



Original Research

Improving Stroke Prevention Behavior of The Elderly with Hypertension through The Family Empowerment Model

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ABSTRACT

The number of patients with hypertension is steadily increasing and poses a significant chronic health problem. Individuals with hypertension have an 87.5% risk of experiencing a stroke. The role of family caregivers is crucial in elderly care, particularly in stroke prevention. The family empowerment model is an approach designed to enhance self-efficacy, enabling individuals to make informed decisions regarding their health. This study aimed to examine the effect of a family empowerment model on stroke prevention behavior among the elderly with hypertension. This quasi-experimental study involved 132 families with hypertensive elderly, using multistage random sampling. A six-week intervention program consisting of education and skill-building activities was implemented. Stroke prevention behaviour was measured using the validated Elderly Stroke Prevention Behaviour Questionnaire (knowledge, attitude, and behaviour). Data were analysed using paired and independent t-tests. The Results show significant improvements were observed in the intervention group following the implementation of the family empowerment model ($p < 0.001$). Knowledge scores improved from 6.61 (SD = 1.86) to 9.15 (SD = 0.88), attitude scores improved from 17.11 (SD = 2.30) to 25.79 (SD = 3.30), and behaviour scores improved from 7.18 (SD = 2.20) to 9.02 (SD = 0.97). The eight-week empowerment model effectively improved stroke prevention behaviour among the elderly with hypertension. This model can be integrated into community-based programs to promote elderly self-care and reduce the risk of stroke. The Recommendations, empowering the elderly, are essential to enhance self-efficacy and overall quality of life.

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INTRODUCTION

Data from the World Stroke Organization indicates that the prevalence of stroke reaches 13.7 million new cases annually, with

approximately 5.5 million deaths caused by stroke. Around 70% of strokes and 87% of stroke-related deaths and disabilities occur in low- and middle-income countries (Singh, 2021). According to the 2018 Basic Health Research (Riskesdas) data, the prevalence of

stroke is 10.9 per mille, meaning that 10.9 out of 1,000 Indonesian residents suffer from stroke (Ministry of Health, Republic of Indonesia, 2019).

One of the most common risk factors for stroke in the community is hypertension. Often referred to as a “silent killer,” hypertension typically presents without clear symptoms and is frequently only diagnosed after complications such as stroke or heart attack occur (Ministry of Health, Republic of Indonesia, 2023). Research by Sofiana & Rahmawati (2019) found that found a significant correlation between hypertension and stroke, with hypertensive individuals having an 87.5% risk of experiencing a stroke. The role of families in the early detection of stroke symptoms is crucial to prevent more severe complications. A study by Sari, Murni, and Nurmala (2023) confirmed that family knowledge about stroke signs and symptoms is associated with the severity of stroke in patients.

Stroke can be prevented by modifying risk behaviors, including adopting a healthy lifestyle and managing underlying conditions (Owolabi, et al., 2022). Family support plays a vital role in shaping these preventive behaviors by educating and assisting elderly individuals in managing risk factors (Parellangi et al., 2023). This is supported by Hosseini et al. (2023), who found that lifestyle-based family empowerment programs were effective in reducing cardiovascular risk factors.

The family empowerment model is an approach designed to enhance a family’s capacity to support elderly care, particularly in making health-related decisions. This, in turn, enhances self-confidence and self-efficacy, which positively impact the capabilities of the family and the quality of life of the elderly. Family empowerment involves enabling families to change their behavior (Caro et al., 2018). Its primary aim is to increase family knowledge related to health promotion, and it has been shown to improve the quality of life for stroke patients (Luthfa, Yusuf, Fitryasari, & Khasanah, 2025). A study by Boonyathee et al. (2021), which implemented a Social Support Family Caregiver Training Program (SSFCIP) over 12 weeks, demonstrated significant improvements in family knowledge, self-efficacy, and caregiving behaviors for elderly individuals with hypertension. Likewise, Izadi-Avanji (2020) revealed that family-focused empowerment models could improve the quality of life for stroke patients.

The family empowerment model developed in this study focuses specifically on improving family knowledge, attitudes, and behaviors related to stroke prevention. This approach empowers families to support elderly individuals in self-care, with the ultimate goal of reducing stroke risk and enhancing quality of life. Unlike previous studies that emphasized self-efficacy, caregiver burden, or patient compliance with medical checkups (e.g., blood pressure, cholesterol, or glucose monitoring), the model in this study emphasizes family capacity-building through targeted stroke prevention education, early symptom detection training, and

facilitation of physical activity. Families are encouraged to actively support and empower the elderly by guiding them in physical exercises and the adoption of a healthy lifestyle to prevent stroke. The objective of this study is to examine the effect of a family empowerment model on family behavior, specifically, their knowledge, attitudes, and behaviors regarding stroke prevention among elderly individuals with hypertension.

METHOD

This study employed a quasi-experimental pre-posttest design with a control group to evaluate the influence of the family empowerment model on stroke prevention behavior among elderly individuals with hypertension. The research was conducted in East Jakarta from April to November 2024. A multistage random sampling method was used to select participants. Participants were then evenly allocated into intervention and control groups (66 participants in the intervention group and 66 participants in the control group). The total sample consisted of 132 families with elderly hypertensive members.

In the intervention group, the family empowerment model was implemented through eight sessions over eight weeks. Weekly home visits were conducted using a door-to-door approach, during which one intervention was delivered. The family then independently implements the intervention by empowering the elderly. Progress was monitored weekly using a standardized monitoring booklet, and the next intervention was provided during the following visit. This cycle continues until the eighth week. These interventions utilized modules on stroke prevention, early detection of stroke, and stroke prevention interventions (Physical exercises to prevent stroke). Meanwhile, the control group received the standard interventions provided by local primary healthcare centers (Puskesmas) through home visits, where actions were taken based on the specific issues identified within each family.

Data collection was conducted using a stroke prevention behavior questionnaire (knowledge, attitude, and behavior), which was developed by the researchers. Knowledge comprised 10 items with true/false answers (true=1 and false=0), attitude consisted of 10 items uses a four-point Likert scale with options ranging from strongly disagree (0) to strongly agree (3), and stroke prevention behavior comprised 10 items with responses categorized as performed (1) and not performed (0). All instruments underwent validity and reliability testing, yielding positive results. Instrument testing results demonstrated Knowledge (r -value > 0.386 ; Cronbach’s $\alpha = 0.824$), Attitude (r -value > 0.397 ; Cronbach’s $\alpha = 0.856$), and Behavior (r -value > 0.487 ; Cronbach’s $\alpha = 0.847$). Data were analyzed using dependent (paired) and independent t-tests to assess differences within and between groups. Prior to implementation, researchers obtained permission from the Health Office of DKI Jakarta, along with ethical clearance from the Ethics Committee of Poltekkes Kemenkes Jakarta III (No. LB.02.02/F.XIX.21/3765/2024).

RESULT

Table 1. Frequency Distribution of Family Characteristics

Variable	Intervention Group		Control Group	
	N	%	N	%
Age				
1. 20-44 years	53	80.3	60	90.9
2. 45-59 years	13	19.7	6	9.1
Gender				
1. Male	18	27.3	28	42.4
2. Female	48	72.7	38	57.6
Marital Status				
1. Married	61	92.4	54	81.8
2. Not Married	5	7.6	12	18.2
Education				
1. < High School	22	33.3	19	28.8
2. ≥ High School	44	66.7	47	71.2
Occupation				
1. Working	41	62.1	39	59.1
2. Not Working	25	37.9	27	40.9
Income				
1. Less than adequate	31	47	40	60.6
2. Adequate	35	53	26	39.4
Family Type				
1. Nuclear Family	47	71.2	48	72.7
2. Extended Family	19	28.8	18	27.3

An analysis of family characteristics showed that the majority of participants in both groups were female and aged 20–44 years (adults). Most participants were married and had completed at least high school education. In both groups, most families reported being

employed, although approximately half stated their income was insufficient. Additionally, the nuclear family structure was the most common in both the intervention and control groups.

Table 2. Analysis of Differences in Stroke Prevention Behaviors of Families Before and After Intervention with The Family Empowerment Model in the Intervention and Control Groups

Variable	Group	Mean	SD	Mean Difference	p-value
Knowledge	Intervention				
	Before	6.61	1.872		
	After	9.15	0.881	2.54	<0.001
	Control				
Attitude	Before	6.76	1.969		
	After	6.97	1.856	0.21	0.389
	Intervention				
	Before	17.11	2.301		
Behavior	After	25.79	3.279	8.86	<0.001
	Control				
	Before	17.42	2.184		
	After	16.98	2.166	0.44	0.117
Behavior	Intervention				
	Before	7.18	2.204		
	After	9.02	0.936	1.84	<0.001
	Control				
Behavior	Before	7.59	2.097		
	After	7.45	2.171	0.14	0.588

The dependent t-test revealed significant improvements in knowledge, attitude, and behavior within the intervention group, with all p-values <0.001. In the intervention group, significant differences were observed before and after the implementation of

the family empowerment model. Knowledge scores improved from 6.61 (SD = 1.86) to 9.15 (SD = 0.88), attitude scores improved from 17.11 (SD = 2.30) to 25.79 (SD = 3.30), and behaviour scores improved from 7.18 (SD = 2.20) to 9.02 (SD = 0.97). Based on these

three variables, the largest mean difference is 8.86 points in the attitude variable, and the smallest is 1.84 points in the behavior variable, whereas in the control group, no significant differences were found.

Table 3. Analysis of Differences in Stroke Prevention Behaviors of Families After Intervention with the Family Empowerment Model in the Intervention and Control Groups

Variable	Group	Mean	SD	95% CI	p-value
Knowledge	Intervention	9.15	0.881	1.681-2.682	<0.001
	Control	6.97	1.856		
Attitude	Intervention	25.79	3.279	7.846-9.760	<0.001
	Control	16.98	2.166		
Behavior	Intervention	9.02	0.936	0.985-2.136	<0.001
	Control	7.45	2.171		

The independent t-test results reveal significant differences in family knowledge, attitude, and behavior between the intervention and control groups following the implementation of the family empowerment model, with p-value consistently <0.001. These results confirm that the family empowerment model was effective in improving families' knowledge, attitudes, and behaviors related to stroke prevention in the elderly.

DISCUSSION

Family Characteristics

The results of the study show that the majority of families were adults aged 20–44 years, predominantly female, married, employed, and came from nuclear families, although approximately half reported having insufficient income. These findings are consistent with those of Septianingrum (2024) and Zuraidah et al. (2024), who found that most caregivers were adult married women, reflecting prevailing cultural expectations in Indonesia. Adults in this age range tend to demonstrate emotional maturity, enabling them to provide effective care for elderly family members. This aligns with the qualitative research findings of Rahmawati (2022), which highlighted the emotional and spiritual dedication families bring to caregiving. Her study described how caregivers persevere through challenges with patience, sincerity, and faith, often turning to prayer and consistent religious practice as sources of strength and resilience when caring for elderly relatives.

Interestingly, this study identified a younger age group of caregivers compared to Boonyathee et al. (2021), who reported that caregivers were predominantly aged 50–59 years. This difference may be attributed to variations in family structures and caregiving dynamics. In the current study, most participants came from nuclear families, where adult children, often in their 30s or 40s, served as the primary caregivers for their aging parents. Conversely, the study by Boonyathee et al. (2021) appears to reflect a context of extended family structures, where elderly spouses or older adult children (aged 50–59) assume the caregiving role, possibly due to the very advanced age of the care recipients. These contextual differences highlight the importance of considering cultural and familial patterns when examining caregiving roles across populations.

Stroke Prevention Behavior

The study results revealed significant improvements in stroke prevention behaviors (knowledge, attitude, and actions) before and after implementing the family and elderly empowerment model. The mean increase in knowledge was 2.54 points, in attitude was 8.68 points, and in behavior was 1.84 points, with statistically meaningful differences observed between the intervention and control groups.

Enhancing knowledge and caregiving skills through structured educational programs, such as training sessions, has proven to be effective. This study demonstrated that providing education to families through training programs using stroke prevention modules, early stroke symptom detection, and stroke prevention interventions helped improve families' understanding and skills in caring for elderly individuals with hypertension. Families were actively involved in teaching healthy lifestyle behaviors and monitoring the elderly's health progress using structured monitoring books, thereby reinforcing the crucial role families play in elderly care. These results align with Bakri, Irwandy, & Linggi (2020), who reported that home-based stroke care education enhances family knowledge and caregiving ability.

Our findings also support previous evidence from Setiawati et al. (2022) and further extend the literature by demonstrating not just short-term awareness but also long-term behavioral changes. Through the empowerment process, caregivers were able to consistently apply stroke prevention behaviors at home, improving overall caregiving quality. This is consistent with Husnaniyah, Hidayatin, & Handayani (2021), who found that the majority of respondents engaged in positive stroke prevention behaviors after targeted interventions. Knowledge of hypertension management plays a pivotal role in preventing stroke among elderly individuals. Adequate and accurate knowledge enables caregivers to provide appropriate health services, recognize risk factors, and respond to potential complications. This finding is also supported by Safitri & Agustin (2020), who highlighted that strong caregiver knowledge and motivation are critical to effective stroke prevention in hypertensive patients.

In terms of behavioral changes, family attitudes towards stroke

prevention showed the most significant improvement. After participating in the intervention, families increasingly recognized that hypertension is a serious health risk that can lead to stroke. They also developed a stronger belief that stroke is preventable and took proactive steps to meet the needs of elderly members, especially when they were unwell. This is supported by Dziesetuo et al. (2024), whose study showed improvements in family attitudes and awareness following stroke-related education.

Family Support

These findings emphasize the important role of family support in stroke prevention, which is further discussed below. Family support plays an important role in shaping stroke prevention behaviors, particularly through risk factor management and the provision of knowledge (Parellangi, et al., 2023). Research conducted by Ambarika and Anggraini (2022) found a significant relationship between family support and the occurrence of recurrent strokes. Emotional strength, love, and practical caregiving from family members serve as powerful motivators for elderly individuals to engage in preventive health behaviors. These findings are supported by Dongdong Li et al. (2025), whose study on the knowledge, attitudes, and practices of family members caring for stroke patients revealed significant positive correlations among all three variables: knowledge and attitude, knowledge and practice, and attitude and practice. Knowledge directly influences attitudes and practices, while attitudes directly affect practices.

The ability of families to guide the elderly in adopting healthy lifestyle habits, including regular physical activity and appropriate dietary practices, has a strong motivational impact. Although not all elderly individuals are able to implement them well, especially in managing their dietary patterns, after the 8-week intervention period, elderly individuals gradually managed to follow a hypertension diet, resulting in controlled blood pressure. Research by Hosseini, et al. (2023) revealed significant differences in blood pressure, physical activity, and dietary patterns between the intervention and control groups after implementing a family-centered empowerment program based on a lifestyle aimed at preventing risk factors for cardiovascular disease. Future studies should examine the specific factors that influence the effectiveness of family involvement in promoting healthy lifestyle behaviors among the elderly, particularly in dietary management, and assess the sustainability of such interventions over longer periods.

Elderly Empowerment

The involvement of elderly individuals in their own care through empowerment by their families enhances self-confidence, as they feel included in managing their diet and activities. This finding aligns with the study by Susanti, Manurung, and Pranata (2018), which demonstrated a strong positive relationship between family support and elderly self-esteem. Dewi and Wati (2022) also found correlation

between family knowledge and patient self-efficacy, which plays a critical role in preventing stroke recurrence. Additionally, Pedersen, et al. (2020) reported that self-management interventions significantly improved self-efficacy, with a notable difference between intervention and control groups ($p = 0.003$).

Family participation in educating elderly individuals about healthy lifestyles and facilitating stroke-preventive physical exercises was shown to contribute meaningfully to their awareness and motivation to maintain health. The use of a monitoring book throughout the intervention enabled the research team to systematically track the engagement of older adults in implementing the recommended health behaviors aimed at stroke prevention. Future research is recommended to explore factors influencing long-term dietary adherence and sustained engagement in stroke prevention behaviors among hypertensive elderly.

This study is limited by a short intervention duration, which does not allow assessment of long-term effects; reliance on self-reported data that may be affected by subjective biases such as social desirability and recall errors; and a localized context that may restrict the generalizability of the findings to broader populations with different characteristics.

CONCLUSION

This study demonstrates that the family empowerment model effectively enhances stroke prevention behaviors among families caring for elderly individuals with hypertension. By strengthening family involvement, this intervention improves the quality of care provided to the elderly and promotes their engagement in self-care behaviors. Interventions involving education, training, and support for the elderly encourage a greater active role of the family in promoting a healthy lifestyle, including proper diet, increased physical activity, stress management, medication adherence, and regular blood pressure monitoring. Such sustained family support fosters a positive environment that enables elderly individuals to adopt and maintain healthy habits. As a result, their self-efficacy and quality of life improve, contributing directly to a reduced risk of stroke. The practical implications of this model highlight its value in strengthening the family's role within stroke prevention programs for the elderly. Further research is recommended to assess the long-term sustainability of these outcomes and to explore adaptations of the model for various cultural settings and other chronic diseases.

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