



The effect of health education teaching media design to prevent hypertension in the elderly, Namon District, Kalasin Province by applying the theory of health belief model

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ABSTRACT

Intro: The research was conducted on the basis of quasi-experimental study design that aimed to make a comparison of the effect of health education teaching media design to prevent hypertension in the elderly, Namon district, Kalasin province between the experimental group and the control group, 40 persons per group. Data were collected using an interview 1 week before and after the experiment was conducted. Data analysis was performed using frequency, percentage, mean, standard deviation while paired samples t-test and independent samples t-test were used for the comparison. The statistical significance level was set at 0.05 with 95% confidence interval.

Results: The study shows that: The study results revealed that the pretest and post-test mean scores of knowledge of the experimental group were 5.50 (S.D.=1.71), 9.65 (S.D.=0.48), respectively and the post-test mean score on knowledge between the experimental group and the control group were 9.65 (S.D.=0.48), 8.37 (S.D.=0.95), respectively. The mean knowledge scores were statistically significant, $p=0.014$ and $p<0.001$, respectively. The application of the theory of health belief model can be broken down into 1) the post-test mean scores of perceived susceptibility of the experimental group and the control group were 4.26 (S.D.= 0.18), 4.02 (S.D.= 0.25) respectively. The mean score of the experimental group was higher than that of the control group with statistical significance level, $p<0.001$, 2) the post-test mean scores of perceived severity of the experimental group and the control group were 4.34 (S.D.= 0.16), 3.79 (S.D.= 0.25), respectively. The mean score of the experimental group was higher than that of the control group with statistical significance level, $p<0.001$, 3) the post-test mean scores of perceived benefits to treatment and disease prevention of the experimental group and the control group were 4.38 (S.D.= 0.24), 3.70 (S.D.= 0.57), respectively. The mean score of the experimental group was higher than that of the control group with statistical significance level, $p<0.001$, and 4) the post-test mean scores of perceived barriers of the experimental group and control group were 4.10 (S.D.= 0.23), 3.97 (S.D.= 0.28), respectively. The mean score

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of the experimental group was higher than that of the control group with statistical significance level, $p=0.001$.

Conclusion: Multimedia in the form of lecture media in combination with reliable online media from Ministry of Public Health and agencies with reliable academic sources were used, such as Facebook, YouTube or video media disseminating knowledge about hypertension or personal media with direct experience in having the disease. Questions were randomly asked to obtain the elderly's understanding as much as possible, which may result in the different mean scores in which the post-test scores were higher than the pretest scores. The study results should be magnified in other public health agencies.

Keywords: Theory of health belief model, hypertension diseases, the elderly

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1. Introduction

Hypertension is estimated to cause 7.5 million deaths globally and the number of people with hypertension reached 1,000 million. The prevalence is expected to increase to 1.56 billion by 2025. According to Thailand statistics, hypertension is still a highly significant health problem, increasing from 4 million people in 2013 to 6 million people in 2018. According to the estimate of medical expense associated with hypertension, it was found that Thailand's health expense was almost 80 billion baht per year per 10 million patients (Bureau of Non-Communicable Diseases Ministry of Public Health, 2019)¹

Hypertension is a vital health issue of the world's population. It causes 7.5 million deaths worldwide and there are almost 1 million patients with hypertension. In Thailand, hypertension is a major health problem. According to Thai National Healthcare Survey through physical examination, the prevalence of hypertension among people aged 15 years and above tended to increase from 24.7% in 2014 to 25.4% in 2020. The prevalence of hypertension in Health Region 7 (Khon Kaen, Maha Sarakham, Kalasin, Roi Et) during 2017-2021 tended to increase to 9,830, 10,552.4, 11,699, 12,441 and 13,101 per 100,000 population, respectively (Department of Disease Control Ministry of Public Health 2022).² A significant health

problem in Kalasin province was associated with hypertension in people aged 60 years and above (2018- 2020) and the prevalence increased to 44,406, 47,721 and 50,916 per 100,000 population. It was also found that the number of patients with hypertension in Kalasin province increased every year and in Namon district during 2018 - 2020 there were 1,107, 1,260 and 1,343 patients with hypertension accounting for 26.14%, 29.04% and 23.04% per 1,000 population, respectively (Kalasin Provincial Public Health Office, 2020).³

Consequently, the research team was interested to design health education teaching media to prevent hypertension in the elderly in Namon district, Kalasin province. The research team recognized the importance of the ongoing problem; therefore, the theory of health belief model was applied to design multimedia consisting lecture media in combination with reliable online media from Ministry of Public Health and agencies with reliable academic sources were used, such as Facebook, YouTube or video media disseminating knowledge about hypertension or personal media with direct experience in having the disease. The theory of health belief model was applied to prevent hypertension in the elderly under the supervision of hospitals in the cooperation network of Faculty of Science and Health Technology, Kalasin University.

2. Method

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2.1 Objective

-To study knowledge about hypertension of the elderly

-To compare the pretest and post-test mean scores of the effect of health education teaching media design to prevent hypertension in the elderly between the experimental group and the control group.

2.2 Studied population: The study was conducted to investigate the effect of health education teaching media design to prevent hypertension in the elderly in Namon district, Kalasin province. Population and sample were 80 people from Ban Hua Ngua, Song Plueai sub-district, Namon district, Kalasin, divided into the experimental group and the control group.

2.3 Research Instrument: A questionnaire was used for data collection. The quality and content validity of the questionnaire were examined and measured index of item-objective congruence (IOC). Each question had IOC greater than 0.50. Kuder-Richardson 20⁴ (KR-20) was used to measure the internal consistency and reliability of the knowledge test and the KR-20 coefficient was 0.742. Cronbach's alpha coefficient⁵ was used to measure the internal consistency and reliability of the behavior measuring scale of the health belief model, the overall coefficient was 0.82.

Health education teaching media design to prevent hypertension in the elderly can be broken down into the following:

1. Instrument in the experiment (Treatment) – the instrument was created by the researcher for conducting the research in Kalasin by applying the 4 components of the health belief model and knowledge about hypertension. Multimedia in the form of lecture media in combination with reliable online media from Ministry of Public Health and agencies with reliable academic sources were used, such as Facebook, YouTube or video media disseminating knowledge about hypertension or personal media with direct experience in having

the disease. Questions were randomly asked to obtain the elderly's understanding as much as possible. The health education teaching media to prevent hypertension in the elderly were designed according to the following points:

1. 1 Knowledge about hypertension - the researcher designed the media based on lectures from knowledgeable lecturer who specialize in the disease. A knowledge test about hypertension was performed before lectures about hypertension were given. Questions were randomly asked to gain the elderly's understanding as much as possible.

1.2 Perceived susceptibility – the researcher designed media from lectures given by knowledgeable lecturers who have experience in risk factors for the disease, in conjunction with the use of media from Facebook, YouTube and videos disseminating knowledge about hypertension to supplement the lectures to indicate effects from the disease. Questions were randomly asked to obtain understanding about the elderly's perceived susceptibility as much as possible.

1.3 Perceived severity – the researcher design media from lectures given by knowledgeable lecturers who have experience in disease severity in conjunction with using media from Facebook, YouTube, and videos disseminating knowledge about hypertension to supplement the lectures in order to indicate effects from the disease, and personal media having direct experience in getting sick with the disease to have a talk and share their experience about the severity of the disease by the time they had the disease. Questions were randomly asked to obtain the elderly's understanding about disease severity as much as possible.

1. 4 perceived benefits to treatment and disease prevention- the researcher design media from lectures given by knowledgeable lecturers who have experience in conjunction with using media from Facebook, YouTube, and videos disseminating knowledge about benefits of



treatment and self-prevention to avoid having hypertension. Questions were randomly asked to obtain the elderly's understanding about perceived benefits as much as possible.

1. 5 Perceived barriers – the researcher designed media from lectures given by knowledgeable lecturers who have experience in getting sick with the disease to learn about what kinds of barrier affecting them to have the disease in conjunction with using media from Facebook, YouTube, and videos disseminating knowledge about hypertension to supplement lectures to indicate effects from the disease, and personal media who have direct experience in getting sick with the disease to have a talk and share their experience about barriers of the disease. Questions are randomly asked to obtain the elderly's understanding about perceived barriers as much as possible.

2. Instrument for data collection –there are various kinds of instruments created by the researcher for data collection but the popular ones are an interview form for collecting general data, an interview form for contributing factors about knowledge about the disease. Scoring criteria were referred to Bloom's Learning For Mastery-based grading system (Bloom, 1968).

2.5 Data analysis: Descriptive statistics were used for general data presented in the form of number, percentage, mean, and

Table 1: The mean score of knowledge, perceived susceptibility, perceived severity, perceived benefits to treatment and prevention, and perceived barriers

Variable names	Experimental group			Control group		
	\bar{X}	S.D.	Interpretation	\bar{X}	S.D.	Interpretation
Knowledge						
Pretest	5.50	1.71	Low	6.63	1.37	Moderate
Post-test	9.65	0.48	High	7.38	0.95	Moderate
Perceived susceptibility						
Pretest	3.11	0.33	Moderate	3.27	0.45	Moderate
Post-test	4.26	0.18	High	4.02	0.26	High
Perceived severity						
Pretest	3.45	0.34	Moderate	3.14	0.33	Moderate
Post-test	4.34	0.16	High	3.79	0.25	High

standard deviation. Inferential statistics were used to analyze consumption behavior of patients with hypertension in Ban Hua Ngua community, Song Plueai sub-district, Namon district, Kalasin province through paired samples t-test and independent samples t-test. Statistical significance level was set at 0.05 with 95% confidence interval.

2.6 Research Ethics: The researcher took into account the protection of the data rights of the sample to obscure personal insights into human research ethics and rigorously in every research process.

3. Results

The sample in the study consisting of 80 elderly persons from 2 villages. They were screened by a simple random sampling technique. They were divided into 40 persons in the experimental group and 40 persons in the control group. The majority of the sample in both groups is women, 76.67% and 73.33%, respectively, the mean age is 67 . 63 and 67 . 73 year , respectively. 70.00% and 86.67% are farmers, 93.33% and 96.67% finished primary education level , 60.20% and 62.30% have household income lower than 5,000 baht/month, 66.67% and 73.33% are married and stay together.



Perceived benefits to treatment and prevention						
Pretest	3.19	0.40	Moderate	3.31	0.47	Moderate
Post-test	4.38	0.24	High	3.70	0.57	High
Perceived barriers						
Pretest	3.27	0.45	Moderate	3.04	0.35	Moderate
Post-test	4.10	0.23	High	3.97	0.28	High

From Table 1, the pretest and post-test mean scores of 5 components, i.e. knowledge about hypertension, perceived susceptibility, perceived severity, perceived benefits to treatment and disease prevention, and perceived barriers between the experimental group and the control group were compared. It was found that most post-test mean scores of all 5 components of the experimental group were increased and at a high level; 9.65 (S.D.=0.48), 4.26 (S.D.=0.18), 4.34 (S.D.=0.16), 4.38 (S.D.=0.24) and 4.10 (S.D.=0.23), respectively. The pretest

mean scores of all 5 components of the experimental group were lower than the post-test mean scores; 5.50 (S.D.=1.71), 3.11 (S.D.=0.33), 3.45 (S.D.=0.34), 3.19 (S.D.=0.40), and 3.27 (S.D.=0.45), respectively. As for the post-test comparison results of the control group, the mean scores of all 5 components of the control group were lower than those of the experimental group; 7.38 (S.D.=0.95), 4.02 (S.D.=0.26), 3.79 (S.D.=0.25), 3.70 (S.D.=0.57), and 3.97 (S.D.=0.28), respectively.

Table 2: The comparison of hypertension, the differences of the pretest and post-test mean scores of knowledge about hypertension between the experimental group and control group

Item names	n	\bar{X}	S.D	t-test	Mean Difference	95% CI	p-value
Experimental group							
Pretest knowledge	40	5.50	1.71	4.15	1.55	0.78 to 0.35	0.014*
Post-test knowledge	40	9.65	0.48				
Post-test knowledge							
Experimental group	40	9.65	0.48	8.17	1.28	0.95 to 1.59	<0.001**
Control group	40	8.37	0.95				

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Remark *with statistical significance level at 0.05*

with statistical significance level at <0.001

From Table 2, the pretest and post-test mean scores of knowledge about hypertension of the experimental group were 5.50 (S.D.=1.71), 9.65 (S.D.=0.48), respectively (95%CI: 0.78 to 0.35). The post-test mean scores of knowledge about hypertension between the experimental group and the control group were 9.65 (S.D.=0.48), 8.37 (S.D.=0.95), respectively (95%CI: 0.95 to 1.59). The mean scores of knowledge about hypertension were statistically significant, p=0.014 and p<0.001, respectively.

Table 3: Comparison results of the differences of the pretest and post-test mean scores of the effect of health education teaching media design to prevent hypertension in the elderly between the experimental group and the control group



Variable names	n	\bar{X}	S.D	t-test	Mean Difference	95%CI	p-value
Perceived susceptibility							
Experimental group	40	4.26	0.18	4.15	0.24	0.12to0.36	0>.001**
Control group	40	4.02	0.26				
Perceived severity							
Experimental group	40	4.34	0.16	13.83	0.56	0.47to0.64	0>.001**
Control group	40	3.79	0.25				
Perceived benefits to treatment and disease prevention							
Experimental group	40	4.38	0.24	7.24	0.68	0.49to0.88	0>.001**
Control group	40	3.70	0.57				
Perceived barriers							
Experimental group	40	4.10	0.23	3.49	0.14	0.05to0.22	0.001**
Control group	40	3.97	0.28				

Remark *with statistical significance level of 0.05*

with statistical significance level at <0.001

From Table 3, comparison results of the differences of the mean scores after participating in activities from the design of health education teaching media to prevent hypertension in the elderly between the experimental group and the control group (40 persons/group), before and after the experiment was performed, by applying the theory of health belief model can be divided into 4 points as follow:

1) The post-test mean scores of perceived susceptibility of the experimental group and the control group were 4.26 (S.D.= 0.18), 4.02 (S.D.= 0.25), respectively (95%CI: 0.12to0.36). The mean score of perceived susceptibility of the experimental group was higher than that of the control group with statistical significance level at $p < 0.001$.

2) The post-test mean scores of perceived severity of the experimental group and the control group were 4.34 (S.D.= 0.16), 3.79 (S.D.= 0.25), respectively (95%CI: 0.47to0.64). The mean score of perceived severity of the experimental group was higher than that of the control group with statistical significance level at $p < 0.001$.

3) The post-test mean scores of perceived benefits to treatment and disease prevention of the experimental group and the control group were 4.38 (S.D.= 0.24), 3.70 (S.D.= 0.57), respectively (95%CI: 0.49to0.88). The mean score of perceived benefits to treatment and disease prevention of the experimental group was higher than that of the control group with statistical significance level at $p < 0.001$.

4) The post-test mean scores of perceived barriers to treatment and disease prevention of the experimental group and the control group were 4.10 (S.D.= 0.23), 3.97 (S.D.= 0.28), respectively (95%CI: 0.05to0.22). The mean score of perceived barriers of the experimental group was higher than that of the control group with statistical significance level, $p = 0.001$.

4. Discussion

The study aimed to investigate the effect of the program by applying the theory of health belief model to prevent hypertension in the elderly in Ban Hua Ngua, Song Plueai sub-district, Namon district, Kalasin province. Important points to be discussed are as follow:



4. 1 Pretest and post-test knowledge about hypertension between the experimental group and the control group and the mean score of knowledge about hypertension – it was found that the pretest and post-test mean scores of knowledge about hypertension of the experimental group were 5.50 (S.D.=1.71), 9.65 (S.D.=0.48), respectively (95%CI: 0.78 to 0.35). After the experiment was performed, the mean scores of the knowledge between the experimental group and the control group were 9.65 (S.D.=0.48), 8.37 (S.D.=0.95), respectively (95%CI: 0.95 to 1.59). The mean scores of the knowledge were statistically significant, $p=0.014$ and $p<0.001$ respectively, consistent with Rumpai Noktajun¹⁴ showing that after the experiment was performed, the experimental group had knowledge about hypertension, perceived severity to hypertension, perceived susceptibility to hypertension, expectation for the effectiveness of response to prevent hypertension, expectation for self-efficacy to prevent hypertension, and how to conduct themselves to prevent hypertension greater than the control group had with statistical significance level, ($p < 0.001$). It is also consistent with Suptawee Hirungerd, Pitoon Vutiso and Maywadee Srimongkol⁹ indicating that after the experiment was performed, the group given the health belief model had higher mean scores of the knowledge, hypertension prevention behavior than the group given the regular knowledge, the mean score of blood pressure level, and had lower blood pressure levels than the group given the regular knowledge with statistical significance level, (p -value < 0.05).

4.2 Pretest and post-test perceived susceptibility to hypertension between the experimental group and the control group – it was found that the post-test mean scores of perceived susceptibility of the experimental group and the control group were 4.26 (S.D.=0.18), 4.02 (S.D.=0.25) respectively, (95%CI: 0.12 to 0.36). The mean score of perceived susceptibility of the experimental group was higher than that of the

control group with statistical significance level, $p < 0.001$, consistent with Ratchanee Wattanameatee and Pankarin Hoyrat⁶ finding that after attending the program, the experimental group had the mean scores of perceived susceptibility to complications from hypertension, perceived severity to complications from hypertension, perceived benefits to how to conduct themselves to control hypertension, perceived self-efficacy to conduct themselves to control hypertension and hypertension control behavior greater than the control group had with statistical significance level at 0.001, 0.001, 0.001, 0.05 and 0.001 respectively, consistent with Rumpai Noktajun¹⁴ revealing that after the experiment was performed, the experimental group had knowledge about hypertension, perceived severity to hypertension, perceived susceptibility to hypertension, expectation about the effectiveness of response to hypertension prevention, expectation about self-efficacy to prevent hypertension and how to conduct themselves to prevent hypertension greater than the control group had with statistical significance level, ($p < 0.001$). This is also consistent with Cheunchom Sompol, Thassanee Rawiworakul and Patcharaporn Kirdmongkol⁷ indicating that after the experiment was performed, the experimental group had the post-test mean scores of perceived severity to the disease, perceived susceptibility to the disease, perceived effectiveness of the results of how to behave themselves, perceived self-efficacy greater than the control group had with a statistical significance level, (p -value < 0.05), consistent with Junjira Seesawang, Pulawit Thongtaeng, Sirirat Vichitragoonthavon, and Sujitra Chaiwuth¹² finding that after the experiment was performed, the experimental group given the program promoting perceived susceptibility to cardiovascular disease had higher scores of perceived susceptibility to cardiovascular disease and self-healthcare behavior to prevent cardiovascular disease than before they were given the program, ($p < 0.00$



1and had higher scores than the control group, ($p < .001$) significantly, and the experimental group had lower average blood pressure than before the experiment was performed, ($p < .001$) and lower than the control group with statistical significance level, ($P < .05$).

4.3 Pretest and post-test perceived severity to hypertension between the experimental group and the control group – it was found that the post-test mean scores of perceived severity of the experimental group and the control group were 4.34 (S.D.= 0.16), 3.79 (S.D.= 0.25), respectively (95%CI: 0.47 to 0.64). The mean score of perceived severity of the experimental group was higher than that of the control group with a statistical significance level, $p < 0.001$, consistent with Ratchanee Wattanameatee and Pankarin Hoyrat⁶ finding that after participating in the program, the experimental group had higher mean scores of perceived susceptibility to complications from hypertension, perceived severity of complications from hypertension, perceived benefits to how to conduct themselves to control blood pressure, perceived self-efficacy to conduct themselves to control blood pressure, and self-healthcare behavior to control blood pressure than the control group with the control group with statistical significance level at 0.001, 0.001, 0.001, 0.05 and 0.001, respectively, consistent with Cheunchom Sompol, Thassanee Rawiworakul and Patcharaporn Kirdmongkol.⁷ showing that after the experiment was performed, the experimental group had the mean scores of perceived severity to the disease, perceived susceptibility to the disease, perceived effectiveness of results of self-healthcare behavior, perceived self-efficacy, and how to behave themselves higher than before they participated in the program. In addition, the experimental group had the post-test mean scores higher than the control group had with a statistical significance level, (p -value < 0.05), consistent with Patsadu P, Jong-Udomkarn¹⁰

Indicating that after the experiment was performed, the experimental group had the mean score of self-healthcare behavior to prevent stroke higher than before they participated in the program with a statistical significance level. Likewise, Chayarut P, Roojanavech S, Chatdokmaiprai K¹¹ found that after the experiment was performed, the experimental group had the mean score of self-healthcare behavior to prevent stroke higher than before they participated in the program with a statistical significance level at 0.05.

4.4 The pretest and post-test perceived benefits to treatment and hypertension prevention between the experimental group and the control group – it was found that the post-test mean scores of perceived benefits to treatment and hypertension prevention of the experimental group and the control group were 4.38 (S.D.= 0.24), 3.70 (S.D.= 0.57), respectively (95%CI: 0.49 to 0.88). The mean score of perceived benefits to treatment and hypertension prevention of the experimental group is higher than that of the control group with a statistical significance level at $p < 0.001$, consistent with Ratchanee Wattanameatee and Pankarin Hoyrat⁶ indicating that after participating in the program, the experimental group had higher mean scores of perceived susceptibility to complications from hypertension, perceived severity to complications from hypertension, perceived benefits to how to conduct themselves to control blood pressure, perceived self-efficacy to control blood pressure, and self-healthcare behavior to control blood pressure than the control group with statistical significance level at 0.001, 0.001, 0.001, 0.05 and 0.001, respectively, consistent with Junjira Seesawang, Pulawit Thongtaeng, Sirirat Vichitragoonthavon, and Sujitra Chaiwuth.¹² finding that after the experiment was performed, the experimental group given the program promoting perceived susceptibility to cardiovascular disease and self-healthcare



behavior to prevent risks for cardiovascular disease had higher scores than before the experiment was performed, ($p < .001$) and their scores were higher than those of the control group with a statistical significance level, ($p < .001$), and had lower average blood pressure than before they participated in the experiment, ($p < .001$) and lower than that of the control group ($P < .05$) with a statistical significance level at 0.05, consistent with Loussug W, Lawang W & Homsin P¹³ indicating that after the experiment was performed, the experimental group had higher mean score of self-healthcare behavior to prevent stroke than before they participated in the program with a statistical significance level at 0.05.

4. 5 Pretest and post-test perceived barriers to treatment and hypertension prevention between the experimental group and the control group – it was found that the post-test mean scores of perceived barriers to treatment and hypertension prevention of the experimental group and the control group were 4.10 (S.D.= 0.23), 3.97 (S.D.= 0.28), respectively (95%CI: 0.05 to 0.22). The mean score of perceived barriers of the experimental group was higher than that of the control group with a statistical significance level, $p=0.001$, consistent with Chontira Kawthaisong and Rujira Dungsong⁸ finding that after the experiment was performed, the experimental groups had higher mean scores of knowledge, perceived susceptibility, perceived severity, perceived benefits and barriers, perceived self-efficacy, intention and self-health care behavior to prevent stroke than before they participated in the experiment and their mean scores were higher than those of the control group with a statistical significance level. Moreover, after the experiment was performed, the experimental group had the post-test mean scores of blood pressure level and blood cholesterol level lower than the pretest mean scores, and lower than those of the control group with a statistical significance level, (p -value < 0.05).

6. SUGGESTION

In this research, the researcher design each activity that covers the 4 components of the theory of health belief and knowledge, such as knowledge about hypertension, perceived susceptibility, perceived severity, perceived benefits to treatment and hypertension prevention, and perceived barriers. Multimedia in the form of lecture media in combination with reliable online media from Ministry of Public Health and agencies with reliable academic sources were used, such as Facebook, YouTube or video media disseminating knowledge about hypertension or personal media with direct experience in having the disease. Questions were randomly asked to obtain the elderly's understanding as much as possible, which may result in the different mean scores in which the post-test scores were higher than the pretest scores. The study results should be magnified in other public health agencies to prevent hypertension in the elderly in different areas accordingly.

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7. Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

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