Original article

Received:Jan. 7, 2025
Revised:Feb. 11, 2025
Accepted:Mar. 10, 2025
Published:Mar. 15, 2025

Factors Influencing Self-Management Behaviors for Hypertension Prevention Among Prehypertensive Individuals in Mae Hong Son Province, Northern Thailand

Somporn Santiprasitkul[1], Prapatsorn Thammetha[1], Watanee Chaita[2], Sawitree Commoy[3], Ratchanee Phathaisoemboon[3], Bandit Sanprakorn[4], Pattarika Panya[1], and Sarinya Chainunt[1*]

[1]Faculty of Nursing, Chiang Mai Rajabhat University, Mae Hong Son Campus
[2]Mae La Noi Hospital
[3]Mae Pang Subdistrict Health Promoting Hospital
[4]Mae Su Subdistrict Health Promoting Hospital

Abstract

Hypertension is a significant health problem affecting populations worldwide and serving as a major risk factor for cardiovascular and cerebrovascular diseases. These are leading causes of premature death, particularly among populations in remote areas such as Mae Hong Son Province. Preventing hypertension requires proper self-management behaviors, alongside other factors such as self-management ability awareness, access to and use of healthcare services, and health literacy. This study aims to describe these variables and examine the influence of access to health information and services, self-efficacy, and health literacy on self-management among individuals with prehypertension in Mae Hong Son. The sample consisted of 286 individuals at risk of hypertension, aged 35 and above, selected by convenience sampling. The data collection tools included a five-part interview: personal information, self-efficacy, access to health information and services, health literacy, and self-management behaviors. The quality of the tools was validated for reliability using Cronbach's alpha, which ranged from .77 to .98. The study results revealed that the sample exhibited low self-management behavior (6.14%), moderate (33.22%), high (44.07%), and only 16.57% exhibited the highest level of self-management behavior. The findings revealed that self-efficacy had a positive correlation ($r = .722$, $p < .01$) and could significantly predict self-management behavior ($ß = .623$, $p < .001$). Additionally, access to health information and services was positively correlated ($r = .491$, $p < .01$) and significantly predicted self-management behavior ($ß = .260$, $p < .001$). Health-promoting hospitals should refocus self-management programs by enhancing self-efficacy in individuals with prehypertension.

Keywords: Prehypertensive Individuals, Self-management, Self-efficacy, Health Services, Health Literacy

Corresponding author: Sarinya Chainunt, E-mail: sarinya_cha@g.cmru.ac.th

Introduction

Hypertension, commonly known as high blood pressure, is a significant global health concern due to its high prevalence and severe health consequences. As of 2019, approximately 1.28 billion adults aged 30–79 years worldwide were living with hypertension, with two-thirds residing in low- and middle- income countries (World Health Organization [WHO], 2021). In Thailand, the prevalence of hypertension has been steadily increasing. Data from the National Health Examination Survey indicate that the prevalence rose from 21% in 2003 to 25% in 2014 (MIMS Thailand, 2024). More recent studies suggest that this trend has continued, with the prevalence remaining high in subsequent years (Aekplakorn et al., 2024). Notably, a significant proportion of individuals with hypertension in Thailand are unaware of their condition, and among those diagnosed, blood pressure control rates remain suboptimal (WHO, 2023). The consequences of uncontrolled hypertension are profound and multifaceted. Medically, it is a leading risk factor for cardiovascular diseases, including heart attacks and strokes, and can lead to kidney failure and other health complications (WHO, 2021). Economically, hypertension imposes a substantial burden on healthcare systems and economies. The WHO reports that the economic benefits of improved hypertension treatment programs outweigh the costs by about 18 to 1, highlighting the financial strain unmanaged hypertension places on societies (WHO, 2023). Socially, individuals with hypertension may experience a diminished quality of life due to the chronic nature of the condition and its associated health challenges.

One of significant public health strategies to address hypertension is to prevent the progression of the disease in prehypertensive populations. Prehypertension is defined as systolic blood pressure between 120– 139 mmHg or diastolic pressure between 80– 89 mmHg, serving as an intermediate stage before the onset of hypertension (Whelton et al., 2018). Globally, prehypertension affects a significant portion of the adult population, with prevalence estimates ranging from 22% to 38% in various studies (Li et al., 2019). In Thailand, a study reported that 32. 8% of adults aged 15 years and over were classified as prehypertensive, indicating a substantial public health concern (Rerksuppaphol & Rerksuppaphol, 2011). Preventing the progression from prehypertension to hypertension is crucial, as early intervention can reduce the risk of cardiovascular events and other complications. Implementing these interventions at the prehypertensive stage is vital for public health, as it can curb the increasing prevalence of hypertension and its associated health burdens. Effective strategies include lifestyle modifications such as adopting a heart- healthy diet, reducing sodium intake, engaging in regular physical activity, maintaining a healthy weight, and managing stress (He et al., 2020; Margerison et al., 2020; Ndanuko et al., 2016). These non-pharmacological interventions have been shown to significantly lower blood pressure and delay the onset of hypertension. In some cases, pharmacological treatments may be considered, especially for individuals with additional risk factors, to further prevent the development of hypertension (Fuchs et al., 2015). Adopting these preventive behaviors, however, requires consistent effort and commitment. While these behaviors are proven to reduce the risk of hypertension, maintaining them over time can be challenging without the necessary skills, knowledge, and motivation (Appel et al., 1997; Hayes et al., 2022; Pescatello et al., 2015). Developing effective self-management strategies is therefore essential, as it empowers individuals to take control of their health and make sustainable lifestyle changes (Esler, 2017; Whelton et al., 2018).

Self- management refers to an individual's ability to manage their health condition through monitoring symptoms, adhering to treatments, maintaining healthy behaviors, and addressing the psychosocial impacts of their condition (Barlow et al., 2002). Self-management involves individuals actively monitoring and managing their health conditions. It requires knowledge, skills, and motivation to make informed

decisions. Key characteristics include goal setting, problem-solving, self-monitoring, and adherence to treatment plans. Effective self- management behaviors are shaped by several factors, including access to health information and services, self- efficacy, and health literacy. Access to reliable health information and services provides the foundational knowledge and resources needed for individuals to make informed decisions about their care (Nutbeam, 2008). Self- efficacy, or the confidence in one' s ability to perform health- related tasks, determines whether individuals will take action and persist in managing their condition (Bandura, 1997). High self-efficacy promotes commitment to adopting health behaviors that effectively prevent hypertension (Tan et al., 2021). Literature reviews indicate a positive correlation between self-efficacy and self- management behaviors in postpartum women (Wongchanglor et al., 2017), patients with chronic diseases (Chen et al., 2023), individuals with chronic obstructive pulmonary disease (Wattanakitkrileart et al., 2015), and diabetic patients (Xie et al., 2020). This underscores the empowering role of self-efficacy in managing chronic conditions, including hypertension, and the potential for individuals to take control of their health. Health literacy, which enables individuals to understand and apply health information, enhances both access to services and self-efficacy, as informed individuals are better equipped to navigate healthcare systems and implement effective self- care practices (Nutbeam, 2008). Together, these factors create a synergistic relationship, empowering individuals to self- manage their health more effectively. Research shows that health literacy significantly influences health behaviors and self- management behaviors in patients with various chronic conditions and older adults with uncontrolled hypertension.

Mae Hong Son Province, with its mountainous terrain and remote communities, presents unique challenges in healthcare delivery. The Mae Hong Son Provincial Public Health Office reported that in 2023, the incidence of new hypertension cases among individuals aged 35 years and older from 2020 to 2022 was 4.18%, 4.80%, and 3.36%, respectively. However, in 2022, only 50.04% of patients achieved controlled blood pressure levels, falling short of the 60% target. The province also reported a higher proportion of stroke patients (24– 27%) compared to the national average (20%), attributed to undiagnosed conditions, lack of consistent treatment, and difficulties accessing healthcare services due to geographic, workforce, and financial barriers (Mae Hong Son Provincial Public Health Office, 2023).

The high prevalence of hypertension in Mae Hong Son underscores the urgent need to understand how prehypertensive populations manage their risk factors. In rural contexts such as Mae Hong Son, geographic isolation and limited healthcare infrastructure significantly impede access to timely care and essential health information (WHO, 2021). Studies have shown that self- efficacy and health literacy are often low in resource-limited or rural settings, further complicating effective self- management (Berkman et al., 2011; Nutbeam, 2008). A previous qualitative study in Mae Hong Son found that older adults with hypertension struggled to self-manage their diet, exercise, and medication due to limited knowledge and skills, compounded by physical frailty and low literacy (Kongai et al., 2023). Given these challenges, it is essential to explore how access to health information and services, along with self- efficacy and health literacy, influence self- management among individuals with prehypertension in the context of Mae Hong Son. This study aims to describe these variables and examine the influence of access to health information and services, self- efficacy, and health literacy on self- management among individuals with prehypertension in Mae Hong Son. A deeper understanding of these relationships will inform the development of tailored strategies and interventions to enhance self-management and prevent the progression of hypertension in prehypertensive individuals (Barlow et al., 2002).

Research Methodology

Study Design

This was a cross-sectional descriptive study.

Study Population and Sample

The population consisted of individuals at risk for hypertension, both males and females, residing in Mae Hong Son Province. The convenience sampling was chosen due to logistical concerns associated with conducting random sampling in remote areas of Mae Hong Son and the need to ensure health service accessibility, allowing the study to capture individuals already engaged with local healthcare facilities based on the following inclusion criteria: 1) Aged 35 years or older 2) Screened for hypertension by healthcare professionals at a health promoting hospital in the past 12 months with a record of systolic blood pressure (SBP) between 120–139 mmHg and/or diastolic blood pressure (DBP) between 80–89 mmHg. 3) Never diagnosed with hypertension by a physician. Exclusion criteria included: 1) Taking antihypertensive medications.

Sample Size: Of the 993 pre-hypertensive people, the sample size was calculated using Taro Yamane's formula (Yamane, 1973) at a 0.05 significance level, resulting in 286 participants.

Research Instruments. The data collection tools comprised five parts as follows:

1) Personal and health information questionnaire. The Personal and Health Information Questionnaire was designed to gather essential demographic, health, and treatment data. This tool was a foundational instrument to ensure that the study sample was appropriate and that the subsequent analyses could account for relevant personal health factors.

2) Self-Efficacy for Hypertension Prevention Scale. Developed by the researcher and validated by three experts (CVI = 0.73), this scale included 16 items rated on a 4-point Likert scale. It measured the participants' confidence in their ability to engage in behaviors that prevent hypertension. Scores were divided into four categories: low (0–16), moderate (17–32), high (33–48), and very high self-efficacy (49–64), with a Cronbach's alpha coefficient for reliability of 0.94, indicating excellent internal consistency.

3) Access to Health information and services Scale. This researcher-developed scale was validated by three experts (CVI = 0.80) and included five items rated on a 4-point Likert scale. Scores were also rated on a 4-point Likert scale and categorized into low (0-5), moderate (6–10), high, and very high access levels (16 - 20). Cronbach's alpha coefficient of 0.84 demonstrated reliable results for measuring this variable.

4) Health Literacy for Hypertension Prevention Scale. This researcher-developed tool, validated by three experts (CVI = 0.82), consisted of 17 items assessing understanding of hypertension and its prevention, with a total score of 34. Higher scores indicated greater health literacy, categorized as low health literacy (0–12), Moderate health literacy (13–24), and High health literacy (25–34). Cronbach's alpha coefficient for reliability was 0.77.

5) Self-Management Behaviors for Hypertension Prevention Scale. This researcher-developed scale, validated by three experts (CVI = 0.88), included 16 items rated on a 4-point Likert scale, reflecting the frequency of self-management behaviors. Scores were categorized as low self-management (0–16), moderate self-management (17–32), high self-management (33–48), and very high self-management (49–64). The Cronbach's alpha coefficient for reliability was 0.97, reflecting outstanding internal consistency.

Data Collection

This research was conducted between October–November 2024. After the Human Research Ethics Committee approved the research proposal, the researcher proceeded with data collection as follows:

1. The researcher submitted a letter of approval to the Provincial Public Health Office to request permission to collect field data and provide a detailed explanation of the research project.

2. The researcher met with healthcare personnel in the research area to request their assistance in identifying potential participants who met the inclusion criteria. The researcher then scheduled appointments to meet with individuals expected to become the study sample at a community multipurpose centre. Afterward, the researcher and the team met with the potential participants to introduce themselves and explain the details of the study. The data collection began once the participants agreed to join the research and signed the consent form. A face-to-face structured interview was conducted, where data collectors read the questionnaire aloud to each participant, who then provided their responses. The interviews lasted 15 to 30 minutes and were conducted using the research interview questionnaire.

Data Analysis

The researcher analyzed the data using statistical software (SPSS version 30) as follows:

1. For personal data such as gender, age, education, body mass index, blood pressure levels, and monthly income, descriptive statistics, including frequency distributions, percentages, mean, minimum, and maximum values, were used.

2. For data regarding the scores on self- efficacy for hypertension prevention, access to health information and services, health literacy for hypertension prevention, and self- management behaviors for hypertension prevention, descriptive statistics such as percentages, means, standard deviations, and minimum and maximum values were used.

3. Multiple regression analysis using the enter method was employed to assess the predictive power of factors such as self-efficacy for hypertension prevention, access to health information and services, and health literacy for hypertension prevention on self-management behaviors for hypertension prevention. The significance level was set at .05.

Ethical Approval

This research has been approved by the Human Research Ethics Committee of Chiang Mai Rajabhat University (IRBCMRU 2024/ 362. 14. 08) . The researcher clearly explained the research objectives, procedures, expected benefits, and potential risks of participation. Participants were also allowed to ask any questions regarding the study. Furthermore, the researcher explained how to protect participants' rights.

Participants were informed that they had the right to voluntarily decide whether to join or decline participation in the study, with no coercion involved. They were also asked to sign an informed consent form to participate. Additionally, participants were made aware that they could withdraw from the study without providing a reason and that their decision to withdraw would not affect the treatment they receive now or in the future.

Results

General Information

The sample consisted of 46.67% males and 53.33% females, with an average age of 54.42 years (SD = 12.82). Regarding marital status, 77.67% were married, 9.33% were single, and 13.00% were widowed or divorced. Educational levels were as follows: 35.66% had no formal education, 30.67% had primary education, 5% had completed lower secondary education, 9% had completed upper secondary education, and 19.67% had education beyond high school. The majority of the sample (57%) were farmers. Regarding health history, 88.67% had no chronic diseases, and 54% had no family history of chronic illnesses. Approximately 56.67% had a body mass index greater than 23 (kg/m^2), and the average systolic blood pressure was 128.07 mmHg (SD = 13.45), while the average diastolic blood pressure was 79.65 mmHg (SD = 9.47).

Self-efficacy for hypertension prevention, access to health information and services, health literacy, and self-management behaviors for hypertension prevention.

Pearson's Product Moment Correlation analysis revealed significant relationships between the variables. Self-management behaviors showed a strong positive correlation with self-efficacy for hypertension prevention ($r = 0.722$, $p < .01$), a moderate positive correlation with access to health services ($r = 0.491$, $p < .01$), and a weak positive correlation with health literacy regarding hypertension prevention ($r = 0.154$, $p < .01$). These findings highlight the important roles of self-efficacy, access to health information and services, and health literacy in influencing self-management behaviors for hypertension prevention.

Table 1. Percentage distribution of self-efficacy for hypertension prevention, access to health information and services, health literacy for hypertension prevention, and self-management behaviors for hypertension prevention (n = 286)

Variables	Number	Percentage
Self-Efficacy for Hypertension Prevention		
Low	4	1.40
Moderate	72	25.18
High	167	58.39
Very High	43	15.03
Access to Health Information and Services		
Low	8	2.79
Moderate	38	13.29
High	152	53.15
Very High	88	30.77
Health Literacy for Hypertension Prevention		
Low	7	2.45
Moderate	208	72.73
High	71	24.82
Self-Management Behaviors for Hypertension Prevention		
Low	9	3.15
Moderate	103	36.01
High	123	43.01
Very High	51	17.83

The analysis of the predictive power of self-efficacy for hypertension prevention, access to health information and services, and health literacy for hypertension prevention on self-management behaviors for hypertension prevention revealed the following:

The independent variables, namely self-efficacy for hypertension prevention and access to health services, together significantly explained the variance in self-management behaviors for hypertension prevention in the sample ($p < .05$). However, health literacy for hypertension prevention did not significantly explain the variance in self-management behaviors for hypertension prevention in the sample ($p > .05$). (Table 2)

Table 2. Multiple Regression Statistics for Self-Efficacy for Hypertension Prevention, Access to Health Services, and Health Literacy for Hypertension Prevention on Self-Management Behaviors for Hypertension Prevention (n = 286)

Variables	B	Std. Error	ß	t	p-value
Self-efficacy for hypertension prevention	.712	.048	.623	14.980	0.001**
Access to health information and services	.941	.150	.260	6.275	0.001**
Health literacy for hypertension prevention	.085	.133	.025	.636	.177

$R^2 = .763$, R^2 adjust = .578, $F = 130.852$, $p = .05$, *$p < .05$; **$p < .01$

Discussion

The results of this study indicate that the sample exhibited varying levels of self-management behaviors for hypertension prevention: 6.14% demonstrated low self-management, 33.22% moderate self-management, 44.07% high self-management, and 16.57% the highest level of self-management.

Self-efficacy showed a strong positive relationship with self-management behavior ($r = 0.722$, $p < 0.01$) and significantly predicted self-management behavior for hypertension prevention ($ß = 0.623$, $p < 0.001$). This finding aligns with Lu et al. (2022), who investigated the relationship between self-efficacy and self-management behavior among middle-aged and elderly Chinese patients with hypertension. Their study revealed that higher self-efficacy positively influenced behaviors such as medication adherence, symptom monitoring, and exercise, concluding that individuals are more likely to adopt preventive behaviors when they believe those behaviors are effective in preventing disease. Similarly, Xie et al. (2020) found that enhancing self-efficacy in diabetic patients improved their self-management behaviors. Chen et al. (2023) also reported that self-efficacy was strongly associated with better health self-management among patients with chronic illnesses. In patients with chronic obstructive pulmonary disease, Wattanakitkrileart et al. (2013) observed that higher self-efficacy improved symptom control and exercise tolerance. Likewise, Chen et al. (2023) found a positive relationship between self-efficacy and self-management behaviors in chronic patients. Collectively, these studies highlight that individuals with strong self-efficacy beliefs are more likely to engage in behaviors aligned with those beliefs, reinforcing the role of self-efficacy as a key factor in fostering effective self-management.

Access to health information and services was moderately correlated with self-management behaviors ($r = 0.491$, $p < 0.01$) and significantly predicted self-management behaviors for hypertension prevention ($ß = 0.260$, $p < 0.001$). This finding aligns with research by Wilson et al. (2011), who studied access to health services and self-management behaviors among diabetic patients from ethnic minorities. They found that limited access to health services, combined with language barriers that hindered effective communication, led to insufficient health advice and poor self-management. Similarly, a geographical study by Graves et al. (2019) reported that individuals in rural areas with long travel distances to health services—and thus limited access—experienced higher rates of diabetes-related complications and mortality. The study highlighted that delayed access to health services significantly impeded effective disease management. Convenient and timely access to health services is vital for effective self-management, as it enables patients to discuss concerns and receive personalized guidance and support from healthcare professionals. This interaction fosters education, emotional support, and trust, empowering patients to manage their conditions and prevent complications. Research underscores the critical role of patient-provider communication in promoting self-management. Sharkiya (2023) highlight that supportive communication enhances health outcomes and adherence to self-management practices. Paltzat et al. (2024) found that tailored self-management education and support intervention promote patient engagement and self-management behaviours. Additionally, a provider's ability to adjust and tailor their communication style is an important factor in helping patients to achieve optimal self-management. (Iroegbu et al., 2024).

The study found that health literacy was not a significant predictor of self-management behaviors for hypertension prevention **($p = 0.525$).** Health literacy is essential for understanding health information, but it alone does not consistently lead to self-management behaviors**.** Knowledge must be complemented by motivation, self-efficacy, and supportive environments to drive behavior change**.** Guo et al**. (**2021**)** emphasize that health literacy must work in conjunction with motivational and environmental factors, as knowledge

without action is insufficient. Cultural and belief systems also shape how health information is perceived and applied, with deeply ingrained practices often taking precedence over health literacy, as Nutbeam (2008) highlights. Moreover, health literacy often focuses on passive knowledge acquisition, whereas active skills like problem-solving and goal-setting are critical for effective self-management. This is consistent with a study by Kongai et al. (2023), which found that older adults with hypertension relied heavily on their families for managing their condition and treatment regimen. Schillinger et al. (2002) found that interventions integrating health literacy with behavioral skills training were significantly more effective in promoting self-management than health literacy alone. These findings underscore the need for a comprehensive approach that addresses motivation, psychosocial barriers, and environmental supports alongside health literacy to foster meaningful behavior change.

Conclusion

This study underscores the significant role of self-efficacy and access to health information and services in predicting self-management behaviors for hypertension prevention. The strong positive correlation between self-efficacy and self-management behaviors emphasizes the importance of fostering individuals' confidence in their ability to manage their health, as it has been shown to influence preventive actions directly. Additionally, access to health services, particularly in remote or underserved areas, is crucial in enhancing self-management outcomes, underlining the importance of timely and effective healthcare access. However, the findings indicate that health literacy alone does not significantly predict self-management behaviors, suggesting that a comprehensive approach, which includes motivation, environmental support, and psychosocial factors, is necessary to promote meaningful behavior change. These results underscore the need for tailored interventions that boost self-efficacy, improve access to healthcare, and address psychosocial and environmental barriers. This approach offers hope for the future of health management, as it can enhance self-management behaviors and prevent the progression of hypertension.

Limitations

This study has several limitations that should be acknowledged. First, the use of a convenience sample may limit the generalizability of the findings. Participants were selected based on accessibility rather than random sampling, which may introduce selection bias and reduce the representativeness of the broader population. As a result, the findings should be interpreted with caution and may not be directly applicable to other settings or demographics. Second, the study relied on face-to-face interviews, which are subject to recall bias and social desirability bias. This potential bias could affect the accuracy and reliability of the reported data. Third, we relied on secondary data sources for participants' prehypertension status and lacked details on the blood pressure screening procedures used by health-promoting hospitals. This may affect the accuracy of blood pressure readings and the interpretation of prehypertension status. Despite these limitations, the study provides valuable insights into self-management behaviours in pre-hypertensive individuals, contributing to the existing body of knowledge and offering directions for future research. Future studies should consider employing randomized sampling methods and objective measurement techniques to enhance the validity and reliability of findings.

Recommendations

Based on the discussion of findings, we recommend further research to explore the influence of factors such as professional and family support on self-management behaviors, as well as their role as mediators of health literacy in relation to self-management. Regarding health services and policies, self-management support programs based at health promoting hospitals should be designed and redirected with a focus on enhancing the self-efficacy of individuals

with prehypertension to improve their self-management outcomes.

Acknowledgements

We would like to express our sincere gratitude to the Mae La Noi District Public Health Office, Mae Pang Subdistrict Health Promoting Hospital, Mae Su Subdistrict Health Promoting Hospital, and Mae La Noi Hospital for their invaluable support throughout the research process. We would also like to acknowledge the Rajabhat University Strategic Program for Local Development for their financial support.

References

Aekplakorn, W., Chariyalertsak, S., Kessomboon, P., Assanangkornchai, S., Taneepanichskul, S., Goldstein, A., Cazabon, D., Neelapaichit, N., & Aimiosior, O. (2024). Trends in hypertension prevalence, awareness, treatment, and control in the Thai population, 2004 to 2020. *BMC Public Health, 24*, 3149. https://doi.org/10.1186/s12889-024-20643-1

Appel, L. J., Moore, T. J., Obarzanek, E., Vollmer, W. M., Svetkey, L. P., Sacks, F. M., ... & Karanja, N. (1997). A clinical trial of the effects of dietary patterns on blood pressure. *New England Journal of Medicine, 336*(16), 1117-1124. https://doi.org/10.1056/NEJM199704173361601

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: W.H. Freeman.

Barlow, J., Wright, C., Sheasby, J., Turner, A., & Hainsworth, J. (2002). Self-management approaches for people with chronic conditions: A review. *Patient Education and Counseling, 48*(2), 177–187. https://doi.org/10.1016/S0738-3991(02)00032-0

Berkman, N. D., Sheridan, S. L., Donahue, K. E., Halpern, D. J., & Crotty, K. (2011). Low health literacy and health outcomes: An updated systematic review. *Annals of Internal Medicine, 155*(2), 97–107. https://doi.org/10.7326/0003-4819-155-2-201107190-00005

Chen, J., Tian, Y., Yin, M., Lin, W., Tuersun, Y., Li, L., Yang, J., Wu, F., Kan, Y., Li, X., Gan, Y., Sun, X., Wu, Y., & He, F. (2023). Relationship between self-efficacy and adherence to self-management and medication among patients with chronic diseases in China: A multicentre cross-sectional study. *Journal of Psychosomatic Research*, *164*, 111105. https://doi.org/https://doi.org/10.1016/j.jpsychores.2022.111105

Chen, J., Tian, Y., Yin, M., Lin, W., Tuersun, Y., Li, L., Yang, J., Wu, F., Kan, Y., Li, X., Gan, Y., Sun, X., Wu, Y., & He, F. (2023). Relationship between self-efficacy and adherence to self-management and medication among patients with chronic diseases in China: A multicentre cross-sectional study. *Journal of Psychosomatic Research*, 164, 111105. https://doi.org/https://doi.org/10.1016/j.jpsychores.2022.111105

Esler, M. (2017). Mental stress and cardiovascular risk: Brain mechanisms and stress responses in hypertension. *Journal of Hypertension, 35*(3), 451-457. https://doi.org/10.1097/HJH.0000000000001191

Fuchs, F. D., de Mello, R. B., & Fuchs, S. C. (2015). Preventing the progression of prehypertension to hypertension: Role of antihypertensives. *Current Hypertension Reports, 17*(1), 505. https://doi.org/10.1007/s11906-014-0505-1

Graves, B. A., Liu, G., Kunberger, J., Canaday, L., & Bambis, B. (2019). Access to Diabetes Self-Management Education in a Rural State: A GIS Analysis. *Online Journal of Rural Nursing and Health Care, 19*(2), 98–126. https://doi.org/10.14574/ojrnhc.v19i2.575

Guo, S., Armstrong, R., Waters, E., et al. (2021). Role of health literacy in health behavior change. *Health Promotion International*, 36(1), 123–135.

Hayes, P., Ferrara, A., Keating, A., McKnight, K., & O'Regan, A. (2022). Physical Activity and Hypertension. *Reviews in Cardiovascular Medicine, 23*(9),302. https://doi.org/10.31083/j.rcm2309302

He, F. J., Tan, M., Ma, Y., & MacGregor, G. A. (2020). Salt reduction to prevent hypertension and cardiovascular disease. *Journal of the American College of Cardiology, 75*(6), 632-647. https://doi.org/10.1016/j.jacc.2019.11.055

Hibbard, J. H., & Greene, J. (2013). What the evidence shows about patient activation: Better health outcomes and care experiences; fewer data on costs. *Health Affairs*, *32*(2), 207-214.

Iroegbu, C., Tuot, D. S., Lewis, L., & Matura, L. A. (2024). The Influence of Patient-Provider Communication on Self-Management Among Patients With Chronic Illness: A Systematic Mixed Studies Review. *Journal of advanced nursing*, 10.1111/jan.16492. Advance online publication. https://doi.org/10.1111/jan.16492

Kongai, A., Kamdaeng, P., Lorga, T., Apiwongwarn, P., Satjasakulrat, S., & Naunboonruang, P. (2023). Hypertension Literacy and Self-Management among Older Persons Living with Hypertension, Mae Hong Son Province: A Critical Incident Technique Qualitative Study. *Journal of Nursing and Therapeutic Care, 41*(4), e265940.

Li, Y., Wang, L., Feng, X., Zhang, M., Huang, Z., Deng, Q., ... & Wang, L. (2019). Geographical variations in hypertension prevalence, awareness, treatment and control in China: findings from a nationwide and provincially representative survey. *Journal of Hypertension, 37*(9), 1819-1827. https://doi.org/10.1097/HJH.0000000000002093

Lu, J., Liu, L., Zheng, J., & Zhou, Z. (2022). Interaction between self-perceived disease control and self-management behaviors among Chinese middle-aged and older hypertensive patients: the role of subjective life expectancy. *BMC Public Health, 22*(1), 733. https://doi.org/10.1186/s12889-022-12990-8

Margerison, C., Riddell, L.J., McNaughton, S.A., & Nowson, C.A. (2020). Associations between dietary patterns and blood pressure in a sample of Australian adults. *Nutrition Journal, 19*, 5. https://doi.org/10.1186/s12937-019-0519-2

MIMS. (2024). *Hypertension: Disease Background*. Retrieved December 9, 2024 from https://www.mims.com/thailand/disease/hypertension/disease-background

Ndanuko, R.N., Tapsell, L.C., Charlton, K.E., Neale, E.P., & Batterham, M.J. (2016). Dietary Patterns and Blood Pressure in Adults: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. *American Society for Nutrition, 7*, 76-89. https://doi.org/10.3945/an.115.009753

Nutbeam, D. (2008). The evolving concept of health literacy. *Social Science & Medicine, 67*(12), 2072–2078. https://doi.org/10.1016/j.socscimed.2008.09.050

Paltzat, K., Scott, S., Dhaliwal, K. K., Saunders-Smith, T., Manns, B. J., Campbell, T., Ivers, N., Pannu, R., & Campbell, D. J. T. (2023). Patient Perspectives on a Tailored Self-Management Education and Support Intervention for Low-Income Seniors With Chronic Health Conditions. *CJC open*, *5*(11), 808–815. https://doi.org/10.1016/j.cjco.2023.08.002

Pescatello, L. S., Buchner, D. M., Jakicic, J. M., Powell, K. E., Kraus, W. E., & Bloodgood, B. (2015). Physical activity to prevent and treat hypertension: A systematic review. *Medicine & Science in Sports & Exercise, 47*(7), 1324-1333. https://doi.org/10.1249/MSS.0000000000000751

Rerksuppaphol, S., & Rerksuppaphol, L. (2011). Prevalence of prehypertension and hypertension among rural Thai adolescents. *Journal of the Medical Association of Thailand, 94*(7), 849-854.

Schillinger, D., Grumbach, K., Piette, J., et al. (2002). Association of health literacy with diabetes outcomes. *JAMA, 288*(4), 475–482.

Sharkiya, S.H. (2023). Quality communication can improve patient-centred health outcomes among older patients: a rapid review. *BMC Health Service Research*, *23*, 886. https://doi.org/10.1186/s12913-023-09869-8

Tan, F.C.J.H., Oka, P., Dambha-Miller, H. et al. (2021). The association between self-efficacy and self-care in essential hypertension: a systematic review. *BMC Fam Pract*. 22(44) https://doi.org/10.1186/s12875-021-01391-2

Wattanakitkrileart, D., Jarusombat, L., Chauyakul, P., & Pratumsri, V. (2015). Effect of a self-management program on perceived self-efficacy to control dyspnea and exercise tolerance in patients with chronic obstructive pulmonary disease. *Ramathibodi Nursing Journal, 21*(3), 352 – 367.

Whelton, P. K., Carey, R. M., Aronow, W. S., Casey, D. E., Collins, K. J., Dennison Himmelfarb, C., ... & Wright, J. T. (2018). 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults. *Hypertension, 71*(6), e13-e115. https://doi.org/10.1161/HYP.0000000000000065

World Health Organization [WHO]. (2021). *Hypertension*. Retrieved December 9, 2024 from https://www.who.int/news-room/fact-sheets/detail/hypertension

WHO. (2023). *First WHO report details devastating impact of hypertension and ways to stop it*. Retrieved December 9, 2024 from https://www.who.int/thailand/news/detail/19-09-2023-first-who-report-details-devastating-impact-of-hypertension-and-ways-to-stop-it

WHO. (2023). *Hypertension Thailand 2023 country profile*. Retrieved December 9, 2024 from https://www.who.int/publications/m/item/hypertension-tha-2023-country-profile

Wilson, C., Alam, R., (Assoc, S., Knighting, K., Williamson, S., & Beaver, K. (2011). Patient access to healthcare services and optimisation of self-management for ethnic minority populations living with diabetes: a systematic review. *Health & Social Care in the Community, 20*, 1–19. https://doi.org/10.1111/j.1365-2524.2011.01017.

Wongchanglor, J., Duangchan, P., & Intarakamhang, U. (2017). Influencing factors to individual and family self-management behavior of first-time postpartum mother. *Kuakarun Journal of Nursing*, *24*(1), 179 – 196.

Xie, Z., Liu, K., Or, C., Chen, J., Yan, M., & Wang, H. (2020). An examination of the socio-demographic correlates of patient adherence to self-management behaviors and the mediating roles of health attitudes and self-efficacy among patients with coexisting type 2 diabetes and hypertension. *BMC Public Health, 20*(1), 1227. https://doi.org/10.1186/s12889-020-09274-4

Yamane, T. (1973). *Statistics: An Introductory Analysis*. London: John Weather Hill.