Research Article

# Factors relating to stroke prevention behavior in hypertension patients based on Health Promotion Model (HPM) theory in the Gubeng district area of Surabaya

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## ABSTRACT

Stroke is the number one cause of disability in Indonesia. Stroke is a condition of loss of brain function caused by stopping the blood supply to the brain. The main risk factor for stroke is hypertension. Hypertension sufferers who have poor preventive behavior have the potential to experience a stroke. This study aimed to identify the dominant factors related to stroke prevention behavior based on the Health Promotion Model (HPM) theory in the Gubeng District area of Surabaya. This research used cross-sectional research with a sample of 108 respondents using purposive sampling. Data were collected using a questionnaire and analyzed using the logistic regression test $\alpha < 0.05$. Independent factors related to stroke prevention behavior are perceived self-efficacy (0.000), activity-related affect (0.002), personal influences (0.000), and situational influences (0.023). Meanwhile, factors that have no relationship are prior related behavior (0.360), personal factor (motivation) (0.319), perceived benefits to action (0.200), perceived barriers to action (0.243), education level (0.708), socio-economic status (0.105). In conclusion, this research can be used as material for developing health workers' knowledge in intervening related to stroke prevention behavior in hypertension sufferers.

## INTRODUCTION

Stroke is still the number one cause of disability and the number two cause of death after ischemic heart disease in Indonesia (Wirastuti et al., 2023). A stroke is a brain function disorder that appears suddenly, which is caused by a disruption in brain blood circulation and can happen to anyone and at any time (Pistoia et al., 2016)(CDC, 2023). Stroke causes paralysis of the limbs, impaired speech (slurred speech), loss of vision, and impaired thinking and memory processes (Mccarthy et al., 2021)(Ali et al., 2023). A person with signs and symptoms of stroke must be treated quickly and appropriately to prevent permanent disability or even death. Still, many patients come to the hospital already in serious condition with decreased consciousness (Sutejo et al., 2023). This is due to the lack of stroke prevention behavior, which consists of controlling the main risk factor, namely hypertension (Cipolla et al., 2018)(Rosdiwati et al., 2023).

Gubeng is one of the sub-districts in the city of Surabaya, which has an area of 7.99 km$^2$ and a population of 132.690 people. Based on the health profile of the City of Surabaya (2019), the number of hypertension sufferers in Gubeng District is 33.561 people, which means 25.3% of the population suffers from hypertension, which has the potential to experience a stroke. Hypertension triggers ischemic and hemorrhagic stroke (Gronseth GS, Cox J, Gloss D, Merillat S, Dittman J, Armstrong M, 2017)(Wulandari et al., 2023). Hypertension is when the systolic blood pressure is more than 140 mmHg, and the diastolic pressure is more than 90 mmHg in repeated measurements (Puspitasari, 2020). Hypertension is often called the silent killer because it usually appears without symptoms and is only discovered when disorders occur in the body (Anggita et al., 2023).

The Health Promotion Model (HPM) theory, according to Nola J. Pender, demonstrates the relationship between humans and their physical and interpersonal environments in various dimensions (Grech & Grech, 2021). The approach in HPM theory focuses on an individual's ability to maintain their health condition with the belief that the best intervention is to take action to prevent disease and then try to take action that improves their condition (Taft et al., 2021). Stroke prevention behavior is a top priority in reducing morbidity, disability and mortality rates due to stroke.
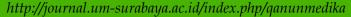
In general, stroke is caused by uncontrolled hypertension. Preventive behavioral factors make an essential contribution to the prognosis of a disease. Stroke needs serious attention because the impact of stroke on the quality of life of sufferers and their families is very large. Loss of organ function causes patient dependency, decreased productivity and the family's economic capacity (Ogunlana et al., 2014).

The Health Promotion Model (HPM) theory analyzes factors that influence health behavior, including previous behavior (prior related behavior), personal factors, perceptions of the benefits of action, perceived barriers to action), self-ability (perceived self-efficacy), attitudes related to activities (activity related affect), individual influences (personal influences), and situational influences (situational influences).

Nola J. Pender as the creator of the Health Promotion Model (HPM) theory explains that humans try to utilize their unique potential to create conditions to remain healthy, humans have the capacity to raise self-awareness as well as an assessment of their abilities, humans assess development as a positive value and try to achieve a balance between change and stability, each individual tries to regulate behavior actively, individuals in their

bio-psycho-social complexity interact with the environment, transform progressively with the environment and are transformed all the time, health professionals are part of the interpersonal environment that influences humans throughout their lives, and interactive patterns between humans and environment initiate self-reconfiguration, are important for behavior change (Mudgal S et al., 2021). This research was conducted to determine the dominant factors associated with stroke prevention behavior, and then the results of the analysis can be used to design interventions to provide health education to improve stroke prevention behavior for hypertension sufferers.

## METHODS

The research uses a cross-sectional design where the researcher observes phenomena at a certain time, explaining the relationship of one variable with other variables in the population studied, testing the validity of a model and the level of differences between sampling groups at a certain point. The population is all hypertension sufferers in Gubeng District, namely 33.561 people and a sample of 108 respondents using purposive sampling with the inclusion criteria being willing to be a respondent, being able to read and write, systolic blood pressure >140mmHg and diastolic >90mmHg. The exclusion criteria were that the respondent had had a stroke. The independent variables in this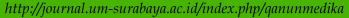 research are prior related behavior, personal factors, perceived benefits, perceived barriers to action, perceived self-efficacy, activity-related influences, personal influences, and situational influences. Meanwhile, the dependent variable is stroke prevention behavior.

The researchers created the instrument by referring to the Health Promotion Model (HPM) theory. This questionnaire consists of 64 questions, prior related behavior totaling 12, personal factor (motivation) totaling 5, perceived benefits to action totaling 5, the perceived barrier to action totaling 6, perceived self-efficacy totaling 9, activity-related affect totaling 5, personal influences totaling 6, situational influences totaling 4, and stunting prevention behavior totaling 12.

The questionnaire was measured using the Likert and Guttman scales. The validity test uses the Pearson correlation formula with a valid value if $p > 0.05$. The reliability test is based on the Cronbach's Alpha scale of 0 to 1; instrument items are considered reliable if $> 0.60$. The research was conducted in Gubeng District, Surabaya with a research period of 4 months. Data analysis used bivariate analysis for cross-tabulation between each independent variable and the dependent variable using the chi-square test, and multivariate analysis used the logistic regression statistical test with p-value $< 0.05$. This research applies research ethics, namely informed consent, anonymity and confidentiality.

## RESULTS

### Demographic Characteristics of Respondents

**Table 1.** Distribution of demographic characteristics of respondents in May 2024

| No. | Demographic Characteristics of Respondents | | Category | Frequency | Percentage |
|---|---|---|---|---|---|
| 1 | Level of education | | Elementary school | 18 | 16.7 |
| | | | Junior High School | 10 | 9.3 |
| | | | Senior High School | 55 | 50.9 |
| | | | College | 25 | 23.1 |
| | | **Total** | | **108** | **100** |
| 2 | Socio-economic Status | | < 2,000,000 | 47 | 43.5 |
| | | | > 2,000,000 | 61 | 56.5 |
| | | **Total** | | **108** | **100** |
| 3 | Age | | 26 – 35 years old | 6 | 5.6 |
| | | | 36 – 45 years | 21 | 19.4 |
| | | | 46 – 55 years old | 40 | 37 |
| | | | 56 – 65 years old | 33 | 30.6 |
| | | | > 65 years | 8 | 7.4 |
| | | **Total** | | **108** | **100** |
| 5 | Ethnic group | | Javanese | 108 | 100 |
| | | **Total** | | **108** | **100** |
| 6 | Gender | | Female | 65 | 60.2 |
| | | | Male | 43 | 39.8 |
| | | **Total** | | **108** | **100** |

Based on table 1, it shows that the majority of respondents' education level was high school 55 (50.9%). Most of the socio-economic status was > 2,000,000, as many as 61 (56.5%). The majority of respondents were 46-55 years old 40 (37%). The respondent's ethnicity is 108 Javanese (100%). The gender of the respondents was mostly female, 65 (60.2%).

### Special Data

This section describes the distribution of factors related to stroke prevention in hypertension sufferers based on the Health Promotion Model, namely previous behavior, personal factors, perceived benefits to action, perceived barrier to action, perceived self-efficacy, activity-related affect, personal influences, situational influences, and stroke prevention behavior.

Based on table 2, it shows that previous behavior was mainly in the good category as much as 58 (53.7%), personal factors (motivation) were primarily in the sufficient category, as much as 77 (71.3%), perceived benefits to action were mostly in the sufficient category as much as 60 (55.6%), perceived barrier to action by the majority of the sufficient category was 82 (75.9%), perceived self-efficacy of the majority of the sufficient category was 81 (75%), activity-related affect in the majority of the sufficient category was 81 (75%), personal influences of the majority of the sufficient category was 80 (74.1%), situational influences are mostly in the sufficient category was 93 (86.1%), and stroke prevention behavior is mostly in the positive category 57 (52.8%).

# QANUN MEDIKA
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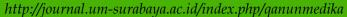*http://journal.um-surabaya.ac.id/index.php/qanunmedika*

**Table 2.** Distribution of respondents based on previous behavior, personal factors, perceived benefits to action, perceived barrier to action, perceived self-efficacy, activity-related affect, personal influences, situational influences, and stroke prevention behavior

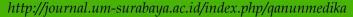| No. | Variables measured | Category | Frequency | Percentage |
|---|---|---|---|---|
| 1 | Previous behavior | Poor | 0 | 0 |
| | | Sufficient | 50 | 46.3 |
| | | Good | 58 | 53.7 |
| | **Total** | | **108** | **100** |
| 2 | Personal factors (motivation) | Poor | 0 | 0 |
| | | Sufficient | 77 | 71.3 |
| | | Good | 31 | 28.7 |
| | **Total** | | **108** | **100** |
| 3 | Perceived benefits to action | Poor | 0 | 0 |
| | | Sufficient | 60 | 55.6 |
| | | Good | 48 | 44.4 |
| | **Total** | | **108** | **100** |
| 4 | Perceived barrier to action | Poor | 13 | 12 |
| | | Sufficient | 82 | 75.9 |
| | | Good | 13 | 12 |
| | **Total** | | **108** | **100** |
| 5 | Self-efficacy | Poor | 0 | 0 |
| | | Sufficient | 81 | 75 |
| | | Good | 27 | 25 |
| | **Total** | | **108** | **100** |
| 6 | Activity related affect | Poor | 0 | 0 |
| | | Sufficient | 81 | 75 |
| | | Good | 27 | 25 |
| | **Total** | | **108** | **100** |
| 7 | Personal influences | Poor | 0 | 0 |
| | | Sufficient | 80 | 74.1 |
| | | Good | 28 | 25.9 |
| | **Total** | | **108** | **100** |
| 8 | Situational influences | Poor | 0 | 0 |
| | | Sufficient | 93 | 86.1 |
| | | Good | 15 | 13.9 |
| | **Total** | | **108** | **100** |
| 9 | Stroke prevention behavior | Negative | 51 | 47.2 |
| | | Positive | 57 | 52.8 |
| | **Total** | | **108** | **100** |

**Table 3.** Relationship between independent variables and dependent variables

| No. | Variables measured | Category | Preventive Behavior | | Total |
|-----|--------------------|----------|---------|---------|-------|
| | | | **Negative** | **Positive** | |
| 1 | Previous behavior | Poor | 0 | 0 | 0 |
| | | Sufficient | 26 (24.1%) | 24 (22.2%) | 50 (46.3%) |
| | | Good | 25 (23.1%) | 33 (30.6%) | 58 (53.7%) |
| | | Total | 51 (47.2%) | 57 (52.8%) | 108 (100%) |
| | **Logistic Regression Test p = 0.360 (not significant)** | | | | |
| 2 | Personal factors (motivation) | Poor | 0 | 0 | 0 |
| | | Sufficient | 34 (31.5%) | 43 (39.8%) | 77 (71.3%) |
| | | Good | 17 (15.7%) | 14 (13%) | 31 (28.7%) |
| | | Total | 51 (47.2%) | 57 (52.8%) | 108 (100%) |
| | **Logistic Regression Test p = 0.319 (not significant)** | | | | |
| 3 | Perceived benefits to action | Poor | 0 | 0 | 0 |
| | | Sufficient | 25 (23.1%) | 35 (32.4%) | 60 (55.6%) |
| | | Good | 26 (24.1%) | 22 (20.4%) | 48 (44.4%) |
| | | Total | 51 (47.2%) | 57 (52.8%) | 108 (100%) |
| | **Logistic Regression Test p = 0.200 (not significant)** | | | | |
| 4 | Perceived barrier to action | Poor | 1 (0.9%) | 12 (11.1%) | 13 (12%) |
| | | Sufficient | 46 (42.6%) | 36 (33.3%) | 82 (75.9%) |
| | | Good | 4 (3.7%) | 9 (8.3%) | 13 (12%) |
| | | Total | 51 (47.2 %) | 57 (52.8%) | 108 (100%) |
| | **Logistic Regression Test p = 0.243 (not significant)** | | | | |
| 5 | Self-efficacy | Poor | 0 | 0 | 0 |
| | | Sufficient | 48 (44.4%) | 33 (30.6%) | 81 (75%) |
| | | Good | 3 (2.8%) | 24 (22.2%) | 27 (25%) |
| | | Total | 51 (47.2%) | 57 (52.8%) | 108 (100%) |
| | **Logistic Regression Test p = 0.000 (significant)** | | | | |
| 6 | Activity related affect | Poor | 0 | 0 | 0 |
| | | Sufficient | 45 (41.7%) | 36 (33.3%) | 81 (75%) |
| | | Good | 6 (5.6%) | 21 (19.4%) | 27 (25%) |
| | | Total | 51 (47.2%) | 57 (52.8%) | 108 (100%) |
| | **Logistic Regression Test p = 0.002 (significant)** | | | | |
| 7 | Personal influences | Poor | 0 | 0 | 0 |
| | | Sufficient | 46 (42.6%) | 34 (31.5%) | 80 (74.1%) |
| | | Good | 5 (4.6%) | 23 (21.3%) | 28 (25.9%) |
| | | Total | 51 (47.2%) | 57 (52.8%) | 108 (100%) |
| | **Logistic Regression Test p = 0.000 (significant)** | | | | |
| 8 | Situational influences | Poor | 0 | 0 | 0 |
| | | Sufficient | 48 (44.4%) | 45 (41.7%) | 93 (86.1%) |
| | | Good | 3 (2.8%) | 12 (11.1%) | 15 (13.9%) |
| | | Total | 51 (47.2%) | 57 (52.8%) | 108 (100%) |
| | **Logistic Regression Test p = 0.023 (significant)** | | | | |

| 9 | Education level | Elementary School | 9 (8.3%) | 9 (8.3%) | 18 (16.7%) |
|---|---|---|---|---|---|
| | | Junior High School | 2 (1.9%) | 8 (7.4%) | 10 (9.3%) |
| | | Senior High School | 28 (25.9%) | 27 (25%) | 55 (50.9%) |
| | | College | 12 (11.1%) | 13 (12%) | 25 (23.1%) |
| | | Total | 51 (47.2%) | 57 (52.8%) | 108 (100%) |
| | **Logistic Regression Test p = 0.708 (not significant)** | | | | |
| 10 | Socio-economic status | < 2 million | 18 (16.7%) | 29 (26.9%) | 47 (43.5%) |
| | | > 2 million | 33 (30.6%) | 28 (25.9%) | 61 (56.5%) |
| | | Total | 51 (47.2%) | 57 (52.8%) | 108 (100%) |
| | **Logistic Regression Test p = 0.105 (not significant)** | | | | |

## DISCUSSION

### The relationship between education level and stroke prevention behavior

The results of the analysis show that the majority of respondents have a high school education level. The results of the logistic regression test showed that there was no relationship between the respondent's education level and stroke prevention behavior. This is in line with the results of research conducted by Dhirisma (2022), which states that there is no significant relationship between education level and public knowledge about hypertension with a significance value of 0.158 (Dhirisma & Moerdhanti, 2022). A high level of education does not guarantee that it will influence a person's knowledge. Good knowledge is not only obtained from education but is also obtained in various ways, either through one's initiative or encouragement from other people. Knowledge can also be obtained from experience and formal or informal learning processes (Angkawijaya, 2016).

Hypertension is not only influenced by a person's level of education, but many factors can influence a person to suffer from hypertension such as genetics, lifestyle and environmental factors (Dhirisma & Moerdhanti, 2022). Interventions that can be carried out to increase the level of knowledge of hypertension sufferers in making efforts to prevent stroke are through providing health education that is tailored to the characteristics of the respondent, especially their level of education.
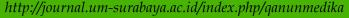
Health education is an activity or effort to convey health messages to groups or individuals, hoping that with these messages, groups or individuals can gain better knowledge about health. This knowledge is ultimately expected to influence behavior. In other words, health promotion is expected to affect changing individual behavior (Retnaningsih et al., 2021).

### The relationship between socio-economic status and stroke prevention behavior

The results of the analysis show that the majority of respondents have an income of > IDR 2,000,000. The results of the logistic regression test showed that there was no relationship between socio-economic status and stroke prevention behavior. This is not in line with the results of research conducted by Li et al. (2024) that there is a relationship between socio-economic status and the prevalence of hypertension in Fujian China. Hypertension is relatively high in respondents who have the lowest annual income (Li et al., 2024). Hypertension is more common in low socio-economic groups, as explained in research by Veisani et al. (2019) in Ilam, Iran (Veisani et al., 2019).

Low economic level can be a factor in someone suffering from hypertension apart from lifestyle. A person with a lower-middle-class economy is likelier to use his income to meet basic needs such as paying house rent, electricity, and water rather than prioritizing buying healthy food and checking himself into a health facility. Even though they know that they have hypertension, they sometimes ignore advice from health workers regarding treatment and prevention of complications (Lestari & Nugroho, 2020). Income level is associated with a person's purchasing power. High income has purchasing power for quality foodstuffs, especially for daily consumption. On the other hand, in communities with low socio-economic status, there is a lack of ability to meet health needs, including a healthy diet for hypertension and good and adequate medication (Putra et al., 2019).

Based on Table 3, the results show that most respondents with large incomes behave negatively at 30.6%. This can be caused by high income and busy work, making someone buy and consume fast food due to lack of time to prepare healthy food. High income also encourages people to buy various kinds of food without being able to control the amount of sodium contained in the food.

**The relationship between previous behavior and stroke prevention behavior**

The analysis results show that the majority of respondents had good previous behavior, 58 people (53.7%). The results of the logistic regression test showed that there was no relationship between previous behavior and stroke prevention behavior. This is in line with the results of research by Harun (2019), which explains that there is no relationship between food consumption patterns and the incidence of hypertension. Because there are several factors that cause hypertension such as race, family history, gender, age, lifestyle, obesity, stress, smoking, lack of physical activity, and the presence of comorbidities such as dyslipidemia and diabetes mellitus (Harun, 2019). The Indonesian Ministry of Health also explained that there are several risk factors for hypertension which are divided into factors that can be controlled and factors that cannot be controlled. Factors that can be controlled include consuming salt, smoking habits, consuming foods high in fat, using used cooking oil in the cooking process, obesity, consuming alcoholic drinks, lack of exercise, stress, and use of estrogen. Factors that cannot be controlled include age, gender, genetics, and family history.

This is different from the research results of Seprina (2022), which explains that CERDIK behavior has a significant relationship with controlling blood pressure (Seprina et al., 2022). CERDIK is an acronym for regular health checks, eliminating cigarette smoke, diligent physical activity, balanced diet, adequate rest, and managing stress. Hypertension sufferers can engage in SMART behavior as an effort to improve health, control blood pressure, and prevent complications, one of which is stroke.

Previous behavior is behavior that has often been carried out in the past, directly or indirectly, which impacts the possibility of behavior that improves health status. Past dietary habits such as high sodium intake, the habit of consuming high-fat foods, fried foods, and fermented foods and drinks can cause a person to suffer from hypertension. The more unhealthy a person's diet is, the higher a person's risk of developing hypertension.

**The relationship between personal factors (self-motivation) and stroke prevention behavior**

The analysis results show that the majority of respondents have sufficient self-motivation,

77 people (71.3%). The results of the logistic regression test showed that there was no relationship between self-motivation and stroke prevention behavior. This is in line with the results of research by Purnamasari (2023) which explains that there is no relationship between motivation and adherence to taking medication in hypertension sufferers (Purnamasari et al., 2023). This could be because patients lack the desire to control the hypertension they suffer from, so respondents are reluctant to carry out routine self-examination and treatment. To keep blood pressure monitored, patients must comply with taking hypertension medication because this can prevent complications such as stroke, which can cause death (Purnamasari et al., 2023).

This is different from the research results of Aprilianawati (2022), which explains a relationship between self-motivation and blood pressure control behavior. Respondents with low motivation have low blood pressure control behavior, whereas respondents with high motivation also have high blood pressure control behavior (Aprilianawati & Wahyudi, 2022).

Even though in this study, motivation was not related to stroke prevention behavior, this does not mean that the motivation of patients with hypertension was not taken into account. Motivation must be built and applied to every hypertension sufferer to prevent complications. Self-motivation is a hope that encourages someone to carry out activities to achieve a goal. Intrinsic factors and extrinsic factors influence motivation. Intrinsic factors consist of interests, needs, and hopes, while extrinsic factors consist of the environment and facilities (Aprilianawati & Wahyudi, 2022). Hypertension sufferers who have high self-motivation, because of their need to recover from their disease and avoid deadly complications.

**The relationship between perceived benefits to action and stroke prevention behavior**

The results of the analysis show that the majority of respondents have a perception of the benefits of sufficient action as many as 60 people (55.6%). The results of the logistic regression test showed that there was no relationship between perceptions of the benefits of action and stroke prevention behavior. This is in line with the results of research by Wahyuni (2023) which explains that there is no relationship between the perception of the benefits of action and the compliance of hypertensive patients with treatment (Wahyuni & Iqbal, 2023). This could be due to the lack of knowledge obtained by respondents about the benefits of medication adherence for hypertension sufferers. It is known that the main factor that can influence a person's health beliefs is knowledge. Respondents do not fully understand the benefits of stroke prevention behavior, this could be because the explanation process is still one-way communication. One-way communication risks giving rise to misunderstandings, so respondents feel unclear about what is being conveyed because they do not have the opportunity to respond.

This is different from the research results of Soesanto (2020) which explains a relationship between perceived benefits and the health behavior of hypertension sufferers (Soesanto & Marzeli, 2020). The respondents perceived that if they adopted healthy behavior, they would be able to control blood pressure and prevent complications. The benefit of action is the effectiveness of a program to reduce health threats, the decision to take a countermeasure or disease prevention behavior depends on a person's perception of the benefits of the action they will take (Soesanto & Marzeli, 2020).

Perceived benefits are beliefs related to the effectiveness of various behaviors as an effort

to reduce the threat of disease or the benefits a person perceives in generating disease prevention behavior (Solhi et al., 2023). Perceived benefits are perceptions of benefits that have a positive relationship with healthy behavior. Perceived benefits are a person's belief that the benefits of the recommended behavior are greater than all obstacles. Someone who has a high perception of benefits will have healthy behavior as an effort to prevent stroke in hypertension sufferers. A high perception of benefits can increase the confidence of hypertension sufferers in implementing stroke prevention behavior.

**The relationship between perceived barriers to action and stroke prevention behavior**

The results of the analysis show that the majority of respondents perceive sufficient barriers to action as many as 82 people (75.9%). The results of the logistic regression test showed that there was no relationship between perceptions of barriers to action and stroke prevention behavior. This is in line with the research results by Wahyuni (2023), which explains that there is no relationship between perceived barriers to action and hypertension patients' compliance with treatment (Wahyuni & Iqbal, 2023). This can be caused by limited access to health facilities, limited time for physical activity, limited economy to meet healthy living needs, as well as limited counseling between health workers and patients (Wahyuni & Iqbal, 2023).

This is different from the research results of Soesanto (2020), which explains that there is a relationship between perceived barriers and the health behavior of hypertension sufferers (Soesanto & Marzeli, 2020). This is because respondents felt that it would be a burden on their families if they carried out healthy behavior, the family had to pay for medical expenses, and the family had to set aside time at work to take them to health services (Soesanto & Marzeli, 2020).

Perception of action barriers is a perception of negative aspects that prevent someone from carrying out healthy behavior, feeling that healthy efforts will require more effort, be troublesome, cost money and time, cause pain, unpleasant experiences, until when someone thinks about one of these reasons, he will think that doing so will be difficult. Barriers that arise in disease prevention behavior can influence a person in carrying out these preventive actions. If the perceived barriers are low, a person's efforts to carry out preventive behavior will be higher.

**The relationship between self-efficacy and stroke prevention behavior**

The analysis results show that most respondents have sufficient self-efficacy, 81 people (75%). The results of the logistic regression test show that there is a relationship between self-efficacy and stroke prevention behavior. This is in line with the results of research by Huda (2017) which explains that there is a relationship between self-efficacy and self-care management in hypertension sufferers (Huda, 2017). Respondents who have high self-confidence are reported to be able to manage their own care better (Ekawati Rahayu Sa'pang et al., 2022).

A person's ability to organize and carry out major actions, not only the skills a person has but the decisions a person takes from the skills he or she has. A person's efficacy decision is known from the expected results, namely a person's ability to take action with the resulting benefits. Skills and competencies motivate individuals to perform superior actions. Feelings of expertise in an action will encourage a person to carry out the desired behavior more often than feelings of lack of skill (Diah Retnoningtyastuti et al., 2022).

Hypertension sufferers who have high self-efficacy are able to carry out healthy behavior in order to prevent complications, namely stroke. A person with high self-efficacy is able to reduce salt and fat consumption, stop smoking, increase physical activity, manage stress, sleep on time, and modify his lifestyle to a healthy lifestyle (Rasyid et al., 2023).

Someone who has high *self-efficacy* can make positive behavioral changes so that they can control the severity of the chronic disease they suffer from. The abilities a person has can support high self-efficacy, whereas for someone who thinks their abilities are low, the possibility of their self-efficacy is lower.

### The relationship between activities related attitudes and stroke prevention behavior

The results of the analysis show that the majority of respondents have attitudes related to sufficient activities, 81 people (75%). The results of the logistic regression test show that there is a relationship between attitudes related to activity and stroke prevention behavior. This is in line with the results of Watung's research (2021) which explains that there is a relationship between attitude and efforts to prevent stroke in hypertensive patients (Watung, 2021).

According to Sunaryo, attitude is a readiness to respond consistently positively or negatively to an object or situation. Attitude is an individual's tendency to act in the form of a closed response to certain stimuli or objects. Attitude shows the suitability of reactions to stimuli that involve a person's opinion and emotional factors. So attitude is not an action or activity, but is a tendency to carry out actions or behavior or roles. According to Nursalam, a person's attitude can be influenced by several factors, namely age, employment, education and parity. If the respondent has a positive attitude then his actions and behavior will tend to be positive too.

A person's attitude is influenced by the knowledge they have (Watung, 2021). The knowledge possessed by hypertension sufferers is an important part that determines a person's ability to implement stroke prevention behavior. In this study, most of the respondents had a secondary education (SMA) background which is related to the ability to search for and understand information.
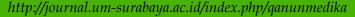
### The relationship between personal influences and stroke prevention behavior

The results of the analysis show that the majority of respondents have sufficient individual influence, 80 people (74.1%). The results of the logistic regression test show that there is a relationship between individual influence and stroke prevention behavior. This is in line with the results of research by Aprilianawati (2022), which explains that there is a relationship between family support and blood pressure control attitudes in elderly people who suffer from hypertension (Aprilianawati & Wahyudi, 2022). Family support describes an attitude of serving the family, providing full emotional support, and giving appreciation. Family support directly controls sufferers' blood pressure by modifying their lifestyle to one that is healthy.

Hypertension sufferers expect attention from the family, providing support in the form of action through family acceptance of the sufferer in dealing with illness and helping the healing process from the disease (Aprilianawati & Wahyudi, 2022). Apart from family, the role of health workers is also influential in preventing stroke in hypertension sufferers. Health cadres are tasked with providing support to families in the process of treating and rehabilitating hypertension sufferers. Families strive to be able to develop independence, increase self-confidence, and prevent disability against the possibility of a re-stroke (Ernawati & Yan,

2023). The role of health workers in exposure to disease prevention programs is also critical to change people's behavior.

According to Potter and Perry, the various roles of health workers (doctors, midwives, nurses, etc.) are as communicators. A communicator is a person who provides information to the person who receives it. Another role of health workers is as a motivator, a motivator is a person who provides motivation to other people. The final role is as a facilitator. A facilitator is a person or body that makes it easy to provide facilities for other people who need them. This role influences a person's knowledge and attitudes. Health workers as educators must be able to educate and teach individuals, families, groups and communities, as well as other health workers in accordance with their responsibilities. Health workers as educators, strive to provide education or health counseling to clients with evaluations that can improve learning.

**The relationship between situational influences and stroke prevention behavior**

The analysis results show that the majority of respondents have sufficient situational influence as many as 93 people (86.1%). The results of the logistic regression test show that there is a relationship between situational influences and stroke prevention behavior. This is in line with the research results of Khotimah (2019), which explains a relationship between environmental factors and adherence to a healthy lifestyle mediated by personal factors in hypertension patients based on social cognitive theory (Khotimah et al., 2019). Environmental factors influence a person's behavior, environmental factors can influence personal factors and personal factors influence adherence to a healthy lifestyle.

Environmental support can be obtained from friends, family and health workers. The low level of support and concern from the environment in adopting a healthy lifestyle causes sufferers to be reluctant to modify their lifestyle. Bandura (2004) in social cognitive theory explains that environmental factors can influence personal factors. One of the factors that influence a person's compliance with a medical program is social support in the form of emotional support from the environment, so that friends, family and health workers can become a support group in achieving patient compliance with the medical program (Sabrina et al., 2015).

Based on research results, Gibran (2020) explains that there is a relationship between environmental conditions (house temperature) and the incidence of hypertension (Halil Gibran & Heriyani, 2020). High population density and house occupancy can trigger hot temperatures in the area. Due to hot temperatures, it can increase the dilation of peripheral blood vessels (vasodilation) and narrowing of deep blood vessels (vasoconstriction), followed by an increase in pulse and blood pressure. It can be concluded that exposure to hot temperatures due to residential density that reaches more than 30 °C will cause an increase in blood pressure (hypertension).

The limitation in this research is that there are 10 variables, so respondents have to fill out many questionnaires. Apart from that, collecting data on respondents cannot be done at one time and in one place. So the research team had to go to the respondents' homes one by one. The number of respondents was 108 people so the results of this study cannot be used to generalize to all hypertensive patients in Gubeng District. Therefore, it is necessary for further research to involve a larger sample size.

## CONCLUSION

Independent factors related to stroke prevention behavior are perceived self-efficacy (0.000), activity-related affect (0.002), personal influences (0.000), and situational influences (0.023). Meanwhile, factors that have no relationship are prior related behavior (0.360), personal factor (motivation) (0.319), perceived benefits to action (0.200), perceived barriers to action (0.243), education level (0.708), socio-economic status (0.105). This research can be used as material for developing health workers' knowledge in intervening in stroke prevention behavior in hypertension sufferers.

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