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Health Belief Model Predictors of Medication Adherence Among Patients With Hypertension: A Cross-Sectional Study

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Abstract

Background: Hypertension represents a significant global health challenge, The present study examines the relationship between HBM constructs and medication adherence among hypertensive patients.

Methods: A quantitative cross-sectional study design was employed. The sample included 85 hypertensive patients receiving antihypertensive therapy, all of whom were adults or elderly. Data collection instruments included the Health Belief Model Questionnaire and the Morisky Medication Adherence Scale (MMAS-8).

Results: The mean HBM score was 99.85, while the mean medication adherence score was 6.35. Domain-specific HBM scores were as follows: vulnerability 16.29, severity 9.40, threat 9.85, benefit 22.18, barrier 17.51, and self-efficacy 24.62. The correlation between overall HBM and treatment adherence was significant ($p<0.001$, $r=0.527$). Moderate correlations were observed for perceived susceptibility ($r=0.559$), perceived severity ($r=0.553$), perceived threat ($r=0.527$), perceived benefits ($r=0.521$), and perceived barriers ($r=0.463$), while self-efficacy demonstrated a weak correlation ($r=0.326$).

Conclusion: A significant correlation was identified between HBM constructs and medication adherence. Moderate correlations were observed for perceived susceptibility, severity, threat, benefits, and barriers, whereas self-efficacy exhibited a weak correlation.

Keywords: Health Belief Model, Hypertension, Medication Compliance

BACKGROUND

Hypertension is a pressing global health problem and a major risk factor for heart disease, stroke, and kidney failure. According to the World Health Organization (WHO), more than 1.28 billion adults worldwide suffer from hypertension, and two-thirds of these are in developing countries. Unfortunately, only 21% have their blood pressure under control, indicating a serious gap in diagnosis, treatment, and adherence. The prevalence of hypertension is also relatively high; according to 2018 data, it reached 34.1%, increasing from 25.8% in 2013 (1). However, it decreased to 29.2% in 2023 (2). In South Sulawesi, the prevalence of hypertension was recorded at 31.4%, while in Makassar City it reached 29.4% in 2022 (3). One of the biggest challenges in managing hypertension is low patient compliance with pharmacological therapy prescribed by health workers.

Non-compliance with treatment in hypertensive patients can lead to dangerous complications. Long-term uncontrolled high blood pressure can cause arterial hardening, impairing blood flow to the heart. As a result, patients are at risk of angina (chest pain), heart attack, heart failure, and sudden death (4). A study shows that patients who do not comply with antihypertensive medication have a two to three times higher risk of heart and blood vessel complications than patients who comply (5). Besides endangering health, hypertension that is not properly treated also increases medical costs for patients and the health care system, especially because it can lead to serious complications such as stroke and kidney failure (6).

This problem of non-compliance significantly affects the success of therapy. For example, a study in Latvia reported that approximately 46.2% of hypertensive patients did not follow their medication regularly (7). A similar finding was found in Namibia, where lack of medication, family support, and regular health check-ups contributed to low compliance (8). Medication adherence can prevent complications such as stroke, coronary heart disease, and kidney failure (9). Preventing stroke is important because a ruptured blood vessel in the brain can cause brain damage within minutes, resulting in death (10). Similarly, kidney failure increases the economic burden because patients must undergo dialysis to survive (11). Unfortunately, many patients in Makassar City, Indonesia, do not fully understand the importance of taking their medications regularly. Some feel healthy because they experience no symptoms or side effects, have limited understanding, or rely more on traditional medicine (12), especially the knowledge factor, which influences the occurrence of a disease (13). One example is the Bugis Sinjai community, a member of the Makassar community in Indonesia. To this day, they continue to use traditional medicine in accordance with their beliefs and knowledge systems. Knowledge of these traditional healing methods and practices was inherited from their ancestors and continues to be preserved and passed down through generations (14). Therefore, it is important to understand people's behavior when caring for themselves.

To understand patient behavior, one approach is the HBM. This model explains that a person's behavior towards health is influenced by their perception of disease risks and the benefits of preventive measures (15). The HBM consists of six main constructs: perceived susceptibility, perceived severity, perceived threat, perceived benefits, perceived barriers, and self-efficacy (16). The application of the HBM in the context of hypertension can help us understand in-depth the factors that hinder or promote patient adherence to long-term treatment. Previous research has shown that the HBM construct can predict up to 50.5% of the variability in adherence to antihypertensive medication (17). By identifying factors inhibiting medication adherence, HMB-based interventions can be developed and implemented. Previous research has shown that HMB-based interventions significantly improve blood pressure control and medication adherence in hypertensive patients (18). However, there has been little research that specifically integrates all components of the HBM to analyze the compliance of hypertension patients in Indonesia, especially within local cultural and social contexts.

This knowledge gap provides an important basis for further research. Although several intervention models have been implemented, many studies emphasize only one or two components of the HBM and pay little attention to comprehensive integration into educational design or behavioral assessment. This study aims to examine the relationship between HBM constructs and medication adherence among hypertensive patients.

METHODS

Study Design

The study employed a quantitative analytical survey with a cross-sectional design. The primary variables included medication adherence and components of the Health Belief Model: perceived susceptibility, perceived severity, perceived threat, perceived benefits, perceived barriers, and self-efficacy.

Sample/Participans

The study population comprised 112 individuals who had received antihypertensive medication therapy within the past three months. The sample size was calculated using the Isaac and Michael table with a 5% margin of error, yielding 85 respondents.

Instruments

Instruments were validated and tested for reliability. The Health Belief Model was measured using the HBM instrument (19), while medication adherence was assessed with the MMAS-8 Questionnaire (20).

Data Collection

The research was conducted at the X Community Health Center in Makassar City, Indonesia, from September to November 2025. The data collection team comprised four members. Respondents were selected based on predetermined criteria: currently receiving antihypertensive medication, being an adult or elderly individual, and willingness to participate. Eligible respondents were contacted by the nurse responsible for the Community Health Center chronic disease management program to participate in research interviews. All participants provided written informed consent. Data collection involved in-person interviews using a structured questionnaire, which included an explanation of the interview procedure, an informed consent form, and respondent identification details such as name, age, gender, and religion.

Data Analysis

Research data were analyzed using IBM SPSS Version 29, employing correlation tests. Data normality was assessed with the Shapiro–Wilk test prior to inferential analysis. Due to the presence of non-normally distributed and ordinal variables, the Spearman rank correlation test was applied to examine relationships between variables. Statistical significance was defined as $p < 0.05$. Confounding factors such as duration of antihypertensive therapy, education, and economic status were not specifically analyzed in this study. As these factors may influence medication adherence in hypertensive patients, future research should consider them to provide a more comprehensive understanding.

Ethical Considerations

Ethical approval was obtained from the Universitas Muslim Indonesia and informed consent was secured from all participants.

RESULT AND DISCUSSION

RESULT

Demographics Characteristics

The present study investigates the association between Health Belief Model constructs and medication adherence among hypertensive patients. A total of 85 hypertensive patients participated in the research. Following data analysis, respondent characteristics, univariate results, and bivariate findings were identified. (Table 1)

Tabel 1. Distribution of Respondent Characteristics

Variables	n	%
Gender		
Male	41	48,2
Female	44	51,8
Age		
36 – 45 Years	13	15,3
46 – 55 Years	26	30,6
56 – 65 Years	37	43,5
>65 Years	9	10,6
Religion		
Islam	65	76,5
Christianity	17	20,0
Buddhism	3	3,5
Tribes		
Makassar	35	41,2
Bugis	32	37,6
Mandar	2	2,4
Toraja	8	9,4
Etc.	8	9,4
Total	85	100

Table 1. Respondent Characteristics by gender: out of 85 respondents, there were more women (44) than men. By age, the largest group was 56-65 years old, at 37 (43.5%), and the smallest group was >65 years old, at 9 (10.6%). By religion, the largest group was Islam, 65 (76.5%), and the smallest was Buddhism, 3 (3.5%). The largest group was Makassar, with 35 (41.2%), and the smallest was Toraja, with 8 (9.4%).

HBM Levels and Medication Adherence in Hypertensive Patients

Table 2. HBM levels and medication adherence in hypertensive patients.

Variables	n	Mean	CI	SD
Health Belief Model	85	99,85	91,35-108,35	39,413
Medication Compliance	85	6,35	6,08-6,62	1,248

SD: Standard Deviation; 95% C1: Confidence Interval

Table 2. Regarding the HMB Level and medication adherence of hypertensive patients. Of 85 respondents, the average HBM Level was 99.85 (±91.35-108.35), with an SD of 39.413. Based on the Level of Medication Compliance, the average was 6.35 (±6.08-6.62) and SD 1.248.

HBM Levels for Each Construct

Table 3. HMB Levels for Each Construct.

Health Belief Model Construct	n	Mean	CI	SD
Perceived Vulnerability	85	16.29	14.39-18.20	8.837
Perceived Severity	85	9.40	8.32-10.48	4.993
Perceived Threat	85	9.85	8.73-10.96	5.67
Perceived Benefits	85	22.18	19.71-24.65	11.452
Perceived Barriers	85	17.51	15.86-19.15	7.629
Self-Efficacy	85	24.62	23.86-25.39	3.542

SD: Standard Deviation; 95% C1: Confidence Interval

Table 3 presents the Health Belief Model levels for each construct. Among 85 respondents, the mean score for Perceived Vulnerability was 16.29 (95% CI: 14.39–18.20; SD = 8.837). The mean Perceived Severity was 9.40 (95% CI: 8.32–10.48; SD = 4.993). The mean Perceived Threat was 9.85 (95% CI: 8.73–10.96; SD = 5.167). The mean Perceived Benefit was 22.18 (95% CI: 19.71–24.65; SD = 11.452). The mean Perceived Barriers score was 17.51 (95% CI: 15.86–19.15; SD = 7.629). The mean Self-Efficacy score was 24.62 (95% CI: 23.86–25.39; SD = 3.542).

Relationship Between HBM Constructs and Medication Adherence

Table 4. Relationship between HBM Constructs and Medication Adherence in Hypertensive Patients

	Medication Compliance		
	n	p	r
Health Belief Model Construct	85	<0.001	0.527
Perceived Vulnerability	85	<0.001	0.559
Perceived Severity	85	<0.001	0.553
Perceived Threat	85	<0.001	0.527
Perceived Benefits	85	<0.001	0.521
Perceived Barriers	85	<0.001	0.463
Self-Efficacy	85	<0.001	0.326

P-Value: 0,005

Table 4. The relationship between the HBM and medication adherence in hypertensive patients. The analysis revealed a statistically significant positive correlation between the HBM and medication adherence among hypertensive patients ($r = 0.527$, $p < 0.001$). This finding indicates a moderate positive relationship: patients with stronger health beliefs tend to demonstrate better adherence to antihypertensive medication. The analysis of each HBM construct and medication adherence among hypertensive patients, including perceived susceptibility (r 0.559, $p < 0.001$), showed a moderate positive relationship. This indicates that patients who perceive themselves as vulnerable to complications of hypertension tend to have better medication adherence. Perceived severity (r 0.553, $p < 0.001$) showed a moderate positive relationship, indicating that the higher the patient's perception of the seriousness of hypertension and its complications, the higher the medication adherence. The perception of threat ($r = 0.527$, $p < 0.001$) showed a moderate positive relationship; this finding indicates that the perception of the impact of hypertension can increase patient motivation to undergo therapy regularly. Perceptions of benefits ($r = 0.521$, $p < 0.001$) showed a moderate positive relationship, indicating that patients' beliefs in the benefits of antihypertensive treatment contribute to increased adherence. Perceptions of barriers ($r = 0.463$, $p < 0.001$) show a moderate positive correlation but remain weak. This indicates that patients' perceptions of barriers to treatment still affect adherence,

although the strength of the relationship is lower than in other domains. Perceptions of Self-Efficacy ($r = 0.326$, $p < 0.001$) show a weak positive correlation, indicating that patients' beliefs in their ability to carry out treatment have a weaker relationship to medication adherence than other HBM constructs.

DISCUSSION

Respondent Characteristics

The majority of respondents were female, which aligns with previous research indicating that women are more frequently diagnosed with hypertension and utilize healthcare services more often. Women also demonstrate higher medication adherence, attributed to a stronger perception of risk (21). Individuals aged 56–65 are at increased risk for hypertension and typically perceive disease complications as more severe. Prior studies have shown that older age heightens perceived threat, which may influence adherence (22). Additionally, cultural factors and the beliefs of different ethnic groups can shape health behaviors. Previous research has found that local cultural norms affect perceptions of vulnerability and the perceived benefits of treatment (23).

HBM Levels and Medication Compliance in Hypertensive Patients

Respondents demonstrated relatively high Health Belief Model (HBM) scores, suggesting that patients generally possess a strong perception of their health in relation to hypertension and its management. The HBM posits that individual health behaviors are shaped by beliefs regarding susceptibility, disease severity, perceived benefits of interventions, perceived barriers, and self-efficacy in adopting healthy behaviors (24). Within the context of hypertension, positive perceptions of the disease and its treatment can enhance patient motivation to adhere to long-term therapy. The elevated HBM scores observed in this study indicate that most patients recognize the importance of blood pressure control and the risks associated with hypertension-related complications. This result is consistent with previous research, which has found that hypertensive patients with positive health perceptions are more likely to engage in optimal treatment behaviors and achieve better blood pressure control. Such perceptions can also heighten awareness of the necessity of antihypertensive therapy as a preventive strategy against cardiovascular complications (25). Nevertheless, the relatively large standard deviation observed suggests considerable variation in health perceptions among respondents. This variability may be attributable to factors such as age, educational attainment, disease experience, family support, access to healthcare services, and prevailing community attitudes toward hypertension management (26). For some patients, hypertension is perceived as a benign condition due to its often asymptomatic nature, which may diminish motivation for consistent treatment adherence.

Medication compliance among patients with hypertension was generally high. Adherence to prescribed medication regimens is essential for effective hypertension control and for reducing the risk of complications such as stroke, coronary heart disease, kidney failure, and heart failure (27). The favorable compliance rates observed in this study may be attributed to increased patient awareness of the benefits of antihypertensive therapy in preventing adverse outcomes. Prior studies have demonstrated that comprehensive health education and active involvement of healthcare professionals are critical in promoting adherence among individuals with hypertension (28). Additionally, family support and access to healthcare services contribute to sustained medication adherence (29). Despite these positive findings, variation in adherence levels persists, as reflected by the standard deviation values. This suggests that some patients continue to encounter challenges in maintaining consistent medication use. Barriers to adherence may include fatigue with long-term therapy, adverse medication effects, forgetfulness, reliance on traditional medicine, and insufficient social support (30). These findings underscore the necessity for clinical approaches that address not only pharmacological management but also the psychological and behavioral dimensions of patient care.

HBM Levels on Each Construct

The results demonstrated that Health Belief Model (HBM) levels among hypertensive patients varied across constructs. Differences in mean scores across domains reflect distinct patient perceptions regarding hypertension, treatment benefits, therapy barriers, and beliefs about health behavior implementation. These findings indicate that medication adherence in hypertensive patients is shaped by multiple interrelated psychological dimensions and health perceptions. Self-efficacy exhibited the highest mean score, whereas perceived severity had the lowest. The observed variations suggest that patients' perceptions and beliefs about hypertension are influenced by individual experiences, health knowledge, social conditions, and interactions with both the environment and healthcare professionals.

The perceived vulnerability construct suggests that most patients possess adequate awareness of the risks associated with hypertension complications if the condition is not properly managed. Perceived vulnerability is a critical component of the HBM, as individuals who recognize their susceptibility to disease are more likely to engage in preventive and treatment behaviors (31). Among hypertensive patients, awareness of risks such as stroke, heart disease, and kidney failure enhances the perceived importance of regular medication and blood pressure monitoring. Previous studies have reported that patients with high perceived vulnerability are more likely to adopt effective health behaviors compared to those unaware of their risk (30).

The perceived severity construct reveals that some patients lack a comprehensive understanding of the seriousness of hypertension and its impact on quality of life. Perceived severity pertains to beliefs about the physical, social, and psychological consequences of the disease (32). The low perceived severity observed in this study may be attributed to hypertension's nature as a 'silent killer,' where patients often do not experience symptoms despite elevated blood pressure. This perception leads some patients to regard hypertension as benign, resulting in reduced treatment awareness. Previous research supports this finding, indicating that insufficient understanding of hypertension's long-term consequences diminishes motivation for regular treatment (33).

The threat perception construct is a combination of perceived vulnerability and perceived severity, describing the extent to which patients view hypertension as a serious threat to their health. These results indicate that some patients are aware of the dangers of hypertension, but the level of threat perception varies among individuals. According to the HBM theory, the higher a person's perceived threat, the more likely they are to take health measures to prevent complication (34). A good threat perception in hypertensive patients can increase motivation to take medication regularly, maintain a diet, and do physical activity regularly.

The perceived benefit construct indicates that most patients have a good level of confidence in the benefits of antihypertensive medication and lifestyle changes in controlling blood pressure. Perceived benefit is an individual's belief that a particular health action will have a positive impact on their health (24). Patients who believe that antihypertensive medication is effective in preventing complications tend to be more compliant with therapy. This finding aligns with previous research that suggests that belief in the benefits of pharmacological therapy is a key factor in improving medication adherence in hypertensive patients (35).

The perceived barriers construct describes the obstacles patients experience in undergoing treatment, such as drug side effects, treatment costs, boredom with long-term medication use, and limited access to health services. According to the HBM theory, perceived barriers are the most powerful factor influencing whether someone engages in or avoids health behaviors (36). High levels of perceived barriers can reduce patient adherence to antihypertensive therapy. In clinical practice, these barriers need to be identified early through educational and counseling approaches to enable patients to overcome the challenges they face during treatment.

This self-efficacy construct indicates that most patients have a high level of confidence in their ability to manage their hypertension independently. Self-efficacy is an individual's belief in their ability

to perform certain actions to achieve desired outcomes (37). The high self-efficacy in this study may be influenced by patients' experience in managing chronic disease, family support, and education provided by healthcare professionals. Patients with high self-efficacy tend to be more confident in managing medication schedules, maintaining diets, and conducting regular health check-ups. Previous research has also shown that high self-efficacy is associated with better self-management behaviors in patients with hypertension. (38).

Overall, the results of this study indicate that each construct of the Health Belief Model has distinct characteristics in hypertensive patients. High self-efficacy and perceived benefits indicate strong potential to support medication adherence. However, low perceived severity and persistent perceived barriers indicate the need for more comprehensive health education interventions. An HBM-based approach can be used as a strategy to increase patient awareness of the risks of hypertension, strengthen perceptions of the benefits of therapy, and reduce treatment barriers to improve the success of hypertension control in the community.

The Relationship Between HBM Components and Medication Adherence in Hypertension Patients

The study results demonstrated that the Health Belief Model (HBM) is positively and significantly associated with medication adherence among patients with hypertension. The correlation coefficient indicated a moderate relationship, suggesting that improved health perceptions, as conceptualized by the HBM, are associated with greater adherence to antihypertensive therapy. This finding supports the HBM framework, which posits that health behaviors are influenced by perceptions of disease risk, severity, benefits of health actions, perceived barriers, and confidence in the ability to perform health-related behaviors (31). In the context of hypertension, patient perceptions regarding the disease and its treatment are critical factors in sustaining long-term adherence to therapy.

Analysis of each HBM construct—perceived vulnerability, perceived severity, perceived threat, perceived benefits, and perceived barriers—revealed moderate associations with medication adherence, whereas the self-efficacy domain demonstrated a weak relationship. Perceived vulnerability exhibited a moderate and significant correlation with adherence; patients who recognized their susceptibility to hypertension complications, such as stroke or heart disease, were more likely to adhere to treatment. This observation is consistent with previous research indicating that perceived vulnerability is a significant predictor of medication adherence among hypertensive patients in community settings (39). Perceived severity of disease also showed a moderate association with adherence. Patients who understood the serious consequences of hypertension for quality of life and mortality risk were more compliant with therapy. This finding aligns with prior studies suggesting that awareness of the long-term effects of hypertension enhances adherence to treatment regimens (40). Threat perception, which combines perceived susceptibility and severity, was moderately correlated with medication adherence, indicating that a heightened sense of threat can serve as an internal motivator for maintaining healthy behaviors. This supports previous studies identifying threat perception as a key factor in adherence to hypertension medication (41). Perceived benefits of treatment were also moderately associated with adherence; patients who believed in the efficacy of antihypertensive medications for blood pressure control and complication prevention were more likely to adhere. These results are consistent with research demonstrating that belief in the benefits of pharmacological therapy is significantly associated with adherence to hypertension treatment (42). Perceived barriers were moderately related to adherence, though the correlation was lower than for other constructs. Barriers such as medication side effects, missed doses, and limited access to healthcare can reduce adherence. Early identification of these barriers and the implementation of multifaceted interventions are necessary to improve medication adherence (42). Self-efficacy exhibited a weak but significant relationship with adherence, suggesting that patient confidence in managing treatment contributes to adherence, though to a lesser extent than

other HBM domains. This may be due to the influence of external factors, including support from healthcare professionals and family (43).

The findings indicate that the Health Belief Model is a valuable theoretical framework for understanding medication adherence behaviors in patients with hypertension. Patient perceptions of disease and treatment significantly influence motivation to maintain regular therapy. Consequently, interventions based on the HBM can serve as effective educational and health promotion strategies to enhance medication adherence. Such interventions may include increasing awareness of hypertension complications, reinforcing the benefits of therapy, addressing treatment barriers, and strengthening patient self-efficacy in disease management. These results have important implications for nursing practice and primary healthcare. Healthcare professionals should develop individualized educational programs focused on behavior change. The integration of digital health technologies, app-based medication reminders, family counseling, and community-based approaches may offer sustainable strategies to improve adherence to hypertension medication (44). Further research employing longitudinal designs and multivariate analyses is recommended to more comprehensively identify factors influencing medication adherence.

The observed low correlation between self-efficacy and adherence underscores the need for further research to examine external factors that influence patients' ability to sustain long-term medication behaviors, such as family support, communication with healthcare providers, and sociocultural influences. Future studies should utilize longitudinal or multivariate approaches to more comprehensively identify predictors of medication adherence and assess behavioral changes over time. The development of culturally tailored interventions is also essential, as health perceptions and medication behaviors among hypertensive patients are shaped by local cultural values and beliefs. An HBM-based approach therefore holds promise as an effective promotive and preventive strategy for supporting long-term hypertension control in primary healthcare settings.

CONCLUSION

This study demonstrates that the HBM construct plays a significant role in improving medication adherence in hypertensive patients. Perceptions of susceptibility, severity, disease threat, treatment benefits, and barriers to treatment contribute to patient adherence to antihypertensive therapy. These findings confirm that medication adherence is influenced not only by medical aspects, but also by patients' perceptions and beliefs about their disease. Clinically, the results of this study demonstrate the importance of an HBM-based educational approach and behavioral interventions in nursing practice and hypertension management in the community. Interventions that focus on increasing patient awareness of the risks of hypertension complications, strengthening perceptions of the benefits of therapy, and reducing barriers to treatment have the potential to sustainably improve medication adherence. Furthermore, the low contribution of self-efficacy indicates the need for strategies to support and empower patients to increase confidence in undergoing long-term treatment.

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AUTHOR'S CONTRIBUTION STATEMENT

RH: Conceptualization, Writing Original Draft, Review & Editing and Validation. NIP, MH: Conceptualization, Methodology, Manuscript review, and Supervision.

CONFLICT OF INTEREST

None

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

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DATA AVAILABILITY

The dataset generated and analyzed during the current study is available from the corresponding author upon request.

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