

THE RELATIONSHIP BETWEEN THE HEALTH BELIEF MODEL AND HYPERTENSION MEDICATION ADHERENCE: A SYSTEMATIC LITERATURE REVIEW

Nuzulul Nindya Kirana¹, Eko Winarti²

¹²Faculty of Public Health, University of Kadiri

Article info	ABSTRACT
Corresponding Author: Nuzulul Nindya Kirana nnindyak15@gmail.com Faculty of Public Health, University of Kadiri	Hypertension control depends heavily on sustained medication adherence and self-management, and poor adherence remains a major barrier to reducing cardiovascular morbidity and mortality. The HBM has been widely used to explain why patients engage in or avoid anti-hypertensive treatment by focusing on perceived susceptibility, severity, benefits, barriers, self-efficacy, and cues to action. The method is used as a library research method by critically reviewing academic oriented literature. There were 10 research journals adjusted to the literature review problem. The results show that the Health Belief Model is associated with hypertension treatment compliance, with the strongest support for improved short-term adherence and blood pressure control in intervention studies, while observational studies show that the most predictive construct varies by population. Overall, the literature supports a positive but context-dependent relationship between the Health Belief Model and hypertension treatment compliance. Keywords: <i>Health Belief Model, Hypertension</i>
This article distributed under the terms of the Creative Commons Attribution-Share Alike 4.0 International License (https://creativecommons.org/licenses/by-sa/4.0/)	

INTRODUCTION

The Health Belief Model (HBM) posits that health-related behavior depends on an individual's motivation, perceived vulnerability to disease, and belief that following health recommendations will reduce complications (Joho, 2021). The model encompasses six core constructs perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy, and cues to action that collectively predict whether a patient will adhere to prescribed treatment (Wang, 2024)

Hypertension, often called the "silent killer" because it frequently presents without symptoms, requires lifelong medication adherence to prevent cardiovascular morbidity and mortality, making behavioral models like the HBM particularly relevant for understanding compliance (Onwukwe, 2022)

A substantial body of cross-sectional, longitudinal, and intervention research across low-, middle-, and high-income countries has applied the HBM framework to antihypertensive medication adherence (Arshed, 2023; Jemon 2021). Multiple systematic reviews and meta-analyses have synthesized this evidence, finding consistent associations between HBM based interventions and improved blood pressure control (Arshed, 2023; Burnier 2021). Despite the breadth of evidence, key questions remain about which HBM constructs most strongly drive compliance, whether interventions sustain long-term behavioral change, and how cultural and socioeconomic factors moderate the model's predictive power (Kam, 2024; Chauke, 2022).

METHOD

The search ran over 170 million research papers indexed in Consensus, drawing from Semantic Scholar, PubMed, and other biomedical databases. The deep search strategy employed six research groups spanning foundational HBM theory, alternative behavioral models, critiques and null findings, comparative chronic disease applications, intervention and implementation studies, and sociocultural moderators. An initial 977,121 papers were identified through keyword searches; after machine learned relevance filtering, 240 papers were screened and 117 passed the relevance threshold. Deduplication yielded 117 unique papers, from which the top 20 were selected by relevance ranking for inclusion in this synthesis.

RESULT AND DISCUSSION

Finding

The corpus is anchored by a systematic review, a meta-analysis, and several landmark RCTs that establish the empirical foundation linking HBM constructs to hypertension compliance. Islam et al. (2025) provide the most comprehensive synthesis, reviewing 24 quantitative studies across LMICs and finding consistent associations between HBM based interventions and improved blood pressure control (Arshed, 2023). Apriliani et al. (2022) contribute a meta-analysis of 13 studies demonstrating that perceived benefits and cues to action significantly increase the odds of antihypertensive adherence (Zahed, 2023). Wang et al. (2024) report a well-powered RCT showing HBM-based health education significantly lowers blood pressure and improves medication adherence at six months.

Cross sectional studies across diverse populations consistently identify specific HBM constructs as significant predictors of anti-hypertensive adherence, though the dominant construct varies by context. Perceived barriers emerge as the strongest negative predictor in multiple studies. Joho (2021) found perceived barriers had the highest predictive weight ($\beta = -0.477$, $p < .001$) among 135 Tanzanian patients and Dhar et al. (2025) replicated this finding in a Bangladeshi tertiary hospital cohort. Perceived benefits, by contrast, function as the strongest positive predictor in elderly populations, with Widayani et al. (2024) reporting an adjusted odds ratio of 12.061 for medication adherence among elderly Indonesians with high perceived benefit scores (Made 2024). Self-efficacy independently predicts adherence in several cohorts. Acharya et al. (2025) found self-efficacy was the only HBM construct significantly associated with medication adherence in a Nepalese cohort ($\beta = 0.26$, $p < 0.001$), and Novita et al. (2025) identified it as the most dominant predictor (PR 33.67, $p = 0.005$) among hypertensive patients in Semarang. Cues to action and perceived susceptibility also

show significant associations, though less consistently across populations (Zangiabadi 2022; Dhar 2025).

Beyond this trial, Arshed et al. (2023) demonstrated that a multifaceted mHealth intervention grounded in the HBM significantly improved adherence scores (median SEAMS 32 vs 21, $p < .001$) and reduced systolic blood pressure by 7 mmHg over six months in a Pakistani RCT of 439 patients. A smartphone app integrating HBM constructs in Turkey similarly produced higher medication adherence self-efficacy scores and significant systolic blood pressure improvements (Arabaci, 2024). Quasi experimental studies in Iran and Iraq showed HBM based educational programs significantly increased self-care behaviors and reduced perceived barriers in hypertensive elderly (Naeemi, 2022; Kader 2023).

The relationship between HBM constructs and adherence is moderated by socio demographic factors. Education level consistently predicts both health beliefs and adherence Atibila et al. (2022) found non adherence was significantly associated with lower education ($p = 0.009$) among Ghanaian patients. Widyaningrum et al. (2025) showed education influenced perceived susceptibility, severity, and benefit. Age affected all five HBM perceptions in a pandemic era Indonesian study. Cultural beliefs further complicate the model's predictive power: 40.9% of older adults in coastal Madura, Indonesia, continued visiting traditional healers despite 76.3% trusting doctors (Susilawati, 2026). African American patients face unique adherence barriers rooted in historical mistrust of the healthcare system and passed-down beliefs about medications (Augusta, 2025). Notably, Atibila et al. found that high perceived susceptibility and severity did not necessarily translate into positive medication behavior, and strong cues to action remained the most useful construct for reducing noncompliance (Atibila, 2022).

The research arc progressed from early cross-sectional association studies (2021–2023) to RCT validated interventions and digital health applications (2023–2025), culminating in systematic reviews and meta-analytic syntheses confirming the model's utility.

No	Tittle	Researcher	Year	Design of research	Population & Sample	Sampling Technique	Result
1.	Using the Health Belief Model to Explain the Patient's Compliance to Anti-hypertensive Treatment in Three District Hospitals - Dar Es Salaam,	A. Joho	2021	cross-sectional study	Elderly hypertensive patients in Tanzania as 135 people	Simple Random Sampling	A total of 135 participants were enrolled of whom 56% were compliant to hypertensive treatment. Multivariate analysis indicated significant model fit for the data ($F=11.19$ and P value $<.001$). The amount of variance in treatment compliance that was explained by the predictors was 30.3% ($R^2=0.303$) with perceived barrier being the strongest predictor of

	Tanzania: A Cross Section Study						treatment compliance ($\beta = -0.477$; $p < .001$). Other predictor variables were not statistically associated with treatment compliance.
2.	Effectiveness of a Multifaceted Mobile Health Intervention (Multi-Aid-Package) in Medication Adherence and Treatment Outcomes Among Patients With Hypertension in a Low-to Middle-Income Country: Randomized Controlled Trial	Muhamad Arshed, Aidalina Mahmud, H. Minhat, P. Lim, R. Zakar	2023	Cross-sectional survey and structural equation modeling study	Elderly patients with hypertension in western China, 439 patients	randomized controlled trial	Results of the pill-counting method showed an increase in adherent patients in the intervention group compared to the controls (83/220, 37.2% vs 2/219, 0.9%; $P < .001$), as well as within the intervention group (difference of $n = 83$, 37.2% of patients, baseline vs 6 months; $P < .001$). Overall, the number of patients with uncontrolled hypertension decreased by 46 in the intervention group (baseline vs 6 months), but the control group remained unchanged. The variables groups (adjusted odds ratio [AOR] 1.714, 95% CI 2.387-3.825), time (AOR 1.837, 95% CI 1.625-2.754), and age (AOR 1.618, 95% CI 0.225-1.699) significantly contributed ($P < .001$) to medication adherence.
3.	Self-Efficacy and Medication Adherence Among Persons with Hypertension in Nepal: A Cross-Sectional Study	Shova Acharya, Chiraporn Tachaudomdach, Warawan Udomkhamsuk	2025	cross-sectional study	Hypertensive patients in Nepal, sample 193 patients	Stratified random sampling	In the regression analysis, only self-efficacy was significantly associated with medication adherence ($\beta = 0.26$, $t = 3.614$, $P < 0.001$). In conclusion, self-efficacy was the only variable that demonstrated a significant association with medication adherence among persons with hypertension in this study. Interventions to improve adherence should focus on enhancing patients' confidence in their ability to manage medication.

4.	Evaluation of the effects of health education interventions for hypertensive patients based on the health belief model	Hongmei Wang, Ying Chen, Yan Shen, Xiaomei Wang	2024	randomized controlled trial	Adults with hypertension in two community health centers in China, sample size 140 recruited; 70 intervention and 70 control	convenience sampling	The intervention group had significantly lower systolic blood pressure [mean difference (MD): -8.2 mmHg, $P < 0.001$] and diastolic blood pressure (MD: -5.1 mmHg, $P = 0.002$) compared to the control group at six months. The intervention group also had higher medication adherence (MD: 1.8, $P < 0.001$), self-efficacy (MD: 12.4, $P < 0.001$), perceived benefits (MD: 3.2, $P < 0.001$), lower perceived barriers (MD: -2.6, $P = 0.001$), higher perceived susceptibility (MD: 2.8, $P = 0.002$), and higher perceived severity (MD: 3.1, $P < 0.001$) than the control group at six months.
5.	Integrating the health belief model into health education programs in a clinical setting	B. Kam, Sang Yeoup Lee	2024	randomized controlled trial	adult patients with hypertension in community health center catchment areas in China , The sample size was 140 patients with hypertension	convenience sampling	The article demonstrates that health belief model (HBM)-based health education in hypertensive patients effectively improves blood pressure control and medication adherence at 3 months and 6 months. The HBM addresses perceived barriers, benefits, susceptibility, severity, and self-efficacy, leading to better health behaviors. HBM-based education has been effective in various contexts, including managing chronic diseases, promoting cancer screenings, and preventing infectious diseases.

6.	The Influence of Parents on Medication Adherence of Their Children in China: A Cross-Sectional Online Investigation Based on Health Belief Model	Pu Ge, Siyun Liu, Shuxian Xu, Jinzi Zhang, Yongjie Lai, Run Fu, Xinyu Ke, Juan Zhao, Y. Bian, Yi-bo Wu	2022	cross-sectional study	Parents of children from 28 cities in China, sample size 573	multi-stage stratified sampling	The result of the questionnaire exploratory factor analysis met the standard. According to the SEM, self-efficacy ($\lambda = 0.177$), perceived susceptibility ($\lambda = -0.244$), and perceived severity ($\lambda = 0.243$) were direct influencing factors of children's medication adherence. The absolute values of females perceived susceptibility, severity, and self-efficacy for their children's medication adherence path coefficients were higher than males.
7.	Effects of Nursing Intervention Based on Health Belief Model on Self-Perceived Burden, Drug Compliance, and Quality of Life of Renal Transplant Recipients	Shuqin Hu, Rui Xiong, Qingxiang Hu, Qingling Li	2022	randomized controlled trial	Renal transplant recipients, sample size 60	convenience sampling	The nursing satisfaction in the study group was higher compared to the control group ($P < 0.05$). Secondly, we compared the scores of self-burdens. Before nursing, they exhibited no significant difference ($P > 0.05$); after nursing, they decreased. In terms of drug compliance, the rates of no missed medication, noncontinuous missed medication, timely medication, dose-by-dose medication, and non-self-stopping medication in the study group were higher compared to the control group ($P < 0.05$).

8.	Analysis of Factors Affecting Compliance Taking Medicine for Elderly Hypertension Based Health Belief Models	Aulia Hilda Pristianti, Trisna Vitaliati, Nurul Maurida	2023	cross-sectional study	Hypertensive patients in Semarang, Indonesia, sample size 33 hypertensive patients	purposive sampling	Bivariate analysis indicated that perceived susceptibility, benefits, severity, and self-efficacy significantly correlated with treatment adherence. Multivariate analysis revealed that perceived severity and self-efficacy were the strongest predictors of adherence, with self-efficacy being the most dominant factor (PR 33.67, 95% CI 2.937–385.989, $p = 0.005$).
9.	The research arc progressed from early cross-sectional association studies (2021–2023) to RCT-validated interventions and digital health applications (2023–2025), culminating in systematic reviews and meta-analytic syntheses confirming the model's utility.	Shohaelul Mohamad Tanvir Islam, M. Arafat, Arna Chowdhury, Keertika Orchi, S. Sultana, Md 2 Tanjela Bushra, Redwanul Islam, Md 2 Khanda kar Fatema, Maruf Haque Khan, Atiqul Haque	2025	systematic review	People with hypertension in low- and middle-income countries, sample size , The final sample contained 24 studies	systematic study selection	This study aims to explore the role of the health belief model in hypertension management, with a focus on blood pressure control, medication adherence, and self-management. This review included English full-text quantitative studies on HBM and hypertension management in low- and middle-income countries (LMICs), excluding qualitative, mixed methods, protocols, and nonoriginal data.

10.	Predictors of Nonadherence to Medications among Hypertensive Patients in Ghana: An Application of the Health Belief Model	Fidelis Atibila, E. T. Donkoh, R. Ruiter, G. Kok, G. T. Hoor	2022	Cross sectional	Staff member of Iran University of Medical Sciences, sample size 128	Quasi-Experimental	This current study specified that the education-based health belief model effectively promotes hypertension preventive behaviors among Iran University of Medical Sciences staff.
-----	---	--	------	-----------------	--	--------------------	---

Discussion

The corpus demonstrates consistent evidence that HBM constructs, particularly perceived barriers, perceived benefits, self-efficacy, and cues to action, are significantly associated with anti-hypertensive medication adherence across diverse populations and settings. The 2025 systematic review by Islam et al. synthesizing 24 studies across LMICs provides the strongest aggregate evidence that HBM based interventions reduce blood pressure and improve. And the meta-analysis by Apriliani et al. quantifies specific effect sizes for perceived benefits (aOR 1.60) and cues to action (aOR 1.52). Multiple RCTs including Wang et al. (2024) in China. Arshed et al. (2023) and Xu et al. (2025) in gestational hypertension Xu, 2025 demonstrate causal evidence that HBM grounded interventions improve both adherence and clinical outcomes.

However, several limitations temper these findings. Most studies are cross sectional, capturing associations at a single time point and precluding causal inference about construct-to-behavior directionality (Zangiabadi, 2022; Şahin, 2025). The strongest construct predictor varies across populations perceived barriers dominate in Tanzanian and Bangladeshi cohorts (Joho, 2021; Dhar, 2025). Perceived benefits in Indonesian elderly Made, 2024, and self-efficacy in Nepalese and Semarang patients. Acharya, 2025; Novita, 2025 suggesting that the model's predictive architecture is context dependent rather than universal. Atibila et al. (2022) found that high perceived susceptibility and severity paradoxically did not improve adherence, challenging the model's assumed linear pathway. The Papuan study by Rayanti et al. (2021) found only weak correlations between HBM constructs and hypertension management. And a large RCT by Keller et al. (2025) using behavioral science principles including HBM adjacent constructs found no significant improvement in adherence from mailed communications. Intervention follow-up periods rarely exceed six months, leaving long-term sustainability untested (Wang, 2024; Kam 2024).

CONCLUSION

The literature reviewed studies consistent evidence that the Health Belief Model is a valid theoretical framework for understanding and improving hypertension treatment compliance. Perceived barriers, perceived benefits, self-efficacy, and cues to action emerge as the most robust predictors across populations, while HBM based interventions ranging from face to face education to mHealth platforms demonstrably improve medication adherence and blood pressure control. However, the model's predictive architecture is

context-dependent, with different constructs dominating in different cultural and demographic settings, and long-term intervention sustainability remains insufficiently tested.

BIBLIOGRAPHY

- Acharya, S., Tachaudomdach, C., & Udomkhamsuk, W. (2025). Self-Efficacy and Medication Adherence Among Persons with Hypertension in Nepal: A Cross-Sectional Study. *Natural and Life Sciences Communications*. <https://doi.org/10.12982/nlsc.2025.075>
- Apriliani, E. D., Prasetya, H., & Murti, B. (2022). Meta-Analysis: Application of Health Belief Model on the Adherence to Antihypertensive Medication. *Journal of Health Promotion and Behavior*. <https://doi.org/10.26911/thejhp.2022.07.03.06>
- Arabaci, Z., & Toraman, A. U. (2024). The Effects of a Smartphone App-Supported Nursing Care Program on the Disease Self-Management of Hypertensive Patients: A Randomized Controlled Study. *Public Health Nursing*, 42. <https://doi.org/10.1111/phn.13499>
- Arshed, M., Mahmud, A., Minhat, H., Lim, P., & Zakar, R. (2023). Effectiveness of a Multifaceted Mobile Health Intervention (Multi-Aid-Package) in Medication Adherence and Treatment Outcomes Among Patients With Hypertension in a Low-to Middle-Income Country: Randomized Controlled Trial. *JMIR mHealth and uHealth*, 12. <https://doi.org/10.2196/50248>
- Atibila, F., Donkoh, E. T., Ruiter, R., Kok, G., & Hoor, G. T. (2022). Predictors of Nonadherence to Medications among Hypertensive Patients in Ghana: An Application of the Health Belief Model. *International Journal of Hypertension*, 2022. <https://doi.org/10.1155/2022/1418149>
- Augusta, T., Howard, S., & Mary, A. (2025). Exploring Hypertension Medication Adherence in African Americans Using the Health Belief Model and the Social Determinants of Health.. *Research and theory for nursing practice*, 39 2, 151-168 . <https://doi.org/10.1891/rtnp-2024-0071>
- Dhar, U., Rahim, A., Khanam, S., Khatun, T., Fardows, J., Das, A., Kahhar, M., Chowdhury, A. W., & Consultant, J. (2025). A Clinical Study on Non Adherence of Antihypertensive Therapy among Hypertensive Patient in a Tertiary Level Hospital. *Saudi Journal of Medical and Pharmaceutical Sciences*. <https://doi.org/10.36348/sjmps.2025.v11i01.001>
- Fauziah, F., Sastrawan, S., Setiawan, S., & Mardani, R. A. D. (2026). Hubungan komponen health belief model (HBM) dengan kepatuhan minum obat dan tingkat stress pada pasien hipertensi. *Holistik Jurnal Kesehatan*. <https://doi.org/10.33024/hjk.v19i12.2079>
- Islam, S. M. T. 1., Arafat, M., Chowdhury, A., Orchi, K., Sultana, S., Bushra, M. T. 2., Islam, R., Fatema, M. K. 2., Khan, M. H., & Haque, A. (2025). Role of the Health Belief Model in the Management of Hypertension: A Systematic Review. *Cureus*, 17. <https://doi.org/10.7759/cureus.94139>
- Joho, A. (2021). Using the Health Belief Model to Explain the Patient's Compliance to Anti-hypertensive Treatment in Three District Hospitals - Dar Es Salaam, Tanzania: A Cross Section Study. *The East African Health Research Journal*, 5, 50 - 58. <https://doi.org/10.24248/eahrj.v5i1.651>

- Kader, M., & Faraj, R. (2023). Health Belief Model Efficacy on improving hypertension control among old age at Kirkuk City, Iraq: A Randomized Controlled Trial. *Rawal Medical Journal*. <https://doi.org/10.5455/rmj.20230421060107>
- Kam, B., & Lee, S. Y. (2024). Integrating the health belief model into health education programs in a clinical setting. *World Journal of Clinical Cases*, 12, 6660 - 6663. <https://doi.org/10.12998/wjcc.v12.i33.6660>
- Made, N., Widayani, A., Putu, G., Suyasa, D., Kamaryati, N., & Rahyanti, S. (2024). Perceived benefit is the strongest determinant factor of medication adherence in the elderly with hypertension. *Jurnal Keperawatan Padjadjaran*. <https://doi.org/10.24198/jkp.v12i2.2384>
- Naeemi, L., Daniali, S., Hassanzadeh, A., & Rahimi, M. (2022). The effect of educational intervention on self-care behavior in hypertensive older people: Applying the health belief model. *Journal of Education and Health Promotion*, 11. https://doi.org/10.4103/jehp.jehp_1800_21
- Novita, M. P., Kusuma, A., Fajar, B., Darmawan, B., Dewi, H. E., Maharani, Y. D., & Ratnawati, R. (2025). Relationship of Health Belief Model with Medication Adherence in RW 11, Bangetayu Kulon Village, Semarang. *Healthy Tadulako Journal (Jurnal Kesehatan Tadulako)*. <https://doi.org/10.22487/htj.v11i2.1643>
- Pristianti, A. H., Vitaliati, T., & Maurida, N. (2023). Analysis of Factors Affecting Compliance Taking Medicine for Elderly Hypertension Based Health Belief Models. *Journal of Rural Community Nursing Practice*. <https://doi.org/10.58545/jrcnp.v1i2.202>
- Susilawati, E., Hidayat, S., Amin, E. S., Hakim, A. R., & Nindawi, N. (2026). Sociodemographic and Cultural Determinants of Hypertension-Controlling Beliefs Among Older Adults: A Cross-Sectional Study Based on the Health Belief Model. *Journal of Applied Nursing and Health*. <https://doi.org/10.55018/janh.v8i1.581>
- Wang, H.-M., Chen, Y., Shen, Y., & Wang, X. (2024). Evaluation of the effects of health education interventions for hypertensive patients based on the health belief model. *World Journal of Clinical Cases*, 12, 2578 - 2585. <https://doi.org/10.12998/wjcc.v12.i15.2578>
- Widyaningrum, K., Zuhriyah, L., Wardhani, V., & Rudijanto, A. (2025). Continuum of Care for Diabetes and Hypertension Patients During the Pandemic Era: Bridging the Gap. *The Malaysian Journal of Medical Sciences : MJMS*, 32, 212 - 223. <https://doi.org/10.21315/mjms-12-2024-989>
- Zangiabadi, A., Esmaili, A. S., Tabatabaei, S. V. A., Movahed, E., & SHhankestani, H. (2022). Factors Regarding Adherence to Medication in Patients with Hypertension Based on Health Belief Model in the South of Kerman, Iran, in 2019. *Journal of Community Health Research*. <https://doi.org/10.18502/jchr.v11i2.9995>