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DISCOVERY SCIENTIFIC SOCIETY

Systematic review of the impact of collaborative care on the progression of disease complications in the management of Hypertension in Asia

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ABSTRACT

Background: Asian countries exhibit a high prevalence of hypertension., substantially increasing the burden of cardiovascular diseases owing to variables such as lifestyle choices, eating habits, and genetic dispositions. *Objective:* The systematic review evaluates the effectiveness of collaborative care approaches in the treatment of hypertension and the corresponding complications, emphasizing the significance of interdisciplinary healthcare teams in enhancing patient outcomes. *Methodology:* The researchers conducted a systematic evaluation using several search engines to find intervention-based experimental studies. A comprehensive search was carried out using one or more of the following online databases: Web of Science, Google Scholar, Science Direct, Pro Quest, Pub Med, Research Gate, and Scopus. The research group conducted this systematic review following the "Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)" guidelines. *Results:* This review incorporated the latest research findings ranging from 2003 to 2023. The present review included a total of 20 studies that met the specified criteria out of 2334 studies. Interventions that involve collaboration among healthcare professionals, such as pharmacists, nurses, and dietitians in Asia, resulted in significant decreases in both systolic and diastolic blood pressure among individuals. We used the ZEE tool to evaluate the quality and relevancy of the research. *Conclusion:* The review demonstrates the effectiveness of the collaborative care framework and emphasizes the need for a multidisciplinary approach in educating patients.

Health care providers such as nurses, pharmacists, and dietitians play an important role in providing personalized guidance optimized to each patient's needs, which improves hypertension management.

Keywords: Hypertension, Disease complications, Blood pressure, Cardiovascular risk, collaborative care, hypertension in Asia

1. INTRODUCTION

Hypertension, also referred to as elevated blood pressure, is a major health problem that has a substantial impact on cardiovascular health. It is defined by elevated levels of blood pressure, with a systolic range of 120 to 139 mmHg and a diastolic range of 80 to 89 mmHg in the prehypertensive stage, impacting individuals of all age cohorts. The disease is a significant cause of premature death worldwide; Cardiovascular, diseases are the leading cause of death globally (Chang et al., 2021). According to data from the World Health Organization (WHO), 17.9 million deaths worldwide were attributed to cardiovascular diseases (CVDs) in 2019, making cardiovascular diseases the primary cause of death globally (Reddy and Mathur, 2021).

In addition, a recent World Heart Federation analysis showed that the number of deaths from CVD increased from 12.1 million in 1990 to 20.5 million in 2021. Approximately 80% of cardiovascular disease (CVD) casualties take place in low- and middle-income nations. The research highlighted that hypertension, atmospheric pollution, smoking, and increased levels of LDL cholesterol are significant factors leading to cardiovascular disease mortality (Lee and Hendriks, 2023). Hypertension, or high blood pressure, is influenced by several variables, including poor lifestyle habits such as an inadequate diet, insufficient physical exercise, and tobacco use. These behaviors not only elevate the likelihood of developing hypertension but also aggravate the difficulty of controlling it. Furthermore, the presence of stress, despair, and anxiety can negatively affect the regulation of blood pressure. Additionally, those with a genetic predisposition and those who are obese are at an even higher risk of developing elevated blood pressure (Shyuan et al., 2020).

In Asia, specifically in nations such as India, Pakistan, and China, there is a substantial incidence of hypertension. A considerable percentage of the population in these countries lacks an understanding of hypertension and does not have sufficient access to healthcare services (Jafar et al., 2009). Uncontrolled hypertension may result in severe problems, including life-threatening cardiovascular events such as heart disease and stroke. Although hypertension is a serious condition, it is frequently not detected, particularly in older persons, since it does not often cause noticeable symptoms. Early identification and therapy are crucial in preventing the spread of complications caused by this silent killer (Hari et al., 2021). Multidisciplinary care models have emerged as an effective strategy to manage hypertension and its related risks. These models emphasize the importance of a team approach in offering holistic treatment that tackles the multifaceted aspects of hypertension.

By focusing on collaborative care, these models aim to improve blood pressure control and reduce cardiovascular issues through patient education, support for lifestyle changes, and regular monitoring (Haghighat and Salehi, 2015). The high prevalence of hypertension in Asia, together with the growing incidence of cardiovascular diseases, highlights the immediate need for efficient treatment measures. This systematic study aims to investigate the influence of collaborative care on the progression of disease complications in the treatment of hypertension in Asia. The review seeks to analyze current research and data to emphasize the advantages of a cooperative approach and provide valuable insights on its successful implementation in various healthcare environments. The aim is to make a valuable contribution to the ongoing efforts to enhance the treatment of hypertension and ultimately reduce the global burden of cardiovascular diseases.

2. MATERIALS AND METHODS

The methodology for this systematic review primarily involved searching online databases to locate and identify a significant number of studies conducted on the impact of collaborative care in managing complicated cases of Hypertension in Asian regions: For this review, we actively searched through Science Direct, PubMed, Web of Science, Scopus, Directory of Open Access Journals, and ProQuest. We also conducted manual searches using Google Scholar. Furthermore, we evaluated the studies using the ZEE tool and ensured that the research protocols followed the principles outlined in the PRISMA flow statement.

The search terms used to locate these research studies included "Collaborative healthcare", "Integrated health care", "Management of uncontrolled hypertension", "Role of Pharmacist", "Role of Nurses", "Role of Physicians", "Role of nutritionists", "Therapeutic interventions for hypertension," "Pharmacological interventions for hypertension," "Lifestyle interventions for controlling hypertension", "Interventional approaches to hypertension management", "Nutritional interventions for hypertension", and "hypertension in Asia". The search included studies within the period, from 2003 to 2023. Out of the 2334 studies identified, we included only 20 in the systematic review based on their adherence to the inclusion criteria.

Inclusion Criteria

The inclusion criteria were as follows:
The studies were from Asia.
The studies included patients of hypertension (with or without complications).
The studies selected were intervention-based experimental studies.
The studies published were in English.

Exclusion Criteria

The Exclusion criteria were as follows:
Studies not conducted in Asia.
Studies that did not include hypertensive patients.
The studies involved alternative therapy methods, such as acupuncture, Ayurvedic, or homeopathic medicines.
The studies without before-and-after measurements of blood pressure.
Studies not published in English.

Data Extraction

The information gathered from these investigations included details on the authors, the country of the research, the year the study was conducted, the number of participants or the population involved, the structure of the study, the interventions implemented during the experiment, and the effects of these interventions on the participants' systolic and diastolic blood pressures. The ZEE tool served as a checklist for evaluating the quality of included studies.

Data Synthesis and Analysis

We paid particular attention to understanding the significance of healthcare workers in handling hypertension and its associated complications. We achieved this by carefully examining their interventions in the study and assessing their impact on different health indicators, including systolic and diastolic blood pressure, LDL cholesterol levels, triglyceride levels, and HbA1C levels. The findings and subsequent discussions underscored the beneficial effects of collaborative care in controlling hypertension.

3. RESULTS

Through searches in electronic databases, we discovered 2,334 original research articles in total following the removal of duplicates and unsuitable records, 1,645 articles underwent screening. We excluded 1,393 articles after reviewing their titles and abstracts for relevance to our keywords, leaving 252 studies for further consideration. We attempted to retrieve 252 of these studies, but could not access 103 studies; this included 63 conference proceedings and 53 case studies. Consequently, we reviewed 139 studies for suitability. The full texts of 15 studies were unavailable, we excluded 48 studies because they were published more than 20 years ago. Additionally, we excluded 56 studies that did not meet the inclusion criteria. Ultimately, we selected 20 research articles for inclusion in the review. For detailed data extraction information, refer to the PRISMA Chart depicted in (Figure 1).

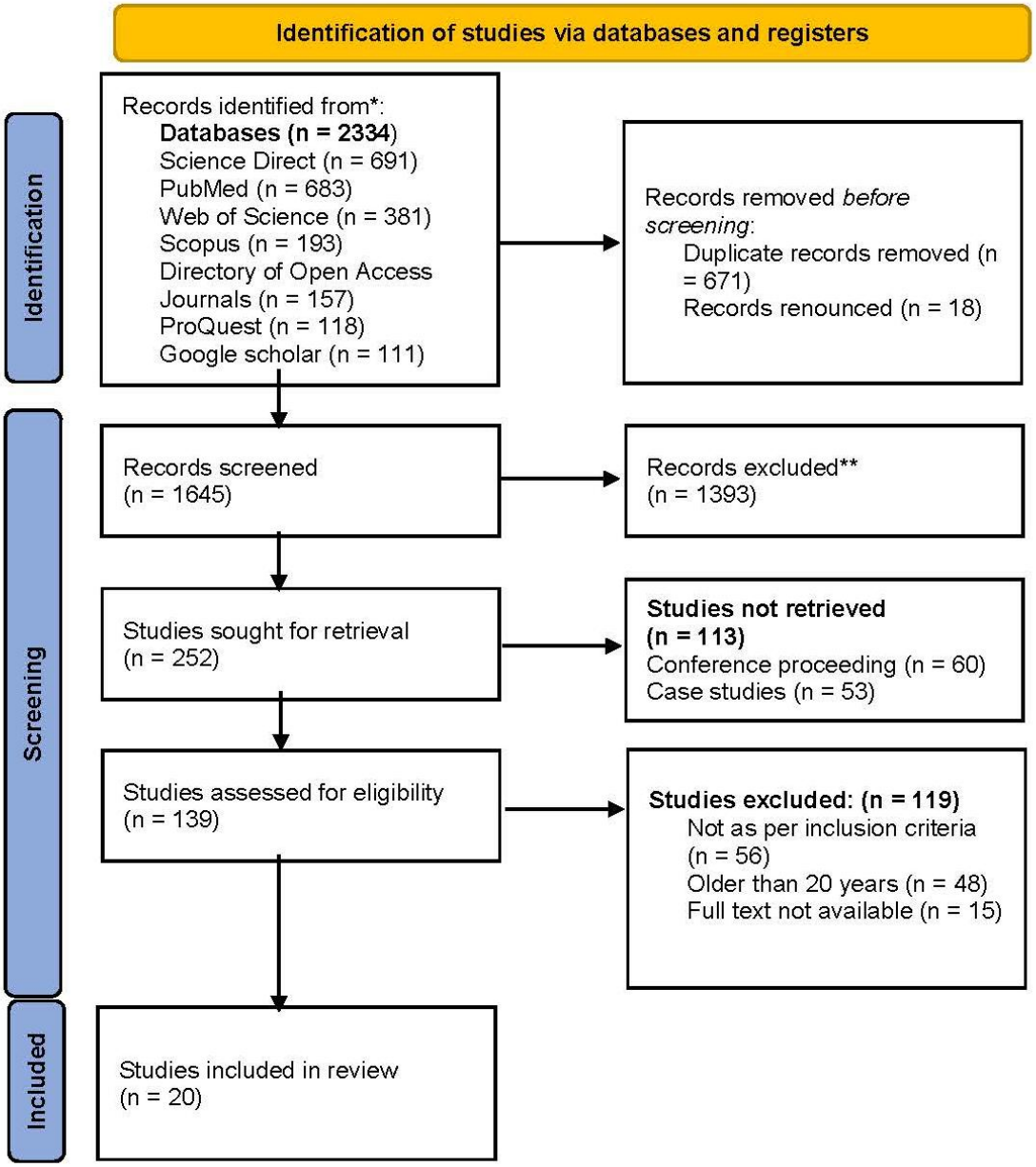

Figure 1 PRISMA flow diagram for systematic review

Different tools are available to assess the quality of various study designs. These include the adaptation of the Newcastle-Ottawa scale (NOS) for cross-sectional studies, the Johanna Briggs Institute checklist (JBIC) specifically for analytical cross-sectional research, the NIH quality assessment tool (NIH-QAT) suitable for both observational cohort and cross-sectional studies, and the ZEE tool, which is applicable to cross-sectional, observational, qualitative, and randomized controlled trials (RCTs). Introduced in 2016, the ZEE tool, often referred to as ZEE 20, comprises a 20-item questionnaire designed to evaluate crucial aspects of cross-sectional, observational, qualitative, and randomized controlled trials (RCTs). This includes the study's design, the rationale behind the sample size, the target demographic, the sampling method, the validity and reliability of the research, and the study's overall methodological approach.

The table presents the results of our analysis on the included studies, conducted using the ZEE tool (Table 1 ZEE Tool). Our analysis detailed critical aspects of the studies, including their geographical settings, participant numbers, survey lengths, methodological

designs, follow-up procedures, applied interventions (like educational initiatives, treatment changes, or lifestyle adjustments), and the outcomes of these interventions. Most of the studies we reviewed were Randomized Controlled Trials (RCTs), with some incorporating survey-based and interview-based quantitative analyses. Additionally, our review covered a Retrospective Cohort study, a Case-Control study, and an open-label, single-arm trial. In the studies analyzed, a notable portion explicitly defined their goals.

The majority reported no conflicts of interest. A small portion disclosed their funding sources, while the bulk did not. The researchers provided justification for the sample size and was provided in only seven out of the total number of studies. Among the 20 studies reviewed, four originated from Malaysia, three were conducted in India, another three in China, three took place in Iran, two in Japan, two in Turkey, and one each in Singapore, Pakistan, Bangladesh, and Sri Lanka combined, and another in various other developing nations. The duration of these studies varied, with the longest extending over three years and the shortest spanning just a few days.

Zee Tool for Cross-sectional Study Evaluation

The Zee tool, a modified and validated version of the AXIS tool, serves as a crucial instrument for critically appraising cross-sectional studies. It systematically assesses their trustworthiness, importance, and relevance in clinical research. This tool is notable for its thorough approach in evaluating the quality of observational interventional studies, encompassing both cohort studies and case-control studies. This tool is essential for assessing the credibility, relevance, and reliability of clinical research findings, as detailed in (Table 1).

Table 1 Represents the Zee tool

Study	1 (Miao et al., 2020)	2 (Cakir & Pinar 2006)	3 (Shima et al., 2014)	4 (Devi et al., 2011)	5 (Kandasamy et al., 2016)	6 (Wei and Omar, 2017)	7 (Jafar et al., 2009)	8 (Ali et al., 2020)	9 (Li et al., 2021)	10 (Hu et al., 2023)	(Eghbali-Babadi et al. 2018)	12 (Shyuan et al., 2020)	13 (Jafar et al., 2017)	14 (Chua et al., 2012)	15 (Zhao et al., 2012)	16 (Siang et al., 2019)	17 (Kordvarkane et al., 2023)	18 (Kawamura et al., 2016)	19 (Akita et al., 2003)	20 (Maslakpak et al., 2018)
Clarification of Objectives: Ensuring Clear Understanding of Study Goals and Aims	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Alignment of Study Aims with Design: Evaluation of Consistency Between Research Objectives and Study Methodology	√	√	√	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√	√	√
Justification of Sample Size: Assessing the Rationale Behind the Determination of Participant Numbers	×	×	×	×	√	√	×	×	√	×	√	√	√	×	×	×	×	×	×	×

Clarity of Target Population Definition: Evaluation of the Precision and Transparency in Identifying the Study's Intended Population	√	×	√	√	√	√	×	×	√	×	√	√	√	×	√	√	×	√	×	√
Relevance of Study Sample to Target Population: Assessment of the Appropriateness and Representativeness of the Sample in Relation to the Intended Population	√	×	√	√	√	√	√	√	×	√	√	√	√	√	×	√	√	√	×	×
Relevance of Selected Population to Sample Size: Evaluation of the Applicability and Sufficiency of Sample Size in Representing the Target Population	√	√	√	×	√	×	×	×	√	√	√	√	√	×	√	√	√	√	√	×
Addressing and Categorizing Non-Responders: Strategies and Measures	√	×	×	√	√	×	×	×	×	×	√	√	×	×	×	√	√	×	×	√
Assessment of Appropriateness: Risk Factor and Outcome Variable Measurement in Relation to Study Aims	√	×	√	×	√	√	×	√	√	√	√	√	√	√	×	√	√	√	√	√
Validity of Measurement: Utilization of Established Instruments for Assessing Risk Factors and Outcome Variables	√	×	√	√	√	×	√	√	√	√	√	√	√	√	×	√	√	√	√	√
Clarity in Statistical	√	√	√	×	×	√	×	×	√	√	×	√	√	×	√	√	√	√	√	×

Significance and Precision Estimation Determination: Utilization of Metrics such as p-values and Confidence Intervals																				
Adequacy of Method Description for Replicability: Ensuring Sufficient Detail in Statistical and Procedural Explanations	×	√	×	×	×	√	×	√	√	√	×	×	√	√	√	×	×	√	√	×
Adequacy of Basic Data Description: Ensuring Sufficient Detail in Presenting Fundamental Data Characteristics	√	×	√	√	√	√	√	×	√	×	√	√	√	√	√	√	×	√	×	√
Concerns Regarding Non-Responsive Bias: Evaluation of Response Rate Implications	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Description of Non-Responder Information: Appropriateness and Completeness of Reporting on Non-Responders	×	×	√	×	×	×	×	×	√	×	×	×	×	×	×	√	√	×	×	×
Internal Consistency of Results: Evaluation of Coherence and Harmony Within the Study Findings	√	√	√	√	√	√	×	√	√	√	√	√	√	×	√	√	√	√	√	√
Comprehensive Presentation of Results: Ensuring Inclusion of All Analyses Described in the Methodology	√	×	√	×	√	√	×	√	√	√	√	√	√	√	×	√	√	√	√	√
Alignment of Discussion and Conclusions with Results: Assessing	√	×	√	√	√	×	√	√	√	√	√	√	√	√	×	√	√	√	√	√

the Appropriateness of Authors' Interpretations Based on Study Findings																				
Influence of Funding Sources and Conflict of Interest on Author Interpretation: Examination of Potential Biases in Result Interpretation	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Ethical Approval and Participant Consent: Assessment of Compliance with Ethical Standards and Consent Procedures	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

Table 2 Study characteristics of the included studies

Sr	Study	Country	Study Duration	Sample Size (N)	Study type	Follow Up's	Intervention	Outcome
1.	(Miao et al., 2020)	China	12 weeks	N=156	Single-blind, randomized controlled trial	In every two weeks	In this study, Nurse-led intervention. Nurses provide guidelines to patients through phone calls or home visits. Top of Form The guidelines include change in lifestyle, quit smoking, regular exercise	Systolic blood pressure by interventions decrease up to 15.03±23.75 mm Hg. And Diastolic blood pressure decreases up to 8.54±8.86 mm hg.
2.	(Cakir & Pinar 2006)	Istanbul, Turkey	26 weeks	N = 70	Randomized controlled trial	Two months	This study involves a self-directed intervention with guidance from healthcare professionals. Interventions include limiting sodium intake,	The mean reductions in SBP were 8.8 (SD = 5.2) and DBP were 6.9 (SD = 5.3) mmHg.

							exercising, quit smoking, and reducing alcohol consumption.	
3.	(Shima et al., 2014)	Malaysia	12 weeks	N=25	Quantitative analysis, interview base	Not mentioned	Healthcare professionals conduct a 45-minute interview with each patient to discuss in detail the causes and factors leading to high blood pressure. The patients are then recalled for follow-up, and the results are analyzed quantitatively.	The study helps to find symptoms of first diagnosis, barrier in hypertension care, and non-adherence attitude of the patient towards treatment.
4.	(Devi et al., 2011)	India	8 Weeks	N=402	Randomized, open-label parallel trial	Seven visits in 8 weeks	Participants were randomly assigned to groups and treated with varying dose strengths of a combination of medications, specifically amlodipine and metoprolol XL.	The group with a higher dose gives better results in the reduction of blood pressure.
5.	(Kandasamy et al., 2016)	Southern India	26 weeks	N=60	Randomized controlled study	Two follow-ups per month	During the first follow-up, pharmacists provided patients with information about hypertension, including its causes, normal values, and diagnosis, along with advice on lifestyle modifications. In	In this study, there was a reduction of SBP in the intervention group from a starting of 150.13±25.670 to a final follow-up of 145.33±12.914

							the second follow-up, pharmacists enhanced the patients' understanding of potential medication complications and dietary planning.	
6.	(Wei and Omar, 2017)	Malaysia	Few days	N=200	Survey base study	No follow up	Physicians make pharmacological and non-pharmacological interventions to control blood pressure. Non-pharmacological interventions encompass lifestyle modifications, such as cessation of smoking and dietary improvements. Additionally, caregivers educated hypertension patients about the risk factors associated with the condition.	This survey reveals that patients in nursing care facilities effectively manage their blood pressure, primarily through non-pharmacological activities.
7.	(Jafar et al., 2009)	Developing countries	2years	N=1341	Randomized controlled study	Follow-up after every 3 months	Healthcare workers advise patients on maintaining a normal body weight, regulating salt intake, engaging in physical activity, quit	Systolic blood pressure decreases up to 10.8mm of Hg and Diastolic blood pressure decrease up to 6mm of Hg.

							smoking, consuming fruits and vegetables essential for hypertensive patients, and reducing fat intake.	
8.	(Ali et al., 2020)	India	3 years	N=404	Parallel, open- label, pragmatic randomize d clinical trial	Every 6 months.	Intervention aims to focus on decreasing depression and stress of patients. Caregiver are giving counselling about day-to-day activities, dietary interventions, social behavior, exercises, and not to take tobacco.	Patient's blood pressure decreases by about 5 percent.
9.	(Li et al., 2021)	China	3–6 months	N=636	Comparative randomized controlled trial	Two months	The Pharmacist's involvement consists of a baseline blood pressure check, patient education, prescription adjustment, guidance for physicians, and a monthly review of drugs. A questionnaire was used to gauge participant knowledge and medication adherence both before and after the experiment	The study found that the intervention group experienced a decrease in systolic blood pressure by 6.65 mmHg and a decrease in diastolic blood pressure by 7.26 mmHg.
10.	(Hu et al., 2023)	Singapore	18 months	N=1,783	Retrospective cohort study.	Two months	The collaborative care team ensured that the	The intervention significantly reduced the SBP

							patients were promptly screened for issues connected to type-2 diabetes, while physicians and pharmacists reviewed the medication. The patient received guidance from the clinical nurse regarding lifestyle adjustment and preventive health, while the collaborative team scheduled the subsequent appointment and coordinated hospital referrals as needed.	by 1.74 mmHg. Significantly reduced LDL-cholesterol by 0.085 mmol/L and HbA1c was significantly reduced by 0.19% in the ICT group compared with the UC group.
11.	(Eghbali-Babadi et al. 2018)	Iran	6 Months	N=190	A Randomized Controlled Trial.	Two months	The interventions by doctors and pharmacists included definitions training, risk factors for complications, preventions, both pharmacological and non-pharmacological treatments for BP and advice on leading a healthy lifestyle	The study demonstrated that for 56.4% of the subjects in the intervention group and 61.5% of those in the control group, the mean SBP was below 140 mmHg and the mean DBP was below 90 mmHg.
12.	(Shyuan et al., 2020)	Malaysia	6 Months	N=334	Unmatched case-control study	Two months	The actions of physicians and pharmacists are to provide all	Patients with medication non-adherence had 11.36 times

							hypertensive patients with a brief, validated questionnaire to complete the medication adherence assessment.	higher and Clinical inertia increased 7.82 times the odds of uncontrolled hypertension.
13.	(Jafar et al., 2017)	Bangladesh, Pakistan and SriLanka	24 months	N=2550	Cluster randomized controlled trial.	Two months	Government community health workers (CHWs) will provide home health education. BP monitoring and stepped-up referral to a trained general practitioner using a checklist Hypertension management training for public and private providers. Government clinics will designate hypertension care coordinators and hypertension triage counters.	The study observed a reduction in SBP by 3 mm Hg in one country and by 9 mm Hg in the other two countries.
14.	(Chua et al., 2012)	Malaysia	Six months	N= 477	Controlled trial	Every four week	In this study, the pharmacist counseled the patients about medication, educated the patients about their disease state and recommended a change in dose or frequency, monitored the	The interventions made by the pharmacists significantly improved the medication adherence and reduced systolic blood pressure

							patient's condition	
15.	(Zhao et al., 2012)	China	Six months	N= 278	Prospective, randomized, controlled study	After every two months	Initiated therapy with an additional anti-hypertensive agent, Escalated the dosage, Modified the dosing schedule of the anti-hypertensive medication, Transitioned to a different medication within the same pharmacological class to achieve better blood pressure control and either Reduced the dosage of the anti-hypertensive drug to mitigate side effects.	At the end of the study, the SBP was decreased by 8.5mmHg in the intervention group and then 1.8 mmHg in the control group The DBP decreased by 4.7 mmHg in the intervention group, compared to a decrease of 1.8 mmHg in the control group.
16.	(Siang et al., 2019)	Malaysia	Six months	N= 45	A single center, prospective convenient sampling	Two follow ups	Health education programs, which include education about hypertension Pharmacological interventions Quality use of medication Non-pharmacological management of hypertension	Systolic and diastolic blood pressures were initially reduced to 146.6 ± 11.1 mmHg and 87.6 ± 9.6 mmHg, respectively. However, after four months of interventions, only the systolic blood pressure showed a significant reduction, reaching 140.1 ± 10.7 mmHg. Medication

								adherence improved by 29.3% after two months and by 70.7% after four months of interventions.
17.	(Kordvarkane et al., 2023)	Iran	Four months	N= 72	Randomized controlled trial	Phone follow-up once every 3rd day	Training program based on common sense model of self-regulation	The intervention group showed a significant reduction in blood pressure and enhanced self-management aspects
18.	(Kawamura et al., 2016)	Japan	Six months	N=59	An open-label single arm trial	After one, two, three and six months	DASH diet for 2 months and after 2 months normal diet for next 4 months	Significant reduction of SBP by 23.5mmHg and DBP by 11.8 mmHg was observed
19.	(Akita et al., 2003)	Japan	Three months	N=375	A multicenter, randomized feeding trial	Not mentioned clearly	DASH diet	The DASH diet enhanced the relationship between mean arterial pressure and urinary sodium excretion more than the controlled diet did, suggesting that the DASH diet has a natriuretic effect.
20.	(Maslakpak et al., 2018)	Iran	Four months	N= 100	Single bind randomized; parallel-group controlled trial	Not stated clearly	Group discussions about diet, physical activities, stress management, smoking cessation, BP monitoring, and medication adherence. Educational training sessions	Group discussions significantly improved treatment compliance among patients with hypertension, including adherence to medication, a

							regarding lifestyle modification and changing attitudes	low sodium diet, and medical appointments. The impact of educational interventions on medical treatment compliance was notably greater in patient- and family-oriented groups compared to other groups. Top of Form Family-oriented patient education resulted in improving BP control and ultimately reduced systolic and diastolic blood pressure in patients with hypertension

4. DISCUSSION

Hypertension, which is recognized as the primary determinant for cardiovascular diseases, occurs due to the combination of social, environmental, and genetic variables. Key environmental factors contributing to health issues encompass obesity, inadequate diet, excessive salt consumption, insufficient potassium intake, and a sedentary lifestyle. Joint efforts by healthcare workers, including doctors, pharmacists, nurses, and dieticians, have proven successful in managing hypertension. This collaborative approach improves control of blood pressure, boosts compliance with treatment, motivates lifestyle changes, and aids in the surveillance of potential complications. The incidence and traits of hypertension in Asia need particular attention due to unique features such as white-coat hypertension, masked hypertension, and fluctuating blood pressure readings, which are more prevalent in this region (Kario et al., 2020).

Asia's swift economic expansion is associated with a move towards less healthy living habits, including greater intake of high-fat diets, decreased physical activity due to technological progress, and a lack of adequate health awareness. These changes contribute to rising levels of obesity and hypertension (Yang et al., 2023). This scenario highlights the need for customized management approaches in Asian nations to tackle the unique challenges and risk factors common among the population. The current systematic review concentrates on assessing the effect of collaborative care on the advancement of disease complications in the management of hypertension in Asia. The findings of the review indicate that a team-based care approach, involving doctors, pharmacists, nurses, and dietitians, effectively reduced systolic and diastolic blood pressure levels. This approach also led to a decrease in the incidence of hypertension-related complications in Asia.

Likewise, a study from the US demonstrated that a multidisciplinary team effort, particularly involving pharmacists and nurses, has been successful in lowering systolic and diastolic blood pressure, thereby enhancing patient health (Proia et al., 2014). A separate study from the US in 2019 showed that collaborative care models between pharmacists and physicians (PPCCM) have improved average blood pressure levels and achieved a significantly increased rate of blood pressure control, reaching nearly 90%. Dixon et al., (2020) while in a pragmatic randomized controlled trial conducted in Switzerland, targeting patients with untreated hypertension, participants were divided into two groups: One received treatment-based control (TBC), At the same time another group received standard care. Following a 6-month observation period, researchers observed no significant changes in blood pressure levels. However, after 12 months, those in the TBC group demonstrated better management of systolic blood pressure, though diastolic blood pressure saw no change (Santschi et al., 2021).

This review illustrates various reasons why care delivered by a team was effective in managing the progression of complications by efficiently controlling blood pressure in patients with hypertension in Asia. By adopting a multidisciplinary strategy, healthcare professionals were able to support in managing medications, ensuring patients followed their medication regimens closely and made the required adjustments for ideal blood pressure management. Furthermore, by providing patients with education on hypertension and lifestyle changes, they were more prepared to handle their condition effectively. Our systematic review found that interventions supporting self-management of hypertension, led by nurses, significantly lowered both systolic and diastolic blood pressure. A 2005 study in the USA found that educational initiatives led by nurses significantly improved blood pressure management. This improvement resulted from patients more faithfully following their medication schedules, adopting healthier lifestyle changes, and, when possible, practicing self-monitoring of their blood pressure (Bosworth et al., 2005; Denver et al., 2003).

Face-to-face interventions seem to be more effective, at least for the reducing DBP levels (Bosworth et al., 2005). A randomized control study in Sweden found that a nurse-led secondary prevention program, using telephone follow-ups for medication adjustments, significantly improved blood pressure management more effectively than standard care (Irewall et al., 2015). Adding pharmacists to the clinical team, focusing specifically on enhancing medication strategies, led to the most significant improvements in blood pressure control. The most effective interventions featured pharmacists as essential members of the clinical team, directly contributing to the strategy and implementation of treatment. These pharmacists played a vital role in modifying prescription regimens in collaboration with physicians, evaluating patients' medication adherence, and guiding patients through lifestyle modifications to meet their health objectives.

Similarly, a study was undertaken in the USA where a clinical pharmacist was included into each office's staff. The pharmacist offered advice to both doctors and patients in the intervention offices. The objective of the investigation was to assess the potential of pharmacist assistance in enhancing blood pressure. The research shown a significant decrease in blood pressure (Anderegg et al., 2016; Carter et al., 2008; Tobari et al., 2010). This improvement likely results from the pharmacist's expertise in medication management, along with their dedication to ensuring proper drug treatment and medication adherence. In addition, pharmacists have a crucial role in advising patients on how to manage their blood pressure via lifestyle changes. Furthermore, the research conducted in Asia confirmed that using the Dietary Approaches to Stop Hypertension (DASH) diet resulted in significant reductions in both systolic and diastolic blood pressure, thereby validating the effectiveness of this dietary approach.

In addition, it is well recognized that making other changes to one's diet, such as reducing salt intake, losing weight, and moderating alcohol use, can help to decrease blood pressure. Significant research has focused on how food scientists and nutritionists contribute to managing hypertension by incorporating functional foods into diets. These experts have used the DASH diet methodology, which has shown significant efficacy in decreasing both systolic and diastolic blood pressure (Chiu et al., 2016). Additionally, previous research conducted in the United States has explored the effects of the DASH diet on blood pressure. This research consistently demonstrates that following the DASH diet leads to a notable reduction in both systolic and diastolic blood pressure (Sacks et al., 2001; Challa et al., 2023). Likewise, a study conducted in Italy discovered that following the DASH diet significantly lowered both systolic and diastolic blood pressure.

Additional findings indicated that the DASH diet also reduced the total levels of LDL cholesterol and triglycerides in people suffering from hypertension (Ravera et al., 2016). The outcomes of this systematic review, drawing from research across Asian nations, highlight the critical importance of adopting team-based care approaches to improve the management of hypertension significantly. These findings stress the urgency for healthcare infrastructures to embrace these strategies to prevent the progression of hypertension-related complications. Future efforts should prioritize the integration and improvement of multidisciplinary teams to provide effective,

patient-centered care that addresses the complex features of hypertension and its treatment, using the distinctive abilities of each team member.

5. CONCLUSION

The review underlines the benefits of team-based care in managing high blood pressure in Asia, pointing out the value of a team approach in healthcare. Reviewing 20 studies revealed that healthcare workers made efforts, including pharmacists, nurses, and nutrition experts, resulted in significant drop in the upper (systolic) and lower (diastolic) blood pressure. The actions taken by pharmacists, doctors, nurses, and other health professionals involved lifestyle changes, ensuring patients follow their medication schedules, diet adjustments, preventive strategies, and providing advice.

Research shows that following the DASH diet, along with taking preventive measures, significantly reduces blood pressure. Additionally, joint efforts from doctors and pharmacists improved health in patients with other comorbidities. Nurses enhanced the execution and regularity in keeping the disease within normal limits. Together, all healthcare workers played a part in minimizing adverse treatment results. The effective results of this method indicates that a more widespread implementation within healthcare systems is needed for the management of hypertension in patients.

Limitations of the study

A notable limitation of the review is its geographical focus on Asia, which may limit the generalizability of the findings to other regions with different healthcare systems and population dynamics. Future research could explore the scalability of collaborative care models to other regions with diverse healthcare infrastructures and examine the long-term impacts of such models on cardiovascular disease prevention and management.

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Ethical approval

The current systematic review has been conducted after receiving approval from the university's ethical review board, with ethical procedure number ERB-PHRMD-DPP/2413-A.

Informed consent

Not applicable.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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