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EMPOWERING COMMUNITIES IN STROKE AWARENESS AND PREVENTION THROUGH A PUBLIC HEALTH EDUCATION WEBINAR INITIATIVE

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ABSTRACT

Introduction: Stroke remains a major public health issue in Indonesia, with increasing prevalence and significant impacts on morbidity and mortality. This health education intervention, implemented through an interactive public health education webinar on stroke awareness and prevention, aimed to empower the community by improving their knowledge and awareness of stroke symptoms, risk factors, and prevention strategies through an interactive online health education webinar.

Methods: This activity was conducted as a public webinar on June 13, 2025 via Zoom. A total of 98 participants who completed both the pre-test and post-test included in the analysis. The participants consisted of community members, health cadets, and university students from various regions in Indonesia. The educational materials included multimedia content such as short videos focused on stroke prevention, health promotion, and rehabilitation with sessions led by specialist in radiology and neurology. Quantitative data were analyzed using descriptive statistics to summarize demographic and knowledge-level distributions, and a paired sample t-test to examine differences in mean knowledge scores between pre-test and post-test.

Results: A total of 98 participants, the majority female (74.49%) and aged 19–29 years (60.30%), completed both assessments and were included in the analysis. Mean knowledge scores increased from 84.15 ± 6.43 (pre-test) to 95.16 ± 4.03 (post-test), with a paired t-test showing a significant improvement ($t(97) = -25.211$, $p < 0.001$). Before the webinar, 14.29% had poor knowledge and 74.49% had good knowledge; post-webinar, poor knowledge dropped to 2.04% while good knowledge rose to 88.78%.

Conclusion: Digital educational platforms can serve as scalable and sustainable models for community health promotion, particularly in regions with limited access to in-person education. Future initiatives are encouraged to include follow-up community engagement and ongoing digital outreach to maintain knowledge retention and promote long-term behavioral change.

KEYWORDS

community; empowerment; health education; stroke prevention.

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1. INTRODUCTION

Stroke is a medical emergency characterized by a sudden interruption of blood flow to the brain, resulting in damage to brain tissue. It is a rapidly progressive neurological event that can lead to long-term disability or death, typically presenting with

acute symptoms such as unilateral facial or limb paralysis, dysarthria, impaired speech, altered consciousness, and visual disturbances (Feigin et al., 2017). Stroke remains a significant global health burden, with notable disparities in incidence and outcomes across different regions. According to the

World Stroke Organization (2025), approximately 12 million individuals experience a stroke annually, with an estimated 7 million stroke-related deaths. Furthermore, one in four adults over the age of 25 is expected to suffer a stroke at some point in their lifetime.

The global incidence of stroke is highest in regions such as East Asia, Eastern Europe, and parts of North Africa and the Middle East, exceeding 100 cases per 100,000 people annually. In contrast, countries in Australia, North America, and Western Europe report lower incidence rates, often below 50 cases per 100,000 individuals (Donkor, 2018). These discrepancies are largely attributed to variations in healthcare infrastructure, public awareness, and access to preventive services. High-income countries tend to demonstrate lower stroke mortality due to early detection, standardized stroke management protocols, and access to rehabilitation services. Conversely, many low- and middle-income countries, including Indonesia, experience higher stroke-related mortality and disability due to inadequate healthcare services and delayed treatment (Johnson et al., 2019).

Indonesia ranks stroke as the second leading cause of death, accounting for approximately 11% of all deaths nationally (American Heart Association., 2019). In 2013, there were an estimated 25.7 million stroke survivors worldwide, with 10.3 million new cases and over 113 million Disability-Adjusted Life Years (DALYs) lost due to stroke complications (Feigin et al., 2017). The 2018 Basic Health Research (Riskedas, 2018) reported a national stroke prevalence of 10.9 per 1,000 population, up from 7.0 per 1,000 in 2013. In the same year, East Java ranked 7th out of 34 provinces in Indonesia in terms of stroke prevalence, recording one of the highest rates at 12.4%. These regional differences may reflect variations in sociodemographic factors, healthcare access, lifestyle behaviors, and underlying health conditions.

Stroke risk increases significantly with advancing age, particularly after the age of 55, and is further compounded by pre-existing medical conditions such as hypertension, coronary artery disease, and hyperlipidemia, all of which contribute to vascular damage and increased vulnerability to cerebral ischemic events (Benjamin et al., 2019). In addition, among younger populations, behavioral and psychosocial factors play an increasingly prominent role in escalating stroke risk. Sedentary lifestyles, unhealthy diets rich in saturated fats and refined sugars, chronic stress, alcohol consumption, smoking, and illicit drug use contribute substantially to the development of stroke in this younger demographic. Smoking, in particular, accelerates the process of atherosclerosis by promoting endothelial dysfunction and inflammation, thereby further compromising cerebral circulation and increasing the risk of both ischemic and hemorrhagic strokes (Virani et al., 2020).

The multifactorial nature of stroke necessitates comprehensive and targeted public health interventions that address both medical management and lifestyle modifications. Effective prevention strategies include rigorous control of hypertension and diabetes, cholesterol management, smoking cessation, promotion of physical activity, healthy dietary practices, stress reduction, and moderation of alcohol intake. Moreover, raising public awareness through education campaigns and improving access to screening and early intervention services are critical components for reducing stroke incidence and improving outcomes, especially in regions with limited healthcare infrastructure (World Stroke Organization, 2023).

In response to these challenges, an online webinar initiative has been launched to reduce stroke incidence by providing accessible, structured, and evidence-based health education to the wider public. Designed to reach a broad audience across diverse regions, this initiative emphasizes health literacy and

the promotion of sustainable behavioral change. The program is a collaborative effort between the Department of Radiology and the Department of Neurology, Faculty of Medicine, Universitas Airlangga. This initiative aims to evaluate the effectiveness of public health education webinar in increasing community knowledge, awareness, and preventive behavior related to stroke. Through continuous monitoring and evaluation, the initiative seeks to assess its impact on both knowledge improvement and health behavior outcomes. Ultimately, this program aspires to become a scalable model for stroke prevention and public health promotion, especially in low resource and high-risk communities throughout Indonesia.

2. MATERIAL AND METHODS

This health education intervention on stroke awareness and prevention was conducted to enhance public knowledge and awareness about stroke, with particular emphasis on its radiological and neurological aspects. The intervention took the form of an interactive public health education webinar on stroke awareness and prevention, focusing on early detection, risk factor management, and lifestyle modification. Targeting the general population, the program was delivered through an online educational session to ensure broad accessibility and

participation across diverse regions. A total of 98 individuals from various backgrounds attended the session. The initiative was organized through a collaborative effort between the Department of Radiology and the Department of Neurology, Faculty of Medicine, Universitas Airlangga. The organizing committee comprised faculty members, radiology residents, and medical students. The program was based on a multi-faceted community service framework, incorporating community development, persuasive, educative, and participatory approaches, as described by (Wekke, 2022). The community development component focused on empowering individuals by positioning them as active agents in managing their own health and promoting direct involvement in the learning process. The persuasive approach was reflected in the respectful and non-coercive encouragement of participants to adopt healthier behaviors. The educative strategy aimed to provide structured, evidence-based information to improve health literacy, while the participatory element promoted active engagement and interaction throughout the session (Islam et al., 2022)

The public webinar as part of the community service activity was conducted online Zoom on Friday, June 13, 2025, from 1:00 PM to 3:00 PM was attended by 98 participants, mostly female (74.49%) and aged 19-29 years (60.305). The entire

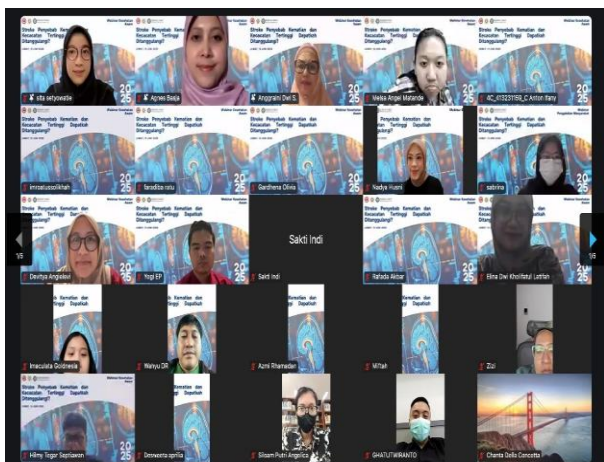


Figure 1. Participants attending the webinar online via Zoom, showing high engagement during the session

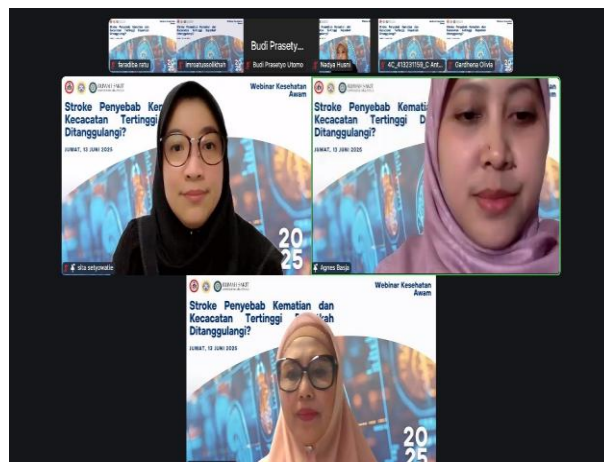


Figure 2. The speakers delivering presentations and interacting with participants during the webinar

implementation of this activity proceeded smoothly and effectively, as reflected in the participant's high level of enthusiasm and active engagement throughout the session. Their involvement was evident not only from their attentiveness but also from their eagerness to interact and ask questions during the discussion (Figure 1).

The webinar featured two informative presentations on stroke-related topics delivered by Prof. Dr. Anggraini Dwi Sensusiati, dr., Sp.Rad., Subsp. NKL(K), and Sita Setyowatie, dr., Sp.N (Figure 2). Both sessions were well-received, with participants showing great interest and actively participating during the Q&A segments. This dynamic interaction underscored the relevance of the topics and the effectiveness of the speakers in delivering the material. An evaluation conducted after the event identified several key aspects: the outcomes achieved, the strengths of the activity, and areas for improvement in both the preparation and implementation phases. These insights will be valuable for optimizing future community service programs.

To evaluate knowledge acquisition, participants completed pre- and post-tests administered online using personal mobile devices. The test instrument assessed understanding of stroke symptoms, risk

factors, and preventive behaviors. Knowledge levels were categorized as good (76–100%), fair (56–75%), and poor ($\leq 55\%$) (Arikunto, 2013). Quantitative data were analyzed using descriptive statistics to summarize knowledge distributions and a paired sample t-test to compare mean scores before and after the intervention, assessing the statistical significance of knowledge improvement by (Fraenkel & Wallen, 2019). Additionally, participant feedback was collected through an online evaluation form, allowing attendees to share their assessments, suggestions, and critiques regarding the activity. These insights were used to identify strengths, outcomes, and areas for improvement to enhance future community service programs. Overall, this community engagement activity represents an academic-based public health education model contributing to improved stroke awareness and prevention through accessible, collaborative, and evidence-informed strategies.

3. RESULTS

A total of 98 participants completed both pre- and post-test assessments and were included in the analysis. Most participants were female (73; 74.49%), and the majority were young adults aged 19–29 years (59; 60.20%), followed by early adults aged 30–39

Table 1. Characteristic of Participant

Adult Age Subcategory	Age Range	n	%
Young Adults	19-29 years	59	60.20
Early Adults	30-39 years	21	21.43
Middle-aged Adults	40-49 years	14	14.29
Late Adults	50-59 years	4	4.08
Total		98	100

Table 2. Results of Paired Sample t-Test on Knowledge Scores (n = 98)

Variable	Mean $\pm$ SD (Pre-test)	Mean $\pm$ SD (Post-test)	t	df	p-value
Knowledge Score	84.15 $\pm$ 6.43	95.16 $\pm$ 4.03	-25.211	60.20	< 0.001

Table 3. Frequency Distribution of Participants based on Knowledge at The Public Webinar (n = 98)

Knowledge	Before		After	
	n	%	n	%
Poor	14	14.29	2	2.04
Fair	11	11.22	9	9.18
Good	73	74.49	87	88.78
Total	98	100	98	100

years (21; 21.43%), middle-aged adults aged 40–49 years (14; 14.29%), and late adults aged 50–59 years (4; 4.08%) (Table 1).

Knowledge levels improved significantly following the webinar. The mean pre-test score was 84.15 ± 6.43 , which increased significantly to 95.16 ± 4.03 in the post-test assessment. The paired sample t-test revealed a statistically significant difference between the two mean scores ($t(97) = -25.211$, $p < 0.001$), confirming a substantial positive effect of the educational intervention on participants' knowledge levels (Table 2). These findings indicate that the online public health education webinar effectively improved participants' cognitive understanding of stroke symptoms, risk factors, and prevention strategies.

The distribution of knowledge categories also demonstrated a positive upward shift. Before the webinar, most participants (73; 74.49%) had good knowledge, while 11 (11.22%) had fair knowledge, and 14 (14.29%) had poor knowledge. After the intervention, the proportion of participants with poor knowledge decreased sharply to 2 (2.04%), and those with fair knowledge slightly declined to 9 (9.18%), while those with good knowledge increased to 87 (88.78%) (Table 3). These results highlight the effectiveness of the webinar in bridging knowledge gaps and enhancing understanding of stroke prevention, early detection, and risk management.

Beyond improvements in knowledge, participants' feedback and post-webinar reflections indicated enhanced awareness and more positive attitudes toward stroke prevention. Many participants reported that the session helped them better recognize early warning signs and understand the importance of managing modifiable risk factors such as hypertension, diet, and physical inactivity. Several respondents expressed stronger motivation to adopt healthier behaviors, including exercising regularly, reducing salt and fatty food intake, and avoiding smoking. Furthermore, some participants

mentioned feeling more confident in discussing stroke-related information with their families or community members, reflecting a broader shift in health awareness. Although quantitative measurement of awareness was not conducted, these qualitative observations suggest that the webinar contributed not only to knowledge enhancement but also to greater readiness to engage in preventive health actions.

4. DISCUSSION

The findings from this community engagement initiative, which involved active participation of adults from diverse age groups in an interactive public health webinar, clearly demonstrate that such programs serve as an effective tool for enhancing stroke prevention knowledge and awareness among the general population. The mean knowledge scores increased significantly from 84.15 ± 6.43 (pre-test) to 95.16 ± 4.03 (post-test), as confirmed by a paired sample t-test ($t(97) = -25.211$, $p < 0.001$). Notably, 88.78% of participants were categorized as having "good knowledge" post-webinar, highlighting the effectiveness of digital education in delivering complex stroke-related information, including recognition of symptoms, understanding of risk factors, and adoption of preventive behaviors in an accessible and engaging manner. This outcome reinforces prior research indicating that community based educational programs significantly improve awareness of stroke warning signs and the imperative for timely medical intervention, especially in underserved populations (Abbasian et al., 2024; Albalawi et al., 2020).

The interactive multidisciplinary approach, involving neurologists and radiologists, aligns with best practices identified in contemporary health education research. As Gibson et al (2022) found, participatory methods like live Q&A sessions and quizzes enhance information retention and motivate behavioral change. This is crucial given the complex nature of stroke involving vascular, neurological, and

radiological dimensions. Furthermore, the integration of audiovisual media heightened participant engagement and comprehension, consistent with (Mayer, 2009) findings that multimedia learning optimizes understanding of medical concepts through stimulating imagination and motivation. The program's sustainability is reinforced by its design enabling recorded sessions to be shared widely post-event, illustrating a scalable model for ongoing health promotion beyond geographical and temporal constraints (Saposnik, 2025). However, knowledge gains must be complemented by ongoing community support and reinforcement to translate awareness into sustained behavioral changes including blood pressure control, smoking cessation, and lifestyle modification as emphasized by Lynch et al (2019).

Importantly, the use of an interactive, multidisciplinary approach featuring neurologists and radiologists helped engage participants effectively. As noted by Gibson et al (2022), participatory learning methods that encourage interaction, such as Q&A sessions and quizzes, improve retention of information and motivate behavior change. This approach addresses barriers often present in traditional health education by fostering a sense of empowerment and accountability among participants (Wekke, 2022). The integration of audiovisual media also played a significant role in enhancing learning motivation and comprehension, consistent with prior research that emphasizes the benefits of multimedia tools in health education (Mayer, 2009). Audiovisual aids stimulate imagination and help translate complex medical knowledge into understandable content, which is essential when dealing with topics like stroke pathophysiology and radiological diagnosis.

The findings from this community engagement initiative clearly demonstrate that public health webinars serve as an effective tool for enhancing stroke prevention knowledge and awareness among

the general population. Digital health interventions, including webinars, have been shown to increase knowledge and preventive behaviors in stroke at-risk groups (Morgado et al., 2021). In addition, community-based stroke education programs significantly improve awareness of stroke warning signs and symptoms as well as knowledge about controllable risk factors such as hypertension, smoking, and diet, leading to better management of these risks, including increased blood pressure monitoring and smoking cessation (Chen et al., 2022). The substantial increase to 88.78% of participants categorized as having "good knowledge" post-webinar highlights the capacity of digital education to deliver complex stroke related information including recognition of symptoms, understanding of risk factors, and adoption of preventive behaviors in an accessible and engaging manner. This outcome reinforces prior research indicating that community based educational programs significantly improve awareness of stroke warning signs and the imperative for timely medical intervention, especially in underserved populations (Abbasian et al., 2024; Albalawi et al., 2020). Statistical analysis using a paired t-test confirmed that the improvement in knowledge scores from pre- to post-webinar was highly significant ($p < 0.001$), indicating that the observed gains were unlikely due to chance and directly attributable to the intervention. By emphasizing actionable, evidence-based knowledge, such programs effectively empower high-risk individuals and their families, fostering proactive health behaviors and potentially contributing to a reduction in stroke incidence.

Moreover, the continuous availability of recorded webinar sessions for redistribution expands the outreach beyond the initial live event, supporting a sustainable model of promotive and preventive health. Nonetheless, while knowledge improvement is a crucial first step, influencing long-term behavioral changes remains a challenge. Ongoing education

reinforced by community support and follow-up programs is necessary to translate increased awareness into consistent preventive practices such as blood pressure control, smoking cessation, and lifestyle modification (Lynch et al., 2019). With over 75% of strokes being first-time events, such early educational interventions targeting modifiable risk factors are vital for reducing stroke burden worldwide (World Stroke Organization, 2025). Moreover, digital campaigns and community programs that combine education with accessible, interactive platforms are proving essential in tailoring stroke prevention at the population level (Abbasian et al., 2024)

In conclusion, this study confirms that webinar-based stroke education is a scalable, inclusive, and effective approach that addresses both knowledge dissemination and participant engagement, thereby contributing significantly to stroke prevention efforts. Future efforts should focus on integrating follow-up assessments and longitudinal studies to evaluate behavioral outcomes and further refine educational methodologies for maximum public health impact.

5. CONCLUSION

The findings of this study indicate that the public health webinar was associated with a significant improvement in participants' knowledge about stroke risk factors, symptoms, and prevention, as demonstrated by the pre- and post-test comparisons and the positive shift in knowledge categories. Participants' qualitative feedback further suggested increased awareness and motivation to adopt preventive behaviors. These results support the potential of digital education, such as webinars, as an effective tool for enhancing health literacy and promoting preventive health actions. Future studies with larger samples and formal statistical assessment of awareness and behavior change are recommended to strengthen the evidence and confirm the intervention's effectiveness.

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