

# Improving Health Literacy using the Health Education and Health Empowerment Program in Thai Adults with Uncontrolled Hypertension: A Randomized Controlled Trial

Nattaphat Janchai, Wannee Deoisres,\* Nujjaree Chaimongkol

**Abstract:** Hypertension is one of the serious health issues worldwide and requires medications and lifestyle modifications to prevent its serious complications. Lifestyle modification requires health literacy which is an important factor for people with hypertension to manage themselves to control blood pressure. Health literacy is the cognitive and social skills of individuals to acquire, access to, understand, and use information to stay healthy. This randomized controlled trial aimed to examine the effectiveness of Health Education and Health Empowerment Program to improve health literacy in Thai adults with uncontrolled hypertension. Two sub-district health promoting hospitals in a province in the east of Thailand were randomly selected and assigned to an intervention hospital and a control hospital. Twenty participants in each hospital were randomly selected. Participants in the experimental group received a 4-week Program, whereas participants in the control group received only usual care. The Health Literacy for Hypertension Questionnaire was administered at baseline (week 0), immediate post-intervention (week 4) and at follow-up after 4 weeks of intervention completion (week 8). Two-way mixed ANOVA and repeated measures were used to analyze the data.

The results indicated that participants in intervention group had a significantly higher health literacy mean scores than those in the control group at immediately post-intervention and follow-up period. The mean scores of health literacy in hypertension in the intervention group had significantly increased over time. These findings indicate the benefit of the program in improving health literacy among people with uncontrolled hypertension. Further testing of the program with participants in other provinces is needed to validate the results before implementation in practice.

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## Introduction

Hypertension (HT) is one of the most common non-communicable chronic diseases worldwide including in Thailand.<sup>1,2</sup> The prevalence of undiagnosed HT rates, including untreated and uncontrolled HT are higher in low- and middle-income countries than

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they are in high-income countries.<sup>1-3</sup> In Thailand, hypertension is one of the first 10 diagnoses for inpatients per 100,000 of the population and was the

leading cause of death in 2014, and ranked second in 2019.<sup>4</sup> Hypertension is a key risk factor, and may lead to other chronic illness and disabilities such as kidney damage, stroke, and coronary heart disease. Such chronic conditions and disabilities cause a burden on families, the health care system, and quality of life and can lead to death.<sup>5</sup>

Health education is one strategy used to control hypertension to avoid various complications, however, it is not enough to achieve the sustainable outcomes.<sup>6,7</sup> Growing evidence suggests that developing people's health literacy (HL) may be a promising strategy to improve the health outcomes and quality of life for people with a chronic condition.<sup>7</sup> Previous studies found the positive association between HL and better control of HT.<sup>8,9</sup> Since health literacy is the cognitive and social skills of individuals to acquire, access to, understand and use information to stay healthy,<sup>6,10</sup> which reflect the active involvement of people in management of their disease. People's involvement in the treatment process is an international gold standard for providers of medical care services expecting to achieve the desirable health outcome.<sup>7</sup> Thus, to achieve HL, health education can be complemented by other means of boosting health literacy.<sup>6</sup> Empowerment education was proposed as an effective type of health education,<sup>6</sup> since it helps the individual to recognize personal resources, and build a supportive network and help participants to recognize social services and their utilization to achieve the outcomes.<sup>11,12</sup> Considering the limits of health education, this study sought to determine whether health education and health empowerment would increase health literacy among adults with uncontrolled HT.

## **Literature Review and Conceptual Framework**

Health literacy is defined as the cognitive and social skills of individuals to acquire access to,

understand and use information in ways to stay healthy,<sup>6,10</sup> and is comprised of three distinctive elements: functional, interactive, and critical health literacy.<sup>6,10</sup> Functional health literacy means basic reading and writing skills that enable individuals to function effectively in daily social lives.<sup>10</sup> Interactive health literacy is the advanced skills that enable individuals to derive meaning from various forms of communications and apply new information to ever-changing situations in their daily lives.<sup>10</sup> Critical health literacy is defined as sets of cognitive skills more advanced than interactive health literacy and are focused on critically analyzing information which can be used to exercise greater control over life events and circumstances.<sup>10</sup>

With the increasing number of studies focusing on interventions to address low HL in clinical settings, countries such as the US, China and Australia and some European countries have established national strategies to address the high rates of low HL in their populations.<sup>11-13</sup> People with low HL can better understand health information through changes in communication and mixed strategy interventions, thereby introducing positive changes and better health outcomes.<sup>12,13</sup> In this study, the Teach-Back was used because it has been shown to be a useful method in that it requires people to explain the information given by health professionals using their own words.<sup>14</sup>

In order to improve HL, clear communication is necessary.<sup>15</sup> Communication should be purposeful and individualized and to lead to multiple teaching strategies that are specific.<sup>16</sup> Health education is described as consciously constructed opportunities of learning through the types of communication focusing on improving HL including knowledge and skill development promoting individual health. Belief in an individual's competence is necessary because it leads to action and health information can be modified to fit the needs of individuals.<sup>17</sup> Health education develops not only HL skills but also self-confidence. Therefore, tailoring health education to the individuals' levels is also important. If socio-economic conditions are not

considered, there will be significant limitations to the interventions since the environmental conditions often determine access to services and resources. Changing an individuals' perception of the environment is a crucial element in health education.<sup>18,19</sup> For health empowerment, it is defined as purposefully participating in the process of changing one's behaviors and one's environment, recognizing patterns and engaging inner resources for well-being and it occurs when individuals recognize their own personal and social contexts.<sup>18,19</sup> The purpose of health empowerment interventions is to ease individuals into recognizing personal resources, recognizing and building social contextual supportive network and helping participants to recognize social services and their utilization.

Since there have been no reports which claim to have improved HL by using both health education and health empowerment, the Health Education and Health Empowerment Program (HEaHEP) was developed based on the theory of health education<sup>6</sup> and health empowerment.<sup>18</sup> Health education focuses on health-related knowledge and belief and health information can be modified to fit the needs of individuals. Accordingly, the HEaHEP was developed to fit the needs of population in Thailand by using HL<sup>20,21</sup> and providing three levels of customized sessions (functional, interactive and critical health literacy).<sup>10</sup> With respect to part of health empowerment, using Teach-Back and Ask-Me 3 methods were used to enhance clear communication and understanding health information for better interactive HL with health professionals' support. Ask-Me 3 is an educational strategy promoting three simple questions for a patient in every health care interaction: What is my main problem? What do I need to do? Why is it important for me to do this?<sup>22</sup> The combination of both concepts was intended to prolong the retention of HT related knowledge and eventually leads to improved critical HL with decision-making.<sup>16</sup>

Thus, the aim of this study was to examine the effectiveness of the HEaHEP to improve HL in Thai adults with uncontrolled HT. The hypotheses were 1)

the participants in the intervention group would have a significantly higher mean score on the Health Literacy for Diabetes and Hypertension (HLH) than those in the control group at post-intervention (week 4), and during the follow-up period (week 8), and 2) the HLH mean scores on intervention group would significantly increase over time at the three time points.

## Methods

**Study Design:** A single-blind randomized controlled trial (RCT) with a two-group design and following the CONSORT recommendations<sup>23</sup>

**Sampling and Setting:** To estimate the sample size, the G\*Power 3.1.6 program<sup>24</sup> was used. This study had repeated measures analysis of variance (ANOVA) with two-way mixed design (one within and between subjects). The effect-size from the previous study, which examined the effect of improved HL through HT prevention behavior intervention, was 0.4.<sup>25</sup> The medium effect size to achieve a power of test is 0.8, a probability of type I error of .05. For higher effectiveness of the intervention, the 0.05 for partial eta-squared a power of test is 0.8 was selected, a probability of type I error of .05. The minimum number of the total sample was 34 participants.<sup>26</sup> Considering potential drop-out of the sample from the study intervention was 25%.<sup>25</sup> The sample size was a total of 40 (20 participants in each group).

The inclusion criteria for the participants were: 1) diagnosed uncontrolled hypertension (systolic and diastolic blood pressure between 140/90 -180/100 mmHg), 2) aged between 18-59 years, 3) had smartphones, and 4) able to communicate, read and write in Thai language. Exclusion criteria were: 1) vision and hearing loss, musculoskeletal problem, renal failure, heart failure, health status deteriorated by conditions such as stroke, or alteration of consciousness and 2) incapable of completing the three time of the study.

One province in the east of Thailand was purposively selected. Then, two sub-district health promoting hospitals (HPHs) were randomly selected

from 105 sub-district HPHs. These 2 sub-district HPHs were randomly assigned to an intervention hospital and a control hospital. The number of adults with uncontrolled hypertension in the intervention hospital and control hospital were 269 and 289, respectively. The potential participants based on the inclusion criteria were 46 in the intervention hospital and 54 in the control hospital. However, only 40 in each hospital were willing to participate. For the random selection of participants enrolled in each group, random assignment software provided at sealed envelope.com

was used to produce randomly-generated numbers. The list of participants was uploaded, and the blocked randomizer provided a unique code by blinding randomization. Forty sequentially-numbered opaque sealed envelopes (SNOSE) containing even and odd numbers per group was prepared. Then, the potential participants from both intervention and control hospital drew an envelope out of the 40. The participants who chose odd numbers of the SNOSE were finally selected as the participants in the study, which were 20 in each group. The flow of the participants is shown in Figure 1.

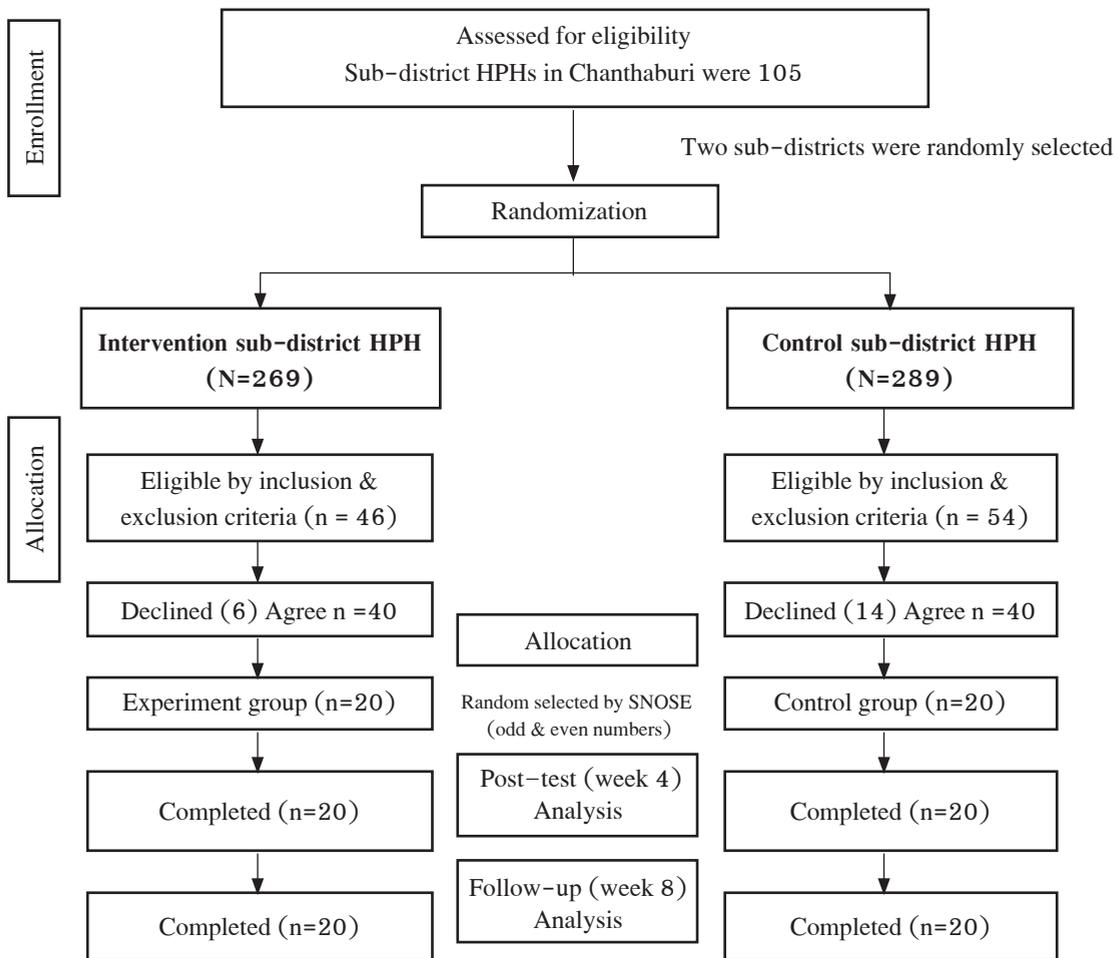


Figure 1 Flow chart of participation through the RCT

**Ethical Considerations:** The study was approved by the Institutional Review Board (IRB) of the Faculty of Nursing, Burapha University, Thailand (protocol number: 01-07-2562). Permissions for conducting the study were also obtained from the directors of hospitals. The explanations to participants were given regarding the study were comprised of the <sup>8</sup> demographic data form and the health history questionnaire and of the study, program implementation, benefits and potential risk, time involved, confidentiality and right to withdraw any time prior to the completion of data collection without any repercussion. Signed informed consents were then obtained before the study.

**Instruments:** The instruments and program involved are as follows:

*The demographic data form* was developed to obtain information on the participant's including age, gender, education level, marital status, family income, occupation, smoking and alcohol history, HT history, medications, and any health education received.

*The Thai Health Literacy for Diabetes and Hypertension Questionnaire* was developed by the Health Education Division, Department of Health

Service Support, Ministry of Public Health.<sup>20</sup> It consists of 7 categories: 1) need for health information (2 items), 2) capability to read vocabulary in three sets (1. 22 words, 2. 22 words, 3. 20 words, total 64 words), 3) capability to read and understand numbers (8 items), 4) capability to access and seek health information (5 items), 5) knowledge and understanding of diabetes and HT disease (23 items), 6) practice of problem solving in various situations (17 items), and 7) decision-making (11 items). In the category of knowledge and understanding of diabetes and HT disease, only the part of HT was used (6 items) in this study. One score was given per item. The total score was a possible 224, with a higher score indicated higher HLH. Interpretation of the level of proficiency scores of HLH is as follows: 0 -167 points or < 75% of the full score = low HL or minimal understanding; 167-224 points or > 75% of the full score = high HL or sufficient understanding.

The reliability of the HLHQ was tested in 30 adults with HT in a sub-district HPH. The reliability of the questionnaire both in pilot and main study are shown in **Table 1**.

**Table 1** Reliability of each dimension of the HLHQ in pilot and main study

Part / Items	HLHQ		Pilot study (HLHQ)	
	KR-20	Cronbach's Alpha	KR-20	Cronbach's Alpha
Part 1: Need for health information questions		0.81		0.81
Part 2: Hypertension medical vocabulary				
Set 1 Primary	0.98		0.98	
Set 2 Moderate	0.99		0.99	
Set 3 Difficulty	0.98		0.98	
Part 3: Numeracy test	0.82		0.98	
Part 4: Accessing health information questions		0.54		0.60
Part 5: Knowledge of hypertension disease	0.89		0.89	
Part 6: Communication		0.97		0.98
Part 7: Decision-making				
Part 7.1	0.49		0.48	
Part 7.2		0.68		0.67

**HEaHE Program**

This was developed by the primary investigator (PI), based on theory of health education and health empowerment, and the concepts of health literacy in

a literature review. The HEaHE program comprises providing education, group discussion, and a decision-making session. The content validity of HEaHE program was validated in terms of content and processes,

appropriate languages, activities, time and arrangement by three experts consisting of a physician who is an expert in hypertension with at least five years of experience, one in the health education and behavior field, and a registered nurse having experience in working with people with hT. The program is held over 4 weeks with 8 sessions provided (see details in Table 2).

**Usual care from sub-district health promoting hospitals:** This refers to the care provided to people with uncontrolled HT by doctors, nurses, and other support staff. It includes physical examination, recording vital signs, and measuring blood pressure for adjustment of antihypertensive drugs following the HT guideline.

**Data Collection:** The study was conducted from October–November 2019. After receiving permission from the director of the sub-district HPHs, the PI selected one research assistant (RA) in each setting who was a registered nurse with more than 3 years of experience

in taking care of people with HT. Research assistants (RAs) were trained regarding informed consent, the sampling method, data collection, and research ethics. They collected all data at baseline (week 0), immediately after intervention completion (week 4) and at follow-up (week 8). The RAs did not know the experiment or control status in their own setting. The HEaHE intervention program was implemented by the PI as indicated in Table 2.

**Statistical Analysis:** The statistical software program was used to analyze the data. Statistical significance was set at 0.05. Demographic data between two groups were compared by using Chi-square test, Fisher’s exact test, and independent *t*-test. Repeated measures with two-way mixed ANOVA (one within-subjects variable and one between – subjects variable) was performed to evaluate the effectiveness of the HEaHEP.

**Table 2** The details and the implementation of the HEaHE program

Session/Week	Objective	Activities
<b>Week 1</b>	<b>1. To improve functional health literacy</b>	1. Overview and introduction
<b>Session 1:</b> Goals and expectations 1 hour (13:00–14:00)		2. Explanation of guideline
<b>Session 2:</b> Knowledge and understanding of hypertension disease 1 hour (14:00–15:00)		3. Ice breaking
		1. Providing knowledge about hypertension by using booklets
		2. Knowledge about how to access information about hypertension
		3. Enhancing the understanding of hypertension by using ‘Teach Back’ and ‘Show Me’
<b>Week 2</b>	<b>2. To enhance interactive health literacy by using Health Empowerment and Motivation Interview</b>	1. Group discussion by using open-ended questions to improve participants’ self-evaluation
<b>Session 3:</b> Group discussion by using the motivational interviewing 1 hour (13:00–14:00)		2. Affirmations: Recognizing the participants’ strengths and efforts to improve their confidence in their ability to change
		3. Reflections: Way of responding to participants that involves listening carefully and making a reasonable guess about what the participants say
		4. Summary: Relating to what participants have expressed.
<b>Session 4:</b> Group discussion by using health empowerment 1 hour (14:00–15:00)		1. Reinforcement of strengths and self-capacity building by providing knowledge about hypertension and how to access health information

**Table 2** The details and the implementation of the HEaHE program (Continued)

Session/Week	Objective	Activities
		<ol style="list-style-type: none"> <li>2. Group discussion, sharing experiences about health services and social contextual resources to find out knowledge about how to access health information and medical services in specific social contexts</li> <li>3. Building social network by group Line application, using social media messenger and strengthening connection within social network</li> <li>4. Promote problem-solving, by self-evaluation using opening questions such as “How can you control blood pressure?” “How can you achieve your goal?”; An activity to encourage the participants to achieve their goals</li> <li>5. Increasing knowledge of health services and social welfare through group discussion (with questions like “When you run out of money how can you receive the medications?”)</li> <li>6. Reinforce recognition of social service resources, e.g. “How many health services you can contact?”</li> </ol>
<b>Week 3</b>	<b>Skill building</b>	
<b>Session 5:</b> Accessing health information practicing. 1 hour (13:00-14:00)		<ol style="list-style-type: none"> <li>1. How to use electronics such as mobile phones, YouTube, websites and applications</li> <li>2. Health access evaluation</li> </ol>
<b>Session 6:</b> Practicing communication and questioning 1 hour (14:00-15:00)		<ol style="list-style-type: none"> <li>1. Examples of situations to practice such as patient who has had hypertension more than 5 years, medication errors</li> <li>2. Training about how to make questions by using “Ask Me 3” technique</li> </ol>
<b>Week 4</b>	<b>3. To promote decision making and self-evaluation to improve critical health literacy.</b>	
<b>Session 7:</b> Practicing decision-making 1 hour (13:00-14:00)		<ol style="list-style-type: none"> <li>1. Training by using “tree diagram”; The session includes practice session on decision-making. Evaluation of decision-making conducted by asking questions about advantages and disadvantages of decisions</li> <li>2. Evaluation of pros and cons of decision-making</li> </ol>
<b>Session 8:</b> Self-evaluation 1 hour (14:00-15:00)		<ol style="list-style-type: none"> <li>1. Self-evaluation by self-report; Participants were asked to write about what benefits they had from intervention</li> <li>2. Effectiveness of the intervention done by using Satisfaction Assessment Form of HEaHE program</li> </ol>

**Table 3** Characteristic of the participants

Characteristic	Intervention group (n=20)		Control group (n=20)		t	p-value
	n	%	n	%		
<b>Gender</b>						
Male	8	40	5	25	.50 <sup>a</sup>	.25
Female	12	60	15	75		
<b>Education level</b>					.20 <sup>a</sup>	.10
Primary school	9	45	14	70		
Secondary school and above	11	55	6	30		
<b>Occupation</b>					.19 <sup>a</sup>	.76
Housewife	3	15	7	35		
Small business	7	35	8	40		
Employee	10	50	5	25		
<b>Alcohol Intake</b>					1.0 <sup>a</sup>	.50
Drink	5	25	5	25		
Do not drink	15	75	15	75		
<b>Cigarettes</b>					.49 <sup>a</sup>	.24
Smoke	2	10	0	0		
Do not smoke	18	90	20	100		
<b>Income</b>					.72 <sup>a</sup>	.62
Sufficient for living and saving	3	15	5	25		
Insufficient for saving	13	65	11	55		
Insufficient for living	4	20	4	20		
<b>Hypertension health education received</b>					.03 <sup>a</sup>	.02
Individual health education	8	40	16	80		
Group health education	12	60	4	20		
<b>Hypertension medication intake</b>					1.0 <sup>a</sup>	.50
One medication	14	70	15	75		
Two or more medications	6	30	5	25		
<b>Age</b>	51.55	8.04	51.60	6.56	.02	.98
	Range=30-59		Range=38-59			
<b>Duration of hypertension disease (years)</b>	6.15	2.28	6.30	2.36	.20	.84
	Range= 5-15		Range=5-12			

<sup>a</sup> = Fisher's Exact Test

## Results

All characteristics of participants in both groups were similar in age, gender, duration of being diagnosed with HT, education level, drinking and smoking, occupation, income, receiving health education for HT, and medication taking (Table 3). All these characteristics

were not significantly different between the two groups. Before starting the HEaHEP, the mean HLH scores in intervention and control group were at a low level. After the intervention at weeks 4 and 8, only the mean score of HLH in the intervention group was increased to a high level whereas in the control group was still at a low level (Table 4).

**Table 4** The mean score of health literacy of participants in the intervention group and control group

Variable	Interval	M	SD	Range	Level
<b>Intervention</b> (n=20)	Pre-intervention	143.75	11.52	116-161	Low HLH
	Post-intervention	184.20	5.88	174-198	High HLH
	Follow-up	189.25	8.92	170-201	High HLH
<b>Control</b> (n=20)	Pre-intervention	137.30	19.66	88-165	Low HLH
	Post-intervention	142.90	25.18	88-185	Low HLH
	Follow up	147.65	23.85	97-185	Low HLH

Two-way mixed ANOVA (**Table 5**) showed significant main effect of group ( $F_{1,38} = 34.43, p < .001$ ) indicating that mean scores of HLH in the intervention and control group were significantly different. Results from the one-way ANOVA (**Table 6**) revealed that the mean scores between the intervention and control groups were not statistically significant at baseline (week 0) ( $F_{1,38} = 1.79, p = .19$ ), but at post-intervention (Week 4), and at follow-up (Week 8), the mean score of HLH in the intervention group were significantly higher than that of the control group ( $F_{1,38} = 51.03, p < .001$ ) and ( $F_{1,38} = 53.39, p < .001$ ), respectively. Furthermore, there was a significant change in mean HLH score over time ( $F_{1.69} = 119.53, p < .001$ ) and

the time-group interaction was also significant ( $F_{1.69} = 54.36, p < .001$ ) (**Table 5**). The multiple pairwise comparisons using the Bonferroni test between each point of measurement showed that HLH score of the experimental group increased significantly from baseline (week 0), post-intervention (week 4) and to the follow up (week 8). The mean HLH scores in the control group were statistically significant across all three times points, but pairwise comparisons showed no significant increase from baseline (week 0) to post-intervention (week 4), and from post-intervention (week 4) to follow-up (week 8), but significantly increased from baseline (week 0) to follow up (week 8) (**Table 7**). Thus, both hypotheses were supported.

**Table 5** Results of repeat measures analysis of variance on a total score of HLHQ

Source of Variation	df	SS	MS	F	p-value
Between Subjects					
Group	1	26910.07	26910.07	34.43	<.001
Error	38	29698.25	781.53		
Within Subjects					
Time	1.69	17448.22	10344.66	119.53	<.001
Time * Group	1.69	7935.45	4704.75	54.36	<.001
Error(time)	64.09	5547.00	86.54		
Intercept	1	2980216.01	2980216.01	3813.30	<.001

\*df by using Greenhouse-Geisser

**Table 6** Simple effect of groups on total HLH scores at each time point

Source	df	SS	MS	F	p-value
Pre-intervention					
Between group	1	483.03	483.03	1.79	.19
Error	38	10225.95	269.10		
Post-intervention					
Between group	1	17056.90	17056.90	51.03	<.001
Error	38	12701.000	334.237		
Follow up					
Between group	1	17305.60	17305.60	53.39	<.001
Error	38	12318.30	324.17		

**Table 7** Pairwise comparisons using Bonferroni of the mean difference in total scores between each pair of time differences in the intervention and control groups

Time	$M_{diff}$	SE	p-value
Experiment group			
T1 vs. T2	-39.95	3.19	<.001
T1 vs. T3	-45.00	2.64	<.001
T2 vs. T3	-5.05	2.18	.03
Control group			
T1 vs. T2	-5.60	3.49	.38
T1 vs. T3	-10.35	2.59	.02
T2 vs. T3	-4.75	2.29	.16

T1= time 1 (week 0) baseline, T2=time 2 (week 4), T3 = time 3 (week 8).

### Discussion

This study implemented a 4-week HEaHE program aimed to enhance health literacy in hypertension (HT) among adults with uncontrolled HT receiving care at primary care settings in health promoting hospitals. Findings of this study demonstrated that after receiving the program participants in the intervention group had significant and steadily increased HLH scores, while participants in the control group who received only usual care showed no significant changes in the HLH scores. Comparing with the control group, results also indicated that after receiving the HEaHE program the intervention participants had significantly higher improvements in HLH scores than the control group both immediately after program completion and at 8 weeks follow-up.

We believe the HEaHE program was found to improve HL among adults with uncontrolled HT because the program was developed and designed based on HL education guidelines<sup>10, 20, 21</sup> and evidence from HL interventions. The program used a variety of methods in providing knowledge of HT, promoting participants' communication skills, and skills building and empowerment. Participants were taught knowledge about HT and given booklets that contained health information about HT using plain language, infographic pictures and cartoons, so that they could easily understand the material. In providing knowledge, the PI used the Teach-Back method to ascertain whether the participants

understood the health instructions and could repeat the health information in their own words. Participants were trained how to search for HT information and joined other intervention participants via group Line facilitated by the PI, thereby they could discuss and learn successfulness, problems, and findings solutions related to their HT health care. Moreover, participants were trained about the use of 3 questions: *What is the main problem in my HT control? What I need to do to control my HT?* and *Why it is important for me to control HT?* These Ask Me3 questions intervention empowered the participants to engage in learning process and enable them to more active involvement in their hypertension health care decision making.

Results of this study are consistent with previous studies. Various studies have shown the effectiveness of using Teach-Back method in enhancing HL among HT patients. For example, a study in underserved people, a one-to-one Teach-Back method was found to be effective in improvements HL regarding their HT knowledge.<sup>27</sup> In other studies, Teach-Back education significantly increased patients' HT knowledge and blood pressure control,<sup>14</sup> significantly improved HL and was effective in reducing the blood pressure among Iranian patients with uncontrolled hypertensive.<sup>28</sup> This education also improved HL in the dietary aspects of patients with HT.<sup>29</sup> With regard to the effectiveness of Ask Me 3 questions, findings of previous studies revealed that patients exposed to this intervention felt empowered to ask questions and to seek clarity on

issues that felt concerning,<sup>16</sup> and had significant improvements in HL related to diet and medication adherence.<sup>30</sup> Results of our study were also supported by previous studies using multiple health literacy techniques such as Teach-Back technique, Ask Me 3 questions, and motivational interviewing techniques that reported a significant increase in HL among patients with uncontrolled HT.<sup>31,32</sup> However, another study demonstrated that motivational interviewing was more effective compared to the Teach-Back method in regard to HT health outcomes.<sup>33</sup>

### **Limitations**

Some limitations of this study are noted. Firstly, although randomization of settings to experiment or control group was employed, the similarity of the environment of two settings could not be assured. Thus, threats to internal validity cannot be avoided, even though the principal of randomization was used to prevent any bias. Secondly, generalization of the findings to other settings in other parts of Thailand may be limited, since only one province was selected for the study. Thirdly, this study measured HLH for only at a short period immediately after post- intervention and four weeks later, thus, the sustainment of HLH over a long period is questionable. Fourthly, this study did not include blood pressure control, which is an important ultimate clinical outcome. Thus, it is not known whether this program is effective in controlling blood pressure. Further study is needed to determine the program's effectiveness on both behavioral and biological health outcomes with a random control trial for a longer period, e.g. six months of the program completion.

### **Conclusions and Implications for**

#### **Nursing Practice**

The HEaHEP utilized novel strategies to provide health education and to empower adults with uncontrolled HT and the program could greatly improve overall

aspects of health literacy in hypertension. Therefore, we recommend that it could be appropriate to implement in practice at primary care setting after further testing and possible modification. It is envisaged the program and be used to improve HLH in primary care settings after special training is provided. In addition, new innovations such as a video for the intervention session may help people with uncontrolled HT gain program access at any time. They could also use telehealth if the program was an application on a smart phone, and in this case the program would be a tool to access health information. Follow up may then help such people to have better control of their blood pressure.

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# การพัฒนาความรู้ทางสุขภาพโดยใช้โปรแกรมให้ความรู้ทางสุขภาพและการเสริมสร้างพลังอำนาจในผู้ป่วยโรคความดันโลหิตสูงที่ควบคุมความดันโลหิตไม่ได้: การทดลองแบบสุ่มที่มีกลุ่มควบคุม

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**บทคัดย่อ:** โรคความดันโลหิตสูงเป็นปัญหาสุขภาพที่สำคัญทั่วโลกซึ่งต้องรักษาด้วยยาและการปรับเปลี่ยนพฤติกรรมเพื่อป้องกันภาวะแทรกซ้อนที่รุนแรง ปัจจัยสำคัญที่จะทำให้ผู้ป่วยสามารถปรับพฤติกรรมสุขภาพและควบคุมระดับความดันโลหิตได้คือการมีความรู้ทางสุขภาพที่ดี ความรู้ทางสุขภาพคือทักษะทางปัญญาและสังคมของบุคคลในการเข้าถึง เข้าใจ และใช้ข้อมูลทางสุขภาพเพื่อดูแลตนเองให้มีสุขภาพที่ดี การทดลองแบบสุ่มที่มีกลุ่มควบคุมครั้งนี้ มีวัตถุประสงค์เพื่อศึกษาประสิทธิผลของโปรแกรมให้ความรู้ทางสุขภาพและการเสริมสร้างพลังอำนาจเพื่อพัฒนาความรู้ทางสุขภาพในผู้ป่วยโรคความดันโลหิตสูงที่ควบคุมระดับความดันโลหิตไม่ได้ ผู้วิจัยสุ่มเลือกโรงพยาบาลส่งเสริมสุขภาพตำบล 2 แห่ง ในจังหวัดหนึ่ง ในภาคตะวันออกเฉียงเหนือเป็นสถานที่ทำการวิจัย โดยสุ่มโรงพยาบาลแห่งหนึ่งเพื่อทำการทดลองและอีกโรงพยาบาลสำหรับกลุ่มควบคุม แล้วสุ่มผู้ป่วยจำนวน 20 คนจากแต่ละโรงพยาบาลเป็นผู้เข้าร่วมวิจัย กลุ่มตัวอย่างในกลุ่มทดลองได้รับโปรแกรมให้ความรู้ทางสุขภาพและการเสริมสร้างพลังอำนาจ เป็นเวลา 4 สัปดาห์ร่วมกับการดูแลตามปกติ ในขณะที่กลุ่มควบคุมได้รับการดูแลตามปกติจากโรงพยาบาลเท่านั้น กลุ่มตัวอย่างตอบแบบสอบถามความรู้ทางสุขภาพเกี่ยวกับโรคความดันโลหิตสูงในระยะก่อนการทดลอง (สัปดาห์ที่ 0) หลังการทดลองทันที (สัปดาห์ที่ 4) และระยะติดตามผล (สัปดาห์ที่ 8) วิเคราะห์ข้อมูลด้วยการวิเคราะห์ความแปรปรวนแบบผสมและวัดซ้ำ

ผลวิจัยพบว่า ภายหลังจากการทดลองและระยะติดตามผล ผู้เข้าร่วมวิจัยกลุ่มทดลองมีคะแนนเฉลี่ยความรู้ทางสุขภาพสูงกว่ากลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติ และคะแนนความรู้ทางสุขภาพผู้เข้าร่วมวิจัยกลุ่มทดลองเพิ่มขึ้นอย่างมีนัยสำคัญทางสถิติ ผลวิจัยบ่งชี้ว่าโปรแกรมให้ความรู้ทางสุขภาพและการเสริมสร้างพลังอำนาจสามารถเพิ่มความรู้ทางสุขภาพในผู้ป่วยโรคความดันโลหิตสูงที่ควบคุมความดันโลหิตไม่ได้ อย่างไรก็ตามการทดสอบโปรแกรมในกลุ่มผู้ป่วยในจังหวัดอื่น ๆ จะช่วยยืนยันผลการวิจัยก่อนนำไปประยุกต์ใช้ในการปฏิบัติการพยาบาลต่อไป

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