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Application of Health Belief Model of Tertiary Prevention Behavior in Elderly People with Hypertension: A Multilevel Analysis

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ABSTRACT

Background: The health of the elderly is influenced by various risk factors and changes from within themselves and their environment. These various conditions can affect health problems, functional status, level of independence and quality of life of the elderly. Deterioration of health in the elderly can manifest in a variety of diseases, including hypertension. Efforts to control the incidence of hypertension can be done through the provision of health education about hypertension, which aims to raise awareness of hypertensives about the concept of hypertension, complications, and how to overcome. This study aims to examine the application of the Health Belief Model (HBM) as a predictor by taking into account the contextual effects of the Elderly Integrated Healthcare Posts in Kepanjen, Malang, East Java, Indonesia.
Subjects and Method: This study was an observational analytical study with a cross-sectional approach using a multilevel analysis model. The population in this study was all elderly people with hypertension at the Elderly Integrated Healthcare Posts in the working area of Kepanjen Community Health Center, Malang, East Java, Indonesia. The sample in this study was 200 elderly with hypertension at the Elderly Integrated Healthcare Posts in the Kepanjen Community Health Center Working Area, Malang, East Java, Indonesia. The study used the Stratified Sampling technique at the healthcare level (Elderly Integrated Healthcare Posts), and Stratified Random Sampling in the selection of the elderly.
Results: Tertiary prevention behavior among elderly with hypertension increased with high self-efficacy (b= 0.57; CI 95%= 0.39 to 0.73; p<0.001), cues to action (b= 0.27; CI 95%= 0.35 to 1.71; p<0.001), female gender (b= 0.76; CI 95%= 0.10 to 0.42; p<0.001), age 70-90 years (b= 0.37; CI 95%= -0.01 to 0.75; p= 0.060). Integrated health posts for elderly on the tertiary prevention behavior of hypertension. The Integrated Healthcare Posts had contextual effect on tertiary prevention behavior (ICC=29.87%; p<0.001).
Conclusion: Tertiary prevention behavior of hypertension in the elderly increases with high self-efficacy, cues to action, female gender, age 70-90 years.

Keywords: hypertension, elderly, self-efficacy, cues to action.

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BACKGROUND

The health of the elderly is influenced by various risk factors, internal and environmental changes. These conditions can affect health problems, functional status, level of independence, and quality of life of the elderly (Patel and Goyena, 2019). The prevalence of hypertension in Indonesia mostly occurs in the elderly group, but it turns out that the prevalence of hypertension in the productive age group tends to increase (Rayanti et al, 2021).

According to data from Riskesdas of the East Java Province, Indonesia, the prevalence of hypertension reaches 26.2%. The highest prevalence of hypertension is found in the age group of ≥75 years, which is 62.4%. Based on previous research conducted at the Kepanjen Community Health Center, Malang, East Java, Indonesia, which consists of 18 villages, the number of elderly people aged 60-70 years who have received treatment in the past year was 5,136 elderly (Fithri et al, 2021).

Hypertension can be grouped into two types, namely primary (essential) hypertension and secondary hypertension. The cause of primary hypertension is generally unknown, but it can cause changes in the heart and blood vessels. In contrast, secondary hypertension is generated or as a result of other diseases with an identified cause, such as kidney disease and hormonal disorders, or the use of certain medications (Ma, 2018).

The incidence of hypertension is caused by high salt intake, lack of physical activity, and lack of knowledge about hypertension. It requires efforts to raise public awareness about health (Setiyaningsih, 2016). Efforts to control the incidence of hypertension can be done through the provision of health education about hypertension, which aims to make hypertensives aware of the concept of hypertension, its complications, and how to overcome hypertension.

Health education is a planned opportunity to learn through the information dissemination from health workers that affects the process of human behavior change (Arindari and Suswitha, 2020). One of the methods in disseminating health education is based on the theory of The Health Belief Model. This theoretical model is often used to observe health prevention and treatment behaviors, such as the behavior of early detection of disease. Health education based on The Health Belief Model is a conceptual collection that aims to find out the factors of change (demographics and knowledge) and individual perceptions of their acceptance of health, which are assessed through the individual's motivation to avoid illness and their belief that there is an effort to avoid the disease.

This method is applied to encourage clients to take better health measures. The Health Belief Model (HBM) has been used to describe and predict an individual's health behavior to prevent or control diseases and their complications by incorporating perceived susceptibility, seriousness, severity, benefits, and barriers to health behaviors (Joho, 2021). Based on the background of the problem, the researcher is interested in conducting a study entitled the Application of Health Belief Model of tertiary preventive behavior in the elderly with hypertension: multilevel analysis at the Elderly Integrated Healthcare Posts, Kepanjen, Malang, East Java, Indonesia.

SUBJECTS AND METHOD

1. Study Design

This study was an observational analytical study with a cross-sectional approach using a multilevel analysis model.

2. Population and Sample

The population in this study was all elderly people with hypertension at the Elderly Integrated Healthcare Posts in the working area of Kepanjen Community Health Center, Malang, East Java, Indonesia. The sample in this study was 200 elderly with hypertension at the Elderly Integrated Health Posts in the Kepanjen Community Health Center Working Area, Malang, East Java, Indonesia. The sampling technique used at the level of healthcare (Elderly Integrated Healthcare Posts) was Stratified Sampling, and in the selection of the elderly was Stratified Random Sampling.

3. Study Variables

Dependent variables include tertiary prevention behaviors. Independent variables were perceived susceptibility, perceived severity, perceived benefits, perceived barrier, cues to action, self-efficacy, age, and gender.

4. Operational Definition of Variables

Perceived susceptibility is an individual's subjective perception of the risk of developing a disease, as well as the perceived possibility of a person's risk of developing a certain disease or adverse health effects. In the context of the Health Belief Model (HBM), the likelihood of having a disease is used to examine an individual's opinion about how their behavior may have a negative impact on their health. It was measured using a questionnaire with 5 questions.

Perceived severity is the perception of the seriousness/severity of the disease or leaving it untreated (including an evaluation of both the medical and clinical consequences and the social consequences that may arise), as the circumstances or actions may occur. Measured using a questionnaire with 5 questions.

Perceived benefits is a person who experienced the benefits obtained when paying for health facilities and services when compared to the risk of his disease. The Health Belief Model (HBM) stated that health-related behaviors are also influenced by an individual's perception of the benefits of doing healthy actions or behaviors. Measured using a questionnaire with 5 questions.

Perceived barriers is an individual who experiences obstacles from within when the individual is in healthy behavior. Measured using a questionnaire with 5 questions.

Cues to action is a stimulus to act, which is a necessary stimulus to trigger the decision-making process so that health behaviors occur. "Cues to action" measures the social and environmental effects that stimulate (stimulate) an individual's desire to take health-related actions. Measured using a questionnaire with 5 questions.

Tertiary prevention behavior of hypertension is an effort to avoid experiencing a disease. Measured using a questionnaire with 8 questions.

5. Study Instruments

The study instrument used for data collection is using a questionnaire.

6. Data analysis

Univariate analysis was used to obtain the frequency distribution and percentage of the characteristics of the study subjects. Bivariate analysis was used to analyze the differences between independent and dependent variables, and multivariate analysis was conducted using multilevel models.

7. Research Ethics

Research ethics, including informed consent, anonymity, and confidentiality, were handled carefully throughout the

study process. The ethical clearance for the study was obtained from the Research Ethics Committee of dr. Sayidiman Magetan Hospital, East Java, Indonesia No. 445/34/403.300/2024, on January 3, 2024.

RESULTS

1. Univariate Analysis

Univariate analysis presents the mean value, standard deviation, minimum value, and maximum value of each study variable, which includes: preventive behavior, perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy. The following are the results of the univariate analysis.

Table 1 presents a description of the characteristics of the sample. The study subjects with male gender were as much as 33.50% and female gender were 66.50%. The number of study subjects aged 60-69 years was 69.50%, and 70-90 years old was 30.50%. The Integrated Healthcare Posts with the status of "madya' or intermediate were 33%, "purnama-level" or complete were 59%, and "mandiri" or independent were 8%.

Table 2 presents a description of the scores of the health belief model (HBM) constructs, including n, mean, SD, minimum, and maximum obtained from sample data.

Table 1. Results of univariate analysis of categorical data

Variable	Category	N	%
Gender	Male	67	33.50
	Female	133	66.50
Age	60-69 years	139	69.50
	70-90 years	61	30.50
Status of the Integrated Healthcare Posts	Madya	66	33.00
	Purnama	188	59.00
	Mandiri	16	8.00

Table 2. Results of univariate analysis of continuous data of various constructs of the health belief model

Variable	n	Mean	SD	Min	Max
Preventive behavior	200	10.00	2.17	2	12
Perceived susceptibility	200	5.53	0.80	3	6
Perceived severity	200	3.05	1.07	0	4
Perceived benefits	200	7.14	1.37	2	8
Perceived barriers	200	7.55	2.37	0	10
Cues to Action	200	5.31	1.76	1	8
Self-Efficacy	200	6.52	1.51	1	8

2. Bivariate Analysis

Bivariate analysis was used to explain the relationship between the independent variables of self-efficacy, cues to action, gender, age with the dependent variables of preventive behavior. Table 3 presents the results of a bivariate analysis of the effects of several variables of the Health Belief Model (HBM) theory on tertiary preventive behavior in the elderly with hypertension. There was a positive association of self-efficacy (b= 0.99; 95%CI= 0.84 TO 1.14; P<0.001) and cues to action (B=0.79; 95% CI= 0.65 TO 0.92; P<0.001) on tertiary prevention behaviors of hypertension and these effects were statistically significant.

Table 3 also shows that tertiary prevention behaviors of hypertension were better in female than in male and the difference was statistically significant (b= 1.29; 95% CI= 0.67 to 1.90; p<0.001). Similarly, it shows differences in tertiary prevention behaviors of hypertension by age group in the elderly. Elderly aged 70-90 years had better preventive behaviors on average than those aged 60-70 years, and the difference was statistically significant (b=0.82; 95% CI= 0.17 to 1.47; p= 0.014).

Table 3 Results of bivariate analysis of health belief model factors on tertiary prevention behavior of hypertension

Variable	Regression Coefficients (b)	95% CI		p
		Lower limit	Upper limit	
Self-efficacy	0.99	0.84	1.14	<0.001
Cues to Action	0.79	0.65	0.92	<0.001
Gender (female)	1.29	0.67	1.90	<0.001
Age (70-90 years)	0.82	0.17	1.47	0.014

3. Multivariate Analysis

Table 4 presents the results of a multilevel multiple linear regression analysis of the effects of factors in *the Health Belief Model* (HBM) on tertiary prevention behaviors of hypertension in the elderly, and these effects were statistically significant.

Self-efficacy and tertiary prevention behaviors of hypertension

Positive effect of self-efficacy on tertiary prevention behaviors of hypertension in the elderly. The stronger the self-efficacy, the better the tertiary prevention behavior of hypertension in the elderly. (b= 0.57; CI 95%= 0.39 to 0.73; p<0.001).

Cues to action and tertiary preventive behavior of hypertension

Positive effects of cues to act on tertiary preventive behaviors of hypertension in the elderly. Cues to action increased the likelihood of the elderly to perform tertiary preventive behaviors of hypertension. (b= 0.27; CI 95%= 0.35 to 1.71; p<0.001).

Gender and tertiary prevention behaviors of hypertension

Differences in tertiary prevention behaviors of hypertension by gender indicated that females, on average, had better tertiary hypertension prevention behaviors than males. (b= 0.76; CI 95%= 0.10 to 0.42; p<0.001).

Age and tertiary prevention behaviors of hypertension

Tertiary prevention behaviors of hypertension by age. Elderly people aged 70-90 years had better tertiary hypertension prevention behaviors on average than those aged 60-70 years. (b= 0.37; CI 95%= -0.01 to 0.75; p= 0.060).

This multilevel analysis showed the contextual effects of variables at the Integrated Healthcare Posts level on the tertiary prevention behavior of hypertension in the elderly with Intraclass Correlation (ICC) = 29.87%. This means that as many as 29.87% of the variation in tertiary prevention behavior of hypertension was determined by variables at the Integrated Health Posts level.

Contextual and behavioral effects of tertiary prevention behavior of hypertension

The contextual effect was quite large (ICC > 8-10%). Therefore, it should not be ignored in the analysis of data on the relationship between Health Belief Model (HBM) variables and tertiary prevention behaviors of hypertension in the elderly.

Table 4: The results of multilevel multiple linear regression analysis on the effects of self-efficacy, cues to action, gender, and age on tertiary prevention behaviors of hypertension

Independent Variable	Regression Coefficients (b)	95% CI		p
		Lower limit	Upper limit	
Fixed effect				
Self-efficacy	0.57	0.39	0.73	<0.001
Cues to action	0.27	0.35	1.71	<0.001
Gender (female)	0.76	0.10	0.42	<0.001
Age (70-90 years)	0.37	-0.01	0.75	0.060
Random effect				
Integrated Post				
Var (constant)	0.65	0.30	1.41	
N observation = 200				
N group = 25				
Average of group= 8, min = 8, max = 8				
Log likelihood = 344.81				
p<0.001				
ICC= 29.87%				

DISCUSSION

The Effect of Self-Efficacy and Tertiary Prevention Behaviors of Hypertension

There was a positive effect of self-efficacy on the tertiary prevention behaviors of hypertension in the elderly. The stronger the self-efficacy, the better the tertiary prevention behavior of hypertension in the elderly. (b= 0.57; CI 95%= 0.39 to 0.73; p<0.001). The self-efficacy of hypertension clients at the Kepanjen Community Health Center, Malang, East Java, Indonesia had indicated good confidence.

The beliefs that a person has will affect a person's lifestyle, such as doing regular physical activity, a healthy diet by reducing fast food and high-fat meals, reducing salt consumption, checking blood pressure, obediently taking medication, and being able to do stress management (Fauziah et al, 2021).

Self-efficacy is also defined as a person's ability to make a self-assessment of the competencies they have to succeed in completing certain tasks. Self-efficacy is generative capability, which means that all cognitive, social, emotional, and behavioral potentials must be managed to achieve certain goals (Olpah et al, 2023).

The Effect of Cues to Action and Tertiary Prevention Behaviors of Hypertension

Cues to action increased the likelihood of the elderly to conduct tertiary preventive behaviors of Hypertension. (b= 0.27; CI 95%= 0.35 to 1.71; p<0.001). Cues to action are factors that motivate a person to take an action.

In the context of tertiary prevention of hypertension, these cues can be in the form of symptoms, complications, or risk factors that increase the likelihood of complications (Rusmadi et al, 2021). Tertiary hypertension prevention behavior is an effort to minimize the impact and complications of pre-existing hypertension disease. This effort is carried out by controlling blood pressure, preventing further complications, and improving the quality of life of patients.

Cues to Action is an important factor in encouraging tertiary prevention behaviors of hypertension. Patients with hypertension

must understand internal and external cues that can increase the risk of complications. By understanding these cues, patients can take appropriate steps to prevent complications and improve quality of life (Fitriah et al, 2023).

The Effect of Gender and Tertiary Prevention Behaviors of Hypertension

Women, on average, had better tertiary prevention behaviors of hypertension than men. (b= 0.76; CI 95%= 0.10 to 0.42; p<0.001). Some studies suggest that there is an association between gender and tertiary prevention behaviors of hypertension. Men are generally less compliant in treatment and lifestyle modification than women.

Gender is an important factor to consider in the tertiary prevention of hypertension. Men are generally more at risk of developing hypertension and have a harder time controlling their blood pressure. It is important to conduct men-specific education and interventions to improve medication adherence and lifestyle modification (Arindari and Suswitha, 2020).

Gender and tertiary preventive behavior are two important factors that can affect the health outcomes of hypertensive patients. Men have a higher risk of hypertension complications than women. Good tertiary preventive behaviors can help lower blood pressure, prevent complications, and improve the quality of life of hypertensive patients.

It is important for hypertensive patients to understand the effect of gender and tertiary preventive behaviors on their health. Male patients should be more aware of the complications of hypertension and should strive to better control their blood pressure. Patients of any gender can improve their health by following good tertiary preventive behaviors (Hoky et al, 2022).

The Effect of Age and Tertiary Prevention Behaviors of Hypertension

Elderly people aged 70-90 years had better tertiary prevention behaviors of hypertension on average than those aged 60-70 years. (b=0.37; CI 95%= -0.01 to 0.75; p= 0.060). Tertiary preventive behaviors of hypertension in the elderly aim to prevent further complications and improve quality of life. Age is a major risk factor for hypertension.

Tertiary prevention of hypertension in the elderly is essential to prevent further complications and improve quality of life. Efforts to improve tertiary hypertension prevention behaviors in the elderly must be carried out comprehensively, including through health education, family support, and elderly programs. Age is one of the main risk factors for hypertension. Tertiary prevention behaviors of hypertension are important at all ages, including the elderly. There are several strategies that can be used to improve the tertiary prevention behaviors of hypertension in the elderly. (Williams, 2021).

This study concludes that a cross-sectional study was conducted on the elderly to measure the tertiary prevention behavior of hypertension among as many as 200 people at Kepanjen Community Health Centers, Malang, East Java, Indonesia, at 25 Integrated Healthcare Posts. There is a positive effect of self-efficacy on tertiary hypertension prevention behavior in the elderly. The stronger the self-efficacy, the better the tertiary prevention behavior of hypertension in old age. Cues to action increase the likelihood of the elderly to perform tertiary preventive behaviors of hypertension. Women, on average, have better tertiary prevention behaviors of hypertension than men. Elderly people aged 70-90 years have better tertiary prevention

behaviors of hypertension on average than those aged 60-70 years.

This multilevel analysis shows the contextual effect of variables at the Integrated Healthcare Posts level on the tertiary prevention behavior of hypertension in the elderly with Intraclass Correlation (ICC) = 29.87%. This means that as many as 29.87% of the variation in tertiary prevention behavior of hypertension is determined by variables at the Integrated Healthcare Posts level. The contextual effect is quite large (ICC > 8-10%). Therefore, it should not be ignored in the analysis of data on the association between HBM (Health Belief Model) variables and tertiary preventive behaviors of elderly hypertension.

AUTHORS CONTRIBUTION

Hallisa'tu Zahro as a researcher who chose topics, searched, and collected study data. Argyo Demartoto, and Bhisma Murti analyzed the data and reviewed the study documents.

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CONFLICT OF INTEREST

There was no conflict of interest in this study.

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