

Self-Care Management for Hypertension in Southeast Asia: A Scoping Review

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Background: Self-care practices such as lifestyle modifications in diet, exercise, and stress management are effective in reducing the incidence of and enhancing better management of hypertension. However, little is known about the self-care management practices of people with hypertension in Southeast Asia (SEA) countries where the prevalence of hypertension is sharply increasing.

Methods: A scoping review of research and grey literature (2006–2021) was performed using Scoping Review Frameworks by Arkey and O'Malley. For the research literature, ten databases were searched followed by a manual search of the reference lists of relevant topical papers. Criteria for inclusion included both qualitative and quantitative primary data studies, focused on adult (18 years and over) hypertensive patients, self-care management methods, conducted in SEA. The study protocol has been registered at Open Science Framework (<https://osf.io/s4nvk/>).

Results: Out of 1667 studies examined, there were 57 studies that met criteria and were included in this review. Results indicate a paucity of relevant literature. Moreover, most studies reviewed showed an incident rate of 50% or more incidence of behavioural risk factors in people diagnosed with hypertension, including overweight/obesity, poor physical exercise, poor/low-quality dietary intake, and not adhering to medication. Few studies indicated adequate traditional self-care practice among SEA hypertension populations. Use of a non-prescription herbal as the medication is identified in some studies. Several reviewed articles indicated that there is individual variation in the facilitators and barriers to implementing self-care practices and we put it into a working framework. The facilitators and barriers are relevant to personal choice (internal factors) or to the environment or context (external factors).

Conclusion: Enhancing self-care management of hypertension in SEA may require a multi-focused approach including targeting personal choice as well as external factors such as cultural relevance, environment, and resources.

Keywords: self-care hypertension, facilitating and inhibiting factors, Southeast Asia countries

Plain Language Summary

In SEA countries where the prevalence of hypertension is sharply increasing, there are few relevant studies on how patients perform their self-care management practices. The studies that have been completed indicate that many hypertensive people have significant behavioral risk factors for heart disease and stroke despite the common medical advice to address these risk factors through self-care management practices. Irwan et al in their review, found a prevalence rate of 50% or more of hypertension people being overweight/obese, having poor physical exercise and low-quality dietary intake, and not adhering to medication. They also found variation in the facilitators and barriers to implementing self-care practices, including personal choices and cultural influence. This information is useful for nurses suggesting that nurses working in the community in SEA countries should consider a multi-focused approach and cultural aspect in helping hypertensive patients manage their self-care and risk reduction practices.

Introduction

Hypertension is a major chronic disease among adults affecting 1 in 4 men and 1 in 5 women representing over one billion people worldwide.¹ The American Heart Association defines hypertension as the systolic blood pressure readings of ≥ 130 mmHg and/the diastolic blood pressure readings of ≥ 80 mmHg.² It is considered a primary risk factor for stroke, heart disease, and kidney failure.³

To reduce the incidence of and to provide better management of hypertension, several self-care activities are recommended by the 8th Joint National Commission including medication adherence, bodyweight management, dietary intake, alcohol consumption, tobacco cessation, and physical exercise.^{4,5} Modification of lifestyle risk factors addressed through healthy self-care management activities is now a fundamental part of treatment recommendations, as people who implement such self-care strategies have shown a decrease in blood pressure, increase adherence to antihypertensive medications, reductions in complications and in overall mortality rate associated with hypertension.⁶

Numerous reviews of self-care management for hypertension have been done regarding the experimental approach to lifestyle intervention provided through the research protocol.⁷⁻⁹ While important to understand the efficacy of the intervention, these studies do not address the self-care management initiated and sustained by people in their naturalistic settings. Few studies address potential facilitating and inhibiting factors in practicing self-care management for hypertension. In addition, the majority of studies reviewed were conducted in Western countries.⁷⁻⁹ Different cultures, lifestyles, and food preferences in SEA countries will affect the use and success of self-care management of hypertension.

In SEA countries, the prevalence of hypertension has been sharply increasing for the past two decades.¹⁰ In a recent study, there was a reported increase of one-third of the adult population with hypertension in SEA annually.¹¹ SEA countries are currently experiencing rapid modernization and fast-changing lifestyle, conditions contributing to the high prevalence of hypertension.¹⁰ However, little is known about the self-care management practices of these populations. The previous review by Nawi et al focused on the prevalence and risk factors of hypertension in the urban area without emphasizing current self-care management for hypertension.¹¹ Understanding the self-care management of people with hypertension is crucial to determine gaps and potential points of intervention to strengthen their use and effectiveness. Therefore, we conducted a scoping review to explore and map the current state of self-care and lifestyle management activities among people with hypertension in SEA countries. Secondly, we reviewed the retrieved articles for facilitating and inhibiting factors to the reported self-care management practices. The anticipated outcome of such a scoping review is to better understand the current state of self-care practices for hypertension management in SEA. This information will be useful in designing future studies.

Methods

The Preferred Reporting Items for Systematic Reviews and Meta-analyses extension for Scoping Reviews (PRISMA-SCR) was utilized to optimize reporting and increase fidelity ([Supplementary File 1](#)). The review was conducted using the guidelines of Scoping Review Frameworks.¹² In addition, The Preferred Reporting Items for Systematic Reviews and Meta-analyses extension for Scoping Reviews (PRISMA-SCR) was utilized to optimize reporting and increase fidelity.¹³ The study protocol has been registered at Open Science Framework (<https://osf.io/s4nvk/>). We utilized the five stages of Scoping Review Frameworks as indicated below.

Stage 1: Research Question

The research question raised by this scoping review was:

What type of self-care management strategies do hypertensive people in SEA countries use to control their blood pressure where SEA countries include Brunei, Malaysia, Indonesia, Thailand, Singapore, the Philippines, Vietnam, Laos, Cambodia, Myanmar, and East Timor?

Stage 2: Relevant Studies and Search Terms

The review explored the current state of self-care management practices used by hypertension populations based on evidence from the existing scientific literature for SEA. Because “lifestyle change” and “self-care management” are often used interchangeably in reported studies, we used both terms to identify relevant studies.¹⁴⁻¹⁶ Furthermore, specific emphasis was focused on the application of general self-care management techniques practiced across cultures and their geo-socio-political nuances with emphasis on the SEA context.

We used ten data bases used in this scoping review. An initial search was conducted to retrieve titles, abstracts, and content to identify terms and key words including alternative aliases across languages and cultures. [Table 1](#) displays the

Table 1 Keywords for Databases

No	Database	Keywords	Articles	Access Date
1	Medline	(((((“Hypertension”[Mesh]) OR (((hypertensive) OR (high blood pressure)) OR (blood pressure) OR (hypertens))) AND ((“Self Care”[Mesh]) OR ((self-care practice) OR (self-management)))) OR ((“Life Style”[Mesh]) OR (lifestyle management))) AND ((“Asia, Southeastern”[Mesh]) OR ((southeast asia) OR (indonesia))))	712	August 10, 2021
2	CINAHL	(MH “Hypertension”) OR “high blood pressure” OR “hypertensive” AND self-care practice OR lifestyle management AND southeast asia OR Indonesia	243	August 10, 2021
3	Embase	“hypertension”/exp OR hypertensive OR “high blood pressure” AND “self care”/exp OR “self-care practice” OR “self-management” OR “lifestyle”/exp OR “healthy lifestyle”/exp AND “southeast asia”/exp OR “indonesia”/exp	45	August 10, 2021
4	Scopus	(TITLE-ABS-KEY (hypertension) OR TITLE-ABS-KEY (“high blood pressure”) OR TITLE-ABS-KEY (hypertensive) AND TITLE-ABS-KEY (“self-care”) OR TITLE-ABS-KEY (“self-management”) OR TITLE-ABS-KEY (“lifestyle management”) AND TITLE-ABS-KEY (“southeast asia”) OR TITLE-ABS-KEY (indonesia)) AND PUBYEAR > 2005	17	August 10, 2021
5	Web of Science Core Collection	(((((TS=(hypertension)) OR TS=(“high blood pressure”)) OR TS=(hypertensive)) AND TS=(“self-care practice”) OR TS=(“self-management”) OR TS=(“lifestyle management”)) AND TS=(“southeast asia”) OR TS=(indonesia))	118	August 10, 2021
6	PsycINFO	DE “Hypertension” OR “high blood pressure” OR “hypertensive” AND DE “self-care” OR “self-management” OR “lifestyle management”	182	August 10, 2021
7	Global Health	(hypertension) OR (high blood pressure) OR (hypertensive) AND (self-care practice) OR (self-management) OR (lifestyle management) AND yr:[2006 TO 2021]Refinements: Document type = Journal article AND Geographic Location = Vietnam OR Malaysia OR Singapore OR Thailand OR Indonesia	138	August 10, 2021
8	Global Index Medicus	(tw:(hypertension)) OR (tw:(high blood pressure)) OR (tw:(hypertensive)) AND (tw:(self-care practice)) OR (tw:(self-management)) OR (tw:(lifestyle management)) AND (tw:(southeast asia)) OR (tw:(indonesia))	31	August 10, 2021
9	Cochrane Library	Hypertension OR “high blood pressure” OR hypertensive AND “self-care practice” OR “lifestyle management”	133	August 10, 2021
10	Garuda	Search hipertensi OR tekanan darah tinggi OR tekanan darah AND self-care AND self-management AND gaya hidup, by abstract	48	August 10, 2021
11	Google Scholar	“Hypertension” OR “high blood pressure” OR “hypertensive” AND “self-care practice” OR “self-management” OR “lifestyle management” AND “southeast asia” OR “Indonesia”	41	August 1, 2021

key words and phrases used in the search. In addition, references in the Google Scholar search engine were sought for additional articles that may have been missed in the previous database searches.

The inclusion and exclusion criteria for the scoping review was based on Population Concept Context (PCC) model¹⁷ and are listed in Table 2. The definition of hypertension is as defined by the author(s) of the studies. The review included

Table 2 Eligibility Criteria for Articles

Criterion	Inclusion
Population	Studies focused on adult (18 years and over) hypertensive patients
Concept	Self-care management methods
Context	Conducted in SEA, a subregion of Asia and consists of eleven countries: Brunei, Malaysia, Indonesia, Thailand, Singapore, the Philippines, Vietnam, Laos, Cambodia, Myanmar, and East Timor ⁹¹

both qualitative and quantitative primary data studies. Review, intervention, study protocol papers, and pregnancy-induced hypertension populations were not included. The search was limited to full-text articles published in English and Bahasa from 2006 to 2021. Fifteen years was chosen as the time window of the search as that coincides with the recent rise in prevalence of hypertension in SEA countries.

Stage 3: Study Selection

Study Extraction from Databases

Figure 1 illustrates the process, screening results, and criteria for manuscript extraction once the initial search was completed based on the study inclusion and exclusion criteria. To summarize, from the 10 databases, 1667 relevant abstracts were collected and 41 additional manuscripts were identified through Google Scholar. After the removal of duplication of articles, 1668 articles remained. Furthermore, titles were screened for their relevance resulting in 167 articles for further screening. Of these, 125 articles were categorized as directly related to the research question,

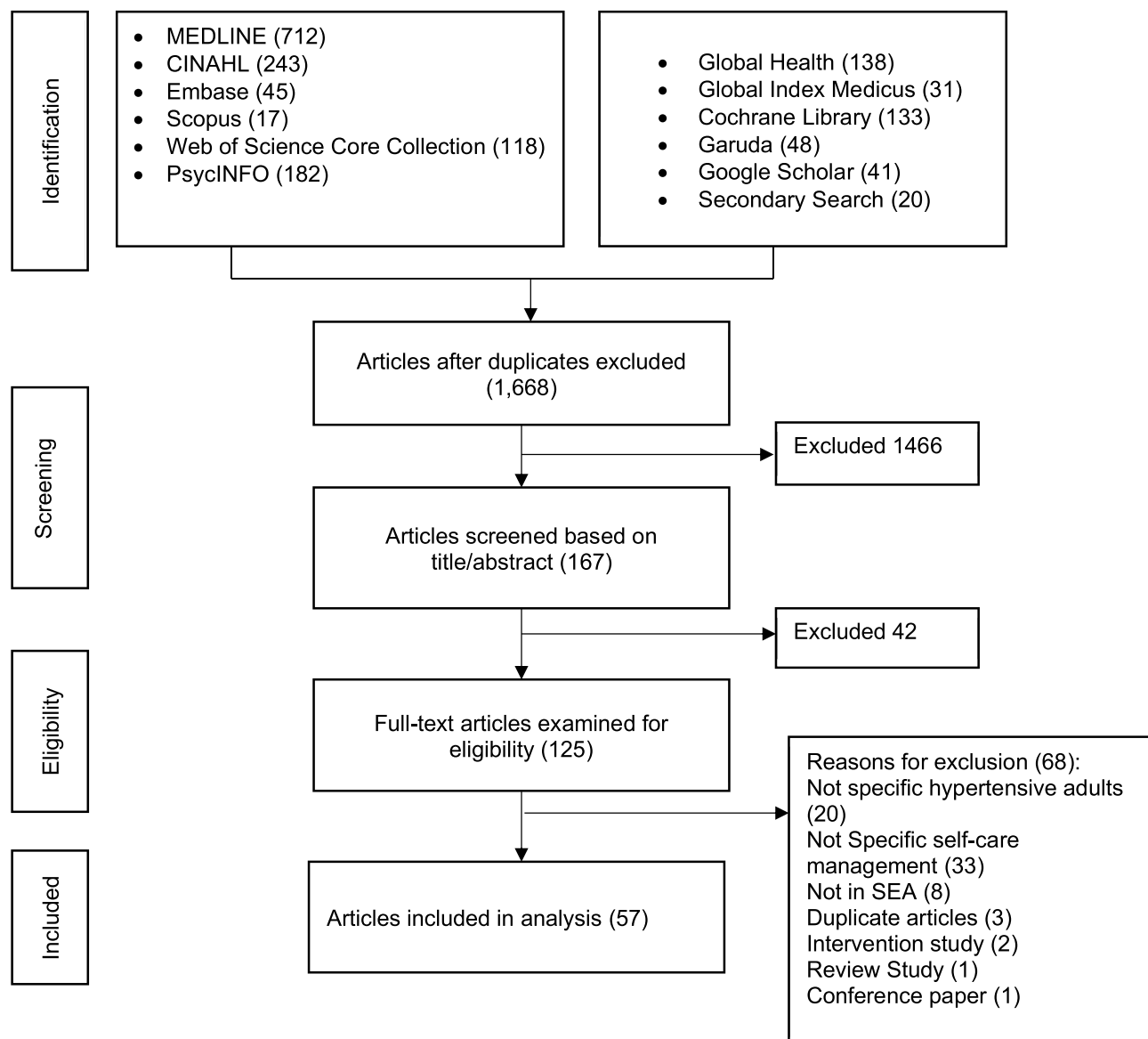


Figure 1 PRISMA flowchart.

Notes: Adapted from Tricco AC, Lillie E, Zarin W et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med*.2018;169(7):467–473.¹³

followed by full article reading and study abstraction. Third-stage searching was also conducted by screening reference list from the articles selected by reading full text resulting in an additional 20 articles. Articles were then excluded that were not relevant to the hypertension, not self-care management, not in SEA, or were an intervention, a study protocol, or were a literature review. This selection process resulted in the final inclusion of 57 primary research studies in the analysis.

Reliability of Study Extraction

All abstracts identified from the article search were downloaded to Mendeley software reference manager and exported following de-duplication into the Rayyan software program.¹⁸ To ensure inter-rater reliability of articles screened using exclusion and inclusion criteria was established by two reviewer random samples of 25 articles in English language (AMI and KP) for sampling of titles, abstracts, and full texts using JBI Manual methods.¹⁷ There was disagreement in 5% of articles which was resolved in reviewer discussion to reach 100% agreement at each sampling stage.

Stage 4: The Data

Data were extracted to include important information, encompassing the study site, study design, aim, sample, and main findings. Variable measured are listed in [Tables 3 and 4](#).

Stage 5: Thematic Summary and Key Findings

Inductive thematic analysis, informed by the work of Braun and Clarke¹⁹ across studies, was used to identify emerging key themes. This entails familiarization with each research finding and generating initial codes. These codes were then refined to arrive at the final themes reported in the paper.

Ethical Considerations

This study was exempt from review by the Institutional Review Board for Human Subjects (IRB) because only de-identifiable data is revealed in the articles reviewed.

Study Characteristics

Across the 57 included studies, more than half (thirty studies) were conducted in Indonesia, seven in Thailand, six in Malaysia, four in Myanmar, three for each in Vietnam and in Singapore, one in the Philippines, one in Laos, and two combined across SEA countries. There are three countries of SEA which have no included articles: Brunei, Cambodia, and East Timor. The design of the studies was varied. Forty-five were cross-sectional studies,^{20–64} ten were qualitative,^{65–74} one case control,⁷⁵ and one mixed-method design.⁷⁶ The findings of quantitative and mixed-method studies are displayed in [Table 3](#) and qualitative studies in [Table 4](#). The sample sizes of quantitative and mixed-method studies ranged from 47 to 313,714 participants. A study with the largest sample (313,714) was conducted by Nurdiantami et al.²⁴ Sample sizes ranged from 5 to 30 participants in the qualitative studies reviewed. For study settings, in quantitative and mixed-method studies, 10 studies took place nationally,^{24,41,47–51,53,63,64} 19 in the urban areas,^{20,21,23,31–33,36–38,40,42,44–46,52,54,55,58,76} 16 in rural areas,^{22,25–29,34,39,43,56,57,59–62,75} and two studies in multiple settings.^{30,35} For quantitative studies, four of them were conducted in urban settings,^{66,67,70,71} five were in the rural area^{65,69,72–74} and one study could not be specified.⁶⁸ Overall, thirteen^{22,26–29,32,42,45,57–60,64} studies have the mean age of older people as the participants (60 years old and above), whereas the rest of the studies were adults 18 years and older.

Self-Care and Lifestyle Management

In the quantitative and mixed-method studies, body weight management (29 studies^{20,24,25,29,30,33,36,39–50,52,53,56–62,64}) and physical exercise (22 studies^{21,22,24,30–33,35,38,40–43,45,47,52,53,56,57,60,61,75}) were the most reported, whereas in the qualitative studies, medication adherence and diet intake was the most reported self-care practice. In addition, a few studies described alternative self-care management methods such as stress-relieving methods (6 studies^{35,40,60,66,68,75}), sleep and rest (2 studies^{68,74}), and spiritual fulfilment was described in one study.

Table 3 Articles Exploring Self-Care Management for Hypertension (Quantitative and Mixed Method Studies)

Author, Year	Aim	Sample (n, M Age, Range) and Setting	Findings	Self-Care Management
Sulastrri et al ²⁰ (2012) Indonesia ^a	To investigate the relationship of obesity with the incidence of hypertension among Minangkabau ethnic	n=204 (range=35–65) Urban area	Obese (56.6%) and central obesity (54.9%)	Traditional: Bodyweight management with a cultural approach
Herwati & Sartika ²¹ (2014) Indonesia ^a	To determine the relationship between diet and exercise habits with controlled blood pressure among hypertensive patients	n=78 Urban area	Poor diet pattern (59.5%) and poor exercise habit (85.1%)	Traditional: Dietary intake and physical exercise
Santoso et al ²² (2015) Indonesia	To determine predictors of physical activity among older people with hypertension	n= 174, M age= 66 years (range=60–85) Rural area	Inadequate physical activity (44.2%)	Traditional: physical exercise
Adriaansz et al ²³ (2016) Indonesia ^a	To identify the correlation between food intake and hypertension incidence among older people	n=47 Urban Area	High salt intake (88.2%) and high fat intake 70.5%	Traditional: Dietary sodium and fat intake
Nurdiantami et al ²⁴ (2018) Indonesia	To investigate the association of general and central obesity with hypertension in women	n=313,714, ≥18 years old National	Less active (52.9%), never smoke (95.6%), overweight (31.1%), obese (13.9%)	Traditional: Physical exercise, tobacco cessation Body weight management
Diana et al ²⁵ (2018) Indonesia	To explore the risk factors of hypertension among married couples	n=112 couples, (range=40–59) Rural area	Overweight and obese (35.8%), high body fat (38.4%), and high visceral fat (33.8%)	Traditional: Bodyweight management
Rahmawati & Bajorek ²⁸ (2018) Indonesia	To explore how and where people obtain their anti-hypertensive medications	n=384, M age = 65.7 years (range= 45–90) Rural area	Traditional medicines only (68.5%), both traditional and antihypertensive medication (33.6%)	Traditional: Medication adherence
Rahmawati & Bajorek ²⁷ (2017) Indonesia	To identify medication adherence and hypertension knowledge and their predictive factors	n=384, M age = 65.7 years (range= 45–90) Rural area	Medication adherence (11%)	Traditional: Medication adherence
Rahmawati & Bajorek ²⁶ (2018) Indonesia	To describe the use of traditional medicines and to identify factors associated with hypertension	n=384, M age = 65.7 years (range= 45–90) Rural area	Anti-hypertensive medications from public or private healthcare services (52.9%)	Traditional: Medication adherence
Pertiwi et al ²⁹ (2018) Indonesia	To determine the factors associated with the visit-to-visit variability of blood pressure among hypertensive patients	n=74, M age= 62.70 years (range= 45–81) Rural area	Sodium intake (mg/day) was 1387.14 ±451.98 and BMI was 25.49 ± 4.07	Traditional: Dietary sodium intake and bodyweight management
Noventi & Kartini ³⁰ (2019) Indonesia	To examine the relationship between the Healthy Lifestyle Index score to the occurrence of hypertension in	n= 90 (range= 30–80) Multi setting: mountainous, coastal, and urban area	<ul style="list-style-type: none"> • Smoking from mountainous (53%), coastal (6.7%) and urban (53%) communities • Unhealthy dietary habit from mountainous (20%), coastal (70%) and urban (60%) communities • Active physical activity from mountainous (20%), coastal (63%), and urban (73%) communities • Obese from mountainous (53%), coastal (13%), and urban (70%) communities 	Traditional: Physical exercise, Dietary intake, tobacco cessation, bodyweight management

Sutini et al ⁷⁵ (2018) Indonesia	To determine the association of hypertension self-management with the incidence of stroke in patients with hypertension	n= 88 Rural area	Self-management: Poor diet (56.8%), poor exercise (34.1%), good stress (84.1%), good alcohol (97.7%), good smoking (84.1%), poor medication adherence (22.7%)	Traditional: Physical exercise, Dietary intake, Medication adherence, tobacco cessation, alcohol consumption, Alternative: Stress relieving
Simanullang ³¹ (2018) Indonesia ^a	To analyze the relationship of lifestyle and hypertension prevalence among older people	n=60 Urban area	Low physical activity (81.7%), unhealthy lifestyle (58.3%), and smoking (45%)	Traditional: Physical exercise and tobacco cessation
Lestari et al ³² (2019) Indonesia	To examine the relationship between medication adherence and hypertension status	n=55 M age= 62.9 years Urban area	Salt consumption (1540±257.7 mg), unregular exercise (>73.9%), and did not adhere to medication (78.1%)	Traditional: Dietary intake, physical exercise, medication adherence
Priscilia & Sartika ³³ (2019) Indonesia	To measure the effect of sleep duration on physical activity of hypertensive patients	n=97 (range= 30–65) Urban area	Less active (32%) and overweight (61.9%)	Traditional: Physical exercise and bodyweight management
Islami et al ³⁴ (2019) Indonesia	To examine the relationship between diet quality and mental emotional disorder status with the prevalence of hypertension in women	n=143 (range =35 –55) Rural area	Low diet quality (86.1%)	Traditional: Dietary intake
Pangastuti et al ³⁵ (2019) Indonesia	To compare sodium intake, physical activities, and psychological problems in patients with hypertension	n= 81 (rural) 74 (urban) M age= 57.8 (rural) and 60.7 (urban) years Rural and urban area	Excessive sodium intake from rural (32%) and urban (28.4%), vigorous activity level from rural (59%) and urban (27%), normal level of stress from rural (98.8%) and urban (95.9%)	Traditional: Dietary intake, physical exercise, Alternative: stress-relieving
Ridha et al ³⁶ (2019) Indonesia	To analyze the relationship between fruit and vegetable intake among older people	n=138 Urban area	Consumed fruit ≤ 2x/day (48.2%), consumed vegetables ≤ 3x/day (51.7%), overweight/obese (29.9%)	Traditional: Dietary intake and body weight management
Farapti et al ³⁷ (2017) Indonesia	To analyze the association between both urinary and dietary (Na/K) ratio and BP among older women	n=51, M age = 56.98 year Urban area	The Urinary Na/K ratio of hypertensive patients was 6.01±1.89 [mmol/mmol]	Traditional: Dietary sodium intake
Adiyasa & Cruz ³⁸ (2020) Indonesia	To analyze the correlation between self-care behavior and self-efficacy of adults with hypertension	n=120 ≥ 40 years old Urban area	Medication adherence (mean score 3.93), Healthy dietary (mean score 3.63), Physical activities (mean score 3.52) were considered good.	Traditional: Medication adherence, dietary intake, physical exercise
Livana & Basthomi ³⁹ (2020) Indonesia	To determine the triggering factors associated with hypertension	n=428 M age = 47 years (range= 25–60) Rural area	Moderate level of obesity (43.2%)	Traditional: Bodyweight management
Prihandana et al ⁴⁰ (2020) Indonesia ^a	To determine patients' self-care behavior toward hypertension	n=250 Urban area	Overweight (30.0%), obese (36%), low level of medication adherence (68%), high intensity of physical exercise (59.2%), did not exercise regularly (46.5), do not adhere to the recommended diet (58.8%), manage stress by praying (59.6)	Traditional: bodyweight management, medication adherence, physical exercise, dietary intake Alternative: stress-relieving

(Continued)

Table 3 (Continued).

Author, Year	Aim	Sample (n, M Age, Range) and Setting	Findings	Self-Care Management
Nugroho & Erniastutik ⁴¹ (2020) Indonesia	To determine the associated factors with hypertensive middle-aged patients in Indonesia	n=5401 (range= 45–59) National	Current smoker (19.5), low physical activity (24%), Obese (17.7%)	Traditional: tobacco cessation, physical exercise, bodyweight management
Gusty & Merdawati ⁴² (2020) Indonesia ^a	To assess hypertension self-care behaviors and their associated factors among hypertensive patients	n=260 M age= 60 Urban area	Medication adherence (37.7%), low-salt diet (16.9%), physical activity (10.4%), not smoking (73.8%), body weight management (20.8%), did not consume alcohol (100%)	Traditional: Dietary intake, physical exercise, tobacco cessation, bodyweight management, and alcohol consumption
Defianna et al ⁴³ (2021) Indonesia	To examine the prevalence of hypertension and associated factors among adult men and women	n= 4328 ≥18 years old. Rural area	High physical activity (71%), never smoke (69.5%), abdominal obesity (61.4%)	Traditional: Physical exercise, tobacco cessation, bodyweight management
Ramli et al ⁴⁴ (2012) Malaysia	To assess medication adherence among patients undergoing hypertensive treatment	n=653 M age= 57.84 years (range= 32–84) Urban area	Medication adherence (53.4%), obese (40.1%), overweight (38.9%), smokers (8.4%), alcohol users (5.5%)	Traditional: Medication adherence, bodyweight management, tobacco cessation, and alcohol consumption
Salihah & Mei ⁴⁵ (2017) Malaysia	To determine the knowledge, awareness, and perception towards hypertension among residents in nursing homes	n=200 M age= 70.6 years Nursing home, Urban area	Exercise regularly (46.5%), normal weight (58.0%), not smoking (85.0%)	Traditional: Medication adherence, physical exercise, bodyweight management, tobacco cessation,
Salim et al ⁴⁶ (2019) Malaysia	To determine self-care profiles and their determinants among hypertensive patients	n=730 M age = 59.5 years ≥18 years Urban area	Overweight (32.9%), obese (48.6), The mean total HTN-SCP score was 124.2 (SD 22.8) out of 180.	Traditional: Bodyweight management, other unspecified self-care behavior
Lim & Yong ⁴⁷ (2019) Malaysia	To examine and compare the risk factors of hypertension	n=24,632 National	Obese and overweight: undiagnosed and known hypertension Physically inactive, ex-smokers and drinkers: known hypertension	Traditional: Bodyweight management, physical exercise, tobacco cessation, alcohol consumption
Wu et al ⁴⁸ (2009) Singapore	To examine demographic and cardiovascular disease risk factors associated with awareness, treatment and control of hypertension in a multi-ethnic Asian population.	n=5022 (Range 24–94) National	Hypertensive medication (84.4%), BMI ≥ of 27.5 (58.2%), daily smoker (43.7%), alcohol drinker (53.0%)	Traditional: Medication adherence, bodyweight management, tobacco cessation, and alcohol consumption
Malhotra et al ⁴⁹ (2010) Singapore	To assess the prevalence and correlates of hypertension and awareness, treatment, and control among older people	n=4,441 National	Moderate risk of BMI (40.5%), high risk of BMI (23.4%)	Traditional: Bodyweight management
Son et al ⁵⁰ (2012) Vietnam	To estimate mean blood Pressure, the prevalence of hypertension, and its awareness, treatment and control	n= 9832, Mage= 42.7 years (range=25–100) National	Overweight (38.1%), obese (50.9%)	Traditional: Bodyweight management

Do et al ⁵¹ (2015) Vietnam	To identify the prevalence of hypertension and prehypertension and its determinants.	n=17,199, M age = 44 years (range=25–64) National	Men (24.5%) and Women (17.5%) were current smokers. Men (25.1%) and Women (15.8%) did not drink alcohol	Traditional: Alcohol consumption, tobacco cessation
Nguyen et al ⁵² (2020) Vietnam	To explore the rate of uncontrolled hypertension and identified associated factors	n=220 Hospital, urban area	Did not smoke (87.7%), alcohol drinkers (28.6%), overweight/obesity (58%), did not adhere to medication (99.6%), did not follow a low-salt diet (50.5%), exercised regularly (85.0%)	Traditional: Tobacco cessation, Alcohol consumption, bodyweight management, medication adherence, dietary intake, physical exercise
Ko-Ko-Zaw et al ⁵³ (2011) Myanmar	To determine the prevalence of hypertension and its associated factors	n=4616 ≥20 National	Medication consumption (32%), current smokers (24.9%), alcohol drinkers (47.1%), moderate physical activity (47%), overweight (29.9%), obese (11.8%)	Traditional: Medication adherence, tobacco cessation, alcohol consumption, physical exercise, bodyweight management
Han et al ⁵⁴ (2015) Myanmar	To determine the prevalence of the adherence and to identify the factors related to medication adherence among hypertensive patients	n=216, M age= 52.8 years Hospital, Urban area	Poor medication adherence (49.1%)	Traditional: Medication adherence,
Oo et al ⁵⁵ (2018) Myanmar	To describe the relationships between personal and environmental factors and health behaviors in persons with hypertension	n=104, M age= 53.27 years (range= 21 to 80) Urban area	Moderate level of health behaviors (70.59 ± 12.39)	Unspecified
Haug et al ⁵⁶ (2020) Myanmar	To identify the prevalence of self-care behaviors and their associated factors among hypertensive patients	n=410 M age= 55.4 years (range =30–70) Rural area	Did not adhere to medication (75.9%), low diet quality (62.2%), inadequate physical activity (75.1%), poor bodyweight management (90.5%), smoking (49.8%), did not drink alcohol (97.8%)	Traditional: Medication adherence, dietary intake, physical exercise, bodyweight management, tobacco cessation, and alcohol consumption
Apidechkul ⁵⁷ (2018) Thailand	To determine the prevalence of hypertension and its associated factors among older people	n=749 M age= 70.1 years (range= 60–100) Rural area	Smoking (17.4%), drinking alcohol (13.3%), consumed salty food (85%), less active (58.7%), overweight (57.3%)	Traditional: Tobacco cessation, alcohol consumption, dietary intake, physical exercise, and body weight management
Visanuyothin et al ⁵⁸ (2018) Thailand	To determine the prevalence of hypertension and associated factors between appearance and home blood pressure	n=125 M age= 63 years (range= 35–70) Urban area	Most patients had a Waist Circumference (WC) higher than the normal limit, BMIs ≥23 kg/m ² , nondrinkers and nonsmokers	Traditional: Bodyweight management, tobacco cessation, alcohol consumption
Meelab et al ⁵⁹ (2019) Thailand	To determine the prevalence of uncontrolled hypertension and to assess its relationship with patient characteristics	n=406 M age = 63.6 years aged ≥18 years Rural area	Never smoke (83.5%), never drink alcohol (71.9%), without any medication (17.7%), overweight (42.6%), obese (10.3%)	Traditional: Tobacco cessation, alcohol consumption, medication adherence, and bodyweight management

(Continued)

Table 3 (Continued).

Author, Year	Aim	Sample (n, M Age, Range) and Setting	Findings	Self-Care Management
Chotisiri et al ⁶⁰ (2016) Thailand	To explore hypertension knowledge, attitudes, and practices	n=144 M age = 66.1 years (range= 55–80) Rural area	Overweight (43.8%), consumed healthy diet (3–4 days/week) (50%), had physical exercise 1–2 times/week (91.0%), stress-relieving activities 1–2 times/week (87.5%)	Traditional: bodyweight management, dietary intake, physical exercise Alternative: stress-relieving
Somprasong et al ⁶¹ (2020) Thailand	To estimate the prevalence of HT and to determine the factors associated with HT among individuals from hill tribes	n=1287 M age=52.2 years (range=35–90) Rural area	Overweight (67.7%), smoking (10.5%), were alcohol drinkers (11.5%), did not exercise (54.9%) used a lot of salt for cooking (35.5%), used a lot of oil for cooking (32.2%)	Traditional: Bodyweight management, tobacco cessation, alcohol consumption, physical exercise, dietary intake with a cultural approach
Rusmevichientong et al ⁶² (2021) Thailand	To examine the dietary-salt-related determinants associated with the risk of hypertension	n=376 M age=59.69 Rural area	Overweight (42.7%), obese (23.8%), consumed 5 days a week high dietary salt food (34.6%), often/always taste the food before seasoning, read the amount of salt on the nutrition label, did not add salt/fish sauce to the food (53.5%)	Traditional: Bodyweight management and dietary intake
Pengpid et al ⁶³ (2019) Laos	To determine the national prevalence of hypertension and its awareness, treatment, and control	n=2543, M age=38.7 years (range= 18–64) National	Medication consumption (18.2%), older age taking an herbal remedy (12.8%)	Traditional: Medication adherence
Wee et al ⁶⁴ (2021) Singapore and Malaysia.	To compare hypertension self-care profiles in two populations in primary care settings from Singapore and Malaysia.	n= 1123 M age= 63.6 years (Singapore) 60.4 years (Malaysia) ≥40 years National	<ul style="list-style-type: none"> On three or more than four antihypertensive medications: Malaysia (20.9%) and Singapore (14.3%) Overweight: Malaysia (34.3%) and Singapore (33.9) Obese: Malaysia (47.8%) and Singapore (43.1%) The mean total score of HTN-SCP: Malaysia (Mean 184.1, SD 22.8) and Singapore (mean 189.9, SD 27.6) 	Traditional: Medication adherence and bodyweight management
Rahman et al ⁷⁶ (2015) Malaysia, Indonesia, Thailand, and The Philippines	To gain a deeper understanding of hypertension management in Asia (Malaysia, Indonesia, Thailand, and The Philippines)	n= 110 (range= 35–65) Urban area	Motivations for implementing hypertension management. See Table 2.	Unspecified

Note: ^aArticle in Bahasa; HTN-SCP: hypertension self-care profile.

Table 4 Articles Exploring Self-Care Management for Hypertension (Qualitative Studies)

Author, Year	Aim	Sample (n, M Age, Range) and Setting	Findings	Self-Care Management
Mizutani et al ⁷⁴ (2016) Indonesia	To explore healthy-lifestyle behaviors as perceived by Muslim married couples with hypertension	n=12 couples, M age = 51.2 years (range= 40–64) Rural area	Eating behavior, physical activity, resting, not smoking, managing stress, seeking health information, seeking health care, caring for other people, and fulfilling an obligation to God were implemented healthy lifestyle	Traditional: Physical exercise, Dietary intake, tobacco cessation, stress-relieving Alternative: spiritual fulfillment, resting
Rahmawati & Bajorek ⁶⁵ (2017) Indonesia	To explore perspectives of hypertension from people who do not consume their medication	n=30, ≥45 years Rural area	Reluctance to take anti-hypertensive medications. Details at Table 2	Traditional: Medication adherence
Kurnia et al ⁶⁶ (2018) Indonesia	To explore the experiences of barriers to hypertension management in the Minangkabau ethnic group	n=12 Urban area	Lack of self-motivation in the management of hypertension. Details in Table 2 .	Traditional: Dietary intake Alternative: stress-relieving with a cultural approach
Berek & Afiyanti ⁶⁷ (2020) Indonesia	To explore inhibiting and barrier of hypertensive patient self-care compliant	n=5 (range=43–70) Urban area	Inhibiting and barrier of self-care. See Table 2	Traditional: Medication adherence, dietary intake
Sulistyaningrum et al ⁶⁸ (2021) Indonesia	To understand the behavior of hypertensive patients	n=6 Hospital, N/A	Participants have implemented A low salt diet, cessation of cigarette and alcohol consumption, increase in activity and exercise, regulation of sleep and rest needs, application of stress control methods, and hypertension treatment and care	Traditional: Dietary intake, tobacco cessation, alcohol consumption, physical exercise treatment adherence Alternative: sleep and resting, stress-relieving
Shima et al ⁶⁹ (2014) Malaysia	To explore patients' experiences with hypertension and reasons for not following self-care recommendations	n=25 M age= 49 years Rural area	Reasons for not following self-care recommendations. See Table 2 .	Traditional: Medication adherence, dietary intake, physical exercise
Tan et al ⁷⁰ (2017) Malaysia	To explore hypertensive patients' perspectives on medication usage and hypertension management	n=17 Urban area	Poor medication adherence and Herbal consumption was chosen over medication	Traditional: Medication adherence
Tan et al ⁷¹ (2019) Singapore	To explore the perceived social and physical environments of low socio-economic status of older people with hypertension	n=22 Urban area	Social and physical environments of hypertensive older patients. See Table 2	Traditional: Culturally diet intake, physical exercise, medication adherence
Woodham et al ⁷² (2018) Thailand	To understand reasons for poor adherence and home self-management of hypertensive older people	n=30 (range =60–79) Rural area	Reasons for poor medication adherence. See Table 2 .	Traditional: Medication adherence
Sadang et al ⁷³ (2021) Philippines	To explore the common self-care hypertension practices of the Meranao tribe during the Covid-19 pandemic	n=10 Rural area	Self-care practice: use of herbal remedies, Compliance with prescribed medications, Dietary control, physical activity active.	Traditional: Medication adherence, dietary intake, physical exercise with a cultural approach

In the quantitative and mixed-method studies, studies indicated that traditional self-care management, such as body weight management, physical exercise, dietary intake, and medication adherence were poorly practiced. Respectively, studies showed unaddressed risk factors for heart disease and stroke with a 50% incidence or more being reported for overweight/obese (8 studies^{20,30,33,50,52,56,57,61}), low level physical exercise (8 studies^{21,24,31,32,45,56,57,61}), poor/low-quality dietary intake (9 studies^{21,23,30,34,40,56,57,60,75}), and poor adherence to medication (4 studies^{27,32,52,56}).

In the qualitative studies, the majority explored reasons for not adhering to self-care management mainly on medication adherence which we will explain in detail in the next section. Overall, a few studies^{28,70,73} identified the usage of herbal as medication for hypertension.

Facilitating and Inhibiting Factors

In the review of the retrieved articles, we identified facilitating and inhibiting factors of self-care management for hypertension. These factors are described in the article texts as examples from the statements of participants found in the studies and are described in Table 5. We further divided these examples into internal and external associated factors. Internal sources are those that are under individual's control or influence and external sources or associated factors are those that are influenced by others in the household or by the community or environment in which the participant lives. Statements described in the articles text such as "Put reminder not to forget" and "motivation to avoid progression" are considered as internal facilitating factors to practice self-care management. Having "discussion with partners related to medication problems and organized activities by the health center" to improve health, are examples of external facilitating associated factors. Whereas statements in the text such as "Perceived self-care practice not as a priority", "side effects", "feeling tired of medication", "having no signs and symptoms" of hypertension, as well as "time and financial barrier" were classified as internal inhibitory sources which inhibit self-care practice among hypertensive subjects in SEA. Whereas hypertension diet "not adjusted to the culture", "distance barrier" to the health center, "lack of family support", and "lack of knowledge" related to hypertension and its management were considered as external sources.

Discussion

The primary aim of this review was to examine and map the state of the science of self-care management of hypertensive people living in SEA countries. The evidence presented indicates that there is a high rate of overweight/obese, poor physical exercise, poor/low-quality dietary intake, and not adhering to medication in hypertensive people in the SEA region. As a consequence of economic development, significant changes in diet, mainly the increased consumption of high fat and sugar, combined with physical exercise reduction occurred in many Asian countries.^{77,78} Other economically developed or developing countries show similar trends. In the USA, diet adherence and body weight management are only 18% and 39%, respectively, among hypertensive patients.⁸⁰ Poor body weight management (53.2%) and poor physical exercise (69%) were reported among hypertensive patients in Ethiopia.⁷⁹ In Iran, among hypertensive patients, only 24.5% adhered to performing physical exercise and 39.2% managed their body weight.⁸⁰ Lifestyle has been a critical factor contributing to the rise in incidence of hypertension globally, and lifestyle risk factors remain poorly managed by many populations including SEA. A focus on lifestyle risk reduction in hypertensive people is a clear implication of our findings.

Another finding of our review is the use of herbal as hypertension medication. Similarly, previous studies have shown that using a herbal as self-medication is not only found with older age, but also among young people in SEA. Fear of adverse reactions in prescribed medicine, the effectiveness of herbal medicine, and easier access were reasons for choosing herbal.^{83–85} However, consuming herbals as self-medication poses a health risk as dosing is unreliable, efficacy for short- and long-term use is understudied, and harmful interaction effects with polypharmacy may occur.^{84–86} Therefore, it is important to assess the knowledge of patients in using herbal and to what extent herbal medicine is used to manage hypertension.

We report various internal and external factors described across studies influencing poor self-care management. Because this is a secondary finding of our review, further research into the scope and complexity of factors influencing self-care management is warranted.

Table 5 The Facilitating and Inhibiting Factors of Self-Care Management for Hypertension

Factors	Theme	Sub-Theme	Sources	Quotations
Facilitating	Internal sources	Put reminder not to forget	Tan et al; ⁷⁰ Tan et al ⁷¹	I keep it in a plastic bag. I will write or record in a book when taking medicine to avoid forgetting because I am a stroke patient; ⁷⁰ p.4).
		Motivation to avoid progression	Tan et al; ⁷¹ Mizutani et al; ⁷⁴ Sulistyanningrum et al; ⁶⁸ Rahman et al ⁷⁶	If you do not protect yourself, who would protect? Others cannot protect you ... If [you have] high blood pressure and do not control yourself, if [you] collapse ... heart does not die, body dies ... So, you just lay there and it's awful ... and become a burden to others; ⁷¹ p.6)
	External Sources	Having discussion partner	Tan et al; ⁷⁰	I prefer to share my medication problem with member of the NGO because they know me well; ⁷⁰ p.4).
		Organized activities by the health center	Berek & Afyanti; ⁶⁷ Mizutani et al; ⁷⁴ Rahmawati & Bajorek; ⁶⁵ Tan et al; ⁷⁰ Tan et al ⁷¹ at the public health center, usually every Saturday there is an elderly exercise program, so I joined there ...; ⁶⁷ p.27.
Inhibiting	Internal sources	Self-care practice is not a priority	Shima et al; ⁶⁹ Berek & Afyanti; ⁶⁷ Rahmawati & Bajorek ⁶⁵	Taking medication is not a priority in my daily routine; ⁶⁹ p.1601.
		Side effects and feeling tired of medication	Shima et al; ⁶⁹ Tan et al; ⁷⁰ Berek & Afyanti; ⁶⁷ Woodham et al; ⁷² Rahmawati & Bajorek; ⁶⁵ Rahman et al ⁷⁶	I got tired easily and had no mood. I also experienced neatness, palpitations, and sweating with the medication; ⁶⁹ p.1601.
		No sign and symptoms	Woodham et al; ⁷² Sadang et al; ⁷³ Rahmawati & Bajorek; ⁶⁵ Rahman et al ⁷⁶	I do not feel like I need to take medicine because I do not have any signs or symptoms. I do not have headache or anything. I do not see reason why I need to take medicine; ⁷² p.86.
		Financial barrier	Mizutani et al; ⁷⁴ Sadang et al; ⁷³ Rahmawati & Bajorek; ⁶⁵ Rahman et al; ⁷⁶ Kurnia et al ⁶⁶	I want a variation of menu, but I cannot afford it. I have similar menu for breakfast, lunch, and dinner; ⁷⁴ p.20.
		Time barrier	Mizutani et al; ⁷⁴ Berek & Afyanti; ⁶⁷ Kurnia et al; ⁶⁶ Tan et al ⁷¹	I am too busy for my life ... I work from 9.00 to 17.00. I want to walk in the morning before working, but I cannot because I am busy; ⁷⁴ p.20.
	External Sources	Not adjusted to the culture	S. T. Tan et al; ⁷¹ Kurnia et al ⁶⁶	They advise taking this like ... Oat, green veggies that Chinese like to take as soup, steamed fish ... We Malays cannot eat like that ... You know Malays must eat with chilies, without chilies we cannot eat right; ⁷¹ p.6.
		Distance barrier	Tan et al; ⁷⁰ S. T. Tan et al; ⁷¹ Mizutani et al; ⁷⁴ Rahmawati & Bajorek ⁶⁵	I have problem in getting transportation because hospital is too far; ⁷⁰ p.4.
		Lack of support from family	Shima et al; ⁶⁹ Berek & Afyanti; ⁶⁷ Kurnia et al ⁶⁶	My wife still cooks food high in salt and fats although she knows I have hypertension; ⁶⁹ p.1601.
		Lack of knowledge	Rahmawati & Bajorek; ⁶⁵ Rahman et al ⁷⁶	Honestly, I expect the midwife to give me specific instructions about medicines that can decrease my blood pressure. The truth is, the midwife never told me to take any hypertensive medications; ⁶⁵ p.237.

Hypertensive study participants described unique challenges across studies we examined. However, some patterns emerged. We found that motivation to avoid the progress of hypertension, having discussion partners, and various health activities conducted by health centers were facilitating factors in the practice of self-care management. Others have reported that the motivation to avoid the progress of hypertension increases when patients have sufficient knowledge of the disease process. Knowledge of hypertension was positively related to self-care management of hypertension.^{81,82} By sharing with others, patients have a chance to exchange information, share their problems and increase their willingness to manage their hypertension.^{81,83,84} Therefore, assessing knowledge of hypertension, ensuring the availability of partner to support hypertension management, and creative program offered by community health centers are important to consider in future research.

Another consideration of self-care management for hypertensive patients in SEA countries is family structure, where most are extended families.^{85,86} People living under the same roof will affect self-care management as indicated in our findings. Lack of family support is one of the inhibiting factors in implementing high-quality dietary intake. In one study, low family support also correlated with the low score of hypertension self-care among hypertensive patients.⁸⁷ Therefore, involving family while working with hypertensive patients to strengthen their self-care management need to be considered in future research.

We identified some cultural aspects as inhibiting factors to implement self-care practice as in Figure 2. Food intake in SEA countries is still closely affected by the culture in terms of salty, oily, and cooked with coconut milk.⁸¹ Things that should be reduced in self-care management. Approach that aptly adopts culture could increase the successfulness of intervention.¹⁴

Another inhibiting factor is the financial status of the individual and family. Insufficient response of health-care systems in low-income/middle-income countries in many SEA nations left the burden of medical cost to the patients,⁸⁸

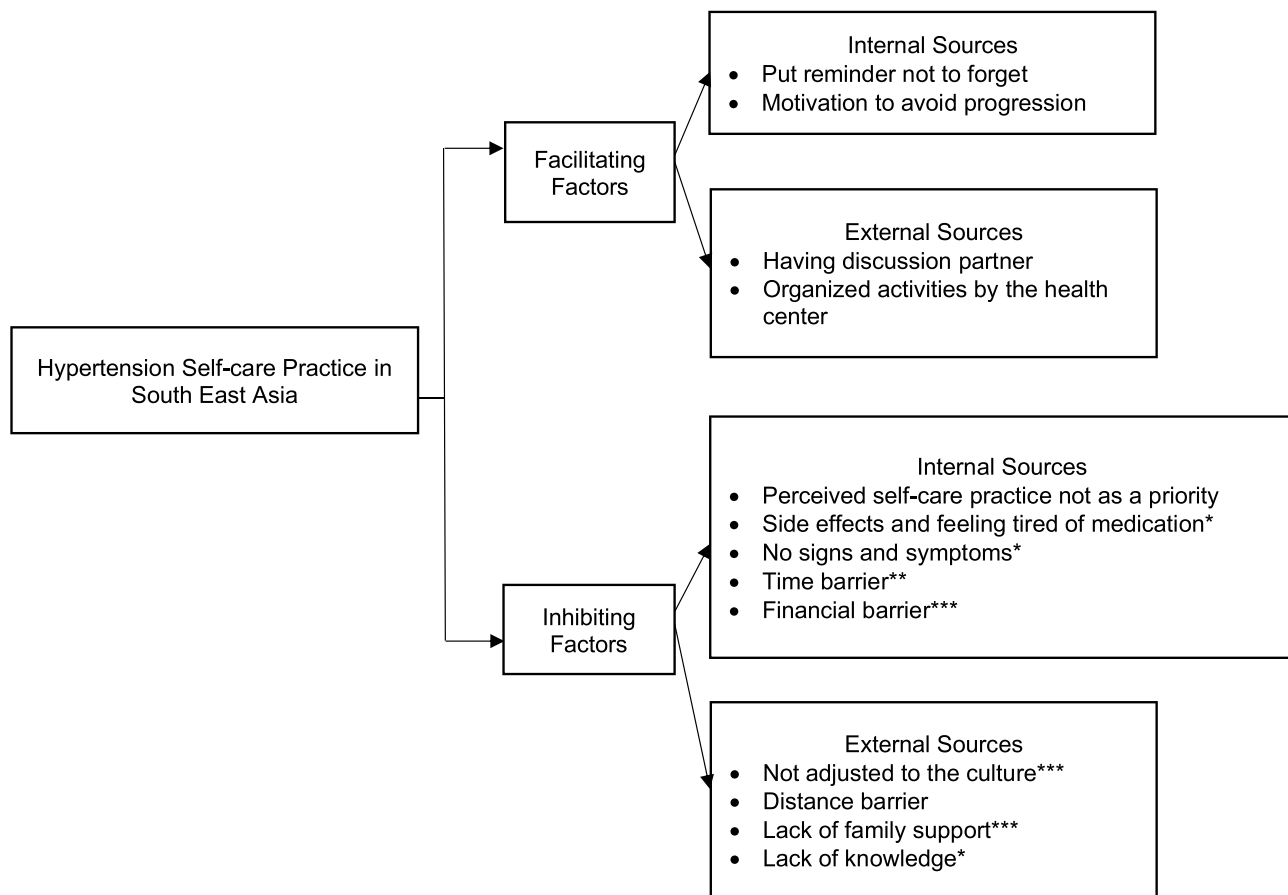


Figure 2 The framework of hypertension self-care practices inhibiting and facilitating factors in South East Asia. *Factors of not adhering to medication. **Factors of poor physical exercise. ***Factors of overweight/obese and poor/low-quality dietary intake.

including the patient with chronic diseases such as hypertension who need lifelong treatment. The cost of medication was a major reason for non-compliance in self-care management.^{89,90}

Better understanding of the particular issues confronting hypertensive individuals will allow for a better-adjusted response to address the need of particular patients and for particular environments and contexts.⁹⁵ Personalized approaches that consider both personal attributes and external circumstances in self-management of hypertensive populations were found to be important in this scoping review and should be rigorously studied in future research. Nurses working in the community have an important role to help manage the self-care practice and should consider individual and cultural aspect in helping hypertensive patients to manage their self-care. In addition, health service agencies must consider issues of access and cost of hypertension treatment which is prevalent among the adult populations of SEA and requires lifetime treatment.

The limitations of the review are only English and Bahasa material were included in the analysis.

Conclusions

Our review is the first to explore hypertension self-care management in SEA countries in naturalistic setting. Our findings indicate a high prevalence of obesity, low physical exercise, poor quality dietary intake and poor adherence to prescribed medications in many of the studies reviewed. Use of herbals as the anti-hypertensive medication is also identified in some of the reviewed studies. Our review indicates a range of challenges for individuals in practicing hypertensive self-care. Further prospective research on the challenges to self-care management of hypertension needs to be done to better understand individual and contextual influences. Personalized approaches to manage these challenges will require rigorous study.

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