An Idea Nursing Journal
https://ihj.ideajournal.id/index.php/INJ/index

INJ
E-ISSN: 2961-8592

Volume 5(2), 223-237
© The Author(s) 2026
https://doi.org/10.53690/inj.v5i03.835

Original Article

Association Between Health Belief Model and Stroke Prevention Behavior Among Patients with Hypertension: A Cross-Sectional Study

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Abstract

Background: Hypertension is a significant modifiable risk factor for stroke. Preventive behaviors are influenced by patients' knowledge, perceptions of stroke risk and severity, perceived benefits and barriers to prevention, and confidence in taking preventive actions.

Methods: This study investigated the association between Health Belief Model (HBM)-based health perceptions and stroke prevention behaviors among patients with hypertension.

Result: This cross-sectional observational study included 40 patients with hypertension at Posyandu ILP Kridha Utama, selected via purposive sampling. We collected data using a validated HBM-based questionnaire with 20 items on health perception and 10 items on stroke prevention behavior, each rated on a four-point scale. The instruments demonstrated high internal consistency (Cronbach's $\alpha = 0.947$ and 0.925, respectively). We analyzed the data using Spearman rank correlation. Results**:** Most respondents exhibited moderate health perception (60.0%), and 62.5% demonstrated good stroke prevention behavior. Health perception was positively and significantly correlated with stroke prevention behavior (Spearman's rho = 0.663, $p < 0.001$).001).

Conclusion: Higher HBM-based health perception was associated with improved stroke prevention behavior among patients with hypertension. However, interpret these findings with caution because of the small sample size, purposive sampling method, and predominance of female respondents.

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Article info :
Received: 22 May 2026 | Revised: 19 Aug 2026| Accepted: 20 Aug 2026| Available Online: 10 Sept 2026
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Keywords
Hypertension; Stroke; Health Knowledge.

Background

The problem of stroke cannot simply be seen as a neurological condition that stops at discharge from the emergency room or the ward where the patient is admitted. Sometimes, it starts to present itself beyond its acute stage, with patients who have no option but to stop working, relatives who become their caregivers, repeated rehabilitation sessions, or costs incurred due to healthcare issues, despite the resolution of the immediate medical crisis. Issues surrounding long-term disability, dependence, reduction in production, and stress within the family setting elevate the disease to the status of a public health problem that affects everyone in society. According to the estimates made by GBD 2021 at Stroke Risk Factor Collaborators (2024), there were approximately 11.9 million new stroke cases globally, 93.8 million people living with stroke, 7.3 million deaths due to stroke, and 160.5 million disability-adjusted life years (DALYs) due to stroke(1). Feigin et al. also emphasized that the global burden of stroke is increasingly shifting toward low- and middle-income countries. For Indonesia, this point matters because prevention cannot rely only on specialist care; it has to reach people who may already have hypertension but still feel “healthy enough” to postpone treatment(2). Stroke may also result in communication and swallowing problems that affect patients’ independence(3), while post-stroke dysphagia may lead to serious clinical complications and poor outcomes(4).

Hypertension is one of the main modifiable risk factors for stroke. The importance of hypertension is significant in the prevention of strokes for multiple reasons, including the existence of hypertension among the population on a grand scale, lack of knowledge of the condition by individuals, and different solutions such as medication, healthy eating, exercise, and other solutions that can help fix the problem. According to statistics from the NCD Risk Factor Collaboration, the number of adults aged 30-79 with high blood pressure rose considerably between 1990 and 2019. Nonetheless, the problem is evident, but what makes the situation alarming is that many people do not know they have it (5). Based on the findings of the Indonesian Health Survey conducted in 2023, the percentage of hypertension cases among individuals aged 18 and above in Indonesia is 30.8%. The incidence of stroke among adults in Indonesia is 8.3/1,000(6). Thus, it significantly impacts the probability that stroke may occur due to hypertension in Indonesia.

The high incidence of both hypertension and stroke in Indonesia indicates that efforts should not be limited only to building clinics, issuing prescriptions, or having counseling sessions. Prevention behaviors for stroke among hypertensive individuals entail the consumption of antihypertensive drugs, measuring blood pressure frequently, restricting intake of salt and fats, exercising, controlling body weight, avoiding smoking, managing stress levels, and undergoing health checks regularly. However, although this may seem easy to do based on advice in pamphlets, doing it is another matter altogether. Hypertension may not show symptoms, so some patients may think that not experiencing

dizziness, headaches, or weakness means the disease is not serious. According to Sarfika et al., the practice of self-care in hypertensive patients was moderately high and varied depending on some determinants like marital status and body mass index(7). Sari et al. have also indicated that knowledge concerning hypertension had no significant relationship with self-care practices. It is vital since it undermines the idea that providing information is enough to bring about behavioral changes(8).

The Health Belief Model (HBM) would be beneficial for understanding the inconsistent reasons an individual chooses to act, delay action, or disregard preventive advice. According to Azadi et al., the HBM suggests that health behavior is shaped by individual perceptions, modifying factors, and beliefs about one's ability to perform a particular behavior(9). For hypertensive patients, perceived susceptibility means the degree to which the risk of having a stroke is perceived by them, not just in terms of other people getting affected by a stroke or older adults who have a higher severity of their symptoms. Perceived severity refers to awareness of the disease's potential impacts on the patient. These include the belief that one can prevent the risk of getting a stroke by controlling their blood pressure, taking prescribed medication, limiting sodium intake, and leading a healthy lifestyle. But the problem begins once the individual perceives barriers such as the expenses associated with the treatment plan, lack of enough time, already existing diets, fear of negative consequences caused by the drugs, or inadequate family support. Self-efficacy, on the other hand, is defined by the degree to which a patient believes that they can adhere to a preventive behavior. In the present research, the HBM construct was treated as a single construct, not a set of distinct dimensions. Additionally, Wang et al. stated that applying the Health Belief Model in health education for hypertensive patients was effective in improving patients' beliefs, adherence, self-efficacy, and blood pressure (10).

There is enough information on the importance of health perception in treating hypertension, despite differences in the directions of the two studies. In their study, Suhat et al. noted that the Health Belief Model greatly influenced hypertensive patients' adherence to medication and helped avoid factors that could cause hypertension in Cimahi, Indonesia (11). Tan et al., who conducted their research in a Malaysian community setting, identified health motivation and barriers as key factors influencing self-care behavior to prevent hypertension (12). Nonetheless, research in the past tends to concentrate on medication compliance, self-management for general hypertension, or even general hypertension prevention. The relationship between health perceptions according to the HBM framework and stroke prevention behavior because of hypertension has not been investigated extensively enough.

The association between health perceptions and hypertensive behaviors is evident in the current literature, although stroke prevention behaviors among those with hypertension have not always been highlighted as the major behavioral issue. According to Setyopranoto et al., some hypertensive patients in Banyumas did not know about their stroke risks(13). Woldetsadik et al. also pointed out that there was variability in the knowledge and prevention behaviors regarding stroke among those with hypertension and that those practices were yet to become optimal(14). Purnamasari et al. examined stroke

prevention behavior in hypertensive patients, but their study used the Health Promotion Model rather than the HBM(15). Direct studies examining the relationship between overall HBM-based health perception and stroke prevention behavior remain limited, particularly in community-based health services in Indonesia.

The study was developed from that gap, especially the need to understand whether overall health perception based on the Health Belief Model is related to stroke prevention behavior among patients with hypertension. The contribution of the study lies in three linked choices: focusing on hypertensive patients as a high-risk population, treating stroke prevention behavior as the outcome variable, and using the HBM as a broader framework to read patients' health perceptions. The main question was whether patients with stronger HBM-based health perceptions also demonstrated better stroke prevention behavior. The alternative hypothesis proposed that a significant relationship exists between Health Belief Model-based health perceptions and stroke prevention behavior among patients with hypertension, while the null hypothesis proposed that no significant relationship exists.

Methods

Research Design

This cross-sectional observational study examined the relationship between health perception and stroke prevention behavior in patients with hypertension. Data were collected at Posyandu ILP Kridha Utama from March to April 2026. Each participant was assessed once, with no follow-up.

Sample/Participants

The source population included 50 older adults registered at Posyandu ILP Kridha Utama. We used purposive sampling based on predefined inclusion and exclusion criteria. Of the 43 individuals diagnosed with hypertension, those able to communicate and willing to participate were included, while those with severe cognitive impairment or medical conditions preventing questionnaire completion were excluded. Two individuals were excluded for cognitive impairment, and one declined participation, resulting in 40 eligible participants who provided written informed consent. All available and eligible individuals were included, so no separate sample-size calculation was performed.

Questionnaire

This study used a structured questionnaire previously developed and validated by Setyaningsih and Susanti d in this study(16). The questionnaire had three parts. Part one collected demographic information, including age, gender, education level, years with hypertension, and family history of stroke. It assessed susceptibility, perceived severity, perceived benefits, perceived barriers, and self-efficacy. Participants rated responses on a four-point Likert scale. An example item was, "My history of hypertension makes me more vulnerable to stroke than people with normal blood pressure." The total score represented overall HBM-based health perception. Part three assessed stroke prevention

behavior using 10 items covering medication adherence, blood pressure monitoring, dietary practices, physical activity, smoking avoidance, stress management, regular health visits, and health information seeking. Responses ranged from never (1) to always (4), and an example item was, "I take hypertension medication according to the instructions given by health professionals."

In the original instrument-development study, item validity was assessed using Pearson Product Moment correlation (r-table = 0.444). The 20 health perception items had correlation coefficients from 0.561 to 0.897, and all 10 stroke prevention behavior items were valid within the same range. Cronbach's alpha was 0.947 for health perception and 0.925 for stroke prevention behavior. Construct validity by factor analysis was not examined. Total scores were classified as high/good ($X \geq \mu + 1SD$), moderate ($\mu - 1SD \leq X < \mu + 1SD$), or low/poor ($X < \mu - 1SD$) based on the mean and standard deviation.

Data Collection

The researcher conducted data collection at Posyandu ILP Kridha Utama from March to April 2026. Before completing the questionnaire, participants received an explanation of the study's purpose, procedures, expected benefits, data protection, and their right to withdraw at any time. The researcher obtained written consent from all participants. Each participant completed the questionnaire individually, and the researcher maintained confidentiality. If a question was unclear, the researcher clarified its meaning without influencing responses. Participants reviewed their questionnaires before submission to ensure they answered all items. As a result, all 40 questionnaires were fully completed with no missing data.

Data Analysis

Data processing included editing, coding, entry, cleaning, and analysis. All statistical analyses were performed using IBM SPSS Statistics version 25. Descriptive statistics summarized demographic characteristics and study variables. We reported categorical variables (age, sex, education, duration of hypertension, family history of stroke, health perception category, and stroke prevention behavior category) as frequencies and percentages. Numerical variables (total health perception and stroke prevention behavior scores) were summarized by mean, standard deviation, median, minimum, maximum, range, and 95% confidence interval.

Before analyzing the relationship between the variables, the we assessed the distributions of total health perception and stroke prevention behavior scores for normality using the Shapiro-Wilk test. Neither variable was normally distributed.

We analyzed the relationship between health perception and stroke prevention behavior using Spearman Rank Correlation, as the data did not meet normality assumptions. Statistical significance was set at $\alpha = 0.05$. The null hypothesis stated that no significant relationship existed between HBM-based health perception and stroke prevention behavior, while the alternative hypothesis stated that a significant relationship existed. A p-value below 0.05 indicated statistical significance and led to rejection of the

hypothesis. The Spearman correlation coefficient was interpreted to determine the direction and strength of the relationship.

Ethical Clearance

This study received ethical approval from the Health Research Ethics Committee of Universitas Muhammadiyah Purwokerto (No. KEPK/UMP/143/VIII/2025). Before participating, respondents received information about the study objectives and procedures, the protection of their personal information, and their right to decline participation or leave the study at any stage without consequences. All respondents provided written informed consent before taking part in the study. We maintained confidentiality by assigning identification codes to respondents instead of recording their names.

Result and Discussion

Demographic of Participants

This study included 40 hypertensive patients receiving treatment at Posyandu ILP Kridha Utama. The variables considered were age, sex, education, years of hypertension, and family history of stroke. Table 1 below summarizes these variables.

Table 1. Characteristics of Nurse Respondents (n = 40)

Characteristics	Category	Frequency (n)	Percentage (%)
Age	50–55 years	1	2.5
	56–60 years	7	17.5
	60–65 years	12	30.0
	66–70 years	18	45.0
	70–75 years	2	5.0
Sex	Male	1	2.5
	Female	39	97.5
Educational level	Elementary school	3	7.5
	Junior high school	4	10.0
	Senior high school	28	70.0
	Higher education	5	12.5
Duration of hypertension	<1 year	8	20.0
	1–5 years	15	37.5
	>5 years	17	42.5
Family history of stroke	Yes	9	22.5
	No	31	77.5

Table 1 shows that the largest age group among respondents is 66-70 years, with 18 individuals (45.0%). The next largest group is 60-65 years, comprising 12 respondents (30.0%). Only one respondent (2.5%) is in the 50-55 age group. Most respondents are adults. Regarding gender, 39 respondents (97.5%) are female, while one respondent (2.5%) is male. Regarding educational attainment, most respondents (28) have completed

high school. Five respondents (12.5%) finished tertiary education, four (10.0%) completed junior high school, and three completed elementary education.

Regarding hypertension duration, 17 subjects (42.5%) have had the condition for more than five years. Fifteen subjects (37.5%) reported having it for 1 to 5 years, while eight subjects (20.0%) have had it for less than 1 year. On the issue of family history of stroke, 31 subjects (77.5%) reported that their families had no history of stroRegarding family history of stroke, 31 subjects (77.5%) reported no family history of stroke, while nine subjects (22.5%) indicated a family history of stroke.

Distribution of Health Perception and Stroke Prevention Behavior

Table 2 reveals how patients with hypertension perceive their health and approach stroke prevention, offering a closer look at their behaviors and attitudes.

Table 2. Distribution of Health Perception and Stroke Prevention Behavior

Variable	Category	Frequency (n)	Percentage (%)
Health perception	Low	2	5.0
	Moderate	24	60.0
	High	14	35.0
Stroke prevention behavior	Poor	2	5.0
	Moderate	13	32.5
	Good	25	62.5

According to Table 2, 24 respondents (60.0%) reported a moderate level of health perception, 14 (35.0%) reported a high level, and 2 (5.0%) reported a low level. These findings indicate that most patients with hypertension have an adequate understanding of stroke risk and prevention, as outlined by the Health Belief Model.

For stroke prevention behavior, 25 respondents (62.5%) were classified as good, 13 (32.5%) as moderate, and 2 (5.0%) as poor. This suggests that most respondents demonstrated effective stroke prevention behaviors.

Most respondents had moderate health perception, while most stroke prevention behaviors were classified as good. This suggests that many practiced effective prevention behaviors, even if their health perception was not consistently high.

Descriptive Statistics of Study Variables

Descriptive statistics were used to describe the total scores of health perception and stroke prevention behavior. Table 3 shows the results.

Table 3. Descriptive Statistics of Health Perception and Stroke Prevention Behavior

Variable	Mean	SD	Median	Min	Max	Range	95% CI
Health perception	65.43	9.209	66.00	34	80	46	62.48–68.37
Stroke prevention behavior	32.42	6.160	33.50	15	40	25	30.46–34.39

Note. *SD = standard deviation; CI = confidence interval. The 95% CI represents the confidence interval for the mean. All values are presented as observed total scores.*

Table 3 shows a mean stroke prevention behavior score of 32.42, with a standard deviation of 6.160. The median score is 33.50, and scores range from 15 to 40, for a range of 25. The 95% confidence interval for the mean is 30.46 to 34.39. These results indicate that respondents generally demonstrated favorable stroke prevention behaviors.

Normality Test

A normality test was conducted to select the appropriate statistical method for analyzing variable relationships. With 40 respondents, we used the Shapiro-Wilk test to assess normality. Table 4 shows the results.

Table 4. Normality Test Results

Variable	Shapiro-Wilk Sig.	Interpretation
Health perception	0.015	Not normally distributed
Stroke prevention behavior	0.002	Not normally distributed

Note. Normality was assessed using the Shapiro–Wilk test. A p-value < 0.05 indicates a statistically significant departure from normality. Both health perception and stroke prevention behavior were therefore considered non-normally distributed.

The level of significance for Shapiro-Wilk in the case of Health Perception and Stroke Prevention Behavior was 0.015 and 0.002, respectively, as depicted in Table 4. Since both values were below 0.05, this indicated absence of normality. We chose the Spearman rank correlation test to establish the relationship between the two variables because it is non-parametric.

Relationship Between Health Perception and Stroke Prevention Behavior

A bivariate analysis was conducted to examine the relationship between health perception and stroke prevention behavior among patients with hypertension. We selected the Spearman rank correlation test because the total score data were not normally distributed the data. Table 5 presents the results.

Table 5. Relationship Between Health Perception and Stroke Prevention Behavior Among Patients with Hypertension

Variables	n	Spearman Correlation Coefficient (r)	p-value	Interpretation
Health perception and stroke prevention behavior	40	0.663	<0.001	Significant

Note. n = sample size; r = Spearman's rank correlation coefficient. A p-value < 0.05 was considered statistically significant

Table 5 shows a Pearson rank correlation of 0.663 and a p-value below 0.001. This indicates a significant association between health perception and stroke prevention behavior in individuals with hypertension.

A correlation coefficient of 0.663 indicates a strong positive relationship. Patients with higher health perception scores demonstrated better stroke prevention behavior. Thus, the alternative hypothesis was accepted, confirming that Health Belief Model-based health perception is significantly related to stroke prevention behavior in patients with hypertension.

DISCUSSION

This study found a significant positive relationship between health perception and stroke prevention behavior among patients with hypertension (Spearman's rho = 0.663, $p < 0.001$). The result shows a strong positive association. Good health perception was associated with good stroke prevention behavior among patients. This conclusion aligns with the Health Belief Model (HBM). The factors that determine health behavior include susceptibility, seriousness, benefits, barriers, and self-efficacy. Behavior regarding stroke prevention for patients diagnosed with hypertension cannot be regarded only as an outcome of diagnosis. It also reflects how patients perceive their risk, interpret the potential impact of stroke, and judge their ability to prevent complications.

Respondent characteristics help explain the study context. The majority of the participants were women, elderly people, graduates from senior high school, and hypertensive individuals with at least five years of experience living with the condition. The above characteristics reveal that the participants were a group of people requiring constant management for hypertension. A longer duration of hypertension may also increase exposure to health information, blood pressure checks, and education from health workers or Posyandu ILP Kridha Utama cadres. The high proportion of female respondents also needs attention. The findings may more strongly reflect female patients with hypertension who actively attend Posyandu ILP Kridha Utama services.

The significant finding of this study is the positive association between health perception and stroke prevention behavior. Good health perceptions in patients mean that they can see that hypertension is one of the major reasons for stroke, and that they are also aware of the impact it causes and are convinced that prevention of stroke can bring benefits. These perceptions can encourage patients to take their medicines, control blood pressure, exercise regularly, and undergo medical tests. Therefore, health education does not include only hypertension and stroke knowledge. It should also strengthen belief, motivation, and readiness to act.

The relationship between health perception and stroke prevention behavior can be understood through the components of the HBM. Perceived susceptibility lets the patients know that the failure to control hypertension will put them at risk of developing a stroke. Perceived severity lets the patients know that the consequences of developing a stroke may be disability, dependency, diminished quality of life, difficulties in communication, difficulty in swallowing, and death. Perceived benefits increase confidence that they can lower their risk by adhering to medications, maintaining healthy blood pressure levels, following a proper diet, exercising, and getting regular checkups. Perceived barriers may include high salt intake, lack of motivation or time, and so on. Cues to action can come from health education, blood pressure readings, family experience, and Posyandu ILP activities. Another key factor that will help sustain the practice is self-efficacy.

These results are in line with those of Suhat et al., where the HBM is associated with medication compliance and risk factor prevention among individuals with hypertension(11). In another study, Widianto reported that perceived benefits, cues to action, and perceived susceptibility were associated with medication adherence among patients with hypertension (17). Andayani also reported associations between perceived barriers, self-efficacy, and adherence to a healthy diet and antihypertensive medication

(18). Taken together, these findings support the relevance of the HBM framework in understanding health-related behaviors among patients with hypertension.

This study is also consistent with research on the role of self-efficacy in hypertension management. According to Tan et al., in their systematic review on hypertension self-care, high self-efficacy levels correlated with effective self-care behaviors among individuals with hypertension, including medication adherence, dietary changes, and exercise (19). Upoyo et al. further established the importance of motivation and self-efficacy in self-care among Indonesian patients with hypertension (20). This study correlates with the present findings because, for patients to adopt healthy behaviors in stroke prevention, self-efficacy is an important factor.

This study also shows that although knowledge plays an important role in preventive behavior, it may not be sufficient on its own. Sari et al. (2025) found no relationship between knowledge of hypertension and self-care practices for hypertension. The reason for this is that, despite being knowledgeable about the disease and consequences, patients would not engage in any self-care practice when they felt that they were safe, did not perceive a stroke as being threatening, and did not have the capacity for behavior change(8). The health belief model's health perception may thus be regarded as a psychological determinant of behavior.

Regarding the problem of stroke prevention, the above study is related to the study by Setyopranoto et al., which showed that some patients with hypertension did not know about their increased vulnerability to strokes. Lack of awareness regarding such vulnerability could affect willingness to engage in behavior that promotes prevention, despite hypertension being identified as one of the key risk factors for stroke(13). As per Silva et al., hypertension is one of the most significant stroke risk factors, and prevention should be based on controlling blood pressure levels(21). Health perception is thus crucial because it helps people understand the need for consistent prevention.

In this study, 62.5% of respondents had good stroke prevention behavior. This proportion shows a relatively positive pattern. The result differs from Woldetsadik et al., who found that stroke prevention practices among patients with hypertension were still suboptimal(14). It also differs from Alhowaymel et al., who reported low knowledge, attitudes, and stroke prevention practices among hypertensive patients in rural Saudi Arabia(22). These differences may relate to access to health services, frequency of health education, sociocultural context, family support, and the presence of community-based services. Posyandu ILP Kridha Utama may have contributed to better behavior in this study by providing blood pressure monitoring, repeated education, and interaction with cadres or health workers.

The findings can also be compared with Sariana et al., who reported that most patients with hypertension had good stroke prevention practices. Their study found associations between prevention practices and education, knowledge, information sources, family support, and health worker support(23). This comparison strengthens the idea that stroke prevention behavior depends not only on internal perception, but also on support systems that help patients maintain healthy routines. Purnamasari et al., using the

Health Promotion Model, found that self-efficacy, personal influences, situational influences, and activity-related affect were related to stroke prevention behavior among patients with hypertension(15). Although the theoretical model was different, the findings point to the same issue. Stroke prevention behavior is multidimensional and shaped by psychological, social, and health service factors.

One notable result is that most respondents had moderate health perception, yet most also showed good stroke prevention behavior. This pattern suggests that good behavior may not always come from high internal perception alone. Support from the health service environment may also play a role. Posyandu ILP Kridha Utama activities, routine blood pressure checks, cadre guidance, health education from workers, and family reminders may encourage patients to act even when their internal perception is still moderate. These contextual factors were not measured in the present study and should therefore be interpreted cautiously. According to Khasanah et al., hypertensive patients among older people in Indonesia require help in the management of their diseases, services for accessing health facilities, family support, and professional help in self-management(24). This implies that community-based services may support stroke-preventive behaviors.

In public health and speech-language therapy, the article's findings also have implications beyond hypertension and blood pressure control. So, one is supposed to know about strokes for persons such as Aphasia and Dysarthria (speech problems) and dysphagia (problem swallowing). This can make the patient unable to attend social functions or engage in activities that limit movement, thereby limiting food intake and reducing their standard of living. Schindel et al. were careful to note dysphagia due to strokes(3). Dziewas et al. also underlined the importance of screening, assessment, and management of dysphagia as a side effect of stroke associated with negative consequences(4). In conclusion, in addition to affecting movement, stroke may also affect speaking, language comprehension, swallowing, and participation in everyday activities.

The good level of stroke prevention behavior found in this study should be interpreted in the context of Posyandu ILP Kridha Utama. Routine blood pressure monitoring, health education, cadre guidance, and health worker support may all contribute to prevention behavior. If these supports decrease, prevention behavior may also weaken, especially when patients' internal health perception remains moderate. Community-based interventions therefore need to maintain routine services while also strengthening patients' perceptions of stroke risk, stroke severity, benefits of prevention, barriers that must be addressed, and self-efficacy.

This study implies a need for HBM-based stroke prevention education in community health settings. Collaboration between health care workers, public health professionals, speech therapists, and Posyandu ILP cadres could facilitate communication about the relationship between hypertension and stroke, the seriousness of disabilities due to stroke, and the importance of prevention measures. Additionally, education is expected to help patients identify their individual barriers and adopt suitable approaches, such as gradually reducing salt intake, taking antihypertensive drugs regularly, engaging in activity appropriate to their abilities, and having regular blood pressure checks. According to

Azadi et al., HBM-based education improves hypertension prevention behavior(9). Yulianti et al. also concluded that theory-based interventions can improve medication adherence among patients with hypertension in primary care and community settings(25).

Theoretically, this study supports the use of the HBM as an overall health perception construct for understanding stroke prevention behavior among patients with hypertension. However, using a total HBM score also has limitations. This approach cannot identify which component is most strongly related to stroke prevention behavior. Prior literature suggests that such variables as self-efficacy, perceived barriers, perceived benefits, and cues to action are vital for hypertension intervention behavior. In the future, it is recommended to study the influence of each measured HBM component on its own to understand which factor- perception of susceptibility, severity, benefits, barriers, or self-efficacy is most strongly associated with stroke prevention behavior.

This study has several limitations. First, the cross-sectional design allows identification of associations among variables, but it does not establish causality. Second, the sample size was small (40 respondents), so the results cannot be generalized to all hypertension patients. Third, purposive sampling is likely to introduce selection bias, since the respondents were probably patients who sought health care. Fourth, the fact that females dominated the study makes the results non-representative for male patients suffering from hypertension. Fifth, a self-reported questionnaire may introduce subjectivity and social desirability bias. Sixth, the HBM construct was measured using the total score.

Future studies should consider larger samples, diverse healthcare settings, and a gender balance between male and female subjects. Researchers can use multivariate analyses such as linear regression, logistic regression, or structural equation modeling to explore the role of the HBM construct in stroke prevention. Research with longitudinal or intervention designs should also be considered to determine whether health perceptions influence stroke prevention behavior. Further studies could also include other variables such as actual blood pressure levels, body mass index, number of comorbidities, and medication adherence rates.

Overall, this study shows that Health Belief Model-based health perception has a strong and significant relationship with stroke prevention behavior among patients with hypertension. The finding confirms that stroke prevention should not rely solely on information delivery. It also highlights the need for increased risk perception, greater understanding of disease seriousness, perceived benefits, lower barriers, stronger action incentives, and higher self-efficacy. Continuous and theory-based education may be used in health practices to help people living with high blood pressure understand their risks of stroke.

Conclusion

The current research found a significant correlation between health perception and stroke preventive behavior among hypertensive patients at Posyandu ILP Kridha Utama, with Spearman's rho = 0.663, $p < 0.001$. Individuals with higher levels of health

perception showed better stroke preventive behaviors. Therefore, the research hypothesis was supported.

The findings indicate that health perception, based on the Health Belief Model, plays a key role in promoting stroke prevention behaviors among hypertensive patients. Community health education should not only provide information but also enhance patients' risk perception, understanding of stroke severity, belief in prevention benefits, ability to address barriers, and confidence in practicing preventive behaviors.

This study is limited by its cross-sectional design, small sample size, purposive sampling, predominance of female respondents, and reliance on self-reported questionnaires. Future research should use larger, more diverse samples and analyze each Health Belief Model component separately to identify the strongest influences on stroke prevention behavior.

Acknowledgements

The authors sincerely thank all respondents who willingly took the time to participate in this study. Their openness, cooperation, and valuable contributions played an important role in completing this research article. The authors also extend heartfelt appreciation to the health cadres at Posyandu ILP Kridha Utama for their warm support, assistance, and cooperation throughout the data collection process. Their dedication greatly helped the researchers reach the respondents and create a comfortable atmosphere during the study. The authors hope the findings of this study can provide meaningful benefits for improving community health services, particularly within Posyandu ILP Kridha Utama.

Declaration of Conflict of Interest
None.

Funding
None.

Author Contributions
NS and WS designed the research; WS conducted the data collection; NS analyzed the data; NS and WS contributed to the interpretation of the findings; NS wrote the first draft of the manuscript; WS critically reviewed and revised the manuscript. Both authors read and approved the final manuscript.

Data Availability Statement
The data analyzed in this study can be obtained from the corresponding author upon a reasonable request.

Declaration of the Use of AI in Scientific Writing
AI tools assisted with language refinement and manuscript readability. The authors remain fully responsible for the scientific content, analysis, and interpretation of the findings.

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How to Cite This Article :
Susanti N & Setyaningsih W. Association Betwwen Health Belief Model and Stroke Prevention Behavior Among Patients With Hypertension: A Cross Sectional Study. 2026:5(3): 223-237. doi: 10.53690/inj.v5i02.835