

# Use Behavioral Change Program to Decrease Hyperlipidemia and Hypertension in Primary Health Setting

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**Abstract**—This randomized controlled trial study aimed to determine the effectiveness of a behavioral change program for Thais with hyperlipidemia and hypertension. The program was based on self-care knowledge, self-care ability, blood lipid and blood pressure control. The study involved 98 purposively selected, patients with hyperlipidemia and hypertension receiving care at a hospital. Subjects were randomly assigned to either the experimental (n = 50) or control group (n = 48). Those in the experimental group received a 24-week behavioral change program and routine care, while those in the control group received only routine care. The behavioral change program consisted of group education sessions, wherein cognitive restructuring was used to increase the subjects' knowledge about, and ability to carry out self-care for hyperlipidemia and hypertension. Data were collected via interview-administered questionnaires, blood lipid and blood pressure measurements, before and after participation in the program. Data were analyzed utilizing descriptive statistics; Chi-square; Mann-Whitney U test; and, independent t-test. Results indicated the experimental group, 24 weeks after completion of the program, had a significantly higher mean rank of self-care knowledge and self-care ability regarding medication-taking, dietary control, exercise, risk behavioral avoidance, as well as significantly lower mean blood lipid and blood pressure levels, than the control group. Findings suggest the program was effective in enhancing subjects' knowledge regarding hyperlipidemia and hypertension, as well as control of their blood lipid and blood pressure.

**Index Terms**—hyperlipidemia, hypertension, self-care, self-management

## I. INTRODUCTION

Persons with a chronic illness as hyperlipidemia and hypertension often have to self-manage the disease process for a prolonged period of time. Individuals with hyperlipidemia and hypertension need self-care ability to manage the symptoms and lifestyle changes inherent in living with a chronic condition. [1] Self-management implies those with a chronic illness, such as hyperlipidemia and hypertension, should be active participants in the control of their blood lipid and blood pressure. Therefore, they need to

learn to appropriately manage their blood lipid and blood pressure through lifestyle modifications and take prescribed anti-hyperlipidemia and anti-hypertension medications. [2] However, factors affect development of self-care abilities of persons with hyperlipidemia and hypertension often resulting in inadequate self-care management. [3] Poor adherence to long-term therapy often is due to individuals having a lack of knowledge and limiting self-management skills about the disease. [4] In addition, Persons with hyperlipidemia and hypertension are failing to understand the need to take medications. [5] With the increased prevalence in the number of Thais experiencing hyperlipidemia and hypertension, the disease control has become a major public health challenge. [6] Although Thais with hyperlipidemia and hypertension have been reported to have good self-care behaviors, they are known to experience difficulty performing needed self-care. [7] They often self-adjust medication dosages and stop taking medications when they do not experience abnormal symptoms. [8]

The role of self in dealing with the chronically illness has been recognized as an important factor in managing hyperlipidemia and hypertension. [9] According to Wagner's Chronic Care Model, disease control requires active participation on the part of patients and healthcare providers, [10] Healthcare providers can assist patients in control of their illness by helping them acquire knowledge and skills necessary to engage in self-care. Therefore, implementation of a behavioral change program, in combination with educational approaches that encourage self-care abilities, could result in more effective blood lipid and blood pressure controlling of patients with hyperlipidemia hypertension.

## II. REVIEW OF LITERATURE

Although educational programs regarding hyperlipidemia and hypertension have been recognized as necessary for improving knowledge of self-care, the improving knowledge alone has been found to insufficiently alter one's behavior change related to adherence to taking blood lipid and blood pressure control medications. [11] A combination of improving self-care knowledge and behavioral change interventions have been noted to provide medication taking, dietary control, exercise, stress management, follow-up visits, risk behavioral avoidance, blood lipid and blood pressure

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monitoring. [12]

The effectiveness of a behavioral change program has been demonstrated, using Orem's Self-Care Deficit Nursing Theory [13] and Cognitive-Behavioral Therapy. [14] The Self-Care Deficit Nursing Theory proposes self-care is a performance to maintain life, health and well-being, while the Cognitive-Behavioral Therapy is an interaction of cognition, emotion, behavior, and environment of human.

Few studies have examined the effect of a behavioral change program among Thais with hyperlipidemia and hypertension. Although prior study has investigated the effect of knowledge in regards to disease, none has focused on behavioral change related to how to manage daily self-care of a chronic illness. Even though the study has addressed skills related to exercise and relaxation, none appear to have provided information regarding behavioral change. [15] Self-care studies conducted in Thailand, have examine the frequency of medication taking, dietary control, exercise and stress management over time. [15,16] However, investigations of blood lipid and blood pressure control have not examined. [17,18] The use of single group designs, [19,20] non-random assignments [21] also has led to methodological problems among the studies.

Persons with hyperlipidemia and hypertension appear to need to effectively engage in taking prescribed medications and modifying their lifestyle to control their blood lipid and blood pressure. [4] Thus, development of a behavioral change program could be appropriated to use with Thais with hyperlipidemia and hypertension. [22] In addition, Cognitive-Behavioral Therapy as cognitive restructuring, problem-solving, goal-setting, and self-monitoring are approaches shown to be effective means of assisting patients in understanding their illnesses, making informed decisions performing self-care. [23,24] Therefore, the purpose of this study was to determine the effectiveness of behavioral change program among Thais with uncontrolled hyperlipidemia and hypertension. Two specific hypotheses were formulated for this study.

1) Thais, with hyperlipidemia and hypertension, who have received a behavioral change program, plus routine care, will have, 24 weeks after completing the program, higher scores regarding knowledge of self-care and self-care ability than those, with hyperlipidemia and hypertension, who have received only routine care.

2) Thais, with hyperlipidemia and hypertension, who have received the behavioral change program, plus usual care, will have, 24 weeks after completing the program, lower levels of blood Triglyceride and diastolic blood pressure than those, with hyperlipidemia and hypertension, who have received only routine care.

### III. METHOD

#### A. Design

An experimental, randomized, control-trial design was used in the study

#### B. Ethical considerations

Approval to conduct the study was granted by the human subjects committee. All potential subjects were informed about the purpose, potential risks, benefits, voluntary participation, confidentiality and anonymity issues, withdrawal from the study without effect, and use of a tape-recorder during data gathering. All subjects who consented to participate were asked to sign a consent form.

#### C. Sample and Setting

Potential samples consisted of Thais, registered at an out-patient clinic of a hospital; who were: diagnosed with hyperlipidemia and hypertension; and, able to attend 24-week behavioral change program. The inclusion criteria included the following: 1) samples ability to hear and speak; 2) willingness to participate in the 24-week of behavioral change program; and 3) having blood Triglyceride levels more than 150 mg per deciliter and diastolic blood pressure more than 90 mmHg. The exclusion criteria included the following: 1) the samples that had severe complications such as heart diseases, stroke and the final stages of renal failure; 2) persons who attended the group meeting less than 24 weeks; and 3) having cognitive impairments. Potential samples were identified and asked to participate in the study, by a registered nurse, at the hospital, who was aware of the study's purpose and inclusion criteria. The initial 98 potential samples, which volunteered and met the inclusion criteria, completed the study. 50 persons were randomly assigned to the experimental group and 48 persons were randomized sampling to the control group.

The samples in the experimental and control groups were, respectively: female (n = 29; 57% and n = 32; 66.2%); average age 62.2 years (range = 46-75 years) and 61.9 years (range = 40-79 years; had an educational level of primary school (n = 39; 77% and n = 36; 74.9%); engaged in household work (n = 32; 63% and n = 27; 55.3%); and, had a monthly income of \$60 to \$120 USD (n = 33; 65%) and \$50 to \$100 USD (n = 34; 70%). Those in the experimental group had hyperlipidemia an average of 7.7 years (range = 1-21 years), while those in the control group had hyperlipidemia an average of 6.86 years (range = 1-22 years). Those in the experimental group had hypertension an average of 5 years (range = 1-19 years), while those in the control group had hypertension an average of 5.5 years (range = 1-20 years).

#### D. Instruments

Data gathered involved the use of:

1) The personal information questionnaire comprised 7 checklists-questions asking about samples' gender, age, education level, occupation, income, and duration of hyperlipidemia and hypertension. The mailing address each subject provided was recorded in order to send the

motivational letters.

2) The knowledge of self-care questionnaire was developed by the researcher and based upon the literature review. The instrument consisted of 36 items and served as a cognitive measure of each subject's knowledge about hyperlipidemia, hypertension and self-care actions. Examples of items included: "Persons who have parents or siblings with hyperlipidemia and hypertension have greater risks of hyperlipidemia and hypertension than those who do not have them?"; and, "Persons with hyperlipidemia and hypertension can stop medications for blood lipid and blood pressure control when they have no abnormal symptom? Possible responses to each item were "yes" or "no." Each correct answer received a score of 1, while each incorrect answer received a score of 0. A total score was calculated by summing the score of all items. Higher scores indicated a better level of knowledge about hyperlipidemia and hypertension and self-care performance. A reliability coefficient for the questionnaire was determined (using 30 persons with uncontrolled hyperlipidemia and hypertension who had demographic characteristics similar to the sample) to be 0.81.

3) The self-care ability questionnaire was developed by the researcher and based upon the literature review. The instrument contained 14 open-ended questions designed to measure each subject's ability to perform 5 dimensions: 1) medication-taking; 2) dietary control; 3) exercise; 4) stress management; and, 5) risk behavior avoidance. Examples of the open-ended questions were: "How do you take care of yourself when you receive treatment for hyperlipidemia and hypertension?" "How do you solve a problem related to taking medications? Data obtained by interview, were noted and recorded on a tape recorder. Data from each dimension then were classified into categories. [25] The score could range from 0 to 3, based on the researcher criteria of: 0 = undeveloped; 1 = developing; and, 2 = developed. A higher score indicated a more developed level of self-care ability for blood lipid and blood pressure control. A reliability coefficient for the questionnaire was 0.76.

Prior to use the instruments in this study, the content validity index of the knowledge of self-care and self-care ability questionnaires were assessed by 3 experts of cardiovascular physicians. The content validity index for knowledge of self-care and self-care ability questionnaires were 0.94 and 0.91, respectively.

#### *E. Procedure*

One week prior to the start of the study, pre-test data were obtained, for each sample, via administration of the: personal information, knowledge of self-care, and self-care ability questionnaires, and two blood Triglyceride and blood pressure measurements. The questionnaires were verbally administered, individually, to each sample in the out-patient clinic of the hospital. The entire process took approximately 30 minutes.

The experimental group samples were provided, when they

had their pre-test data collected, a written time and date schedule for their assigned sessions of the behavioral change program which designed by the researcher based on Orem's Self-Care Deficit Nursing Theory [13] and Cognitive-Behavioral Therapy. [14]

The program included: a) 2 weeks of cognitive restructuring related to knowledge about hyperlipidemia and hypertension and self-care ability; and, b) 22 weeks of motivation to engage in daily self-care related to medication-taking, dietary control, exercise, stress management, and risk behavior avoidance. To encourage the motivation for the experimental group, letters that contained information regarding how to perform self-care were be sent to each subject.

During the first two weeks of the program, misunderstandings about hyperlipidemia and hypertension and self-care experiences were identified and resolved through lecture, group discussion and demonstration. Each subject wrote down his/her personal goals and action plans regarding self-care of hyperlipidemia and hypertension to meet the goals on a work sheet. As a way to improve self-monitoring of blood lipid and blood pressure, subjects were shown how to take and record their blood lipid and blood pressure on a graph in a provided booklet In addition, subjects were shown how to record their daily self-care activities on a work sheet. Subjects were asked to bring their blood lipid and self-care activities recorded in booklets for the next meetings.

During the 22 weeks later, the discussion of problematic related to medication taking, dietary control, exercise, stress management, and risk behavior avoidance; were carried out to enhance subjects' cognitive restructuring, problem-solving and communication skills. Sharing of experiences was encouraged among group members related meeting their goals and plans.

Those in the control group received the routine care occurred during a regular clinic visits once a month, and consisted of: a) blood lipid, blood pressure and weight measurements; b) meeting with and receiving brief advice from the physician regarding how to deal with hyperlipidemia and hypertension; c) receiving prescribed medications; d) a laboratory request for hyperlipidemia and hypertension measure; and, e) written information regarding the time and date of the next clinic appointment. 24 weeks after the experimental group completed the behavioral change program, post-test data, were collected, using the same procedure used to collect the pre-test data, from the experimental and the control group subjects. Thereafter, those who had been assigned to the control group were invited to participate in the behavioral change program.

#### *F. Data Analysis*

Descriptive statistics were used to analyze the demographic characteristics and calculate the instruments' scores. Chi-square and the Mann-Whitney U test were used to evaluate differences in demographic characteristics between the experimental and control groups. Because knowledge of self-care violated the assumption of normal distribution, and self-

care ability was measured at the ordinal level, the Mann-Whitney U test was used for testing hypothesis 1. Hypothesis 2 was tested using the independent t-test. This was done because the blood Triglyceride and diastolic blood pressure, measured at the ratio level, passed the assumption of normality and homogeneity of variance using the Shapiro-Wilk test and Levene's test, respectively.

IV. RESULTS

As shown in Table 1, prior to implementation of the behavioral change program, no significant differences were found, between the experimental and control groups' knowledge of self-care and self-care ability. However, significant differences were found, between the experimental and control group, 24 weeks after the experimental group completed the program, with respect to knowledge of self-care and four of the five dimensions in self-care ability. The experimental group was found to have higher scores, than the control group, regarding knowledge of self-care and self-care ability (medication taking, dietary control, exercise, and risk behavioral avoidance). Thus, hypothesis 1 was partially supported.

No significant differences in blood Triglyceride and diastolic blood pressure between the experimental and control groups were found prior to the behavioral change program. However, the blood Triglyceride and diastolic blood pressure of the experimental group was found to be lower than the blood Triglyceride and diastolic blood pressure of the control group after completion of the program (see Table 2). Thus, hypothesis 2 was supported.

TABLE I

KNOWLEDGE OF SELF-CARE DEMANDS AND SELF-CARE ABILITY

VARIABLES	PRE-POSTTEST	MEAN RANK		Z	P
		EXPERIMENT GROUP (N = 50)	CONTROL GROUP (N = 48)		
KNOWLEDGE OF SELF-CARE	PRETEST	49.95	49.01	-.17	.87
	POSTTEST	55.02	43.50	-2.04	.04
SELF-CARE ABILITY					
MEDICATION TAKING	PRETEST	48.99	50.05	-.21	.83
	POSTTEST	55.88	42.57	-2.61	.01
DIETARY CONTROL	PRETEST	53.42	45.24	-1.60	.11
	POSTTEST	56.04	42.39	-2.56	.01
EXERCISE	PRETEST	51.86	46.93	-.921	.36
	POSTTEST	59.24	38.92	-3.70	.00
STRESS MANAGEMENT	PRETEST	49.74	49.24	-.15	.88
	POSTTEST	50.00	48.96	-1.04	.30
RISK BEHAVIOR AVOIDANCE	PRETEST	48.55	50.97	-.57	.57
	POSTTEST	55.25	43.25	-2.55	.01

TABLE II

BLOOD TRIGLYCERIDE AND DIASTOLIC BLOOD PRESSURE

VARIABLES	PRE-POSTTEST	MEAN		T	P
		EXPERIMENT GROUP (N = 50)	CONTROL GROUP (N = 48)		
TRIGLYCERIDE	PRETEST	153.15	151.61	.75	.46
	POSTTEST	129.56	145.67	-5.50	.00
DIASTOLIC PRESSURE	PRETEST	100.73	99.86	.538	.60
	POSTTEST	93.98	98.37	-2.14	.04

V. DISCUSSION

The behavioral change program was effective in improving knowledge of self-care, self-care ability, blood lipid, and blood pressure control in Thais with uncontrolled hyperlipidemia and hypertension. The findings are congruent with prior findings regarding the effectiveness of an intervention program on knowledge of hyperlipidemia and hypertension, [17,21] self-care behavior in medication taking [7], exercise [15,16], blood lipid and blood pressure control. [17,21] However, the findings are incongruent with prior studies regarding the effectiveness of a complex intervention program on stress management [15-17,21,] and risk behavioral avoidance.

The results may be explained in regards to the fact that the behavioral change program was based on Orem's Self-Care Deficit Nursing Theory [13] and Cognitive-Behavioral Therapy. [14] Orem proposed that a supportive-educative nursing system and helping methods are useful for patients who lack sufficient knowledge or skills to perform needed of action. The subjects' requirements for help, in this study, were confined to decision making, behavioral control and acquisition of particular knowledge and skills. In addition, Cognitive-Behavioral Therapy suggests that persons' negative emotions and behavior are strongly influenced by their cognitions and can be changed via use of cognitive and behavioral techniques. [23] The findings revealed the behavioral change program helped experimental group subjects understand hyperlipidemia and hypertension, the need to control their blood lipid and blood pressure and the means to meet their self-care goals.

During the program, experimental group subjects' misunderstandings about hyperlipidemia and hypertension, and self-care experiences were identified and corrected via use of the sharing experience with one another regarding success. This appeared to help motivate and enhance self-confidence to perform daily self-care. [26] Because subjects in the experimental group had established goals and plans, their self-monitoring through the interaction of awareness, measurement and observation appeared to enhance their self-management by providing continual information for the actions they need to take. [27] Since they were able to track a decrease in their blood lipid and blood pressure over time, via plotting a graph, experimental group subjects seemed to be motivate to perform self-care activities. In addition, their daily self-care monitoring allowed them to stay informed regarding how often they needed to perform self-care behavior. Moreover, the motivational letters reminded them about the scheduled time for exercise and low fat and salt diet consumption. However, no significance differences between the experimental and control groups regarding stress management. This may be because prior to the behavior change program, most subjects in both groups had high scores in their self-care ability regarding stress management. The subjects indicated the predominantly used coping methods that were not harmful to their health when managing stress.

The behavioral change program also provided specific knowledge, skills and motivation to help those in the experimental group, through active participation in self-care, identify problems, find possible solutions, take action, and

self-evaluate their actions. By doing so, they were better to understand the self-care demands of their illness. Thus, the experimental group subjects improved their knowledge of self-care, self-care ability, blood lipid and blood pressure control 24 weeks after completion of the program and recommended the program be offered to others with uncontrolled hyperlipidemia and hypertension.

## VI. LIMITATIONS AND RECOMMENDATIONS

The effectiveness of the behavioral change program only was examined over a 24 week period with individuals who were older and able to take care of themselves without being concerned about an occupation. Thus, the long-term effects of the behavioral change program needs to be examined, as well as do the effectiveness of the program with young and employed. Also, subjects were obtained only from one healthcare institution; further studies need to utilize multiple settings.

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