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Effectiveness of the COM-B Model Application in Hypertension Management; a Systematic Review

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Authors
Abidah A.*[1] *RN*
Sukartini T.[2] *PhD*
Mariyanti H.[3] *PhD*

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[1]Faculty of Nursing, Airlangga University, Surabaya, Indonesia
[2]Department of Advanced Nursing, Faculty of Nursing, Airlangga University, Surabaya, Indonesia
[3]Department of Basic Nursing, Faculty of Nursing, Airlangga University, Surabaya, Indonesia

Correspondence
Address: Faculty of Nursing, Airlangga University, Soekarno Street, Surabaya, Indonesia. Postal Code: 60115
Phone: +62 (859) 56661432
aqmarina.abidah-2024@fkp.unair.ac.id

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ABSTRACT

Aims This systematic review aims to identify the effectiveness of the COM-B-based intervention model on hypertension management behavior and to explore the barriers and facilitators of COM-B interventions in changing hypertension behavior.

Information & Methods This systematic review uses the PRISMA guide. The databases of Scopus, PubMed, ProQuest, and Web of Science were searched from January 2015 to April 2025. The search strategy uses keywords and Boolean operators. The selection of articles is based on the research's inclusion and exclusion criteria. This study used the Joanna Briggs Institute Critical Appraisal Checklist to assess the quality of the included studies.

Findings Twelve studies involving 1,961 participants from China, the United States, Uganda, Nepal, India, and Ghana were included. 5 quantitative articles showed that COM-B-based interventions had clinical significance in terms of blood pressure values and behavioral significance, including blood pressure control, self-management, dietary patterns, and others. 7 qualitative articles report on barriers and facilitators to behavior change, including low health literacy, medical costs, pill fatigue, and social factors. Meanwhile, facilitators of behavior change are family support, interactive education, and treatment facilities such as digital reminders.

Conclusion The COM-B model is effectively used to evaluate barriers and facilitators to the performance of health behaviors. Identified barriers and facilitators can be used to develop COM-B-based behavior change interventions. Behavioral changes are evident in the results of COM-B-based intervention research, which significantly influence clinical outcomes.

Keywords Behavior Change Techniques; Hypertension; Self-Management; Systematic Review

CITATION LINKS

[1] The global epidemiology of ... [2] Korea hypertension fact sheet 2023 ... [3] Factors associated with antihypertensive medication ... [4] Comprehensive effects of lifestyle reform ... [5] Closing the gap in global ... [6] Indonesian health ... [7] Barriers and facilitators of medic ... [8] Unmeet need for healthcare among ... [9] Overview of the evolution of hypertension ... [10] Analysis of the effectiveness of posbindu ... [11] The behaviour change wheel: A new ... [12] The impact of a walking program ... [13] Implementation of evidence-based PCOS ... [14] Using the COM-B model to identify ... [15] Barriers and facilitators for treatment ... [16] The use of the capability-opportunity ... [17] Effects of an exercise intervention ... [18] PRISMA2020: An R package and shiny ... [19] Development of a health behavioral digital ... [20] Hypertension self-management in socially ... [21] Effectiveness of a BCW-based interactive ... [22] Improved hypertension control at six ... [23] Effects of an individualized mHealth-based ... [24] Barriers and facilitators to cognitive ... [25] Engaging patients in population-based ... [26] Exploring barriers to medication adherence ... [27] Physician perceived barriers and facilitators ... [28] Barriers and facilitators of hypertension ... [29] A brief introduction to the COM-B ... [30] A qualitative study on barriers to ... [31] Health literacy in relation to health ... [32] Factors associated with perceived behavioral ... [33] The effect of providing health education ... [34] Exploring the interplay of motivation ... [35] People underestimate their capability ... [36] Forgetfulness to take antihypertensive medications ... [37] Adherence to antihypertensive medication and ... [38] Text messaging to improve retention ... [39] Barriers to knowledge, treatment, and ... [40] Enhancing therapy adherence: Impact ... [41] Blood pressure control, accessibility, and ... [42] Anti-hypertensive medication access and ... [43] Knowledge about hypertension and associated ... [44] Why are there different versions ... [45] Analysis of determinant factors affecting ... [46] Video or Text? Education through ... [47] The effect of multimedia-based ... [48] Medication adherence and predictive factors ... [49] Motivation can improve medication adherence ... [50] The relationship between family support ... [51] Perceived familial support and medication ... [52] Social support and motivation were ...

Introduction

Hypertension is the main risk factor for various diseases, such as cardiovascular, brain, and kidney diseases, and death, but hypertension continues to increase globally [1, 2]. The continued increase in the incidence of hypertension is caused by the patient's ignorance that they have hypertensive disease and inadequate management of hypertension in patients who have been diagnosed [3]. Inadequate adherence behaviors in people with hypertension contribute to increased complications, risk of cardiovascular disease, and worsening clinical outcomes [4].

More than 1.3 billion adults in the world have high blood pressure, and hypertension has a major role in causing 5 million deaths in the world [5]. The prevalence of hypertension in Low- and Middle-Income Countries (LMICs) is 31.5%, which is higher than in high-income countries (28.5%) [1]. The Indonesian health survey in 2023 shows that 34.11% of hypertension cases are diagnosed by doctors [6]. 36.4% of people with hypertension regularly take medication, and 16.9% do not take hypertension medication [6].

These figures show that medication adherence is difficult to achieve when patients lack an understanding of compliance and when interventions are not developed based on factors that affect compliance [3]. In addition, hypertension management behavior is also influenced by low medication literacy, poorly perceived treatment outcomes, and reluctance to comply [7]. Hypertension management behavior is influenced by internal and external factors. However, often the treatment of hypertension provided by health services does not include both at the same time. The researcher's opinion is strengthened by a study in Indonesia, which found that three-quarters of patients with hypertension have not met their health care needs [8]. Hypertension management is generally provided more in primary services, as they have a large volume of patients, allowing education to be delivered in a short time [9]. One effort to treat hypertension in Indonesia is the Integrated Development Post for Non-Communicable Diseases (Posbindu PTM), but some Posbindu PTMs do not achieve satisfactory results due to suboptimal implementation of socialization, counseling for non-communicable diseases, and referral systems, which can lead to hypertension becoming uncontrollable [10].

The COM-B model-based intervention involves developing interventions to improve health behavior change by considering the barriers and facilitators people with hypertension face. The COM-B model's flexibility in adjusting intervention strategies can lead to long-term behavioral changes [11]. This model forms the core of the Behavior Change Wheel (BCW), a comprehensive framework for designing interventions [11]. While the COM-B model has been applied to various chronic conditions [12-14], its consolidated evidence specifically for hypertension—a condition heavily dependent on daily self-management behaviors—remains unexplored.

Studies on the application of the COM-B model in designing behavior change interventions and in identifying barriers and supports for people with chronic diseases have been widely conducted [12, 13, 15-17]. However, this systematic review will fill a critical knowledge gap by synthesizing evidence on how COM-B-based interventions target these components to improve hypertension outcomes. Therefore, this review aims to synthesize evidence on the effectiveness of COM-B model-based interventions in improving hypertension management behaviors and outcomes.

Information and Methods

This systematic review used the PRISMA guidelines to conduct a literature search, screening, feasibility assessment, and synthesis of articles. The research questions were prepared using the PICOS framework (Table 1).

Table 1. PICOS (Population, Intervention, Comparison, Outcome, Study Design) framework

PICOS	Concept
Population	Adults diagnosed with hypertension
Intervention	Interventions that explicitly mention the use of the COM-B model or the Behavior Change Wheel (BCW) in the implementation of the intervention
Comparison	Standard care
Outcomes	Health behaviors, medication adherence, lifestyle modification, clinical outcomes, health literacy, and blood pressure control
Study design	Randomized Controlled Trial (RCT), quasi-experiment, qualitative studies

The literature sources used as references for the articles come from four databases; Scopus, PubMed, ProQuest, and Web of Science. The research inclusion criteria were studies published from January 2015 to April 2025, in English or Indonesian, with full text, with a population aged>18 years, and that complied with the PICOS framework. Non-original articles (protocols, pilot, cross-sectional, case, retrospective, and reviews) were excluded. Literature search was conducted using keywords based on Medical Subject Heading (MeSH) in the form of "hypertension", "hypertensive", “high blood pressure", "blood pressure", "COM-B Model", "behaviour change wheel", "BCW", "Michie's Mode", and using boolean operators ("AND", "OR"; Table 2).

Data selection was carried out using the Rayyan tool. All references were imported into Rayyan, and the selection process began with the elimination of duplicate articles and the identification of eligible articles according to inclusion and exclusion criteria. Data were extracted using a standardized form that captured publication year, study design, population characteristics, intervention details, methodology, outcomes, and key findings (Figure 1).

Table 2. Searching strategy

Database	Search query
Scopus (54)	Article title, abstract, keywords ((com-b OR BCW OR Michie's) AND (hypertension OR hypertensive OR blood-pressure))
PubMed (76)	((Hypertension OR Hypertensive OR High Blood Pressure OR Blood Pressure) AND (COM-B Model OR Behaviour Change Wheel OR BCW OR Michie's Model))
Proquest (25)	Abstract (Hypertension OR Hypertensive OR High Blood Pressure OR Blood Pressure) AND abstract (COM-B Model OR Behaviour Change Wheel OR BCW OR Michie's Model)
Web of Science (167)	((Hypertension OR Hypertensive OR High Blood Pressure OR Blood Pressure) AND (COM-B Model OR Behaviour Change Wheel OR change wheel OR BCW OR Michie's Model OR Capability Opportunity Motivation))

The quality assessment of the research methodology was carried out using a critical appraisal tool developed by the Joanna Briggs Institute (JBI) to evaluate the quality of the articles used and to avoid potential biases. RCTs were appraised using the JBI checklist for randomized trials, quasi-experimental studies with the quasi-experimental checklist, and qualitative studies with the corresponding qualitative checklist. Only studies with a quality appraisal score of ≥75% were included in the final synthesis to ensure the robustness of the evidence (Table 3).

A narrative synthesis was performed due to the heterogeneity of the interventions and outcomes. Studies were grouped by intervention type (digital, community-based, educational). Findings were mapped onto the COM-B components to identify which capabilities, opportunities, and motivations were targeted and how they influenced behavior and outcomes. Thematic analysis was used to synthesize qualitative findings on barriers and facilitators.

Table 3. Critical appraisal (- : Unclear; X = No; √ = Yes)

Study	Study design	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Score
Sun *et al.*	Randomized Control Trial	√	√	√	X	X	√	√	√	√	√	√	√	√	84.6%
Boulware *et al.*	Randomized Control Trial	√	√	√	X	X	√	√	√	√	√	√	√	√	84.6%
Zhang *et al.*	Quasi-experiment	√	√	√	√	√	√	√	√	√					100%
Chen *et al.*	Quasi-experiment	√	√	√	√	√	√	√	√	√					100%
Muddu *et al.*	Quasi-experiment	√	√	√	√	√	√	√	√	√					100%
Kanyike *et al.*	Qualitative research	√	√	√	√	√	√	√	√	-	√				90%
Muwanguzi *et al.*	Qualitative research	√	√	√	√	√	√	√	√	√	√				100%
Park *et al.*	Qualitative research	√	√	√	√	√	-	-	√	√	√				80%
Fang *et al.*	Qualitative research	√	√	√	√	√	√	√	√	√	√				100%
Bhandari *et al.*	Qualitative research	√	√	√	√	√	√	√	√	√	√				100%
Gondi *et al.*	Qualitative research	√	√	√	√	√	√	√	√	√	√				100%
Mishra *et al.*	Qualitative research	√	√	√	√	√	√	√	√	√	√				100%

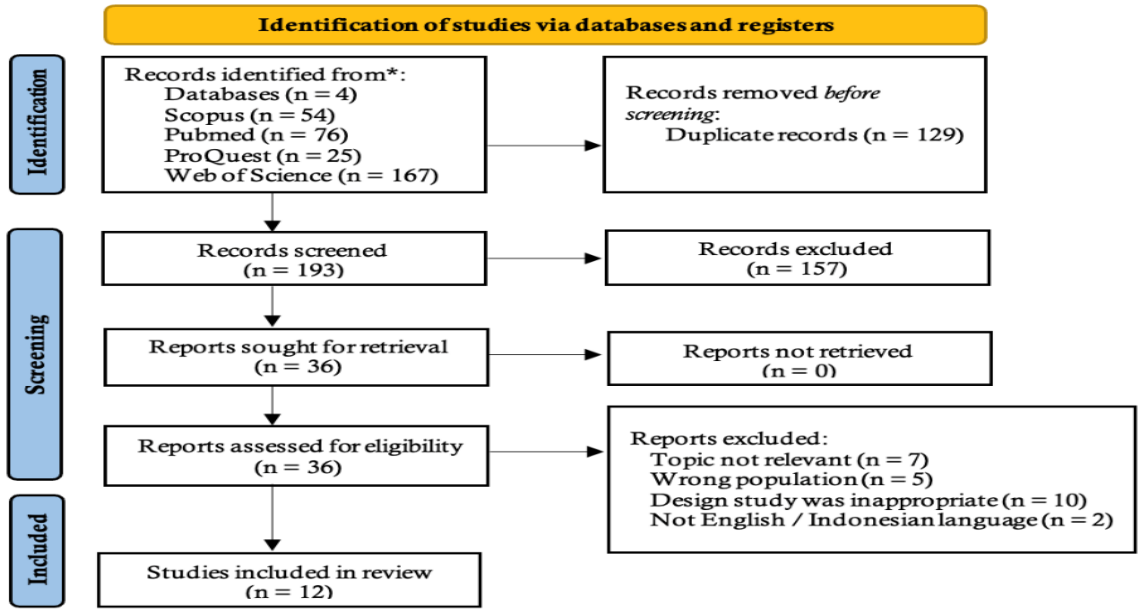

Figure 1. Diagram flow PRISMA [18]

Findings

This systematic review included 12 studies (5 quantitative and 7 qualitative) involving 1,961 respondents from the United States, China, Ghana, India, Nepal, and Uganda (Table 4).

COM-B-based interventions demonstrated a clinically significant reduction in systolic blood pressure, with decreases ranging from 7.36 to 11.3 mmHg [19-22]. Additionally, significant diastolic blood pressure reductions were observed in merely two of the included studies [21, 22]. COM-B-based interventions yielded significant results in health behavior change. Three studies reported improvements in blood pressure control, with one

study demonstrating an increase from 36% (baseline) to 52% (12 months) [19, 20, 22]. Additionally, two studies reported improvements in self-management behavioral capabilities [20, 21]. Evidence from two studies indicated that COM-B-based interventions effectively improved adherence to physical activity [19, 23]. Dietary improvements, including adherence to DASH-style diets, were reported as positive health behavior changes in two studies [19, 23]. Furthermore, interventions in two other studies were effective in enhancing quality of life, health literacy, and self-efficacy [21, 23].

This study found that the obstacles within the capability component, namely the lack of health worker training [24] and patient health literacy, remain relatively low [15]. In the opportunity section, there are obstacles in the limited access to medical equipment and treatment [25], short consultation time for health workers [26], and limitations on the cost of drugs and treatments [27, 28]. Then, the motivation of hypertensive patients is influenced by the social and family environment [15], as well as the patient's fatigue to continuously take medication (pill fatigue) and the patient's fear of drug side effects [16].

Table 4. Summary of quantitative (5 titles) and qualitative (7 titles) research

Study/Location	Design	Intervention	Results
Sun *et al.*, 2024 [19]/China	Randomized Control Trial (68 samples)	WeChat-based education in the form of Health Behavioral Digital Intervention for Hypertensive Patients (HBDIHP) about exercise, DASH diet, medication, and blood pressure monitoring	1. Increased adherence to weekly exercise time, medication, and frequency of blood pressure monitoring 2. Improvement of the type and amount of food according to DASH 3. Decrease in systolic blood pressure 7.36 mmHg
Boulware *et al.*, 2020 [20]/United States	Randomized Control Trial (159 samples)	Community Health Worker (CHW) support with several combinations of interventions in the form of blood pressure monitors, exercises using monitor tools, joint decision-making skills training (DoMyPART), and self-management problem-solving training	1. Improved blood pressure control from 36% (baseline) to 52% (12 months) across all groups 2. Significant reductions in systolic blood pressure across all groups (mean decreases: 7.4 to 11.3 mmHg) 3. Improvement of self-management behavior in the group given blood pressure monitoring interventions, exercises using monitor tools, and self-management problem-solving training (problem-solving)
Zhang *et al.*, 2025 [21]/China	Quasi-experiment (110 samples)	Interactive Pictorial Health Education uses conversation maps, which are image-based interactive educational media with material on complication prevention, treatment, diet, exercise, and blood pressure monitoring, as well as follow-up	1. Increased health literacy 2. Decrease in systolic and diastolic blood pressure 3. Improved self-management behavior 4. Improved quality of life
Muddu *et al.*, 2022 [22]/Uganda	Quasi-experiment (1015 samples)	WHO HEARTS-based strategy in the form of health education, lifestyle counseling, routine hypertension screening, evidence-based treatment protocols, availability of free hypertension medications, hypertension monitoring, and evaluation tools	1. Increase in hypertension control from 9.3% to 74.1% 2. Decrease in systolic 22.0 mmHg ($p<0.001$) and diastolic blood pressure 12.4 mmHg ($p<0.001$)
Chen *et al.*, 2023 [23]/China	Quasi-experiment (138 samples)	The mHealth intervention is a WeChat education mini program consisting of individual diet and physical activity recommendations, daily recording of diet and physical activity, consultation, and follow-up	1. Improvement in health behaviors, including physical activity and diet 2. Increased self-efficacy 3. Improved quality of life 4. Increased time, cost, and labor efficiency in healthcare
Bhandari *et al.*, 2021 [15]/Nepal	In-depth interview, Focus Group Discussion (41 samples)	Education, text messaging (TEXT4BP), community campaigns	Theme (Opportunity, Motivation); Category (Access to treatment, fear of complications)
Park *et al.*, 2023 [16]/United States	Semi-structured and open-ended questions (14 samples)	Text messages, reminder apps (Medisafe)	Theme (Capability); Category (Forgetting to take medicine, fatigue from taking medicine)
Muwanguzi *et al.*, 2023 [24]/Uganda	In-depth interview, semi-structured interview (20 samples)	-	Theme (Opportunity); Category (Lack of training)
Fang *et al.*, 2022 [25]/United States	Observation, interview (332 samples)	Communication training, health portals	Theme (Opportunity); Category (Cost of medicines)
Mishra *et al.*, 2021 [26]/India & Ghana	In-depth interview, Focus Group Discussion (35 samples)	Family education, SMS reminders, and financial aid	Theme (Opportunity, Motivation); Category (Medical expenses, desire for treatment)
Gondi *et al.*, 2021 [27]/United States	Semi-structured interview (17 samples)	Patient education, MyChart portal, and financial incentives	Theme (Opportunity); Category (Cost of blood pressure monitoring)
Kanyike *et al.*, 2024 [28]/Uganda	In-depth interview, Focus Group Discussion (12 samples)	-	Theme (Capability, Opportunity); Category (Limited knowledge, inadequate facilities)

Discussion

A synthesis was carried out to identify barriers and facilitators of behavior change based on research on hypertension management interventions using the COM-B (Capability, Opportunity, Motivation) model, and to analyze behavior change strategies by identifying barriers and facilitators. The COM-B model is a behavioral model that aims to support the development of behavior change interventions by identifying desired [29]. Low knowledge of diseases and treatment reflects capabilities that can inhibit the formation of behavior change in hypertension management [25].

Studies in Ghana and India found that patients' understanding of the disease was a major barrier to adherence [27]. In addition, poor capabilities are exacerbated by misconceptions about hypertension, which are also an obstacle to optimal blood pressure control [30]. A common misconception is the understanding that hypertension treatment and control do not need to be done if there are no complaints. Individual capabilities are inseparable from the level of health literacy they have. Previous systematic reviews have found that low health literacy is associated with limited understanding of hypertension and impacts health outcomes [31]. Deficits in health literacy (Capability) directly impede accurate illness perceptions and self-management skills, which is consistent with cognitive theories of health behavior [32]. Health literacy problems can be addressed through education grounded in the COM-B model. Studies using interactive educational media on physical activity, diet, medication, blood pressure monitoring, and complication prevention are effective in improving health literacy and hypertension self-management behaviors in peri-urban areas of China [21]. Providing education can increase perceptions of individual seriousness, which can be a factor in improving treatment [33].

Providing education is one of the intervention strategies to improve capabilities. A lack of understanding of the disease will affect the response to treatment and the patient's motivation to make behavior changes. This is because COM-B affects each of its components.

As capabilities increase, motivation will increase as well. Motivation plays a big role in the human learning process. Motivation to develop knowledge in individuals is accompanied by positive emotions, leading to greater capabilities [34]. Capability will create a feeling of ability and confidence in individuals to do something [29]. Unfortunately, individuals often underestimate their ability to maintain intrinsic motivation without extrinsic incentives when performing long-term, repetitive work [35]. Examining this, encouragement from the surrounding environment and health workers to convince individuals of their capabilities is deemed necessary.

Other obstacles are forgetting to take medication and feeling bored with taking medication continuously [16]. Forgetting to take medication is among the cognitive problems that constitute an obstacle to the capability component. Forgetting is related to the length of time they have had hypertension; Patients who have had hypertension for 1-5 years generally experience forgetfulness more often [36]. In line with that, patients who forget to take medication have lower adherence [37]. Extensive research has examined intervention strategies to address medication nonadherence, including reminders, follow-ups, and medication boxes. Reminder text messages have been widely used and proven effective in increasing patient retention in treatment in Low-Income Countries [38]. Other researchers highlighted the use of reminders via digital applications [16].

Capability is accompanied by the opportunity to form behavior, but several conditions hamper its formation when the individual lacks the opportunity. The cost of control and treatment is often an obstacle that causes patients to avoid health care [25, 28]. This condition certainly affects the size of the opportunity for hypertension sufferers to get treatment. In Latin America, economic factors hinder access to the health system, including the costs of transportation, appointments, and medicines [39]. On the other hand, non-compliance indirectly increases financial expenses related to the treatment of disease complications resulting from poor hypertension management [40]. Opportunity is an external factor that enables the formation of obedient behavior.

The COM-B model research in Low-Income Countries (LMICs) integrating HIV-hypertension services with the WHO HEARTS approach, which focuses on the provision of free medications, non-physician training, and blood pressure monitoring, showed an improvement in blood pressure control from 9.3% to 74.1% over 6 months [22]. There was a significant association between accessibility to hospital treatment and blood pressure control [41, 42]. Research in Northwest Ethiopia shows higher levels of knowledge among patients living near hospitals than among those living in more remote areas [43].

Opportunity is not always about the availability of health and medical facilities, but economic factors are also included. Even though free treatment is available, patients still cannot comply with the medication and health information if they experience problems with transportation costs. Several COM-B intervention studies were conducted to improve patient opportunities by providing digital education through a community approach. Research in the United States involved Community Health Worker (CHW) support to provide joint decision-making skills training (DoMyPART) and self-management problem-solving training [20]. The intervention is considered highly innovative in increasing patients' opportunities to solve the problems they face.

Similar to capability, opportunity is a component that influences motivation. If an individual has strong capabilities but lacks the opportunity, the motivation to make a behavior change cannot be realized. A behavior arises from the interaction between a person's 'capability' to perform a behavior and the 'opportunity' and 'motivation' to perform that behavior [44]. Capabilities and opportunities influence the relationship between motivation and behavior. The more an individual feels capable of performing a behavior and is in a supportive environment, the more often motivation is present, so that the greater the individual's desire to do something [29].

Motivation involved in the selection of various behaviors concerns the extent to which behavior is possible [30]. Motivational barriers are illustrated by the results of a study that found that pill fatigue or medication fatigue and negative emotions have an impact on decreasing compliance of hypertension patients [16]. In addition, external factors also have a significant impact, such as the stigma related to hypertension that occurs in Nepal [15]. Patients sometimes choose to take medication because they are afraid of dying [15]. Fear of complications of illness and death is a facilitator that is formed to increase motivation for behavior change, so that the provision of information due to poor hypertension management behavior and disease case modeling is needed.

The study, which analyzed factors influencing medication adherence, found that the most dominant variable was motivation to seek treatment (p=0.0001), suggesting the need to develop educational strategies to increase motivation [45]. Some of the educational strategies used to improve intervention management include WeChat-based education [19, 23], education using conversation maps [21], education through campaigns [15], education via text messages [15], and direct education [20, 22]. One study found that the most effective method for providing primary prevention information about hypertension is using social media websites [46]. Meanwhile, other studies have found that providing multimedia information through videos and modules is highly effective in improving patient knowledge [47]. This illustrates that each individual has different abilities and comforts in using educational media.

Motivation factors, self-efficacy, and depression directly affected medication adherence [48]. Great motivation plays a significant role in increasing medication adherence; factors related to motivation include family support, understanding of treatment benefits, and confidence in managing hypertension [49]. There was a significant relationship between family support and knowledge of medication adherence (p=0.0001) [50]. Interventions such as motivational text messaging and family support [26] can increase reflective motivation and automatic motivation. Family presence, providing understanding, encouragement, and validation, is needed as emotional support for patients with hypertension [51]. Support from family can foster a person's confidence in obeying the rules or recommendations they must follow [52].

This study shows that COM-B-based interventions and multidisciplinary approaches have great potential for managing hypertension behaviors. However, long-term success requires adaptation to patient needs, social and family support, and support from health care providers and policymakers. In addition, there is still a need to explore the COM-B model in combination with interventions to achieve a more optimal impact on the wider population.

A key strength of the evidence synthesized in this review is the application of the robust COM-B theoretical framework across the included studies, such as a comprehensive COM-B model to identify and address barriers to behavior change in people with hypertension. This approach provides a holistic intervention that addresses capability, opportunity, and motivation, making it effective in improving medication adherence, blood pressure control, and quality of life. Several interventions, such as the use of digital technologies and community-based approaches (CHW), have shown effectiveness in improving medication adherence, blood pressure control, and health literacy. However, the studies analysed had some limitations, mostly being quasi-experimental or qualitative, which also limited the generalizability of the findings. This review is limited to English and Indonesian language studies, which may introduce language bias and omit relevant evidence from other linguistic contexts.

The findings of this review have direct implications for both clinical practice and future research. For health policymakers, integrating COM-B-based assessments into existing public health programs, such as Posbindu PTM (The Integrated Development Post for Non-Communicable Diseases), is recommended to systematically identify local barriers and tailor interventions, for instance, by subsidizing blood pressure monitors for low-income groups or training community health workers in motivational interviewing. For clinicians, adopting the COM-B model in patient consultations can provide a structured framework to quickly diagnose the root cause of non-adherence, whether it stems from a knowledge gap (capability), a financial or access barrier (opportunity), or a lack of motivation, thereby enabling more personalized and effective advice. To build upon this evidence, future research should prioritize conducting high-quality, large-scale randomized controlled trials with long-term follow-up to evaluate the sustained impact of multimodal COM-B interventions. Furthermore, studies should explore the adaptation and cost-effectiveness of these interventions in diverse, low-resource settings, such as rural Indonesia, and should use objective adherence measures, such as electronic pill monitors, to complement self-report data and minimize bias.

Conclusion

This review provides evidence supporting the COM-B model as a viable and effective framework for designing targeted hypertension management interventions. The findings advocate a paradigm shift from generic interventions to tailored, multi-component strategies that address specific deficits in capability, opportunity, and motivation within a given context. The COM-B model provides a structured approach to designing culturally relevant and sustainable interventions for hypertension management.

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