Effects of comprehensive cardiac nursing program on health-related quality of life in patients with coronary heart disease

Padthayawad Pragodpol*

Yupin Aungsuroch** Sureeporn Thanasilp**

Pragodpol P, Aungsuroch Y, Thanasilp S. Effects of comprehensive cardiac nursing program on health-related quality of life in patients with coronary heart disease. Chula Med J 2012 Mar - Apr; 56(2): 189 - 209

Introductions	:	*Initially diagnosed coronary heart disease (CHD) patients experience new form of life-threatening illness which includes various health problems that significantly contribute to low health-related quality of life (HRQOL). Low HRQOL impacts the recovery process, decrease compliance with treatments, and causes a higher rate of hospital readmission for numerous complications and/or death. Self-management intervention is most successful in promoting outcome of health including HRQOL. Comprehensive cardiac nursing program (CCNP) has been developed with its emphasis on patient's management of risky health behavior, in order to improve their HRQOL.*
Objectives	:	*To evaluate the effectiveness of CCNP on HRQOL in firstly diagnosed CHD patients.*
Settings	:	*Two secondary healthcare settings in Thailand.*
Research design	:	*Randomized control trial.*
Samples	:	*There were 74 eligible patients who received their first diagnosis as CHD.*

* PhD Candidate, Faculty of Nursing, Chulalongkorn University

**Faculty of Nursing, Chulalongkorn University

Methods   :   *The subjects were randomly assigned by block randomization.*
Thirty-seven participants in the experimental group received CCNP
together with their usual care, whereas 37 participants in the control
group received only their usual care. The experimental group underwent
4 phases which were: 1) the risky health behavior assessment;
2) preparation phase; 3) practice phase; and, 4) evaluation phase.
HRQOL was evaluated by Quality of Life Index, Cardiac version IV on
the second day of admission and at 8 weeks after discharge.

Results   :   *HRQOL scores and the percentage of change in the overall and all*
domains of health and functioning, social and economic, psycho and
spiritual, and family of the participants who received the CCNP in
the experimental group had significantly higher than the participants
who received usual care in the control group (p <.05).

Conclusions   :   *The comprehensive cardiac nursing program was effective for*
improvement of HRQOL in patients firstly diagnosed with CHD.

Keywords   :   *Comprehensive cardiac nursing program, self-management model,*
health-related quality of life, coronary heart disease patients.

บทนำ	:	*ผู้ป่วยที่ได้รับการวินิจฉัยโรคหลอดเลือดหัวใจในครั้งแรกต้องเผชิญกับการเจ็บ*
ป่วยที่คุกคามต่อชีวิตอีกทั้งยังมีปัญหาสุขภาพที่ส่งผลทำให้มีคุณภาพชีวิตต่ำ
การมีคุณภาพชีวิตต่ำเกิดผลกระทบต่อการฟื้นฟูสภาพหลังการเจ็บป่วย ความ
สามารถในการปฏิบัติตามแผนการรักษาลดลง จึงทำให้เกิดภาวะแทรกซ้อน
มากมายที่นำไปสู่การกลับเข้ารับการรักษาในโรงพยาบาลในอัตราที่สูงและ
ทำให้เสียชีวิตได้ง่าย จากการทบทวนวรรณกรรมพบว่าโปรแกรมการจัดการ
ตนเองประสบผลสำเร็จในการพัฒนาภาวะสุขภาพและคุณภาพชีวิตผู้ป่วย ดังนั้น
โปรแกรมการพยาบาลแบบรวบยอดจึงถูกพัฒนาขึ้นโดยมุ่งเน้นการจัดการ
พฤติกรรมเสี่ยง เพื่อพัฒนาคุณภาพชีวิตผู้ป่วยที่ได้รับการวินิจฉัยโรคหลอดเลือด
หัวใจในครั้งแรก
วัตถุประสงค์	:	*เพื่อประเมินประสิทธิผลของโปรแกรมการพยาบาลแบบรวบยอดต่อคุณภาพ*
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วิธีการ	:	*กลุ่มตัวอย่างทั้งหมดแบ่งออกกลุ่มทดลองและกลุ่มควบคุม จำนวนกลุ่มละ*
37 ราย ด้วยวิธีการสุ่มแบบบล็อค ผู้ป่วยในกลุ่มควบคุมได้รับการดูแลตามปกติ
ผู้ป่วยในกลุ่มทดลองได้รับการดูแลตามปกติร่วมกับโปรแกรมการพยาบาล
แบบรวบยอด ซึ่งประกอบด้วยกระบวนการทั้งหมด 4 ระยะ ได้แก่ 1) การประเมิน
พฤติกรรมเสี่ยง 2) การเตรียมความพร้อม 3) การปฏิบัติการ และ 4) การประเมิน
ผล การจัดการตนเองเกี่ยวกับโรคหลอดเลือดหัวใจ คุณภาพชีวิตประเมิน
โดยใช้ดัชนีคุณภาพชีวิตสำหรับผู้ป่วยโรคหัวใจ ในวันที่ 2 ของการเข้ารับ
การรักษาในโรงพยาบาล และ 8 สัปดาห์ หลังจำหน่ายออกจากโรงพยาบาล

ผลการศึกษา : *ผู้ป่วยในกลุ่มทดลองที่ได้รับโปรแกรมการพยาบาลแบบรวบยอดมีคะแนน
คุณภาพชีวิตและเปอร์เซ็นต์การพัฒนาคุณภาพชีวิตโดยรวมและคุณภาพชีวิต
รายด้านได้แก่ สุขภาพและการทำหน้าที่ สังคมและเศรษฐกิจ จิตใจและ
จิตวิญญาณ และครอบครัว สูงกว่ากลุ่มควบคุมที่ได้รับการดูแลตามปกติ
อย่างมีนัยสำคัญทางสถิติที่ระดับ .05*

สรุป : *โปรแกรมการพยาบาลแบบรวบยอดมีประสิทธิผลในการพัฒนาคุณภาพชีวิต
ผู้ป่วยที่ได้รับการวินิจฉัยโรคหลอดเลือดหัวใจในครั้งแรก*

คำสำคัญ : *โปรแกรมการพยาบาลแบบรวบยอด, แนวคิดการจัดการตนเอง, คุณภาพชีวิต,
ผู้ป่วยโรคหลอดเลือดหัวใจ.*

Coronary heart disease (CHD) is an incurable, chronic and seriously progressive. Particularly, first diagnosed patients with CHD have to deal with a new experience of life-threatening illness with various health problems that significantly contribute to low health-related quality of life (HRQOL).[1-4] Nowadays, CHD has been a crucial health problem, an important burden to healthcare systems worldwide.[5] Thailand is no exception; CHD is the 3rd leading cause of death, and the trend of morbidity from this disease is increasing every year.[6]

All dimensions of HRQOL of CHD patients were negatively affected by the disease.[7-14] HRQOL is a construct which means the extent to which perceived health or responses to the changing health status have impacts on an individual. HRQOL refers to the impact on health conditions, symptoms, and treatments on individual's quality of life.[15] As for this study HRQOL was defined as "subjective sense of well-being that stems from life satisfaction with specific and holistic aspects of life in health and functions, social and economic, psychological/ spiritual, and family that are important to a person".

Findings from previous studies have shown that the initially diagnosed patients with CHD patients have lower HRQOL in all dimensions of HRQOL.[14, 16-19] The mean HRQOL score of first diagnosed CHD patients was 56.89 from a possible 100.[21] The HRQOL scores of Thai post-myocardial infarction patients were not good, at 65.78 percent.[22] An overall reduction of HRQOL was caused by various health problems[4, 21, 23-27] including physiological, psychological, socioeconomic, and spiritual. All these health problems developed from their risky health behaviors related to increased cardiac risk factors that could be traced back to the underlying mechanism of CHD, i.e., atherosclerotic plague occlusion in the coronary arteries.[28-30]

Before and after being diagnosed with CHD, most patients show, and usually retain, their risky health behaviors including consumption of food with high fat and cholesterol,[30-31] rare exercises and negligence of activity,[32-35] continued smoking,[36] and psychological problems.[37-38] All these risky behaviors cause health problems in the patients with first diagnosed CHD, leading to low HRQOL by reducing opportunities for satisfaction in important life domains.[39]

The goal of nursing role for caring of patients who are first diagnosed with CHD is not only to prolong life but also to improve HRQOL. Then, nurses should have a good plan in order to meet their goals. Previous studies have found that patients with first diagnosed with CHD who participated in cardiac rehabilitation had improved HRQOL.[40-42] In addition, Hofer et al.[43] revealed that their cardiac rehabilitation improved both cardiac risk factors and HRQOL. However, some studies found no significant improvements in HRQOL.[23, 44-46] Some Thai studies found that nursing cardiac rehabilitations enhanced HRQOL of Thai CHD patients who were not first diagnosed. They had both significantly[47-48] and non significantly improved[49] HRQOL that were similarly to the studies from the West. Therefore, both Thai and western studies demonstrated a controversial result regarding the HRQOL.

Furthermore, almost all cardiac rehabilitation programs in Thailand have been made available for patients at tertiary or university hospitals. They emphasize on post invasive treatment groups. CHD

patients in secondary healthcare settings which are the most common location for patients suffered from their initial diagnosis of CHD actually have a restricted range of available cardiac rehabilitation interventions. They receive only medical treatment and limited access to invasive and new treatment strategies.[50]
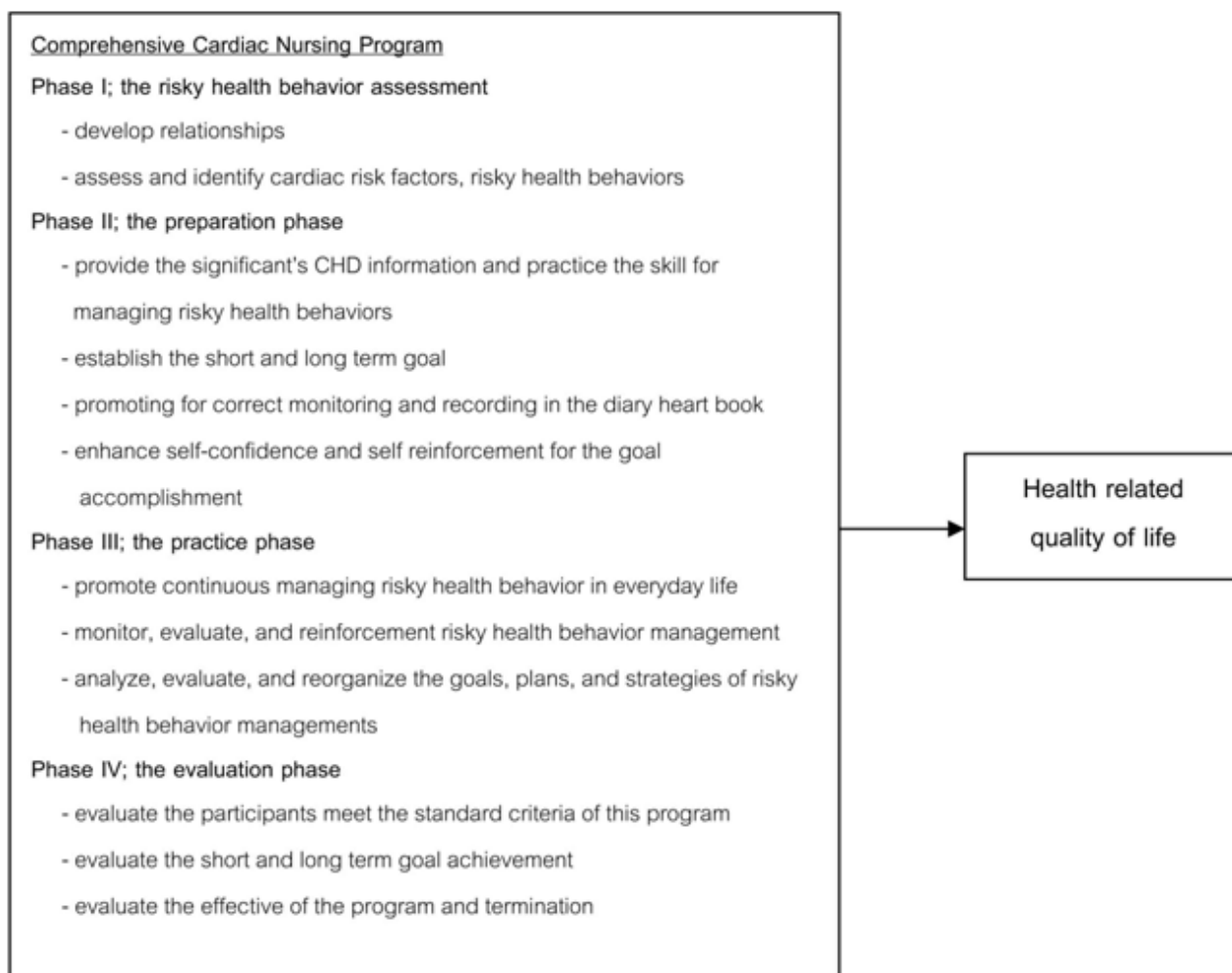
Reviews of literature also found that self-management interventions support the patients to live their best possible HRQOL with the chronic conditions.[51-53] Self-management is widely recognized as a necessary method or a learning process for managing and improving patients' health behavior and health status[54] associated with better HRQOL[15, 55-56] with lower healthcare costs.[57] Self-management intervention is the most successful program to promote health outcome including HRQOL in patients with diabetes, asthma, arthritis and coronary artery disease.[58-60] The characteristic that distinguishes self-management intervention from other traditional health programs are self-tailoring with appropriate use of applied knowledge and self-management skills to oneself.[57]

Currently, there is no self-management intervention has been found implemented to enhance HRQOL for first diagnosed CHD patients. This phenomenon is a critical issue for nurses to take more active role in conducting effective strategies for these patients: firstly, because of increased incidence of CHD in Thailand; secondly, the patients with first diagnosed CHD have a changing health status that needs management and they have to live with serious progressive life threatening chronic illness; thirdly, they have many risky health behaviors and many health problems that significantly affect them and lower HRQOL; fourthly, low HRQOL impacts the recovery process, decreases compliance with treatments, and causes a higher rate of hospital readmission under many complications and death.[61-63]

Therefore, developing an effective nursing care model to help the patients manage their risky behaviors, improve health status and HRQOL is needed, especially when they are initially diagnosed with CHD. Consequently, the purpose of this study is to evaluate the effects of Comprehensive Cardiac Nursing Program (CCNP) on HRQOL in patients with first diagnosed CHD. The CCNP is a multi-component nursing intervention that emphasizes on the management of patient's risky health behaviors by using self-monitoring, self-evaluation, and self-reinforcement processes that are significantly related to the promotion of health status with improvement of HRQOL.

The CCNP was developed based on self-management model [56] Ornish's heart disease reversal program and existing knowledge which provides sufficient knowledge and practical skills that the patients can perform to manage their risky health behaviors. This program is holistic nursing care accompanied by mutual cooperation of patients and the nurses, comprises of 4 phases for self-management of the coronary heart disease patients including: 1) risky behavior assessment phase; 2) preparation phase; 3) practice phase; 4) evaluation phase. The conceptual framework of the CCNP is summarized in Figure 1.

Comprehensive Cardiac Nursing Program

Phase I; the risky health behavior assessment

  - develop relationships

  - assess and identify cardiac risk factors, risky health behaviors

Phase II; the preparation phase

  - provide the significant's CHD information and practice the skill for

   managing risky health behaviors

  - establish the short and long term goal

  - promoting for correct monitoring and recording in the diary heart book

  - enhance self-confidence and self reinforcement for the goal

   accomplishment

Phase III; the practice phase

  - promote continuous managing risky health behavior in everyday life

  - monitor, evaluate, and reinforcement risky health behavior management

  - analyze, evaluate, and reorganize the goals, plans, and strategies of risky

   health behavior managements

Phase IV; the evaluation phase

  - evaluate the participants meet the standard criteria of this program

  - evaluate the short and long term goal achievement

  - evaluate the effective of the program and termination

Health related
quality of life

Figure 1. Conceptual framework of comprehensive cardiac nursing program.

Methods

This study is a randomized control trial, a pretest-posttest research design that randomly assigned participants either to experimental or control group by four-block randomization technique.[64-65] The eligibility criteria were: patients who are initially diagnosed with CHD by electrocardiography, cardiac enzyme or troponin T investigation including STEMI, NSTEMI and UA; receiving medical treatment; having no complication that inhibits cooperation in the study (such as severe congestive heart failure, severe arrhythmia, or severe uncontrolled hypertension, physical problems); being classified as class III or IV based on the Canadian Cardiovascular Society Classification System; having no cognitive impairment; competent to read and write Thai; and, willing to participate in the investigation. The sample size is calculated based on statistical power analysis and effect size determination. According to the table of sample size from the principle of Cohen, [66] it is found that 35 cases in each group are sufficient for

comparison. However, to compensate for any possible withdrawal of subjects, the researchers recruited 37 participants per group from Singburi and Angthong hospitals.

Accordingly, Singburi and Angthong provincial hospitals are the first and second ranks of CHD incidence rates (averagely five years in retrospective).[6] Then, both of them could represent the secondary healthcare setting of Thailand that cannot provide the invasive treatment for the people. No participants refuted, dropped out, or loss to follow up.

The protection of human right subjects in the study has been approved by the research ethics committee of each hospital for permission prior to data collection. In addition, the information sheet was provided to all participants before they would sign their consent form. In each setting, there were subjects from both the experimental and control groups. The participants in the experimental group received the usual care plus the CCNP, whereas the participants in the control group received only the usual care.

The CCNP was composed of four phases as previously mentioned, and it was implemented into 5 sessions which provided to each participant including at least one family member as follows: the first and second sessions are implemented at the medical ward in the second and third day of admission which will provide significant information about coronary heart disease and practical skills for the management of their risky health behaviors by using a booklet and DVD. In addition, the participants have to set their short- and long-term goals of achievement in the management of their risky

health behaviors. The third session is implemented at participant's home to promote the participants for continuing management of risky health behaviors in everyday life, and to monitor and evaluate the short-term goals.

The fourth session is conducted by telephone calls at 4 and 6 weeks after discharge from the hospital, to reinforce, monitor, and evaluate the participants regarding their maintenance of the management of risky health behaviors and regular records in their heart book dairy. The last session is conducted at the outpatient department at 8 weeks after discharge. The aims are to evaluate the achievement of participant's long-term goals, to reinforce the participants in continuing management of their risky health behaviors in their daily life, and to terminate the program. The participants in the experimental group have to meet the standard criteria of the program that require passing 75% of the Coronary Heart Disease Patient's Management Questionnaire taken in the second and third sessions for evaluation of the subjects on their knowledge of CHD and their self-management, respectively.

The media of this program comprises a booklet, a DVD, and a heart book diary. The coronary heart disease booklet provides significant information about CHD in the second session. The DVD describes and demonstrates the target of the management of risky health behaviors that include diet management, physical activity and exercise management, smoking cessation management, and stress management which provided in the third session. The heart book diary is used for self-monitoring and self-evaluation on the management of risky health behaviors. All media are validated by 7

experts who were same the experts who validated the instruments with additional 1 expert in mass media communication.

The instruments used in this study include: 1) Questionnaire on personal data and the health behaviors related to cardiac risk factors; 2) Medical record that is used for collection medical and laboratory investigations related to cardiac risk factors; 3) Quality of Life Index-Cardiac Version IV developed by Ferrans and Powers[68] in which a global measure and translated into Thai by Atchara Sukornthasan; 4) The Coronary Heart Disease Patient's Management Questionnaire which is used for monitoring and evaluating the subjects in the experimental group whether they meet the standard criteria of this program. The instruments 1, 2, 4 were developed by the researchers based on extensive literature reviews, and were tested with their content validated by 7 experts including 4 nurse instructors, 2 advanced practitioner nurses, and a physician. All instruments were also tried out with 30 patients with first diagnosed CHD. The result shows that all instruments are accepted at high quality

for content validity index and internal consistency reliability. [69]

Instruments 1-3 are used for collecting personal data, health behaviors related to cardiac risk factors and HRQOL on the second day of admission for pretest and 8 weeks after discharge for posttest in both groups by research assistants. Two research assistants who are experienced in medical nursing care for at least 5 years were trained to use the instruments for data collection. The obtained data are analyzed with descriptive, chi-square test, and independent *t*-test statistics.

Results

The personal characteristics of the subjects in both experimental and control groups were tested by chi-square. The result shows that all of personal characteristics regarding gender, age, marital status, education, economic status, family history, diagnosed, symptoms, and comorbidities were not significantly different between the experimental and control groups. They are shown in Table 1 as follows:

Table 1. Personal characteristics of the experimental and control groups.

Personal characteristics	Experimental group N=37 Number (%)	Control group N=37 Number (%)	Total N=74 Number (%)	χ^2	df	p
Gender				.00	1	1.00
Male	21 (56.76)	21 (56.76)	42 (56.76)			
Female	16 (43.24)	16 (43.24)	32 (43.24)			

Table 1. Personal characteristics of the experimental and control groups. (continued)

Personal characteristics	Experimental group N=37 Number (%)	Control group N=37 Number (%)	Total N=74 Number (%)	χ^2	df	p
Age group				.16	5	1.00
31-40	3 (8.11)	3 (8.11)	6 (8.11)			
41-50	5 (13.51)	5 (13.51)	10 (13.51)			
51-60	10 (27.03)	10 (27.03)	20 (27.03)			
61-70	8 (21.62)	8 (21.62)	16 (21.62)			
71-80	8 (21.62)	8 (21.62)	16 (21.62)			
81-90	3 (8.11)	3 (8.11)	6 (8.11)			
	Mean = 61.24	Mean = 62.54	Mean = 61.89			
	SD = 14.50	SD = 13.33	SD = 13.85			
	Max = 90	Max = 88				
	Min = 35	Min = 35				
Marital Status				.32	3	.95
Single	1 (2.70)	1 (2.70)	2 (2.70)			
Married	28 (75.68)	26 (70.27)	54 (72.97)			
Divorced	7 (18.92)	9 (24.32)	16 (21.62)			
Widowed	1 (2.70)	1 (2.70)	2(2.70)			
Education				2.71	3	.44
Elementary	28 (75.68)	27 (72.97)	55 (74.32)			
Secondary	5 (13.51)	8 (21.62)	13 (17.57)			
Diploma	2 (5.41)	-	2 (2.70)			
Bachelor	2 (5.41)	2(5.41)	4 (5.41)			
Occupation				12.43	7	.09
Unemployed	15 (40.54)	11 (29.73)	26 (35.14)			
Day laborer	8 (21.62)	4 (10.81)	12 (16.22)			
Agriculturist	4 (10.81)	7 (18.92)	11 (14.86)			
Merchant	2 (5.41)	10 (27.03)	12 (16.22)			
Government	2 (5.41)	1 (2.70)	3 (4.05)			
Government pension	1 (2.70)	2 (5.41)	3 (4.05)			
Employee	5 (13.51)	1 (2.70)	6 (8.11)			
Priest		1(2.70)	1 (1.35)			
Economic status				2.66	1	.10
Enough	23 (62.16)	16 (43.24)	39 (52.70)			
Not enough	14 (37.84)	21(56.76)	35(47.30)			

Table 1. Personal characteristics of the experimental and control groups. (continued)

Personal characteristics	Experimental group N=37 Number (%)	Control group N=37 Number (%)	Total N=74 Number (%)	χ^2	df	p
Family history				.09	1	.76
No family history	30 (81.08)	31 (83.78)	61 (82.43)			
Family history	7 (18.92)	6 (16.23)	13 (17.57)			
Diagnosed				.30	2	.86
Unstable Angina	9 (24.32)	11 (29.73)	20 (27.03)			
NSTEMI	21 (56.76)	20 (54.05)	41 (55.41)			
STEMI	7 (18.92)	6 (16.22)	13 (17.57)			
EKG				4.79	5	.44
ST depress	8 (21.62)	4 (10.81)	12 (16.22)			
ST elevate	6 (16.22)	5 (13.51)	11 (14.86)			
Non specific	11 (29.73)	8 (21.62)	19 (25.68)			
T- wave invert	2 (5.41)	2 (5.41)	4 (5.41)			
2 types	9 (24.32)	14 (37.84)	23 (31.08)			
3 types	1 (2.70)	4 (10.81)	5 (6.76)			
BMI (kg/m2)				.95	1	.33
$\leq$ 25	26 (70.27)	22 (59.46)	48 (64.86)			
> 25	11 (29.73)	15 (40.54)	26 (35.14)			
Troponin T				2.73	2	.26
Negative	19 (51.35)	12 (32.43)	31 (41.89)			
Positive	7 (18.92)	10 (27.03)	17 (22.97)			
Not examination	11 (29.73)	15 (40.54)	26 (35.14)			
CPK				2.09	2	.35
Normal	5 (13.51)	10 (27.03)	15 (20.27)			
Abnormal	7 (18.92)	6 (16.22)	13 (17.57)			
Not examination	25 (67.57)	21 (56.76)	46 (62.12)			
CK-MB				.10	2	.95
Normal	12 (32.43)	11 (29.73)	23 (31.08)			
Abnormal	17 (45.95)	17 (45.95)	34 (45.95)			
Not examination	8 (21.62)	9 (24.32)	17 (22.97)			
Symptoms				12.81	6	.05
Chest pain	35 (94.59)	34 (91.89)	69 (93.24)			
Dyspnea	24 (64.86)	17 (45.95)	41 (55.41)			
Refer pain	7 (18.92)	15 (40.54)	22 (29.73)			
Sweating	6 (16.22)	11 (29.73)	17 (22.97)			
Stomach pain	9 (24.32)	5 (13.51)	14 (18.92)			
Nausea/Vomitting	3 (8.11)	7 (18.92)	10 (13.51)			
Fainting	-	5 (13.51)	5 (6.76)			

Table 1. Personal characteristics of the experimental and control groups. (continued)

Personal characteristics	Experimental group N=37	Control group N=37	Total N=74	χ^2	df	p
	Number (%)	Number (%)	Number (%)			
Comorbidity				3.05	4	.55
Hypertension	27(72.97)	25 (67.57)	52 (70.27)			
Dyslipidemia	15 (40.54)	12 (32.43)	27 (36.49)			
Diabetes Mellitus	9 (24.32)	12 (32.43)	21 (28.38)			
No History	8 (21.62)	10 (27.03)	18 (24.32)			
Others	11 (29.73)	5 (13.51)	16 (21.62)			

The independent *t*-test statistical is used to test the difference of personal data related to cardiac risk factors. The result shows that all of the personal data related to cardiac risk factors regarding weight, BMI, systolic, diastolic, cholesterol, triglyceride, HDL, LDL, and FBS are not significantly different between the experimental and control groups, showed in Table 2 as follows:

Table 2. The comparison of personal data related to the cardiac risk factors between experimental and control groups.

Personal data (units)	Experimental Group N=37		Control Group N=37		t	df	p-value
	$\overline{x}$	SD	$\overline{x}$	SD			
Weight (kg)	59.96	11.80	61.97	9.99	-.79	72	.43
BMI (kg/m2)	22.81	4.19	23.96	3.25	-1.39	72	.17
Systolic (mmHg)	140.50	21.14	142.22	22.03	-.43	72	.67
Diastolic(mmHg)	80.73	11.96	83.97	15.03	-1.03	68.55	.31
Cholesterol(mg/dl)	252.11	48.82	239.70	42.39	1.17	72	.25
Triglyceride (mg/dl)	222.54	85.18	203.08	65.06	1.10	72	.27
HDL (mg/dl)	40.46	9.73	37.49	8.19	.14	72	.16
LDL (mg/dl)	177.89	43.30	176.49	48.45	.13	72	.90
FBS (mg%)	137.35	63.88	123.14	40.39	1.14	60.82	.26

The comparison of the overall and each domain of HRQOL between the experimental and control groups at pretest and posttest were tested by independent *t*-test statistical. The result shows that the overall HRQOL, health and functioning domain, social and economic domain, psychological and spiritual domain, and family domain scores are not significantly different between the experimental and control groups at pretest. In contrast, the overall and all of those domains are significantly different between the experimental and control groups at posttest (*p*<.05). The mean scores of the overall and each domain of HRQOL are higher than the mean scores of the control group at the posttest; shown in Table 3 as follows:

In addition, to confirm the effectiveness of the CCNP, comparing the percentage of change in the overall and each domain of HRQOL between the experimental and control groups was performed by using independent *t*-test. The result shows that the percentage of change in the overall and all domains of the experimental group are significantly higher than the control group (*p* <.05). The percentage of change in the overall, health and functioning domain, social and economic domain, psychological and spiritual domain, and family domain of the experimental group are 28.70%, 38.59%, 21.06%, 27.48%, and 21.53% respectively; whereas the control group are 1.09%, .96%, 2.39%, .95%, and .60%, respectively. They are shown in Figure 2 as follows:

Table 3. The comparison of the overall and each domain of health related quality of life between the experimental and control groups at pretest and posttest.

Health related quality of life (HRQOL)	Experimental group N=37 $\overline{x}$ (SD)	Control group N=37 $\overline{x}$ (SD)	Total N=74 $\overline{x}$ (SD)	t (df)	p-value
Pretest					
Overall HRQOL	18.24(2.75)	18.22(2.05)	18.23(2.41)	.036(72)	.972
Health and functioning domain	16.46(2.97)	16.30(2.42)	16.38(2.69)	.254(72)	.800
Social and economic domain	22.40(2.98)	22.57(2.37)	22.49(2.67)	-.274(72)	.785
Psychological/spiritual domain	17.05(3.98)	17.35(2.55)	17.20(3.32)	-.378(61.29)	.707
Family domain	18.57(3.33)	18.22(1.82)	18.39(2.67)	.563(55.79)	.575
Posttest					
Overall HRQOL	23.21(1.89)	18.37(1.68)	20.79(3.01)	11.637(72)	.000
Health and functioning domain	22.37(1.74)	16.39(2.03)	19.38(3.55)	13.619(72)	.000
Social and economic domain	26.83(1.97)	23.01(1.79)	24.92(2.68)	8.732(72)	.000
Psychological/spiritual domain	21.18(3.48)	17.53(2.80)	19.35(3.64)	4.970(72)	.000
Family domain	22.29(2.28)	18.07(1.56)	20.18(2.88)	9.315(63.75)	.000
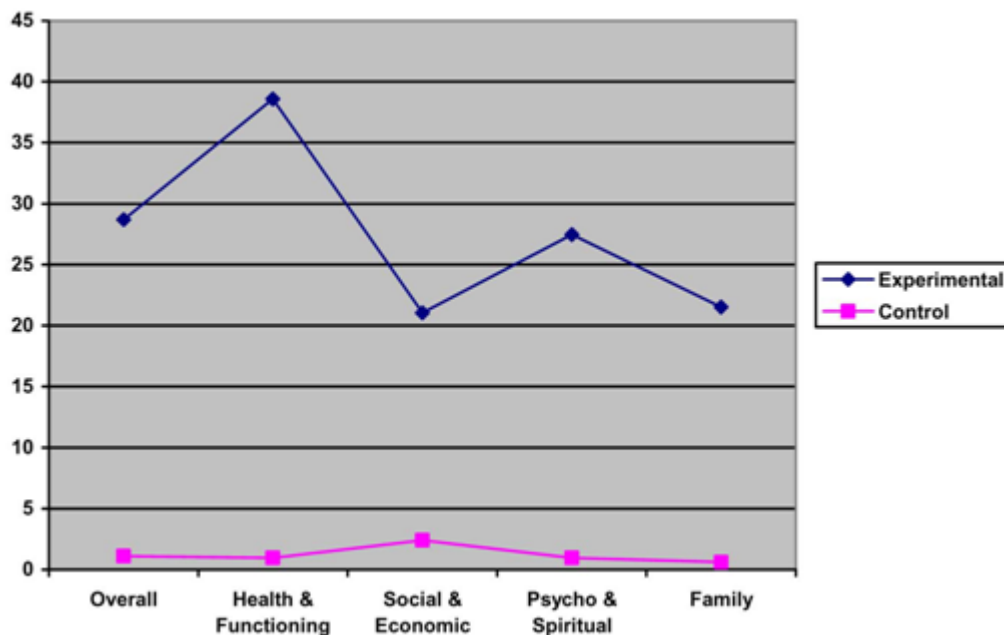
Figure 2. The comparison of the percentage of change in the overall and each domain of the health related quality of life between the experimental and control group.

Discussion

The result shows that the CCNP was effective in improving HRQOL in patient with initially diagnosed CHD. The HRQOL scores and the percentage of change in the overall and all domains of health and functioning, social and economic, psycho and spiritual, and family of the participants who received the CCNP in the experimental group had significantly higher than those who received only the usual care in the control group (p <.05).

The result of this study is similar to that of Yu et al., [42] Hofer et al., [43] Keawcharenta, [47] Methajan, [48] Lewin, [70] Koertge et al., [71] Aldana et al., [72] Pischke et al., and [73] Frattaroli et al. [74] All, as previously mentioned, emphasized that cardiac rehabilitation program has been shown to improve the HRQOL in CHD patients, CHD patients who received coronary angioplasty, newly diagnosed angina, CHD patients who received medication, patients with recent myocardial infarction, and chronic cardiac pain patients.

The result of this study is also related to many studies that were conducted by the meta-analysis method of Senivong na Ayudthaya. [75] She found that cardiac rehabilitation had significantly improved the patient's HRQOL. In addition, the result of this study is also related to other studies on self-management programs in asthma, diabetes, and arthritis patients. [59]

Efficacy of the CCNP based on self-management model encompassed the ability of the participants to perform and manage their risky health behaviors by using self-monitoring, self-evaluation, and self-reinforcement process. [56] All these activities significantly affected the cognitive, behavioral and emotional responses necessary to maintain satisfactory quality of life. [76]

The CCNP was provided to the participants with multi components by mutual accompanied activities between participants and nurses. The multi-components of this program include physiological, psychological, social and spiritual. All these are significantly related to the domain of HRQOL and reflect holistic nursing care that are related to the study of Bodenheimer *et al*.; [51] Fernandez *et al*.; [52] and Yusuf *et al*. [53] They mentioned that self-management interventions supported patients to live up to the best possible HRQOL in spite of their chronic health condition.

The CCNP well supported the participants to have sufficient knowledge of CHD and able to manage their risky health behaviors in real life. This is related to self-management concept as a necessary method for maintaining and improving patients' health behaviors and health status.[54]

Moreover, the CCNP based on self-manage-ment model was promoted the participants to perceive the significance of management of risky health behaviors, regarding diet, physical activity and exercise, stress, and smoking cessation. The patients who accept their goals as desirable are motivated toward their achievement. The literature review supported that risky health behaviors were correlated with low HRQOL. [1, 20, 77-78] When the participants accomplished their goals in the management of risky health behaviors, it significantly improved their HRQOL. [15] In addition, the family's members who cooperated in this program have been the most significant factors for the improvement of HRQOL of the patients initially diagnosed with CHD. This finding is in congruence with the study of Shen *et al*. [79] who found social support independently related to higher HRQOL.

Developing an effective cardiac rehabilitation program for improving HRQOL as CCNP since the initial diagnosis of CHD is necessary. [17, 34, 80- 81] Due to improving HRQOL is the best way to prevent further health deterioration, reduce the incidence of subsequent myocardial infarction, decrease the need for surgical procedures, and reduce readmission, morbidity and mortality. [17, 34, 80- 81] In addition, it is also representing the quality of nursing care, and the best way to decrease the cost of care of these patients.[72, 82] The results of this study show that the effectiveness of the CCNP on HRQOL in patients with first diagnosed CHD. Then, this program should be implemented as a guideline for nursing practices or used as an administration to provide direction for policy making.

The CCNP was developed for the patients in the secondary healthcare settings. It might be limitation for the patients at other settings. Another limitation is the CCNP implementation is time-consuming intervention. However, it is very interesting and challenging. Future research should examine the long-term effects of the CCNP, and develop self-management intervention similar to CCNP for patients who are initially diagnosed with others chronic illness.

Conclusion

The CCNP provides holistic care, and promotes the participants' management of risky health behaviors which significantly improves the HRQOL in patients who are initially diagnosed with CHD.

References

1. Deaton C, Namasivayam S. Nursing outcomes in coronary heart disease. J Cardiovasc Nurs 2004 Sep; 19(5):308-15

2. Fitzsimons D, Parahoo K, Stringer M. Waiting for coronary artery bypass surgery: A qualitative analysis. J Adv Nurs 2000 Nov; 32(5): 1243-52

3. Lukkarinen H. Life course of people with coronary artery disease. J Clin Nurs 1999 Nov; 8(6): 701-11

4. Rubenach S, Shadbolt B, McCallum J, Nakamura T. Assessing health-related quality of life following myocardial infarction: Is the SF-12 useful? J Clin Epidemiol 2002 Mar; 55(3): 306-9

5. Mosca L, Banka CL, Benjamin EJ, Berra K, Bushnell C, Dolor RJ, Ganiats TG, Gomes AS, Gornik HL, Gracia C, et al. Evidence-based guidelines for CVD prevention in women: 2007 update. Circulation 2007 Mar; 115(11): 1481-501

6. Bureau of Policy and Strategies, Ministry of Public Health. Thailand Public Health 2006-2007: Highlight and analysis of Thailand's health statistics (8th ed.). Nonthaburi: Alpha research, 2007: 35-159

7. Beck CA, Joseph L, Belisle P, Pilote L. QOLAMI investigators: Predictors of quality of life 6 months and 1 year after acute myocardial infarction. Am Heart J 2001 Aug; 142(2): 271-9

8. Brink E, Karlson BW, Hallberg, LM. Health experiences of first-time myocardial infarction: Factors influencing women's and men's health-related quality of life after five months. Psychology, Health & Medicine, 2002 Feb; 7(1): 5-16

9. Brink E, Grankvist G, Karlson BW, Lillemor R-M, Hallberg LR. Health-related quality of life in women and men one year after acute myocardial infarction. Qual Life Res 2005; 14(3):749-57

10. Boini S, Briancon S, Guillemin F, Galan P, Hercberg S. Occurrence of coronary artery disease has an adverse impact on health-related quality of life: A longitudinal controlled study. Int J Cardiol 2006 Nov; 113(2):215-22

11. Lukkarinen H. Life course of people with coronary artery disease. J Clin Nurs 1999 Nov; 8(6): 701-11

12. Mendes de Leon CF, Krumholz HM, Vaccarino V, Williams CS, Glass TA, Berkman LF, Kas SV. A population based perspectives of change in health related quality of life after myocardial infarction in older men and woman. J Clin Epidemiol 1998 Jul; 51(7): 609-16

13. Plevier CM, Mooy JM, Marang-Van de Mheen PJ, Stouthard ME, Visser MC, Grobbee DE, Gunning-Schepers LJ. Persistent impaired

functioning in survivors of a myocardial infarction? Qual Life Res 2001; 10(2):123-32

14. Worcester CM, Murphy BM, Elliott PC, Grande ML, Higgins RO, Goble AJ, Roberts SB. Trajectories of recovery of quality of life in women after an acute cardiac event. Br J Health Psychol 2007; 12(1):1–15

15. Ferrans CE, Zerwic JJ, Wilbur JE, Larson JL. Conceptual model of health related quality of life. J Nurs Scholarsh 2005; 37(4):336-42

16. Benzer B, Hofer S, Oldridge N. Health related quality of life in patients with coronary artery disease after different treatments for angina in routine clinical practice. Herz 2003 Aug; 28(5):421-8

17. Daly J, Elliott D, Cameron-Traub E, Salamonson Y, Davidson PM, Jackson D, Chin C, Wade V. Health status, perceptions of coping, and social support immediately after discharge of survivors of acute myocardial infarction. Am J Crit Care 2000; 9(1):62–9

18. Kristofferzon ML, Löfmark R, Carlsson M. Coping, social support and quality of life overtime after myocardial infarction. J Adv Nurs 2005 Oct; 52(2):113-24

19. Lukkarinen H. Methodological triangulation showed the poorest quality of life in the youngest people following treatment of coronary artery disease: a longitudinal study. Int J Nurs Stud 2005 Aug; 42(6):619-27

20. Lukkarinen H, Hentinen M. Assessment of quality of life with the Nottingham Health Profile among women with coronary artery disease. Heart Lung 1998 May; 27(3):189-99

21. Leingkobkij S. Quality of life of patients with coronary artery disease. Master's Thesis of Public Health, Faculty of Graduate Studies, Mahidol University, 1999

22. Lortajakul C. The Development of the quality of life instrument in Thai patients with post myocardial infarction. Doctoral's dissertation of Nursing Science, Faculty of Nursing, Chulalongkorn University, 2006

23. Chan DK, Chau JC, Chang AM. Acute coronary syndromes: Cardiac rehabilitation programs and quality of life. J Adv Nurs 2005 Mar; 49(6): 591-9

24. Bengtsson I, Hagman M, Wedel H. Age and angina as predictors of quality of life after myocardial infarction: A perspective comparative study. Scan Cardiovasc J 2001; 35(4):252-8

25. Brink E, Karlson BW, Hallberg, LM. Readjustment 5 months after a first-time myocardial infarction: Reorienting the active self. J Adv Nurs 2006 Feb; 53(4):403-11

26. Drory Y, Kravetz S, Hirschberger G, Israeli Study Group on First Acute Myocardial Infarction. Long-term mental health of men after a first acute myocardial infarction. Arch Phys Med Rehabil 2002 Mar; 83(3):352-9

27. Westin L, Carlsson R, Israelsson B, Willenheimer R, Cline C, McNeil TF. Quality of life in patients with ischemic heart disease: A prospective controlled study. J Intern Med 1997 Sep; 242(3):239-47

28. Pothipan L. Risk factor prevalence, risk status, and perceived risk for heart disease among Thai elderly. J of Thai Nurse Ass 2000; 27(2): 16-28

29. Rozanski A, Blumenthal JA, Kaplan J. Impact of psychological factors on the pathogenesis of cardiovascular disease and implications for therapy. Circulation 1999 Apr 27; 99(16): 2192-217

30. Thumatisthan S. The study of health behaviors in patients with coronary heart disease: A case study at Vachira Phuket hospital. Master's Thesis of Nursing Science (Adult Nursing), Faculty of Graduate Studies, Mahidol University, 2000

31. Keinwong T. Lifestyle of coronary artery disease patients in Thailand. Master thesis of Science (Health Education), Srinakharinwirot University, 2004

32. Chuprapawan J. Health status of Thai population. Bangkok: Usa publication, 2000

33. Pongkeaw A. The study of health behaviors of female with coronary heart disease in Bangkok. Master's Thesis of Nursing Science (Adult Nursing), Faculty of Graduate Studies, Mahidol University, 1997

34. Changperk C. The effects of transitional care on health perception and health behaviors in coronary artery disease patients. Master's Thesis of Nursing Science (Adult Nursing), Faculty of graduate studies, Mahidol University, 2001

35. Sriprasong S. A study of the level of activity during the first six weeks after discharge of patients with acute myocardial infarction. Master's Thesis of Nursing Science (Adult Nursing), Faculty of Graduate Studies, Mahidol University, 2000

36. Wongmaneewan B, Twichsri C, Pathummanont C. Tobacco smoking behavior in myocardial infarction patients [online] 2003. Available April 20, 2007, from: http//www.lph.go.th/ha/research_sub3.htm

37. Dixon T, Lim, LY, Powell H, Fisher JD. Psychological experiences of cardiac patients in early recovery: A community-based study. J Adv Nurs 2000 Jun; 31(6): 1368-75

38. Stewart M, Davidson K, Meade D, Hirth A, Makrides L. Myocardial infarction survivors' and spouses' stress, coping, and support. J Adv Nurs 2000 Jun; 31(6):1351-60

39. Schwartz CE, Sprangers MG. Adaptation to changing health: Response shift in quality-of-life research. Washington: American Psychological Association, 2000

40. Campbell NC, Thain J, Deans HG, Ritchie LD, Rawles JM, Squair JI. Secondary prevention clinics for coronary heart disease: Randomized trial of effect on health. BMJ 1998 May 9; 316(7142):1434–7

41. Warrington D, Cholowski K, Peters D. Effectiveness of home-based cardiac rehabilitation for special needs patients. J Adv Nurs 2003 Jan; 41(2):121–9

42. Yu C, Lau C, Chau J, McGhee S, Kong S, Cheung BM, Li LS. A short course of cardiac rehabilitation program is highly cost effective in improving long term quality of life in patients with recent myocardial infarction or percutaneous coronary intervention. Arch Phys Med Rehabil 2004 Dec; 85(12):1915-22

43. Höfer S, Kullich W, Graninger U, Brandt D,

Gassner A, Klicpera M, Laimer H, Marko C, Schwann H, Muller R. Cardiac rehabilitation in Austria: Short term quality of life improvements in patients with heart disease. The Middle European Journal of Medicine 2006 Dec; 118(23-24):744-53

44. Hawkes A, Nowak M, Speare R. Short form-36 survey as an evaluation tool for cardiac rehabilitation programs: Is it appropriate. Cardiopulm Rehabili 2003 Jan; 23(1):22–5

45. Mendes de Leon CF, Czajkowski SM, Freedland KE, Bang H, Powell LH, Wu C, Burg MM, DiLillo V, Ironson G, Krumholz HM, et al. The effect of a psychosocial intervention and quality of life after acute myocardial infarction: The enhancing recovery in coronary heart disease (ENRICHD) clinical trial. Cardiopulm Rehabil 2006 Jan; 26(1): 9-13

46. Tingstrьm PR, Kamwendo K, Bergdahl B. Effects of a problem-based learning rehabilitation program on quality of life in patients with coronary artery disease. Eur J Cardiovasc Nurs 2005 Dec; 4(4):324-30

47. Keawcharenta P. Effects of home cardiac rehabilitation on peak oxygen uptake and quality of life among persons with coronary artery disease. Master's Thesis of Nursing Science (Medical-Surgical Nursing), Graduate School, Chiangmai University, 2004

48. Methajan N. Effects of cardiac rehabilitation program on maximum oxygen uptake and quality of life among patients undergone coronary angioplasty. Master's Thesis of Nursing Sciences (Medical-Surgical Nursing), Graduate School, Chiangmai University, 2001

49. Saengsiri A. The effects of a self-care promotion program on quality of life and reduction of risk factors of coronary heart disease patients. Master's Thesis of Nursing Science (Adult Nursing), Graduate School, Mahidol University, 2003

50. Maraprasertsak M. Acute Coronary Syndrome in Phrae Hospital. Thai heart journal 2006; 19(3): 96-104

51. Bodenheimer T, Lorig K, Holman H, Grumbach K. Patient self-management of chronic disease in primary care. JAMA 2002 Nov; 288(19): 2469-75

52. Fernandez RS, Davidson P, Griffiths R, Juergens C, Salamonson Y. Development of a health-related lifestyle self-management intervention for patients with coronary heart disease. Heart & Lung 2009 Nov; 38(6): 491-7

53. Yusuf S, Hawken S, Ounpuu S, Dans T, Avezum A., Lanas F, et al. (2004). Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): Case-control study. Lancet, 364, 937–52

54. Dongbo F, Hua F, McGowan P, Yi-e S, Lizhen Z, Huiqin Y, Jianguo M, Shitai Z, Yongming D, Zhihua W. Implementation and quantitative evaluation of chronic disease self-management programme in Shanghai, China: randomized controlled trial. Bull World Health Organ 2003; 81(33): 174-82

55. Creer TL. Self-management and the control of chronic pediatric illness. In: Drotar D. (Ed.), Promoting adherence to medical treatment in

chronic childhood illness: Concepts, methods, and interventions. NJ: Erlbaum, 2000: 95–129

56. Kanfer FH, Goldstein AP. Helping people change: a textbook of methods (4th, Eds) Boston: Allyn band Bacon, 1991

57. Lorig KR, Sobel DS, Stewart AL, Brown BW Jr, Bandura A, Ritter P, Gonzalez VM, Laurent DD, Holman HR. Evidences suggesting that a chronic disease self-management program can improve health status while reducing hospitalization: A randomized trial. Med Care 1999 Jan; 37(1):5-14

58. Barlow J, Wright C, Sheasby J, Turner A, Hainsworth J. Self-management approaches for people with chronic conditions: A review. Patient Educ Couns 2002 Oct -Nov; 48(2): 177-87

59. Newman S, Steed L, Mulligan K. Self-management interventions for chronic illness. Lancet 2004 Oct 23-29; 364(9444):1523-37

60. Norris SL, Engelgau MM, Narayan KM. Effectiveness of self-management training in type 2 diabetes. Diabetes Care 2001 Mar; 24(3):561-87

61. Christian AH, Cheema AF, Smith SC, Mosca L. Predictors of quality of life among women with coronary heart disease. Qual Life Res 2007 Apr; 16(3):363-73

62. Fauerbach JA, Bush DE, Thombs BD, McCann UD, Fogel J, Ziegelstein RC. Depression following acute myocardial infarction: A prospective relationship with ongoing health and function. Psychosomatics 2005 Aug; 46(4): 355- 61

63. Seki E, Watanabe Y, Sunayama S, Iwama Y, Shimada K, Kawakami K, Sato M, Sato H, Mokuno H, Daida H. Effects of phase III cardiac rehabilitation programs on health-related quality of life in elderly patients with coronary artery disease: Juntendo cardiac rehabilitation program (J-CARP). Circ J 2003 Jan; 67(1):73-7

64. Friedman LM, Furberg AC, DeMets DL. Fundamental of clinical trial. NewYork: Springer-Verlag, 1998

65. Vickers AJ. How to randomize. J Soc Integr Oncol 2006; 4(4): 194–8

66. Cohen J. Statistical power analysis for the behavioral sciences (2nded). Hilsdale: Lawrence Eribaum, 1988

67. Shadish WR, Cook TD, Campbell DT. Experimental and quasi-experimental designs for generalized causal inference. Boston, MA: Houghton Mifflin, 2002

68. Ferrans CE, Powers MJ. Quality of life index cardiac version-IV [online] 1998. Available April 20, 2007, from http://uic.edu/orgs/qli/questionatres/pdf/cardiacversionIV

69. Berns N, Grove SK. The practice of nursing research: Conduct, critique, & utilization (5thed.). St. Louis: Elsevier Saunders, 2005

70. Lewin RJP, Furze G, Robinson J, Griffith K, Wiseman S, Pye M, Boyle R. A randomized controlled trial of a self-management plan for patients with newly diagnosed angina. Br J Gen Pract 2002 March; 52(476): 194-201

71. Koertge J, Weidner G, Elliott-Eller M, Scherwitz L, Merritt-Worden TA, Marlin R, Lipsenthal L,

Guarneri M, Finkel R, Saunder DE et al. Improvement in medical risk factors and quality of life women and men with coronary artery disease in the multicenter lifestyle demonstration project. Am J Cardiol 2003 Jun; 91(11): 1316-22

72. Aldana SG, Whitmer WR, Greenlaw R, Avins AL, Thomas D, Salberg A, Greenwell A, Lipsenthal L, Fellingham GW. Effect of intense lifestyle modification and cardiac rehabilitation on psychosocial cardiovascular disease risk factors and quality of life. Behav Modif 2006 Jul; 30(4):507-25

73. Pischke CR, Weidner G, Elliott-Eller M, Scherwitz L, Merritt-Worden TA, Marlin R, Lipsenthal L, Finkel R, Saunders D, McCormac P, et al. Comparison of coronary risk factors and quality of life in coronary artery disease patients with versus without diabetes mellitus. Am J Cardiol 2006 May; 97(9): 1267-73

74. Frattaroli J, Weidner G, Merritt-Worden TA, Frenda S, Ornish D. Angina pectoris and atherosclerotic risk factors in the multisite cardiac lifestyle intervention program. Am J Cardiol 2008; 101(7):911–8

75. Senevong na ayudhaya S. The effect of nursing interventions on health outcomes of patients with heart disease: A meta-analysis. Master's Thesis of Nursing Science, Faculty of Nursing, Chulalongkorn University, 2004

76. Clark NM, Becker MH, Janz NK, Lorig K, Rakowski W, Anderson L. Self-management of chronic disease by older adults: A

review and questions for research. J aging Health Feb 1991; 3(1): 3-27

77. Jamieson M, Wilcox S, Webster W, Blackhurst D, Valois RF, Durstine JL. Factors influencing health related quality of life in cardiac rehabilitation patients. Prog Cardiovasc Nurs 2002 Summer; 17(3):124-31

78. Oldridge N, Gottlieb M, Guyatt G, Jones N, Streiner D, Feeny D. Predictors of health-related quality of life with cardiac rehabilitation after acute myocardial infarction. J Cardiopulm Rehabil 1998 Mar-Apr; 18(2): 95-103

79. Shen BJ, Myers HF, McCreary CP. Psychosocial predictors of cardiac rehabilitation quality-of-life outcomes. J Psychosom Res 2006 Jan; 60(1):3-11

80. Boini S, Briançon S, Guillemin F, Galan P, Hercberg S. Occurrence of coronary artery disease has an adverse impact on health-related quality of life: A longitudinal controlled study. Int J Cardiol 2006 Nov 10; 113(2): 215-22

81. Fox KF, Nuttall M, Wood DA, Wright M, Arora B, Dawson E, Devane P, Stock K, Sutcliffe S, Brown K. A cardiac prevention and rehabilitation program for all patients at first presentation with coronary artery disease. Heart 2001 May; 85(5): 533–8

82. Berra K. The effect of lifestyle interventions on quality of life and patient satisfaction with health and health care. J Cardiovasc Nurs 2003 Sep-Oct; 18(4):319-25