ปัจจัยที่มีความสัมพันธ์กับความรอบรู้ด้านสุขภาพในการป้องกันโรคความดันโลหิตสูง ของกลุ่มเสี่ยงในอำเภอนาดี จังหวัดปราจีนบุรี
Factors Related to Health Literacy for Hypertension Prevention among High-risk Individuals in Nadee District, Prachinburi Province

นิพนธ์ต้นฉบับ

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Original Article

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บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาระดับและปัจจัยที่สัมพันธ์กับความรอบรู้ด้านสุขภาพในการป้องกันโรคความดันโลหิตสูงของกลุ่มเสี่ยงโรคความดันโลหิตสูงชาวไทย **วิธีการศึกษา:** การวิจัยแบบศึกษาเชิงสหสัมพันธ์ กลุ่มตัวอย่างได้แก่ ประชาชนกลุ่มเสี่ยงโรคความดันโลหิตสูง อายุ 18-59 ปี จำนวน 214 คน ในอำเภอนาดี จังหวัดปราจีนบุรี ด้วยการสุ่มตัวอย่างแบบหลายขั้นตอน เครื่องมือรวบรวมข้อมูลประกอบด้วยแบบสัมภาษณ์ข้อมูลทั่วไป ความเครียด เจตคติต่อการป้องกันโรคความดันโลหิตสูง ปฏิสัมพันธ์กับผู้ให้บริการ การเข้าถึงและใช้บริการทางสุขภาพ และความรอบรู้ด้านสุขภาพในการป้องกันโรคความดันโลหิตสูง รวบรวมข้อมูลระหว่างธันวาคม พ.ศ. 2563 ถึงมกราคม พ.ศ. 2564 วิเคราะห์ข้อมูลด้วยสถิติพรรณนา สถิติสัมประสิทธิ์สหสัมพันธ์ของเพียร์สัน และสถิติสัมประสิทธิ์สหสัมพันธ์พอยท์ไบซีเรียล **ผลการศึกษา:** กลุ่มตัวอย่าง มีความรอบรู้ด้านสุขภาพในการป้องกันโรคความดันโลหิตสูงภาพรวมอยู่ในระดับต่ำ (*mean* 87.23, *SD* = 21.92 คะแนน) พบว่าปัจจัยที่สัมพันธ์กับความรอบรู้ด้านสุขภาพในการป้องกันโรคความดันโลหิตสูงอย่างมีนัยสำคัญทางสถิติได้แก่ เพศ (*r* = 0.138, *P*-value < 0.05) รายได้ (*r* = 0.202, *P*-value < 0.05) ความเครียด (*r* = 0.427, *P*-value < 0.01) ปฏิสัมพันธ์กับผู้ให้บริการ (*r* = 0.242, *P*-value < 0.01) และการเข้าถึงและใช้บริการสุขภาพ (*r* = 0.242, *P*-value < 0.01) ส่วนอายุ ระดับการศึกษา และเจตคติต่อการป้องกันโรคความดันโลหิตสูงมีสัมพันธ์กับความรอบรู้ด้านสุขภาพในการป้องกันโรคความดันโลหิตสูง **สรุป:** ประชากรกลุ่มเสี่ยงโรคความดันโลหิตสูงมีความรอบรู้ด้านสุขภาพในการป้องกันโรคความดันโลหิตสูงในระดับต่ำ และสัมพันธ์กับเพศ รายได้ ความเครียด ปฏิสัมพันธ์ระหว่างกลุ่มเสี่ยงโรคความดันโลหิตสูงและผู้ให้บริการ และการเข้าถึงและใช้บริการสุขภาพ

คำสำคัญ: ปัจจัย, ความรอบรู้ด้านสุขภาพ, กลุ่มเสี่ยงโรคความดันโลหิตสูง

Abstract

Objective: To determine level of and factors associated with health literacy for hypertension prevention among a high-risk Thai population. **Method**: In this correlation research, 2 1 4 individuals in Nadee district, Prachinburi province, who were at a high risk of hypertension were recruited using the multistage random sampling technique. Research instruments were questionnaires to gather data for demographic information, stress, attitude toward hypertension prevention, relationship between at the high-risk group and provider, access to care and use of health care services, and health literacy. Data collection was conducted from December, 2020 to January, 2021. Descriptive statistics, Pearson's product moment correlation and point biserial correlation were used to analyze the data. **Results**: Health literacy for hypertension prevention was found to be at a poor level (*mean* = 87.23, *SD* = 2 1 . 9 2). Health literacy for hypertension prevention was significantly correlated with sex (*r* = 0.138, *P*-value < 0.05) income (*r* = 0.202, *P*-value < 0.05) stress (*r* = 0.427, *P*-value < 0.01) relationship between the high-risk group and providers (*r* = 0.242, *P*-value < 0.01), and access to care and use of health care services (*r* = 0.242, *P*-value < 0.01). Age, education level and attitude toward hypertension prevention were not significantly correlated with health literacy. **Conclusion:** Among the high-rsik individuals for hypertension, health literacy for hypertension prevention was at a poor level and significantly associated with sex, income, stress, relationship between the high-risk group and providers, and access to care and use of health care services.

Keywords: Factors/ Health literacy/ risk of hypertension group.

Introduction

Hypertension, as a non-communicable disease, is complicate with a high risk of acute complications. The critical condition associated with such acute complications is the leading cause of premature death worldwide. If these hypertensive patients had been taken care of before they were diagnosed with hypertension (or pre-hypertension) as a high-risk population for hypertension, the likelihood being hypertensive could be reduced. In Department of Disease Control, Ministry of Public Health of Thailand, morbidity rates of hypertension had been increasing continuously from 2016 to 2019 (2,008.92, 2,091.28 and 2,245.09 per 100,000 population, respectively).[1] In the health region 6 of Thailand, morbidity rates of hypertension from 2016 to 2018 had also been continuously increasing (2,365.24, 2,396.41 and 2,558.24

per 100,000 population, respectively). More importantly, proportions of individuals with a high risk of hypertension from 2016 to 2018 had been 1,3420.63, 13,226.75, and 12,839.48 per 100,000 population, respectively) and new cases of hypertension from these with the high risk had been 15,584.8, 35,463.3 และ 39,572.9 per 100,000 population.[2]

In the health region 6 of Thailand, proportions of individuals with a high risk of hypertension in 2016 to 2018 were 36,561, 37,293 and 34,544 per population and new cases of hypertension of 37,674.9, 24,649.2 and 33,288.5 per 100,000 population of these high-risk individuals, respectively. Among all provinces in the health region 6, prevalence of hypertension high-risk individuals was the second highest in Prachinburi province.[2] In Prachinburi, proportions of individuals with a high risk of hypertension in 2016 to 2018 were 37,063, 37,518 and 38,329 per population and new cases of hypertension of 16,288.1, 21,479.7 and 26,554.1 per 100,000 population of these high-risk individuals, respectively. Based on the annual health screening in 2019, a total of 38,392.2 individuals per 100,000 population with a high risk of hypertension (or 38.25%) which was the highest prevalence in Prachinburi.[3] With an increasing prevalence of hypertension, appropriate self-care is crucial for preventing hypertension. Among various factors, health literacy is one of key factors for the prevention.

Health literacy is essential in developing the person's capacity to improve and sustain their good health. As a personal skill, health literacy helps develop confidence improving personal health by means of modifying lifestyle and living environment, accessing health related information and effectively using knowledge to achieve the good health.[4] Based on the report on health literacy about the risk of hypertension and diabetes mellitus of the Ministry of Public Health in 2015, most Thai population aged 15 – 59 years old had a poor to fair level of health literacy and poor health behavior.[5] Among people aged 15 – 59 with a high risk of hypertension in Bangkok, the majority were at a moderate level of health literacy (57.8%), followed by those with a low level (40.1%).[6] Individuals with poor health literacy were more likely to develop hypertension if poor health behavior is continued. Health literacy has been found to be associated with self-care behavior and healthcare service usage. Health literacy could also reduce health impacts such as healthcare expenditures, disease severity, and premature death. Factors affecting health literacy

could be defined as personal factors, interpersonal interaction factors, and interpersonal factors.[7]

Literature review and relevant documents suggested that health literacy for preventing hypertension is associated with gender, age, education level, income, stress, attitude toward hypertension prevention, interactions between patients and healthcare providers. Since these individual factors have been tested in different studies, our present study thus aimed to examine the associations between these factors simultaneously on health literacy for hypertension prevention.

The study conceptual framework was guided by the integrated model of health literacy of Sorensen and colleagues.[8] The select study variables included demographic characteristics (gender, age, education level, and income), stress, attitude toward hypertension prevention, interaction between patients and healthcare providers, and access and usage of healthcare service. Findings could be useful for developing health literacy programs and activities suitable for individuals with a high risk of hypertension. Successful prevention on hypertension could lead to less burden on healthcare system and higher quality of life of the patient.

Methods

In this correlational, cross-sectional research, study population was individuals aged 15 – 59 years old living in Nadee district, Prachinburi province who were registered as the new case with the high risk for hypertension with the Nadee Office of Health Administration in 2019. They had no other co-morbidities such as diabetes mellitus. Heart diseases, emphysema or kidney failure diseases. They were with a high risk of hypertension, i.e., having systolic blood pressure of 120 - 136 mmHg and/or diastolic blood pressure of 80 – 89 mmHg based on the guideline of the Bureau of Non-communicable Disease, Department of Disease Control, Ministry of Public Health. Study sample was those residing in Nadee district from October 1, 2019 to September 30, 2020.

Sample size was estimated based on power analysis with a type I error of 5% and a power of test of 0.80. As a medium effect size of was suggested for most nursing study, an effect size of 0.20 was used and a total of 194 participants were required.[9] To compensate for 10% of questionnaires with potential incomplete answers or errors, a total of 214 participants were needed.[10]

Participants were selected by multistage sampling. Based on a 50% representative sample, three out of the total six sub-districts were selected by simple random sampling without replacement. With a total of 50% of number of villages in each sub-district further selected using the simple random sampling without replacement, 5, 4 and 6 villages in the first, second and third selected sub-district were sampled, respectively. At each selected village, potential participants, i.e., those with the high risk for hypertension, were identified. Numbers of participants to select from each village were proportional to numbers of potential participants from each village.

Research instruments

A set of questionnaires was used in this survey study. Questionnaire for each of the study variables was from the work of other researchers. We tested the internal consistency reliability of each of the questionnaires in 30 individuals comparable to the prospective participants. This set of self-administered questionnaires consisted of 6 parts as follows. In the first part, the questions asked about demographic characteristics of the participant including gender, age, religion, marital status, occupation, income, healthcare setting for regular service, and source of health information. Questions were in a checklist and open-ended format.

In the second part, the stress was evaluated using the ST-5 questionnaire of the Department of Mental Health, Thailand Ministry of Public Health.[11] ST-5 assesses the pressure, uneasiness, and anxiety which could result in physical symptoms and behavioral manifestations including sleep problem, decreased concentration, irritability, boredom, and social isolation. Subjects were asked to rate frequency of each of these five symptoms within the last two weeks. The response was a 4-point Likert-type rating scale ranging from 0 "never or almost never" to 1 "sometimes," 2 "usually," and "3 "always or all the time." With a total score of 0 – 15 points, higher scores indicate higher level of stress. In our study, the questionnaire had a high internal consistency reliability with a Cronbach's alpha coefficient of 0.85.

The third part was the questionnaire of attitude toward hypertension prevention of Onsrinoi and colleagues.[12] The ten questions asked the participant about their beliefs and feelings toward their preventive behavior for hypertension. Response was a 4-point Likert-type rating scale ranging from 4 "highly agree," to 3 "agree," 2 "disagree," and 1 "highly disagree" for positive statements and vice versa for the negative ones. With

the total score of 10 – 40 points, higher scores indicate more positive attitude toward hypertension prevention. In our study, internal consistency reliability was acceptable with a Cronbach's alpha coefficient of 0.73.

The fourth part was the questions of interactions between individuals with the high risk of hypertension and healthcare providers. The questions were about the participant's perception on the services provided by healthcare providers. These eight questions were modified by the researcher from questions about relationship between patients and healthcare providers of Kaewnopparat.[13] Response was a 5-point Likert-type rating scale ranging from 1 "the least true" to 2 "less true," 3 "somewhat true," 4 "mostly true," and 5 "absolutely true." With the total score of 5 – 40 points, higher scores indicated better interaction. In our study, internal consistency reliability was high with a Cronbach's alpha coefficient of 0.88.

In the fifth part, 13 questions asked the participant about their perception on access and usage of regular healthcare service including adequacy, quality, convenience, expenditure, and access to the setting. These questions were modified from those assessing primary care access of the disabled of Keawkaew.[14] Response was a 4-point Likert-type rating scale ranging from 4 "highly agree," to 3 "agree," 2 "disagree," and 1 "highly disagree" for positive statements and vice versa for the negative ones. With the total score of 13 – 65 points, higher scores indicated higher level of access to the healthcare service. In our study, internal consistency reliability was high with a Cronbach's alpha coefficient of 0.90.

The sixth part contained questions about health literacy for hypertension prevention. Eight aspects of health literacy included knowledge and understanding about health, access to information and service, communication to enrich health expertise, self-management of health condition, media literacy, proper decision to practice in preventing hypertension, social participation and behaviors of self-care and behaviors to prevent hypertension. The risky behaviors relating to hypertension were based on those suggested by the Ministry of Public Health including inappropriate diet, low exercise, poor emotion, smoking, and excessive alcohol intake. The questions were based on these risky behaviors for individuals aged 15 years old or older with a high risk of diabetes mellitus and/or hypertension, originally created by the Health Education Division, Department of Health Service Support, Ministry of Public Health.[5] Eight sections of questions according to the eight aspects of health literacy were as follows.

In the first section of the health literacy questionnaire, knowledge and understanding about health literacy was assessed. For each question, a score of one point was given for a correct answer and zero point for an incorrect one. With the total of six questions, a total possible score was 0 – 6 points. The internal consistency reliability was slightly lower than acceptable level with a KR-20 coefficient of 0.61.

Level of level of knowledge and understanding was categorized as poor, fair and good using the cut-off values based on 60 and 80 percentiles.[15] Therefore, the poor, fair and good knowledge was correspodingto the ranges of total scores of 0.00 – 3.69, 3.70 – 4.89 and 4.90 – 6.00 points, respectively. All total scores in each of eight individual sections were also categorized into poor, fair and good levels based on this criterion.

In sections 2 to 8, response format was a 5-point Likert-type rating scale ranging from 0 "never," to 1 "rarely," 2 "sometimes," 3 "usually," and 4 "always." For certain negative statements in sections 3 and 8, the scale was in the opposite direction.

In section 2, access to and usage of healthcare service was assessed with five questions. With the total score of 0 – 20 points, level of access to and usage of the service was categorized as poor, fair and good with the scores of 0 – 11, 12 – 15, and 16 – 20 points, respectively.[15] The internal consistency reliability was high with a Cronbach's alpha coefficient of 0.86.

The third section of health literacy questionnaire asked about communication to enrich health expertise. With the total of six questions (three positive and negative statements each) and total score of 0 – 24 points, level of communication was categorized as poor, fair and good with the scores of 0 – 14, 15 – 19, and 20 – 24 points, respectively.[15] The internal consistency reliability was high with a Cronbach's alpha coefficient of 0.91.

In the fourth section, five questions asked about self-management of health condition. With the total score of 0 – 20 points, level of self-management was categorized as poor, fair and good with the scores of 0 – 11, 12 – 15, and 16 – 20 points, respectively.[15] The internal consistency reliability was high with a Cronbach's alpha coefficient of 0.89.

In the fifth section, five questions asked about media literacy. With the total score of 0 – 20 points, level of media literacy was categorized as poor, fair and good with the scores of 0 – 11, 12 – 15, and 16 – 20 points, respectively.[15] The internal consistency reliability was high with a Cronbach's alpha coefficient of 0.83.

The sixth section of health literacy asked about proper decision to practice in preventing hypertension. With the total of two questions and total score of 0 – 8 points, level of proper decision was categorized as poor, fair and good with the scores of 0 – 4.7, 4.8 – 6.3, and 6.4 – 8.0 points, respectively.[15] The internal consistency reliability was close to acceptable level with a Cronbach's alpha coefficient of 0.67.

In section 7, five questions asked about social participation. With a total score of 0 – 20 points, social participation was categorized as poor, fair and good with the scores of 0 – 11, 12 – 15 and 16 – 20 points, respectively. The internal consistency reliability was high with a Cronbach's alpha coefficient of 0.87.

In the last section of health literacy questionnaire, 10 questions asked about behaviors of self-care and behaviors to prevent hypertension. With a total score of 0 – 40 points, preventive health behavior was categorized as poor, fair and good with the scores of 0 – 23, 24 – 31 and 32 – 40 points, respectively.[15] The internal consistency reliability was acceptable with a Cronbach's alpha coefficient of 0.71.

Overall health literacy was based on the sum of the scores of each of the eight sections. With the total score of 0 – 158 points, overall health literacy was categorized as poor, fair and good with the scores of 0 - 94.7, 94.8 – 126.3, and 126.4 – 158.0 points, respectively.[15]

Participant's right protection and data collection procedure

The study protocol was approved by the Ethics Committee for Human Research of Burapha University (approval number: G-HS 069/2563). Data collection was conducted from December, 2020 to January, 2021. At the data collection setting, the researcher provided prospective participants with study objectives, steps, voluntary nature of the study, and the right to withdraw from the study at any time with no consequences on their regular care services. Once written informed consent was obtained, the participants were asked to complete the self-administered questionnaire which took about 20 – 30 minutes. Once complete, the researcher inspected the filled questionnaire for errors or incomplete answers. Data were kept in a secured place. Findings were presented as summarized not individual results.

Statistical data analysis

Descriptive statistics were used to present demographic characteristics and scores of study variables including mean with standard deviation (SD) and frequency with percentage. To examine correlations between health literacy and selected sudy factors, Pearson's product moment correlation analysis or point biserial correlation analysis was used as appropriate. Statistical significance was set a type I error of 5%. All statistical analyses was performed using the SPSS Statistics Package version 26.

Results

About half of the participants were female (51.9%) (Table 1). Thei average age was 44.21 $\pm$ 11.94 years old. The majority of them were Buddhist (98.1%), married (66.8%), with primary school education (45.3%) followed by high school education (42.5%), general labors (30.4%) followed by factory workers (22.4%), and with a monthly income of 10,000 baht or less (67.28%) (with a mean monthly income of 10,648.50 Baht for all participants). The majority of participants received regular care service at sub-district health promoting hospitals (55.6%), received health information from healthcare providers (45.8%) followed by mobile phone/Internet (30.4%), and television/village news center (18.2%) (Table 1).

Participants had an overall poor level of health literacy for preventing hypertension (mean = 87.23 $\pm$ 21.92 points) (Table 2). For each of the eight aspects of health literacy, **good health literacy** was found in proper decision to practice in preventing hypertension (mean 6.43 $\pm$ 1.45 points). **Fair health literacy** was found in knowledge and understanding about health literacy (mean 4.47 $\pm$ 1.24 points) and media literacy (mean = 13.07 $\pm$ 4.41 points). The rest of the eight aspects of health literacy was in **poor level** including access to and usage of healthcare service, communication to enrich health expertise, self-management of health condition, social participation, and behaviors of self-care and behaviors to prevent hypertension (Table 2).

Health literacy was significantly correlated with gender (r = 0.138, P-value < 0.05), income (r = 0.202, P-value < 0.05), stress (r = 0.427, P-value < 0.01), interactions with healthcare providers (r = 0.242, P-value < 0.01) and access to and usage of healthcare service (r = 0.242, P-value < 0.01) (Table 3). Those not significantly correlated with health literacy included age, education level, and attitude toward hypertension prevention.

Table 1 Demographic characteristics and access to healthcare information of participants (N = 214).

Characteristics	N	%
Gender		
Men	103	48.1
Women	111	51.9
Age (years) (min = 18, max = 59, *Mean* = 44.21, *SD* = 11.94)		
≤ 40	71	33.2
41-50	58	27.1
≥ 51	85	39.7
Religion		
Buddhism	210	98.1
Christian	3	1.4
Islam	1	0.5
Marital status		
Married	143	66.8
Single	61	28.5
Widowed/divorced/separated	10	4.7
Education level		
Primary school	97	45.3
Secondary school	91	42.5
Associate degree/secondary vocational school	9	4.2
Bachelor's degree or higher	17	8.0
Occupation		
General labors	65	30.4
Farmers	38	17.8
Factory workers	48	22.4
Employee of government or governmental enterprise	27	12.6
Small business	22	10.3
No occupation	14	6.5
Monthly income (Baht) (min = 0, max = 80,000, *Mean* = 10648.50.21, *SD* = 11,237.46)		
≤ 10,000	144	67.3
10,001 – 20,000	56	26.2
≥ 20,001	14	6.5
Healthcare setting for regular service		
Sub-district health promoting hospital	119	55.6
Public hospital	88	41.2
Private clinic	5	2.3
Private hospital	2	0.9
Source of health information		
Healthcare providers	98	45.8
Mobile phone/Internet	65	30.4
Television/radio/village news center/billboard	39	18.2
Village health volunteer	12	5.6

Table 2 Health literacy for preventing hypertension of participants (N = 214).

Health literacy	Mean	SD	Level
Knowledge and understanding about health literacy (6 points)	4.47	1.24	Fair
Access to and usage of healthcare service (20 points)	10.80	3.56	Poor
Communication to enrich health expertise (24 points)	10.13	5.01	Poor
Self-management of health condition (20 points)	10.07	4.83	Poor
Media literacy (20 points)	13.07	4.41	Fair
Proper decision to practice in preventing hypertension (8 points)	6.43	1.45	Good
Social participation (20 points)	9.32	5.17	Poor
Behaviors of self-care and behaviors to prevent hypertension (40 points)	22.86	5.29	Poor
Overall (158 points)	87.23	21.92	Poor

Table 3 Correlations between health literacy and selected study factors (N = 214).

Study factors	r	P-value
Gender[$]	0.138	0.044
Age[†]	0.090	0.191
Education level[†]	0.001	0.988
Income[†]	0.202	0.003
Stress[†]	0.427	< 0.01
Attitude toward hypertension prevention[†]	-0.086	0.208
Interactions with healthcare providers[†]	0.242	< 0.01
Access to and usage of healthcare service[†]	0.242	< 0.01

[†] Pearson's product moment correlation coefficient; [$] Point bi-serial correlation coefficient

Discussions and Conclusion

Among individuals with a high risk of hypertension, overall level of health literacy for preventing hypertension was at a poor level (mean = 87.23 ± 21.92 points). Health literacy aspects with poor level included access to and usage of healthcare service, communication to enrich health expertise, self-management of health condition, behaviors of self-care and behaviors to prevent hypertension, and social participation. Most participants did not participate in knowledge management activities or health promotion campaigns. More than half did not participate in health modification activities or social measures in community health monitoring. These findings are consistent with the work of Tanak and colleagues of which participants' age was comparable to our study.[6] They found that health literacy in most community-dwelling individuals with a high risk of hypertension in Bangkok was at a medium level (57.8%) followed by a poor level (40.11%).

Health literacy was significantly correlated with gender, income, stress, and interactions with healthcare providers and access to and usage of healthcare service. For gender, women were more likely to have more health literacy than men. This could be due to the belief that men have a stronger physique than women.[16] As a result, men are less likely to seek health literacy to take care of themselves to prevent hypertension[17] and less access to healthcare service than women.[18] This in turn leads to further less health literacy among men. This finding of ours is consistent with the study of Çaylan and colleagues in which gender was associated with health literacy score in adults (P-value = 0.01), specifically women had more health literacy than men.[19] The study of Ansari and co-workers also revealed that women elderly were more likely to have health literacy than male counterparts.[20]

As income was found significantly associated with health literacy score (r = 0.202, P-value < 0.05), those with higher income were more likely to have higher literacy. Since income is a factor determining health literacy, individuals with higher income are more likely to have a better access to the Internet, health related information service, and a wider range of options of healthcare service than those with lower income. Their health literacy is thus better.[21] Our finding is consistent with the study of Buyuksireci and Demirsoy in which income was associated with health literacy about disease progress among women with fibromyalgia (r = 0.416, P-value < 0.05)[22], and the study of Xie et al in which income was also associated with health literacy among individuals in the central China (r = -0.277, P-value < 0.05).[23]

Stress was found associated with health literacy for preventing hypertension (r = 0.427, P-value < 0.001). This positive correlation could be because stress, as a positive psychological mechanism, could lead to hope, confidence, enthusiasm, and excitement in learning and seeking health related information and measures to cope and overcome their illness.[24] This finding is consistent with the study of Nakamura-Taira et al in which stress and stress management behavior were associated with health literacy among ว Japanese workers.[25] Individuals with low stress had low health literacy since low-stressed individuals were less interested or motivated to seek mental health information. In contrast, those with higher stress were more motivated to do so, therefore, they had more health literacy.

Interactions between individuals with a high risk of hypertension with their healthcare providers was associated with health literacy (r = 0.242, P-value < 0.001). The interaction is crucial for the access to healthcare service, participation in healthcare and ultimately self-management on their health. Such process could lad to more health literacy.[26] This finding is consistent with the study of Kamimura et al s in which the interaction with healthcare providers was positively associated with health literacy among vulnerable patients (P-value < 0.01).[27]

Lastly, access to and usage of healthcare service was associated with health literacy for preventing hypertension (r = 0.242, P-value < 0.001). Access to risk factor information could improve health literacy.[7] The finding is consistent with the study of Tanak et al in which proactive healthcare service in individuals with a high risk of hypertension was associated with health literacy (r = 0.152, P-value < 0.001)[6] and the study

of Javadzade et al in which access to healthcare service was associated with health literacy among the elderly in Isfahan, Persia (*P*-value < 0.001).[28]

Based on our findings, related healthcare agents should monitor population hypertension risk and promote health literacy in the high-risk group especially men and those with low income. Community nurses and related healthcare providers and agents should initiate a policy to promote health literacy for high risk population emphasizing access and usage of healthcare service, interactions between high-risk individuals and providers and more effective communications. Community nurses and relate healthcare providers should play a major role in motivating people with high risk to perceive their risk of hypertension and its impact, and developing activities to promote hypertension prevention.

Our study had a limitation. Only participants from one district of Prachinburi province was selected. Generalization to a wider range of population at risk is limited. Participants from wider geographical are and socioeconomic status should be included in future studies. We also recommend studies on predictive associations of health literacy with health promoting behaviors in other chronic illnesses. Programs to improve competency of healthcare providers to promote health literacy for hypertension prevention should be developed. Access to information for hypertension prevention should be the goal of the program. The program should also emphasize the perception, understanding and monitoring on behavioral change to prevent hypertension.

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