# Enhancing Self–Management through Geragogy–Based Education in Older Adults with Uncontrolled Hypertension: A Randomized Controlled Trial

*Kiattisak Ongkulna, Linchong Pothiban,* Sirirat Panuthai, Rojanee Chintanawat*

**Abstract:** Uncontrolled hypertension is a major medical problem leading to many serious health consequences. Enhancing self-management is essential for older adults with uncontrolled hypertension to control blood pressure and improve quality of life. Substantial evidence reveals that health literacy and self-efficacy are the strongest factors influencing self-management behaviors. According to geragogy, older adults require a different kind of education to other age groups. This randomized controlled trial investigated the effects of a Geragogy-Based Self-Management Education Program on health literacy, self-efficacy, and self-management behaviors among older adults with uncontrolled hypertension. One hundred participants who met the inclusion criteria were randomly assigned into experimental (n = 50) and control groups (n = 50). The experimental group received the self-management education program based on the geragogy teaching principle combined with transformative learning theory in addition to routine patient education, whereas the control group received only routine patient education. Data were collected at baseline, at the program end, and one and three months after the end of the program using the Health Literacy Scale, Hypertensive Self-Management Self-Efficacy Scale, and Self-Management Behaviors Scale. Data were analyzed using descriptive statistics, two-way repeated measures ANOVA, and independent sample t-test.

The results demonstrated that after receiving the program, the experimental participants had significantly higher health literacy, self-efficacy, and self-management behaviors at all time-points of measurement than before commencing the program and the control participants. The findings of this study indicated a successful self-management education program. Further studies to ensure efficacy of this program are suggested.

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## Introduction

Hypertension is a serious medical problem affecting over 1.13 billion people worldwide.[1] In Thailand, prevalence rates of hypertension among the elderly aged 60–69, 70–79, and over 80 years

were 48.4%, 56.8%, and 64.9%, respectively.[2] Hypertension is a risk factor for many major diseases including coronary artery disease (CAD) stroke, and chronic kidney disease (CKD), and is responsible for at least 45.0% and 51.0% of deaths due to coronary heart disease and stroke, respectively.[3,4] Control of blood pressure is thus very important. In one study, over half (68.9%) of Thai older adults had uncontrolled hypertension[2] which may have resulted from various factors, particularly, ineffective self-management. Therefore, enhancing self-management of older adults with hypertension is essential. Self-management education is a substantial technique and effective strategy for improving self-management.[5] Importantly, an education program should be able to transform older adults to be active in their life-long self-management to control their blood pressure.

## Review of Literature and Conceptual Framework

Self-management is defined as learning and practicing skills necessary to carry on an active and emotionally satisfying life in the face of chronic health problems,[6] including hypertension. People with hypertension need to manage their medical conditions, roles, and emotion to maintain the blood pressure level to a recommended ≤ 140/90 mm Hg as the goal.[3,4] Previous studies showed a strong association between self-management and a decrease in blood pressure.[7,8,9] However, self-management behaviors of Thai older adults with uncontrolled hypertension were found at a low level.[10] There are various factors influencing self-management behaviors. Among those factors, low health literacy and low self-efficacy are the strongest.[10,11,12,13] These factors can be manipulated through patient education.

Health literacy is an important factor affecting self-management behaviors. It is defined as the personal cognitive and social skills which determine the ability of individuals to gain access to, understand, and use information to promote and maintain good health.[14] Adequate health literacy contributes to control of blood pressure in people with hypertension.[15] Interestingly, almost half (48.7%) of Thai older adults with hypertension had inadequate health literacy.[16] Prior evidence shows that inadequate health literacy is associated with poor self-management and a low health-related quality of life among older adults.[17,18]

Another factor affecting self-management behaviors is self-efficacy, a belief in one's own capabilities to organize and execute the course of action required to attain a goal.[19] An earlier study indicated people with hypertension with high self-efficacy could better control their blood pressure.[20] Self-efficacy allows individuals to raise their motivation to maintain self-management behaviors. This is congruent with a study finding that older adults with uncontrolled hypertension and low self-efficacy had low self-management behaviors in terms of lack of motivation and discontinuation to perform.[21] To enhance self-management behaviors, therefore, self-efficacy must be increased.

In previous Thai studies, self-management of people with chronic diseases has been enhanced mostly through a 6-week long self-management education program based on Lorig's self-management program and the 5As (Assess, Advise, Agree, Assist, Arrange) self-management model. Several studies using a self-management education program among older adults with hypertension have reported positive effects of the program.[7,8,9] Interestingly, even though there are numerous useful teaching methods in these self-management programs, the Thai older adults with hypertension were still unable to maintain their blood pressure. It can be explained by the fact that, in Thai context, adult children hold strong beliefs and behaviors regarding respect and obligation to look after older parents, whether healthy or sick.[22] This might lead to older Thais often being viewed as passive recipients of care and dependent on caregivers or health care providers to take care of themselves. Additionally,

Thai older adults usually perceive self-management as unimportant and inconvenient.[12] Therefore, the high percentage of Thai older adults with uncontrolled hypertension possibly reflects ineffective self-management. Further, older adults' life experiences and frames of reference or mindsets may be obstacles for their self-management.[23] Existing self-management programs are not specifically designed to change the mindset of older learners from being passive to active. Therefore, testing of an educational intervention designed to enhance older adults' self-management behaviors that emphasize transforming them to be the active self-learner is essential. Teaching methods for older learners should also be appropriate.

Geragogy is a teaching method for older adults that compensates for the cognitive, sensory, and physical effects of aging and fosters independence.[24] The geragogy method includes clear verbal communication, appropriate written materials, and a comfortable environment.[25] In addition, this teaching method pays attention to the principles of knowing a learner's background, values, life experiences, and frames of reference or mindset, the maintenance of independence, and fostering a positive attitude toward learning.[24,25] To ensure positive learning outcomes of older learners, all concerns need to be addressed in geragogy-based education. This form of education can change older people's mindsets from care recipients to being active recipients, and includes transformative learning strategies such as disorienting dilemmas, critical reflection, and rational discourse.[23] These strategies can be used together with other teaching-learning methods. Group discussion is a method suitable for transformative learning as it is interactive and encourages participants to share experiences with the group.[23] This can empower the individual to change their frames of reference to understand the significance of self-management, and to enhance knowledge, attitude, and skills toward self-management.

This study applied geragogy teaching methods[25] combined with transformative learning strategies[23] to guide the educational program. Older adults with uncontrolled hypertension who participated in the program were provided essential disease knowledge and skills for self-management through geragogy-based education specifically designed for older adults.

## Study Aim and Hypotheses

This study aimed to investigate the effectiveness of the Geragogy-Based Self-Management Education Program (GBSEP) in enhancing health literacy, self-efficacy, and self-management behaviors among older adults with uncontrolled hypertension. The following hypotheses were tested: The mean scores of health literacy, self-efficacy, and self-management behaviors in the experimental group would be significantly higher than before receiving the program, and in the control group at the program end, and at one and three months after the program.

## Methods

**Design:** This study employed a parallel, two-group randomized controlled trial (RCT) with a pretest-posttest design. The RCT is reported here in accordance with the requirements of the CONSORT 2010 guidelines.

**Sampling and Setting:** The study setting was a province in the north of Thailand where there were many older adults with uncontrolled hypertension. Random sampling was used to choose one of seven district hospitals in this province. The inclusion criteria were people: 1) aged 60-80 years; 2) diagnosed with primary hypertension and treated with at least one type of antihypertensive drugs for at least four months; 3) presenting with systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg for at least twice during measuring of blood pressure (1-minute duration between each measurement, taking on the same arm, and 5 mmHg for difference in blood pressure twice); 4) able to do basic ADLs with a score of Barthel Index ≥12 points; 5) able to communicate, read, and write in Thai language; and 6) willing to

participate in the study. Participants were excluded if they had severe complications that made them unable to fully participate in the study.

The sample size was calculated by the formula for repeated measures, ANOVA, using $\eta^2$ at medium effect of .06, $\alpha$ of .05, and power of .80. Data from statistical power tables indicated the total sample size was 90,[26] and 10% of estimated sample was added to overcome possible attrition. Therefore, the actual sample required was 100, 50 per group.

In this study, 130 older adults with hypertension were initially approached, of whom, 110 met eligible criteria and were asked to participate in the study. Ten refused to participate due to: residing far away from research setting, lack of caregivers to accompany them to the setting, and lack of time to attend the whole program. Totally, 100 eligible participants were enrolled and assigned into the experimental and control groups with 50 persons per group. All participants remained in the program (100% retention) **(Figure 1).**

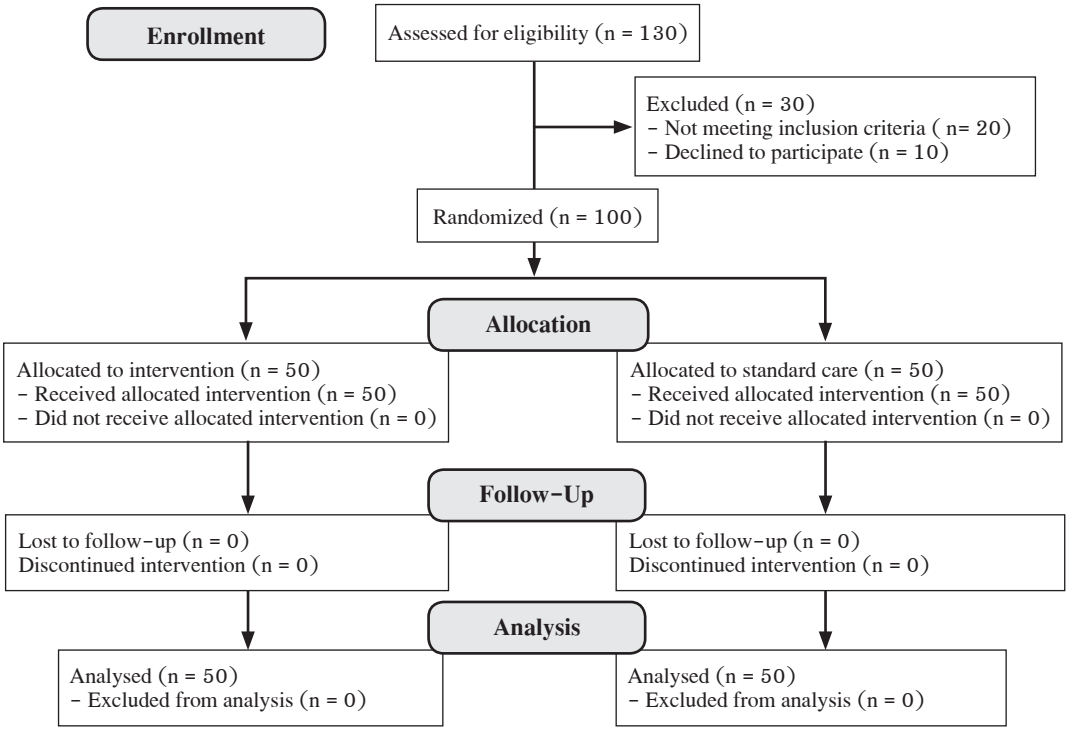


**Figure 1.** Flow chart of the participants throughout the trial

**Randomization:** Permuted block randomization was used to assign the recruited participants into the experimental (E) and control (C) groups using a block size of four and the primary investigator (PI) randomized the blocks until required sample size was reached. The participant number and the group assigned were written down on paper and kept in the opaque sealed envelope labeled with a serial number. The PI opened the sealed envelope once the eligible participants gave informed consent to participate in the study.

**Ethical considerations:** This study was approved by the Research Ethics Committee of the Faculty of Nursing, Chiang Mai University, Thailand (Study code: 2019-FULL018). The participants were informed about the study and protection of their rights. Participation in this study was totally voluntary, withdrawal from

the study could occur at any time with no consequences, and confidentiality was strictly maintained. All participants signed an informed consent form to participate in the study.

**Research instruments:** Data were collected using the following questionnaires:

*A demographic data recording form*, developed by the PI, was used to obtain participants' personal data including gender, age, marital status, religion, educational level, duration of hypertension, comorbid diseases, previous complications, and blood pressure values.

*The Health Literacy Scale (HLS).* This scale was originally developed by Ishikawa et al.[27] The PI translated the HLS into Thai language after obtaining the original authors' permission. It was then back-translated into English language by three bilingual experts. Identification of the items' discrepancies and adjustments were undertaken by the authors. There were 14 items with 3 factors; functional health literacy (5 items e.g., you have found that the print was too small to read), communicative health literacy (5 items e.g., you have collected information from various sources), and critical health literacy (4 items e.g., you have considered whether the information was applicable to your situation). Each item is rated on a 4-point Likert scale, ranging from 1 (never) to 4 (often); and the scores are reversed for functional health literacy. The total possible scores range from 14 to 56 and are divided into three levels based on class intervals: low (14-28), moderate (28.01-42), and high (42.01-56). Higher scores indicate higher levels of health literacy. The HLS was tested for its content validity by a panel of six experts including a physician specialized in gerontology, a public health instructor specialized in health literacy, two nursing instructors specialized in gerontology, and two nursing instructors specialized in hypertension and self-management. The Scale-based Content Validity Index (S-CVI) of the translated HLS was 0.96. The internal consistency reliability was tested with 10 participants who met the same inclusion criteria as the study participants. Cronbach's alpha coefficients for the translated HLS in the pilot and present studies were .90 and .97, respectively.

*The Hypertensive Self-Management Self-Efficacy Scale* (HSMSES) developed by Pinprapapan et al.[28] was used to measure self-management self-efficacy of older adults with uncontrolled hypertension. The scale consists of 26 items including taking of antihypertensive medication (6 items), dietary modifications (4 items), weight control (2 items), physical exercise (6 items), avoiding risk factors (4 items), stress management (2 items), and follow-up visit (2 items). Item examples are: "You have confidence to take antihypertensive drugs every day" and "You have confidence to reduce or avoid high-sodium consumption." A 4-point Likert scale is used for responses to each item, ranging from 1 (less confidence) to 4 (most confidence). The total possible scores range from 26 to 104. The scores are divided into 3 levels based on class intervals: low (26-52), moderate (52.01-78), and high (78.01-104). Higher scores indicate higher levels of self-efficacy. The internal consistency reliability using Cronbach's alpha coefficients of the HSMSES in the present study was .97.

*The Self-Management Behavior Scale* (SMBS). This scale was originally developed by the PI based on literature review regarding self-management behaviors. It is a 30-item scaled instrument used to assess self-management behaviors of older adults with uncontrolled hypertension. The scale comprises three components; medical management (22 items, e.g., you reduce or avoid to intake high salt diet), role management (6 items, e.g., you regularly visit physicians as scheduled appointment), and emotional management (2 items, e.g., you do relaxation when you feel stressed such as praying, reading books, listening to music, watching television, and gardening). A 4-point Likert scale is used with scores from 1 to 4, where 1 is 'never perform' and 4 is 'always perform'. The total possible scores range from 30 to 120 and are divided into 3 levels based on class intervals: low (30-60), moderate (60.01-90),

and high (90.01-120). Higher scores indicate higher levels of self-management behaviors. This scale was tested for content validity by the same experts for the HLS. The S-CVI of the SMBS was 0.94. The internal consistency reliability was tested with 10 participants who met the same inclusion criteria as the study participants. Cronbach's alpha coefficients in the pilot and present studies were .87 and .95, respectively.

**Intervention:** The Geragogy-Based Self-Management Education Program (GBSEP) and educational materials were developed by the PI based on geragogy teaching methods[25] combined with transformative learning strategies.[23] The GBSEP is a group-based intervention (8-10 participants per group) aiming to transform the participants from passive to active care recipients. The intervention was conducted at a private conference room of a district hospital in a province up north of Thailand. This program was divided into 6 sessions led by the PI. Each session lasted about 2 hours with 1 intermittent break (15 minutes) during the session in progress, held twice a week for 3 consecutive weeks. In the first session, the PI enhanced awareness and motivation for self-management of the participants through group discussion including demonstrating consequences of uncontrolled hypertension, sharing lived experiences, and reflecting their beliefs about blood pressure control. In the second session, the PI provided information about hypertension, complications, treatments, and proper self-management using proper media. From the third to the sixth sessions, the participants were trained about essential skills for effective self-management including 1) DASH diet and dietary planning, 2) effective exercises for older adults with hypertension, 3) medication management and role management, and 4) emotion management and relaxation techniques. The details of 6 sessions were described in **Table 1.** A booklet for the personal use of the participants, Living a Happy Life with Hypertension, was developed based on appropriate written materials for older learners and given to them. The GBSEP was assessed for content validity in terms of content and activities, media, duration, and arrangement by a panel of three experts including a physician specialized in gerontology, a nursing instructor specialized in gerontology, and a nursing instructor specialized in hypertension and self-management. It was then adjusted according to the experts' suggestions.

**Table 1.** Content of the Geragogy-Based Self-Management Education Program (GBSEP)

| Week/ Session/ Time | Topic/ Teaching method and strategy | Objectives | Teaching-learning activities |
|---|---|---|---|
| Week 1/ Session 1/ (2 hrs) | Disorienting dilemmas and critical reflection/ Geragogy and transformative learning | 1. To introduce the participants in the study<br>2. To raise awareness and motivation for self-management<br>3. To set a goal for blood pressure control | 1. Self-introduction to make a good mutual relationship and warm atmosphere<br>2. Program introduction including objectives and procedures of the study<br>3. Encouraging the participants to share lived experiences about their disease (Disorienting dilemma) through group discussion with open-ended questions; 1) What is your present blood pressure level? and why is it important for you to know? 2) Did you know about recommended level of blood pressure? 3) How do you think about your current health status? 4) Have you ever had symptoms from high blood pressure? and what are your symptoms? |

**Table 1.** Content of the Geragogy-Based Self-Management Education Program (GBSEP) (Cont.)

| Week/ Session/ Time | Topic/ Teaching method and strategy | Objectives | Teaching-learning activities |
|---|---|---|---|
| | | | 4. Encouraging the participants to reflect their beliefs about blood pressure control (Critical reflection and rational discourse) through group discussion with open-ended questions; 1) How do you think about the importance of blood pressure control as recommended level? and why do you think that? 2) How do you perform about blood pressure control? 3) What are your problems about blood pressure control? 4) If you want to change your behaviors for blood pressure control, what should you do?<br>5. Demonstrating consequences of uncontrolled hypertension using VDO presentation<br>6. Encouraging the participants to set the optimal goal and commitment to their responsibilities to control blood pressure as the recommended level |
| Week 1/ Session 2/ (2 hrs) | Hypertension and complications/ Geragogy | 1. To enhance knowledge about hypertension and complications | 1. Encouraging the participants to discuss about previous knowledge of hypertension using open-ended questions<br>2. Providing information about hypertension and complications using VDO and power point presentation including definition, causes and types, symptoms and complications, and treatments of hypertension |
| Week 2/ Session 3/ (2 hrs) | Healthy eating/ Geragogy | 1. To enhance knowledge about DASH diet<br>2. To enhance skills about dietary planning | 1. Encouraging the participants to share lived experiences about their previous eating behaviors<br>2. Teaching about appropriate diet for older adults with hypertension including DASH diet, sodium reduction, and moderate alcohol consumption using VDO and power point presentation<br>3. Practicing about dietary planning using food models through group activities |
| Week 2/ Session 4/ (2 hrs) | Effective exercises/ Geragogy | 1. To enhance knowledge about effective exercises for older adults with hypertension<br>2. To enhance skills about effective exercises for older adults with hypertension | 1. Encouraging the participants to share their experiences about daily exercises through group discussion<br>2. Teaching about benefits of regular exercise and effective exercises for older adults with hypertension using VDO and power point presentation<br>3. Demonstrating and practicing Boonmee's long stick exercise |

**Table 1.** Content of the Geragogy-Based Self-Management Education Program (GBSEP) (Cont.)

| Week/ Session/ Time | Topic/ Teaching method and strategy | Objectives | Teaching-learning activities |
|---|---|---|---|
| Week 3/ Session 5/ (2 hrs) | Medication management and role management/ Geragogy | 1. To enhance knowledge about medication management and role management<br>2. To enhance medication management skills | 1. Encouraging the participants to share their experiences about medication management and role management through group discussion<br>2. Teaching about medication management and role management using power point presentation<br>3. Practicing medication management using medication instruction written sheets through group activities |
| Week 3/ Session 6/ (2 hrs) | Emotion management/ Geragogy | 1. To enhance knowledge about stress management<br>2. To enhance relaxation skills | 1. Encouraging the participants to share lived experiences about their emotional problems through group discussion<br>2. Teaching about stress management using VDO and power point presentation<br>3. Demonstrating and practicing relaxation techniques: breathing exercise, muscle relaxation, and massage |

**Data collection:** The study was implemented at a district hospital in a province up north of Thailand during May-October 2019. After study approval, the PI selected two research assistants (RAs) at the research setting and informed them about objectives of the study, the program activities, prospective participants, and data collection procedures. Prior to commencing the program, the RAs who did not know the status of experimental group collected pretest (baseline) data including health literacy, self-efficacy, and self-management behaviors of both groups using the study questionnaires. Completion of the questionnaires took approximately 45-60 minutes. After that, the PI conducted the program sessions twice a week for 3 consecutive weeks, while the control group received routine care including physical examination by physicians, regular treatments upon theirs symptoms, and routine patient education. After intervention completion, the RAs collected posttest data of both groups right after the program ended, one month, and three months after.

**Data analysis:** Data analysis was carried out using SPSS version 18. Descriptive statistics (i.e. frequencies, percentages, range, mean, and standard deviation) were used to describe demographic data and mean scores of three dependent variables (health literacy, self-efficacy, and self-management behaviors). Because data were normally distributed, two-way repeated measures ANOVA was used to compare the differences of the mean scores of the dependent variables between groups and times. Additionally, the independent sample t-test also was used to test the differences of the mean scores of the dependent variables between the experimental and control groups at each point of measurement.

## Results

Most of the participants in both groups were female, in the young older age group, married, Buddhist, had primary school level education, had hypertension for 1-10 years, no comorbid diseases, and no previous complications. All demographic data between the two groups were not significantly different. (See **Table 2**).

**Table 2.** Demographic and clinical characteristics of participants (n = 100)

| Characteristics | Control group (n = 50) | | Experimental group (n = 50) | | *p*-value |
|---|---|---|---|---|---|
| | n | % | n | % | |
| Gender | | | | | |
| Male | 15 | 30.0 | 17 | 34.0 | .668[a] |
| Female | 35 | 70.0 | 33 | 66.0 | |
| Ages (years) | | | | | |
| Mean (SD) | 68.16 (5.08) | | 67.98 (6.30) | | .875[t] |
| 60-69 (Young-old) | 30 | 60.0 | 32 | 64.0 | |
| 70-79 (Old-old) | 20 | 40.0 | 17 | 34.0 | |
| ≥ 80 (Oldest-old) | 0 | 0.0 | 1 | 2.0 | |
| Marital status | | | | | |
| Single | 1 | 2.0 | 0 | 0.0 | .727[a] |
| Married | 34 | 68.0 | 37 | 74.0 | |
| Widowed | 12 | 24.0 | 10 | 20.0 | |
| Divorced | 3 | 6.0 | 3 | 6.0 | |
| Religion | | | | | |
| Buddhism | 50 | 100.0 | 50 | 100.0 | - |
| Educational level | | | | | |
| Primary school | 45 | 90.0 | 45 | 90.0 | 1.000[a] |
| Secondary school/Vocational certificate | 3 | 6.0 | 3 | 6.0 | |
| Diploma/High vocational certificate or above | 2 | 4.0 | 2 | 4.0 | |
| Duration of having hypertension (years) | | | | | |
| Mean (SD) | 7.50 (6.41) | | 7.66 (5.86) | | .897[t] |
| 1-10 | 40 | 80.0 | 37 | 74.0 | |
| 11-20 | 9 | 18.0 | 11 | 22.0 | |
| 21-30 | 1 | 2.0 | 2 | 4.0 | |
| Comorbid diseases | | | | | |
| None | 25 | 50.0 | 29 | 58.0 | .422[a] |
| Having comorbid diseases | 25 | 50.0 | 21 | 42.0 | |
| Previous complications | | | | | |
| None | 42 | 84.0 | 45 | 90.0 | .233[a] |
| Dizziness | 3 | 6.0 | 4 | 8.0 | |
| Headache | 5 | 10.0 | 1 | 2.0 | |
| Systolic blood pressure (mmHg) | | | | | |
| Range | 142-168 | | 140-167 | | .240[t] |
| Mean (SD) | 151.24 (6.18) | | 149.70 (6.83) | | |
| Diastolic blood pressure (mmHg) | | | | | |
| Range | 73-100 | | 72-96 | | .619[t] |
| Mean (SD) | 84.68 (5.13) | | 84.12 (6.06) | | |

*Note.* [a] = Chi-square test, [t] = Independent sample t-test

At baseline, the health literacy mean scores of the groups were similar at a moderate level. After intervention completion, the health literacy mean scores of the experimental group reached a high level and were also gradually higher at the program end, and one and three months after the program, while the control group remained at a moderate level.

The self-efficacy mean scores of both groups were similar at a moderate level. After intervention accomplishment, the self-efficacy mean scores of the experimental group increased to a high level and were also gradually higher at the program end, and one and three months after the program, whereas the control group were still at a moderate level.

The self-management behaviors mean scores at baseline of both groups were similar at a moderate level. After intervention, the self-management behaviors mean scores of the experimental group rose to a high level and were continuously higher at the program end, and one and three months after the program, while those of the control group did not change (See **Table 3**).

**Table 3.** Range, mean, standard deviation, and level of health literacy, self-efficacy, and self-management behaviors in the control and the experimental groups

| Variables | Control group | | | Experimental group | | |
|---|---|---|---|---|---|---|
| | Range | Mean (SD) | Level | Range | Mean (SD) | Level |
| **Health Literacy** (Possible score = 14-56) | | | | | | |
| Baseline | 22-52 | 36.16 (8.60) | Moderate | 22-52 | 36.26 (8.46) | Moderate |
| At the program end | 22-52 | 36.36 (8.70) | Moderate | 33-56 | 44.56 (6.70) | High |
| 1 month after | 23-52 | 36.58 (8.54) | Moderate | 33-56 | 45.62 (6.03) | High |
| 3 months after | 23-52 | 36.76 (8.60) | Moderate | 36-56 | 46.94 (5.31) | High |
| **Self-efficacy** (Possible score = 26-104) | | | | | | |
| Baseline | 50-89 | 69.40(10.66) | Moderate | 48-91 | 70.84(10.74) | Moderate |
| At the program end | 50-88 | 69.44(10.54) | Moderate | 66-100 | 83.66 (9.34) | High |
| 1 month after | 52-90 | 69.82(10.53) | Moderate | 72-103 | 86.24 (8.52) | High |
| 3 months after | 52-90 | 69.96(10.52) | Moderate | 75-103 | 87.88 (8.00) | High |
| **Self-Management Behaviors** (Possible score = 30-120) | | | | | | |
| Baseline | 61-99 | 79.42 (9.74) | Moderate | 61-100 | 80.94 (9.95) | Moderate |
| At the program end | 61-99 | 79.60(10.38) | Moderate | 89-116 | 99.66 (8.04) | High |
| 1 month after | 61-99 | 79.88(10.26) | Moderate | 92-118 | 102.34 (8.10) | High |
| 3 months after | 61-99 | 80.08(10.22) | Moderate | 95-118 | 104.44 (7.09) | High |

To compare the differences in health literacy, self-efficacy, and self-management behaviors mean scores between groups and times, two-way repeated measures ANOVA were used. There were significant differences in health literacy, self-efficacy, and self-management behaviors mean scores between each point of measurement in each group ($p < .05$) (**Table 4**). Therefore, the difference among mean scores at each point of time in each group needed to be confirmed.

**Table 4.** The differences of health literacy, self-efficacy, self-management behaviors between groups and times

| Variables | SS | Df | MS | F[r] | *p*-value |
|---|---|---|---|---|---|
| **Health Literacy** | | | | | |
| Within subject[a] | | | | | |
| Time | 1,917.210 | 1.320 | 1,452.447 | 424.478 | < .001 |
| Time x group | 1,581.660 | 1.320 | 1,198.240 | 350.186 | < .001 |
| Error | 442.630 | 129.359 | 3.422 | | |
| Between subject[a] | | | | | |
| Group | 4,733.440 | 1 | 4,733.440 | 20.211 | < .001 |
| Error | 22,951.450 | 98 | 234.198 | | |
| **Self-efficacy** | | | | | |
| Within subject[a] | | | | | |
| Time | 4,748.810 | 1.289 | 3,683.226 | 559.981 | < .001 |
| Time x group | 4,250.620 | 1.289 | 3,296.825 | 501.234 | < .001 |
| Error | 831.070 | 126.352 | 6.577 | | |
| Between subject[a] | | | | | |
| Group | 15,625.000 | 1 | 15,625.000 | 40.659 | < .001 |
| Error | 37,660.890 | 98 | 384.295 | | |
| **Self-Management Behaviors** | | | | | |
| Within subject[a] | | | | | |
| Time | 9,128.090 | 1.208 | 7,557.523 | 444.823 | < .001 |
| Time x group | 8,323.380 | 1.208 | 6,891.271 | 405.609 | < .001 |
| Error | 2,011.030 | 118.366 | 16.990 | | |
| Between subject[a] | | | | | |
| Group | 29,241.000 | 1 | 29,241.000 | 89.883 | < .001 |
| Error | 31,881.690 | 98 | 325.323 | | |

*Note*. [r] = Two-way repeated measures ANOVA, [a] = Greenhouse-Geisser, $p < .05$

An independent sample t-test was used to test the differences of the mean scores of health literacy, self-efficacy, and self-management behaviors between the groups at each point of measurement. The results demonstrated that the health literacy, self-efficacy, and self-management behaviors mean scores of the experimental group were significantly higher than those of the control group at all points of measurement ($p < .05$) (**Table 5**).

**Table 5.** Means difference of health literacy, self-efficacy, self-management behaviors mean scores between the control and the experimental groups at each point of time

| Variables | Control group | Experimental group | t | *p*-value |
|---|---|---|---|---|
| | Mean (SD) | Mean (SD) | | |
| **Health Literacy** | | | | |
| Baseline | 36.16 (8.60) | 36.26 (8.46) | 0.059 | .953 |
| At the program end | 36.36 (8.70) | 44.56 (6.70) | 5.281 | < .001 |
| 1 month after | 36.58 (8.54) | 45.62 (6.03) | 6.113 | < .001 |
| 3 months after | 36.76 (8.60) | 46.94 (5.31) | 7.122 | < .001 |

**Table 5.** Means difference of health literacy, self-efficacy, self-management behaviors mean scores between the control and the experimental groups at each point of time (Cont.)

| Variables | Control group | Experimental group | t | *p*-value |
|---|---|---|---|---|
| | Mean (SD) | Mean (SD) | | |
| **Self-efficacy** | | | | |
| Baseline | 69.40 (10.66) | 70.84 (10.74) | 0.673 | .503 |
| At the program end | 69.44 (10.54) | 83.66 (9.34) | 7.139 | < .001 |
| 1 month after | 69.82 (10.53) | 86.24 (8.52) | 8.573 | < .001 |
| 3 months after | 69.96 (10.52) | 87.88 (8.00) | 9.586 | < .001 |
| **Self-Management Behaviors** | | | | |
| Baseline | 79.42 (9.74) | 80.94 (9.95) | 0.772 | .442 |
| At the program end | 79.60 (10.38) | 99.66 (8.04) | 10.803 | < .001 |
| 1 month after | 79.88 (10.26) | 102.34 (8.10) | 12.147 | < .001 |
| 3 months after | 80.08 (10.22) | 104.44 (7.09) | 13.853 | < .001 |

*Note*. t = Independent sample t-test. $p < .05$.

## Discussion

In this study, geragogy teaching methods combined with transformative learning strategies were provided to older adults with hypertension. Transformative learning strategies were delivered to change older adults' mindsets to enhance awareness of self-management and transform them from passive to active care recipients. After gaining knowledge and skills, the participants became informative persons that in turn would increase health literacy that older adult can be used to extract, communicate, and apply health-related information to make decision and perform self-management behaviors. Additionally, the participants who had high self-efficacy through mastery experiences may increase intrinsic motivation and self-determination to initiate performing self-management behaviors to control their blood pressure, eventually. The results from this study demonstrated that the Geragogy-Based Self-Management Education Program (GBSEP) could enhance health literacy, self-efficacy, and self-management behaviors among older adults with uncontrolled hypertension. The findings supported the conceptual framework and the proposed research hypotheses of the study, and showed that health literacy and self-efficacy are the most powerful factors affecting self-management behaviors.[10,11,12,13] The study findings also revealed that the experimental group participants increased health literacy and self-efficacy after taking part in the program. Once the participants became health literate and had high self-efficacy, they had enough confidence to perform self-management. Studies have found that adequate health literacy and high self-efficacy can strengthen and maintain self-management behaviors.[10-13,15] Accordingly, the participants' self-management behaviors could improve after participating in the program. Due to the positive relationships between three outcome variables, the reason why the program affected all outcomes can be explained in the same way.

The GBSEP provided disease knowledge and essential self-management skills for the experimental group participants through proper teaching methods (geragogy). Disease knowledge was information about hypertension in terms of causes, sign and symptoms, complications, and treatments. Essential skills for self-management included the DASH diet and dietary planning, effective exercises for older adults with hypertension, medication management and role

management, as well as emotion management and relaxation techniques. Besides use of teaching methods, knowledge about hypertension was derived from group discussion for sharing lived experiences and self-reflection, which forms part of transformative learning strategies. The PI encouraged the participants to reflect on their beliefs and current behaviors about blood pressure control, share beneficial health information, better establish social networks, and seek practical assistance. With these activities, the participants could effectively learn about disease-specific knowledge and essential skills for performing self-management, communicate with health care providers, and apply the obtained information to make decision for their disease.[14,29] Consequently, they became informed people who had increased health literacy. In line with the present study finding, previous studies show that older adults with more disease knowledge have better health literacy,[29] and older adults increased their health literacy after receiving a transformative learning intervention.

In addition, a previous study showed that health literacy was positively associated with self-efficacy among people with diabetes mellitus,[30] that is, enhancement of health literacy could directly increase self-efficacy. Therefore, our participants in the experimental group who had high health literacy had more self-efficacy. Furthermore, hypertension knowledge and trained self-management skills that the participants obtained from the program could help them learn about how to modify their lifestyle and to deal with problems that may arise while changing their behaviors to achieve targeted blood pressure. This helped them to gain self-efficacy and more confidence to self-manage effectively. Importantly, the experimental participants became self-efficacious to perform self-management through mastery experiences that the participants were assigned to practice self-management skills in each session and initiated performing self-management at their homes according to the participants' personal booklet. The participants could gain direct experiences through successful self-management and blood pressure control. As a result, achievement experiences and the feeling of mastery could strengthen their sense of self-efficacy.[19] Therefore, the program was effective in improving self-efficacy among older adults with uncontrolled hypertension. It is supported by a systematic review and meta-analysis reporting that self-management interventions can increase self-efficacy in older adults with hypertension.[9]

Since adequate health literacy and high self-efficacy can enhance self-management behaviors,[10-13] the experimental participants with high health literacy and high self-efficacy focused on hypertension self-management might have improved their self-management behaviors. However, knowledge provision combined with self-management skills training might not be adequate to influence ones' self-management behaviors unless older adults were aware of their roles to take. Therefore, transformative learning strategies were performed in the first session using group discussion to raise awareness and change their way of thinking. In this study, the participants were encouraged to share lived experiences and self-reflection about blood pressure control and serious complications of uncontrolled hypertension. These teaching-learning activities can transform older adults' mindset from passive learners to active learners.[23] So, they shifted perspectives on their illness and changed their mindset to become more aware about the significance of self-management. With increased awareness, they had motivation and self-determination in their lives to initiate performing self-management to control their blood pressure to recommended levels. Moreover, offering positive encouragement on a person's performance can increase intrinsic motivation.[31] In this study, the PI in every session offered positive reinforcements to all participants to reach their desirable blood pressure and for their achievements of self-management. Such encouragements led to an increase in intrinsic motivation and continuing performance of self-management. The findings of this study are consistent with previous studies demonstrating that a self-management intervention

is effective in improving self-management behaviors and blood pressure control in older adults with hypertension.[7-9]

## Limitations

There were some limitations of this study. First, the program was conducted at the hospital, so some prospective participants who needed help in transportation could not participate. Second, this study evaluated only the primary behavioral outcomes (health literacy, self-efficacy, and self-management behaviors). The second outcome, blood pressure, was not evaluated so the effect of the program on the clinical outcome like blood pressure was not demonstrated. Therefore, investigation of clinical outcomes such as blood pressure is recommended in further study to ensure the effectiveness and sustainability of the program.

## Conclusions and Implications for Nursing Practice

This study is the first study to apply the integration of geragogy teaching methods combined with transformative learning strategies as the framework in the context of self-management in older adults. The study findings demonstrated that the Geragogy-Based Self-Management Education Program (GBSEP) aiming at encouraging being active, concerning learning limitations, and transforming mindset of older learners to effectively self-manage can enhance self-management behaviors among older adults with uncontrolled hypertension.

The findings of this study provide evidence of an effective self-management education program that nurses can use with older adults with hypertension to enhance their health literacy, self-efficacy, and self-management behaviors. It is also suggested that further testing of the GBSEP be extended to older adults with uncontrolled hypertension in other settings and those with other chronic diseases to ensure the efficacy of this program.

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## References

1. World Health Organization. Global health observatory (GHO) data: raised blood pressure [Internet]. 2019 [cited 2022 Jul 30]. Available from: http://www.who.int/gho/ncd/risk_factors/ blood_pressure_prevalence_text/en
2. Aekplakorn W, Puckcharern H, Satheannoppakao W. The report of the Sixth Thai National Health Examination Survey 2019-2020 [Internet]. 2021 [cited 2022 Jul 30]. Available from: https://www.hsri.or.th/media/ printed-matter/detail/13443 (in Thai)
3. Thai Hypertension Society. 2019 Thai guidelines on the treatment of hypertension [Internet]. 2019 [cited 2019 Oct 19]. Available from: http://www.thaihypertension.org/guideline.html (in Thai)
4. Kaplan NM, Victor RG. Kaplan's clinical hypertension. 11th ed. Philadelphia: Wolters Kluwer; 2015.
5. Centers for Disease Control and Prevention. Self-management support and education [Internet]. 2020 Jun 25 [cited 2022 Jul 30]. Available from: https://www.cdc.gov/dhdsp/pubs/guides/best-practices/self-management.htm
6. Lorig K. Self-management of chronic illness: a model for the future. Generations. 1993;(17)3:11-4.
7. Wannakhao S, Danyuthasilp C, Siripornpibul T. Effects of a self-management program on blood pressure levels and self-management behaviors among elderly with hypertension in Uttaradit Province. BCNUT J Nurs. 2019;11(1):126-41 (in Thai).
8. Sungkhao M, Thaniwattananon P. Effect of self-management supporting program on medication adherence and blood pressure level among the older patients with uncontrolled hypertension. Songklanagarind J Nurs [Internet]. 2020 Mar 28 [cited 2022 Jul 30];40(1):84-100. Available from: https://he02.tci-thaijo.org/index.php/nur-psu/article/view/240716 (in Thai)
9. Truong PV, Apriliyasari RW, Lin MY, Chiu HY, Tsai PS. Effects of self-management programs on blood pressure, self-efficacy, medication adherence and body mass index in older adults with hypertension: meta-analysis of randomized controlled trials. Int J Nurs Pract. 2021;27(2):e12920. https://doi.org/10.1111/ijn.12920

10. Jandeekaewsakul P, Watthayu N, Suwonnaroop N. Factors predicting self-management behavior among patients with uncontrolled essential hypertension. J Nurs Sci [Internet]. 2018 Mar 31 [cited 2022 Jul 30];36(1):31-43. Available from: https://he02.tci-thaijo.org/index.php/ns/article/view/145412 (in Thai)
11. Truong PV, Jullamate P, Piphatvanitcha N. Factors related to self-management behaviours in hypertensive older adults in Haiduong Province, Vietnam. J Nurs Health Sci. 2016;10(3):56-64.
12. Seesawang J, Thongtang P. Factors associated with self-management ability among older adults with hypertension in Asia: a systematic review of qualitative studies. Nurs Sci J Thail [Internet]. 2019 Mar 29 [cited 2022 Jul 30]; 37(1):86-107. Available from: https://he02.tci-thaijo.org/index.php/ns/article/view/183645
13. My TT, Methakajanasak N, Minh HV. Relationships between hypertension knowledge, self-efficacy, treatment beliefs and self-management behaviors among uncontrolled hypertension patients in Da Nang city, Vietnam. JNSH [Internet]. 2020 Dec 26 [cited 2022 Jul 30];43(4):59-71. Available from: https://he01.tci-thaijo.org/index.php/nah/article/view/243186
14. Nutbeam D. Health literacy as a public goal: a challenge for contemporary health education and communication strategies into 21st century. Health Promot Int. 2000;15(3):259-67. https://doi.org/10.1093/heapro/15.3.259
15. Shi D, Li J, Wang Y, Wang S, Liu K, Shi R, et al. Association between health literacy and hypertension management in a Chinese community: a retrospective cohort study. Intern Emerg Med. 2017;12(6):765-76. doi: 10.1007/s11739-017-1651-7.
16. Wannasirikul P, Termsirikulchai L, Sujirarat D, Benjakul S, Chanuantong T. Health literacy, medication adherence, and blood pressure level among hypertensive older adults treated at primary health care centers. Southeast Asian J Trop Med Public Health. 2016;47(1):109-20.
17. Geboers B, de Winter AF, Spoorenberg SLW, Wynia K, Reijneveld SA. The association between health literacy and self-management abilities in adults aged 75 and older, and its moderators. Qual Life Res. 2016;25(11):2869-77. doi: 10.1007/s11136-016-1298-2.
18. Park NH, Song MS, Shin SY, Jeong JH, Lee HY. The effects of medication adherence and health literacy on health-related quality of life in older people with hypertension. Int J Older People Nurs. 2018;13(3):e12196. doi: 10.1111/opn.12196.
19. Bandura A. Self-efficacy: the exercise of control. New York: W.H. Freeman and Company; 1997.
20. Warren-Findlow J, Seymour RB, Brunner Huber LR. The association between self-efficacy and hypertension self-care activities among African American adults. J Community Health. 2012;37(1):15-24. doi: 10.1007/s10900-011-9410-6.
21. Lee E, Park E. Self-care behavior and related factors in older patients with uncontrolled hypertension. Contemp Nurse. 2017; 53(6): 607-21. doi: 10.1080/10376178.2017.1368401.
22. Knodel J, Teerawichitchainan B, Pothisiri W. Caring for Thai older persons with long-term care needs. JAH. 2018;30(10): 1516-35. https://doi.org/10.1177/0898264318798205
23. Mezirow J. The handbook of transformative learning: theory, research and practice. San Francisco: Jossey-Bass; 2000.
24. Kopera-Frye K. Health literacy among older adults. New York: Springer Publishing; 2017.
25. John MT. Geragogy: a theory for teaching the elderly. Act Adapt Aging. 1988;11(3-4):xi-156.
26. Polit DF, Beck CT. Nursing research: generating and assessing evidence for nursing practice. 8th ed. Philadelphia: Lippincott Williams & Wilkins; 2008.
27. Ishikawa H, Takeuchi T, Yano E. Measuring functional, communicative, and critical health literacy among diabetic patients. Diabetes Care. 2008;31(5):874-9. doi: 10.2337/dc07-1932.
28. Pinprapapan E, Panuthai S, Vannarit T, Srisuphan W. Casual model of adherence to therapeutic regimens among Thais with hypertension. Pacific Rim Int J Nurs Res. [Internet]. 2013 Aug 28 [cited 2022 Jul 30];17(3):268-81. Available from: https://he02.tci-thaijo.org/index.php/PRIJNR/article/view/8781
29. Liu Y, Wang Y, Liang F, Chen Y, Liu L, Li Y, et al. The health literacy status and influencing factors of older population in Xinjiang. Iran J Public Health. 2015;44(7):913-9.
30. Lee Y, Shin S, Wang R, Lin K, Lee Y, Wang Y. Pathways of empowerment perceptions, health literacy, self-efficacy, and self-care behaviors to glycemic control in patients with type 2 diabetes mellitus. Patient Educ Couns. 2016;99 (2):287-94. doi: 10.1016/j.pec.2015.08.021.
31. Ryan RM, Deci EL. Self-determination theory: basic psychological needs in motivation, development, and wellness. New York: Guilford Press; 2017.

# การส่งเสริมการจัดการตนเองโดยโปรแกรมการให้ความรู้ที่ใช้หลักการสอนผู้สูงอายุในผู้สูงอายุโรคความดันโลหิตสูงที่ควบคุมไม่ได้: การทดลองแบบสุ่มและมีกลุ่มควบคุม

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**บทคัดย่อ:** โรคความดันโลหิตสูงที่ควบคุมไม่ได้เป็นปัญหาสำคัญด้านการแพทย์ที่นำไปสู่การเกิดผลกระทบด้านสุขภาพรุนแรงมากมาย การส่งเสริมการจัดการตนเองจึงมีความจำเป็นสำหรับผู้สูงอายุโรคความดันโลหิตสูงที่ควบคุมไม่ได้เพื่อควบคุมความดันโลหิตและเพิ่มคุณภาพชีวิตให้ดีขึ้น จากหลักฐานเชิงประจักษ์พบว่าความรอบรู้ด้านสุขภาพและสมรรถนะแห่งตนเป็นปัจจัยทำนายที่มีอิทธิพลที่สุดต่อพฤติกรรมการจัดการตนเอง ตามหลักการสอนผู้สูงอายุนั้น ผู้สูงอายุต้องการรูปแบบการสอนที่แตกต่างจากกลุ่มวัยอื่น การทดลองแบบสุ่มและมีกลุ่มควบคุมนี้มุ่งทดสอบผลของโปรแกรมการให้ความรู้เกี่ยวกับการจัดการตนเองโดยใช้หลักการสอนผู้สูงอายุต่อความรอบรู้ด้านสุขภาพ สมรรถนะแห่งตนและพฤติกรรมการจัดการตนเองในผู้สูงอายุโรคความดันโลหิตสูงที่ควบคุมไม่ได้ กลุ่มตัวอย่างที่มีคุณสมบัติตามเกณฑ์ที่กำหนด จำนวน 100 คน ได้รับการสุ่มเข้ากลุ่มทดลองและกลุ่มควบคุม โดยกลุ่มทดลอง (50 คน) ได้รับโปรแกรมการให้ความรู้เกี่ยวกับการจัดการตนเองโดยใช้หลักการสอนผู้สูงอายุร่วมกับทฤษฎีการเรียนรู้สู่การเปลี่ยนแปลง ขณะที่กลุ่มควบคุม (50 คน) ได้รับการสอนให้ความรู้ตามปกติ เก็บรวบรวมข้อมูลก่อนเข้าร่วมโปรแกรม หลังสิ้นสุดโปรแกรมทันที 1 เดือนและ 3 เดือนหลังสิ้นสุดโปรแกรมโดยใช้แบบวัดความรอบรู้ด้านสุขภาพ แบบวัดการรับรู้สมรรถนะแห่งตนเกี่ยวกับการจัดการตนเอง และแบบวัดพฤติกรรมการจัดการตนเอง วิเคราะห์ข้อมูลโดยใช้สถิติบรรยาย การวิเคราะห์ความแปรปรวนแบบวัดซ้ำสองทาง และสถิติทดสอบค่าที

ผลการศึกษาพบว่าหลังได้รับโปรแกรม กลุ่มทดลองมีความรอบรู้ด้านสุขภาพ สมรรถนะแห่งตนและพฤติกรรมการจัดการตนเองสูงกว่าก่อนเข้าร่วมโปรแกรมตลอดทุกช่วงเวลาของการวัด และสูงกว่ากลุ่มควบคุม ผลการศึกษาครั้งนี้แสดงให้เห็นถึงโปรแกรมการให้ความรู้เกี่ยวกับการจัดการตนเองที่ประสบผลสำเร็จ นอกจากนี้ควรมีการศึกษาเพื่อทดสอบประสิทธิภาพของโปรแกรมนี้ต่อไป

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**คำสำคัญ:** หลักการสอนผู้สูงอายุ ผู้สูงอายุ การทดลองแบบสุ่มและมีกลุ่มควบคุม การให้ความรู้เกี่ยวกับการจัดการตนเอง การเรียนรู้สู่การเปลี่ยนแปลง โรคความดันโลหิตสูงที่ควบคุมไม่ได้

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