti-stroke exercises has been conducted regularly, once a week, for elderly community groups, specifically Prolanis. However, it has not been able to reach remote village areas. Home visits are necessary for the early detection of individuals at risk of stroke and to educate them on the importance of physical activity and exercise. Anti-stroke.	After implementing the anti-stroke exercise, it is necessary to monitor its implementation, which will require support from both the government and the community.	Village health workers, both midwives and nurses, play an active role in providing health services. It is essential to educate local village residents on the importance of physical activity and anti-stroke exercises through targeted health education by health professionals.

Recommendation points	Community health center staff	Village heads, community leaders, and community groups	Health cadre
Participation	Community health centers need to prepare a draft policy for implementing anti-stroke exercise and ensure that parties involved in non-communicable disease programs include anti-stroke exercise as a routine activity carried out every week.	Village governments and primary health service providers (Puskesmas) should prepare a draft policy for implementing anti-stroke exercises and include these exercises as a routine activity carried out monthly at cadre meetings.	Cadres are provided with facilities to participate in the early detection and monitoring of anti-stroke exercises, as well as to increase public awareness about the importance of these exercises.

DISCUSSION

The implementation of anti-stroke training in villages using strategies. The first strategy to implement anti-stroke training in village areas was community assessment, and the second strategy was to collaborate with Local Stakeholders. Involving local stakeholders—such as village leaders, health workers (kader), and community organizations, is essential for gaining trust and participation (Erawati et al., 2023). The researcher also used existing community health programs to integrate anti-stroke training with Posyandu Lansia, PKK activities, or routine health outreach. This helps reduce costs and ensures continuity (Nainggolan & Utama, 2022). The Third strategy is to train local health workers and volunteers. Local health workers can be trained to deliver exercise sessions and provide stroke education, ensuring sustainability (Arimbi et al., 2023). Culturally adapted materials utilizing local languages, visual aids, and interactive methods help address literacy barriers and enhance understanding (Melati et al., 2021). The final strategy is culturally adapted materials and monitoring and Evaluation. The limitation of implementing anti-stroke exercises was a lack of transportation or access to facilities (Venketasubramanian et al., 2022).

Health efforts encompass a range of activities aimed at maintaining and improving the health of the community. These efforts include promoting preventive, curative, rehabilitative, and palliative measures. The responsibility for implementing health prevention initiatives, such as those targeting stroke, lies with the central government, regional governments, and the community itself, as stated in Article 1 of Law Number 17 of 2023 (Minsitry of Health Republic Indonesia, 2023).

To effectively prevent strokes and reduce the burden of the disease, it is crucial to empower and involve village village governments. Policies that specifically target villages and aim to increase community participation can be classified as affirmative policies. Affirmative policies are proactive measures designed to fight against discrimination and ensure equal opportunities for certain groups, particularly those at risk of stroke prevention (Ministry of Health Republic Indonesia, 2019).

Village development plays a vital and strategic role in stroke prevention efforts as it encompasses elements of equitable development and its outcomes. By implementing affirmative policies that prioritize stroke prevention and involve the village government (Schuck, 2002), communities can be empowered to participate in health promotion activities and access necessary resources actively.

Implementation of anti-stroke exercises in villages

Based on the findings of observations, interviews, and Focus Group Discussions, it was observed that the Kalegen Regency Government, along with relevant agencies such as community groups and health cadres, showed a responsive attitude toward the implementation

of anti-stroke exercises in village villages. Community engagement played a significant role, particularly in early detection efforts for diabetes mellitus, hypertension, obesity, and anemia (Ghozy et al., 2019). This involved screening for various health parameters, including glucose level, blood pressure, cholesterol level, uric acid level, body mass index, and hemoglobin level.

After identifying the population at risk through health detection, the implementation of anti-stroke exercises included reporting, accountability, and supervision to ensure the attainment of its goals. This implementation adheres to the regulations established by public health centers, encompassing principles such as recognition, subsidiarity, democratization, participation, and community empowerment. The key to successful implementation lies in the regulation and empowerment of health cadres in village villages, as well as the coordination and supervision of community leaders. These measures help ensure that anti-stroke exercises are conducted effectively, promoting community engagement and active participation.

Selection of stroke prevention in village health policies

In selecting stroke prevention as a priority in village health policies in Kalegen Village, the decision was based on an analysis of observations, interviews, and focus group discussions. The selection process considered the increasing incidence of stroke, which was identified as a priority health issue. This decision was made in alignment with the village's characteristics and the focus of the public health center's non-communicable disease prevention program.

The determination of stroke prevention as a priority in village health policies involved the deliberation and decision-making process of the Village Government. This process ensured that the selected policies aligned with the specific needs and circumstances of Kalegen Village.

To enhance community involvement in stroke prevention, the implementation of anti-stroke exercises is planned to take place every Friday morning at the Bandongan Public Health Center. This regular schedule aims to promote community participation and active engagement in stroke prevention activities.

In addition to community involvement, the village health policies will prioritize activities related to community empowerment and the empowerment of health cadres. These efforts aim to build capacity and enable individuals within the community to contribute actively to stroke prevention initiatives.

Community participation

The implementation of anti-stroke exercises in Kalegen Village is carried out through community participation and collaboration with the Bandongan Public Health Center. Community participation takes various forms, including the engagement of Prolanis (Program Lansia Sehat or Healthy Elderly Program) during home visits in each hamlet. This highlights the village government's efforts to actively involve the community in implementing stroke prevention measures.

The Kalegen Village Government recognizes the importance of community involvement and positions the community as an active participant in stroke prevention. The community is encouraged to actively participate by providing opportunities for health checks and education on stroke prevention. By empowering the community and providing them with knowledge about stroke prevention, the village community becomes more informed and capable of independently managing and implementing anti-stroke exercises in Kalegen Village.

The positive impact of involving the community in stroke prevention efforts is an increased awareness among community members regarding the importance of stroke prevention. By actively participating in anti-stroke exercises, the community becomes more proactive in taking preventive measures to reduce the incidence of strokes.

CONCLUSION

The implementation of anti-stroke exercises in villages, as observed in Kalegen Village, illustrates a proactive and community-based approach to stroke prevention. These exercises, which promote cardiovascular health, strength, and flexibility, have been proven effective in reducing stroke risk and improving the overall health of at-risk populations. The research highlights that prevention, particularly through structured physical activity, is more impactful and cost-effective than curative efforts.

The success of the program hinges largely on community participation. The role of community-based groups, such as Prolanis, has been instrumental in mobilizing local engagement and fostering a sense of ownership over health outcomes. Despite these successes, challenges remain in sustaining the program, especially in areas related to monitoring, consistency, and capacity building for local health cadres. It is strongly recommended that anti-stroke exercises be integrated as a fundamental component of stroke prevention programs targeting at-risk populations.

Operational recommendations for policymakers included: 1. Institutionalize Anti-Stroke Exercises: Embed anti-stroke training as a core component of village health programs, supported by policy at the district and provincial levels; 2. Strengthen Community Health Cadres: Provide regular training and incentives for health cadres to improve their ability to lead, monitor, and sustain anti-stroke exercise initiatives; 3. Enhance Supervision Mechanisms: Encourage primary healthcare centers to conduct regular home visits and community audits to monitor progress and identify gaps in stroke prevention activities; 4. Foster Community Ownership: Facilitate the formation and strengthening of community health groups like Prolanis to lead local initiatives, thereby increasing sustainability and responsiveness; 5. Allocate Sustainable Funding: Ensure that village funds (Dana Desa) are consistently allocated for preventive health programs, including anti-stroke exercises, with clear accountability mechanisms in place.

Recommendations for future research include exploring the long-term impact of anti-stroke exercises on stroke incidence and quality of life among rural populations, as well as investigating the barriers to participation among non-engaged community members to improve inclusivity. We recommend conducting comparative studies between villages with and without anti-stroke programs to evaluate their effectiveness across different socio-demographic contexts and assess the cost-effectiveness of implementing anti-stroke exercises to support evidence-based policy scaling.

In conclusion, integrating anti-stroke training into village health strategies presents a viable approach to reducing stroke prevalence in rural areas. Future efforts should focus on providing institutional support, building community capacity, and maintaining continuous monitoring to ensure long-term success.

AUTHOR'S DECLARATION

Authors' contributions and responsibilities

EE: Writing original draft, conceptualization; **MR:** writing original draft (supporting), funding acquisition; **HT:** supervision (lead), validation (equal), visualization (equal), funding acquisition (equal), review and editing; **STRT:** writing original draft, formal analysis, conceptualization; **TPH:** supervision (lead), validation (equal), visualization (equal).

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Availability of data and materials

All data are available from the authors.

Competing interests

The authors declare no competing interest.

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