

The Effect of Lifestyle Modification Program on Behavior Change and Physical Condition among Hypertensive Elders

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Abstract— High blood pressure is a significant health problem worldwide and increase the risks of stroke, heart disease, kidney disease, and blindness. The Joint National Committee suggested a lifestyle modification besides drug medication in the prevention and treatment of hypertension. The aspects that highly affected behavior when intervention of health behavior done by nursing was interpersonal aspects that was guided by the Social Cognitive Theory [SCT]. This study aimed to evaluate the effectiveness of the lifestyle modification program with SCT as a guideline on self-efficacy, outcome expectation, heart rate, and LDL-C. A quasi experiment with two groups, pre and post- test was the design of this study. The sample was randomly selected 29 hypertensive elders in each group from two different primary health centers in the North-Bekasi sub district, West Java, Indonesia. The instrument used consists 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. The results showed there was a significant difference of self-efficacy, outcome expectation, heart rate, and LDL-C within the intervention group ($p < .001$) and there was a significant difference of self-efficacy, outcome expectation, heart rate, and LDL-C between the intervention group and the comparison group ($p < .001$). In conclusion, the results indicate that the lifestyle modification program has a positive effect on improving hypertensive elders' self-efficacy, outcome expectation, and maintaining their heart rate, and LDL-C.

Keywords— *lifestyle modification program, behavior change and physical conditions, hypertensive elders*

V. INTRODUCTION

Hypertension has been a significant health problem for elderly worldwide because it has become a common chronic disease, and a leading risk factor for many other diseases which have been costly and have contributed to the morbidity and mortality rates of elders[1]. Ministry of Health of

Republic Indonesia reported, the prevalence of hypertension among elderly is increasing from 29.8% in 2008 to 33% in 2011 [2]. Considering West Java's growing elderly population, a rapid increase in the prevalence of the disease should become a concern since hypertension is considered one of the top causes of death in outpatient hospitals [3].

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 [5,13]. 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 West Java Provincial Health office reports, elderly with hypertension regardless their blood pressure still high were more resistant to follow lifestyle modifications [10]. During this time, hypertensive patients tend to focus on medication to lower blood pressure only. Few of them participated in physical exercise, and maintain the healthy diets. Unhealthy diets also shown by consuming less vegetables and fruits, high use of salt and monosodium glutamate [MSG], fat and also smoking [11].

Therefore, to best applied the human health-related behaviour, the intervention was designed based on Social

Cognitive Theory by developing model as well as guides in the evaluation of the intervention [12,13]. This theory explained how people regulate their behaviours and emphasized what people think and its effect on their behaviour.

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) [14].

The purpose of this study was to modify a Public Health Centers' program based comprehensive lifestyle modification program. The activities of the lifestyle modification program in this study included providing knowledge related hypertension, physical exercise and 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 elders in West Java, Indonesia and to test its effectiveness.

VI. MATERIAL AND METHODS

A. Design

A quasi-experimental design with two groups with pre and post-test was used in this study. The intervention group received lifestyle modification program including physical exercise and DASH eating plan during 7 weeks with many activities included brainstorming and group discussion 2 times on 2 weeks, provided knowledge about physical exercise and DASH eating plan on 1 week, presenting elderly with hypertension who success maintaining his health status as role model, and practicing physical exercise and DASH eating plan included self-monitoring during 4 weeks. The control group obtained the usual health education with regard to lifestyle modification used in regular basis in the PHC program.

B. Sample

The sample size calculated using Cohen's approach to power analysis for two independent t-tests the sample was 26 participants for each group. To anticipate withdrawal, a 20% of sample was added, make it totally 32 participants in each group. Researcher selected participants and PHC with simple random sampling.

C. 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: heart rate and LDL-C.

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

2) *The hypertension Evaluation of Lifestyle and Management Knowledge Scale (HELM)* was developed by Schapira et al. (2012). 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.

3) *The Social Cognitive Constructs related to Physical Exercise questionnaire* was developed by Plotnikoff et al. (2012). The instrument was rated on a 7 point likert scale, and has an internal reliability with cronbach's alpha .98 .4)

4) *The Social Cognitive Constructs related to DASH eating plan questionnaire* was developed by Dewar et al. (2012). The instrument was rated on a 6 point likert scale, and has an internal reliability with cronbach's alpha .95

5) *Measuring the physical conditions included: heart rate, and LDL-C.*

D. Ethical Review

An approval to conduct the study was granted by Ethical Review Board (ERB) Committee of Boromarajonani College of Nursing Nopparat Vajira (BCNNV)-Bangkok number 46/2014.

E. 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 self-efficacy, outcome expectation, heart rate, and LDL-C within the intervention and comparison groups before and after the intervention. The independent t-test was used to examine the difference of self-efficacy, outcome expectation, heart rate, and LDL-C between the intervention and comparison groups after the intervention.

VII. RESULT

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 (Data not shown).

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. The results showed that the score of self-efficacy and outcome expectation was significantly higher, and for heart rate and LDL-C was increased after intervention than that before participation in the program ($p < .001$). Intervention group and comparison group had a significant improvement in self-efficacy and outcome expectation, increasing in heart rate

and LDL-C after participation in the program ($p < .001$). Moreover, the increasing score of self-efficacy and outcome expectation, increasing in heart rate and LDL-C after participation in the program was higher in intervention group compare to the increasing of heart rate and LDL-C after intervention in the comparison group. This indicates the participants would have more self-efficacy and outcome expectation and could maintain heart rate and LDL-C if they received the lifestyle modification program.

TABLE I. Comparison of self-efficacy, outcome expectation, heart rate, and LDL-C between the intervention group and comparison group before participating lifestyle modification program

Factors of behaviour change and physical conditions	Intervention group (n=29)		Comparison group (n=29)		T	p-value
	M	SD	M	SD		
Self-Efficacy Before	5.24	1.06	4.79	.98	1.68	.09
Self-efficacy After	10.79	.41	3.83	.85	39.78	.001
Outcome Expectation Before	39.48	4.39	37.93	4.47	1.33	.19
Outcome Expectation After	48.34	1.42	38.76	3.60	13.33	.001
Heart Rate Before	79.38	1.82	78.72	1.09	1.66	.10
Heart Rate pressure After	85.34	3.93	79.41	1.27	7.68	.001
LDL-C Before	92.07	5.59	91.72	6.02	.23	.82
LDL-C After	83.45	4.84	90.34	4.21	-5.79	.001

Comparison of self-efficacy, outcome expectation, heart rate, and LDL-C between the intervention group and the comparison group before and after intervention

The score before the intervention lifestyle modification program for self-efficacy, outcome expectation, heart rate, and LDL-C in comparison group was significantly higher than the intervention group ($p > .05$). After the programs took place, the intervention group showed a significant improvement in the self-efficacy, outcome expectation, heart rate, and decreased LDL-C compared to 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. It can be received caused those participants who attend the program can maintaining their healthy lifestyle including physical exercise and DASH eating plan.

VIII. DISCUSSION

This study based on conceptual frame work that emphasized what people think and its effect on their behaviour, shown there is a significant improvement score of self-efficacy and outcome expectation, increased of heart rate

and decreased of LDL-C before and after intervention in the intervention among participants in the intervention group. It could be inferred that the program included many varieties of activities that could promote self-efficacy and outcome expectation, and it could influence as a result.

The findings shows the participants in the intervention group had a higher score in self-efficacy, outcome expectation, increasing heart rate and a decrease in LDL-C after obtaining the lifestyle modification program on behaviour change and physical conditions. Related to self-efficacy in physical exercise and DASH eating plan, the researcher modify by presenting elderly who success doing physical exercise regularly and health diet consumption as role model and practicing gymnastic fitness in small group. This finding showed that, the participants in the intervention group had higher self-efficacy to perform gymnastic fitness 3 times a week at least 30 minutes and DASH eating plan than the participants in comparison group. Several studies showed that self-efficacy has been consistently associated with physical activity behavior (McAuley et al., 2007; Rogers et al., 2008).

Related Outcome expectation in physical exercise and DASH eating plan modify by brainstorming and group

discussion of benefits gymnastic fitness and DASH eating plan. The finding showed that the participants in the

intervention group had higher outcome expectation regarding gymnastic fitness and DASH eating plan than the participants in comparison group. Bandura (1986) suggested, if people achieve the outcomes they expected to when they set out to change their behaviors, they are likely to feel satisfied with their persistence for the newly acquired behavior. This findings was consistent with the previous research showing that the participant with higher outcome expectations have been shown to be related to greater physical activity participation (Son *et al.*, 2009; Umstadd and Hallam, 2007; Mahdizadeh *et al.*, 2013).

The level of physical conditions level including heart rate, and LDL-C 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 (Golberg *et al.*, 2010; Fernandez *et al.*, 2008). According to the AHA recommendation on diet and lifestyle revision (2006), 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 Blumenthal *et al.* (2010) 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, some limitations are also acknowledged. 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 elders, 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 elders.

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. And 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.

V. CONCLUSION

In conclusion, the result indicates that the lifestyle modification program has a positive effect on improving hypertensive elders' self-efficacy, outcome expectation, and maintaining their heart rate and LDL-C. It because based on frame work that can promoted how people regulate their behaviours.

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