

Healthy Lifestyle Behavioral Needs among the Elderly with Hypertension in Chiang Mai, Thailand

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This research aimed to identify the healthy lifestyle needs of hypertensive elderly and to explore the barriers and facilitators associated with healthy lifestyle behaviors. A sequential explanatory mixed-method design was used. In the quantitative phase, a cross-sectional survey of 400 hypertensive elderly was conducted through the self-administered questionnaire. In the qualitative phase, a total of 10 hypertensive elders attended one of two focus groups held in community health centers. Descriptive statistics, the modified priority needs index (PNI_{Modified}) and content analyses were used for the data analysis. According to the finding, it was found that three priorities of healthy lifestyle behaviors were identified as: health responsibility, healthy eating, and engaging in social activity (PNI_{Modified} = 0.36, 0.35, and 0.34, respectively). Participants identified barriers that included a lack of health care concerns, a lack of motivation, their perceived poor physical and mental health and inadequate community resources. Facilitators possessing knowledge of hypertension as well as relevant family supports were also identified. The findings are thought to be useful in terms of the planning and developing of an effectively tailored program to promote HLBs.

Keywords: needs assessment, healthy lifestyle behaviors, hypertension, older adults, aging

Globally, the prevalence of hypertension among senior citizens aged 60 and over has been rapidly increasing (James et al., 2014). Hypertension is also a common chronic disease among the elderly in many Asian countries, especially in developing countries (Jin et al., 2013). Moreover, more than 70% proportion of hypertensive patients in Asia remains uncontrolled blood pressure (Rahman et al., 2015). For Thailand, the number of senior patients with hypertension has steadily risen from 2007-2015 (Bureau of Non Communicable Disease, 2015). The statistics acquired from an internal medicine clinic, Maharaj Nakorn Chiangmai Hospital (2015) showed that the rate of elderly patients with hypertension was the highest when compared to other diseases. According to Tiptaradol and Aekplakorn (2012), urban people from the northern region of Thailand reported the highest prevalence of hypertension. Therefore, hypertension is thought to be an important health challenge, especially among the older population in Chiang Mai.

However, hypertension in the elderly is often undiagnosed and untreated leading to morbidity and mortality due to the fact that most older people with hypertension do not know that they have it until they have serious complications such as strokes, renal failure, atherosclerosis, or ischemic heart disease (Krishnan, Garg, & Kahandaliyanage, 2013). It is estimated that only 10% of cases are able to control and maintain their normal blood pressure (Lloyd-Sherlock, Beard, Minicuci, Ebrahim, & Chatterji, 2014). A significant impact has been observed in terms of health care cost for individual households, as well as the entire nation.

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Consequently, the eighth report by the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC-VIII), presented a treatment algorithm that can be used by physicians. The report also recommending lifestyle modifications and the use of pharmacologic treatments (James et al., 2014). Several studies have also demonstrated that physical activity at a level of moderate-intensity could reduce elevated systolic and diastolic blood pressure among the elderly (Kelley & Kelley, 2001; Martinson et al., 2003; Meisner et al., 2010; Phelan & Larson, 2002). Moreover, according to the Dietary Approaches to Stop Hypertension (DASH) that was developed by the US National Institute of Health along with the control of one's dietary sodium intake, have been determined to be essential for reducing blood pressure levels (Haveman-Nies, Groot, & Staveren, 2003; Sacks et al., 2001). However, only a few researchers have conducted studies on the needs, barriers and facilitators of Thai hypertensive elderly patients with regard to healthy lifestyle behaviors that would encourage hypertension management.

Healthy lifestyle behaviors (HLBs)

The concept of HLBs in the current study was developed from Rowe & Kahn's theory of successful aging (Rowe & Kahn, 1997). Rowe and Kahn (1998) have determined that healthy aging involves three main components: 1) avoiding disease and disabilities, 2) maintaining physical and mental functions, and 3) active engagement with life (Hoglund, Sadovsky, & Classie, 2009; Horowitz & Vanner, 2010). The above mentioned components help to reduce the risk of the incidence of chronic diseases among elderly persons (Lee & Loke, 2005; Peel, McClure, & Bartlett, 2005; Şenol, Ünalın, Soyuer, & Argün, 2014; Thanakwang, Soonthorndhada, & Mongkolprasoet, 2012).

Therefore, HLBs are defined as the ability to avoid disease and disabilities (i.e. via health responsibility and nutrition), the maintaining of physical and mental functions (i.e. exercise and psychological well-being), and active engagement with life (i.e. engaging in social activities). Understanding how well these needs are met is important if interventions are to be developed to improve the health and well-being of elderly people with hypertension. For the purposes of this study, the measurement of HLBs was completed amongst older people living with hypertension in Chiang Mai a Province in Thailand. A measure was also created to assess the frequency with which HLBs behavior occurred to allow for the identification of certain relevant needs among the selected population. Following the quantitative study, focus groups were compared with a sample of the same population to examine in more details the perceived barriers and facilitators with regard to the adoption of HLBs. This data will then be used to inform the researcher of the development of interventions that would help promote the HLBs among the hypertensive elderly people in this area. The research questions of this study were structured to determine: 1) what are the needed priorities to rectify HLBs? and 2) what are the barriers and facilitators to promote HLBs among this population?

Objectives of the Study

The main objectives of this research were to identify the healthy lifestyle needs of hypertensive older adults and to explore the perspectives of hypertensive patients with regard to the barriers and facilitators associated with healthy lifestyle behaviors.

Method

Study Design and Setting

This research was designed using a mixed-method approach, which included two phases beginning with the quantitative research approach and this was followed by a qualitative study (Creswell, 2013). The research subjects were recruited in Muang District of Chiang Mai Province, Thailand; a district that is facing a dramatic increase in older adults living with hypertension.

Participants and Procedures

1) Quantitative survey study

A cross-sectional design was used to prioritize the needs of HLBs. Using the entire hypertensive aging population of Chiang Mai (8,445 hypertensive older people) (Chiang Mai Provincial Public Health Office, 2015), the sample size was derived using Yamane's sample size formula (Yamane, 1967) and this yielded a total of 400 older adults with hypertension that were recruited to participate in the survey. For the sampling method, households were selected according to the calculated number of the study sample in each village and this was determined by stratified random sampling using household lists. Hypertensive elders, who met the inclusion criteria, were recruited. The inclusion criteria involved the following: (i) individuals having been diagnosed by a physician as people who have been suffering from high blood pressure for at least 1 year; (ii) individuals ranging in age from 60 to 75 years; (iii) individuals who are able to understand and speak the Thai language; (iv) individuals who were not suffering from severe problems with their hearing, sight or cognitive impairment; and (v) individuals who were willing to participate in the study. All participants provided the researcher with essential information after verbal consent was obtained. Participants were asked to fill out a questionnaire independently and anonymously. This process took approximately 1 hour.

2) Qualitative focus group study

A qualitative study was performed that consisted of two separate focus group discussions involving older adults with uncontrolled hypertension (one group) and older adults with controlled hypertension (one group). A total of 10 hypertensive older adults were selected by purposive sampling from a community health center in Chiang Mai, Thailand. They were 60 years old or older, diagnosed with hypertension, possessed the ability to verbally communicate in Thai, and were willing to participate in the study. The group members were asked for their opinions and experiences regarding the barriers and facilitators associated with HLBs. Each focus group was moderated by the first author. Both focus groups were audio-recorded. An assistant took notes on each of the encounters. Sessions lasted 90 minutes in a conference room located near where the participants lived.

Measures

Needs Assessment Questionnaire

The questionnaire consisted of two parts: 1) questions designed to elicit the socio-demographic characteristics of the participants, and 2) a needs assessment questionnaire that was presented in a dual response format developed by the researchers. It was based on the interviews with hypertensive Thai elderly individuals regarding HLBs, along with the empirical evidence acquired from literature on HLBs as well as recommending lifestyle modifications from JNC-VIII (Depp & Jeste, 2006; Lee, Chou, & Wu, 2016; Montross, 2006; Strawbridge, Wallhagen, & Cohen, 2002). The questionnaire included 30 items, which captured three main dimensions. These dimensions included the ability to avoid diseases and disabilities (measured by 2 subscales: health responsibility and healthy eating), the ability to maintain physical and mental functions (measured by 2 subscales: exercise and psychological well-being), and active engagement with life (measured by 1 subscale: engaging in social activities). The respondents were asked certain specific questions, for example, “How often have you observed any abnormal signs or symptoms in your body” (Health responsibility); “How often have you eaten vegetables or fiber-rich each day?” (Healthy eating); “How often have you exercised vigorously for 20 or more minutes at least three times a week?” (Exercise); “How often have you tried to solve problems when you have them?” (Psychological well-being) and “How often have you volunteered to work for a charity?” (Engaging in social activity). This instrument uses a 4-point Likert-type response format to obtain data regarding the frequency of the reported behaviors with scores ranging from 1 (never) to 4 (always). Respondents rated both the occurrence of a particular activity and also what they felt the occurrence should be; thus, assessing both the actuality and perceived desirability of the activities. The content validity was tested and assessed by five experienced field professionals, resulting in an IOC value of between 0.60-1.00. The Cronbach’s alpha value was recorded at 0.85.

Focus Group Guide

A focus group guide was prepared to help the moderator cover the two main areas that were acknowledged as the barriers and facilitators associated with HLBs. The focus group questions were developed based on recommendations by health care professionals. The discussion session involved open-ended questions including: “What do you think the obstacles might be when managing HLBs” “What is your view of the factors that influence your support of HLBs” “What else would you like to express about the most important element in the goals or development of the intervention?” and “Which topics did you think were missing during this meeting, but would be important in the process of developing the intervention?”

Data Analyses

Descriptive statistics in terms of frequency, percentage, mean and standard deviations were produced. Moreover, a dependent T-test was used to compare HLBs with regard to the differences of a desired state and the current state of the HLBs of older people living with hypertension. Additionally, the modified Priority Needs Index (PNI_{Modified}) was used to describe how much of a gap is needed for hypertensive elders to improve their current HLBs

in order to reach their desirable HLBs (Wongwanich, 2007). The formula for the calculation is as follows:

$$\begin{aligned} \text{PNI}_{\text{Modified}} &= \text{Modified Priority Needs Index} \\ \text{PNI}_{\text{Modified}} &= (I-D)/D \\ I &= \text{Mean of desirable HLBs of older people with hypertension} \\ D &= \text{Mean of current HLBs of older people with hypertension} \end{aligned}$$

Content analysis was used in the qualitative phase for the purposes of summarizing and classifying the textual data (Hsieh & Shannon, 2005). The accuracy of all answer was ensured by verifying the responses with each patient after the focus group session. Two authors were employed to analyze the transcripts and to identify themes. Each author read the transcript independently in order to become familiar with the contents, and then the themes were identified. The items were arranged in categories that were comprised of similar themes after a listing of the themes had been completed. A consensus was reached after the researchers shared and discussed the themes and categories.

Ethical Considerations

The researcher clearly explained the purpose and the procedures of the study to the participants, stressed the confidential nature of the research study, explained the participants' freedom to withdraw or refuse to answer any question at any time, the fact that the data would be used for research and then obtained informed consent from the participants. This research study was approved by the Human Research Ethics Committee, Srinakharinwirot University (certification number: SWUEC-172/58E).

Results

Findings from this study consisted of the results of quantitative survey and focus group discussions, as follows.

Quantitative Survey Results

A total of 400 elderly people living with hypertension participated in this study, 35% were male ($n = 140$) and 65% were female ($n = 260$). The ages of the participants ranged from 60-75 years (mean age = 63.93, $SD = 3.42$). The majority of the participants had completed at least a primary school level of education (69%) and were currently married (65%); and more than half (60%) of the participants were retired. More than half of the participants (70%) reported having an adequate level of income.

The differences between the desired and current HLBs were found to be statistically significant ($p < .05$). The priorities of the HLBs are ranked from the highest to the lowest levels of needs and are shown in Table 1. It was clear that health responsibility ranked first ($\text{PNI}_{\text{modified}} = 0.36$), followed by healthy eating ($\text{PNI}_{\text{modified}} = 0.35$), engaging in social activity ($\text{PNI}_{\text{modified}} = 0.34$), exercise ($\text{PNI}_{\text{modified}} = 0.33$), and psychological well-being ($\text{PNI}_{\text{modified}} = 0.29$), respectively. The prioritization of needs is useful for guiding in the development of effective interventions to promote healthy lifestyle activities for hypertensive older adults. In order to add more in-depth explanations of these needs so as to explore the views of

hypertensive older adults with regard to the barriers and facilitators for promoting HLBs, focus groups were carried out involving older people with hypertension.

Table 1

Priorities of Healthy Lifestyle Behaviors among Older People Living with Hypertension (n = 400)

Healthy lifestyle behaviors	Desirable situation		Current situation		<i>t</i>	PNI modified	Priority
	M	SD	M	SD			
Health responsibility	3.50	0.25	2.58	0.41	37.75*	0.36	1
Healthy eating	3.43	0.20	2.55	0.37	43.58*	0.35	2
Engaging in social activity	3.35	0.23	2.50	0.38	40.31*	0.34	3
Exercise	3.32	0.31	2.50	0.35	35.05*	0.33	4
Psychological well-being	3.43	0.21	2.66	0.26	43.97*	0.29	5

Note. * $p < 0.05$.

Qualitative Results

Regarding the focus groups, a total of 10 of patients participated in two separate focus group discussions. The majority of the participants were female, 65 years old and married. They had achieved at least a high school level of education. The mean duration of diagnosed hypertension was recorded at 8 years. An analysis of the focus groups generated the following two themes: 1) barriers to the adoption of HLBs; 2) facilitators for promoting HLBs.

The barriers to the adoption of HLBs

Consequently, three major barrier themes surfaced at the personal level: 1) a lack of health care concerns, 2) a lack of motivation, and 3) their perceived poor physical and mental health.

The most frequently mentioned barrier was the lack of health care concerns regarding lifestyle modification for achieving a controlled blood pressure. For example, one uncontrolled hypertension patient described “*I stopped taking it myself because I thought I got better already.*” Another said “*Although my doctor told me to change my eating habits, I prefer eating only my favorite foods such as Kaeng Hung Ley Moo (pork curry), pork rinds, Massaman curry, Khao Soi (Northern style curried noodle soup with chicken), fermented fish, fermented pork and spicy food.*” Secondly, both participants with controlled and uncontrolled hypertension pointed out that a lack of motivation served as an obstacle preventing them from fully adopting HLBs. For example, one participant stated, “*I wasn’t motivated to leave my house to engage in some physical activity or exercise. I stay and watch TV in their home all day.*” Thirdly, several participants discussed their perceived poor physical and mental health as barriers preventing them from HLBs. For example, one participant said “*I used to exercise; I tire easily and have pain in my knees.*” Another said “*I wasn’t motivated and I was afraid of feeling pain when exercising.*”

In addition to the personal level, many participants mentioned inadequate community resources such as having access to few places to participate in physical activities or to engage in social activities within their neighborhoods. For example, one participant stated that “*In*

the past, we could join in exercise activities in our communities, but those activities were cancelled because of there was a lack of safe or affordable places to exercise. Then some people gave up exercising. Some people exercised by themselves in the wrong way. Instead of helping them to be healthy, these circumstances seemed to make them worse.”

Therefore, the barriers can be classified into two categories: 1) personal factors (e.g. a lack of health care concerns 2) a lack of motivation and 3) their perceived poor physical and mental health) and 2) external factors (e.g. inadequate community resources).

Facilitators for promoting HLBs

Most hypertensive elderly people have described knowledge of hypertension as important facilitator for maintaining their blood pressure, as well as one's family support systems, are essential for the adoption of HLBs.

Knowledge of hypertension plays a crucial role in the attitudes and beliefs of hypertensive older patients with regard to possessing a level of confidence toward a lifestyle modification. For example, one patient described *“After attending the hypertension program at a local hospital, I learned about how to change my lifestyle for managing my hypertension. The hospital staffs encouraged me to design my action plan and engage in self-blood pressure monitoring. I feel it's really good for me. I believe that good health is not for sale. If one wants to improve their own life, they have to act.”*

Finally, participants reported that family support systems including family members were seen as motivators in sustaining HLBs across the group and this did affect their efforts in hypertension management. For example, one participant with controlled hypertension explained: *“Most of elders usually forgot to take medicine or stopped taking it themselves. But my daughter monitors my medications for me. She asks me every day, Mom, do you take your medicine? And my daughter always takes me to the hospital at least once every 3 months. I feel it can help me by supporting my hypertension management.”*

Discussion

Based on the results of this study, the three highest priorities of HLBs that were identified amongst Thai elders living with hypertension are health responsibility, healthy eating, and engaging in social activities, respectively. Similar findings were reported in Asia contexts, Singh and colleagues (2000) found that changes in social and economic development have resulted in lifestyle characteristic changes in terms of smoking, alcohol consumption, stress, low-DASH diet, being overweight, and sedentary behavior, all of which are known to be risk factors for developing high blood pressure in India, China, the Philippines, Thailand, Sri Lanka, Iran, Pakistan, Nepal. There is a considerable scope with regard to offering advice and counseling to older hypertensive individuals as a way of helping them improve their patterns of HLBs.

With regard to health responsibility being the first priority, this may be due to the fact that hypertension has no warning signs or symptoms, and many people may not realize that they have it. According to the latest report in China, approximately 130 million patients were unaware of their diagnosis of hypertension; among those receiving anti-hypertensive

treatments, only about 25% of patients reach the optimal BP control (Liu, 2011). Encouraging participation in activities that foster taking responsibility for one's own health, such as having health check-ups, being educated about health, and seeking professional assistance when necessary, could lead to the prevention of high blood pressure, and also to the containment of health care costs (Kaewpan & Kalampakorn, 2012).

With regard to healthy eating being the second priority, a traditional Thai diet consists of rice, cereals, vegetables and fruits and this is being replaced by a higher proportion of saturated fats, cholesterol and reduced levels of fiber along with an increase in the purchasing of unhealthy fast food products (Kosulwat, 2002). Moreover, there has been a significant increase in salt consumption, which has predominantly come from the use of flavor enhancers, such as fish sauce, soy bean sauce, and monosodium glutamate (Supornsilaphachai, 2013). Thus, set against these changing dietary trends the promotion of healthy eating is essential, particularly among the hypertensive elderly population.

In terms of engaging in social activities, the results are similar to that of several other studies, which found that very few Thai older adults routinely engage in social activities. The findings of this study are congruent with the findings in the National Statistical Office survey, which revealed that 25.6 percent of the Thai elderly people were members of elderly clubs, while only 21.1 percent of them consistently participated in elderly social clubs (National Statistical Office, 2007). This can perhaps be explained by recognizing that they were still working albeit in their homes and that they did not have time for these activities (Binhosen et al., 2003). However, engaging in social activities can provide opportunities for meeting friends or forming new social bonds and can help to develop feelings of attachment to their community that could lead to their participation in senior clubs and volunteer activities (Winterbotham & du Preez, 2015). It is therefore essential that health promotion is provided in communities perhaps through senior clubs and volunteer activities as early as possible so that Thai elderly citizens can increase their chances of achieving good health and enjoying a higher degree of life satisfaction.

In our focus group, the barriers to sustaining HLBs for the participants with controlled and uncontrolled hypertension included personal factors (e.g. 1) a lack of health care concerns 2) a lack of motivation and 3) their perceived poor physical and mental health) and external factors (e.g. inadequate community resources). These findings are similar to those of studies by Flynn and colleagues (2013), who revealed that hypertensive patients' and their family members' perspectives regarding several of the barriers to hypertension control include a lack of motivation, poor knowledge, and poor access to community resources. A study from Howes, Warnecke and Nelson (2013) supports this finding by indicating that hypertensive participants had the required knowledge, along with a sense of empowerment and self-confidence to support the patients' lifestyle practices for hypertension control.

Furthermore, our findings are similar to those of prior work, which had identified individual and interpersonal factors to engagement HLBs. These findings were confirmed in the qualitative study which also revealed that the participants' knowledge of hypertension plays a significant role in the individual facilitation of a change in lifestyle behaviors and hypertension management (Ogedegbe et al., 2003; Rimando, 2015). Moreover, the findings regarding the family support was consistent with those of Magrin and colleagues (2015) and Rimando and colleagues (2015), where in it was found that the support of family members encouraged the participation in HLBs in order to be able to manage and maintain their blood

pressure levels. Therefore, the identification of the barriers and facilitators involved with adopting HLBs is an important first step in designing a program of tailored lifestyle intervention according to the needs of hypertensive older patients with regard to hypertension management.

In conclusion, the three priorities of healthy lifestyle behaviors were specifically: health responsibility, healthy eating, and engaging in social activities, respectively. Finally, hypertensive patients perceived that the barriers to embracing HLBs included a lack of health care concerns, a lack of motivation, their perceived poor physical and mental health and inadequate community resources. Participants also identified facilitators with knowledge of hypertension as promoters of HLBs. Relevant family supports also were identified in a positive light.

Limitations and Future Research

It should be noted that there were three limitations that were identified in this study. Firstly, the limitations of the cross-sectional data are that it can give only a snapshot view of how individuals are feeling at a certain period of time. Consequently, a longitudinal element would provide more certainty. Secondly, this study intended to identify the patients' specific personal prioritized HLBs, and to address the relevant barriers, and facilitators. A future study should address the external perspectives at the clinic and community level. Finally, the focus group research involved only two focus groups because of budget limitations; the future study should include at least three focus groups for each group represented to saturate the data (Morgan, Krueger, & King, 1998).

However, the study does provide evidence-based empirical guidance to improve the health of the aging population in Thailand and would help design and develop suitable tailored intervention programs based on the needs of the elderly living with hypertension in order to promote healthier lifestyles for them.

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References

- Binhosen, V., Panuthai, S., Srisuphun, W., Chang, E., Sucamvang, K., & Cioffi, J. (2003). Physical Activity and Health Related Quality of Life Among the Urban Thai Elderly. *Thai Journal of Nursing Research*, 7(4), 321-332.
- Bureau of Non Communicable Disease. (2015). Annual report 2015 Retrieved from <http://thaincd.com/document/file/download/paper-manual/Annual-report-2015.pdf> (In Thai)
- Chiang Mai Provincial Public Health Office. (2015). Hypertension in Chiang Mai Retrieved from http://cmi.hdc.moph.go.th/hdc/reports/report.php?source=formatted/ncd.php&cat_id=6

- a1fdf282fd28180eed7d1cfe0155e11&id=6b9af46d0cc1830d3bd34589c1081c68 [In Thai]
- Creswell, J. W. (2013). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Thousand Oaks, CA: Sage publications.
- Depp, C. A., & Jeste, D. V. (2006). Definitions and predictors of successful aging: a comprehensive review of larger quantitative studies. *The American Journal of Geriatric Psychiatry, 14*(1), 6-20.
- Flynn, S. J., Ameling, J. M., Hill-Briggs, F., Wolff, J. L., Bone, L. R., Levine, D. M., Roter, D. L., Lewis-Boyer, L., Fisher, A. R., Purnell, L., Ephraim, P. L., Barbers, J., Fitzpatrick, S. L., Albert, M. C., Cooper, L. A., Fagan, P. J. Martin, D., Ramamurthi, H. C., & Boulware, L. E. (2013). Facilitators and barriers to hypertension self-management in urban African Americans: perspectives of patients and family members. *Patient Preference and Adherence, 6*(7), 741-749. doi: 10.2147/ppa.s46517
- Haveman-Nies, A., Groot, L., & Staveren, W. (2003). Relation of dietary quality, physical activity, and smoking habits to 10-year changes in health status in older Europeans in the SENECA study. *American Journal of Public Health, 93*(2), 318-322. doi: 10.2105/AJPH.93.2.318.
- Hoglund, M. W., Sadovsky, R., & Classie, J. (2009). Engagement in life activities promotes healthy aging in men. *Journal of Men's Health, 6*(4), 354-365.
- Horowitz, B. P., & Vanner, E. (2010). Relationships Among Active Engagement in Life Activities and Quality of Life for Assisted-Living Residents. *Journal of Housing For the Elderly, 24*(2), 130-150. doi: 10.1080/02763891003757056
- Howes, F., Warnecke, E., & Nelson, M. (2013). Barriers to lifestyle risk factor assessment and management in hypertension: a qualitative study of Australian general practitioners. *Journal of human hypertension, 27*(8), 474-478.
- Hsieh, H. F., & Shannon, S. E. (2005). Three Approaches to Qualitative Content Analysis. *Qualitative Health Research, 15*(9), 1277-1288. doi: DOI: 10.1177/1049732305276687
- James, P. A., Oparil, S., Carter, B. L., Cushman, W. C., Dennison-Himmelfarb, C., Handler, J., Lackland, D. T., Lefevre, M. L., Mackenzie, T. D., Ogedegbe, O., Smith, S. C., Svetkey, L. P., Taler, S. J., Townsend, R. R., Wright, J. T., Narva, A. S., & Ortiz, E. (2014). 2014 evidence-based guideline for the management of high blood pressure in adults: Report from the panel members appointed to the eighth joint national committee (jnc 8). *JAMA, 311*(5), 507-520. doi: 10.1001/jama.2013.284427
- Jin, C. N., Yu, C. M., Sun, J. P., Fang, F., Wen, Y. N., Liu, M., & Lee, A. P. W. (2013). The healthcare burden of hypertension in Asia. *Heart Asia, 5*(1), 238-243.
- Kaewpan, W., & Kalampakorn, S. (2012). Health Status and Health Promoting Behaviors among Aging Workers in Thailand. *Journal of the Medical Association of Thailand, 95*(6), s16-s20.
- Kelley, G. A., & Kelley, K. S. (2001). Aerobic exercise and resting blood pressure in older adults: a meta-analytic review of randomized controlled trials. *Journal of Gerontology: Medical Sciences, 56*(5), M298-M302. doi: 10.1093/gerona/56.5.M298
- Kosulwat, V. (2002). The nutrition and health transition in Thailand. *Public Health Nutrition, 5*(1a). doi: 10.1079/phn2001292
- Krishnan, A., Garg, R., & Kahandaliyanage, A. (2013). Hypertension in the south-east asia region an overview. *Regional Health Forum, 17*(1), 7-14.
- Lee, H. M., Chou, M. J., & Wu, H. T. (2016). Development And Validation Of Chinese-Version Successful Aging Scale Of Taiwan. *European Journal of Research and Reflection in Educational Sciences, 4*(3).

- Lee, R. L. T., & Loke, A. J. T. Y. (2005). Health-Promoting Behaviors and Psychosocial Well-Being of University Students in Hong Kong. *Public Health Nursing, 22*(3), 209-220. doi: 10.1111/j.0737-1209.2005.220304.x
- Liu, L. S. (2011). 2010 Chinese guidelines for the management of hypertension. *Zhonghua xin xue guan bing za zhi, 39*(7), 579-615.
- Lloyd-Sherlock, P., Beard, J., Minicuci, N., Ebrahim, S., & Chatterji, S. (2014). Hypertension among older adults in low- and middle-income countries: prevalence, awareness and control. *International Journal of Epidemiology, 43*(1), 116-128. doi: 10.1093/ije/dyt215
- Maharaj Nakorn Chiangmai Hospital. (2015). Medical Records and Statistics Report Retrieved from http://www.med.cmu.ac.th/hospital/medrec/2011/index.php?option=com_content&view=article&id=1068&Itemid=753 [In Thai]
- Magrin, M. E., D'Addario, M., Greco, A., Miglioretti, M., Sarini, M., Scignaro, M., Steca, P., Vecchio, L., & Crocetti, E. (2015). Social support and adherence to treatment in hypertensive patients: a meta-analysis. *Annals of Behavioral Medicine, 49*(3), 307-318.
- Martinson, B. C., Crain, A. L., Pronk, N. P., O'Connor, P. J., & Maciosek, M. V. (2003). Changes in physical activity and short-term changes in health care charges: a prospective cohort study of older adults. *Preventive Medicine, 37*(4), 319-326. doi: 10.1016/s0091-7435(03)00139-7
- Meisner, B. A., Dogra, S., Logan, A. J., Baker, J., & Weir, P. L. (2010). Do or Decline?: Comparing the Effects of Physical Inactivity on Biopsychosocial Components of Successful Aging. *Journal of Health Psychology, 15*(5), 688-696.
- Montross, L. P., Depp, C., Daly, J., Reichstadt, J., Golshan, S., Moore, D., Sitzer, D., & Jeste, D. V. (2006). Correlates of self-rated successful aging among community-dwelling older adults. *The American Journal of Geriatric Psychiatry, 14*(1), 43-51.
- Morgan, D. L., Krueger, R. A., & King, J. A. (1998). *The Focus Group Kit*. Thousand Oaks: SAGE Publications.
- National Statistical Office. (2007). Report on the 2007 survey of the older person in Thailand. Bangkok (Bangkok): Bureau of Socio-Economic and Opinion. [In Thai]
- Ogedegbe, G., Harrison, M., Robbins, L., Mancuso, C. A., & Allergrante, J. P. (2003). Barriers and facilitators of medication adherence in hypertensive African Americans: a qualitative study. *Ethnicity & disease, 14*(1), 3-12.
- Peel, N. M., McClure, R. J., & Bartlett, H. P. (2005). Behavioral determinants of healthy aging1. *American Journal of Preventive Medicine, 28*(3), 298-304. doi: 10.1016/j.amepre.2004.12.002
- Phelan, E. A., & Larson, E. B. (2002). "Successful Aging"—Where Next? *Journal of the American Geriatrics Society, 50*(7), 1306-1308. doi: 10.1046/j.1532-5415.2002.50324.x
- Rahman, A. R., Wang, J. G., Kwong, G. M., Morasles, D. D., Sritara, P., & Sukmawan, R. (2015). Perception of hypertension management by patients and doctors in Asia: potential to improve blood pressure control. *Asia Pacific Family Medicine, 14*(2), 1-11. doi: 10.1186/s12930-015-0018-3
- Rimando, M. (2015). Perceived barriers to and facilitators of hypertension management among underserved African American older adults. *Ethnicity & disease, 25*(3), 329-336. doi: 10.18865/ed.25.3.329
- Rowe, J. W., & Kahn, R. L. (1997). Successful Aging. *The Gerontologist, 37*(4), 433-440.

- Sacks, F. M., Svetkey, L. P., Vollmer, W. M., Appel, L. J., Bray, G. A., Harsha, D., Obarzanek, E., Conlin, P. R., & Miller, E. R. (2001). Effects on Blood Pressure of Reduced Dietary Sodium and the Dietary Approaches to Stop Hypertension (DASH) Diet. *New England Journal of Medicine*, 344(1), 3-10. doi: 10.1056/nejm200101043440101
- Şenol, V., Ünalın, D., Soyuer, F., & Argun, M. (2014). The Relationship between Health Promoting Behaviors and Quality of Life in Nursing Home Residents in Kayseri. *Journal of Geriatrics*, 1-8. doi: 10.1155/2014/839685
- Singh, R. B., Suh, I. L., Singh, V. P., Chaithiraphan, S., Laothavorn, P., Sy, R. G., Babilonia, N. A., Rahman, A. R. A., Sheikh, S., Tomlinson, B., & Sarraf-Zadigan, N. (2000). Hypertension and stroke in Asia: prevalence, control and strategies in developing countries for prevention. *Journal of Human Hypertens*, 14, 749-763.
- Strawbridge, W. J., Wallhagen, M. I., & Cohen, R. D. (2002). Successful aging and well-being self-rated compared with Rowe and Kahn. *The Gerontologist*, 42(6), 727-733.
- Supornsilaphachai, C. (2013). Evolution of salt reduction initiatives in Thailand: lessons for other countries in the South-East Asia Region. *WHO Regional Health Forum*, 17, 61-71.
- Thanakwang, K., Soonthorndhada, K., & Mongkolprasoet, J. (2012). Perspectives on healthy aging among Thai elderly: A qualitative study. *Nursing & Health Sciences*, 14(4), 472-479. doi: 10.1111/j.1442-2018.2012.00718.x
- Tiptaradol, S., & Aekplakorn, W. (2012). Prevalence, Awareness, Treatment and Control of Coexistence of Diabetes and Hypertension in Thai Population. *International Journal of Hypertension*, 1-7. doi: 10.1155/2012/386453.
- Winterbotham, S., & du Preez, J. (2015). Psychosocial wellbeing in active older adults: A systematic review of qualitative literature. *International Review of Sport and Exercise Psychology*, 9(1), 96-115. doi: 10.1080/1750984x.2015.1122075.
- Wongwanich, S. (2007). *Needs Assessment Research*. Bangkok: Chulalongkorn University. [In Thai]
- Yamane, T. (1967). *Statistic : An Introductory Analysis*. New York: Harper & Row.