Behavioral Models for Controlling Blood Pressure in Patients with Hypertension

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ABSTRACT

Objective: This study aimed to develop a behavior model in controlling blood pressure of patients with hypertension by integrating the theory of Health Belief Model and adaption model theory by Roy.

Method: This was a cross-sectional study conducted in January 2020. The population in this study was hypertension patients at the Community Health Center. The sampling technique used in this study was consecutive sampling. The instrument used in this study was a questionnaire. The data were analyzed by Partial Least Squares.

Result: Modification factor, cues to action, individual beliefs and cognator significantly affected the behavior for blood pressure control with t-statistic value >1.96. Modification factors affected individual beliefs (t=10,648).

Conclusion: This behavioral model can assist nursing in developing strategies to improve blood pressure control behavior in hypertensive patients. The behavior of the hypertensive patients was possibly improved by the involvement of the health worker by routinely educating the patients and their family related to hypertension and how to control blood pressure and also related to stress and how to manage it as well as with support from the family in self-care management and lifestyle modification.

Keywords: behavior, blood pressure, factor analysis, hypertension

Introduction

Hypertension is called 'the silent disease' because there are no signs or symptoms that can damage blood vessels and cause health problems (Dalimartha, 2009). Blood pressure

control in hypertension is still an important health problem and finding strategies to overcome it is a worldwide problem (Chen et al., 2006). Several studies from several countries around the world show that the awareness of hypertension patients regarding blood pressure control is still very low (Bosworth et al., 2007). The World Health Organization (WHO) recorded that, in 2012, there were at least 839 million cases of hypertension, estimated to be 1.15 billion in 2025 or around 29% of the total world population, with more patients in women (30%) than men (29%) and about 80% increase in hypertension cases occurring mainly in developing countries (Triyanto, 2014). The population age over 18 years in Indonesia is 649,625 people. The prevalence of hypertension in Indonesia reaches 34.1% of the population aged over 18 years.

Effective self-care behaviors such as medication adherence, dietary restrictions, not smoking, exercise, and regular blood pressure monitoring, are important components of disease management for patients with uncontrolled hypertension (Lee & Park, 2017). Blood pressure control in adults with hypertension is a health priority that theoretically, and based on evidence, can reduce the adverse effects of uncontrolled hypertension (Jr et al., 2016). The longer the time the treatment is given, the lower the patient's compliance with medication and can cause resistant hypertension (Rantucci, 2009). Based on the impact of these problems, it is necessary to identify a model of blood pressure control behavior in patients with hypertension using the integration of the Health Belief Model (HBM) theory and the adaptation model theory by Roy.

The HBM consists of several key concepts that can predict why people will take action to prevent, filter, or control disease conditions, including vulnerability, seriousness, benefits and obstacles to a behavior, cues for action, and self-efficacy (Glanz et al., 2008). In addition to the HBM theory, the behavioral approach can also use Roy's adaptation concept model which provides a framework for thinking that the goal of nursing is to help patients adapt to disease (S. C. Roy, 2009). This study aimed to develop a behavior model in controlling blood pressure of patients with hypertension by integrating the theory of Health Belief Model and adaption model theory.

Objective

This study aimed to develop a behavior model in controlling blood pressure of patients with hypertension by integrating the theory of Health Belief Model and adaption model theory by Roy.

Method

All participants gave their consent and were assured of confidentiality. It was a cross-sectional study conducted in January 2020. The population in this study was hypertension patients at the Community Health Center in East Nusa Tenggara, Indonesia. The sampling technique used in this study was consecutive sampling. Inclusion criteria in this study were hypertension patients who had been diagnosed with hypertension for at least three months by a doctor; hypertension patients aged 26-60 years, with systolic blood pressure 140-180 mmHg and diastolic blood pressure 90-120 mmHg and could write, read and understand Indonesian. Exclusion criteria in this study were clients with hypertensive crisis, complications of acute hypertension, preeclampsia and psychiatric disorders. The instrument used in this study was a questionnaire. The questionnaire used has been tested for validity and reliability. The questionnaires used in this study are The knowledge instrument consists of 10 statements

related to hypertension, the Perceived Stress Scale (PSS-10)(Cohen et al., 1983) which consists of 10 questions used to assess stress levels, the Eysenck Personality Questionnaire Revised Short (EPQRS)(Manandhar et al., 2015) which consists of 12 questions used to assess personality, the Coping and Adaptation Processing Scale (CAPS): Short Form (15-Item)(C. Roy et al., 2016) used to assess the cognitive coping process, The Individual belief questionnaires(Glanz et al., 2008) consists of 21 question items, The role of health workers and family support questionnaire(Mandasari, 2017) consists of 8 items and Hypertension Self-Management Behavior Questionnaire (HSMBQ)(Akhter, 2010) which consists of 38 items. IBM SPSS Statistics for Windows version 23.0 was used for all statistical analyses. This study uses a variance-based or component-based structural equation model analysis technique called PLS (Partial Least Squares).

Result

The results showed that most of the respondents were in the age range of 56-60 years (60.9%), were female (77.3%), with the last education being elementary school (31.8%), did not work (51.8%), had a high stress level (51.8%), had an extrovert personality (65.5%) and the level of knowledge was in the moderate category (40.9%). Nearly half of the respondents have less family support (44.5%) and the role of health workers is mostly in the moderate category (56.4%). Most of the respondents have moderate perceived threats (53.6%), perceived benefits (50.9%), and perceived self-efficacy (61.8%). Meanwhile, the respondents' perceived barriers are mostly in the high category (67.3%). Most of the respondents have moderate perceptions (57.3%), learning (47.3%), judgments (47.3%), and emotions (58.2%). Most of the respondents have moderate self-integration (62.7%), self-regulation (57.3%), interaction with health workers and others (52.7%), monitoring blood pressure (55.5%) and compliance of respondents (46.4%). The frequency distribution of respondents who filled out the questionnaire can be seen in Table 1.

Figure 1 showed the results of the analysis of the behavior model in controlling blood pressure in hypertensive patients. The measurement model with relative indicators is evaluated based on the results of the validity and reliability of the indicators. Convergent validity is the correlation between the reflective indicator score and the latent variable score. A loading factor value of 0.5 to 0.6 is considered sufficient to state the indicator is valid. There were two indicators that were not valid for measured the modification factor, namely age and gender, which produced a loading factor valued of less than 0.5 so that it was excluded from the analysis. The analysis results showed the relationship between the variables with the level of significance which can be seen in Table 2. Table 2 showed that the results of testing the statistical hypothesis of the model have a significant effect (T> 1.96; p<0.05) and are positive (positive original sample value).

Table 1. Frequency distribution of respondents' answers to the questionnaire

Variables	Frequency (n=110)	Percentage
Modification factors		
Age		
36-45	8	7,3
46-55	35	31,8
56-60	67	60,9

Gender		
Male	25	22,7
Female	85	77,3
Education		
Elementary School	35	31,8
Junior High School	25	22,7
Senior High School	33	30,0
Universities	17	15,5
Occupation		
Not work	57	51,8
Work	53	48,2
Stress level		
Mild	6	5,5
Moderate	47	42,7
Severe	57	51,8
Personality		
Extrovert	72	65,5
Introvert	38	34,5
Knowledge		
Good	37	33,6
Moderate	45	40,9
Less	28	25,5
Cues to action		
Family support		
Good	18	16,4
Moderate	43	39,1
Less	49	44,5
The role of health workers		
Good	13	11,8
Moderate	62	56,4
Less	35	31,8
Individual beliefs		
Perceived threat		
High	8	7,3
Moderate	59	53,6
Low	43	39,1
Perceived benefit		
High	48	43,6
Moderate	56	50,9
Low	6	5,5
Perceived barriers		
High	74	67,3
Moderate	27	24,5
Low	9	8,2
Perceived self-efficacy		
High	37	33,6
Moderate	68	61,8
Low	5	4,5
Cognator		
Perception		
Good	16	14,5
Moderate	63	57,3
Less	31	28,2
Learning		
Good	24	21,8
Moderate	52	47,3
Less	34	30,9
Judgement		
Good	24	21,8
Moderate	52	47,3
Less	34	30,9
Emotions		
Good	30	27,3
Moderate	64	58,2
Less	16	14,5
The behavior of blood pressure control		
Self-integration		
Good	34	30,9
Moderate	69	62,7
Less	7	6,4

Self regulation		
Good	15	13,6
Moderate	63	57,3
Less	32	29,1
Interaction with health workers		
Good	7	6,4
Moderate	58	52,7
Less	45	40,9
Blood pressure monitoring		
Good	13	11,8
Moderate	61	55,5
Less	36	32,7
Compliance with recommended rules		
Good	34	30,9
Moderate	51	46,4
Less	25	22,7

Table 2. Statistical hypothesis testing results.

| Influence	T Statistics	*p*-Values
Modification factors (X1) and Individual beliefs (X3)	10,648	0,000
Modification factors (X1) and Cognator (X4)	3,990	0,000
Modification factors (X1) and The behavior of blood pressure control (Y)	2,876	0,004
Cues to action (X2) and Cognator (X4)	2,331	0,020
Cues to action (X2) and The behavior of blood pressure control (Y)	2,842	0,005
Individual beliefs (X3) and The behavior of blood pressure control (Y)	2,458	0,014
Cognator (X4) and The behavior of blood pressure control (Y)	2,147	0,032
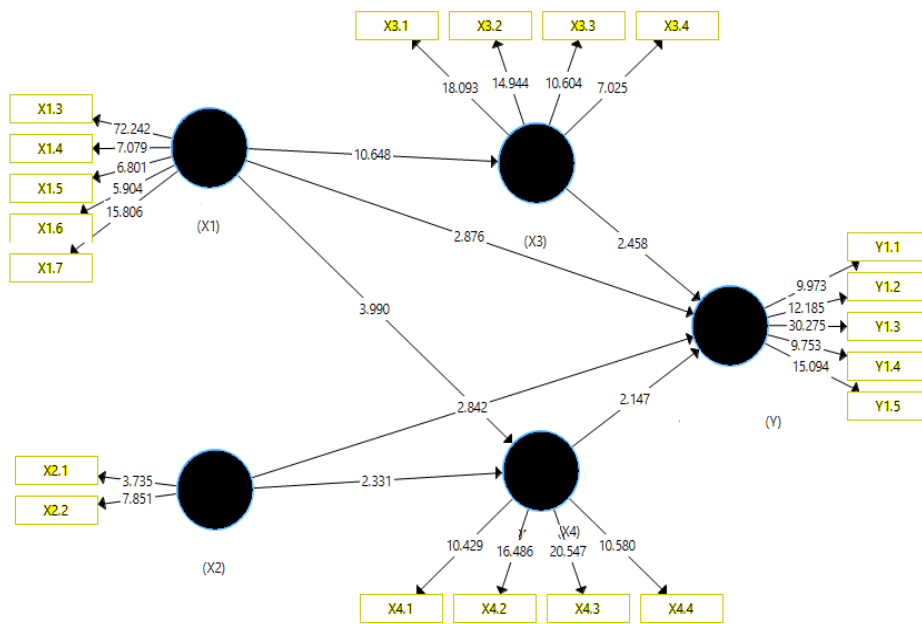
Figure 1: Model structure. X1 Modification factors, X1.3 Education, X1.4 Occupation, X1.5 Stress level, X1.6 Personality, X1.7 Knowledge level, X2 Cues to action, X2.1 Family support, X2.2 Role of health workers, X3 Individual beliefs, X3.1 Perceived threat, X3.2 perceived benefit, X3.3 perceived barriers, X3.4 perceived self-efficacy, X4 Cognator, X4.1 Perception, X4.2 Learning, X4.3 Assessment, X4.4 Emotions, Y The behavior of blood pressure control Y1.1 Self-integration, Y1.2 Self-regulation, Y1.3 Interaction with health workers, Y1.4 Blood pressure monitoring, Y1.5 Compliance with the recommended rules.

Discussion

This study found that the modification factor can directly or indirectly influence blood pressure control behavior. Indirectly, modifying factors can influence blood pressure control behavior through individual beliefs and cognator. Our findings showed that, patients do not understand hypertension and how to control it. This is due to a lack of education and knowledge about hypertension and blood pressure control, obstacles to busy work and other activities, and internal problems that are difficult to resolve. This is in line with study which shown that someone who has low education and does not have a job has low individual beliefs (Masoudiyekta et al., 2018). A person with low socioeconomic factors will affect his lifestyle. In addition, being busy with activities makes it more difficult for people with hypertension to manage their time in controlling blood pressure. This is what makes the obstacles felt by people with hypertension in controlling blood pressure even greater. The level of stress will affect a person's individual beliefs in dealing with the stress experienced (Kilby & Sherman, 2016). Individual beliefs in overcoming their disease are influenced by the personality of each individual (Yoshitake et al., 2019)Someone who has an introverted personality has high perceived threats and benefits and has low perceived barriers and self-efficacy. Meanwhile, someone who has an extrovert personality has low perceived threats and benefits and has high perceived barriers and self-efficacy. Lower knowledge will also affect individual beliefs in overcoming disease (Cai et al., 2017) Education is closely related to a person's cognitive process. This is related to the level of knowledge possessed by each person (Berggren et al., 2018)(Carrillo et al., 2017) People who do not work have lower coping cognators than people who work (Sanger et al., 2016)Cognitive processes tend to be disrupted when stress levels are too high (Cibrian-Llanderal et al., 2018)

Furthermore, modifying factors can directly influence blood pressure control behavior. Blood pressure control behavior also has a greater correlation with factor modification. According to the study, patients still have difficulty knowing the signs and symptoms of hypertension, patient adherence to both medication and blood pressure control to the doctor is also lacking, and there is a lot of misinformation about hypertension and how to control it. This is in line with study which showed that a low level of education and a lack of knowledge play an important role in controlling blood pressure (Cai et al., 2017) Hypertensive patients who have jobs have better behavior in controlling their blood pressure. This is because patients who have jobs have better economic status so that it is easy to obtain health services and treatment options (Leng et al., 2015). Hypertensive patients who have severe stress will affect their health by triggering negative physiological and psychological responses (Keller et al., 2013)The personality of hypertensive patients is closely related to their behavior in overcoming their disease (Kretchy et al., 2019)

In our study, to make blood pressure control behaviors in hypertensive patients better, it is necessary to involve family, social support and the role of health workers. This is in line

with previous study which explained that one of the strategies to improve the behavior of hypertensive patients in controlling their blood pressure is the support from families (Lee & Park, 2017). Interaction and communication between health workers and hypertensive patients is needed to ensure a better influence on patients' self-care behavior (Fazel et al., 2016)

Finding of this study suggested that the behavioral model based on the HBM theory and Roy's adaptation theory has a good influence on blood pressure control behavior in hypertensive patients. HBM theory is a theory of health behavior change and a psychological model used to predict health behavior by focusing on individual perceptions and beliefs about a disease (Priyoto, 2014). Human behavior is also influenced by the mindset or cognition of humans themselves (Stephen, 2011). In Roy's adaptation concept model, the cognitive process is contained in a sub-system of the coping mechanism process, namely the cognator sub-system (Alligood, 2017).

These results could have important implications for nursing practice. Health workers in nursing practice need to increase patient and family knowledge about hypertension, the complications of the benefits of treatment and how to control blood pressure and increase effective communication between patients and health workers. Families also need to provide support to patients in self-care management and lifestyle modifications so as to increase individual confidence and behavior in controlling blood pressure in hypertensive patients. This study has several limitations. The instrument in this study used a subjective questionnaire without any observations of the actual respondent's behavior and the resulting behavior model has not been tested on patients. Therefore, further research, can conduct trials on this behavior model in hypertensive patients.

Conclusion

This behavioral model can assist nursing in developing strategies to improve blood pressure control behavior in hypertensive patients. Increasing the behavior of hypertensive patients can be done with the involvement of health workers in providing routine education to patients and their families about hypertension and how to control blood pressure as well as education about stress and how to control it, support from families in self-care management and lifestyle modification. In addition, health workers also need to conduct counseling and involve patients in the decision-making process related to treatment for themselves.

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