



## APPLICATION OF THE HEALTH BELIEF MODEL TO ANTIHYPERTENSIVE MEDICATION ADHERENCE: A META-ANALYSIS

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### ABSTRACT

This study explores several Health Belief Model (HBM) components, such as perceived susceptibility, severity, benefit, barriers, and cues to action. Through the rigorous conduct of a comprehensive systematic review followed by a meticulous meta-analysis, this research intends to determine the impact of HBM constructs on anti-hypertensive medication adherence in hypertensive patients. Nineteen papers in total were chosen for the comprehensive review and analysis in this research, which employed the following PICO elements as Population- those suffering from elevated blood pressure; Intervention - strong Perception of benefits, presence of cues to action, and perceptions of vulnerability; Comparison - weak perception of benefits, absence of cues to action, and no perception of vulnerability; Outcome - medication adherence. Data were collected from various databases, including PubMed, Springer Link, Science Direct, and Google Scholar. Meanwhile, data analysis was conducted using RevMan 5.3. 19 articles (2012-2020) Adherence to Hypertensive Medication among Hypertensive Patients with Cross-Sectional Design. The 19 articles included in this study design utilized a cross-sectional study design. The results demonstrated that a strong perception of benefit (aOR= 1.63; 95% CI= 1.05 to 2.52; p= 0.030), cues to action (aOR= 1.63; 95% CI= 1.05 to 2.52; p= 0.030), and perceived vulnerability (aOR= 2.16; CI 95% = 1.59 to 2.93; p< 0.001) were statistically significant factors in increasing medication adherence among hypertensive patients. This study investigates the impact of HBM components, such as perceived benefits and cues of action, on hypertensive medication adherence across various populations, including Vietnam, Taiwan, China, Ethiopia, Egypt, and Ghana.

Keywords: health belief model; hypertensive patients; medication adherence

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### INTRODUCTION

Hypertension, often referred to as the 'silent killer,' is a disease that does not typically exhibit noticeable symptoms in sufferers, but it can lead to complications and even death.(Atibila et al., 2021)(Mills et al., 2020) Additionally, this disease has affected a staggering 1.28 billion individuals globally aged between 30 and 79. Astonishingly, up to 46% of those afflicted by hypertension remain oblivious to their condition. Meanwhile, 42% have been diagnosed and are undergoing treatment. Only 21% of the population can successfully control and manage their hypertension.(Koya et al., 2023)(Alshammari et al., 2023). The frequency of hypertension among the working-age population has been steadily increasing, especially among older adults.(Oliveros et al., 2020)(Ghosh et al., 2023) As per the 2018 National Riskesdas Report, the incidence of hypertension among the Indonesian populace aged 18 and above stood at 34.11%. Among the older adult demographic, this figure notably escalated to 63.22%. Given the high mortality rate associated with hypertension and its silent nature, prevention is the key. Initiatives to prevent and manage high blood pressure should commence by increasing public awareness and advocating for a healthier way of life.(Campbell & Niebylski,

2018)(Pathak et al., 2022) Moreover, everyone in the community must learn the proper behavior to understand and embrace healthy habits and avoid disease.(Rippe, 2018).

Hypertension, frequently called 'high blood pressure,' is a notable international healthcare issue.(Mohammed Nawi et al., 2021) Anti-hypertensive drugs play an essential role in managing and controlling hypertension and preventing related complications such as heart disease and stroke.(Ojha et al., 2022)(Mao et al., 2022) Nonetheless, patient adherence to anti-hypertensive medication remains a concern. Therefore, this study attempts to investigate the application of the HBM in understanding and boosting compliance with anti-hypertensive drug regimens. HBM is a theoretical work that delves into how people perceive their health and healthcare.(Jones, 2015) By examining various elements of HBM, like perceived vulnerability, intensity, benefit, hindrances, and stimuli for action, this study seeks to shed light on what drives adherence to anti-hypertensive therapy and to highlight potential interventions to increase the rate of such adherence.

Hypertension is a prevalent condition that affects a large percentage of the world population, and it stands as a prominent factor in the prevalence of disease and death on a global scale.(Singh et al., 2017)(Dai et al., 2022) Notably, anti-hypertensive medications have been proven effective in lowering blood pressure and preventing cardiovascular events.(Dimmitt et al., 2019)(Guerrero-García & Rubio-Guerra, 2018) However, even though effective treatments are accessible, a significant number of hypertensive patients struggle to stick to their treatment plans. In addition, this ongoing issue will remain a significant concern, as it hinders the treatment's effectiveness and contributes to the progression of the condition and its accompanying problems. Therefore, exploring the factors influencing adherence and developing measures to boost medication adherence is a critical step in optimizing hypertension therapy and reducing its associated health risks.(Kvarnström et al., 2021)(Basu et al., 2019).

Recent primary research has explored the utilization of the Health Belief Model (HBM) to analyze patient adherence to anti-hypertensive medication regimens. The findings of these studies emphasize the pivotal role of perceived benefits and external cues in shaping an individual's commitment to complying with their prescribed high blood pressure treatment. Notably, the perception of substantial benefits is a significant driver for patients in adhering to their anti-hypertensive medication.(Joho, 2021) Many individuals express a firm belief in the advantages of adhering to their prescribed anti-hypertensive treatment, further underscoring the critical link between perceived benefits and treatment commitment.(G/Tsadik et al., 2020)(Pan et al., 2023) This sentiment is echoed across various investigations. Furthermore, the presence of cues that prompt action in relation to medication adherence among hypertensive patients holds substantial importance.(Cho, 2018)(Obirikorang et al., 2018) These cues, often originating from the patients' immediate environment, are pivotal in motivating individuals to take action and align their health behavior with their anti-hypertensive medication adherence. The influence of action cues has been well-documented in the research.

The research suggests that a strong belief in the benefits of anti-hypertensive medication adherence, coupled with external cues that stimulate action, significantly influences individuals' commitment to their prescribed treatment for high blood pressure. Given the circumstances, it is critical to grasp the individual perspective on adhering to anti-hypertensive medication to regulate blood pressure and avert complications successfully. The primary goal and the main aim of this statistical synthesis is to determine the extent of the impact achieved by implementing the HBM on anti-hypertensive medication adherence.

## **METHOD**

In order to structure this study, a thorough evaluation and extensive data synthesis were conducted after examining cross-sectional studies that examined the effect of HBM components on people with hypertension who were administered high blood pressure medication. In addition, this study followed the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) criteria when searching for papers. A comprehensive article analysis was conducted to find relevant articles from an

electronic database published in 2022, which included articles in both English and Indonesian. Electronic databases like Google Scholar, Elsevier, PubMed, ProQuest, and Science Direct were employed for this analysis. The objective was to pinpoint studies concerning HBM and its impact on compliance with prescribed medications for hypertension in individuals with the condition. The analysis was initiated using the PICO framework (Population, Intervention, Comparison, and Outcome) with the following keywords: “Health Belief Model” or “HBM” and “Adherence Anti-Hypertensive” or “Compliance Anti-Hypertensive” and “Hypertension” or “High Blood Pressure” and “Multivariate Analysis.” For an article to be eligible for this meta-analysis, it had to provide aOR (Adjusted Odds Ratios) and 95% CI (Confidence Intervals values. Articles that lacked medication adherence outcomes or omitted complete aOR and 95% CI values were excluded. Additionally, articles employing data analysis with smaller effect sizes based on Mean and SD (Standard Deviation) values were included.

To guarantee the methodological soundness of this systematic review, special attention was taken throughout the process. It followed the PRISMA flow diagrams to the letter, which provided an organized framework for openly recording the review procedure. Furthermore, a thorough assessment of the chosen articles' quality was conducted using the Critical Appraisal Skills Program's (CASP) predetermined parameters. The purpose of this systematic evaluation was to determine the validity and dependability of the research papers that were part of the review. The review also conducted an analysis of the collected data using the Review Manager software, specifically RevMan 5.3. This software is a recommended tool for conducting systematic reviews and meta-analyses, enabling the comprehensive synthesis of research findings. Moreover, visual aids such as forest plots and funnel plots were integrated into the analytical process to visually represent and elucidate the effect sizes and the degree of variability (heterogeneity) within the research data. To address the inherent variations among the studies included, a thoughtful decision was made to choose between the Fixed Effect Model (FEM) or the Random Effect Model (REM). This strategic choice allowed for the accommodation of differences in research methodologies and study populations, providing a more robust and flexible analytical framework.

## RESULTS

Table 1.  
Critical Appraisal According to the Critical Appraisal Skills Program (CASP)

Primary Study	Criteria												Total
	1	2	3	4	5	6	7	8	9	10	11	12	
Li <i>et al.</i> (2012)	2	2	2	2	2	2	2	2	2	2	2	2	24
Girma <i>et al.</i> (2014)	2	2	2	2	2	2	2	2	2	2	2	2	24
Yue <i>et al.</i> (2015)	2	2	2	2	2	2	2	2	2	2	2	2	24
Li dan Huang (2016)	2	2	2	2	2	2	2	2	2	2	2	2	24
Li <i>et al.</i> (2017)	2	2	2	2	2	2	2	2	2	2	2	2	24
Madebo <i>et al.</i> (2018)	2	2	2	2	2	2	2	2	2	2	2	2	24
Obirikorang <i>et al.</i> (2018)	2	2	2	2	2	2	2	2	2	2	2	2	24
Gtsadik <i>et al.</i> (2020)	2	2	2	2	0	2	0	2	2	2	2	2	20
Hareri dan Abebe (2012)	2	2	2	2	2	2	2	2	2	2	2	2	24
Hareri <i>et al.</i> (2013)	2	2	2	2	2	2	2	2	2	2	2	2	24
Helal <i>et al.</i> (2019)	2	2	2	2	2	2	2	2	2	2	2	2	24
El-Nahhas <i>et al.</i> (2019)	2	2	2	2	2	2	2	2	2	2	2	2	24
Findlow <i>et al.</i> (2015)	2	2	2	2	2	2	2	2	2	2	2	2	23
Kamran <i>et al.</i> (2014)	2	2	2	2	2	2	2	2	2	2	2	2	24
Kasmaei <i>et al.</i> (2015)	2	2	2	2	2	2	2	2	2	2	2	2	24
Khorsandi <i>et al.</i> (2017)	2	2	2	2	2	2	2	2	2	2	2	2	24
Mariyasoosai <i>et al.</i> (2016)	2	2	2	1	1	1	2	2	2	2	1	2	20
Obirikorang <i>et al.</i> (2018)	2	2	2	1	2	2	2	2	2	2	1	2	22
Yue <i>et al.</i> (2015)	2	2	2	2	2	2	2	2	2	2	2	2	24

The primary search for articles was sourced from various databases, specifically Google Scholar, Elsevier, PubMed, ProQuest, and Science Direct. The screening procedure and the selection of articles that aligned with the research criteria are illustrated in the PRISMA flowchart (Figure 1). Initially, the inquiry generated 973 papers, but after the screening process, 684 papers were identified as the

primary focus. Out of these, 12 papers were included in this meta-analysis. These selected papers were sourced from two continents, Asia (including China, Taiwan, and Egypt) and Africa (comprising Ethiopia and Ghana). A quantitative study quality assessment was conducted in this study, focusing on cross-sectional study designs and based on the 2014 Critical Appraisal Skills Program (CASP) guidelines. The results of the study quality assessment, as conducted by CASP, are presented in Table 1.

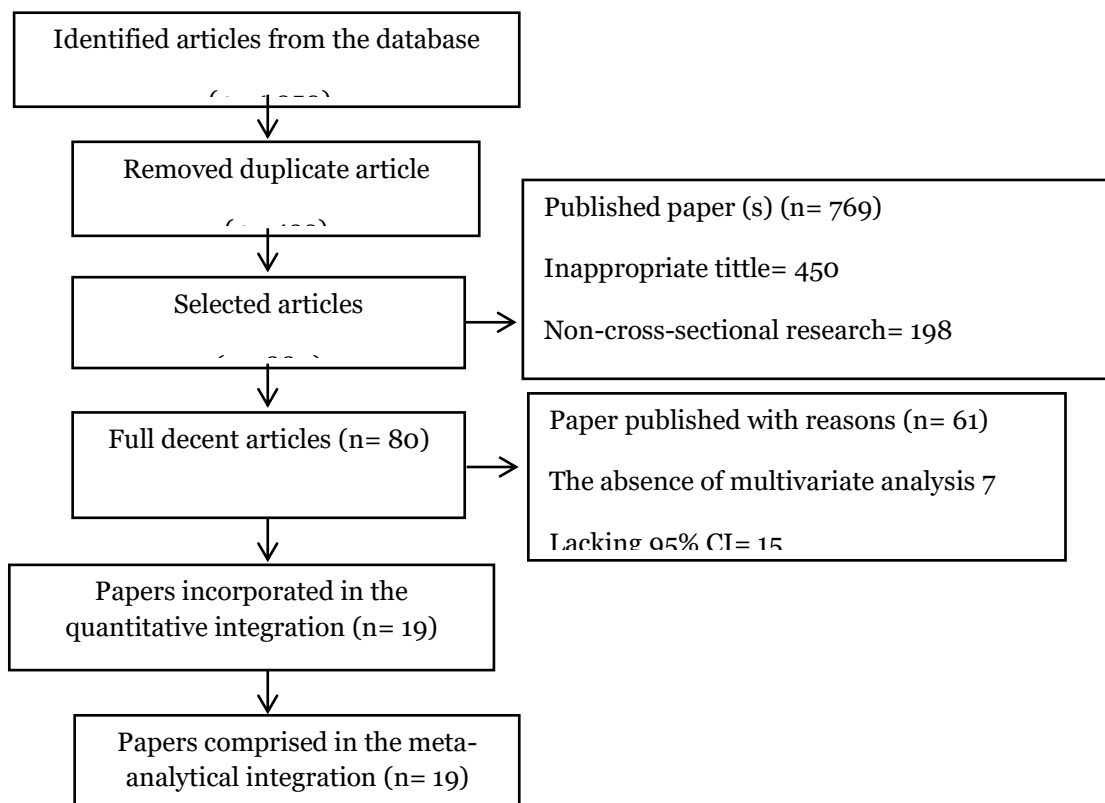


Figure 1: PRISMA flow diagram

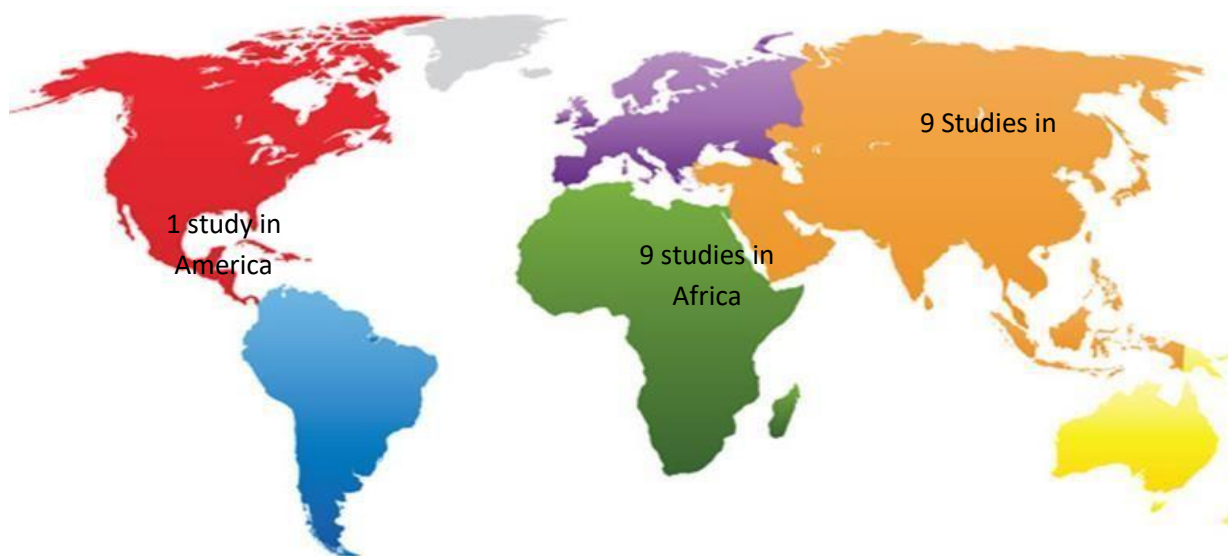


Figure 2: Research Distribution Map

Figure 1 displays a PRISMA flowchart illustrating the process of selecting articles. Initially, 1,250 articles, all published in 2020, were gathered from online databases, which included PubMed, Science

Direct, Springer Link, and Google Scholar. After removing duplicate data, 880 articles remained. Out of these, 80 full articles were eligible for inclusion in the meta-analysis. In contrast, 68 articles were excluded for reasons such as failing to address treatment adherence, failing to disclose complete data and 95% Cis, or failing to use multivariate analysis. Consequently, 19 publications fulfilled the criteria and were incorporated into the Meta-Analytical review.

Table 2.  
PICO Description in the Primary Study on the Impact of Perceived Benefits on Adherence to Hypertensive Medication among Hypertensive Patients with Cross-Sectional Design

Author (years)	Country	Sample	P	I	C	O
Li <i>et al.</i> (2012)	Taiwan	200	Hypertension Patient	Strong benefit perception	Weak benefit perception	Anti-hypertensive medication adherence
Girma <i>et al.</i> (2014)	Ethiopia	2237	Hypertensive patient at Jimma University Hospital	Strong benefit perception	Weak benefit perception	Anti-hypertensive medication adherence
Yue <i>et al.</i> (2015)	Cina	256	Hypertensive patient at Shanghai Hospital	Strong benefit perception	Weak benefit perception	Anti-hypertensive medication adherence
Li dan Huang (2016)	Cina	200	Chinese immigrant hypertension patient	Strong benefit perception	Weak benefit perception	Anti-hypertensive medication adherence
Li <i>et al.</i> (2017)	Vietnam	100	Vietnam Police hypertension patient	Strong benefit perception	Weak benefit perception	Anti-hypertensive medication adherence
Madebo <i>et al.</i> (2018)	Ethiopia	416	Hypertensive patient at Arebaminch Hospital.	Strong benefit perception	Weak benefit perception	Anti-hypertensive medication adherence
Obirikorang <i>et al.</i> (2018)	Ghana	678	Kintampo Clinic hypertension patient	Strong benefit perception	Weak benefit perception	Anti-hypertensive medication adherence
Gtsadik <i>et al.</i> (2020)	Ethiopia	1030	Hypertensive patients at Bishoftu Hospital, Adama, Asella, Shashemene	Strong benefit perception	Weak benefit perception	Anti-hypertensive medication adherence

Table 3.  
Data of aOR and 95% CI in Cross-Sectional Primary Study on Perceived Benefit Impact on Adherence to Anti-hypertensive Medication Among Hypertensive Patients

(Author, year)	aOR	95% CI	
		Lower Limit	Upper Limit
Li <i>et al.</i> (2012)	0.95	0.58	1.56
Girma <i>et al.</i> (2014)	10.30	3.80	27.80
Yue <i>et al.</i> (2015)	1.06	0.84	1.33
Li dan Huang (2016)	0.31	0.12	0.76
Li <i>et al.</i> (2017)	1.91	1.26	2.90
Madebo <i>et al.</i> (2018)	7.10	3.10	15.70
Obirikorang <i>et al.</i> (2018)	1.81	1.21	2.77
Gtsadik <i>et al.</i> (2020)	1.09	0.82	1.46

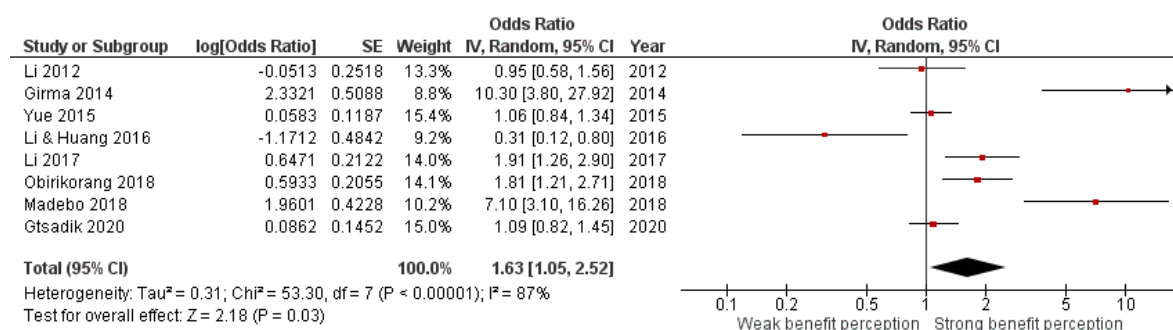


Figure 3: Forest plot - Perceived Benefit’s Effect on Adherence to Anti-Hypertensive Medication Among Hypertensive Patients

The findings reveal that an individual with a substantial perceived benefit is 1.63 times more likely to comply with anti-hypertensive medication when compared to someone with a weak perceived benefit. This difference was statistically significant with aOR= 1.63, 95% CI= 1.05 to 2.52, p= 0.030. Notably, the research data displayed substantial heterogeneity (I<sup>2</sup> = 87%; p <0.001), leading to the utilization of a random effects model in the analysis (see Figure 3).

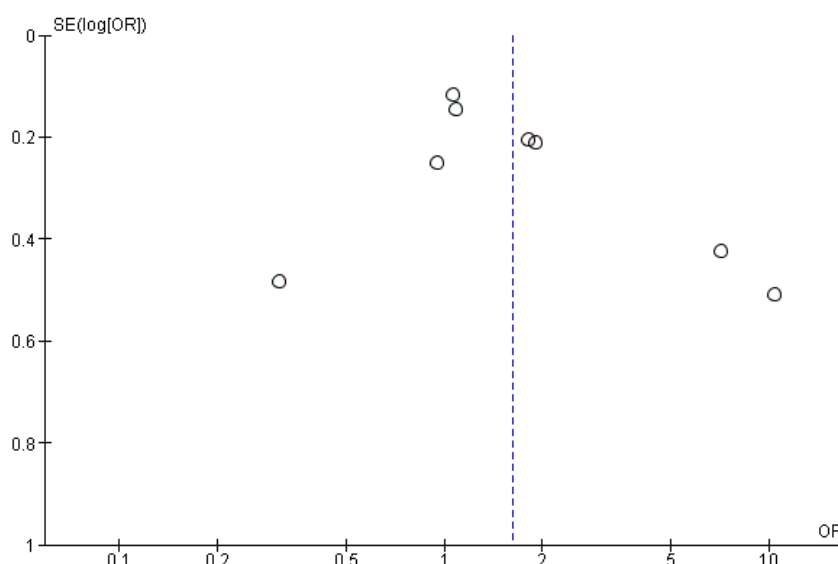


Figure 4: Funnel plot - Impact of Perceived Benefit on Compliance with Anti-Hypertensive Medication in Hypertensive Patients

Figure 4 displays that the spread of effect appraisals from the primary study meta-analysis is skewed more towards the right side of the estimated mean vertical line than the left. This skew suggests the presence of publication bias. As the publication bias correlates with the direction of the diamond shape in the forest plot, it tends to overestimate the impact of the actual perceived benefit on compliance with anti-hypertensive medication in hypertensive patients.

Table 4.

PICO Description in the Cross-Sectional Primary Study on the impact of Cues to Action on Adherence to Hypertensive Medication Among Hypertensive Patients

Author (years)	Country	Sample	P	I	C	O
Gtsadik <i>et al.</i> (2020)	Ethiopia	1030	Hypertensive patients at Bishoftu Hospital, Adama, Asella, Shashemene	Get a cue to action	Not getting a cue to act	Anti-hypertensive medication adherence

Author (years)	Country	Sample	P	I	C	O
Hareri dan Abebe (2012)	Ethiopia	1700	Hypertensive patients at Tikur Anbesa Special Kidney Unit Hospital	Get a cue to action	Not getting a cue to act	Anti-hypertensive medication adherence
Hareri <i>et al.</i> (2013).	Ethiopia	286	Hypertensive patient at Black Lion Hospital Addis Ababa, Ethiopia	Get a cue to action	Not getting a cue to act	Anti-hypertensive medication adherence
Yue <i>et al.</i> (2015).	Cina	256	Outpatient hypertension patient at Shanghai Hospital, China	Get a cue to action	Not getting a cue to act	Anti-hypertensive medication adherence
Helal <i>et al.</i> (2019).	Mesir	350	Mansoura outpatient polyclinic hypertension patient	Get a cue to action	Not getting a cue to act	Anti-hypertensive medication adherence
Obirikorang <i>et al.</i> (2018)	Ghana	678	Kintampo Clinic hypertension patient	Get a cue to action	Not getting a cue to act	Anti-hypertensive medication adherence
El-Nahhas <i>et al.</i> (2019)	Mesir	409	Hypertensive patient at Sohag University Hospital	Get a cue to action	Not getting a cue to act	Anti-hypertensive medication adherence

Table 5.  
Data of aOR and 95% CI in the Cross-Sectional Primary Study on Cues to Action’s Effect on Compliance with Anti-Hypertensive Medication Among Hypertensive Patients

(Author, year)	aOR	95% CI	
		Lower Limit	Upper Limit
Gtsadik <i>et al.</i> (2020)	0.89	0.69	1.15
Hareri dan Abebe (2012)	2.84	1.47	5.50
Hareri <i>et al.</i> (2013)	2.84	1.47	5.49
Yue <i>et al.</i> (2015)	1.30	1.02	1.66
Helal <i>et al.</i> (2019)	2.25	1.40	3.50
Obirikorang <i>et al.</i> (2018)	0.59	0.38	0.90
El-Nahhas <i>et al.</i> (2019)	2.94	1.53	5.55

Figure 5 illustrates that individuals who possess cues to act exhibit a 1.58-fold more significant likelihood of adhering to anti-hypertensive treatment than those lacking such cues. This difference attains statistical significance (aOR= 1.58; 95% CI = 1.04 to 2.40; p= 0.030). Notably, the research data displayed marked heterogeneity ( $I^2 = 86\%$ ;  $p < 0.001$ ), necessitating the utilization of a random effects model (Figure 5).

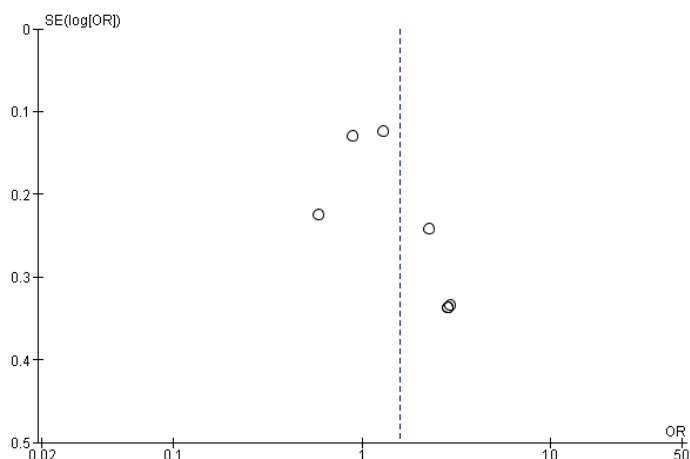


Figure 5: Forest Plot - Effect Cues to Action on Compliance with Anti-Hypertensive Medication among Hypertensive Patients

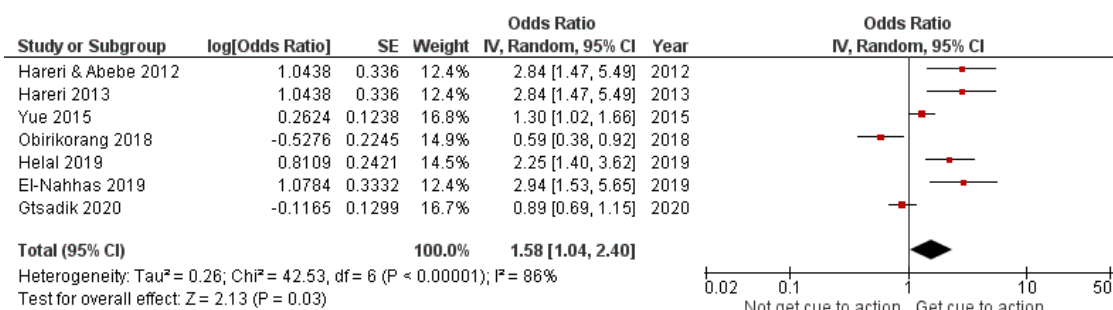


Figure 6: Funnel plot – The Effect of Action Cues on Compliance with Anti-Hypertensive Medication among Hypertensive Patients

Effect estimates from the primary study's meta-analysis are displayed in Figure 6, which shows a notable skew to the right of the estimated mean vertical line and less representation to the left. There may be publication bias present based on this skewed distribution. This bias is typically seen on the right side of the mean vertical line, where it corresponds with the forest plot's diamond-shaped sign. It frequently leads to an overestimation of the true influence of action cues on hypertension patients' adherence to anti-hypertensive medication.

Table 6.

Data of aOR and 95% CI in the Cross-Sectional Primary Study on the Effect of Perceived Susceptibility on Adherence to Anti-Hypertensive Medication among Hypertensive Patients

(Author, year)	aOR	95% CI	
		Lower Limit	Upper Limit
Findlow <i>et al.</i> (2015)	2.71	0.93	7.95
Kamran <i>et al.</i> (2014)	3.10	2.00	4.80
Kasmaei <i>et al.</i> (2015)	2.37	0.96	6.23
Khorsandi <i>et al.</i> (2017)	2.02	1.81	2.26
Mariyasoosai <i>et al.</i> (2016)	0.27	0.08	0.92
Obirikorang <i>et al.</i> (2018)	3.05	2.20	4.25
Yue <i>et al.</i> (2015)	1.82	1.20	2.76

Table 7.

PICO Description in the Cross-Sectional the Primary Study on the Effect of Perceived Susceptibility on Adherence to Anti-Hypertensive Medication Among Hypertensive Patients

Author (years)	Country	Sample	P	I	C	O
Findlow <i>et al.</i> (2015)	The US	95	Hypertension Patient	High Perception of susceptibility, severity, benefits, and self-efficacy	Low Perception of susceptibility, severity, benefits, and self-efficacy	Changes in behavior for medication adherence
Kamran <i>et al.</i> (2014)	Iran	671	Hypertension Patient	High Perception of susceptibility, severity, benefits, barriers, and self-efficacy	Low Perception of susceptibility, severity, benefits, barriers, and self-efficacy	Changes in behavior for medication adherence
Kasmaei <i>et al.</i> (2015)	Iran	125	Hypertension Patient	High Perception of susceptibility, severity, benefits, and self-efficacy	Low Perception of susceptibility, severity, and benefits.	Changes in behavior for medication adherence
Khorsandi <i>et al.</i> (2017)	Iran	100	Elderly hypertensive patients	High Perception of susceptibility, severity, benefits, and self-efficacy	Low Perception of susceptibility, severity, benefits, and self-efficacy	Changes in behavior for medication adherence
Mariyasoosai <i>et al.</i> (2016)	Thailand	227	Outpatient Hypertension	High Perception of susceptibility and barriers	Low Perception of susceptibility and barriers	Changes in behavior for medication adherence
Obirikorang <i>et al.</i> (2018)	Ghana	678	A hypertensive patient diagnosed by a doctor	High Perception of susceptibility, severity, benefits, and barriers	Low Perception of susceptibility, severity, benefits, and barriers	Changes in behavior for medication adherence
Yue <i>et al.</i> (2015)	China	232	Hypertension Patient	High Perception of susceptibility, severity, benefits, and self-efficacy	Low Perception of susceptibility and self-efficacy	Changes in behavior for medication adherence

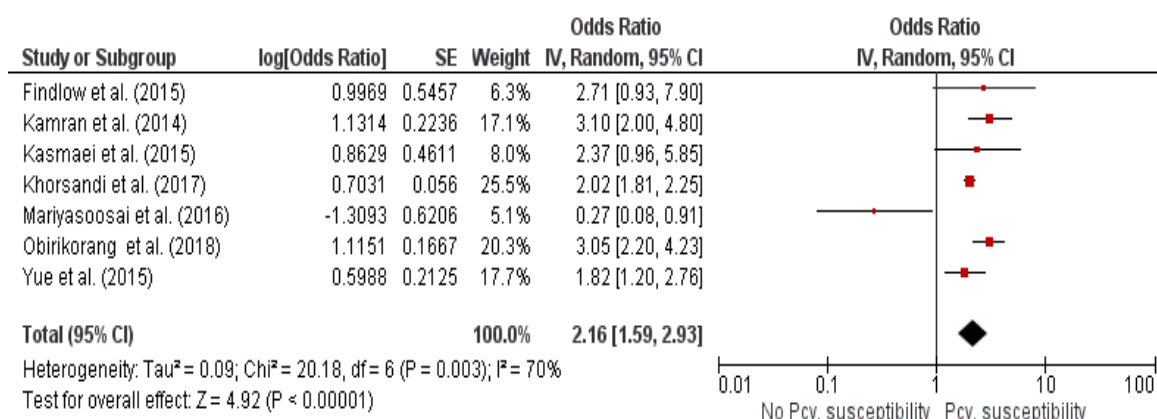


Figure 7: Forest plots - Effect of Perceived Susceptibility on Compliance with Anti-hypertensive Medication Among Hypertensive Patients

The finding suggests that individuals with perceived vulnerability are 2.16 times more inclined to comply with anti-hypertensive treatment than those without susceptibility,

and this difference attains statistical significance (aOR = 2.16; 95% CI = 1.59 to 2.93;  $p < 0.001$ ). Moreover, the research data exhibited moderate heterogeneity ( $I^2 = 70\%$ ;  $p < 0.001$ ), leading to the use of a random effects model (see Figure 7).

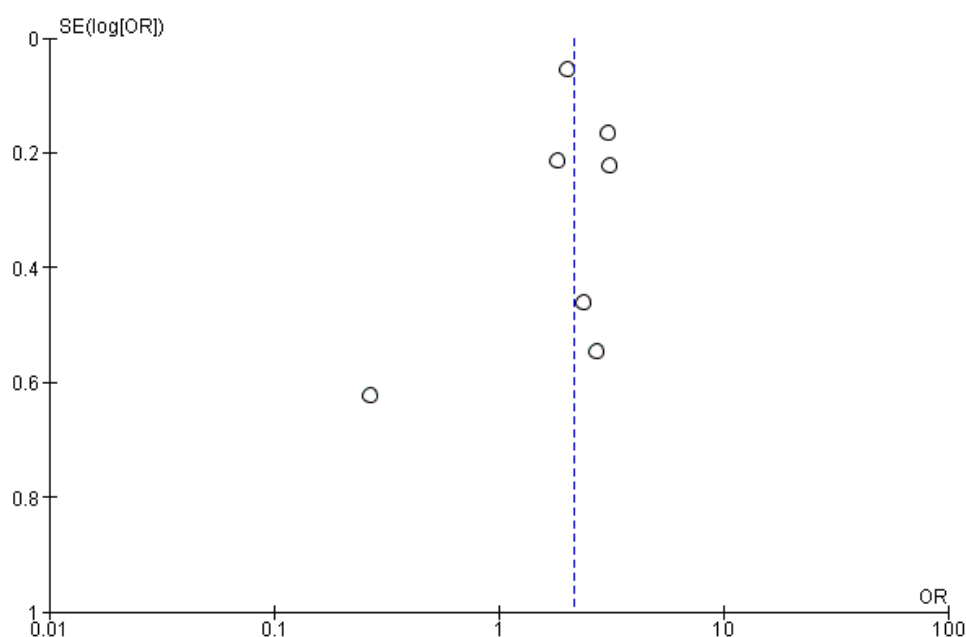


Figure 8: Funnel plot - Effect of Perceived Susceptibility on Compliance with Anti-hypertensive Medication among Hypertensive Patients

The finding suggests that individuals with perceived vulnerability are 2.16 times more inclined to comply with anti-hypertensive treatment than those without susceptibility, and this difference attains statistical significance (aOR = 2.16; 95% CI = 1.59 to 2.93;  $p < 0.001$ ). Moreover, the research data exhibited moderate heterogeneity ( $I^2 = 70\%$ ;  $p < 0.001$ ), leading to the use of a random effects model (see Figure 7).

## DISCUSSION

This comprehensive review and meta-analytical research focus on the impact of the HBM framework concerning compliance with anti-hypertensive medication in hypertensive patients. This research is vital for supporting patients in their treatment and promoting perceptions of benefits, resulting in cues to action to improve medication adherence. Its pertinence is especially pronounced among hypertensive individuals reliant on antihypertension drugs. The meta-analysis of 12 articles revealed statistically significant increases in medication adherence for cues to act (aOR= 1.63; 95% CI= 1.05 to 2.52;  $p= 0.030$ ), overall adherence (aOR= 1.63; 95% CI= 1.05 to 2.52;  $p= 0.030$ ), and perceived vulnerability (aOR = 2.16; 95% CI = 1.59 to 2.93;  $p < 0.001$ ) among hypertensive patients.

Applying HBM in understanding adherence to anti-hypertensive medication provides valuable insights into the factors influencing patient decisions and behavior regarding medication adherence. (Adinkrah et al., 2020) Studies have shown that patients who perceive themselves to be prone to hypertension-related complications and perceive hypertension as a severe health condition are more likely to adhere to their anti-hypertensive drug regimen. As an illustration, individuals who hold the belief that uncontrolled high blood pressure can engender severe health consequences, such as heart disease, stroke, or kidney impairment,

exhibit heightened motivation to maintain their medication regimen. Therefore, interventions aimed at increasing patient awareness about the potential severity of hypertension and its complications can contribute to increasing treatment adherence rates.(Almatouq et al., 2023).

Perceived vulnerability refers to an individual's beliefs about their vulnerability to a particular health condition or its complications.(Long et al., 2018) In the context of hypertension, patients who perceive themselves as vulnerable to the adverse effects of high blood pressure are more likely to recognize the importance of medication adherence. They understand that non-compliance can result in serious health consequences, such as heart disease, stroke, kidney damage, or other cardiovascular complications (Care et al., 2022). Healthcare providers are essential in helping patients understand the severity of hypertension and its implications. By providing education, discussing potential complications, and emphasizing the importance of medication adherence, healthcare professionals can increase patient awareness of the seriousness of their condition, thereby motivating them to adhere to prescribed treatment regimens.(Paczkowska et al., 2021)(Alves et al., 2022).

Understanding the perceived benefits of adhering to anti-hypertensive medication is a crucial factor that significantly influences the behavior of patients when it comes to medication adherence. This insight comes from research conducted by Li et al. in 2012, which sheds light on the pivotal role that the awareness of medication adherence benefits plays in shaping patient behavior. Patients who possess a clear understanding of the advantages of adhering to their prescribed anti-hypertensive regimen, including improved blood pressure control, a reduced risk of complications, and overall better health outcomes, demonstrate a higher likelihood of consistently following their prescribed treatment plan. This underscores the inherent connection between patient knowledge of the positive effects of medication adherence and their commitment to the regimen.

Healthcare providers hold a vital responsibility in ensuring that patients are well-informed about these benefits and the significance of long-term adherence for the effective management of hypertension.(Green et al., 2020) It is incumbent upon healthcare professionals to communicate, in a clear and persuasive manner, the positive outcomes associated with medication adherence. By doing so, they can empower patients with the knowledge needed to make informed decisions about their healthcare. Emphasizing the long-term commitment to medication adherence as a fundamental component of optimal hypertension management is essential. This communication and education process serves as a cornerstone in promoting patient engagement and empowering individuals to take an active role in their health, ultimately contributing to better health outcomes and improved hypertension management.

Understanding the potential positive impact of medication adherence will empower individuals to take control of their health and make informed decisions. This Perception of benefit will help one recognize the direct correlation between adherence and achieving the desired health outcome. The perceived benefits act as a driving force, providing motivation and incentives to individuals to consistently take medication as prescribed.(Heydari et al., 2014). Cues to action can trigger patients to initiate and maintain medication adherence. Healthcare provider recommendations, reminders, and educational interventions can serve as cues for effective action for hypertensive patients. Providing clear instructions, reminders through multiple channels (e.g., phone calls, messages, or mobile apps), and regular follow-up visits can significantly increase compliance rates. In addition, involving family members or caregivers in the drug management process can also act as an essential cue to act for

patients.(Pouya Nematzad et al., 2018).

Cues to action are essential in promoting adherence to anti-hypertensive medication because they serve as triggers or drives that motivate individuals to initiate and maintain treatment. By leveraging cues to action, healthcare providers and individuals can build an environment that supports adherence to anti-hypertensive medication. Reminders, recommendations from health care providers, education, and social support systems all contribute to strengthening the importance of adherence, reducing forgetfulness, and fostering commitment to treatment.(Tsadik et al., 2020)

## CONCLUSION

This study investigates the impact of HBM components, such as perceived benefits and cues of action, on hypertensive medication adherence across various populations, including Vietnam, Taiwan, China, Ethiopia, Egypt, and Ghana. In addition, the study emphasizes the need for healthcare professionals to concentrate on medication adherence among patients to mitigate the risk of hypertension-related problems.

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