

LIFESTYLE MODIFICATION EFFECT ON BEHAVIOR CHANGE AND PHYSICAL CONDITIONS AMONG HYPERTENSIVE ELDERLY IN WEST JAVA, INDONESIA

Neneng Kurwiyah Ihwanudin^{1,*}, Anchaleeporn Amatayakul²,
Sirikul Karuncharernpanit³

¹ Kasetsart University, Bangkok 10900, Thailand

² Boromarajonani College of Nursing Nopparat Vajira, Bangkok 10230, Thailand

³ Boromarajonani College of Nursing Chakriraj, Ratchaburi 70110, Thailand

ABSTRACT:

Background: Lifestyle modification is one of the most essential methods in chronic diseases prevention, cure and control, as in elderly with hypertension. The developed intervention with theoretical framework as a guide could be used in the evaluation of the intervention. The intervention was based on the theory that was more effective in health related behaviors than compared to the intervention without theoretical framework. This study aimed to evaluate the effectiveness of the lifestyle modification program with Social Cognitive Theory as a guideline on behavior change and physical conditions among hypertensive elderly in the North Bekasi sub district, West Java, Indonesia.

Methods: A quasi experiment with two groups, pre and post- test design was applied. Participants were selected from two Primary Health Centers (PHCs) in North Bekasi Sub District, using simple random sampling method. The participants were 29 hypertensive elderly in each group from two different primary health centers. The instruments used consisted of 2 parts; the lifestyle modification program and a self-administered questionnaire including physical examination. Paired t-test and independent t-test were used for data analysis.

Results: There was a significant difference of knowledge, situational perception, blood pressure, and total cholesterol within intervention group ($p < .001$). The mean scores of knowledge, situational perception of the intervention group were significantly higher and blood pressure, and total cholesterol were decreased between the intervention group and comparison group ($p < .001$).

Conclusion: The lifestyle modification program had a positive effect on improving hypertensive elders' knowledge, situational perception, and on maintaining their blood pressure and total cholesterol.

Keywords: Lifestyle modification program, Hypertensive elders, Behavior change, Physical conditions, Indonesia

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INTRODUCTION

Hypertension has been a significant health problem for elderly people worldwide because it has become a common chronic disease for them, and a leading risk factor for many other diseases which have been costly and have contributed to the morbidity and mortality rates [1]. The prevalence of hypertension is expected to increase every year,

particularly in the elderly. Based on a report by the Ministry of Health of Indonesia, the prevalence of hypertension in 2008 was 37. 4% of the total population aged 18 years and over, 29.8% of hypertension cases were among the elderly aged over 60 years and this has increased to 33% in 2011 [2]. Considering West Java's growing elderly population, a rapid increase in the prevalence of this disease is expected and hypertension is considered to be one of the major diseases and ranked as the top causes of death in outpatient hospitals [3].

* Correspondence to: Neneng Kurwiyah Ihwanudin
E-mail: nenengkurwiyah@yahoo.co.id

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The prevention and management of hypertension are major public health challenges, if high blood pressure could be prevented or diminished, a great deal of hypertension, cardiovascular, and renal disease, as well as strokes might be prevented [4]. However, the incidence of ineffective health maintenance was high among the elderly, as evidenced by the lack of participation in healthy behaviours such as exercise and healthy diets [5, 6]. According to the National Health and Nutrition Examination Survey (NHNES), 11% to 63.3% of adults met the healthy diet parameters. The low levels of lifestyle modification in elderly with hypertension may have been a function of individual, social and psychological factors [7]. Lifestyle modification is a complex behaviour influenced by multiple factors within the environmental, social, cultural, psychological, and cognitive domains [8]. The current challenges to health care providers, researchers, government officials, and the general public is developing and implementing effective clinical and public health strategies that lead to a sustained lifestyle modification [9].

Based on the report by the health department of West Java province, elderly people with hypertension were more resistant to following lifestyle modifications even though the health personnel had already discussed the importance of lifestyle modifications, and regardless that their blood pressure was still high after taking antihypertensive medication. During this time, hypertensive patients tended to only rely on medication to lower blood pressure, few of them participated in physical exercise, even less consumed vegetables and fruits, but many consumed salty foods and used monosodium glutamate [MSG] on cuisine, and consumed foods high in fat and also smoked tobacco products [10].

Therefore, the intervention was based on a theory that was more effective in promoting health related behaviours, than compared to interventions without theoretical framework. Since a developed intervention as well as guides could be used in the evaluation of the intervention [11]. In addition, the aspect that most affected behaviours, when nursing intervention was done, were interpersonal aspects that were best guided by the Social Cognitive Theory (SCT).

The social cognitive theory SCT proposed that personal, environmental, and behavioural factors operated as reciprocal, interacting determinants of each other that was influences of an individual's ability to control lifestyle modification and its determinants (i.e., personal, environmental, and

behavioural factors) [12].

The purpose of this study was to modify a Primary Health Centers' Program based comprehensive lifestyle modification program. The activities of the lifestyle modification program in this study were include providing knowledge related hypertension, physical exercise and Dietary Approach Stop Hypertension (DASH) eating plan, group brainstorming and group discussion, presenting role model, practicing gymnastic fitness, and self-monitoring of gymnastic fitness and DASH eating plan for hypertensive elderly in West Java, Indonesia and to test its effectiveness.

METHODS

Design

A quasi-experimental design with two groups with pre and post-test was used in this study.

Sample

The sample size calculated using Cohen's approach [13] to power analysis for two independent t-tests the sample was 26 participants for each group. To anticipate withdrawal, the number was increased by 20 % of the calculation, so the final number of participants was 32 in each group. Researcher selected participants and PHC with simple random sampling.

Data collection

Preparation phase

Initially, the research study and ethical approval had been obtained from Boromarajonani College of Nursing Nopparat Vajira Review Board. Further, permission was approved from the Board for National Unity and People's Protection (Kesbangpol) Bekasi District, and the Head of two PHCs in the North Bekasi district. The participants received information about the study and the information sheet, the consent form also provide for them for the permission to join in the study. After collection of the consent form and check, the participants filled the questionnaires and had a physical examination.

Implementation phase

During the program implementation, participants in the comparison group obtained the usual health education with regard to lifestyle modification that is on a regular basis in the PHC. The program consists of 5 activities within 7 weeks. The times of activities were set by participants in order to avoid disturbing usual activities. Data was carried out from the second week of August to the first week of September 2014. After 7 weeks of this intervention program, the second data collection was conducted.

Table 1 The activity of the lifestyle modification program for behavior change and physical conditions.

Period	Activity
Week 1	Activity 1: Brainstorming (approximately 45-60 minutes) Group activity to brainstorming in order to share self-knowledge and self-experience about lifestyle modification and developing the same perception about lifestyle modification. - Guiding sharing activity about participants' knowledge related to lifestyle modification. - Guiding discussion among groups - Summarizing and made conclusion in same perception about the benefit and consequences of lifestyle modification
Week 2	Activity 2: Provide knowledge about lifestyle modification (approximately 45 - 60 minutes). The researcher gave slide presentation about lifestyle modification (physical exercise and DASH eating plan) in order to enhance level of knowledge on hypertension, benefit and consequences of lifestyle
Week 2	Activity 3: Group discussion (approximately 45-60 minutes). Group discussion about information that researcher give related to the topic (hypertension and lifestyle modification including physical exercise and DASH eating plan), discuss about problem solving when obstacle occur during implementing lifestyle modification.
Week 3	Activity 4: Presenting role model (approximately 60 minutes). The researcher invite the elderly with hypertension who success in lifestyle modification as a model. The model shared stories about their experience related physical exercise and DASH eating plan and how they can deal with unhealthy behaviour. Activity 5: Demonstration of gymnastic fitness and self-monitoring of gymnastic fitness and daily DASH eating plan
Week 4,5, until week 7	Activity 5: Practicing gymnastic fitness three times a week with duration 60 minutes was leading by researcher and follow up of the daily DASH eating plan and discuss if the participants have any problem related DASH eating plan.

The lifestyle modification program for behaviour change and physical conditions

The lifestyle modification program for behaviour change and physical conditions were modified by the researcher based on construction of social cognitive theory including knowledge, situational perception, and physical conditions including blood pressure, and total cholesterol (Table 1).

Research instruments

This study used a self-administrated questionnaire and physical examination to collect the data. Five instruments were used to obtain the data, included: the demographic characteristics; the hypertension evaluation of lifestyle and management knowledge scale (HELM); the social cognitive constructs related to physical exercise questionnaire; the social cognitive constructs related to DASH eating plan questionnaire; and measuring the physical conditions including: systolic and diastolic blood pressure, and total cholesterol.

The demographic characteristic questionnaire was developed by researcher included age, education, duration of hypertension, income, gender, marital status, and religion.

The hypertension evaluation of lifestyle and management knowledge scale (HELM) was developed by Schapira et al. [14]. The instrument consists of 11 items. In this study, the HELM scale

was translated into Indonesian language and was tried out with 30 hypertensive elders who had the same inclusion criteria with the sample study. The instrument has good internal reliability with Cronbach's alpha .89.

The social cognitive constructs related to physical exercise questionnaire was developed by Plotnikoff et al. [15]. The instrument was rated on a 7 point Likert scale, and has an internal reliability with Cronbach's alpha .98 .4)

The social cognitive constructs related to DASH eating plan questionnaire was developed by Dewar et al. [16]. The instrument was rated on a 6 point Likert scale, and has an internal reliability with Cronbach's alpha.95

Measuring the physical conditions included: systolic and diastolic blood pressure, and total cholesterol.

Ethical consideration

Approval to conduct the study was granted by the Ethics Review Board (ERB) of Boromarajonani College of Nursing Nopparat Vajira (BCNNV)-Bangkok, ERBNo.46/214.

Data analysis

The differences of demographic characteristics between groups were determined by frequency, percentage, mean (\bar{x}), and standard deviation. The paired t-test was used to measure the difference of

Table 2 Baseline demographic characteristic compared for intervention group and comparison group (n = 29)

Demographic characteristics	Intervention group		Comparison group		p-value
	Mean	SD	Mean	SD	
Age	65.55	3.18	65.90	2.22	.634
Education	9.10	2.34	6.34	3.76	.001
Duration of hypertension	4.38	1.64	4.41	1.50	.934
Monthly income in IDR	1.40	3.3	1.33	3.3	.389

Table 3 Baseline demographic characteristic compared for intervention group and comparison group (n = 29)

Demographic characteristics	Intervention group		Comparison group		p-value
	n	%	n	%	
Gender					
Male	5	17.2	11	37.9	.080
Female	24	82.8	18	62.1	
Marital status					
Married	18	62.1	19	65.5	.789
Widow	11	37.9	10	34.5	
Religion					
Islam	29	100	27	93.2	.155
Christian			2	6.8	

Table 4 Comparison of knowledge, situational perception, blood pressure, and total cholesterol before and after participating lifestyle modification program in the intervention group (n=29)

Factors of behaviour change and physical conditions	Intervention group				t	p-value
	Before participating		After participating			
	Mean	SD	Mean	SD		
Knowledge	5.24	1.06	10.79	.41	1.68	.001
Situational perception	39.48	4.39	48.34	1.42	1.33	.001
Systolic blood pressure	149.31	10.33	136.21	6.22	-.56	.001
Diastolic blood pressure	92.07	5.59	83.45	4.84	.23	.001
Total cholesterol	231.34	31.05	221.86	30.72	-.36	.001

knowledge, situational perception, blood pressure, and total cholesterol within the intervention and comparison groups before and after the intervention. The independent t-test was used to examine the difference of knowledge, situational perception, blood pressure, and total cholesterol between the intervention and comparison groups after the intervention.

RESULTS

The mean age of the participants was 65.55 years old in the intervention group and 65.90 years old in the comparison group. Most of the participants in both groups were female and they were classified as married, and most of them were Muslim. The participants in the intervention group had completed nine years of education, and the participants in the comparison group were completed six years of education. Most of the participants in both groups have been suffering from hypertension for less than 5 years. The average monthly incomes were IDR 1.40 and 1.33 million for the intervention group and the comparison group

respectively. Statistically, there were no significant differences of demographic characteristics between the intervention group and comparison group except education (Table 1 and 2).

Comparison of knowledge, situational perception, blood pressure, and total cholesterol before and after participating lifestyle modification program in the intervention group and comparison group

The scores of independent variables between before and after participating lifestyle modification program in the intervention group and comparison group were compared with paired t-test (Table 3 and 4). The results showed that the score of knowledge and situational perception was significantly higher, and for blood pressure and total cholesterol was decreased after intervention than that before participation in the program ($p < .001$). Intervention group and comparison group had a significant improvement in knowledge and situational perception, decreasing in blood pressure, and total cholesterol after participation in the program ($p < .001$). Moreover, the increasing score of knowledge and situational perception, decreasing

Table 5 Comparison of knowledge, situational perception, blood pressure, and total cholesterol before and after in the comparison group (n=29)

Factors of behaviour change and physical conditions	Comparison group				t	p-value
	Before		After			
	Mean	SD	Mean	SD		
Knowledge	4.79	.98	3.83	.85	1.68	.09
Situational perception	37.93	4.47	38.76	3.60	1.33	.18
Systolic blood pressure	151.03	12.91	150.69	8.84	-.56	.58
Diastolic blood pressure	91.72	6.02	90.34	4.21	.23	.82
Total cholesterol	234.07	26.02	238.72	26.52	-.36	.72

Table 6 Comparison of knowledge, situational perception, blood pressure, and total cholesterol between the intervention group and comparison group before participating lifestyle modification program (n=29)

Factors of behaviour change and physical conditions	Intervention group		Comparison group		t	p-value
	Mean	SD	Mean	SD		
Knowledge before	5.24	1.06	4.79	.98	1.68	.09
Knowledge after	10.79	.41	3.83	.85	39.78	.001
Situational perception before	39.48	4.39	37.93	4.47	1.33	.19
Situational perception after	48.34	1.42	38.76	3.60	13.33	.001
Systolic blood pressure before	149.31	10.33	151.03	12.91	-.56	.58
Systolic blood pressure after	136.21	6.22	150.69	8.84	-7.22	.001
Diastolic blood pressure before	92.07	5.59	91.72	6.02	.23	.82
Diastolic blood pressure after	83.45	4.84	90.34	4.21	-5.79	.001
Total cholesterol before	231.34	31.05	234.07	26.02	-.36	.72
Total cholesterol after	221.86	30.72	238.72	26.52	-2.24	.03

blood pressure and total cholesterol after participation in the program was higher in intervention group compare to the increasing of knowledge, situational perception, decreasing blood pressure, and total cholesterol after intervention in the comparison group. This indicates the participants would have more knowledge, good situational perception, and could maintain blood pressure and total cholesterol if they received the lifestyle modification program.

Comparison of knowledge, situational perception, blood pressure, and total cholesterol between the intervention group and the comparison group before and after intervention

The score before the intervention lifestyle modification program for knowledge, situational perception or respond of statement from participants about their mental representation of the physical environment influencing their ability to eat healthy foods and physical exercise, blood pressure, and total cholesterol in comparison group was significantly higher than the intervention group ($p > .05$) (Table 5 and 6). After intervention, knowledge and situational perception was significantly higher, and blood pressure and total cholesterol was decreased for the intervention group than the comparison group ($p < .001$). It can be conclude that the participants who attend the lifestyle modification program had a higher

behaviour change and maintain the physical conditions than those who did not attend the program.

DISCUSSION

This study has shown there is a significant improvement score of knowledge and situational perception, decreased of blood pressure and total cholesterol from before and after intervention in the intervention group. It could be inferred that the program included many varieties of activities that could promote knowledge and situational perception, and it could influence as a result.

The findings shows the participants in the intervention group had a higher score in knowledge, situational perception, and a decrease in blood pressure and total cholesterol after obtaining the lifestyle modification program on behaviour change and physical conditions. This is consistent with Sharma [17] who stated that knowledge is an essential component for any behaviour change. It is a necessary precondition for change, but often is not sufficient for making the behaviour change. This finding is consistent with previous research showing that, the participants who had knowledge of the purpose of a treatment and how to monitor the progress of the treatment goals, will make the patient participation stronger in the management of the disease. Health education increased participants'

knowledge of health and can give them information about their health care and health care choices [18]. Therefore, according to the program within this study, it provided factors related to knowledge, including sharing experience, providing knowledge, and group discussion.

Related to the situational perception in physical exercise and DASH eating plan, the participants in the intervention group had a positive situational perception by providing some activities and strategies to improve the positive situational perception about physical exercise and DASH eating plan. Participants in the intervention group had high scores for situational perception in physical exercise and the DASH eating plan. This finding is consistent with study conducted by Mahdizadeh [19] the participants who had correct information can perceive and correct in interpret the environment, the researcher created activities that consisted of brainstorming about perception and the interpretation of the environment of physical exercise and DASH eating plan, rectifying the misperception about physical exercise and the DASH eating plan, and group discussion. Any misperceptions hinder the behaviour change, thus efforts must be made to remove misperceptions and to promote social norms that are healthy.

The level of physical conditions level including Systolic and Diastolic blood pressure, and total Cholesterol might be decreased by doing physical exercise at least 30 minutes 3 times a week and using the DASH eating plan for a short period of 7 weeks. These findings were consistent with several previous studies which focus on 6 weeks on behavioural intervention to improve DASH dietary patterns and physical activity, the result showed at the end of the intervention Systolic and Diastolic blood pressure decreased, and the BMI also decreased [20, 21]. According to the AHA recommendation on diet and lifestyle revision, it mentioned that improving diet and lifestyle is a critical strategy for cardiovascular diseases risk reduction, including low level of total Cholesterol, Triglyceride, high level HDL, increased HR Intensity, and maintaining blood pressure. The study conducted by Smith et al. [22] combining the DASH diet, exercise, and caloric restriction and resulted in significant reduction in blood pressure, BMI, and serum lipid. Moreover, the difference in physical exercise and diet pattern interventions between this study and another study could have influenced changes in physical conditions level.

Although all the objectives had been met in this study, nevertheless, there were limitations. The intervention was provided over 7 weeks with no

continuous follow up, which may not be a sustainable program. The program is only intended for hypertensive elderly, so that the program may not be effective against other chronic diseases and other age groups, and also most of the participants were female hypertensive elderly.

Based on the findings, this study has suggested the way of encouraging people with hypertension to participate in physical exercise and a healthy diet at community centre. Also follow up studies to evaluate the sustainability of the program are needed. Although the elderly should be encouraged to be independent, support from others was also needed to ensure that they maintained their regular and adequate physical exercise and healthy diet to prevent the onset of the chronic diseases among the elderly in West Java, Indonesia.

CONCLUSION

The result indicates that the lifestyle modification program has a positive effect on improving hypertensive elderly's knowledge, situational perception, and maintaining their blood pressure and total cholesterol.

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