

## Relationship of Health Belief Model with Medication Adherence and Risk Factor Prevention in Hypertension Patients in Cimahi City, Indonesia

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### Abstract

**Background:** Medical adherence is critical to hypertension treatment. Medication non-adherence is one of the problems affecting hypertensive patients. Belief in health treatment is very important to support adherence behavior, especially in hypertension.

**Aim:** The present research aimed to determine the relationship of the health belief model with medical adherence and risk factor prevention in hypertension patients.

**Method:** This cross-sectional study was conducted on patients referring to health centers in Cimahi City, Indonesia, in 2020. A total of 180 patients were selected via the purposive sampling method. The instrument used to measure medical treatment adherence and risk factor prevention was the Hill-Bone Compliance to High Blood Pressure Therapy Scale. The data were analyzed in SPSS Software using the Chi-square test and Logistic regression test.

**Results:** The majority of participants were female (88.9%), unemployed (76.7%), within the age range of 40-59 years (60.0%), and had low education (75.0%). Moreover, most cases had health insurance (91.7%), with a maximum duration of hypertension less than 5 years (70.6%), and a body mass index (BMI) between 18.5-25.0 (45%). The health belief model was related to adherence to hypertension treatment ( $P < 0.05$ ); nonetheless, in the multivariate model, the perceived benefit had no significant relationship when entering into the regression model.

**Implications for Practice:** To improve medication adherence and risk factor prevention in hypertensive patients, it is necessary to strengthen the health belief model with continuous and ongoing education about hypertension.

**Keywords:** Health belief model, Hypertension, Medical adherence

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## Introduction

Hypertension is estimated to claim 7.5 million lives, about 12.8% of total deaths across the globe. This accounts for 57 million disability-adjusted life years (1). World Health Organization (WHO) reported that approximately 40% of people over the age of 25 years suffer from hypertension (2). Surveys conducted in the last 10 years indicated that the prevalence of hypertension in Southeast Asia is estimated to be approximately one-third of the number of adults suffering from hypertension with 9.4% of deaths due to hypertension (2). Hypertension often causes no symptoms, while persistent high blood pressure can cause serious complications in the long term. Therefore, the early detection of hypertension is necessary with regular blood pressure checks (3).

The prevalence of hypertension in Indonesia in the population aged 18 years has increased from 25.8% in 2007 to 31.7% in 2013 and 34.1% in 2018 (4). On a national level, the results of Indonesian Basic Health Research in 2018 demonstrated that the prevalence of high blood pressure was 34.11%. The prevalence of high blood pressure in women (36.85%) was higher than that in men (31.34%). The prevalence was higher in urban areas (34.43%), compared to that in rural areas (33.72%); moreover, the prevalence was reported to increase with age (5). Medication non-adherence among hypertensive patients can be caused by different reasons, such as feeling healthy, not controlling, forgetting, and not being able to buy hypertension medicines. The Institute for Health Metrics and Evaluation (IHME) in 2019 stated that 23.8% of the 1.7 million deaths in Indonesia were caused by hypertension (6).

West Java province ranks second in Indonesia in the prevalence of hypertension (7). Based on the health profile of Cimahi City in 2019, the number of people with hypertension continued to increase from 2016 to 2019. This increase in the number of cases was accompanied by an increase in non-compliance with routine treatment and control once a month (8). The success of hypertension treatment is generally influenced by the patient's adherence to taking high blood pressure medication and making lifestyle modifications (9). Failure to achieve treatment targets leads to complications and poor quality of life.

Compliance with pharmacological treatment is still low among hypertensive patients, ranging from 50-70% in patients whose blood pressure is not controlled, and 50% of them have compliance problems (10). Non-compliance with hypertension treatment is often caused by behavioral and treatment factors (11). Changes in patient's compliance depends on the symptoms of illness. That is to say, if blood pressure elevation is accompanied by symptoms of illness, the patient takes the medication, while in the absence of symptoms, the patient feels no need to do so. This poses a serious obstacle to medication adherence among hypertensive patients and hinders the success of hypertension treatment in the community (12).

Public awareness in handling hypertension is reported to be higher in Western countries, such as the UK (66%), as well as Canada and America (80%), when compared to Asia, which is more varied, ranging from 37%-64%. The highest awareness was in Korea, while Indonesia reported the lowest level (37%). This unawareness is related to the lack of hypertension monitoring; therefore, it is necessary to educate the public about the effects and complications of hypertension if it is not handled properly (13).

The results of previous studies pointed out that public confidence in the treatment of hypertension needed to be explored. Public awareness of the importance of health is still lacking, and people only realized the importance of health after suffering from a serious illness. Some of the interventions had been carried out only in the short term since they do not involve the health belief model. Therefore, it is necessary to conduct research on the relationship between the health belief model and medication adherence among hypertension sufferers. In light of the aforementioned issues, the present study aimed to determine the relationship of the health belief model with medical adherence and risk factors prevention in hypertension patients in Cimahi city.

## Methods

The present study was conducted based on a quantitative-based cross-sectional design. The independent variables of the study were the perceptions of seriousness, vulnerability, benefits, and barriers, while the dependent variable was medication adherence and prevention of hypertension risk factors (14). The population of this study were all hypertensive patients in Cimahi City in 2019 (they numbered 13,460 people based on data from the Cimahi City Health Office). The sample is part of the

population and is representative of the population. Participants of this study were hypertensive patients in Cimahi City selected via the purposive sampling method and based on certain criteria. A number of 60 participants were selected from each of three public health centers, namely Cipageran, Cibereum, and Padasuka, yielding a total of 180 subjects. The inclusion criteria were as follows: age range of above 18 years, receiving antihypertensive medication from the public health center, and willingness to take part in this research. On the other hand, the exclusion criteria entailed a history of chronic diseases that could be dangerous (heart disease, asthma, diabetes mellitus, tuberculosis, and stroke), illiteracy, and sickness during the study period.

The Hill-Bone Compliance to High Blood Pressure Therapy Scale was used to assess compliance with hypertensive treatment. Moreover, the instrument to measure the health belief model used several questions that have been tested for validity and reliability, consisting of 6 items on perceived seriousness, 6 items on perceived susceptibility, 7 items on perceived benefits, and 9 items on perceived barriers. All items were valid and reliable. To test the validity and reliability of this research instrument, it was conducted on 30 people with hypertension from the Luewigajah Health Center, which was different from the research location. The results of instrument validity were all  $R > 0.3$ , and Cronbach's alpha coefficients of 0.930, 0.970, 0.879, and 0.782 were obtained for the subscales of perceived seriousness, perceived susceptibility, perceived benefits, and perceived barriers, respectively. Bivariate analysis by Chi-square test was used to determine the related variables and was included in the binary logistic regression model. The final obtained model is a model of the relationship between the health belief model and compliance with hypertension treatment. For ethical consideration, this research has a Certificate of Ethical Approval from the Health Research Ethics Commission Diponegoro University Semarang.

## Results

The characteristics of the research participants ( $n=180$ ) are presented in Table 1. The majority of them were female (88.9%), unemployed (76.7%), within the age range of 40-59 years (60.0%), and had low education (75.0%). Moreover, most cases had health insurance (91.7%), with a maximum duration of hypertension less than 5 years (70.6%), and a body mass index (BMI) between 18.5-25.0 (45%).

The results of the Bivariate analysis by the Chi-square test are displayed in Table 2. Most of the participants with a good perception of seriousness (70.0%) adhered to treatment, while the majority of

**Table 1. Characteristics of hypertensive patients**

Variable	Category	f	%
Gender	Male	20	11.1
	Female	160	88.9
Age (Years)	20-39	12	6.7
	40-59	108	60.0
	$\geq 60$	60	33.3
Education	Low	135	75.0
	Medium	41	22.8
	High	4	2.2
Occupation	No	138	76.7
	Yes	42	23.3
Health Insurance Ownership	No	15	8.3
	Yes	165	91.7
Length of time suffering from hypertension (years)	< 5	127	70.6
	6 - 10	23	12.8
	> 10	30	16.7
Body Mass Index (BMI)	$\leq 18,5$	3	1,7
	18.5-25.0	81	45.0
	25.1-27.0	31	17.2
	>27.0	65	36.1
Total		180	100.0

participants with a low perception of seriousness (64.0%) did not. Respondents with the perception of susceptibility were mostly compliant (68.4%) and those who were not vulnerable were mostly non-compliant (63.4%). Participants with a good perception of benefits were more compliant (68.8%), and respondents who felt there was no benefit were more likely to be non-adherent in taking medication (62.1%). Respondents with high perceptions of obstacles were mostly compliant, and those who felt that there were no obstacles were mostly non-adherent (72.0%). The P-value was <0.001 in all variables—that is to say, all variables can be included in the binary logistic regression model.

Binary logistic regression models are explained in Table 3. Based on the bivariate analysis in Table 2, all independent variables were associated with medication adherence ( $P < 0.001$ ). However, after being included in the binary logistic regression model, perceived benefits were not significantly related to hypertension medication adherence ( $P = 0.15$ ). After the removal of perceived benefits from the model, the final model was obtained, Perceived seriousness [ $P < 0.001$ , CI: 0.090-0.432, Exp(B):0.206], perceived susceptibility [ $P < 0.001$ , CI: 0.141 -0.602, Exp(B):0.292] and perceived barriers [ $P < 0.001$ , CI: 0.066-0.295, Exp(B):0.139] remained statistically significant.

**Table 2. Relationship between health belief model and patients' adherence**

Variables	Adherence				p value*	OR (CI 95%)
	Obey		Not obey			
	f	%	f	%		
Perceived of seriousness						
Good	66	70.2	28	29.8	<0.001	2.15 (1.51-3.04)
Bad	31	36.0	55	64.0		
Perceived of susceptibility						
Not vulnerable	30	36.6	52	63.4	<0.001	2.01 (1.43-2.80)
Vulnerable	67	68.4	31	31.6		
Perceived of benefit						
Beneficial	64	68.8	29	31.2	<0.001	1.99 (1.41-2.81)
No benefit	33	37.9	54	62.1		
Perceived of barriers						
No barriers	76	72.4	29	27.6	<0.001	2.61 (1.86-3.37)
There were barriers	21	28.0	54	72.0		

\*Chi square

**Table 3. Logistic regression the medical adherence of hypertension and health beliefs model**

	B	Wald	Exp(B)	95% CI	P value
(Constant)	7.241	39.69	1395.10		<0.001
Perceived seriousness	-0.158	17.41	0.206	[0.098-0.432]	<0.001
Perceived susceptibility	-0.123	11.10	0.292	[0.141-0.602]	<0.001
Perceived barriers	-0.197	26.45	0.139	[0.066-0.295]	<0.001

## Discussion

The present study recruited 180 hypertensive patients who were taking hypertension medication. The bivariate analysis demonstrated that medication adherence in hypertensive patients was significantly correlated with perceived seriousness, perceived susceptibility, perceived benefits, and perceived barriers. Nevertheless, the multivariate analysis revealed that perception of benefits was not significant in the relationship model between the Health Belief Model and medication adherence in hypertensive patients.

Research on the health belief model at Garut Public Health Center showed that the public perception is not adequate in seeking health services, as well as preventing illness and treatment. Research in Kalirejo public health center, Pesawaran Regency, on the health belief model illustrated that self-care in hypertensive patients was correlated with perceptions of susceptibility, seriousness, benefits, and obstacles (15). One's higher perception of illness and health care facilities results in better behavior. The more serious the illness, the more someone will make efforts to seek treatment. More susceptibility to disease makes a person seek treatment. If the perceived obstacles are not formidable, people will make treatment efforts. This is in accordance with the results of the present research which reported that perceptions of seriousness, susceptibility, barriers, and benefits influence a

person's decision to seek treatment.

Perceived severity refers to an individual's opinion of how serious the consequences of his/her illness are. A person's experience regarding the state of hypertension that is not controlled properly will cause a condition that gets worse. A strong desire, motivation, and attitude encourage a person to make an effort to control his/her disease (16). Perceived susceptibility refers to a person's subjective perception of the risk of acquiring an illness or disease (17). People who feel their illness is serious have high adherence to hypertension treatment (14). One's practice of controlling his/her health is influenced by the perception of the disease. An elderly person who believes that his hypertension will get worse or recover, and feels that the disease is a disease that must be treated immediately (self-susceptibility to disease). Compliance behavior refers to one's perception of the benefits of hypertension treatment.

The results of the current study are in accordance with those reported by researchers who pointed to the relationship between medication compliance in hypertensive patients and perceptions of susceptibility and seriousness. The higher perceptions of vulnerability and seriousness lead to stronger treatment adherence (18). The decision to take measures to control the disease depends on the individual's perception of the benefits. The size of the obstacles to carrying out the action and the individual's view of one's own abilities. Some people do not do anything (no action) since they think that their disease will go away without treatment (16).

The consequences of hypertension are only felt after a while; therefore, patients feel that they will gain no benefit from preventing and treating hypertension. The results pointed out that perceived benefits had an effect on medication adherence. People with stronger perceived benefits of the treatment will adhere more strongly to treatment. Perceived barriers are related to self-care in hypertensive patients; therefore, there is a need for educational interventions based on models that can reduce perceived benefits (19).

Participants with a high perception of barriers think that there are many obstacles to overcome to take treatment. Therefore, their adherence behavior will tend to be not satisfactory, whereas if they feel there are no significant obstacles to the prevention and treatment of hypertension, they will become more compliant. The perception of barriers was demonstrated to affect a person's adherence to hypertension treatment.

The results of the logistic regression displayed that perceived benefits were not related to medication compliance in hypertension patients. This can be ascribed to the fact that they mostly have the perception that hypertension treatment is not useful. Research conducted on the elderly to improve the health belief model can be performed using a health education approach to obtain a good improvement (20). Hypertension lasts a long time and patients have to take medication continuously; therefore, they may feel that taking medication continuously does not have a healing effect on their illness.

### **Implications for practice**

The health belief model was significantly correlated with medical adherence and risk factor prevention in hypertension patients in the bivariate analysis. Based on the results of the logistic regression model, treatment compliance in hypertensive patients showed a significant relationship with perceived susceptibility, perceived benefit, perceived barriers, and perceived seriousness. Only perceived benefits had no effect on treatment compliance. The health belief model might influence medication adherence and risk factor prevention in hypertensive patients. To improve treatment adherence in hypertension sufferers, it is necessary to conduct health education on the health belief model.

### **Acknowledgments**

The present study was extracted from a PhD dissertation approved by Diponegoro University of Public Health Doctoral Program (ethical approval number: 548/EA/KEPK-FKM/2019). The authors' deepest appreciation goes to Diponegoro University for the opportunity and all the participants who helped us in the completion of this research.

### **Conflicts of interest**

The authors declare that they have no conflict of interest.

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