

**ADHERENCE TO SELF-CARE REQUIREMENTS MODEL:
AN EMPIRICAL TEST AMONG PATIENTS WITH
CORONARY ARTERY DISEASE**



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CORONARY ARTERY DISEASE**

Kusuma Khuwatsamrit

Ms. Kusuma Khuwatsamrit,
Candidate

Somchit Hanucharurnkul

Prof. Somchit Hanucharurnkul, Ph.D.
Major-Advisor

Orasa Panpakdee

Assoc.Prof. Orasa Panpakdee, D.N.S.
Co-Advisor

Deborah A. Chyun

Assoc.Prof. Deborah A. Chyun, Ph.D.
Co-Advisor

Supachai

Tanomsup

Assoc.Prof. Supachai Tanomsup, MD.,
FRCPC., FSGC., FSCAI.
Co-Advisor

Chukiat Viwatwongkasem

Assoc.Prof. Chukiat Viwatwongkasem,
Ph.D.
Co-Advisor

Jisnuson Svasti

Prof. M.R. Jisnuson Svasti, Ph.D.
Dean
Faculty of Graduate Studies

Kobkul Phanchaoenworakul

Assoc.Prof. Kobkul Phanchaoenworakul,
Ph.D.
Chair
Doctor of Philosophy Program in Nursing
Faculty of Nursing

Thesis

Entitled

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on
January 27, 2006

Kusuma Khuwatsamrit

Ms. Kusuma Khuwatsamrit,
Candidate

Orasa Panpakdee

Assoc.Prof. Orasa Panpakdee, D.N.S.
Member

Somchit Hanucharurnkul

Prof. Somchit Hanucharurnkul, Ph.D.
Chair

Wanapa Sritanyarat

Asst.Prof. Wanapa Sritanyarat, Ph.D.
Member

Deborah A. Chyun

Assoc.Prof. Deborah A. Chyun, Ph.D.
Member

Saipin Kasemkitvatana

Assoc.Prof. Saipin Kasemkitvatana,
DNS.
Member

Chukiat Viwatwongkasem

Assoc.Prof. Chukiat Viwatwongkasem,
Ph.D.
Member

Supachai Tanomsup

Assoc.Prof. Supachai Tanomsup,
MD.,FRCPC.,FSGC.,FSCAI.
Member

Rajata Rajatanavin

Prof. Rajata Rajatanavin, MD, FACC.
Dean
Faculty of Medicine, Ramathibodi Hospital
Mahidol University

M.R. Jisnusun Svasti

Prof. M.R. Jisnusun Svasti, Ph.D.
Dean
Faculty of Graduate Studies
Mahidol University

Kobkul Phanchaoenworakul

Assoc.Prof. Kobkul Phanchaoenworakul,
Ph.D.
Dean
Faculty of Nursing
Mahidol University

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Kusuma Khuwatsamrit

ADHERENCE TO SELF-CARE REQUIREMENTS MODEL: AN EMPIRICAL TEST AMONG PATIENTS WITH CORONARY ARTERY DISEASE**KUSUMA KHUWATSAMRIT 4437590 NRNS/D****Ph.D. (Nursing)****THESIS ADVISORS: SOMCHIT HANUCHARURNKUL, Ph.D.,
DEBORAH CHYUN, Ph.D., ORASA PANPAKDEE, D.N.S.,
SUPACHAI TANOMSUP, M.D., CHUKIAT VIWATWONGKASEM, Ph.D.****ABSTRACT**

Coronary artery disease (CAD) is one of the leading causes of sudden cardiac arrest and death worldwide, including Thailand. People with CAD are affected by various symptoms and complications. The ability to perform self-care is important. Self-care demands adherence to self-care requirements, self efficacy, and knowledge. In addition, other factors including social support and previous experience may also influence self-care ability. The purposes of this study were to examine the causal relationship among previous experience, social support, knowledge, self-efficacy, and adherence to self care requirements in persons with CAD. Orem's self-care deficit theory and Bandura's self-efficacy theory provided the theoretical framework of this study.

Two hundred and eighty five subjects with CAD who attended a follow up visit at Ramathibodi Hospital's out-patient department were involved. Self-report questionnaires, which included Personal Information, Adherence to Self-Care Requirements, Self-efficacy, Knowledge, and a Social Support Questionnaire were completed by the subjects at home and mailed back to the researcher. Over 80% of the questionnaires were returned. Data were analyzed by using SPSS 11.5 and LISREL 8.52.

The results demonstrated that seventy percent ($R^2 = .70$) of the total variance in adherence to self care requirements was explained by the proposed model. The causal relationship among five majors variables were tested and the final model fitted with the data ($\chi^2 = 199.52$, $df = 176$, $p = 0.108$, $RMSEA = 0.022$, $GFI = 0.94$, $AGFI = 0.92$, $\chi^2/df = 1.133$). Self-efficacy had a positive direct effect on adherence to self care requirements ($\beta = 0.72$, $p < .001$). Social support had a positive direct effect on self-efficacy ($\gamma = 0.41$, $p < 0.001$) and positive indirect effect on adherence to self care requirements ($\gamma = 0.12$, $p < 0.001$). In addition, previous experience had a direct effect on knowledge ($\gamma = 0.71$, $p < 0.05$).

These findings indicate that the proposed model provides a guideline for explaining and predicting adherence to self care requirements. Health care providers have to recognize factors including previous experience, social support, knowledge, and self efficacy, all of which influence adherence to self care requirements in persons with CAD. Longitudinal study and experimental study are recommended for further study.

**KEY WORDS: ADHERENCE TO SELF-CARE REQUIREMENTS/
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รูปแบบความสม่ำเสมอในการดูแลตนเอง: การทดสอบเชิงประจักษ์ในผู้ป่วยโรคหลอดเลือดหัวใจ
(ADHERENCE TO SELF-CARE REQUIREMENTS MODEL: AN EMPIRICAL
TEST AMONG PATIENTS WITH CORONARY ARTERY DISEASE)

กุสุมา คุววัฒนสัมฤทธิ์ 4437590 NRNS/ D

ปร.ด. (การพยาบาล)

คณะกรรมการควบคุมวิทยานิพนธ์: สมจิต หนูเจริญกุล, Ph.D., Deborah Chyun, Ph.D.,
อรสา พันธักกิติ, D.N.S., สุภชัย ถนอมทรัพย์, M.D., ชูเกียรติ วิวัฒนวงศ์เกษม, Ph.D.

บทคัดย่อ

โรคหลอดเลือดหัวใจเป็นสาเหตุการตายอย่างกะทันหันในระดับโลก รวมทั้งประเทศไทย ผู้ป่วยโรคหลอดเลือดหัวใจได้รับผลกระทบจากอาการและภาวะแทรกซ้อนของโรค ความสามารถในการดูแลตนเองจึงมีความสำคัญ ทฤษฎีการดูแลตนเองของโอเร็ม และทฤษฎีการรับรู้สมรรถนะแห่งตนของแบนดราใช้เป็นกรอบแนวคิดในการศึกษา โดยมีวัตถุประสงค์เพื่อทดสอบความสัมพันธ์เชิงสาเหตุระหว่างตัวแปร การรับรู้สมรรถนะแห่งตน ความรู้เกี่ยวกับโรคหลอดเลือดหัวใจ การรับรู้แรงสนับสนุนทางสังคม และประสบการณ์ในอดีต ที่มีผลต่อความสม่ำเสมอในการดูแลตนเอง

กลุ่มตัวอย่างเป็นผู้ป่วยโรคหลอดเลือดหัวใจจำนวน 285 คน ที่มารับการรักษาที่แผนกผู้ป่วยนอกอายุรกรรม โรงพยาบาลรามารินทร์ และมีคุณสมบัติครบตามเกณฑ์ที่กำหนดของการศึกษารั้งนี้ ผู้ป่วยที่เข้าร่วมในการศึกษาจะได้รับแบบสอบถามข้อมูลส่วนบุคคล แบบสอบถามความสม่ำเสมอในการดูแลตนเอง แบบสอบถามการรับรู้สมรรถนะแห่งตน แบบสอบถามความรู้เกี่ยวกับโรคหลอดเลือดหัวใจ แบบสอบถามการรับรู้แรงสนับสนุนทางสังคม และซองติดแสตมป์ที่เจ้าหน้าที่ซองถึงผู้วิจัยเพื่อนำแบบสอบถามที่ตอบเสร็จส่งคืนมายังผู้วิจัย

การศึกษานี้วิเคราะห์ข้อมูลด้วยโปรแกรม SPSS 11.5 และโปรแกรมลิสเรล 8.52 ผลการศึกษาพบว่า การรับรู้สมรรถนะแห่งตน ความรู้เกี่ยวกับโรคหลอดเลือดหัวใจ การรับรู้แรงสนับสนุนทางสังคม และประสบการณ์ในอดีต สามารถทำนายความแปรปรวนของความสม่ำเสมอในการดูแลตนเองได้ 70% รูปแบบสุดท้ายที่ได้รับการปรับแก้ มีความสอดคล้องกับข้อมูลเชิงประจักษ์ ($\chi^2 = 199.52$, $df = 176$, $p = 0.108$, $RMSEA = 0.022$, $GFI = 0.94$, $AGFI = 0.92$, $\chi^2/df = 1.133$) การรับรู้สมรรถนะแห่งตนมีอิทธิพลโดยตรงทางบวกต่อความสม่ำเสมอในการดูแลตนเอง ($\beta = 0.72$, $p < .001$) การรับรู้แรงสนับสนุนทางสังคมมีอิทธิพลโดยตรงทางบวกต่อการรับรู้สมรรถนะแห่งตน ($\gamma = 0.41$, $p < 0.001$) และมีอิทธิพลโดยอ้อมทางบวกต่อความสม่ำเสมอในการดูแลตนเอง ($\gamma = 0.12$, $p < 0.001$) นอกจากนี้ ประสบการณ์ในอดีตมีอิทธิพลโดยตรงทางบวกต่อความรู้เกี่ยวกับโรคหลอดเลือดหัวใจ ($\gamma = 0.71$, $p < 0.05$)

ผลการศึกษาแสดงให้เห็นว่า การรับรู้สมรรถนะแห่งตน ความรู้เกี่ยวกับโรคหลอดเลือดหัวใจ การรับรู้แรงสนับสนุนทางสังคม และประสบการณ์ในอดีต สามารถอธิบายและทำนายความสม่ำเสมอในการดูแลตนเองของผู้ป่วยโรคหลอดเลือดหัวใจ บุคลากรทางสุขภาพควรตระหนักถึงปัจจัยที่มีผลต่อความสม่ำเสมอในการดูแลตนเอง การศึกษาระยะยาวและการศึกษาเชิงปฏิบัติการเป็นสิ่งจำเป็นในการศึกษาต่อไป

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CHAPTER I

INTRODUCTION

Background and Significance of the Problem

Coronary artery disease (CAD) is one of the leading cause of sudden cardiac arrest and death worldwide (American Heart Association (AHA), 2003). In 2002, the World Health Organization (WHO) reported that there were 7.1 million deaths from CAD globally. This figure will have risen to 11.1 million in 2020 (WHO, 2002). This is because economic transition, urbanization, industrialization, and globalization bring about lifestyle changes that promote heart disease, including in Thailand (AHA, n.d.). Although the mortality rate of CAD decreased during the last five years in Thailand, CAD is rated as the fourth cause of death following cancer, accident and poisonings, hypertension, and cerebrovascular disease (Public Health Statistics, 2004). Thus, CAD is still an important health problem in Thai populations.

CAD patients are at considerable risk of suffering further cardiac events. Persons with CAD may have a variety of the common clinical problems including: valvular heart disease, cardiomyopathy, angina pectoris, hypertensive heart disease, myocardial infarction, and heart failure (Livneh & Antonak, 1997). Patients have been impacted by these clinical problems with alterations in cardiac functioning. The alterations of cardiac functioning cause alteration in one's level of health and functional status. CAD can be viewed as both an acute and chronic condition. The nature of heart disease has a variety of symptoms. The goal of therapy for a chronic illness is generally not to cure the disease, but rather to alleviate its clinical problems, improve the patient's functional capabilities, and retard the progression of the underlying disease and improved quality of life (Wenger, Naughton & Furberg, 1996). Because CAD changes between acute and chronic episodes (Creer, 2000), rehospitalization and more costs are inevitable in the acute phase. To help patients with CAD maintain a stable chronic condition, health care providers should promote their self-care abilities.

The important considerations of CAD across the continuum of the disease are cardiac risk factor management. Cardiac risk factor management is an important component of self-care requirements in persons with CAD. Cardiac risk factors are categorized as non-modifiable and modifiable. Non-modifiable cardiac risk factors are sex, age, and family history of cardiovascular disease. Although they can not be changed, CAD may be controlled and alleviate the progress of their pathology by proper management of modifiable cardiac risk factors. In developed countries, the successful encouragement lifestyle modification to control cardiac risk factors has been revealed to decrease the prevalence of CAD and mortality rates and improve patient outcomes (AHA, n.d.).

Patients living with CAD are responsible for the majority of their own care. Their self-care requirements include taking medications as prescribed and modifying risk factors such as following a prescribed diet, engaging in an activity or exercise regimen, and quitting smoking. Failure of adherence to self-care requirements in patients with cardiac disease at any point influences a patients' health outcome (Sabate, 2003). In contrast, adherence to self-care requirements helps in effective prevention of cardiac problems during the course of illness (Burke, 2000). However, Rockwell and Riegel (2001) as well as Kyngas & Lahdenpera (1999) revealed that a person with a more severe disease may be more motivated to learn, engage in and adhere to self-care with the intention of preventing disease exacerbation, than a person with a mild disease who fails to see the importance of attending to self-care requirements. Therefore, it may be more difficult to teach self-care to someone in the early stages of a disease process. The challenge is to encourage patients to engage in self-care before they become more severely ill.

Adherence to self-care requirements is one aspect of self-care agency in Orem's perspective (Orem, 2001). It reflects the individuals' ability to perform specific actions. This agency is influenced by various basic conditioning factors such as previous experiences and perceived social support. Knowledge and perceived self-efficacy are individuals' capabilities which influence adherence to self-care requirements. Knowledge of self-care in patients with heart failure has a positive affect on patient's self-efficacy (Ni et al., 1999). They also found that there was a gap between patients receiving and absorbing or relating information on self-care for heart

failure supplied by health care providers and that a higher knowledge of self-care score in patients with heart failure was associated with prior hospitalization (Ni et al., 1999). In addition, other investigators illustrated that there was a significant relationship between knowledge and self-care in patients with heart failure (Artinian, Magnan, Sloan and Lange, 2002). Knowledge is one of the factors to facilitate adherence to a healthy lifestyle (Pender, 1987). Moreover, educating patients with heart failure to take care of themselves was shown to improve quality of life and reduce hospital use and medical costs (Rich et al., 1995; Fonarow et al., 1997; West et al., 1997; Hershberger et al., 2001).

In Thailand, Kamonsiripichaiporn and Yibinsoy (B.E.2542) reviewed the study of cardiac risk factors from 48 published articles during 1960 to 1998. All of the cardiac risk factor studies emphasized biophysiological factors such as cholesterol level and body mass index. Another group of researchers, the Royal Thai Heart Association (B.E. 2543), have studied the epidemiology of cardiac risk factors in Thai populations. However, these studies are just the beginning step and the results are still a preliminary. If the goal of nursing is to help the patients to adhere to self-care requirements, studies of factors facilitating or inhibiting their ability to adhere to self-care requirements are needed. Thus, this study sought to achieve this goal. The benefit of this study will guide preventive care for Thai patients with CAD.

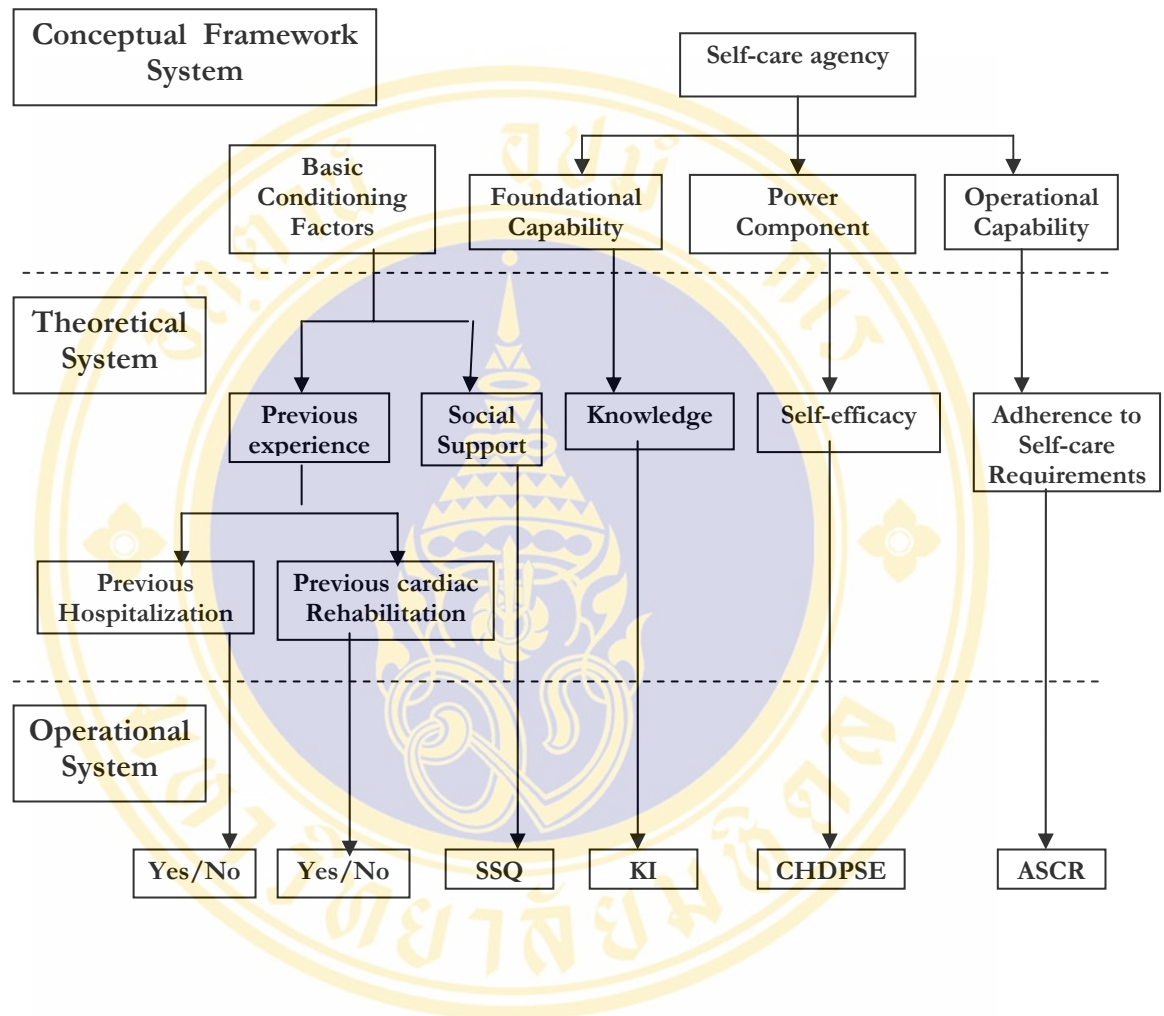
Theoretical Framework

Adherence to a self-care requirements in CAD is derived from Orem's construct of self-care agency and its basic conditioning factors (Orem, 2001), self-efficacy theory by Bandura (1997) and related literature. The model proposes to explain why and what factors contribute to adherence to self-care requirements in persons with CAD. The foundational ideas that formulate the theoretical framework of this study are briefly explained subsequently.

Orem's self-care deficit theory proposed self-care requisites as the source of action components of therapeutic self-care demands and systems of self-care (Orem, 2001). Self-care systems reflect what self-care agents know about the components of self-care demands and their abilities and willingness to perform self care. There are three types of self-care requisites: universal, developmental, and health deviation self-

care requisite. Patients with CAD need necessary and specific health deviation self-care requirements such as medical management and cardiac risk factor management to prevent the progression of disease. The calculation of self-care demands to meet those requirements has to consider an individual's capabilities which are known as "self-care agency" (Orem, 2001). Orem (2001) has developed self-care deficit theory to explain the relationships between individuals' abilities to perform self-care and their demands of self-care.

Concepts and goals within Orem's self-care deficit theory are congruent with concepts proposed in this study, which are individuals' abilities to adhere to self-care requirements about medical and cardiac risk factor management to prevent the progression of disease. This study will focus on two major constructs of self-care deficit theory, basic conditioning factors and self-care agency. In this study, basic conditioning factors refer to perceived social support and previous experiences. Because the concepts in this study are highly abstract in order to facilitate a fuller explication of the linkage among the conceptual, theoretical, and operational systems, Mcquiston and Campbell (1997: 117) have suggested that the process of substruction be used. The hierarchical model progresses from the most abstract constructs to the most concrete constructs as illustrated in figure 1.1.



SSQ = Social Support Questionnaire, KI = Knowledge Inventory Questionnaire,
 CHDPSES = Coronary Heart Disease Prevention Self-efficacy Scale,
 ASCR =Adherence to Self-care Questionnaire.

Figure1.1 Theoretical Substruction: Basic Conditioning Factors and Self-Care Agency

Conceptualization of self-care agency

Self-care agency is one of the major concepts of Orem's self-care deficit nursing theory. It is defined as "the complex acquired ability of mature and maturing persons to know and meet their continuing requirements for deliberate, purposive action to regulate their own human functioning and development" (Orem, 2001, p.522). Self-care agency is also referred to as the power to take necessary action. These capabilities and powers change over human development, with health state, with factors influencing educability, and with life experience. Self-care agency can be developed by intellectual curiosity, by instruction and supervision from others, and by performing self-care measures. Self-care agency is conceptualized as abilities, including the ability to attend to specific situations and exclude other situations, and to understand specific situations characteristics and the meaning of the characteristics; the ability to understand the need to change or regulate the existent situations; to acquire knowledge of appropriate time of action for regulation; the ability to decide what to do; and the ability to do to achieve change or regulation. Self-care agency composes three hierarchical structures including five sets of foundational capabilities and dispositions necessary for deliberate action, a set of power components capability necessary for general self-care, and an operational capability for specific self-care.

In this study, three variables which are relevant to the three hierarchical structure of self-care agency; knowledge, self-efficacy, and adherence to self-care requirements are selected. Knowledge is derived from the first structure of self-care agency: foundational capability and disposition. Self-efficacy is derived from the second structure of self-care agency: power components capability. Adherence to self-care requirements is derived from the third structure of self-care agency: operational capability.

Adherence to self-care requirements

Adherence is defined as an active, responsible and flexible process of self-care, in which the person works to maintain his or her health in close collaboration with health care staff, instead of simply following the rules that are prescribed (Toljamo and Hentinen, 2001). In addition, the term adherence is used as the provider's

commitment to enable the patient to implement the recommended treatment (Burke, 2000).

Orem (2001) proposed self-care requirements as a formulated and expressed insight about actions to be performed by or for individuals, known or hypothesized to be necessary in the regulation of an aspect of human functioning and development continuously or under specified conditions and circumstances. Orem (2001) suggested that self-care requirements must be known before an individual can engage in self-care. In addition, self-care requirements are a form of human endeavor and human action. Meeting self-care requirements is necessary in the control of pathology in early stages of illness and the prevention of defects and disabilities. In a person with CAD, self-care requirements such as diet, exercise, smoking, alcohol consumption and medication management are important in prevention of the progress of cardiac disease and related complications.

The concept of adherence to self-care requirements in this study is individuals' with CAD ability to perform necessary self-care actions such as diet, medication management, exercise, and smoking cessation to prevent and/or slow the progression of disease and complications. Adherence to self-care requirements could be conceptualized under the concept of self-care agency in Orem's self-care deficit theory as the productive operational capabilities while doing operations that achieve deliberate action (Orem, 2001). In a recent study, Barnason et al. (2003) adapted the Cardiovascular Risk Factor Modification Adherence instrument from the Self-Care Index which defined as the patient's ability to make lifestyle changes.

It is important to adhere to self-care requirements in persons with CAD. The reasons are; firstly, CAD is an incurable disease and categorized as an acute and chronic illness. However, the progression and complications can be slowed and/or prevented by performing necessary self-care requirements such as regular exercise, consuming a healthy diet, smoking cessation, and medication management. Moreover, the American Heart Association (AHA, n.d.) reported that adhering to these self-care requirements decreased mortality rate and prevalence of CAD. Furthermore, if persons with health deviation can adhere to self-care requirements, they are believed to have a positive outcome, that is maintaining life, health and well being (Schwarzer & Fuchs, 1995). Secondly, persons with CAD usually live with their disease at home. They have

to integrate self-care requirements into daily life. Although health care providers are expert in knowledge of what the CAD patients should perform, the patients are expert in managing self-care in their real life. Thus, health care providers must work collaboratively with the patients and family to achieve adherence to self-care requirements. An understanding of the factors that contribute to the adherence to self-care requirements is needed to design an intervention program relevant to CAD populations. Factors believed to influence adherence to self-care requirements in this study are: self-efficacy, knowledge, and previous hospitalization and rehabilitation, all of which will be explained in the next following section.

Self efficacy

Self-efficacy is defined as “one’s capabilities to organize and execute the courses of action required to produce given attainments” (Bandura, 1997, p.3) and “a judgment of one’s capability to accomplish a certain level of performance” (Bandura, 1986, p.391). Bandura (1986, 1997) developed the concept of self-efficacy under social cognitive theory. Social cognitive theory is focused on the mechanism for transforming thought into action and operates through a conception-matching process (Bandura, 1986). Bandura (1997) also emphasized that power is a key factor of human agency which in turn plays an essential part of self-efficacy. However, self-efficacy in Bandura's work is a general concept applied to any behavior. In this study self-efficacy is used with specific reference to self-care requirements in persons with CAD.

In Orem's work (Orem, 2001), power components are one dimension of self-care agency. They are human’s ability and potential associated with agency and activity which enable an individual to perform self-care operations. Self-efficacy is congruent with the power components of self-care agency in focusing on power and ability to perform specific required tasks. Bandura (1997) also proposed that the central concept of perceived self-efficacy is the degree of confidence that individuals have in their ability to perform specific activities successfully. For this study, self-efficacy is conceptualized as individuals' perception of confidence of their ability to adhere to self-care requirements related to reducing risk factors and medication management to control and prevent progression of the disease.

Many studies have revealed that perceived self-efficacy is related to self-care behavior in individuals with hypertension (Onchim, 2002), adherence to self-care recommendation in patients with heart failure (Ni et al., 1999), performing exercise in individuals with CAD (Robertson & Keller, 1992; Saiseesub, 2000), lifestyle modification in elderly (Grembowski et al., 1993), and lifestyle modification in individuals with CAD (Liangchawangwong, 1998). These empirical studies suggested a positive relationship between perceived self-efficacy and adherence to self-care requirements. In addition, various factors such as knowledge, previous experience, and social support relate to perceived self-efficacy (Kotcharin, 2001; Nopplup, 2001; Viritsakul, 2001; Bandura, 1997).

Knowledge

Knowledge is an important factor in performance of self-care to meet self-care requirements. Orem (2001) emphasized that before persons can do appropriate self-care, they must gain knowledge of the courses of action open to them and of their effectiveness and desirability. In addition, knowledge about new self-care requirements is important for the individual to maintain the adequacy of self-care agency (Orem, 2001). However, in order to know how to meet self-care requirements, individuals have to know the nature of CAD, etiology or risk factors, and treatment.

Knowledge in this study is conceptualized as foundational capabilities and dispositions of self-care agency in Orem's self-care deficit theory (Orem, 2001). Foundational capabilities and dispositions of self-care agency are composed of five sets of capabilities. Foundational capabilities and dispositions of self-care agency are very broad. One of the five sets contains knowing and doing capabilities which is constituted from those affect knowing, reasoning, and making right judgments and decisions in life situations, this includes the learned skills that affect communication, as well as investigative and production types of operations (Orem, 2001). Knowledge can be reflected as individuals' knowing what they learned because knowledge is a cognitive construct and used as a guide or strategy to transform into actions (Bandura, 1997).

Relationship among knowledge, self-efficacy and adherence to self-care requirements

In persons with CAD, management of medication and modification of cardiac risk factors needs knowledge which not only explains what to do, but also why to do it. Knowledge may influence individuals' judgment and ability to perform these specific requirements. Various interventions conducted by health care providers usually provide knowledge about disease, treatment, and self-care to improve health outcomes (Ni et al., 1999; Hershberger et al., 2001, Saengsiri, 2003). Knowledge of self-care requirements is transformed into skill and regulates action through cognitive learning (Bandura, 1997). Conception of skills serve as guides for developing competencies (Bandura, 1997). Thus, it is suggested that knowledge may be related to adherence to self-care requirements. However, knowledge does not always lead to behavior change or adherence to self-care requirements (Ni et al., 1999; Chan & Molassiotis, 1999; Nodturf et al., 2000). Chan and Molassiotis (1999) reported that there was no relationship between diabetes knowledge and compliance behavior among Chinese with non-insulin dependent diabetes mellitus in Hong Kong ($r = 0.24$, $p = 0.08$). Moreover, there is a controversial relationship between knowledge and adherence to lifestyle changes and drug therapy (Alm-Roijer, Stagmo, Uden & Erhardt, 2004). Even though the relationship between knowledge and behavior cannot be demonstrated in various studies it is still a prerequisite to perform deliberate action such as self-care. Thus, knowledge may affect self-care through other factors, such as self-efficacy. In the literature, perceived self-efficacy is a mediator between knowledge and action or performance of health behavior (Nodturf et al., 2000). Therefore, it can be hypothesized that knowledge has an indirect effect on adherence to self-care requirements through self-efficacy.

Knowledge of self-care requirements can increase self-confidence to perform self-care. Bandura (1997) proposed that knowledge structures serve as cognitive guides for the construction of complex modes of behavior. Thus, the production of skilled action and the development of behavioral proficiency are explicit. While individuals develop the skill of managing recurrent situations, they also create a perceived efficacy of managing those situations without requiring continuing directive or reflective thought (Bandura, 1997). From the literature, a program of self-care

promotion that provides information related to disease and self-care management can increase self-efficacy (Kotcharin, 2001; Nopplub, 2001). Therefore, knowledge related to the nature of CAD, etiology or risk factors, and treatment, can increase self-efficacy. Thus it can be hypothesized that knowledge has a direct positive effect on self-efficacy.

Furthermore, Saiseesub (2000) conducted a descriptive study to examine the influence of perceived self-efficacy on exercise behavior in coronary artery disease patients. The findings indicated that there was a relationship between perceived self-efficacy and exercise behavior ($r = .562$, $p < .01$) and perceived self-efficacy could predict exercise behavior by 31 % ($p < .001$). Thus, perceived self-efficacy has a direct positive effect on performing behavior.

In addition, other factors that influence knowledge of self-care requirements and self-efficacy considered in this study are from previous experience and social support, and will be explained under the concept of basic conditioning factors in the next following section.

Basic Conditioning Factors

Basic conditioning factors are proposed as the peripheral concept of self-care deficit nursing theory and influence a person capability (Orem, 2001). According to Orem (2001, p 245), basic conditioning factors are “factors internal or external to individuals that affect their abilities to engage in self-care or affect the kind and amount of self-care required”. These factors include age, gender, developmental state, health status, sociocultural orientation, health care system factors, family system factors, pattern of living, environmental factors, and resource availability and adequacy. These factors are not complete and should be amended whenever a new factor is identified (Orem, 1991, 1995, 2001). In this study selected basic conditioning factors were based on review of the literature, include social support and previous experiences. These selected basic conditioning factors influence knowledge, perceive self-efficacy, and adherence to self-care requirements. Each factor will be discussed in the following section.

Social Support

Social support is individuals' perceived help from others including family, friends, and relatives and perceived satisfaction from their help. Pender, Murdaugh and Parsons (2001) suggested that social support functions as an important lay referral system for individuals in making decisions to seek professional care for health promotion, illness prevention, or care in illness. In addition, individuals use social support not only during the decision phase, but also during the action phase to make decisions about adherence (Pender, Murdaugh & Parsons, 2001). Social support is also an important factor to be evaluated by health care providers during the course of caring for a cardiac patient (Fair & Froelicher, 2000). The need of social support increases when an individual experiences changes, such as an unexpected situation or stressful event (Huycey, 1998; Tarkka, Paavilainen, Lehti & Astedt-Kurki, 2003). The literature suggests that social support is associated with better outcomes for cardiac patients, especially, a spouse has an important impact on improved mortality in heart failure (Martensson, Dracup & Fridlund, 2001). One study indicated that when spouses are involved in taking care of the patients as source of emotional support and informational support, exercise participants' wives accompanied their husbands to the exercise program and asked questions about the program (Baird & Pierce, 2001). The result of emotional and informational support may also enhance patients' confidence in performing self-care and motivating them to maintain self-care requirements.

The benefit of social support does not only play as the stress buffer, but social support also enhances self-efficacy (Bandura, 1997). Although the support from a spouse is important, the support from family members, relatives, friends, and health care providers is also important in persons with CAD. Because many persons with CAD have to work and still have an active social life, perceived social support from others around them may also impact their self-care behavior and their ability in meeting self-care requirements. A study of a model of exercise behavior for older adults found that social support directly influenced self-efficacy and indirectly influenced exercise behavior through self-efficacy (Resnick & Nigg, 2003). Social support influenced self-efficacy and adherence to self-care requirements by providing verbal encouragement and by serving as the role model. Bandura (1997) also

suggested that verbal persuasion is the source of self-efficacy. Therefore, social support may be verbal persuasion which can increase self-efficacy.

Relationships among social support, knowledge, self-efficacy and adherence to self-care requirements

Various studies of social support suggested the direct and indirect effect on adherence to self-care requirements (Moore, Dolansky, Ruland, Pashkow & Blackburn, 2003; Kijjachanchaikul, 1999; Resnick & Nigg, 2003, Ni et al., 1999). Kijjachanchaikul (1999) found that an education program which applied self-efficacy theory with social support for self-care has a positive effect on knowledge, self-efficacy, and self-care behavior (food control, exercise, stress relaxation, and medication management) among essential hypertension patients. In exercise studies, Moore and colleagues (2003) found that social support usually accounted for exercise maintenance after cardiac rehabilitation. In addition, Dubbert, Martin & Epstein (1986) found that social support was an important variable for prediction of exercise participation in a heart disease prevention and treatment trial. Furthermore, Ni and colleagues (1999) found that social support also influences adherence to self-care recommendations among patients with heart failure. Moreover, perceived social support can help the individual cope better with life changes such as an illness and lifestyle modification (Norbeck, 1988). From these empirical studies, cardiac risk factor and disease management, such as medication management, in persons with CAD, is the goal that can help alleviate disease progress. Social support may help person to meet that goal by improving knowledge for modifying cardiac risk factors and medication management which can increase self efficacy.

Therefore, it can be hypothesized that social support has a positive direct effect on knowledge, self efficacy, and adherence to self-care requirements. In addition, social support has a positive indirect effect on adherence to self-care requirements through knowledge and self efficacy.

Previous experiences

Previous experiences are also other components that influence knowledge of self-care requirements, self efficacy, and adherence to self-care requirements. Previous

experiences from the very active process of refining and changing ideas when confronted with actual situations (Benner, 1984). Orem (2001) addressed that human experience is an important factor in performing self-care to meet self-care requisites. Bandura (1997) proposed that enactive mastery experiences and vicarious experiences are the sources of self-efficacy. Enactive mastery of experience is a personal efficacy experience which serves as an indicator of capability whereas vicarious experience is an efficacy transmission from others. The results of early research using the theory of self-efficacy revealed that enactive mastery experience is the strongest and generalized perceived self-efficacy (Bandura, 1997; Resnick, 2003). Moreover, the experiences of successes and failures of self-care also impact the individual's cognitive appraisal of self-efficacy (Bandura, 1997). If individuals experience success easily in doing self-care and have positive results, they may be motivated to continue doing self-care. On the other hand, if individuals experience failure in doing self-care, they may cease to perform self-care and cannot adhere to self-care requirements.

In this study, previous experiences included number of hospitalizations and participation in cardiac rehabilitation programs. Both experiences provide persons authentic evidence which persons have to mutually involve perform a new necessary of self-care requirements with health care providers. Therefore, individuals' previous experiences may influence individuals' confidence to perform self-care.

Relationship among previous experience, knowledge, self-efficacy and adherence to self-care requirements

Frequent hospitalization of chronically ill patients is associated with increased health care expenditures or increased costs of a health care system. However, patients with heart failure who have been hospitalized have a high level of self-care knowledge (Ni et al., 1999). Orem (2001) stated that knowledge of self-care to meet self-care requirements varies with life experiences. Patients can increase self-care knowledge during hospitalization because they are in more frequent contact with health care providers. In addition, because patients are confronted with a life-threatening situation during the experience of hospitalization, it may result in increased motivation to acquire information about their illness, for example, heart failure (Ni et al., 1999; Rochwell & Riegel, 2001). Previous experience of illness in patients with CAD may

impact their knowledge about cardiac risk factor management and medication management. Moreover, Carlson, Riegel and Moser (2001) studied self-care abilities of patients with heart failure and reported that patients with previous experience of hospitalization were more likely to use appropriate self-care remedies than newly diagnosed patients.

Therefore, it can be hypothesized that previous experience of hospitalization has a positive direct effect on individual's knowledge, self-efficacy, and adherence to self-care requirements. In addition, it will be hypothesized that previous experience of hospitalization has an indirect effect on adherence to self-care requirements through knowledge and self-efficacy.

Rehabilitation is an available health care system option in patients with CAD. Most cardiac rehabilitation programs include advice, information, and education related to disease, medication management, exercise, cardiac risk factor modification, and lifestyle change. Individuals who join cardiac rehabilitation will gain knowledge and enhance their ability to adhere to self-care requirements (Ritchie & Myers, 2000). The benefits of cardiac rehabilitation and secondary prevention in individuals with CAD have been demonstrated (Ades, 2002). Researchers found that there is a positive relationship between cardiac rehabilitation and exercise capability in obese patients (Lavie & Milani, 1996). In addition, education programs on chronic illness, including cardiac patients, demonstrate increased self-efficacy in performing self-management (Nodhturft et al., 2000). Therefore, individuals with CAD who participate or who have prior experience in participating in cardiac rehabilitation programs may increase knowledge, self-care efficacy, and adherence to self-care requirements.

Therefore, it can be hypothesized that previous experiences with participation in a rehabilitation program has a positive direct effect on knowledge, self-efficacy, and adherence to self-care requirements. In addition, previous experiences with participation in rehabilitation have a positive indirect effect on adherence to self-care requirements through increased knowledge and self-efficacy.

In summary, the proposed conceptual model has two exogenous variables: social support and previous experiences with hospitalization and participation in rehabilitation, two endogenous variables: knowledge and self-efficacy, and one outcome variable: adherence to self-care requirements. The proposed conceptual

model can be hypothesized as follows: social support and previous experience have a positive direct effect on knowledge, self-efficacy, and adherence to self-care requirements and a positive indirect effect on adherence to self-care requirements through knowledge and self-efficacy. Moreover, in the proposed model it can be also hypothesized that knowledge has a positive direct effect on self-efficacy and positive indirect effect on adherence to self-care requirements through self-efficacy. A hypothesized model associated with adherence to self-care requirements in persons with CAD is demonstrated in figure 1.2

This proposed model is considered as a middle-range theory to explain why and what factors contribute to adherence to self-care requirements in individuals with CAD. Self-care requirements included medication and cardiac risk factor management which are important to slow and/or prevent progression of disease and complications.

The expectation of this study is that it will contribute to nursing knowledge in understanding patients' capabilities to adhere to self-care requirements. In addition, if the hypothesis of this study was accepted, it will help strengthen the theoretical basis of Orem's self-care deficit theory and will be expected to guide nurses in developing intervention program for patients with CAD.

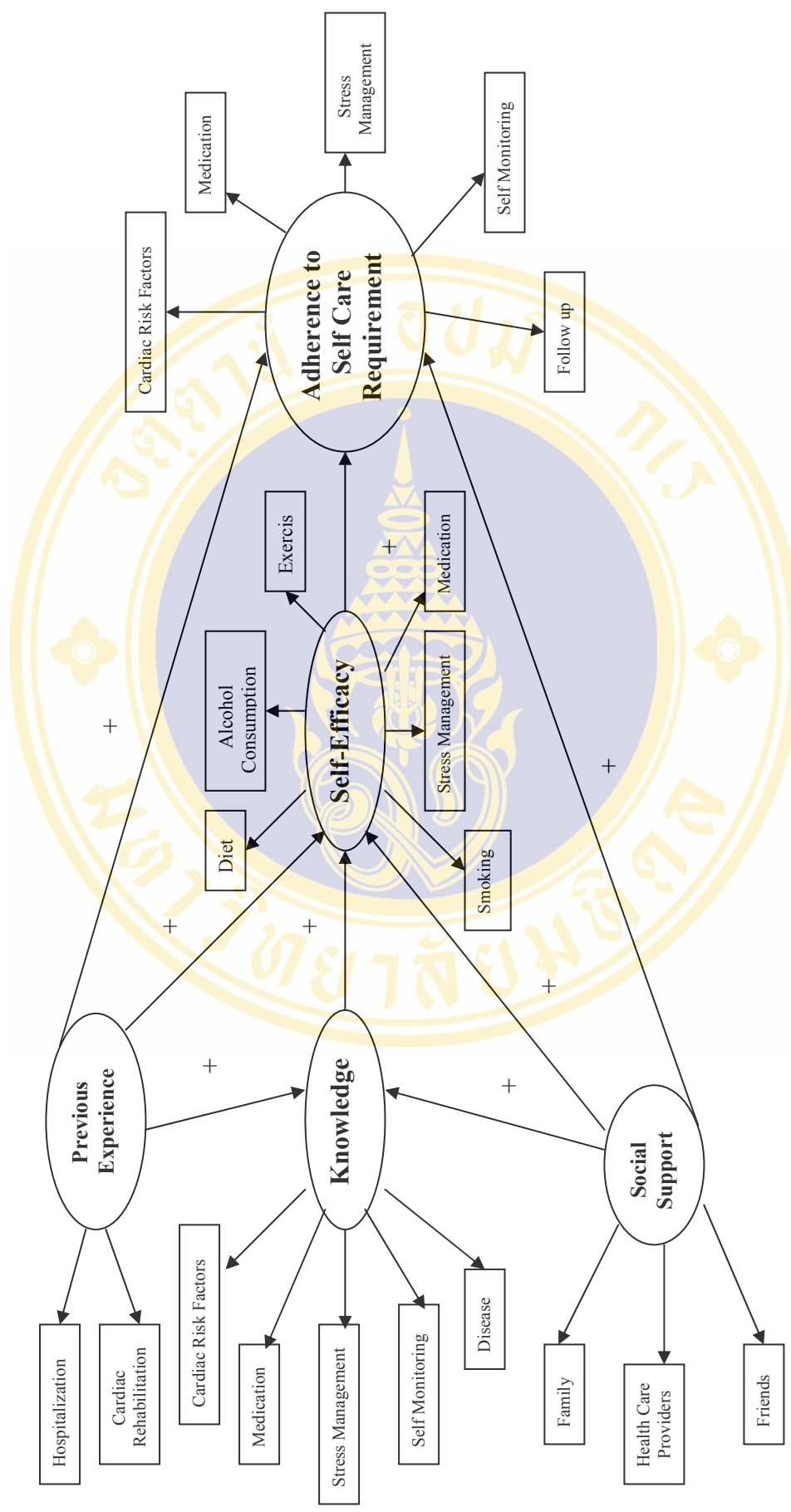


Figure1.2 Adherence to Self-Care Requirements Model in Patients with Coronary Artery Disease

Purposes of the study

The primary purpose of this study is to describe the relationships among self-care agency (knowledge, self-efficacy, and adherence to self-care requirements) and some basic conditioning factors (social support and previous experience) in patients with CAD. The specific aims of the study are to: (1) Describe self-care agency (knowledge, self-efficacy, and adherence to self-care requirements) and basic conditioning factors (social support and previous experience) in Thai patients with CAD. (2) Explore relationships among self-care agency (knowledge, self-efficacy, and adherence to self-care requirements) and basic conditioning factors (social support and previous experience) in Thai patients with CAD; and (3) Test the proposed model of factors contributing to adherence to self-care requirements in CAD patients.

Research Hypotheses

1. Social support and previous experience have a positive direct effect on knowledge, self-efficacy, and adherence to self-care requirements and have a positive indirect effect on adherence to self-care requirements through knowledge and self-efficacy.
2. Knowledge has a positive direct effect on self-efficacy and positive indirect effect on adherence to self-care requirements through self-efficacy.
3. Self-efficacy has a positive direct effect on adherence to self care requirements.

Definition of terms**Dependent variable**

Adherence to self-care requirements is defined as the capability of an individual to perform necessary self-care actions which include cardiac risk factors reduction (diet, exercise, smoking cessation); medication management; stress management; self-monitoring; and follow up. It will be measured by adherence to self-care requirements questionnaire (ASCR) modified from the questionnaire asking about the ability to perform self-care action of patients with essential hypertension developed by Panpakdee, Kotcharin, Nopplub & Varitsakul (2001).

Independent variables

Self efficacy is defined as patients' perception of confidence in their ability to perform risk factor reduction and lifestyle modification including diet, exercise, smoking cessation; medication management; and stress management. Patients' confidence in self-care will be measured by Coronary Heart Disease Prevention Self-efficacy Scale (CHDSES) developed by Kumsorn (2004).

Knowledge is defined as patients' ability to identify and explain necessary self-care about cardiac risk factors including diet, exercise, smoking cessation; medication management; stress management; disease, treatment, and diagnosis; and self monitoring. Patients' knowledge of self-care requirements will be measured by Knowledge Inventory (KI) developed by Schuster, Wright & Tomich (1995) and translated into Thai language.

Social support is defined as patients' perceived support from others which includes: family, health care providers, and friends and will be measured by the Social Support Questionnaire (SSQ) developed by Schaefer, Coyne, and Lazarus (1981) and modified by Hanucharunkul (1988).

Previous experiences are defined as the actual situations of persons with CAD confronted during the course of illness, including hospitalization and previous participation in cardiac rehabilitation. Previous experiences will be measured by asking questions about having experience of hospitalization due to heart problems and participation in cardiac rehabilitation programs.

CHAPTER II

REVIEW OF LITERATURE

This chapter is organized by presenting studies of adherence to self-care requirements and concepts related to adherence to self-care requirements: knowledge, self-efficacy, social support, and previous experiences. The following section will review the relationships among knowledge, self-efficacy, social support, and previous experiences.

The purpose of this review of literature is to identify the gaps in knowledge to adhere self-care requirements in Thai persons with coronary artery disease (CAD). Studies presented in this chapter are based on Western and Thai literature.

Adherence

In the literature, the term “adherence” and “compliance” are usually used interchangeably (Burke, 2000; Murphy & Canales, 2001; DiMatteo & DiNicola, 1982; Russell, Daly, Hughes and Hoog, 2003; Cramer, 1991). Thus, the term “adherence” and “compliance” will be included in the search results, and both terms will be also reviewed. However, some researchers defined “adherence” as more patients’ participation than “compliance” (Toljamo & Hentinen, 2001, Roter et al., 1998). Murphy and Canales (2001) analyzed the definition of compliance from 60 studies. They found that only 30 of the 60 articles presented the definition of the term compliance. Sackett and Haynes are both physicians and interested in the issue of compliance from the early 1970s. Moreover, Murphy and Canales (2001) gathered the definition of compliance in the nursing perspective. They found that the nursing definitions of compliance showed more active participation of individuals to take care themselves by collaborating with health care providers. Russell, Daly, Hughes and Hoog (2003) also suggested that the concept of compliance in the nursing literature is controversial. Therefore, the term “adherence” will be used in this study, the definitions of adherence are as follows:

Toljamo and Hentinen (2001) defined “adherence” combined with “self-care” as “an active, responsible and flexible process of self-care, in which the person works to maintain his or her health in close collaboration with health care staff, instead of simply following the rules that are prescribed”.

Burke and Dunbar-Jacob (1995) defined “adherence” as “emphasizing the mutual responsibility between patient and provider and reinforced the commitment of the provider to enable the patient to implement and follow the treatment plan”.

The American Hospital Association (1982) defined “adherence” as “a collaboration or active alliance between a health care provider and patient in which both endeavor to guarantee the patient’s self-sufficiency in the self-management of his or her condition”.

Sabate (2003) defined “adherence to long term therapy” as “the extent to which a person’s behavior-taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider”. In addition, adherence required the patient’s agreement to the recommendations and patients should be active partners with health professionals in their own care and that good communication between patient and health professional is a must for an effective clinical practice.

From the study of dietary compliance and cardiovascular risk reduction, Metz and colleagues (1997) identified compliance by evaluating the participants’ ability to meet specific criteria for energy intake, fat intake, and the National Cholesterol Education Program/American Heart Association Step 1 and 2 diet recommendations.

In summary, there is no gold standard of the definition of adherence. However, this term as used currently not only focuses on the health care provider perspective but also patient perspective. In nursing science, compliance is seen more widely than merely as behavior coinciding with medical advice (Kyngas & Lahdenpera, 1999). This may reflect the concern that a supportive health care environment not to blame the person who is non-adherence. In addition, the definitions of adherence show the equal responsibilities of care between patients and health care providers in order to promote patients’ abilities to care for themselves. Thus, the definition of adherence in this study will be defined as “the capability of individual with CAD to perform

necessary self-care actions or self-care requirements which include medication and cardiac risk factors.

Self-care requirements

Self-care requirements are defined as a formulated and expressed insight about actions to be performed by or for individuals, known or hypothesized to be necessary in the regulation of an aspect of human functioning and development continuously or under specified conditions and circumstances (Orem, 2001). It is an essential or a desired input to an individual or the individual's environment in order to maintain or optimize human functioning (Renpenning & Taylor, 2003). Self-care requirements are varied over time during the course of illness; individuals have to know how to adjust their necessary self-care requirements. If individuals cannot adjust their self-care requirements during the course of illness, they may not maintain their life, health, and well-being.

There are three types of self-care requirements; universal, developmental and health deviation, which are involved in the calculation to meet self-care demand (Orem, 2001). Universal self-care requirements are common to all human beings during all stages of the life cycle, adjusted to age, developmental state, environment and other factors. Developmental self-care requirements are associated with human growth and developmental processes and with conditions and events occurring during various stages of the life cycle and events that can adversely affect development. Health deviating self-care requirements are associated with genetic and constitutional defects and human structural and functional deviations and with their effects and with medical diagnostic and treatment measures and their effects. These types of self-care requirements are necessary in patients with CAD, especially health deviating self-care requirements. Meeting health deviating self-care requirements may help to control pathology in its early stages (secondary prevention) and to prevent defects and disability (tertiary prevention) (Orem, 2001). There are various self-care requirements in patients with CAD which emphasized medication management and reducing risk factors including smoking cessation, regular physical activity, heart-healthy diet; and stress management.

Juntawises (1996) conducted a phenomenological study to describe the meaning of self-care and related factors in patients post myocardial infarction. Findings of the study revealed that various self-care behaviors were reported by patients such as behavior modification, taking medication as prescribed by physicians, and seeking self-care strategies to increase physical strength. In addition, internal and external factors influencing self-care behaviors were reported. The internal factors were the meaning they gave to the heart and to the illness, lifestyle pattern, and health state. External factors were family and health care system. Moreover, findings also supported that previous experience of exercise and previous habit of eating high cholesterol diet influences exercise and diet behavior post myocardial infarction. Furthermore, motivation is an important factor influencing self-care and lifestyle modification. Because myocardial infarction patients need various self-care action and lifestyle modification behaviors, they need effort and motivation to meet those self-care action and lifestyle modifications. Motivation is one of ten power components of self-care agency in Orem's self-care nursing theory, which is also crucial for individuals' ability to perform self-care and lifestyle modification.

Pradikul-Asdornwised (2000) conducted an ethnographic study to describe self-care and dependent care associated with the experience of Thai patients' with coronary heart disease recovery from coronary artery bypass graft. Four themes emerged; getting back to "normal", life changing event, living a healthier life, and significance of family as protection and support. In addition, the themes, patterns, descriptors, and informants' responses provided support for the concepts of self-care, dependent-care, and self-care requisites and evidence of the influence of basic conditioning factors (gender, family system, and sociocultural orientation) on self-care, dependent-care, and self-care requisites.

In summary, Juntawises's (1996) and Pradikul-Asdornwised's (2000) study indicated that patients with myocardial infarction and coronary artery bypass graft surgery needed to perform various self-care behavior and lifestyle modifications. These are health deviations from self-care requirements according to Orem's perspective (Orem, 2001). Health deviating self-care requirements in CAD patients are life long actions in order to prevention further progress of disease. Self-care requirements of cardiac problems aim at promoting healthy lifestyles such as

medication management, smoking cessation, increased physical activity, and diet modification.

Medication management

Patients with CAD often require multiple medications. Medications frequently used include cholesterol lowering drug, antihypertensive, cardiovascular, anticoagulant, and antidiabetic drugs, etc. The number of medications consumed in CAD patients depends on individuals' symptoms and comorbid diseases. The greater the number of drugs consumed, the more complex the disease is to manage. In addition, the goal of usage these medications is controlling not curing the disease. Therefore, medication usage is a life long requirement. This may be difficult for patients to adhere this life long requirement.

In the literature, managing medication in patients with CAD is crucial to examine by using the concept of adherence to medication. The American Heart Association reported that more than half of all Americans with chronic diseases do not follow their physician's medication and lifestyle guide. In addition, 10% of all hospital admissions are the result of patients failing to take prescription medications correctly. Thus, nonadherence to medication is a major barrier to the effective control of the disease, it may influence health outcome. However, Kyngas and Lahdenpera (1999) found that patients with hypertension reported good compliance with medication (75%) but they cannot control of blood pressure. Because there are various factors related to control of blood pressure such as dietary factors, smoking and alcohol consumption, assessment of medication adherence only is not sufficient. Hence, adherence to medication may be not enough for positive outcomes, adherence to other lifestyle changes must be integrated.

Murray et al. (2004) studied medication adherence in older adults with congestive heart failure. They suggested that the cognitive processes needed to manage and take medications decline with aging while the number of prescription and nonprescription medications consumed increases. Thus, study of medication adherence cannot consider only following the treatment or intervention regimen but also have concern regarding individuals' ability to manage the requirements.

Reducing risk factors

Most studies on self-care requirements are focused on prevalence or self-care of cardiac risk factors. Pothiban (1993) studied risk factor prevalence, risk status, and perceived risk for coronary heart disease among Thai elderly. Two hundred subjects were random sampled from eight random villages. Data were collected using a structured interview and physiological measures. Results indicated that the highest prevalence of cardiac risk factors in Thai elderly is physical inactivity (81.5%). Also, the elderly demonstrated a moderate or high risk status for CAD as assessed by the modified Framingham Heart Disease Risk Prediction Chart. Perceived CAD risk of the subjects was at a low level. In addition, there is no significant association between objective CAD risk status and perceived CAD risk score.

Temcharoen (2001) conducted a five-year longitudinal study to investigate cardiovascular risk factors among the employees of the Government Saving Bank from 1995 to 2000. One thousand and nineteen employees participated in the study. Data were collected two times interval: 1995 and 2000. Study variables were physiological risks for cardiovascular disease composed of blood pressure level, level of fasting plasma glucose, level of total cholesterol and high density lipoprotein cholesterol; personal factors composed of sex, age, education, position rank, family history of disease; stress; health behavior composed of cigarette smoking, alcohol intake, physical activity (work characteristics and exercise habit), and eating habit; and body mass index. The findings reported that male employees had two health behavior risks for cardiovascular disease which were higher than the females: cigarette smoking and alcohol intake. Both cigarette smoking and alcohol intake behaviors did not change during a five-year interval (1.20 ± 0.59 vs 1.19 ± 0.56 , $p=.225$; 3.23 ± 2.67 vs 4.43 ± 3.58 , $p=.261$ respectively).

Pothiban's (1993) and Temcharoen's (2001) studies suggested that Thai people have different CAD risks in different age group. CAD risk in Thai elderly is physical inactivity (Pothiban, 1993). CAD risks in adult working group are cigarette smoking and alcohol intake (Temcharoen, 2001). In addition, gender different in adult working group shows different level of CAD risks. Although Thai patients who already have cardiac disease (MI and CABG) perceived their behavior modification and life change (Juntawises, 1996; Pradikul-Asdornwised, 2000), but a Thai healthy adult working

group cannot change their CAD risk behaviors (Temcharoen, 2001). In general, reducing risk factor is focused on modifiable cardiac risk factors including smoking cessation, regular physical activity, heart-healthy diet, and stress management.

Smoking cessation:

Smoking is a known cause of CAD (Elsenhans, 1986; Guzzetta & Casey, 1992). Smokers under age 50 are five times more likely to die of coronary heart disease than non-smokers (Westcott, n.d.). In Thailand, the study of cardiovascular event rate at slum Klong-Toey during B.E. 2541-2542 in 1885 subjects also supported that smoking was one of the factors related to the mortality rate of CAD in this population (Royal Thai Heart Association of Thailand, B.E. 2543). The World Health Organization estimates by 2020, 7 of every 10 tobacco-related deaths will be in the developing world (WHO, 2002). In United States, up to an estimated 30% of all deaths caused by CAD are attributed to cigarette smoking (Sims & Zucker, 1999). If smoking is combined with other cardiac risk factors including high blood pressure, high blood glucose, and high cholesterol; the risk of CAD will increase. In addition, the amount and duration of cigarettes smoked are important, they will increase the risk of myocardial infarction and death in CAD patients.

Nicotine and carbon monoxide are two major substances in cigarette (Sims & Zucker, 1999; Martin, Miller & Froelicher, 2000). Cigarette smoking effects respiratory system, cardiovascular system, and overall health. These effects include increased platelet adhesiveness, increased heart rate, with resulting increases in myocardial demand, elevated catecholamine levels, and decreased serum oxygen-carrying capacity (Daly-Nee, Brunt & Jairath, 1999). Smoking not only effects individuals' health but also others' health called passive smokers. Therefore, personal and environmental factors are important to consider in managing a smoking cessation program.

Smoking is categorized as the modifiable risk factor which can intervene and change. Various smoking cessation programs are initiated in order to reduce risk factors for CAD because continuing to smoke after myocardial infarction or coronary revascularization can have serious clinical consequences. The mortality of post-myocardial infarction patients who continue to smoke is double that of quitters. In

addition, those who do not stop smoking after coronary revascularization also have a two-fold higher risk of re-infarction and death (Yach, n.d.). However, Yach (n.d.) suggested that smoking cessation is a cost-effective intervention, but many patients do not receive counseling to help them stop smoking. Effective smoking cessation intervention is needed to help CAD patients to reduce and control the development of the disease. Hence, adherence to self-care requirements of smoking cessation is essential, it reduces cardiac event and health care cost.

Regular physical activity:

The role of physical activity in preventing cardiovascular disease and controlling cardiovascular risk factors is well established. With health care reform in Thailand, people are encouraged to exercise, such as aerobic exercise, Yoga, Tai-chi. In contrast, exercise may be problematic for cardiac patients including CAD patients, it relates to functional classification of heart disease. However, researchers showed that exercise training in cardiac rehabilitation provides benefit to cardiac patients (Laughlin, Oltman & Bowles, 1998; Gielen & Hambrecht, 2001; Hambrecht et al., 2000a; Hambrecht et al., 2000b).

The effect of exercise or physical training on physiologic adaptations can be categorized as morphologic, hemodynamic, and metabolic adaptation (Ritchie & Myers, 2000). Morphologic adaptation refers to myocardial hypertrophy. Hemodynamic adaptations include increases in blood volume, end-diastolic volume, stroke volume, cardiac output, and reduced heart rate for any submaximal workload. Metabolic adaptation includes increased mitochondrial volume and number, greater muscle glycogen stores, enhanced fat utilization, enhanced lactate removal, increased enzymes for aerobic metabolism, and increased maximal oxygen uptake. In contrast, the effect of physical inactivity or immobility showed physiologic consequences as follows: loss of muscle mass, strength, and endurance; decreased plasma and blood volume; decreased ventricular volume; increased hematocrit and hemoglobin; diuresis and natriuresis; venous stasis; bone demineralization; increased heart rate at rest and submaximal levels of activity; decreased resting and maximum stroke volume; decreased maximum cardiac output; decreased maximal oxygen uptake; increased venous complacance; increased risk of venous thrombosis and thromboembolism;

decreased orthostatic tolerance; and increased risk of atelectasis, and pulmonary emboli (Myers, 1995). Exercise or physical activity affects physiologic adaptations not only in healthy person, but also in the cardiac population.

Hambrecht et al. (2000b) conducted an exercise program that effected coronary endothelial function in 19 patients with coronary artery disease. The study reported that after four weeks of exercise training, coronary artery constriction in response to acetylcholine at a dose of 7.2 μg per minute was reduced by 54 % (from a mean ($\pm\text{SE}$) decrease in the luminal diameter of 0.41 ± 0.05 mm. in the initial study to a decrease of 0.19 ± 0.07 mm. at four weeks, $p<0.05$, or the comparison with the change in the control group). Coronary blood flow reserve was increased by 29 % after four weeks of exercise (from 2.8 ± 0.2 in the initial study to 3.6 ± 0.2 after four weeks, $p<0.01$ for the comparison with the control group). Because of exercise training influenced coronary endothelial function in patients with CAD, it provides benefit in reducing cardiac risk. Thus, adherence to exercise showed benefit in CAD; it must be encouraged.

Heart-healthy diet:

Diet is clearly associated with CAD risk by fatty diet and cholesterol. Researchers have known that saturated fat found abundance in red meat and dairy products raises cholesterol levels in the blood. In addition, trans-unsaturated fatty-acids are produced by the partial hydrogenation of liquid vegetable oil including margarines, baked goods, and fried foods; they raise low-density lipoprotein (LDL) and triglycerides and reduce high-density lipoprotein (HDL). While polyunsaturated fat is found in vegetable oils and fish and monounsaturated fat found in olive oil, these fats are recommended (Willett & Stampfer, 2003). Further knowledge of cholesterol emphasized the components and the ratio of cholesterol in blood. The major components of cholesterol are LDL, known as “bad cholesterol”, and HDL, known as “good cholesterol”. LDL and HDL have different effects on the risk of CAD. In addition, increasing the ratio of LDL to HDL in the blood raises the risk, whereas decreasing the ratio lowers it. Researchers suggested that replacing saturated fat with either monounsaturated or polyunsaturated fat improves LDL and HDL ratio and would be expected to reduce heart disease (Willett & Stampfer, 2003).

The effect of fatty diet on CAD risk is explained by six types of morphology of the intimal thickening and the inflammatory response hypothesis of endothelium. Six types of the intimal thickening included type I-isolated macrophage foam cells; type II- fatty streak, superficial or submerged; type III-preatheroma; type IV-atheroma, lipid or necrotic core; type V-fibroatheroma; type VI-complicated lesions (Rossi, Jonnalagadda & Kris-Etherton, 1999). In addition, the inflammatory response is hypothesized that through a variety of means, cardiovascular risk factors injure the endothelium, leading to endothelial dysfunction. The change in the dysfunctional epithelium that contributes to the development of the atherosclerotic plaque are increased permeability; increased expression of adhesion molecules that bind monocytes, t-cells, and platelets; and secretion of growth factors such as platelet-derived growth factor (PDGF) that leading to vascular remodeling. As the endothelium becomes more permeable, serum lipids predominantly move into the vascular intima and the LDL becomes oxidized. The oxidized LDL becomes a chemoattractant for monocytes and is also easier for the already present macrophages to ingest through their scavenger receptors. As macrophages take up oxidized LDL, they become the foam cells that form the fatty streak. Interaction between the macrophages or foam cells and the T cells lead to activation of both types of cell. As these cells become activated, the inflammatory response is established (Cunningham, Bene & Vaughan, 2000). Thus, dietary factors are an important issue in regard to cardiac risk factors, and adherence to self-care requirements about a healthy diet are needed in CAD patients.

Stress management

Stress has been conceptualized from both the physiologic and psychological perspectives. Both perspectives are associated with the context of cardiac risk reduction (Kozicz & Casey, 1999). Individuals' responses to stress are unique to each individual because cognitive processes, mediating factors, and coping mechanisms are different.

The exact mechanism of how the stress response relates to coronary heart disease is unclear. However, the activation of the stress response begins with a perceived stress. It is suggested that the three major pathways involve in the stress response include the autonomic nervous system (ANS), musculoskeletal system (MSS), and

psychoneuroendocrine system (PNE) (Kozicz & Casey, 1999). Epinephrine and norepinephrine from ANS and corticosteroids from PNE effect cardiovascular system. Activation of epinephrine and norepinephrine includes increased arterial blood pressure, diminished renal blood flow, increased cardiac output, increased contraction of the MSS, increased triglyceride levels, increased cholesterol levels, and diminished blood flow to the skin and gastrointestinal system. Activation of corticosteroids includes increased glucose levels, increased sodium retention, and altered lipid metabolism. Thus, these physiologic responses to stress may promote the development of coronary heart disease. In addition, psychosocial factors also identified as a cardiac risk factor including type A behavior or hostility, depression, and low level of social support (Kozicz & Casey, 1999).

Adherence to self-care requirements

CAD always requires adherence to reduce cardiac risk factors and treatment regimens in order to achieve the goal of minimization of complications and disease progression (Burke, 2000). In other words, adherence to lifestyle change and treatment regimens may threaten effective prevention of heart disease, as well as clinical outcomes across the disease continuum. It is a fact that the prevention and treatment of cardiovascular disease requires continuing management of lifestyle habits and medication management. Sustained adherence has shown the benefits in the prevention and treatment in heart disease patients. These require actions which are necessary self-care requirements. Because patients have to do actions by themselves to bring about active life in CAD patients by preventing or controlling the pathological processes and their effects; including experienced chest pain and decreased physical function.

According to the western literature, most of the studies to prevent or slow progress of CAD are focus on adherence or compliance specific issues such as medication (Haynes, Sackett, Gibson, Taylor, Hackett, Roberts & Johnson, 1976; Kyngas & Lahdenpera, 1999), cardiac rehabilitation (Glazer, Emery, Frid & Banyasz, 2002; Moore, Dolansky, Ruland, Pashkow & Blackburn, 2003, Gallagher, McKinley & Dracup, 2003), smoking cessation (Rosal, Ockene, Ma, Hebert, Ockene, Merriam & Hurley, 1998), adherence to self-care recommendation (Ni et al., 1999). From the Thai

literature, the study of adherence and compliance in persons with cardiac disease was scanty. Only one study of compliance in ischemic heart disease was reported since B.E. 2529 (Pasunant, 1986). Repeated study is needed because people in this decade have different lifestyles and patterns of living. However, there are various studies of adherence to and compliance with medication or health behaviors in Thai patients with tuberculosis and hypertension. Most studies of Thai cardiac patients focused on health behavior, self-care, and cardiac risk factors. In addition, the result of the intervention program cannot obtain the expected outcomes because conclusion on the effectiveness of the intervention program to maintain self-care requirements cannot be made. Furthermore, Thai patients with coronary artery disease perceived that they need to change or modify their behavior or lifestyle (Juntawises, 1996; Pradikul-Asdornwisdm, 2000) but healthy adults did not change their cardiac risk behavior (Temcharoen, 2001). Although Thai patients with cardiac disease perceive the need for behavior modification, adherence to necessary self-care actions to promote behavior modification is important. Compared to western literature, study related to adherence or compliance is still needed in Thai population focusing on various issues of cardiac problems.

Intervention to increase adherence

There are various interventions to reduce cardiac risk factors. These interventions influence desired patients' outcomes. Cramer (1991) proposed four major practical strategies to improve compliance with a medical regimen including education about treatment, dosing, clinical scheduling for follow up, and communication from the health care provider to the patient. However, these practical strategies expressed that health care provider dominate and control patient. Further, Burke (2000) also proposed a list of strategies for use in assisting patients to improve adherence to behavior change. These strategies are: self-monitoring; stimulus control; goal setting; reinforcement; modeling behavior; self-efficacy enhancement; social support provision; cuing; habit building; contracting; problem solving; relapse prevention; tailoring the regimen; assessing readiness for change; use of frequent, short exercise bouts; home-based exercise; ongoing contact; use of internal cognitive

aids; nurse-managed care; supplementary education and training; and skill development.

Liangchawangwong (1998) conducted a quasi-experimental study to examine the effects of health information and promoting self-efficacy on lifestyle of 20 patients with coronary heart disease. Findings demonstrated that the pretest scores of overall coronary heart disease lifestyle were at a good level (mean = 3.21, S.D. = 16.93). The highest scores of coronary heart disease lifestyle were reported in relation with others (mean = 3.68, S.D. = 1.88) and use of health care system (mean = 3.54, S.D. = 1.53). In addition, the posttest scores of lifestyle (mean = 3.56, S.D. = 12.63) were significantly higher than pretest scores (mean = 3.21, S.D. = 16.93) ($Z = 3.921$, $p < 0.05$). This may suggest that program providing knowledge and promoting self-efficacy enhanced healthy lifestyle in coronary heart disease. Thus, this may be hypothesized that knowledge and self-efficacy influenced lifestyle or health behavior.

Rosal and colleagues (1998) compared the effect of a behavioral multicomponent smoking cessation special-intervention with an advice-only intervention on smoking status at 5 years for smokers with coronary disease. The 160 smokers with angiographically documented coronary artery disease participated in the study. Seventy-eight participants were in the advice-only intervention group and 82 participants were in the special intervention group. At baseline, the advice-only intervention and special-intervention group were similar on demographic and smoking related variables. The special-intervention was a 30-minute inpatient counseling visit, and follow up counseling telephone calls. The advice-only intervention was a 10 to 15-minute advice to stop smoking. They found that maintained quit rates were higher in special intervention compared to advice-only intervention, and never-quit rates were lower in the special intervention group at all follow-up points but differences were not statistically significant. In addition, they also reported that higher self-efficacy predicted 5-year maintained quit smoking status (OR = 1.93; 95% CI=1.40, 2.67).

Hershberger and colleagues (2001) conducted an outpatient heart failure management program to evaluate the clinical and cost outcomes of care. It was a prospective 6 months follow-up intervention design. One hundred and eight of new referrals to a heart failure clinic participated in the study. The heart failure outpatient management program emphasized continuing care by a multidisciplinary team of

health care providers which consisted of cardiologists, specially trained nurses and a social worker. They used heart failure practice guidelines, performed extensive telemanagement of patients, used preemptive hospitalization for decompensating patients, provided continuity of care from inpatient to outpatient settings, provided a variety of educational experiences, and orchestrated community and home health interventions when indicated. Nurses with physician backup were on call 24 hours a day throughout the year to provide a high level of continuous care. Patients were acquainted with help from their health care providers because of the continuing care by the same team of personnel. The program showed that health care providers can increase patients' knowledge of self-care of the importance of daily weighing, dietary salt intake restriction, and contacting providers if experiencing a weight change. The results showed that in the proportion of patients who have knowledge of self-care about recognizing the importance of daily weight monitoring significantly increased from 52.8% at baseline to 73.0% at 6-month ($p < .001$), about dietary salt intake restriction (75.3% vs 83.1%, $p = .01$), and about contracting provider if experiencing a weight change (69.7% vs 88.8%, $p < .001$). As to the change in patients' adherence behaviors, the proportion of patients who weighed themselves daily significantly increased (42.7% vs 52.8%, $p = .02$). However, the evaluation of other self-care adherence behaviors did not show improvement or did not change including skipped medication, taking medication as prescribed all the time, always avoiding salty foods, and always reading labels when buying or eating food. Although most of the self-care adherence behaviors were not improved, other patients outcomes such as New York Heart Association classification (class II was increased from 30.8% at baseline to 55.6% at 6-month, class III was decreased from 57.0% to 37.8%), readmission with cardiac problems, and emergency room visits (56.1% vs 27.2%, $p < .001$ and 54% vs 15%, $p < .01$) were improved over time respectively. This may be because adherence to behavior modification takes more than 6-month time. In addition, non-adherence to self-care behavior modification did not immediate impact on patients' health. Furthermore, patients could easily access health care providers during the intervention program.

Lear, Ignaszewski, Laquer, Pritchard & Frohlich (2001) conducted a randomized trial of long-term lifestyle and risk factor management after completing a standard

rehabilitation. It was a 6-month pilot study with a convenience sample of 49 patients with ischemic heart disease including myocardial infarction, a revascularization procedure, positive coronary angiogram, or episodes of angina. Participants were randomized by computer-generated block randomization into two groups: a lifestyle management intervention (LMI) group and a usual care group (UC). Participants in the LMI group received a Risk Factor Report outlining their current and previous lifestyle behaviors (exercise, diet, and smoking status) and risk factor at baseline of the program. Moreover, participants in the LMI group participated in 6 additional rehabilitation sessions, and counseling on their current Risk Factor Report and on how to initiate their own home exercise programs. Telephone follow-ups were at months 4 and 5 post cardiac rehabilitation program. At six months, a new assessment of Risk Factor Report was generated to the participant; it reported participants' current and previous Risk Factor Report, highlighted achieved goals, and set new goals. Participants in the UC group received no intervention. Both groups were reassessed after 6 months. The study found that patients in the LMI group showed significant reduction in total cholesterol, in LDL-C, and increased physical activity from baseline and 6-month (4.97 ± 1.03 vs 4.54 ± 0.93 , $p < .05$, 2.87 ± 0.73 vs 2.46 ± 0.81 , $p < .05$, and 2175 kcal/week vs 2458 kcal/week, $p = ns$ respectively) while patients in the UC group showed significant increased in diastolic blood pressure ($126/71 \pm 13/11$ vs $131/81 \pm 20/14$, $p < .01$). Findings from this study indicated that more support from health care providers by providing more information, more material, and long term management can influence lifestyle modification.

Metz et al. (1997) conducted a Cardiovascular Risk Reduction Dietary Intervention Study to compare dietary compliance with two food plans: a prepared meal plan and a self-selected diet. At week 0 of dietary intervention, all participants were counseled regarding their assigned therapeutic diet and were provided with educational materials to help them adhere to their program for the 10-week intervention. In addition, all participants were given at week 0 a supplemental manual containing instructions on food-record collection and their individual nutritional prescriptions. A prepared meal plan provided a prepackaged, nutrient-fortified prepared meal plan to participants. A self-selected diet plan provided an exchange-based self-selected diet for which participants chose and prepared their own meal

based on a prescribed number of food servings using the American Dietetic Association exchange lists. In a multicenter trial (10 centers), 560 adults of men and women were randomly assigned to either a self-selected diet (n=277) or a prepared meal plan (n=283); each group was designed to provide 15-20% of energy from fat, 55-60% from carbohydrate, and 15-20% from protein. Nutrient intake was estimated from 3-day food records collected biweekly throughout the 10-week intervention. Compliance was determined by evaluating the participants' ability to meet specific criteria for energy intake, fat intake, and the National Cholesterol Education Program/American Heart Association Step 1 and 2 diet recommendations. The findings demonstrated that compliance with energy, fat, and step 1 and 2 criteria was better in participants who followed the prepared meal plan than in those who followed the self-selected diet ($p<.0001$). Moreover, compliance in both groups achieved greater reductions in total and low-density-lipoprotein cholesterol than noncompliant participants ($p<.05$). From this study, compliance was evaluated by assessing an individual's ability to meet specific requirements.

Nisbeth, Klausen & Anderson (2000) studied the need for counseling and its effect on willingness and ability to change lifestyle, and subsequent changes in coronary heart disease risk factors. All 152 male employees in a computer company, aged between 24-45 year; were randomized into an intervention group (I-group) and a control group. The I-group was divided into subgroups based on baseline behavior and risk factor status: exercise group, smoking group, diet group, no need to change group, and no motivation group. The I-group was counseled to define their own specific goals in order to change their lifestyles into a more healthy direction. Changes were evaluated after 1 year. After an initial health examination, participants from the I-group were counseled at baseline and after 5 months. Twenty-nine were assigned to a control group and 56 to an intervention group (dropout=8). Forty subjects were recommended one or more behavioral changes and eight had no need. An exercise group was advised to exercise aerobically three times/week. A diet group was advised to reduce the intake of saturated fat and increase fish products, and smokers to quit smoking. Results found that thirty-four (70.8%) were willing to make behavioral changes. In addition, the I-group compared to the control group reported the exercise

fitness level increased [0.20 (0.34) vs 0.10 (0.52), $p < .01$] and body weight decreased [-0.2 (2.3) vs 1.4 (3.5), $p < .05$].

In Thailand, Saengsiri (2003) conducted a self-care promotion program on reduction of risk factors for coronary disease patients. This study was 4-month follow up program. The sample size was 17 subjects per group and the total number of subjects in this study was 34. The intervention program provided self-care promotion which emphasized increasing patients' knowledge and skills for self-care activity in order to change their lifestyles. The program included: 1) health educational classes to help the patients gain understanding of risk factors and cardiovascular disease and self-care activities for the reduction of cardiovascular risk factors (diet management, stress management, and exercise), 2) training classes for stress management (yoga and imagery, and 3) motivation and supporting sessions to encourage the maintenance of lifestyle change. Study variables were body weight, low-density lipoprotein cholesterol, and quality of life. The findings revealed that the mean body weight in the experimental group decreased significantly compared with the control group [2.43 kg. (1.48) vs .50 kg. (1.48), $t=3.275$, $p < .05$], but, low-density lipoprotein (LDL) level was decrease in control group and increase in experimental group. The study showed that the intervention program only influenced some expected outcomes.

In summary, the ultimate aims of the intervention reviewed is to reduce risk behavior and maintain healthy lifestyle for better health outcomes. Most of the intervention targeted increase knowledge, motivation, skill, self-care, and confidence in changing behaviors. However, all outcomes were not positive, further study is needed. In addition, many studies revealed that even though knowledge was increased but risk behaviors still could not be changed. Thus, knowledge may not work directly to change behaviors, it may work through other factors. Furthermore, Moore (1990) and Bandura, (1997) suggested that perceived self-efficacy may be the major mediator between knowledge and behavior. Because there is no empirical test among knowledge, self-efficacy, and adherence to self-care requirements as this sequence, only a pair of these variables is tested. Therefore, this study will propose that knowledge has an direct effect on self-care requirements through self-efficacy. If the finding of this study is statistically significant, health care providers may design more specific intervention to obtain positive outcomes.

Factors related to self-care requirements

Coronary artery disease poses two unique adherence problems: adverse short-term effects associated with non-adherence in patients with disease and management of therapy in asymptomatic patients who are at high risk (Leupker, 1993). According to adherence problems in coronary artery disease, factors influencing adherence are identified. Burke and Dunbar-Jacob (1995) categorized three factors that may contribute to inadequate adherence including patient-related, regimen-related, and provider-related factors. Patient-related factors are patient characteristics related to adherence include the following: knowledge and understanding of what the regimen entails and what the patient must do to implement the plan, previous levels of adherence and adherence ability at time of treatment initiation, perceived confidence in ability to perform behavior (efficacy expectation), avoidance as a coping strategy, availability of social support, satisfaction with patient-provider interactions and health care received, and obstacles or barriers to implementation of the regimen. Regimen-related factors and provider-related factors are emphasized, particularly the attention from health care professionals. These include regimen complexity; regimen duration; provider skills and attitudes; and process variables, waiting time, frequency of appointments, ease of reaching the clinic, and continuity of care. This study will focus on patient-related factors because patients with coronary artery disease have to live with the disease and take care of themselves most of the time. Hence, factors will be selected in this study include, knowledge, self efficacy, and previous experience about participation in cardiac rehabilitation and hospitalization.

Factors hypothesized to be related to adherence to self-care requirements in persons with CAD are self-efficacy, knowledge, social support, and previous experience with cardiac rehabilitation and hospitalization. The necessity of each concept and their relationships will be presented in the following section.

Self-efficacy

Social cognitive theory postulated that individuals possess a belief system referred to as self-efficacy, which gives them a measure of control over their thoughts, feelings, motivation and actions (Bandura, 1986; Bandura, 1997). In the literature,

self-efficacy is an important factor influencing behavior change or adherence to behavior change.

According to Bandura (1997), the four sources of self-efficacy include: 1) mastery experience, referring to the most powerful source coming from individuals' performance achievement; 2) modeling or vicarious experience referring to observing another perform a task; 3) verbal or social persuasion referring to ones' beliefs that they possess the capabilities to achieve what they seek; and 4) physiological and affective states referring to making inferences from autonomic arousal or other symptoms such as positive mood enhances perceived self-efficacy.

In addition, the theory of self-efficacy involves two types of expectancies that influence behavior (Bandura, 1997). The first type of expectancy is efficacy expectation. It refers to an individual's perceived ability to perform a behavior. Efficacy expectations influence the decision, effort, and persistence in performing behaviors. The second type of expectancy is outcome expectations which refer to individuals' beliefs that engaging in specific behaviors will result in certain outcomes. This study is focused on self-efficacy expectations which is believed to relate to adherence to self-care requirements in CAD.

Measurement of self-efficacy

There is no all-purpose measure of perceived self-efficacy. It can be measured by the particular interesting domains of functioning under several conditions. In addition, self-efficacy is concerned with perceived capability, self-efficacy items should be reflected in terms of can do rather will do. Can do is a judgment of capability, will do is a statement of intention. Furthermore, perceived self-efficacy should be measured against levels of task demands that represent gradations of challenges or impediments to successful performance. Self-efficacy appraisals reflect the level of difficulty individuals believe they can pass. If there are no obstacles to overcome, the activity is easily to perform with high self-efficacy. Therefore, self-efficacy can serve as a predictor of future performance from initiate to sustain, for instance adherence to treatment regimens, adherence to exercise program.

Self-efficacy and adherence to self-care requirements

In the literature, self-efficacy related to and predicted various behaviors. Onchim (2002) conducted a descriptive study to examine the relationship between perceived self-efficacy and self-care behavior of 150 hypertensive patients. The result showed that perceived self-efficacy had a positive relationship with self-care behavior ($r = .535$, $p = .01$). Moreover, Saiseesub (2000) studied perceived self-efficacy influence on exercise behavior in 154 patients with coronary artery disease. The results showed that perceived self-efficacy had positive significant relationship with aerobic capacity and exercise behavior ($r = .449$, $p < .01$ and $r = .562$, $p < .05$ respectively). In addition, perceived self-efficacy could predict the exercise behavior in patients with coronary artery disease by 35% ($p = .001$).

Moore et al. (2003) conducted a study to identify factors that predict women's exercise following completion of a cardiac rehabilitation program. Sixty women with convenience sampling who had had a myocardial infarction or coronary artery bypass graft surgery were recruited from four phase II cardiac rehabilitation (cardiac rehabilitation after discharge from the hospital) sites in urban and suburban locations in Cleveland, Ohio after completion of the program. The findings showed that self-efficacy was the predictor of exercise amount ($r = .30$, $p < .05$).

Ni and colleague (1999) conducted a needs-assessment survey among 113 patients with heart failure and newly referred to the clinic. They found that the poor adherence to self-care recommendation was associated with lower self-efficacy {coefficient (SE) = 0.50 (0.25), $p = .05$ }. In addition, Rosal, Ockene, Ma, Hebert, Ockene, Merriam and Hurley (1998) found that higher self-efficacy predicted 5-year maintained quit smoking status (OR = 1.93; 95% CI=1.40,2.67).

Robertson and Keller (1992) studied the relationship of self-efficacy and exercise adherence in 51 patients with coronary artery disease. The results showed that there was positive correlational relationships between activity and self-efficacy ($r = 0.352$, $p = 0.005$). In addition, patients with a higher perception of self-efficacy for a recommended exercise regimen had more adherence than those with a lower perception of self-efficacy (coefficient = 0.284, $p = .025$).

Haobin (2000) examined the relationship between self-efficacy and health behaviors among 60 myocardial infarction patients. The findings demonstrated that

there was a significantly positive relationship between self-efficacy and overall health behaviors among myocardial infarction patients ($r = 0.68$, $p < .01$). In addition, there were significantly positive relationships between each health behavior and self-efficacy including: follow-up visiting ($r = 0.42$, $p < .01$), taking medication as prescribed ($r = 0.31$, $p < .05$), checking pulse and abnormal signs and symptoms ($r = 0.40$, $p < .01$), exercising ($r = 0.55$, $p < .01$), modifying nutrition ($r = 0.52$, $p < .01$), limiting smoking ($r = 0.86$, $p < .01$), managing stress ($r = 0.44$, $p < .01$). The first three orders of self-efficacy and health behavior were the same including: follow-up visiting, taking medication as prescribed, and limiting smoking, respectively. The last order of self-efficacy and health behavior were modifying nutrition and exercising.

Charoenwongwiwat (1995) studied perceived self-efficacy, self-care behavior, and the relationship between these two variables in 60 myocardial infarction patients. The results showed that patients reported a high mean score of perceived self-efficacy and a high mean score of self-care behavior. The first three orders of high mean score of self-efficacy were: avoiding consumption of alcohol, giving up smoking, and taking medication as prescribed, respectively. The last three orders of low mean score of self-efficacy were: consuming appropriate diet, doing exercise, checking pulse and abnormal symptoms. The first three orders of high mean score of self-care behavior were: giving up smoking, avoiding consumption of alcohol, and taking medication as prescribed, respectively. The last three orders of low mean score of health behavior were: avoiding high carbohydrate and cholesterol intake, doing exercise, checking pulse and abnormal symptoms, these may worsen myocardial infarction persons to maintain their health.

In summary, both social cognitive theory and empirical reports indicated that self-efficacy was an important variable related to and predicted of health behavior. Although studies reported that self-efficacy related to or predicted health behavior of self-care requirements, such as healthy diet consumption, smoking cessation, weight control, and stress management, more empirical study is needed to investigate the relationship between self-efficacy, adherence to self-care requirements, and other factors in patients with CAD, especially in Thai context.

Knowledge

Knowledge of the natural history of disease and risk factors that affect the development of disease can be used in developing strategies for disease prevention (Daly-Nee, Brunt & Jairath, 1999). Therefore, knowledge can assure that patients understand instructions for how to apply into action (Burke & Dunbar-Jacob, 1995). In addition, knowledge of the rules and strategies for constructing effective courses of behavior provides an individual with the manageability the demand of their everyday life (Bandura, 1997). However, in Pothiban's (1993) study there was no significant association between objective CAD risk status and perceived CAD risk score. This study suggests that Thai elderly may have not enough knowledge to perceive their CAD risk as their real risk status. Therefore, lack of knowledge is also a cardiac risk factor and may influence to their behavior such as inactivity in elderly.

Knowledge, classified as a patient-related factor, has been associated with adherence (Burke & Dunbar-Jacob, 1995), however, the association is inconsistent. Educational interventions providing knowledge only cannot be expected to alter non adherence. Thus, educational interventions are developed to increase self-efficacy expectation in order to enhance adherence (Burke & Dunbar-Jacob, 1995).

Interrelationships among knowledge, self-efficacy, and adherence to self-care requirements

Various strategies of interventions, which provide information, discussion, counseling, supporting, motivation, and encouragement, intend to increase patients' perceived self-efficacy (Kotcharin, 2001; Varitsakul, 2001; Nopplub, 2001). These strategies may also increased patients' knowledge. It seems to suggest that increase knowledge may contribute to increase perceived self-efficacy.

Alm-Roijer, Stagmo, Uden and Erhardt (2004) conducted a descriptive study to investigate if knowledge of risk factors for CAD would show any relationship to compliance to lifestyle changes to attain treatment goals and adherence to drug therapy. The results found that general knowledge about risk factors for CAD significantly related to compliance to certain lifestyle changes such as weight, physical activity, stress management, diet, attainment of lipid level goals, and the likelihood of taking prescribed blood pressure-lowering drugs. However, general knowledge of risk

factors had no relationship to blood glucose, blood pressure level, smoking habit, lipid-lowering drug and blood glucose-lowering drugs therapy. Results indicated that knowledge correlated only with some risk factor behaviors. Thus, this study showed that knowledge did not directly effect compliance to lifestyle changes and drug therapy.

Chan and Molassiotis (1999) studied the relationship between diabetes knowledge and compliance among Chinese with non-insulin dependent diabetes mellitus in Hong Kong. The findings indicated that there was no relationship between diabetes knowledge and compliance behavior ($r = 0.24$, $p = .08$). From these relationships among knowledge, self-efficacy, and adherence to behavior change was not observed. Therefore, it seems that knowledge has an indirect effect on adherence to self-care requirements through self-efficacy. Thus, knowledge may not directly influence behaviors.

In summary, there is a doubtful relationship between knowledge and adherence to self-care requirements. From the prior section of the review showed that self-efficacy is a powerful predictor of health behavior. Therefore, self-efficacy may work as a powerful mediator between knowledge and adherence to self-care requirements, the relationship among these variables need to test by this sequence.

Social support

There is no universally agreed upon definition of social support. The definitions of social support are relational in nature and involve one individual meeting another's basic needs through interpersonal interaction (Rossi & Rossi, 1999). In general, there are two dimensions of social support; types and source. Type of support consists of information, emotional, and tangible support. Sources of support are from family members, friends, health care providers, and coworkers (Hanucharunkul, 1988). In addition, Wills and Shinar (2000) reported that there are four dimensions of perceived support. First, emotional support is the availability of one or more persons who can listen sympathetically when an individual is having problems and can provide indications of caring and acceptance. Second, instrumental support involves practice help when necessary. Third, informational support is defined as providing knowledge

that is useful for solving problems. Fourth, companionship support involves the availability of persons with whom one can participate in social and leisure activities.

It is believed that social support is a facilitator of recovery from illness. This facilitator may be accomplished through increased compliance with prescribed medical regimen. In addition, social support may facilitate an individual in maintaining health or in adapting to changes which is the important factor for prevention of coronary heart disease (Lindsey, 1992).

Social support includes the patient-provider partnership, family, and friends. Ni et al. (1999) found that marital status contributed to adherence to self-care recommendation among patients with heart failure. Toljamo & Hentinen (2001) reported that living alone also related to adherence to self-care among people with insulin-dependent diabetes mellitus. Baird and Pierce (2001) reported that health care provider and family member (wife) were involved in knowledge and adherence to cardiac therapy program.

Interrelationships among social support, knowledge, self-efficacy and adherence to self-care requirements

Systematic review of social support and coronary heart disease during 1978 to early 1999 using Medline, PsychoINFO and EMBASE databases revealed that poor social support adversely affects other lifestyle risk factors such as smoking, diet or exercise (Tennant, 1999). Various studies indicated that social support influenced on life style modification (Juntawises, 1996; Pradikul-Asdornwisdm, 2000) and adherence to self-care requirements about cardiac risk factors (Burke & Dunbar-Jacob, 1995; Moore et al., 2003; Resnick & Nigg, 2003) and medication management (Boutin-Foster & Charlson, 2002).

Baird and Pierce (2001) conducted a qualitative study to identify the self-care factors most often reported by the men as facilitating and inhibiting their adherence to the cardiac therapy program. participants were five men between 60-70 years of age at an outpatient cardiac therapy program at a northwestern Ohio rehabilitation hospital. The finding reported that family system is facilitative factor which positively influence the patients' adherence to participate in the cardiac therapy program. Even though, only five participants included in the study, but results provided some evidence for

selected factors to further study their relationship with adherence to self-care requirements.

Bergman & Bertero (2001) conducted a hermeneutic study to gain knowledge and understanding of what it means to be afflicted with CAD and how it affects the life/lifestyle of the individual. Participants were recruited purposively with inclusion criteria as follow: diagnosed with coronary artery disease and be registered as a patient at the County Hospital during the period November 1997 to April 1999. Eight out of 16 patients participated in the study. Three women and five men were aged between 49 to 68 and had received their diagnosis 5-8 months before the interview. One of the themes emerged from the study was that successful rehabilitation consisted of two factors: the personality of the individual patient and external support. Finding from these two qualitative studies may be supported that family and friend support are associated with adherence.

Boutin-Foster and Charlson (2002) conducted a qualitative study to identify intermediary processes that social support might influence to promote positive health among patients with coronary artery disease. Sixty three patients with a diagnosis of myocardial infarction or angina were recruited during admission and were invited to participate in individual interviews. Findings indicated that patients felt they had to make changes in order to stay healthy including making change in their diet, keeping more doctors appointments, taking their medications, increasing physical activity, and reducing stressful responsibilities at home. Activities performed by social network members that were perceived as being most supportive in helping patients make these modifications are categorized as follow: preparing healthier meals, suggesting recipes of healthy meals, grocery shopping for the patients, accompanying patients to medical visits, going to the pharmacy for the patient, encouraging participation in exercise programs, not smoking or drinking in the presence of the patient, and doing strenuous chores such as lifting, gardening, and shoveling snow. Three themes that emerged from the study included facilitating adherence, facilitating access to medical care, and minimizing exposure to stress.

Furthermore, Moore et al. (2003) conducted a study to identify factors that predicted women's exercise following completion of a cardiac rehabilitation program. Sixty women with convenience sampling who had had a myocardial infraction or

coronary artery bypass graft surgery were recruited from four phase II cardiac rehabilitation (cardiac rehabilitation after discharge from the hospital) sites in urban and suburban locations in Cleveland, Ohio after completion of the program. Other inclusion criteria were 19 years of age or older, able to read and speak English. The exclusion criterion was high-risk criteria for safe exercise participation following a cardiac event. The findings showed that instrumental support was the predictor of exercise persistence and exercise frequency ($r=.36$, $p<.05$ and $r=.26$, $p<.05$ respectively).

Kyngas and Lahdenpera (1999) evaluated compliance, and factors associated with compliance, in patients with hypertension. The convenience sample consisted of 138 patients with hypertension aged under 63 years. The subjects had hypertension for more than one year and were followed in health care center and in occupational health services. The results showed that marital status and family size correlated significantly with smoking ($p<.001$) and those who lived alone smoked more.

In summary, social support is an important factor influencing individual's knowledge, self-efficacy, and adherence to self-care requirements. The sources of social support in cardiac patients are family, health care providers, and friends. In addition, types of social support including information, emotional, and tangible support may facilitate individual with CAD to increase knowledge, self-efficacy, and adherence to self-care requirements.

Previous experience

Previous experience with cardiac rehabilitation and hospitalization is an important factor for adherence to self-care requirements among patients with CAD. The goals of cardiac rehabilitation are to help the patient achieve the highest possible level of wellness, to stabilize the disease process, and to reduce the occurrence of major cardiac events (Riegel & Dossey, 1992). Cardiac rehabilitation programs must include behavioral counseling, life style modification, medication management, stress management, and relaxation skills. Thus, adherence to cardiac rehabilitation programs influence positive patients' outcomes.

There are four phases of cardiac rehabilitation (British Association for cardiac rehabilitation, n.d.). Phase one is the inpatient stage or after a "step change" in the

patient's cardiac condition (myocardial infarction, onset of angina, any emergency hospital admission for CAD, cardiac surgery or angioplasty, or first diagnosis of heart failure). It includes medical evaluation, reassurance and education, correction of cardiac misconceptions, risk factor assessment, mobilization and discharge planning. Phase two is the early post discharge period. Psychological distress and poor social support are powerful predictors of outcome following myocardial infarction, independent of the degree of physical impairment. Support can be provided by home visiting, telephone contact, and by supervised use of an cognitive behavioral program. Phase three is structured exercise training together with continuing educational and psychological support and advice on risk factor. All components can be undertaken safely and effectively in the community. Phase four is long term maintenance of physical activity and life style change. Several studies of cardiac rehabilitation have been conducted in the difference phases. Program of cardiac rehabilitation is developed and supported from health care providers; adherence to the program influence outcomes (Lear et al., 2001).

Patients who are frequently hospitalized are believed to have more experience about their disease and symptom. It is believed that experienced patients practice better self-care than no experienced patients (Carlson, Riegel & Moser, 2001). Because admission gives a chance to get more communication with health care providers, good communication between provider and patient may improve patients adherence to medication. Ni et al. (1999) assessed the knowledge level of and adherence to self-care among patients with heart failure and determined associated factors. One hundred and thirteen subjects were recruited from a heart failure outcomes research project at an academic medical center. The results indicated that the adherence score was significantly correlated with the knowledge score ($r=0.33$, $p=.001$). Poor adherence was found to be associated with being unmarried, lower self-efficacy, a lack of knowledge of self-care, no prior hospitalization, and not being referred by a cardiologist. These variables explained 22% of the adherence to self-care recommendation.

In summary, the interrelationships among previous experience with cardiac rehabilitation participation and number of hospitalization as well as social support, knowledge, self-efficacy, and adherence to self-care requirements were found in the

literature. However, the relationship among these variables has not been tested as the proposed model, will be tested in this study.

Summary

This chapter has presented the literature regarding adherence to self-care requirements and factors influencing adherence to self-care requirements including knowledge, self-efficacy, social support, and previous experience with cardiac rehabilitation and hospitalization. Adherence to self-care requirements in patients with coronary artery disease refers to cardiac risk factor and medication management. It is important to adhere to self-care requirements because doing so prevents the progress of the disease. Furthermore, it also affects patients' outcomes such as mortality, physiological and psychological variables, and health care costs.

The relationship between factors influencing adherence to self-care requirements are reported in both Thai and western literature. However, there is no report testing these factors as this proposed study by using causal modeling. In addition, little study in Thai literature reported the relationship of factors influencing adherence to self-care requirements in patients with coronary artery disease. Therefore, this proposed study will fill this knowledge gap.

CHAPTER III

METHODOLOGY

The methodological aspects in relation to the study will be presented, including research design, sample and setting, instrumentation, protection of human subject, data collection, and data analysis.

Research Design

A descriptive and correlational cross-sectional design was used to examine the interrelationships among adherence to self-care requirements, self-efficacy, knowledge, social support, and previous experience (number of hospitalizations and rehabilitation participation), and the model of adherence to self-care requirements was tested in patients with coronary artery disease (CAD). The cross-sectional study was selected as the design of this study because it looks at a broad perspective of a cross section of the population at a specific point in time. Moreover, it is less time consuming, less expensive, and large amounts of data can be collected at one point. The data were obtained from self-report questionnaires completed by the patients with CAD.

Sample and setting

Data were obtained from persons with CAD who attended a follow-up at cardiology outpatient clinic, Ramathibodi Hospital. Potential subjects were identified purposively by searching in the medical record and appointment schedule. Specific criteria were used for selecting the participants of the study.

Inclusion criteria were as follows:

- 1) Coronary artery disease diagnosed by the physician and reported in their medical record at least three-months preceding entry to the study.
- 2) Able to communicate in the Thai language.
- 3) No psychiatric problem in medical record, and no hearing loss due to old age.

Exclusion criteria are as follows:

Coronary artery disease patients who underwent coronary artery bypass graft less than 2 months previously, percutaneous transluminal coronary angioplasty less than 1 month previously, or myocardial infarction less than 1 month previously.

Sample size: The sample size was determined by the power function and the effects of model violations. For the power function method, the calculation of the sample size was illustrated as follows (Munro, 1997):

$$N = \frac{L(1-R^2)}{R^2} + u + 1$$

N = total sample size

L = effect size index

u = number of independent variables

L called an effect size index is defined by Cohen as a function of power and number of independent variables at a given level of alpha and can be obtained from a table (Cohen, Cohen, West and Aiken, 2003).

Cohen (1988) provides a formula for determining sample size, by using an effect size index, which he calls L. He defines a small effect as having an R^2 of 0.02, a moderate effect as having an R^2 of 0.13, and a large effect as having an R^2 of 0.35.

This proposed study will select a power of 0.80; an alpha of 0.05; thirteen of independent variables (knowledge = 5 indicators, self efficacy = 6 indicators, social support = 3 indicators, and previous experiences = 2 indicators); the value of L is between 20.7 and 22.5 (Cohen, 1988) to determine appropriate sample size (Table 3.1). A moderate effect size is accepted in cardiac patients (Kinney et al., 1996), therefore, the sample size will be between 155.5 and 167.6.

Table 3.1 Calculate sample size by power = .80; alpha = .05; independent variables =16; and effect size (small, moderate, and large).

Effect size	Small $R^2 = 0.02$	Moderate $R^2 = 0.13$	Large $R^2 = 0.35$
Sample size (L = 20.7)	1031.3	155.5	55.4
Sample size (L = 22.5)	1119.5	167.6	58.8

However, the sample size requirement of model testing was impacted by four factors: 1) model misspecification, 2) model size, 3) departures from normality, and 4) estimation procedure (Hair, Anderson, Tatham & Black, 1998). Model misspecification refers to the extent that the model suffers from specification error. The acceptable size would have a ten-to-one ratio for each item in the questionnaire. Calculation of sample size concerned with model misspecification requires a greater sample size than the other factors. Model size considers 5 to 10 respondents per parameter for calculating sample size. Departures from normality should be 15 respondents per parameter. Estimation procedure recommends a sample size by using stratified random sampling. Sample size should be 23 at special clinic, 118 at cardiology clinic, and 71 at general clinic (See Appendix A).

There are approximately 29 parameters ignoring the variance-covariance parameters in this study (figure 1.2) These parameters include two exogenous latent variables: 1) social support, as indicated by three observable variables: family, health care providers, and friends; 2) previous experience, as indicated by cardiac rehabilitation and previous hospitalization; three endogenous latent variables: 1) knowledge, as composed of five indicators: 1.1) disease, treatment, and diagnosis, 1.2) cardiac risk factors, 1.3) medication, 1.4) stress, and 1.5) self-monitoring; 2) self-efficacy, as indicated by six indicators: 2.1) diet, 2.2) alcohol consumption, 2.3) exercise, 2.4) medication, 2.5) stress management, 2.6) smoking; 3) adherence to self-care requirements, as indicated by five indicators: 3.1) cardiac risk factors, 3.2) medication management, 3.3) stress management, 3.4) self-monitoring, 3.5) follow up. In addition, there are 24 items for adherence to self-care requirements questionnaire, 58 items for self-efficacy questionnaire, 49 items for knowledge questionnaire, 21

items for social support questionnaire, and two items for previous experience questionnaire. The total number of questions is 154 items. Note that the exact number of parameters depends on fixing and constraining the parameters contained in matrices of coefficients, and matrices of variance-covariance, in the model.

Calculation of the sample size would be 1540 by model misspecification, 145 to 290 by model size, 420 by departures from normality, and 212 by estimation procedure. Therefore, 290 subjects will be included in the study because it is the middle value and the larger sample size is too sensitive to fit the study model (Hair et al., 1998).

Instrumentation

Instruments was selected to collect data on interested variables were questionnaires on: 1) Personal Information, 2) Adherence to self-care requirements, 3) Self-efficacy, 4) Knowledge, and 5) Social support. Most of these instruments were self-report questionnaires. Psychometric properties of the instruments at the time of development and further study using the instrument will be reported. A pilot study was conducted to determine the validity, internal consistency reliability, and language readability and clarity. One instrument was translated and modified by the investigator to cover the focus of the study. The instruments in this study are summarized in Table 3.2.

Table 3.2 Variables, Instruments, and Psychometric Properties

Variables	Instruments
1) Adherence to self-care requirements	- Adherence to self-care requirements questionnaire modified from the questionnaire asks about the ability to perform self-care action of patients with Essential hypertension (Panpakdee, Kotcharin, Nopplub & Varitsakul, 2001). (24 items)
2) Self-efficacy	- Coronary Heart Disease Prevention Self-efficacy Scale (CHDSES) (Kumsorn, 2004). (58 items)
3) Knowledge	- Knowledge Inventory (KI) (Schuster, Wright & Tomich, 1995). (49 items)
4) Social support	- The Social Support Questionnaire (SSQ) (Hanucharurnkul, 1988). (21 items)
5) Previous experience	- Rehabilitation participation and previous hospitalization. (2 items)

The Personal Information Questionnaire

The Personal Information Questionnaire contains information concerning age, gender, education, income, marital status, number of persons living in the family and the relationship, smoking history, medical history (rehabilitation participation), hospitalization history, medication prescribed by physician, and information of treatment given from health care providers. It was answered by the participants (Appendix B).

Adherence to self-care requirements

Adherence to self-care requirements was measured by Adherence to Self-care Requirements Questionnaire (ASCR). This instrument was modified from the questionnaire which asks about the ability to perform self-care of patients with essential hypertension as developed by Panpakdee, Kotcharin, Nopplub & Varitsakul (2001). Since the self-care action is very similar between hypertension and cardiac

disease, the items were changed from perceived confidence in performing self-care action in hypertension to the ability to perform self-care action in coronary artery disease. The rating scale was also changed from a Graphic Rating Scale of confidence to the number of days the patients had performed self-care action within the past week.

ASCR consisted of 24 items representing self-care actions to meet self-care requisites of coronary artery disease patients (Appendix B). The self-care action was grouped into five dimensions: cardiac risk factor adherence (item number 1-15), medication management adherence (item number 16), stress management adherence (item number 17-18), self-monitoring (item number 19-23), and follow-up (item number 24). It is a self-report questionnaire and the scale ranges from 0 to 7. The necessary self-care action is measured over 7 days to give a score from 0-7. A score of 0 means the subjects do not perform necessary self-care at all within the last week and a score of 7 means the subjects perform necessary self-care seven days per week. The total score on the questionnaire has a range from 0 to 168. A higher score reflects greater adherence to self-care requirements. The item number 1, 2, 4, 7, 8, 9, 11, 13, 14, 15, 16, and 20 has a negative meaning, so the score was reversed before final addition.

Content validity was evaluated by 5 experts (Appendix C). Four experts were nurse instructors with expertise in cardiovascular nursing. One expert was a specialist physician in cardiac rehabilitation. The questionnaire was revised by the researcher as the experts recommended. The revised instrument was sent back to the experts for a second round to ensure the most accurate content.

The reliability of the adherence to self-care requirements questionnaire was tested in 58 persons with CAD. Coefficient alpha of total 24-item was 0.69. For subscales, coefficient alpha of adherence to cardiac risk factors subscale, adherence to stress management subscale, and adherence to self monitoring subscale were 0.61, 0.89, and 0.23 respectively. In addition, another two subscales of adherence to medication management and adherence to follow-up were not tested for coefficient alpha because each subscale had only one item. Although coefficient alpha was low in most of the subscales, it was acceptable in the total questionnaire.

Self-efficacy

The self-efficacy questionnaire was modified from the Coronary Heart Disease Prevention Self-efficacy Scale (CHDSES) developed by Chomson (2004). The CHDSES was selected because it: 1) was developed to measure self-efficacy in coronary heart disease prevention, and 2) has acceptable psychometric properties.

CHDSES was designed to measure self-efficacy related to coronary heart disease prevention in middle aged women. The items were developed by reviewing 31 instruments and in-dept interviewing from 11 middle aged women. Three major types of situations related to environment, behavior, and personal factors were analyzed to identify sub-situations under each dimension. The initial 82 items were elicited. Psychometric properties were tested by using content validity, construct validity, and internal consistency. After initial validation by the experts, 44 items and 4 dimensions were elicited. Face validity was established by 10 middle aged women. Then, the CHDSES was revised from a 44-item and 4 domain version to the current version of 49-items and 5 dimensions. Psychometric testing of the 49-item version was conducted in 125 middle aged women. Construct validity was determined using contrasted groups who were known to have a 27% extremely high and 27% extremely low score in self-efficacy. Findings in contrasted groups showed that the mean score of these two groups was of a significant difference ($p=0.001$). This indicated that the instrument was sensitive to individual differences in the trait being measured. Moreover, factor analysis was used to assess construct validity on the basis of a conceptual framework. Factor analysis elicited 5 factors of self-efficacy related to the prevention of cardiac risk factors in middle aged women. Internal consistency was tested using Cronbach's alpha and yielded 0.95 for the total scale, 0.92 for the diet dimension, 0.93 for the avoiding alcohol consumption dimension, 0.96 for the exercise dimension, 0.98 for smoking cessation, and 0.84 for avoiding passive cigarette smoking.

In this study, the self-efficacy questionnaire consisted of 58 items (Appendix C). It has 6 dimensions: diet dimension of 13 items, alcohol consumption dimension of 6 items, exercise dimension of 14 items, smoking dimension of 13 items, stress management dimensions of 7 items, and medication management dimensions of 5 items. It is a 5 point Likert scale ranged from 0 (no confident at all) to 4 (strongly

confident). The scale is scored by summing the numerical ratings for each response to obtain a total score. The total score on the instrument has a range from 0 to 232. A higher score indicates high confidence. Content validity of the instrument was established by 5 experts. Four experts are nurse instructors with expertise in cardiovascular nursing. One expert is a specialist physician in cardiac rehabilitation.

The reliability of the self-efficacy questionnaire was tested in 58 persons with CAD. Coefficient alpha of total 58-item was 0.92. For subscales, coefficient alpha was 0.87 for diet dimension, 0.95 for alcohol consumption dimension, 0.95 for exercise dimension, 0.90 for smoking dimension, 0.90 for stress management dimension, and 0.36 for medication management dimension.

Knowledge

Knowledge was measured by Knowledge Inventory (KI) developed by Schuster, Wright and Tomich (1995). The KI was translated into the Thai language. It was selected because it: 1) was developed to assess an individual's knowledge of heart disease and risk factors, and 2) had acceptable psychometric properties. It is composed of 50-items assessing the patient's knowledge of heart disease, bypass surgery, diagnosis tests, exercise guidelines, smoking, nutrition, medications, and stress. Scores range from 0 to 50 with 50 indicating greatest knowledge.

Knowledge Inventory was reviewed for clarity, content, and face validity by 10 cardiac rehabilitation professionals (nurses and exercise physiologists) and administered to 10 rehabilitation patients to establish its clarity, adequacy, and freedom from bias. It was pilot tested on 54 hospitalized and outpatient cardiac patients. Internal consistency was at 0.84. The psychometric properties of KI were tested with sixty-four patients with coronary bypass surgery. Findings of the study showed that males, but not females, in structured cardiac rehabilitation programs, showed increased knowledge. Mean scores of knowledge for males and females in home and in structured rehabilitation programs ranged from 28 to 39 until as long as 6 months postprogram. The authors describe the KI as a criterion-referenced mastery test, which means that each learner should attain a certain score level to be successful.

In this study, the knowledge questionnaire consists of 49 items (Appendix B). Two items were deleted because they were specific to coronary artery surgery. One

item was added concerning self-management of chest pain distinct to self-care knowledge of medication to relieve chest pain. Total scores ranged from 0 to 49. A score of 49 indicates the highest knowledge. Content validity of the instrument was validated by 5 experts (Appendix C). Four experts are nurse instructors with expertise in cardiovascular nursing. One expert is a specialist physician in cardiac rehabilitation.

The reliability of knowledge questionnaire was tested in 58 persons with CAD. Coefficient alpha of total 49-item was 0.86. For subscale, coefficient alpha was 0.76 for knowledge of cardiac risk factors, 0.35 for knowledge of medication management, 0.39 for knowledge of stress management, 0.20 for knowledge of self monitoring, and 0.73 for knowledge of treatment of heart disease.

Social support

Social support was measured using the Social Support Questionnaire (SSQ), developed by Schaefer, Coyne, and Lazarus (1981) and modified by Hanucharunkul (1988). The SSQ was selected because it: 1) has been used in multi-group populations (cervical cancer, breast cancer, and caregivers), 2) has acceptable psychometric properties, and 3) can assess support from a specific person (family, health care providers, friends, and the community). The SSQ was designed to separately measure the type of perceived informational, emotional, and tangible sources of social support from each source. The SSQ part I was concerned with tangible support, and the SSQ part II designed to measure informational and emotional support. Hanucharunkul (1988) modified the SSQ part II, the perceived informational and emotional support subscale, for studying Thai cancer patients receiving radiation therapy. Items were changed slightly to be more specific about the support participants reported receiving from persons on their list. In addition, the categories were modified slightly to fit the typical sources of support for cancer patients receiving radiation therapy in Thai society. The SSQ part I, the tangible support scales, was not used because of its low pilot study reliability (Hanucharunkul, 1988) and because the situations described are not applicable to cancer patients receiving radiation therapy. Instead, two aid items from the Norbeck Social Support Questionnaire (NSSQ) (Norbeck, Lindry & Carrieri, 1981) for measuring tangible support were added.

In summary, the SSQ modified by Hanucharurnkul (1988) was designed to measure informational, emotional, and tangible support in Thai cancer patients. The first question served as a measure of informational support. The second to fifth questions measure the domain of emotional support with an emphasis on perception of reliability, morale building, affiliative concern, and trust. The last two questions measure the domain of tangible support.

Psychometric properties were evaluated by reporting stability, construct validity, and reliability. The stability of the SSQ was examined by test-retest with an interval of 3 days between tests in 10 cancer patients receiving radiation therapy. The Pearson product moment correlation was 0.94 for the total SSQ (Hanucharurnkul, 1988). Construct validity of SSQ Thai version was tested by factor analysis in 300 post radiotherapy cervical cancer women. The result revealed that one factor was extracted, and 70.87% of the variance was explained (Santawaja, 2002). Internal consistency was established from 112 cancer patients receiving radiation therapy. The coefficient alpha for total SSQ was 0.97 (Hanucharurnkul, 1988). This questionnaire was modified for use with two studies of breast cancer population, one of post radiotherapy cervical cancer, and one of caregiver for the schizophrenic for which the Cronbach's alpha was .77, .85, .88, and .98 (Kaveevivitchai, 1993; Saneha, 1999; Santawaja, 2002, and Pipatananond, 2001) respectively.

In this study, the SSQ was used to measure social support that patients with coronary artery disease received from their family members, health care providers, and friends (Appendix B). The 21-item questionnaire included three sources of support; family members, health care providers, and friends; and three types of support, informative, emotional, and tangible support. Each subject was asked to rate the amount of support that they received from their family members, health care providers, and friends on five point scale from 0 to 4. A score of "0" means no support and a score of "4" means a great deal of support. Total score of social support was calculated by summing the scores of the 21 items. Possible scores ranged from 0 to 84. Higher scores indicated higher levels of support.

In this study, reliability SSQ was tested with 58 persons in CAD. Coefficient alpha of total SSQ was 0.89. For subscale, coefficient alpha was 0.91 for family

support, 0.91 for health care providers support, and 0.91 for friends support. All were in the acceptable value.

Reliability test for the studied Instruments

Reliability coefficients of the four studied instruments were tested in 285 persons with CAD (See Table 3.3). Kline (1998) suggested the guideline of reliability coefficients around 0.90 can be considered “excellent”, values around 0.80 as “very good”, values around 0.70 as “adequate”, and values around 0.50 indicate that at least one-half of the observed variance may be due to random error. In this study, Reliability coefficients of the total scale were at the acceptable range. However, reliability coefficients of some subscale were very low. Waltz, Strickland and Lenz (1991) stated that “the longer the test (more items), the higher the resulting alpha value”. Therefore, the instruments had to be revised for further study.

Protection of human subjects

Prior to data collection, approval was obtained from the Human Research Review committee of the Faculty of Nursing, Ramathibodi Hospital. The purpose of the study, inclusion and exclusion criteria was explained to the director and personnel at the selected setting. Potential subjects were approached and asked to participate in the study by direct personal contact. The overall purpose of the study and the time required for participation was given to the patients. The subjects were assured of the confidentiality and freedom to discontinue their participation at any time. Written information (Appendix D) was also provided including the detail, purpose of the study, and the discussion of both protection of confidentiality and the freedom to decline participation at any time.

Table 3.3 Reliability Coefficients of the Instruments Used in the study (N = 285)

Scale	Number of Items	Alpha Coefficient
1) Adherence to self-care requirements	24	0.77
Cardiac Risk Factors	15	0.80
Medication Management	1	-
Stress Management	2	0.76
Self Monitoring	5	0.19
Follow up	1	-
2) Self-efficacy	58	0.95
Diet	13	0.91
Alcohol Consumption	6	0.96
Exercise	14	0.95
Smoking	13	0.94
Stress Management	7	0.93
Medication Management	5	0.72
3) Knowledge	49	0.86
Cardiac Risk Factors	23	0.77
Medication Management	5	0.43
Stress Management	3	0.35
Self Monitoring	5	0.33
Disease	13	0.72
4) Social support	21	0.92
Family	7	0.92
Health Care Providers	7	0.90
Friends	7	0.94

Data collection

After the approval of institute review board, the investigator recruited the subjects from the Ramathibodi statistics outpatient database who have been diagnosed with CAD in their medical record. The data collection procedure was initiated as follows:

1) Permission was obtained from the directors of the selected settings for the investigator to approach potential participants in the outpatient clinics. The head nurses and staff of each out patient clinic was also approached and informed about the research study.

2) The subjects were recruited from the Ramathibodi statistics outpatient database. The researcher looked through the patients' record and marked the records of potential subjects. Potential subjects were invited to participate in the study after visiting the physician. Due to the problem of time consume to fill the questionnaires, patients willing to participate in the study were given questionnaires with an attached stamped envelope. In addition, participants willing to complete the questionnaires at the outpatient clinic were also welcomed. Participants were asked to return the questionnaire by mail within 2 weeks. The participants were informed that no negative consequences would be encountered from participation in this study. The patients were also informed of the purpose of the study and the time required for participation. Participants in the study were guaranteed both protection of confidentiality and the freedom to withdraw from participation at any time. Patients' self-reports were used in data collection. If patients could not read the questionnaire, the researcher would read the questionnaire for the patients.

3) The completion of each questionnaire required answering questions on adherence to self-care requirements, self-efficacy, knowledge, and social support.

Data analysis

Data were double-entered into the Statistical Package of the Social Sciences for personal computer. Data analysis included descriptive and inferential statistics. Descriptive statistics were used to delineate characteristics of the sample and examine the distribution of demographic variables. Inferential statistics were used to answer the research questions. According to the advantages of the LISREL statistic program to path analysis and factor analysis, LISREL allows for equation errors, measurement errors, correlated errors of measurement, recursive and non recursive, longitudinal analysis, and simultaneous analysis of several groups (Pedhazur & Schmelkin, 1991; Kline, 1998). Therefore, LISREL 8.52 was used to analyze this study data to explain relationships among variables in both path analysis and the Linear Structural Relationship Model. Data analysis was conducted in two phases as follows:

The first phase: preliminary analysis

- 1) The accuracy of data entry was examined through an inspection of range of score, frequency, mean, and standard deviation.
- 2) Description of the variables including frequency and measurement of central tendencies were used to examine normality of the study variables and to describe the demographic characteristics of the sample.
- 3) Inferential statistics were used to determine both reliability and validity of the study instruments.
- 4) Assumption testing and the correlation matrix of variables were analyzed by using SPSS 11.5 statistical packages.

The second phase: principal analysis

The variables in a causal relationship model to predict adherence to self-care requirements were examined by the Linear Structural Modeling statistical package under the generalized least square procedure in the two-step procedure as follows:

- 1) Parameters of the measurement model and the hypothesized full model were examined.
- 2) The hypothesized full model fit was tested and evaluated by modifying for the best model fitted to answer the hypotheses.

In summary, this chapter presented a research methodology which includes the design, population and sampling, instruments used, and data analysis procedures. In addition, this chapter also included a discussion on human subject protection, the report of the instruments development and psychometric properties.

CHAPTER IV

RESULTS

The findings are reported in four sections. Firstly, demographic and characteristics of the sample are presented. Secondly, descriptive characteristics of the study variables are explained. Then, preliminary analysis is described. Finally, the hypothesized model and the modified model of adherence to self care requirements in coronary artery disease (CAD) are reported.

Demographic Characteristics of Study Sample

The potential subjects were approached in this study equal 340. Approximately 88% (n = 299) returned the questionnaires and 83% (n = 285) were the complete for analysis. The potential subjects rejected to participate in this study at 3% (n = 10). Therefore, a sample of 285 individuals diagnosed with CAD was recruited from the outpatient clinic at Ramathibodi Hospital. The ages of the sample ranged from 31 to 85 years, with a mean of 63 years (SD = 9.47). Most of the subjects in this study were male (69.5%, n = 198). The majority had at least an elementary school education (32.6%, n = 93) while many had a bachelor's or higher degree (24.9%, n = 71). The majority of the sample was married (78.9%, n = 225). The mean number of family members living with the subject was 4 persons. Income varied widely (0-300,000 Baht; Mean = 16,893.19; SD = 27,041.59; Mode = 10,000 and 20,000). Most of the subjects were currently non-smokers (91.9%, n = 262) but an almost equal number were past smokers (50.5%, n = 144) and non-smokers (47.4%, n = 135). In addition, the mean number of present cigarettes smoked was 12.11 cigarettes per day and for past cigarette smokers the average was 21.88 cigarettes per day. Moreover, the mean years of current and previous smoking were 22.25 and 22.34 years respectively. Most of the sample exercised regularly (n = 168, 58.9%). Demographic characteristics in detail are summarized in Table 4.1

Table 4.1 Demographic Characteristics of the Sample (N = 285)

Variables	Number	Percentage
Age		
<i>Mean = 62.87, SD = 9.47</i>	285	
Gender		
Male	198	69.5
Female	87	30.5
Education		
Elementary School	93	32.6
Secondary School	37	13.0
High School	44	15.4
Diploma Degree	21	7.4
Bachelor or Higher Degree	71	24.9
Other	19	6.7
Marital Status		
Single	11	3.9
Married	225	78.9
Separated	7	2.5
Divorced	7	2.5
Widowed	35	12.3
Number of Family Member		
<i>Mean = 4.43, SD = 1.93</i>	74	26
Income (Baht/month)		
<10,000	131	46.1
10,000 – 25,000	94	33.1
25,001 – 40,000	35	12.3
40,001 – 55,000	10	3.6
>55,001	14	4.9
<i>Mean = 16,893.19; SD = 27041.59</i>	284	
<i>Mode = 10,000; 20,000</i>	19	
Missing	1	0.4
Smoking History		
Present		
Smoke	22	7.7
Non Smoke	262	91.9
Missing	1	0.4
Past		
Smoke	144	50.5
Non Smoke	135	47.4
Missing	6	2.1
Physical activity		
Regularity		
Yes	168	58.9
No	116	40.7
Missing	1	0.4
Duration of exercise (minutes/time of exercise)		
<i>Mean = 31.31, SD = 23.62</i>	275	96.5
Missing	10	3.5

Table 4.1 Demographic Characteristics of the sample (N = 285) (Con't)

Variables	Number	Percentage
Type of physical Activity		
Walk	141	49.50
Tai Chi	4	1.40
Yoka	1	0.40
Run	11	3.90
Other	37	12.97
Multiple	78	27.36
Not exercise	9	3.15
Missing	4	1.40

Descriptive Characteristic of Study Variables

The characteristics of study variables are shown in table 4.2. It included the possible range, actual range, mean, and standard deviation of study variables in the CAD subjects. All study variables are at moderate level, however, some subscales are at high level as shown in Table 4.2. The majority of the subjects had previous experience with hospitalization (n = 230, 80.7%). Only 13.7% (n = 39) of subjects participated in a cardiac rehabilitation program. Moreover, the main sources of support were from family (Table 4.2).

Table 4.2 Characteristics of study variables (N = 285)

Variables	Possible Range	Actual Range	Mean	SD	Meaning
Knowledge	0-49	0-36	18.98	7.48	Moderate
Cardiac Risk Factor	0-23	0-19	11.02	4.04	Moderate
Medication	0-5	0-5	1.94	1.26	Low
Stress Management	0-3	0-3	1.44	0.97	Moderate
Self Monitoring	0-5	0-3	0.31	0.61	Low
Disease	0-13	0-12	4.24	2.70	Low
Self-Efficacy	0-232	48-232	153.69	35.71	Moderate
Diet	0-52	0-52	31.96	9.53	Moderate
Alcohol Consumption	0-24	0-24	20.16	5.64	High
Exercise	0-56	0-56	31.76	13.90	Moderate
Cigarette Smoking	0-52	0-52	40.59	11.65	High
Stress Management	0-28	0-28	15.31	6.64	Moderate
Medication Management	0-20	1-20	16.19	3.86	High

Table 4.2 Characteristics of study variables (Cont)

Variables	Possible Range	Actual Range	Mean	SD	Meaning
Adherence to Self care					
Requirements	0-168	54-154	110.91	14.83	Moderate
Cardiac Risk Factor	0-105	29-98	74.89	10.75	High
Medication	0-7	0-7	6.41	1.54	High
Stress Management	0-14	0-14	9.02	4.22	Moderate
Self Monitoring	0-35	0-28	14.01	5.15	Moderate
Follow up	0-7	0-7	6.58	0.90	High
Social Support	0-84	16-84	51.93	14.64	Moderate
Family	0-28	0-28	22.63	5.08	High
Health care providers	0-28	0-28	18.40	5.89	Moderate
Friends	0-28	0-28	14.01	6.46	Moderate
Previous Experience	0-2	0-2	0.94	0.53	Moderate
Cardiac Rehabilitation Participation					
Yes (n = 39, 13.7%)					
No (n = 246, 86.3%)					
Hospitalization					
Yes (n = 230, 80.7%)					
No (n = 53, 18.6%)					
Missing (n = 2, 0.7%)					

Preliminary Analysis

Before data analysis using structural equation modeling (SEM) was used, testing was required in order to ensure that there was no violation of underlying assumptions. If assumptions were violated, the findings were more likely to be biased. Three assumptions were tested as follows: normality; linearity; and multicollinearity.

Normality

Testing for a normal distribution is an important procedure. Skewness and kurtosis were used to test normality. The range of skewness within ± 1 reflects a normal distribution. The value of kurtosis is not beyond ± 1.96 or ± 2.58 (Hair et al., 1998). While ideally both univariate and multivariate normality is required, as univariate alone will not guarantee multivariate, univariate normality testing is accepted by most researchers. (Hair et al., 1998). Table 4.3 showed univariate normality of the studied variables. Most of the skewness and kurtosis of the studied variables were within the normal range. The value of univariate skewness greater than

3 and univariate kurtosis greater than 20 are described as indicating extreme skewness and extreme kurtosis (Kline, 1998). Since only two subscales of adherence to self-care requirements showed extreme skewness, and the total score of adherence to self-care requirements did not show extreme skewness the data were not transformed.

Table 4.3 Univariate normality of study variable.

Variables	Skewness	Kurtosis
Adherence to Self care Requirements	-.214	.558
Cardiac Risk Factor	-.530	.766
Medication	-3.310	10.566
Stress Management	-.611	-.567
Self Monitoring	.566	.605
Follow up	-3.332	15.003
Self-Efficacy	-.185	-.028
Diet	-.187	.308
Alcohol Consumption	-1.707	2.577
Exercise	-.270	-.364
Cigarette Smoking	-1.501	2.345
Stress Management	-.006	-.139
Medication Management	-.985	.817
Knowledge	-.163	-.549
Cardiac Risk Factor	-.349	-.347
Medication	.363	-.398
Stress Management	-.020	-1.002
Self Monitoring	2.124	4.321
Disease	.298	-.475
Social Support	-.011	-.168
Family	-1.218	2.127
Health Care Providers	-.380	-.003
Friends	.104	-.291

Linearity

The most common process to assess linearity is to examine scatter plots of the variables and to identify any nonlinear patterns in the data. The departures from linearity may impact the correlation (Hair et al., 1998). The linear relationship of

studied variables was investigated through a bivariate scatter plot procedure under the PRELIS 2.52 program. By examining the scatter plots between all independent variables and dependent variable (adherence to self care requirements), there was no evidence of nonlinearity between pairs of variables.

Multicollinearity

Multicollinearity refers to the relationship among three or more variables (Appendix E). If the data set showed multicollinearity, it would impact the results because multivariate procedures reduce any single independent variable's predictive power by the extent to which it is associated with the other independent variables (Hair et al., 1998). In addition, multicollinearity occurs because the separate variables actually measure the same thing (Kline, 1998). Three criteria were used to examine multicollinearity: 1) Pearson's correlation coefficients; 2) tolerance values and variance inflation factor (VIF); and 3) condition indices and variance proportion (Hair et al., 1998).

Values and interpretation were identified as follow. First, correlation values between variables should not exceed ± 0.85 (Kline, 1998). Table 4.4 showed the correlation in this study ranged from -0.003 to 0.516. Next, tolerance values should be greater than 0.1 and VIF are less than 10 (Kline, 1998). Table 4.5 showed that tolerance and VIF of this study ranged from 0.852 to 0.961 and 1.041 to 1.174 respectively. Finally, the threshold value of condition indices usually equals 30 and a proportion of variance ≥ 0.90 for two or more coefficients (Hair et al., 1998). Table 4.5 showed that the condition indices are within 30. Table 4.6 showed the variance proportion of this study and no variance proportion was ≥ 0.90 for two or more coefficients. If the values are not within their normal range, they indicate redundant variables. This study indicated all the values were within the normal range, and therefore there was no evidence of multicollinearity.

Table 4.4 Correlation Matrix of Studied Variables (N = 285)

Variables	1	2	3	4	5
1. Adherence to Self care Requirements	1.00				
2. Self-Efficacy	0.514***	1.00			
3. Knowledge	0.208***	0.151*	1.00		
4. Social Support	0.242***	0.327***	0.053	1.00	
5. Previous experience	0.084	0.087	0.179**	0.128*	1.00

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 4.5 Testing for Multicollinearity of studied variables

Variables	Tolerance	VIF
Knowledge	.944	1.059
Self-Efficacy	.859	1.165
Social Support	.850	1.177
Hospitalization	.962	1.040
Participation in cardiac rehabilitation	.928	1.077

Table 4.6 Variance Proportion of the Studied Variables

Model Dimension	Eigen Value	Condition Index	Variance Proportion					
			Constant	KN	SE	SS	Hosp	Rehab
1	5.720	1.000	.00	.00	.00	.00	.00	.00
2	.114	7.081	.00	.89	.01	.03	.00	.07
3	.063	9.559	.01	.03	.10	.06	.02	.89
4	.055	10.234	.01	.06	.10	.14	.50	.01
5	.035	12.864	.00	.02	.64	.66	.00	.01
6	.014	20.062	.98	.00	.15	.11	.48	.02

Note: SS = Social Support, KN = Knowledge, SE = Self-efficacy,
Hosp = Hospitalization, Rehab = Participation in Cardiac Rehabilitation

Table 4.4 showed the relationship among studied variables. Self-efficacy was significantly correlated with adherence to self care requirements ($r = 0.514$, $p < .001$). Moreover, knowledge and social support were significantly correlated with adherence to self care requirements ($r = 0.208$, $p < .001$; $r = 0.242$, $p < .001$) and self efficacy ($r = 0.151$, $p < .05$; $r = 0.327$, $p < .001$) respectively. Furthermore, previous experience was significant correlated with knowledge ($r = 0.179$, $p < .01$) and social support ($r = 0.128$,

$p < .05$). However, social support was non significantly correlated with knowledge. In addition, previous experience was non-significantly correlated with adherence to self care requirements and self-efficacy.

Model Testing and Modification

The structural equation modeling (SEM), the full model, composed of two submodels: 1) a measurement model and 2) a structural model. The measurement model is a model that defines relations between the observed and the latent variables. The structural model is a model defining relations among the unobserved variables. If the hypothesized model is proposed, both submodels need to be tested separately.

SEM has no single statistical test that best describes the “strength” of the model predictions (Hair et al., 1998). Joreskog and Sorbom (1996) proposed that model testing finds a model that not only fits the data well statistically, but also has the property of every parameter having a substantively meaningful interpretation under theory. A precise model is preferable, even though about 30 indicators of model evaluation are available in the LISREL 8.52.

The Overall Model Fit Indexes

The Overall Model Fit Indexes were determined through four measures as follows: Chi-square (χ^2), Goodness-of-fit indices (GFI), Adjusted goodness-of-fit indices (AGFI), and Root mean square error of approximation (RMSEA) (Joreskog & Sorbom, 1996).

Chi-square (χ^2) is a statistically basic measure of goodness-of-fit available in SEM. Statistical significance of χ^2 indicates that the actual and predicted input matrixes are statistically different. The recommended minimum accepted significance level is 0.5 (Hair et al., 1998). However, χ^2 is too sensitive to the sample size especially for cases in which the sample size exceeds 200 respondents. Therefore, it is encouraged to compliment this measure with other measures in all instances (Hair et al., 1998).

The alternative consideration is the Chi-square and degree of freedom ratio (χ^2/df). A large value of χ^2 relative to the degree of freedom signifies that the observed

and estimated matrices differ considerably (Hair et al., 1998). The recommended level is from 1.0 to 2.0 (Hair et al., 1998).

The Goodness-of-Fit Index (GFI) is the square residuals of the prediction and actual data comparison reflecting the overall degree of fit. Its value ranges from 0 (poor fit) to 1 (perfect fit) (Hair et al., 1998; Kline, 1998). The value of GFI above 0.90 is recommended (Kline, 1998).

The Adjusted Goodness of Fit Index (AGFI) is an extension of GFI, adjusted by the ratio of degree of freedom for the proposed model to the degree of freedom for the null model. The value of AGFI over 0.90 is recommended (Hair et al., 1998).

Root Mean Square Error of Approximation (RMSEA) is the discrepancy per degree of freedom. Its value is representative of the goodness-of-fit that could be expected if the model is estimated in the population, not just the sample drawn for the estimation. The value of RMSEA should range from .05 to .08 (Hair et al., 1998).

The Measurement Model Fit Indexes

Once the overall model has been accepted, each of constructs can be examined separately by (1) examining the indicator loadings for statistical significance (Hair et al., 1998). For each variable the *t*-values associated with each of the loadings exceed the critical value of ± 1.96 , ± 2.58 , ± 3.29 for the 0.05, 0.01, and 0.001 significant levels respectively. And (2) assessing the construct's reliability and variance extracted (Hair et al., 1998). The R^2 serves as a reliability indicator of the extent to which each of the variables adequately measures its construct. Its values range from 0.00 to 1.00 (Kline, 1998). A commonly used threshold value for acceptable reliability is 0.70, however, values below 0.70 have been judged acceptable if the research is exploratory in nature (Hair et al., 1998).

According to the two submodels of the proposed SEM, the measurement and the hypothesized model, model testing was conducted first for the measurement model and then followed by the hypothesized model.

The Measurement Model Testing

The confirmatory factor analysis (CFA) procedure under the LISREL 8.52 was employed to test the indicators for each construct and assess the reliability of each

construct for estimating the causal relationships (Hair et al., 1998). There are two common approaches to evaluate the measurement model fit. First, one of the loadings in each construct must be set to the fixed value of 1.0. Second, it is to estimate the construct variance directly. Both approaches result in the same estimates (Hair et al., 1998). However, for the theory testing, the second approach is recommended. To test the theory proposed in the present investigation, the second approach was employed.

There were four measurement models of this study to test the construct of the model and the model fit. The measurement model goodness-of-fit index fit was demonstrated in Table 4.7 (See Appendix F). The results illustrated that three of the measurement models had acceptable overall model fit. Only the measurement model of social support was a perfect fit. All of them had low χ^2 resulting in non-significant levels of probability ≥ 0.05 . The χ^2/df ratio fell within the recommended levels of 1 to 2, with both GFI and AGFI values close to 1.00 or equal to 1.00, and RMSEA values ranged from 0.00 to 0.05.

Table 4.7 The Measurement Model Goodness-of-Fit Index (N = 285)

Variables	χ^2	<i>df</i>	<i>p</i>	GFI	AGFI	RMSEA
Adherence to Self Care Requirements	8.53	5	0.129	0.99	0.96	0.05
Self-efficacy	11.52	8	0.173	0.99	0.96	0.039
Knowledge	2.07	5	0.838	1.00	0.99	0.00
Social Support	0.04	1	0.844	1.00	1.00	0.00

Note: χ^2 = Chi-square, *df* = degree of freedom, *p* = *p* value, GFI = Goodness-of-Fit Index, AGFI = Adjusted Goodness-of-Fit Index, RMSEA = Root Mean Square error of Approximation.

Moreover, testing the measurement model fit was done to examine the observed variable loadings for statistical significance level of 0.05 related to the specific constructs, and verify the posited relationships among indicators and the constructs (Hair et al., 1998). Another testing is to examine the squared multiple correlation (R^2) of the observed variable. R^2 values range from 0 to 1.00. R^2 served as reliability indicators of the extent to which each adequately measured its respective underlying construct (Byrne, 1998). The measurement model fit was presented in Table 4.8 (See Appendix F).

The results of R^2 for each observed variable of the latent variables ranged from a low score (0.01) to a high score (0.59). R^2 for adherence to self care requirements in individuals with CAD were shown to have a low (0.01) to moderate (0.59) strength of linear relationships. The R^2 for self efficacy about self care requirements in persons with CAD were found to be low (0.15) to moderate (0.57). The R^2 for Knowledge were illustrated low (0.07) to high (0.47) relation. The R^2 for social support showed weak relationships (0.29 to 0.49). Although the relationship between observed variables and latent variables were not strong, most of them were statistically significant. Only adherence to follow up, one-item indicator, was non-significant. Because this is an important indicator by which to examine adherence in persons with CAD, this indicator were kept in the model.

In summary, the findings indicated that the measurement model of adherence to self care requirements, self-efficacy, knowledge, and social support was well fitted with the observed indicators. In other word, observed indicators (subscales) were a good representation of unobserved variables (major variables).

Table 4.8 The Measurement Model Construct Measure (N = 285)

Indicators	<i>FL</i>	<i>T</i>	<i>SE</i>	<i>FS</i>	<i>R</i> ²
Adherence to Self care Requirements					
Cardiac Risk Factor	0.77***	3.81	0.20	0.70	0.59
Medication	0.18*	2.14	0.08	0.07	0.03
Stress Management	0.31**	3.07	0.10	0.13	0.09
Self Monitoring	0.26**	2.86	0.09	0.11	0.07
Follow up	0.12	1.51	0.08	0.05	0.01
Self-Efficacy					
Diet	0.75***	12.39	0.06	0.39	0.57
Alcohol Consumption	0.39***	6.15	0.06	0.08	0.15
Exercise	0.60***	10.06	0.06	0.17	0.36
Cigarette Smoking	0.64***	10.02	0.06	0.28	0.42
Stress Management	0.66***	11.15	0.06	0.21	0.43
Medication Management	0.55***	8.98	0.06	0.14	0.30
Knowledge					
Cardiac Risk Factor	0.84***	14.69	0.06	0.57	0.47
Medication	0.45***	7.23	0.06	0.07	0.09
Stress Management	0.46***	7.58	0.06	0.09	0.10
Self Monitoring	0.35***	5.61	0.06	0.04	0.07
Disease	0.81***	14.21	0.06	0.34	0.40
Social Support					
Family	0.54***	7.54	0.07	0.26	0.29
Health care provider	0.70***	8.85	0.08	0.47	0.49
Friend	0.61***	8.12	0.07	0.32	0.37

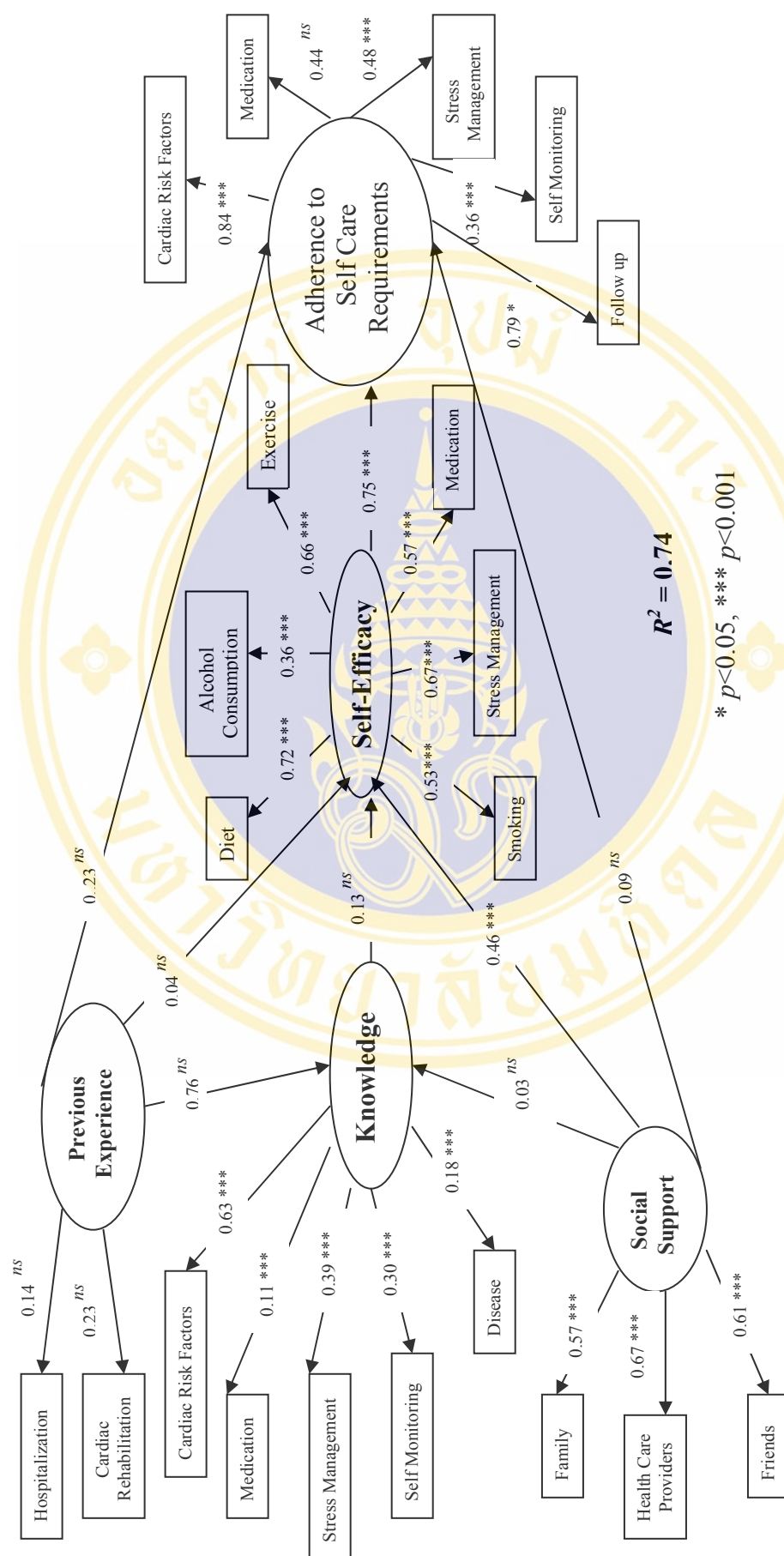
Note: *FL* = Factor Loading, *T* = T-value, *SE* = Standard Error, *FS* = Factor Score, *R*² = Squared Multiple Correlations, * *p* < 0.05, ** *p* < 0.01, *** *p* < .001

The Hypothesized Model Testing and Modifying

A structural equation modeling (SEM) using the LISREL 8.52 was employed to test the hypothesized full model. The results of the hypothesized model testing showed in Figure 4.1 and Table 4.10 revealed that $\chi^2 = 254.59$, *df* = 181, *p* = 0.000, RMSEA = 0.038, GFI = 0.92, AGFI = 0.90, χ^2/df = 1.41. As the findings of the hypothesized model were not in the acceptable range, the hypothesized model was not fit with the data. Model modification was suggested.

The step of model modification is concerned not only the statistical values but also theoretical aspects. Hair and colleagues (1998) emphasized that model respecification procedures are necessary to ensure the estimated model has the more appropriate empirical constraints in order to maximize model goodness-of-fit. In this

regard, there are two types of diagnostic elements -the standardized residuals and modification indices- for indicating potential significant model modification (Hair et al., 1998). The standardized residuals should range from ± 2.58 . The modification indices are not to exceed 3.84 (Hair et al., 1998). The standardized residuals of the hypothesized model ranged from -3.02 to 5.07. Various modification indices exceeded 3.84. Therefore, the hypothesized model was modified by freeing some parameters (Schumaker & Lomax, 1996). The largest modification index showed in the Theta Delta-Epsilon parameter (30.53) which is the first free parameter of the modified model. The results of the modified model illustrated in Figure 4.2 and Table 4.9 reveal that $\chi^2 = 199.52$, $df = 176$, $p = 0.108$, RMSEA = 0.022, GFI = 0.94, AGFI = 0.92, $\chi^2/df = 1.133$. Although standardized (-2.79 to 3.64) residuals and the modification indices were not within the normal range, the values of the modified model were less than the hypothesized model. In addition, the significant parameters of the modified model could be supported by the theoretical framework.



$\chi^2 = 254.59$, $df = 181$, $p = 0.000$, RMSEA = 0.038, GFI = 0.92, AGFI = 0.90, $\chi^2/df = 1.41$,

Figure 4.1 The Hypothesized Adherence to Self Care Requirements Model

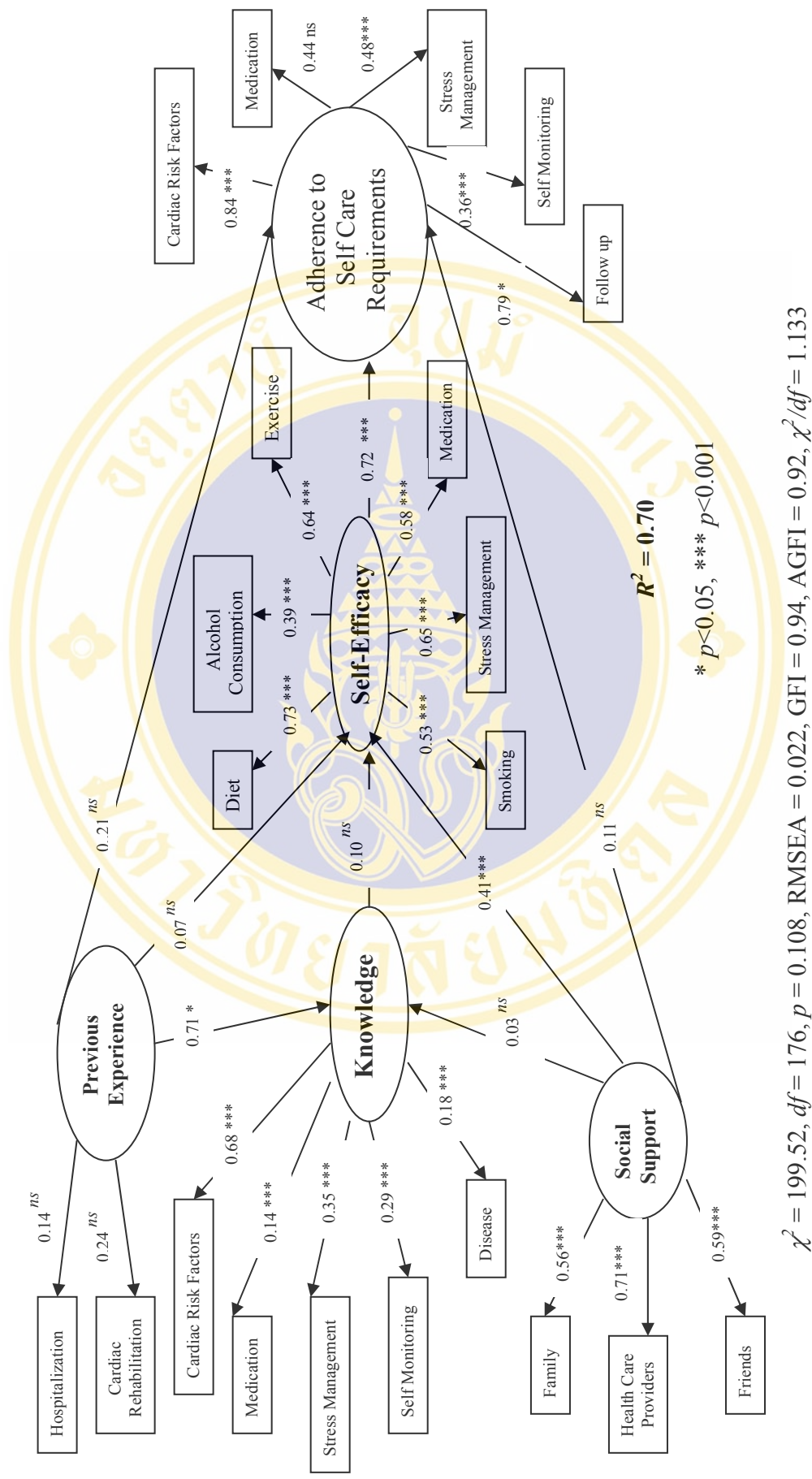


Figure 4.2 The Modified Adherence to Self Care Requirements Model

Table 4.9 The Fitted Index Values of Hypothesized and Modified Model (N = 285)

Fitted Index	Hypothesized Model	Modified Model
Chi-square	254.59	199.52
Degree of Freedom	181	176
P Value	0.000	0.108
RMSEA	0.038	0.022
GFI	0.92	0.94
AGFI	0.90	0.92
Standardized Residuals	-3.02 to 5.07	-2.79 to 3.64
Modification Indices	30.53 (Largest)	5.10

Note: RMSEA = Root Mean Square Error of Approximation, GFI = Goodness of Fit Index,
AGFI = Adjusted Goodness of Fit Index

Besides modification indices, the path coefficient is another index that must be employed as an indicator of model modification. To consider the path coefficient, even though statistical perspective proposes that non-significant parameter should be deleted from the model, the substantive interest must be considered (Byrne, 1998; Schumaker & Lomax, 1996).

In this analysis, the hypothesized model showed two paths of statistical significance as follows: one path of endogenous variables to endogenous variables (beta parameter), self-efficacy to adherence; another path of exogenous variables and endogenous variables (gamma parameter), and social support to self-efficacy (Table 4.10). However, as the hypothesized model did not fit with the data, the modified process was required. The modified process was continued until the goodness of fit indices were at the acceptable level and the direction of the parameters were not negative (Table 4.10). The result of the modified model found one more significant path of exogenous variables and endogenous variables (gamma parameter) from previous experience to knowledge (Table 4.10).

However, the remaining 5 parameters were non-significant in either the hypothesized model nor the modified model (Table 4.10) -4 parameters of exogenous variables and endogenous variables (gamma parameter) as well as 1 parameter of endogenous and endogenous variables 1) previous experience to self-efficacy, 2) previous experience to adherence, 3) social support to knowledge, 4) social support to adherence and 5) knowledge to self-efficacy. The non-significant paths were included

in the model because of their substantive aspects in the theory. The summary results are demonstrated in Table 4.11.

Table 4.10 Path Coefficients, Standard Errors, T-Values of Parameter Estimates of Adherence to Self care Requirements Model (N = 285)

Path	Hypothesized Model			Modified Model		
	Path Coefficients	Standard Errors	t-Values	Path Coefficients	Standard Errors	t-Values
LAMBDA-Y						
Knowledge - Cardiac Risk Factor	0.84***			0.84***		
Knowledge - Medication	0.44***	0.02	6.87	0.44***	0.02	6.86
Knowledge - Stress Management	0.48***	0.02	7.40	0.48***	0.02	7.40
Knowledge - Self Monitoring	0.36***	0.01	5.53	0.36***	0.01	5.50
Knowledge - Disease	0.79***	0.02	11.03	0.79***	0.02	10.98
Self-Efficacy - Diet	0.72***			0.73***		
Self-Efficacy - Alcohol Consumption	0.38***	0.06	5.77	0.39***	0.06	5.81
Self-Efficacy - Exercise	0.66***	0.07	9.39	0.64***	0.07	9.47
Self-Efficacy - Cigarette Smoking	0.57***	0.06	8.74	0.58***	0.06	8.56
Self-Efficacy - Stress Management	0.67***	0.07	9.62	0.65***	0.06	9.57
Self-Efficacy - Medication Management	0.53***	0.05	8.06	0.53***	0.05	8.04
Adherence - Cardiac Risk Factor	0.63***			0.68***		
Adherence - Medication	0.11	0.11	1.89	0.14	0.11	1.92
Adherence - Stress Management	0.39***	0.16	4.48	0.35***	0.16	4.54
Adherence - Self Monitoring	0.30***	0.07	3.85	0.29***	0.08	3.81
Adherence - Follow up	0.18*	0.06	2.42	0.18*	0.07	2.48
LAMBDA-X						
Previous Experience - Participation in Cardiac Rehabilitation	0.14	0.03	0.98	0.14	0.04	1.38
Previous Experience - Hospitalization	0.23	0.06	1.31	0.24	0.05	1.76
Social Support - Family	0.57***	0.05	8.50	0.56***	0.05	8.32
Social Support - Health Care Providers	0.67***	0.06	9.76	0.71***	0.06	9.79
Social Support - Friend	0.61***	0.06	8.68	0.59***	0.06	8.47
BETA						
Knowledge - Self-Efficacy	0.13	0.44	0.29	0.10	0.36	0.27
Self-Efficacy - Adherence	0.75***	0.14	5.49	0.72***	0.12	5.94
GAMMA						
Previous Experience - Knowledge	0.76	0.39	1.39	0.71	0.36	1.96
Previous Experience - Self-Efficacy	0.04	0.56	0.07	0.07	0.47	0.15
Previous Experience - Adherence	0.23	0.14	1.59	0.21	0.13	1.57
Social Support - Knowledge	0.03	0.08	0.42	0.03	0.08	0.41
Social Support - Self-Efficacy	0.46***	0.08	5.46	0.41***	0.08	5.03
Social Support - Adherence	0.09	0.11	0.83	0.11	0.10	1.14

** $p < .01$, *** $p < .001$

Table 4.11 Direct, Indirect, and Total Effects of Causal Variables on Affected Variables (N=285)

Hypothesized Model

Causal Variables	Affected Variables								
	Knowledge			Self-Efficacy			Adherence		
	TE	IE	DE	TE	IE	DE	TE	IE	DE
Previous Experience	0.76	-	0.76	0.14	0.10	0.04	0.33	0.10	0.23
Social Support	0.03	-	0.03	0.46***	0.00	0.46***	0.44***	0.35***	0.09***
Knowledge	-	-	-	0.13	-	0.13	0.10	0.10	-
Self-Efficacy	-	-	-	-	-	-	0.75***	-	0.75***
Structural Equation Fit	$R^2 = 0.74$								

Modified Model

Causal Variables	Affected Variables								
	Knowledge			Self-Efficacy			Adherence		
	TE	IE	DE	TE	IE	DE	TE	IE	DE
Previous Experience	0.71*	-	0.71*	0.14	0.07	0.07	0.32	0.10	0.22
Social Support	0.03	-	0.03	0.41***	0.00	0.41***	0.41***	0.30***	0.11
Knowledge	-	-	-	0.10	-	0.10	0.07	0.07	-
Self-Efficacy	-	-	-	-	-	-	0.72***	-	0.72***
Structural Equation Fit	$R^2 = 0.70$								

Note: TE = Total effect, IE = Indirect effect, DE = Direct effect

* $p < .05$, *** $p < .001$

Hypothesis Testing Results

Hypothesis 1: Previous experience has a positive direct effect on knowledge, self-efficacy, and adherence.

The statistical analysis in Table 4.11 and Figure 4.2 showed that previous experience had a significant direct effect on knowledge ($\gamma = 0.71, p < 0.05$). However, previous experience had a non-significant direct effect on self-efficacy and adherence. Therefore, hypothesis 1 was partially supported.

Hypothesis 2: Previous experience has a positive indirect effect on adherence through knowledge and self-efficacy.

The findings in Table 4.11 and Figure 4.2 revealed that there were non-significant indirect effects between previous experience and adherence through knowledge and self-efficacy. Thus, hypothesis 2 was not supported.

Hypothesis 3: Social support has a positive direct effect on knowledge, self-efficacy, and adherence.

The parameter estimated results in Table 4.11 and Figure 4.2 illustrated that social support had a significant direct effect on self-efficacy ($\gamma = 0.41, p < 0.001$) the direct effect on knowledge and adherence was not significant. Hypothesis 3 was partially supported.

Hypothesis 4: Social support has a positive indirect effect on adherence through knowledge and self-efficacy.

The analysis outcome in Table 4.11 and Figure 4.2 demonstrated that social support had a significant indirect effect on adherence through self-efficacy ($\gamma = 0.30, p < 0.001$). However, social support had a non-significant indirect effect on adherence through knowledge. Thus, hypothesis 4 was partially supported.

Hypothesis 5: Knowledge has a positive direct effect on self-efficacy and has a positive indirect effect on adherence through self-efficacy.

The results in Table 4.11 and Figure 4.2 revealed that knowledge has a nonsignificant positive direct effect on self-efficacy and a non-significant indirect effect between knowledge and adherence through self-efficacy. Therefore, hypothesis 5 was not supported.

Hypothesis 6: Self-efficacy has a positive direct effect on adherence.

The analysis outcomes in Table 4.11 and Figure 4.2 showed that self-efficacy has a significant positive direct effect on adherence ($\beta = 0.72$, $p < .001$). Thus, hypothesis 6 was supported.

In summary, this chapter reported the demographic characteristics of the CAD sample. Descriptive statistics of the major study variables – self care agency and basic conditioning factors and adherence - were also presented. SPSS 11.5 program and PRELIS 2.52 package were used to examine the preliminary analysis. The LISREL 8.52 was employed to test the measurement, hypothesized and modified models. Moreover, the modified model was shown to have a good fit with the data. The final modified model explained 70% of the variance in adherence to self-care requirements in persons with CAD.

CHAPTER V

DISCUSSION

This study aimed to examine the effect of previous experience, social support, knowledge, and self-efficacy on adherence to self care requirements in persons with coronary artery disease (CAD). Firstly, the characteristics of the sample and the variables – adherence to self-care requirements, self-efficacy, knowledge, previous experience, and social support are discussed. Secondly, the overall model of adherence to self care requirements is discussed. Finally, the discussion of how research findings contributed to nursing science will be presented.

Characteristics of the sample

The mean age of the study samples was 63 years of age and more than two-thirds (69.5%) of the sample was male. This is similar to the subjects in another study of patients undergoing coronary artery bypass surgery where the mean age was 63 and 61% were male (Praditkul-Asdornwised, 2000). Both the World Health Organization (WHO) MONICA project and the Health Survey for England reported that the prevalence of CAD is more common in men than in women (American Heart Association, 2004). Educational level of the studied subjects was predominantly elementary school level (32.6%), followed by having a bachelor's degree or higher level (24.9%). The previous study of Juntawises (1996) in post myocardial infarction patients also reported similar levels of educational, primary school level (38.89%) followed by a bachelor's or higher degree (22.23%). Most of these samples included married subjects (78.9%). Prior studies in myocardial infarction (Juntawises, 1996) and coronary artery bypass graft surgery (Praditkul-Asdornwised, 2000) patients also reported that most of the patients were married. The mean number of family members in this study was 4.43 persons /family which was similar to the study of Praditkul-Asdornwised (2000) who reported 5 persons/family. Although the pattern of Thai urban family has changed from a compound family to single family, the connection and the network of family were strong. As showed in this study, family members were

composed not only of a daughter or son but also siblings, nephews, nieces, grandfathers or grandmothers, or daughter-in-law. There was a wide range of income in this study, with about one-fifth of the subjects having no income. Over 30% of the subjects earned their income less than 10,000 baht/month (\$250) and more than half of the subjects having a low income. American Heart Association (AHA) (2004) has suggested that the increased prevalence of CAD would shift to the low socioeconomic groups in developing countries.

Half of the subjects ($n = 144$, 50.5%) were past smokers, with current nonsmokers being as many as 91.9% and current smokers only 7.7%. The previous study of twelve-year follow up of cardiovascular risk factors in the employees of the Electricity Generating Authority of Thailand also revealed that the proportion of current smokers decreased (Sritara et al., 2003). Conversely, the 5 year follow up in cardiovascular risk in the employees of the Government Saving Bank indicated that cigarette smoking and alcohol consumption behaviors did not change in males during the past 5 years (Temcharoen, 2001). According to the data, this may indicate the success of secondary prevention about smoking cessation, but the need for more encouragement about primary prevention about smoking cessation in Thailand is needed. Because WHO reported that people with tobacco use in developing countries was responsible for about 5 million deaths a year, tobacco use is a preventable cause of CAD and the clinical cost of CAD is costly and prolonged. Therefore, prevention of disease and progression of the disease is more cost effective than curing the disease of the exposed risk behavior.

Over half of the subjects regularly exercised ($n = 168$, 58.9%), while approximately 40% ($n = 116$) of the subjects were physical inactive. AHA (2004) found that physical inactivity doubled the risk of developing heart disease and also doubled the risk of dying from cardiovascular disease and stroke. The mean duration of exercise was 31 minutes/time of exercise. This finding was congruent with the AHA cardiac rehabilitation guideline for exercise. Approximately 50% ($n = 141$) of the subjects exercised by walking, with nearly 30% ($n = 78$) of them engaging in more than one type of exercise. Few subjects ($n = 39$, 13.7%) participated in cardiac rehabilitation program. Most of the subjects ($n = 230$, 80.7%) had experienced at least one prior hospitalization.

Characteristics of the studied variables

Adherence to self care requirements

This results showed moderate adherence to self care requirements (mean = 110.90, SD = 14.83) with the possible ranged from 0 to 168. For the subscales, the data showed high to moderate score. The subscales scores at a high level were as follows, adherence to cardiac risk factors (mean = 74.89, SD = 10.75) with the possible ranged from 0 to 105, adherence to medication (mean = 6.41, SD = 1.54) with the possible range from 0 to 7, and adherence to follow up (mean = 6.58, SD = 0.90) with the possible range from 0 to 7. The other two subscales scores at a moderate level were adherence to stress management (mean = 9.02, SD = 4.22) with the possible range from 0 to 14 and adherence to self monitoring (mean = 14.01, SD = 5.15) with the possible range from 0 to 35.

In this study, CAD persons could follow their self care well about cardiac risk factors including diet, exercise, smoking cessation, alcohol consumption, medication, and follow-up. This could be explained by two reasons. Firstly, the success of the health care reform project in Thailand in 2001 emphasized health promotion and disease prevention. Health promotion is a process of enabling people concerned to increase control over and to improve their health by motivating healthy lifestyle behavior (Pongpisut Jongudomsak, 2005). Various organizations such as the Thai Health Promotion Foundation created the Tobacco Consumption Control program, Alcohol Consumption Control Program, and Physical Activity and Sport Sponsorship Plan promote healthy life style. Therefore, these projects may indirectly stimulate CAD persons involving adherence to healthy life style. Secondly, the relationship between patients and health care providers was good. Some patients said that they trusted not only health care team but also health care institute. Some of the subjects told the researcher that they owed their life to Ramathibodi Hospital, the health care teams there gave them new life.

One study of trust in health care providers reported that patients with low trust in their physicians intend not to adhere to the advice given by their physicians (Bandolier, 2005). The positive interaction between patients and health care providers may have increased adherence to advice about cardiac risk factors, medication, and follow up in person with CAD. This finding showed positive correlation between

health care providers support and adherence to follow up ($r=.137$, $p<.05$). However, WHO (2002) reported that most of health care systems have failed to create an environment to promote quality interactions, partnerships and collaborations with patients.

Moreover, CAD was known as a chronic condition. Nonadherence to some behaviors such as consuming a fatty diet, physical inactivity, and smoking might not show negative consequences immediately. Persons with CAD may not be interested in changing their behavior. Furthermore, WHO (2002) reported that healthy life style was difficult to change because of limited choices, for example, the shift in population from rural to urban areas and a dramatic increase in advertising and promotion of unhealthy products in developing countries. Tobacco, alcohol, and food industries have identified countries in which national regulation and public health education programs were weak. These industries created a marketing plan to make profit to the company, but bringing devastating health to the people. Therefore, people including persons with CAD had limited choices to adhere to healthy life style.

This study found that adherence to stress management (mean = 9.02, SD = 4.22) was at moderate level with the possible range from 0 to 14. However, the previous study of adherence to stress management in persons at one and two years after myocardial infraction (MI) were at high and moderate level (mean = 13.24, 15.33; SD = 3.65, 4.57) respectively with the possible score of 0 to 20 (Miller, Wikoff, Garrett, McMahon & Smith, 1990). Miller and colleagues' study (1990) showed that adherence to stress management declined over time (adherence to stress management at 1 year after MI = 15.33 (SD = 3.65) and at 2 years after MI = 13.24 (SD = 4.57). This may be because the pattern of stress drops between 1 year and 2 years after MI. However, the duration after diagnosis of CAD was not included in this study, inclusion criteria of the study required diagnosis of CAD of at least three months. Furthermore, this can be explained that adherence to stress management does not affect patients' health as quickly as adherence to medication. Luepker (1993) supported that chronic illness and those in which the consequences of nonadherence do not occur immediately often result increased nonadherence. Another reason, patients have to adhere to numerous of healthy life style, these may escalate their stress. Therefore, increased adherence to

stress management was an important issue for health care providers to be concerned about and to intervene in order to reduce further progress of CAD.

In this study, adherence to self monitoring was at the moderate level (mean = 14.01, SD = 5.15) with the possible range from 0 to 35. Self monitoring measured patients' awareness about abnormal symptoms of heart disease. Different findings were observed in the study of self monitoring in type 2 diabetes mellitus, where self monitoring in persons was at high level (mean = 16.55, SD = 4.57) with the possible score of 21 (Keeratiyutawong, 2005). Although CAD patients reported moderate levels of self monitoring, they could monitor themselves by detecting the abnormal symptoms whether they needed help from health care providers or not. One of the patients said that "I go to see the doctor if I have dyspnea or chest pain". Moreover, patients thought that monitoring symptoms were not their responsibility, but rather the health care providers' responsibility.

Self-efficacy

This results showed moderate levels of self-efficacy (mean = 153.69, SD = 35.71) with the possible range from 0 to 232. For subscales, the data showed that self-efficacy to control diet (mean = 31.96, SD = 9.53), regular exercise (mean = 31.76, SD = 13.90), and stress management (mean = 15.31, SD = 6.64) were at moderate level with the possible range from 0 to 52, 0 to 56, and 0 to 28, respectively. In addition, the subscales of alcohol consumption (mean = 20.16, SD = 5.64), cigarette smoking (mean = 40.59, SD = 11.65), and medication management (mean = 16.19, SD = 3.86) were at high levels with the possible range from 0 to 24, 0 to 52, 0 to 20, respectively.

Different from this study, Callaghan (2003) reported that self-efficacy about nutrition in healthy adults aged between 18 to 65 years was at a high level (mean = 20.57) with the possible range of 0 to 28. Because persons with CAD were routinely checked up for cholesterol levels, it may have impacted their dietary consumption. One of the sample said that "I strictly control my diet consumption but my cholesterol level is increased and uncontrolled. I have to control by using a lipid lowering drug". Bandura (1997) proposed that successes build a robust belief in one's personal efficacy but failures make opposite results. Therefore, this phenomenon may discourage an individual's efficacy to practice self care about diet consumption.

In this study, self-efficacy in exercise was congruent with the studies of Callaghan (2003) and Phumleng (2002) which reported moderate levels of self-efficacy. Although exercise is beneficial for persons with CAD (Laughlin, Oltman & Bowles, 1998; Hambrecht, et al., 2000a; Gielen & Hambrecht, 2001), it may produce many negative signs such as fatigue, pain, and shortness of breath. Moreover, health problems and aging have been shown to be the impediments to physical exercise (Bandura, 1997). The subjects in this study all had CAD and most of them were old age (mean age = 62), therefore, this may have had a negative impact on their exercise self-efficacy.

Self-efficacy in stress management was at a moderate level in this study. A different finding was observed in Chinese myocardial infarction (Haobin, 2000) patients who had high levels of stress management self-efficacy. According to the social cognitive theory, stress reactions in people occur because of a low sense of self-efficacy to control unpleasant threats and disturbing environmental demands. If people believe they can control a threat or stressor, they are not negatively emotionally aroused, and they are able to use coping strategies effectively (Bandura, 1997). Siela and Wieseke (2000) concluded that self-efficacy and stress and coping are strongly related. In addition, Siela and Wieseke (2000) urged that self-efficacy be reinforced regularly during long-term treatment regimens such as stress management in persons with cardiovascular disease.

Self-efficacy about alcohol consumption and cigarette smoking in this study were at a high level. The Thai Health Promotion Foundation proclaimed both alcohol and cigarette smoking as addictive substances. This foundation persuaded people to abstain from alcohol drinking and cigarette smoking via television and publication media. In addition, this foundation also indicated the effect of these substances on health. Therefore, perhaps people were motivated, encouraged, and confident about avoiding alcohol drinking and cigarette smoking.

In this study, self-efficacy regarding medication was at a high level. The same result was found in the previous research (Haobin, 2000; Phumleng, 2002). Most of the subjects recognized that medication taking was essential to control their cardiac symptoms. Some of them expected that they would be cured of heart disease by taking medication as prescribed. Moreover, the sample accepted their physician as a

specialist, trusting their competency. The studied sample had confidence to take medication, even though they did not know about nor were they concerned about the effectiveness of the medication as demonstrated by the relationship between knowledge of medication management and self-efficacy of medication management. ($r = -.003$, $p > .05$, Appendix D).

Knowledge

The total knowledge score was at moderate level (mean = 18.98, SD = 7.48) with possible range from 0-49. For the subscales of cardiac risk factors and stress management knowledge levels were moderate (mean = 11.02, 1.44; SD = 4.04, 0.97) with possible range from 0 to 23 and 0 to 3, respectively. Persons with CAD have better knowledge about cardiac risk factors and stress management than other three subscales of knowledge, perhaps because of the health care policy and mass media announcements. Health care policy was changed during the year 2001 in Thailand, becoming focused on prevention of disease and health promotion. The mass media are available, as is easily accessible information on risk behavior. However, the other three subscales of knowledge including medication (mean = 1.94, SD = 1.26), self monitoring (mean = 0.31, SD = 0.61), and disease (mean = 4.24, SD = 2.70) were at a low level with possible range from 0 to 5, 0 to 5, and 0 to 13, respectively. Perhaps because knowledge of medication, monitoring symptoms, and disease were perceived as a health care professional is responsibility, patients did not feel that they needed to be knowledgeable about these areas. This study data of knowledge asking about medication and the reason to take medication showed that 33.33% ($n = 95$) of the sample did not know the name of their medication and 65.62% ($n = 187$) did not know the reason of taking those medications. It is difficult to remember the name of the medications because they all named in English. Approximate 16% ($n = 30$) of the 187 subjects reported that they take the medication because the physician prescribes those for them. In addition, the majority of the sample (93%, $n = 265$) did not know the specific risk factors themselves. This study was consistent with an earlier study which found that persons with heart failure had poor knowledge of important signs and symptoms (Carlson, Riegel and Moser, 2001).

Moreover, patients may have scanty resources for consulting or asking questions. Most of the patients said that they felt uncomfortable to ask questions because a lot of patients were also waiting to see the doctor. Orem (2001) stated that persons who can produce effective self care have knowledge of themselves and knowledge of environmental conditions. Eventhough the relationship between social support and knowledge is not significant (Table 4.4), knowledge is prerequisite and may work through others variables. Therefore, knowledge is an important factor to practice self care. Health care providers have to be concerned about increasing information available for patients' knowledge to practice self care.

Previous experience

Experience has a primary role in establishing what is needed for action (Orem, 2001). Moreover, life experiences also influence self care judgments and decisions (Orem, 2001). This study focused on two previous experiences including previous hospitalization and previous participation in cardiac rehabilitation.

Firstly, the majority of the sample had an experience in hospitalization ($n = 230$, 80.7%) which was congruent with the previous research of heart failure (Ni et al., 1999). The prior researchers found that prior hospitalized patients had higher level of self care knowledge (Ni et al., 1999). Secondly, most of the sample had no experienced in participation in cardiac rehabilitation ($n = 246$, 86.3%). Few sample participated in the cardiac rehabilitation program because the routine care of the data collection setting include only person with CAD who underwent coronary artery bypass graft to participate in cardiac rehabilitation program. Many researchers found that exercise programs and cardiac rehabilitation have a beneficial effect on decreasing mortality and increasing physical health (Lavie & Milani, 1996; Hambrecht et al., 2000a). In addition, the American Heart Association proclaimed in 1994 that cardiac rehabilitation was not only to provide an exercise training program, but also should include multifaceted strategies aimed at reducing modifiable risk factors for cardiovascular disease. Therefore, both previous experience of hospitalization and participation in cardiac rehabilitation are potentially important factors. The health care system especially the hospital setting has to provide cardiac rehabilitation program which is easy to access for persons with CAD.

Social support

Person with CAD in this study reported moderate levels of perceived social support (mean = 55.04, SD = 13.37) with the possible range from 0 to 84. Family support was the most important source of support. The second source of support was health care provider support and the last was support from friends. This study was congruent with previous studies found that family support was the primary source of support in various chronic conditions (Praditkul-Asdornwised, 2000; Pipatananond, 2001; Santati, 2005). The literature also supports that the resources of family support are the most important source of support and will be used first. If family support is not enough, then the individual needs to seek other sources of support such as health care providers, friends, co-workers, and other networks. In addition, the role of family supports were not only to accompany the patient to follow up but also helping ask questions about health and treatment. The early researchers reported that family support influence knowledge of self care, adherence to self care behavior, and participation in cardiac rehabilitation. (Ni et al., 1999; Toljamo & Hentinen, 2001; Baird & Pierce, 2001). Therefore, health care providers as the second source of social support have to help and guide the individual to practice effective self care in order to prevent further progress of the disease.

The overall model and the relationships

This discussion section presents the path coefficients between the exogenous variables (previous experience and social support), the mediating variables (knowledge and self-efficacy), and the outcome variable (adherence to self care requirements). The discussion order will follow the study model in which variables are schematically portrayed from the left (exogenous variables) to the right (the endogenous variables). The presentation patterns are also consistent with the sequence of the six research hypotheses proposed.

For path coefficient determination, the guideline proposed by Kline (1998) the standardized path coefficient with absolute values less than 0.10 may indicate a “small” effect, values around 0.30 for a “medium” effect and 0.50 or more for “large” effect. According to this guideline, previous experience had a large positive effect (0.71) on knowledge, social support had a medium positive effect (0.41) on self-

efficacy, and self efficacy had a large positive effect (0.72) on adherence to self care requirements.

Previous experience

Previous experience had a significant direct positive effect ($\gamma = 0.71, p < 0.05$) on knowledge. In this study, the majority of the persons with CAD had an experience in hospitalization and the minority of them had participated in a cardiac rehabilitation program. This study was consistent with the previous research that experience with hospitalization and previous participation in cardiac rehabilitation program influenced patients' knowledge of self care (Ni et al., 1999; Schuster, Wright & Tomich, 1995). Because the studied subjects were taken care by physician specialists and advanced practice nurses in cardiovascular disease during hospitalization and in out-patient clinics, these experts may have provided routine care and treatment including necessary knowledge of self care for their patients. Furthermore, the subjects had more of a chance to get information during hospitalization. Actually, patients often perceived that their disease had progressed when they were admitted to the hospital. They may then be interested in searching for the knowledge required to care for themselves. This can be supported by previous research in patients with hypertension that more symptoms lead to being more alert in self care (Kyngas & Lahdenpera, 1999). Therefore, previous experience of hospitalization became a resource in this situation, it was not a threat situation.

This study found that previous experience had a nonsignificant direct effect on self-efficacy and adherence. In addition, previous experience had a nonsignificant indirect effect on adherence through knowledge and self-efficacy. Previous experience was composed of hospitalization and participation in cardiac rehabilitation. This study supported that previous experience influenced knowledge ($\gamma = 0.71, p < 0.05$). Many researchers found that knowledge and previous experience in cardiac rehabilitation may further increase confidence in self care and adherence to self care requirements (Conn, Taylor & Casey, 1992; McAuley, 1993; Baird & Pierce, 2001). However, Bandura (1997) stated that individuals with knowledge and skill did not necessarily produce high attainments, they required self-efficacy to use them well. Furthermore, individuals' experiences are the most influential source of efficacy information

because they provide the most authentic evidence of success or failure. If people experience only easy successes, they will expect quick results and are easily discouraged by failure (Bandura, 1997). Because the nature of CAD changes between a chronic and acute condition, it is dynamic. Various self care requirements were also dynamic and were believed to control complications and progress of CAD. Persons with successful experiences may increase self-efficacy and adherence to self care requirements, but persons with failure experiences may feel opposite. Therefore, previous experiences may not necessarily have positive direct effect on self-efficacy and adherence for the above reason.

Furthermore, the study subjects who had an experience of participation in cardiac rehabilitation was only 13.7% (n = 39, Table 4.2). Because this number was small, it could not yield statistically significant results.

Social Support

Social support had a significant positive direct effect on self-efficacy ($\gamma = 0.41$, $p < 0.001$). It can be interpreted that social support influenced confidence to practice self care in persons with CAD. This may, in part be explained by the fact that the majority of them were older aged, married, and male and in Thai culture, daughters and sons have to take care their parents when they become old. Males often work outside the home, while females have a role of house wife. Praditkul-Asdornwised (2000) conducted an ethnographic study that revealed that the family provided protection and support such as assistance, vigilance/watching over, and encouragement. Family assistance patterns include assistance in the treatments or medication and assistance in the informants' daily activities, role, and responsibilities. In addition, marital status was a factor associated with knowledge of and adherence to self care among patients with heart failure (Ni et al., 1999). Moreover, Resnick and Nigg (2003) found that social support influences self-efficacy of exercise in older adults. This study also found that the family is the first source of support. Family support in persons with CAD may include meal preparation, role modeling for exercise, and accompanying for follow-up. Family support may be a resource available to be used for the patients in managing their care requirements (Orem, 2001). Family members are involved in the treatment plan and self care. Baird and Pierce

(2001) conducted a qualitative study on adherence to cardiac therapy. They supported that the role of family system facilitated patients' ability to perform self care activities. Therefore, family support as a facilitator may lead to increase perceived self-efficacy of self care.

Moreover, the results showed that social support had a nonsignificant positive direct effect on knowledge and adherence. In the out-patient setting, health care service emphasized treatment. Information of specific self care for persons with CAD was not available. Communication between health care providers and patients was brief and time was limited. Focusing on one significant caregiver, each patient may be taken care by several family member, an overall plan to take into action may not be well developed continuously. Continuous care may not happen unless caregivers have well developed plan. Therefore, social support did not influence knowledge and adherence to self care requirements for the above reasons.

Further analysis of this study revealed that social support had an indirect effect on adherence to self care requirements ($\gamma = 0.12$, $p < 0.001$) in contrast to previous research that reported that social support influenced adherence to exercise and behavior modification (Resnick & Nigg, 2003; Boutin-Foster & Charlson, 2002, Youngpradit, 2004). However, social support had a significant positive indirect effect on adherence through self-efficacy. This finding supports that self-efficacy was an important mediator variable between social support and adherence to self-care requirements.

Knowledge

This study reported that knowledge had a nonsignificant positive direct effect on self-efficacy. This means that knowledge in persons with CAD did not influence their self-efficacy of self care. Bandura (1997) stated that knowledge alone would not instantly provide proficient performance unless the activity was very simple. Moreover, Bandura (1997) emphasized that judgment of self-efficacy required knowledge of task demands. These statements were confirmed with various researchers reporting that knowledge influences self-efficacy of self care (Kotcharin, 2001; Nopplub, 2001; Varitsakul, 2001; Saengsiri, 2002). However, this finding is opposed to others studies.

Persons with CAD in this study had knowledge of cardiac risk factors and stress management at moderate levels, but knowledge scores of medication, self monitoring, and disease were at low level. Therefore, their level of knowledge may not have been high enough to affect their self-efficacy. Moreover, persons with CAD had to perform various tasks they may be burn out to follow those tasks and may feel too difficult to follow. Knowledge may also be influenced by these factors.

Effect of Self-efficacy on Adherence to Self care Requirements

According to the proposed model, this results showed that self-efficacy had a positive direct effect on adherence to self care requirements ($\beta = 0.72, p < .001$). It was a large effect. Bandura (1997) stated that the stronger the efficacy beliefs, the better individuals performed. An early study demonstrated that self-efficacy was an important factor in functional status (Allen, Becker & Swank, 1990), maintenance of exercise participation (McAuley, 1993), adherence to recommended self care (Ni et al., 1999), and disease management (Carlson, Riegel & Moser, 2001). Resnick's (2003) findings supported that increased self-efficacy was associated with increased adherence to treatment, increased self care behaviors, and decreased physical and psychological symptoms. The present findings are consistent with the previous research that demonstrated that self-efficacy influenced adherence to self care requirements.

According to this study analysis, social support had a positive indirect effect on adherence to self care requirements through self-efficacy. It supported that self-efficacy was a mediator variables. This finding was congruent with the early study that exercise self-efficacy is a significant cognitive mediator in the maintenance of exercise behavior (McAuley, 1993; Youngpradit, 2004).

Contribution to Nursing Science

The adherence to self care requirements predictive model of persons with CAD in this study was derived from Orem's self care deficit nursing theory. Study variables were composed of previous experience and social support which were conceptualized as basic conditioning factors as well as knowledge, self-efficacy, and adherence to self

care requirements which were conceptualized as self care agency under Orem's theory.

The proposed adherence to self care requirements model was represented as a middle range theory to strengthen the grand theory of Orem's self care deficit nursing theory. Walker and Avant (1995) stated that middle range theory provided the specificity needed for usefulness in research and practice. This studied model tested the relationship between the concept of basic conditioning factors (previous experience and social support) and the concept of self care agency (knowledge, self-efficacy, and adherence to self care requirements). The results of this studied model contribute to explaining and predicting the abilities of persons with CAD in practicing self care. Furthermore, the findings will guide intervention for future research to enhance adherence to self care requirements in persons with CAD. Intervention program may initiate the guideline lead to better adherence to self care requirements and prevent progression of the disease.

Moreover, the results of this studied model affirmed that self-efficacy was an important mediator variable. In the literature, self-efficacy played an important role as mediating factor for behavior modification (Rossi & Rossi, 1999; Churthong, 2001; Saiseesub, 2000).

Methodological Issues

The methodological aspects related to the study findings were concerned with instrumentation issues, data collection procedures, and data analysis procedures. Each aspect is discussed in the following section.

Instrumentation issues

Four major instruments were used in this study including adherence to self care requirements, self-efficacy, knowledge, and social support. Two instruments composed of adherence to self care requirements and self-efficacy were well developed for the Thai culture context under the particular theory of interest. Therefore, they were not problematic about translation or cultural issues. However, the self-efficacy instrument had 58 items and knowledge instrument had 49 items, they

were too long for older aged individuals and should be revised for use in this population.

Previous experience was indicated by participation in cardiac rehabilitation and hospitalization. The outcome of measures for both cardiac rehabilitation and hospitalization are binary, they violated the normality assumption. Thus, previous experience should be transformed in the next study.

Some items of the social support instrument from health care providers asking about financial aid or activity of daily living need to be revised because health care providers at out-patient clinic were not involved much about financial and activity of daily living support. The same items may not work to evaluate support with different source of support. Items revised with keeping the same context are needed.

Consideration of the reliabilities for the subscales was the other important instrumental issue. Although the reliabilities of the total instruments were acceptable, some subscales showed low reliabilities. Instruments modification are needed in the future study.

Data collecting procedures

Although numerous patients met the inclusion criteria, how to recruit the sample was very important. Cooperation of clinic personnel and the researcher's communication skills were required to access subjects. Moreover, the researcher had to plan well and understand that the process of patient flow was also crucial in the clinic setting.

Time consumed for answering the questionnaire was different between the different aged subjects with less time spent to answer the questionnaire by the younger subjects. Because of old age many older subjects had eye problems, and they could not read well.

The response rate in this study at the first two weeks of data collection was 50%. However, it was increased to 83% by using incentives. The researcher gave the booklet of self care for CAD after finishing this study. Although the subjects did not receive the booklet immediately, more questionnaires were returned. This suggests that patients needed resources to take care themselves and continuing care from health care providers.

Data analysis procedures

Although Structural Equation Modeling (SEM) was considered a causal analysis procedure, causal relationships tested under this technique require a theoretical based. Using SEM for analysis, more than one model could fit the data. Therefore, it requires strong support by the theory.

An experimental design is accepted as the standard to demonstrate causal relationships, rather than cross-sectional designs. However, Boyd, Frey & Aaronson (1999) support the use of SEM in nursing research, as it enables researchers to test complex relationships among multiple variables. In addition, SEM provided a means to parsimoniously develop and test theory.

Summary

This chapter presents a discussion of the study findings. Demographic characteristics, the major variables, the research hypotheses are discussed. Finally, contributions to nursing science and methodological issues are also presented.

CHAPTER VI

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter includes summary of the study which include; sample characteristics, instruments, research findings, conclusion, and the implication as well as recommendation of the finding.

Sample Characteristics

Two hundred and eighty five persons with CAD at medical out-patient clinic, Ramathibodi Hospital participated in this study during April to August, 2005. The majority of subjects (69.5%) had the mean age of 63 years ($SD = 9.47$). The majority of subjects had an elementary school education (32.6%) while many had bachelor's or higher degree (24.9%). The mean number of family member living with the subject was 4 persons. Approximately half of the subjects had incomes lower than 10,000 baht (46.1%) with the mean income equal 16,893.19 baht/month. Most of the subjects were currently non-smokers (91.9%) and regularly exercised (58.9%).

Instruments

The instruments used in this study consisted of 1) Personal Information Questionnaire, 2) Adherence to Self Care Requirements Questionnaire developed by Panpakdee and colleagues (2001), 3) Self-efficacy Questionnaire developed by Chomson (2004), 4) Knowledge Questionnaire developed by Schuster, Wright and Tomich (1995), and 5) Social Support Questionnaire developed by Schaefer, Coyne, and Lazarus (1981) and modified by Hanucharurnkul (1998).

The content validity of the Adherence to Self Care Requirements Questionnaire, Self-efficacy Questionnaire, and Knowledge Questionnaire were assessed by a panel of five experts. Items were revised according to modified by following the experts' advice. Reliabilities of all the instruments were tested first in the pilot study (58 persons with CAD). Confirmatory factor analyses of each measurement were examined under the SPSS 11.5 and LISREL 8.52 statistical

packages with 285 study samples. Cronbach's alpha coefficient of Adherence to Self Care Requirements Questionnaire, Self-efficacy Questionnaire, Knowledge Questionnaire, and Social Support were 0.77, 0.95, 0.86, and 0.92, respectively. However, some subscales showed low Cronbach's alpha coefficient, exploratory factor analysis is needed for further study.

Research Findings

The LISREL 8.52 was employed to test and modify the model. The modified model was performed to fit the empirical data at $\chi^2 = 199.52$, $df = 176$, $p = 0.108$, RMSEA = 0.022, GFI = 0.94, AGFI = 0.92, $\chi^2/df = 1.133$ and could explain 70% of variance in adherence to self care requirements.

The results revealed that the research hypotheses were partially supported. It was found that previous experience had a direct effect on knowledge. However, the direct effect of previous experience on self-efficacy and adherence to self care requirements were not statistically significant. In addition, previous experience had a non-significant indirect effect on adherence to self care requirements through self-efficacy and knowledge.

Social support had a moderate direct effect on self efficacy and a moderate indirect effect on adherence to self care requirements through self efficacy. Social support had a non-significant direct effect on knowledge and adherence to self care requirements and had a non-significant indirect effect on adherence to self care requirements through knowledge.

Knowledge had a non-significant direct effect on self-efficacy and a non-significant indirect effect on adherence to self care requirements through self-efficacy. But, self-efficacy had a direct effect on adherence to self care requirements.

Conclusion

Social support influences adherence to self-care requirements through self-efficacy. This study clarified the role of self-efficacy as a mediator variable between social support and adherence to self care requirements. In addition, self-efficacy strongly influences adherence to self-care requirements.

Implications and Recommendations

Implication for Nursing Practice

The findings from this study depicted the factors that influence adherence to self care requirements in person with CAD. Adherence to self care requirements model can be classified as middle range theory. It describes, explains, or predicts specific phenomena and may be directly applied in clinical practice.

The study model showed that previous experience of hospitalization and participation in cardiac rehabilitation had a direct effect on knowledge, self-efficacy and adherence to self care requirements. Findings from this study may stimulate the responsibility of health care providers to increase individuals' knowledge, but not on self-efficacy, or adherence to self care requirements. Furthermore, knowledge neither influences self-efficacy nor adherence to self-care requirements. Thus, previous experiences of hospitalization and cardiac rehabilitation alone are not sufficiency to increase self-efficacy and adherence to self-care. However, having social support will increase patients' self-efficacy, which will help patients adhere to self-care requirements. Despite hospitalization, health care providers have the responsibility to increase patients' knowledge, self-efficacy, and adherence to self care requirements in other settings such as out-patient clinics. If hospitalization is inevitable, health care providers should assess the cause of admission in order to prevent readmission.

The findings from this study depicted the factors that influence adherence to self care requirements in persons with CAD. Adherence to self care requirements can be classified as a middle range theory. It describes, explains, or predicts specific phenomena and may be directly applied in clinical practice.

Moreover, findings from this study showed that few of the subjects participated in a cardiac rehabilitation program. Most of the study subjects did not know about cardiac rehabilitation programs. In the literature, various researches reported the benefit and positive outcomes from participation in cardiac rehabilitation programs. Currently cardiac rehabilitation programs include not only exercise programs but also healthy diet consumption, smoking cessation and promotion of a healthy life style. Because the resources for cardiac rehabilitation in Thailand are scanty, persons with CAD have difficulty accessing this resource. Since there is great benefit to cardiac rehabilitation, health care policy should provide this resource as routine care.

Therefore, a multidisciplinary team for taking care of persons with CAD may increase adherence to self care requirements.

Furthermore, the results of this study found that social support is an important factor influencing, directly and indirectly, self-efficacy, and adherence to self care requirements. Family support is the most prominent source of support. Family members should participate in the health care team in order to perform continuous care. In addition, intervention programs to increase knowledge and self-efficacy must be provided to both patients and family members in order to enhance patients' adherence to self care requirements. Moreover, family members are important in taking care of individuals with CAD because most of individuals with CAD are older. The nature of old age frequently involves physical and cognitive deterioration. Dependent care agents are required to increase patients' self-efficacy and adherence to self care requirements.

Implication for Future Research

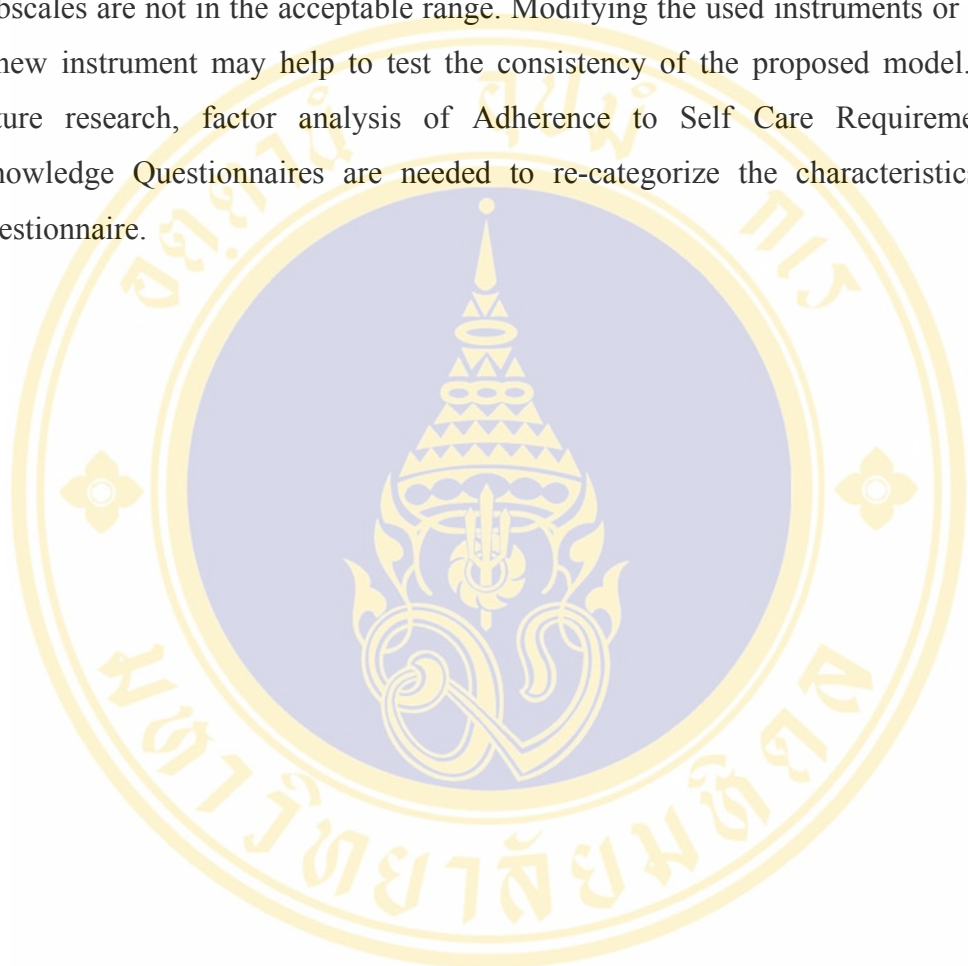
This study is a cross-sectional design which does not reflect change over time and does not capture the ongoing process of adherence to self care requirements in persons with CAD. Because adherence to self care requirements in persons with CAD always refers to behavior change, the study at one point in time may not reflect the changing process. Model comparison over time would further permit a more in-dept understanding of adherence to self care requirements. Thus, longitudinal study is recommended for future study.

The study sample was recruited from a specific setting (Ramathibodi Hospital), therefore, the results of this study are not generalized to the whole CAD population. Stratified random sampling in multiple setting is needed for further study. Stratified random sampling serves the advantages in enhancing the representative of the sample and making comparisons among subgroups.

An intervention study should be conducted to enhance adherence to self care requirements in persons with CAD. It will confirm the causal relationships with the model and the validity of the adherence to self care requirements model. Moreover, it will contribute to the nursing practice and the nursing science development.

To gain a better understand of factors contributing to adherence to self care requirements in persons with CAD, qualitative study is need to explore high and low extreme case of adherence to self care requirements persons.

Concerning the reliabilities of the study instruments, the reliabilities of some subscales are not in the acceptable range. Modifying the used instruments or selecting a new instrument may help to test the consistency of the proposed model. For the future research, factor analysis of Adherence to Self Care Requirements and Knowledge Questionnaires are needed to re-categorize the characteristics of the questionnaire.



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APPENDIX A

Stratified Random Sampling

Type of Clinic	Number of Patients (2004)	$\bar{X}_h$	S_h
Special Clinic	187	114.08	9.84
Cardio Clinic	556	104.37	17.05
General Clinic	300	110.86	19.22

$d = |\mu - \bar{x}| = \text{error of estimation} = 20$

$h = \text{type of clinic}$

$n_{\text{ney}} = \text{sample size using Neyman's Allocation}$

$n_h = \text{sample size in each clinic}$

$N = \text{total population}$

$N_h = \text{population in each clinic}$

$S_h = \text{standard deviation of adherence to self care requirements}$

$$D^2 = d^2 / Z_{\alpha/2}^2 = (20)^2 / (1.96)^2 = 104.16$$

$$\begin{aligned}
 n_{\text{ney}} &= (\sum N_h S_h)^2 / N^2 D^2 + \sum N_h S_h^2 \\
 &= \{(187*9.84) + (556*17.05) + (300*19.22)\}^2 / (1043^2) (104.16) + \{(187*9.84^2) \\
 &\quad + (556*17.05^2) + (300*19.22^2)\} \\
 &= \{1840.08 + 9479.8 + 5766\}^2 / (1087849)(104.16) + (18106.38 + 161630.59 + \\
 &\quad 110822.52) \\
 &= (17085.88 * 17085.88) / 1378408.3 \\
 &= 212
 \end{aligned}$$

Sample size should be 212.

$$\begin{aligned}
 \text{Sample size at special clinic} &= \{N_1 S_1 / \sum N_h S_h\} * n \\
 &= \{(187*9.84) / 17085.88\} * 212 \\
 &= 22.83
 \end{aligned}$$

$$\begin{aligned}
 \text{Sample size at cardio clinic} &= \{N_2 S_2 / \sum N_h S_h\} * n \\
 &= \{(556*17.05) / 17085.88\} * 212 \\
 &= 117.62
 \end{aligned}$$

$$\begin{aligned}
 \text{Sample size at general clinic} &= \{N_3 S_3 / \sum N_h S_h\} * n \\
 &= \{(300*19.22) / 17085.88\} * 212 \\
 &= 71.54
 \end{aligned}$$

Appendix B

Instruments (Thai Version)

ข้อมูลส่วนบุคคลทั่วไป

คำชี้แจง คำถามต่อไปนี้เป็นคำถามทั่วไปเกี่ยวกับตัวท่าน กรุณาเติมข้อความหรือใส่เครื่องหมาย ✓ หน้าข้อที่ตรงกับตัวท่าน

- 1) อายุ _____
- 2) เพศ _____ หญิง _____ ชาย _____
- 3) การศึกษาระดับสูงสุด

☐ ประถมศึกษา	☐ มัธยมศึกษาสาม	☐ มัธยมศึกษาหกหรือปวช
☐ อนุปริญญา หรือปวส	☐ ปริญญาตรี-เอก	☐ อื่นๆ โปรดระบุ _____
- 4) รายได้ต่อเดือน _____ บาท
(ถ้าไม่ได้ทำงานมีรายได้จาก _____ จำนวน _____ บาทต่อเดือน)
- 5) สถานภาพสมรส

☐ โสด	☐ แต่งงานแล้ว	☐ แยกกันอยู่	☐ หย่า	☐ หม้าย
------------------------------	--------------------------------------	-------------------------------------	-------------------------------	--------------------------------
- 6) จำนวนสมาชิกในครอบครัวของท่าน _____
 กรุณาระบุบุคคลในครอบครัวของท่าน

☐ ตัวท่านเอง	☐ สามี/ภรรยาของท่าน	☐ ลูกๆของท่าน
☐ ญาติๆของท่าน	โปรดระบุว่าเป็นอะไรกับคุณ _____	
☐ คนอื่นๆ โปรดระบุ _____		
- 7) ประวัติการสูบบุหรี่

การสูบบุหรี่ในปัจจุบัน	☐ สูบ จำนวน.....ม้วน/วัน สูบมานาน.....ปี
	☐ ไม่สูบ
การสูบบุหรี่ในอดีต	☐ สูบ จำนวน.....ม้วน/วัน สูบมานาน.....ปี
	หยุดสูบนาน.....ปี
	☐ ไม่สูบ
- 8) ประวัติการเข้าร่วมโปรแกรมการฟื้นฟูสุขภาพของท่าน
 - 8.1 ท่านออกกำลังกายเป็นประจำ

☐ ใช่	☐ ไม่ใช่
------------------------------	---------------------------------
 - 8.2 ท่านออกกำลังกายที่วันต่อสัปดาห์ _____
 - 8.3 ท่านออกกำลังกายด้วยวิธี

☐ เดิน	☐ ไทเก๊ก	☐ โยคะ	☐ รุ่ง
☐ อื่นๆ ระบุ _____			

- 8.4 ท่านออกกำลังกายเวลาใด ☐ เช้า ☐ กลางวัน ☐ เย็น
อื่นๆ โปรดระบุ _____
- 8.5 ท่านออกกำลังกายเป็นเวลา _____ นาที/ครั้ง
- 8.6 ท่านเคยเข้าร่วมโปรแกรมฟื้นฟูสมรรถภาพหัวใจ ☐ ไม่เคย ☐ เคย
- 8.7 ท่านเข้าร่วมโปรแกรมฟื้นฟูสมรรถภาพหัวใจโดย
☐ แพทย์เป็นผู้ส่งต่อ
☐ สมัครใจด้วยตนเอง
☐ อื่นๆ โปรดระบุ _____
- 8.8 การเข้าร่วมโปรแกรมฟื้นฟูสมรรถภาพหัวใจมีผลต่อท่านอย่างไร
☐ เฉยๆ
☐ ไม่มีประโยชน์ โปรดระบุ _____
☐ มีประโยชน์ โปรดระบุ _____
- 8.8 ท่านสามารถนำโปรแกรมฟื้นฟูสมรรถภาพหัวใจไปประยุกต์ใช้ในชีวิตประจำวัน
☐ ไม่สามารถนำไปประยุกต์
☐ นำไปประยุกต์ได้บ้าง แต่ไม่มั่นใจ
☐ สามารถนำไปประยุกต์
- 9) ประวัติการเข้ารับการรักษาตัวในโรงพยาบาล
- 9.1 ท่านเคยเข้ารับการรักษาตัวในโรงพยาบาล (ผู้ป่วยใน) เนื่องจากปัญหาโรคหัวใจ
☐ ไม่เคย ☐ เคย
- 9.2 จำนวนครั้งที่เข้าโรงพยาบาลเป็นผู้ป่วยใน _____
- 10) การได้รับข้อมูล
- 10.1 ท่านได้รับการบอกรายละเอียดเกี่ยวกับการรักษา ผลการเจาะเลือด คลื่นหัวใจ ชนิดของยา
ผลข้างเคียงของยา เป็นต้น จากแพทย์ / พยาบาล
☐ ไม่เคย (ตอบข้อนี้ ข้ามไปตอบข้อ 11.3) ☐ เคย
☐ อื่นๆ _____
- 10.2 ท่านเข้าใจการบอกรายละเอียดต่างๆจากแพทย์ / พยาบาล
☐ ไม่เข้าใจ ☐ เข้าใจบ้าง แต่ไม่ใช่ทั้งหมด ☐ เข้าใจ
- 10.3 เมื่อท่านไม่เข้าใจการบอกรายละเอียดต่างๆ ท่านกล้าที่จะซักถามจากแพทย์ / พยาบาล
☐ ไม่กล้าซักถาม ☐ กล้าซักถาม

แบบสอบถามการดูแลตนเองของผู้ป่วยโรคหลอดเลือดหัวใจ

๒๒ ขแจ้ง

คำถามต่อไปนี้ถามเกี่ยวกับกิจกรรมการดูแลตนเองในช่วง 7 วันที่ผ่านมา กรุณาตอบคำถามและใส่เครื่องหมายวงกลมในหมายเลขที่ตรงกับกรปฏิบัติกิจกรรมการดูแลตนเองของท่าน

โดยแต่ละตัวเลือกหมายถึง จำนวนวันในหนึ่งสัปดาห์ที่กระทำกิจกรรมการดูแลที่จำเป็น

การรับประทานอาหาร

- 1) ในช่วง 7 วันที่ผ่านมา ท่านกินอาหารที่มีไขมันสูง เช่น ข้าวขาหมู หมูสามชั้น ข้าวมันไก่ แกงกะทิ ไข่แดง และอาหารผัดที่ใช้ไขมันมากๆ กี่วัน

- 2) ในช่วง 7 วันที่ผ่านมา ท่านกินอาหารด้วยวิธีการทอดน้ำมัน กี่วัน

0 1 2 3 4 5 6 7

- 3) ในช่วง 7 วันที่ผ่านมา ท่านจำกัดชนิด หรือควบคุมปริมาณอาหารที่กินในแต่ละมื้อ กี่วัน

0 1 2 3 4 5 6 7

-
-
-
-

- 23) ในช่วง 7 วันที่ผ่านมา ท่านจับชีพจรตัวเอง กี่วัน

0 1 2 3 4 5 6 7

คำชี้แจง กรุณาตอบคำถามข้อ 24 และใส่เครื่องหมาย ✓ ในตัวเลือกที่ตรงกับการมาตรวจตามนัดของท่าน

การตรวจตามนัด

- 24) ตั้งแต่ได้รับการวินิจฉัยว่าเป็นโรคหัวใจ หรือ ในระยะ 12 เดือนที่ผ่านมา ท่านไปพบแพทย์ตามนัด อย่างไร

- ☐ ไปตรวจตามแพทย์นัดทุกครั้ง แม้ว่าจะมีภารกิจอื่น
- ☐ ไปตรวจตามแพทย์นัดทุกครั้ง และจะไปก่อนนัดเมื่อมีอาการเปลี่ยนแปลงที่ไม่ดี
- ☐ ไปตรวจตามแพทย์นัดทุกครั้ง แต่เลื่อนนัดเป็นบางครั้ง
- ☐ ไปตรวจตามแพทย์นัดบางครั้ง และได้ทำการเลื่อนนัดเป็นบางครั้ง
- ☐ ไปตรวจตามแพทย์นัดบางครั้ง และไม่ได้ทำการเลื่อนนัด
- ☐ ไปตรวจตามแพทย์นัดบางครั้ง แม้ว่าจะมีอาการมากขึ้น
- ☐ ไม่ไปตรวจตามนัด และไม่ได้เลื่อนนัด

พระราชนิพนธ์

- ☐ ไม่ไปตรวจตามนัด จนกว่าจะมีอาการมากขึ้น

परिचय

- ☐ ไม่ไปตรวจตามนัดเลย

เพราะ

แบบสอบถามสมรรถนะแห่งตนในการดูแลตนเองของผู้ป่วยโรคหลอดเลือดหัวใจ

คำชี้แจง คำถามต่อไปนี้ต้องการทราบว่า ถ้าหากมีสถานการณ์ที่กำหนดเกิดขึ้น ท่านมีความมั่นใจมากน้อยเพียงใด ที่จะปฏิบัติกิจกรรมการดูแลตนเองภายใต้สถานการณ์ที่กำหนด โดยแต่ละระดับคะแนนมีความหมายดังนี้

- | | | |
|---|---------|-----------------------|
| 0 | หมายถึง | ไม่มั่นใจเลย |
| 1 | หมายถึง | มีความมั่นใจน้อย |
| 2 | หมายถึง | มีความมั่นใจปานกลาง |
| 3 | หมายถึง | มีความมั่นใจมาก |
| 4 | หมายถึง | มีความมั่นใจมากที่สุด |

ใส่เครื่องหมาย ✓ ในหมายเลขที่ตรงกับความรู้สึกมั่นใจในการทำกิจกรรมของท่าน

ตอนที่ 1 ความสามารถในการดูแลตนเองเกี่ยวกับการกินอาหาร

คำถาม / สถานการณ์	ระดับความมั่นใจ				
	ไม่มั่นใจเลย	มั่นใจน้อย	มั่นใจปานกลาง	มั่นใจมาก	มั่นใจมากที่สุด
ท่านเชื่อมั่นมากน้อยเพียงใดว่า สามารถควบคุมตนเองไม่กินอาหารต้องห้ามสำหรับโรคหัวใจประเภทของมัน ของทอด กะทิ อาหารรสหวาน รสเค็ม ถ้าท่านอยู่ในสถานการณ์ต่อไปนี้	0	1	2	3	4
1. เมื่อไปร่วมงานเลี้ยงพบปะสังสรรค์กับเพื่อนสนิทหรือญาติพี่น้องในงานเทศกาลหรือในวันหยุดพักผ่อน					
2. เมื่อไปร่วมงานพิธีแสดงความยินดีกับเพื่อนสนิทหรือสมาชิกในครอบครัว เช่น งานแต่งงาน งานขึ้นบ้านใหม่					
3. เมื่อไปร่วมงานเทศกาลอาหารและเครื่องดื่ม หรืองานเทศกาลผลไม้ตามฤดูกาล ที่จำหน่ายในราคาถูก					
11. เมื่อท่านประสบความสำเร็จในการควบคุมอาหาร เช่น น้ำหนักลดลง ไขมันในเลือดลดลง					
12. เมื่อท่านรู้สึกเครียด หรือวิตกกังวล / ไม่สบายใจ					
13. เมื่อท่านอยู่ในช่วงพักผ่อน เช่น ดูโทรทัศน์					

ตอนที่ 2 ความสามารถในการดูแลตนเองเกี่ยวกับการดื่มแอลกอฮอล์

คำถาม / สถานการณ์	ระดับความมั่นใจ				
ท่านเชื่อมั่นมากน้อยเพียงใดว่า ตนเองสามารถควบคุมการดื่มแอลกอฮอล์ ถ้าท่านอยู่ในสถานการณ์ต่อไปนี้	ไม่มั่นใจเลย 0	มั่นใจน้อย 1	มั่นใจปานกลาง 2	มั่นใจมาก 3	มั่นใจมากที่สุด 4
14. เมื่อไปร่วมงานสังสรรค์กับเพื่อนสนิทหรือญาติพี่น้องที่ชอบดื่มเครื่องดื่มที่มีแอลกอฮอล์ในงานเทศกาลรื่นเริง					
15. เมื่อต้องร่วมวงสนทนากับเพื่อนๆ หลายคนที่มีแอลกอฮอล์ แม้ไม่มีเทศกาลรื่นเริง					
19. เมื่อมีผู้ซื้อเป็นเครื่องดื่มแอลกอฮอล์มาฝาก					

ตอนที่ 3 ความสามารถในการดูแลตนเองเกี่ยวกับการออกกำลังกาย

คำถาม / สถานการณ์	ระดับความมั่นใจ				
ท่านเชื่อมั่นมากน้อยเพียงใดว่า สามารถควบคุมตนเองให้ออกกำลังกายสม่ำเสมอ เมื่อท่านอยู่ในสถานการณ์ต่อไปนี้	ไม่มั่นใจเลย 0	มั่นใจน้อย 1	มั่นใจปานกลาง 2	มั่นใจมาก 3	มั่นใจมากที่สุด 4
20. เมื่อท่านมีภาระมากมายที่ต้องทำ จนไม่มีเวลาว่าง					
21. เมื่อท่านอยู่ในช่วงที่ต้องรับผิดชอบงานประจำเพิ่มมากขึ้น					
33. เมื่อมีญาติ หรือคนในครอบครัวห้ามไม่ให้ออกกำลังกาย					

ตอนที่ 4 ความสามารถในการดูแลตนเองเกี่ยวกับการสูบบุหรี่ของตนเอง

คำถาม / สถานการณ์	ระดับความมั่นใจ				
ท่านเชื่อมั่นมากน้อยเพียงใดว่า ตนเองจะไม่สูบบุหรี่เมื่อมีสถานการณ์ที่สนับสนุนให้บุคคลอยากสูบบุหรี่ไม่ว่าท่านจะเคยสูบบุหรี่หรือไม่ก็ตาม	ไม่มั่นใจเลย 0	มั่นใจน้อย 1	มั่นใจปานกลาง 2	มั่นใจมาก 3	มั่นใจมากที่สุด 4
34. เมื่อท่านเห็นคนอื่นสูบบุหรี่					
40. ภายหลังการรับประทานอาหาร					

ตอนที่ 5 ความสามารถในการดูแลตนเองเกี่ยวกับการหลีกเลี่ยงควันบุหรี่จากการสูบบุหรี่ของผู้อื่น

คำถาม / สถานการณ์	ระดับความมั่นใจ				
ท่านเชื่อมั่นมากน้อยเพียงใด ว่าสามารถควบคุมไม่ให้ได้รับควันบุหรี่ของผู้อื่น เมื่อท่านอยู่ในสถานการณ์ต่อไปนี้	ไม่มั่นใจเลย 0	มั่นใจน้อย 1	มั่นใจปานกลาง 2	มั่นใจมาก 3	มั่นใจมากที่สุด 4
41. เมื่อท่านต้องติดต่อกับคนที่กำลังสูบบุหรี่					
42. ในขณะที่ท่านกำลังรออะไรบางอย่าง มีคนมาสูบบุหรี่อยู่ข้างๆท่าน					
46. เมื่อท่านไปร่วมงานเลี้ยงที่มีคนสูบบุหรี่					

ตอนที่ 6 ความสามารถในการดูแลตนเองเกี่ยวกับการจัดการความเครียด

คำถาม / สถานการณ์	ระดับความมั่นใจ				
ท่านเชื่อมั่นมากน้อยเพียงใดว่า ตนเองสามารถผ่อนคลายความเครียดได้ เมื่ออยู่ในสถานการณ์ต่อไปนี้	ไม่มั่นใจเลย 0	มั่นใจน้อย 1	มั่นใจปานกลาง 2	มั่นใจมาก 3	มั่นใจมากที่สุด 4
47. เมื่อไม่มีใครให้ความช่วยเหลือ ในขณะที่ต้องการความช่วยเหลือ					
48. เมื่อมีความเห็นไม่ตรงกับผู้อื่น					
53. เมื่อมีปัญหาในครอบครัว					

ตอนที่ 7 ความสามารถในการดูแลตนเองเกี่ยวกับการกินยา

คำถาม / สถานการณ์	ระดับความมั่นใจ				
ท่านเชื่อมั่นมากน้อยเพียงใดว่า ตนเองสามารถกินยาตามแพทย์สั่งได้ เมื่ออยู่ในสถานการณ์ต่อไปนี้	ไม่มั่นใจเลย 0	มั่นใจน้อย 1	มั่นใจปานกลาง 2	มั่นใจมาก 3	มั่นใจมากที่สุด 4
54. เมื่อต้องเดินทางไกลออกนอกบ้านไปยังสถานที่ต่างๆ เช่น ต่างจังหวัด ต่างประเทศ					
55. เมื่อมีโรคพิเศษที่ต่างจากแบบแผนชีวิตประจำวัน					
58. เมื่ออาการของโรคหัวใจดีขึ้น					

แบบสอบถามความรู้เกี่ยวกับโรคหลอดเลือดหัวใจ

คำชี้แจง คำถามต่อไปนี้เกี่ยวกับความรู้เรื่องโรคหลอดเลือดหัวใจ โปรดวงกลมข้อที่ท่านคิดว่าถูกต้องที่สุด เพียงตัวเดียว ถ้าไม่รู้คำตอบให้เลือกตอบ “ข้อ จ. ไม่รู้”

1. หน้าที่ของหลอดเลือดแดงเลี้ยงหัวใจ คือ ข้อใด

- ก. นำเลือดที่มีออกซิเจนและอาหารไปหล่อเลี้ยงกล้ามเนื้อหัวใจ
 ข. เชื่อมต่อระหว่างหัวใจกับปอด
 ง. ช่วยให้เลือดหมุนเวียนไปทั่วร่างกาย
- ค. ทำให้การเต้นของหัวใจสม่ำเสมอ
 จ. ไม่รู้

2. โรคหลอดเลือดแดงเสื่อม / ตีบแข็ง คือข้อใด

- ก. แขนงหน้าอก/ไม่สุขสบายในอก กินยาแล้วไม่ดีขึ้น
 ข. ลิ้มเลือดในหลอดเลือดแดงหัวใจ
 ค. มีคราบไขมัน และสารอื่นเกาะตัวในผนังด้านในของหลอดเลือด
 ง. เชื้อหุ้มหัวใจอักเสบ
- จ. ไม่รู้

45. ข้อใดเป็นปัจจัยที่ท่านเชื่อว่าทำให้เกิดโรคหัวใจ

- 1) ความดันโลหิตสูง 2) การไม่ออกกำลังกาย 3) สูบบุหรี่ 4) ไขมันในเลือดสูง
 5) ความเครียด 6) กรรมพันธุ์ 7) น้ำหนักเกิน 8) เบาหวาน 9) อายุ 10) ไม่รู้

46. อัตราการเต้นของหัวใจสูงสุดขณะออกกำลังกายของท่านควรจะเป็นเท่าใด

_____ ครั้งต่อนาที _____ ไม่รู้

47. อัตราการเต้นของหัวใจต่ำสุดขณะออกกำลังกายของท่านควรจะเป็นเท่าใด

_____ ครั้งต่อนาที _____ ไม่รู้

48. อัตราการเต้นของหัวใจขณะพักของท่าน เท่ากับเท่าใด

_____ ครั้งต่อนาที _____ ไม่รู้

49. โปรด เขียนชื่อยาที่ท่านกินเป็นประจำ และเหตุผลในการกินยาเพื่ออะไร

ลำดับ	ชื่อยา	ลักษณะยา	จำนวนเม็ด/มื้อ	เหตุผลในการกินยาเพื่อ

แบบสอบถามการสนับสนุนทางสังคม

คำชี้แจง โปรดทำเครื่องหมาย / ลงในช่องที่ท่านคิดว่าสมาชิกในครอบครัว เจ้าหน้าที่ในทีมสุขภาพ และเพื่อน ได้ให้ความช่วยเหลือท่านภายหลังที่ท่านได้รับการวินิจฉัยว่าเป็นโรคหัวใจ ตามข้อความต่อไปนี้มาน้อยเพียงใด โดยให้ระดับคะแนน ดังนี้

- | | | |
|---|---------|----------------------------|
| 0 | หมายถึง | ไม่ช่วยเหลือเลย |
| 1 | หมายถึง | ช่วยเหลือเล็กน้อย |
| 2 | หมายถึง | ช่วยเหลือบ้างเป็นครั้งคราว |
| 3 | หมายถึง | ช่วยเหลือค่อนข้างมาก |
| 4 | หมายถึง | ช่วยเหลือมากที่สุด |

สมาชิกในครอบครัว ได้แก่ สามี บิดามารดา บุตร หลาน ญาติพี่น้อง

การช่วยเหลือที่ได้รับ	ไม่ช่วยเหลือเลย 0	ช่วยเหลือเล็กน้อย 1	ช่วยเหลือบ้างบางครั้ง 2	ช่วยเหลือค่อนข้างมาก 3	ช่วยเหลือมากที่สุด 4
1. ให้คำแนะนำและแนวทางในการปฏิบัติตัวที่เป็นประโยชน์					
7. ให้ความช่วยเหลือในการทำกิจวัตรประจำวัน					

เจ้าหน้าที่ในทีมสุขภาพ ได้แก่ แพทย์ พยาบาล เจ้าหน้าที่พยาบาล

การช่วยเหลือที่ได้รับ	ไม่ช่วยเหลือเลย 0	ช่วยเหลือเล็กน้อย 1	ช่วยเหลือบ้างบางครั้ง 2	ช่วยเหลือค่อนข้างมาก 3	ช่วยเหลือมากที่สุด 4
1. ให้คำแนะนำและแนวทางในการปฏิบัติตัวที่เป็นประโยชน์					
7. ให้ความช่วยเหลือในการทำกิจวัตรประจำวัน					

เพื่อน ได้แก่ เพื่อนร่วมงาน เพื่อนบ้าน

การช่วยเหลือที่ได้รับ	ไม่ช่วยเหลือเลย	ช่วยเหลือเล็กน้อย	ช่วยเหลือบ้างบางครั้ง	ช่วยเหลือค่อนข้างมาก	ช่วยเหลือมากที่สุด
1. ให้คำแนะนำและแนวทางในการปฏิบัติตัวที่เป็นประโยชน์					
7. ให้ความช่วยเหลือในการทำกิจวัตรประจำวัน					

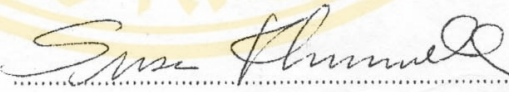
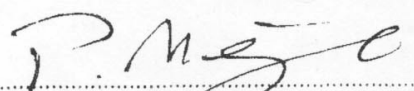
Appendix C

List of Content Validity Experts

List of Content Validity Experts for: Adherence to self-care requirements, Self-efficacy, and knowledge

- 
1. Assoc. Prof. Dr. Saipin Gasemgitvatana
Faculty of Nursing, Mahidol University
 2. Assist. Prof. Dr. Linchong Pothiban
Faculty of Nursing, Chiang Mai University
 3. Assist. Prof. Visal Kantaranakul MD.
Faculty of Medicine, Ramathibodi Hospital, Mahidol University
 4. Assist. Prof. Dr. Usavadee Asdornwised
Faculty of Nursing, Mahidol University
 5. Assist. Prof. Dr. Wantana Maneesriwongkul
Faculty of Medicine, Ramathibodi Hospital, Mahidol University

Appendix D**Documentary Proof of Ethical Clearance**

	
No. <u>45/2005</u>	
Documentary Proof of Ethical Clearance The Committee on Human Rights Related to Human Experimentation Mahidol University, Bangkok	
Title of Project.	Adherence to Self-Care Requirements Model: An Empirical Test among Patients with Coronary Artery Disease (Thesis for Ph.D.)
Principle Investigator.	Miss Kusuma Khuwatsamrit
Name of Institution.	Faculty of Medicine Ramathibodi Hospital
Approved by the Committee on Human Rights Related to Human Experimentation	
Signature of Chairman.	 (Professor Dr. Srisin Khusmith)
Signature of Head of the Institute.	 (Professor Dr. Pornchai Matangkasombut)
Date of Approval.	<u>6 MAY 2005</u>



คณะแพทยศาสตร์ โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล
ถนนพระราม 6 กทม. 10400
โทร. (662) 354-7275, 201-1296 โทรสาร (662) 354-7233
Faculty of Medicine, Ramathibodi Hospital, Mahidol University
Rama VI Road, Bangkok 10400, Thailand
Tel. (662) 354-7275, 201-1296 Fax (662) 354-7233

**Documentary Proof of Ethical Clearance Committee on Human Rights
Related to Researches Involving Human Subjects
Faculty of Medicine, Ramathibodi Hospital, Mahidol University**

No. 0478/2005

Title of Project Adherence to Self-care Requirements Model : An Empirical
Test Among Patients with Coronary Artery Disease

Protocol Number ID 03-48-26

Principal Investigator Miss. Kusuma Ksuwatsamrit

Official Address Department of Nursing
Faculty of Medicine, Ramathibodi Hospital
Mahidol University

The aforementioned project has been reviewed and approved by Committee on Human Rights Related to Researches Involving Human Subjects, based on the Declaration of Helsinki.

Signature of Chairman
Committee on Human Rights Related to
Researches Involving Human Subjects
Prof. Krisada Ratana-olarn, M.D., FRCST, FICS.

Signature of Dean
Prof. Rajata Rajatanavin, M.D., F.A.C.E.

Date of Approval March 16, 2005

Participation's Right Protection Form

เอกสารชี้แจงข้อมูล/คำแนะนำแก่ผู้เข้าร่วมการวิจัย

ชื่อโครงการ รูปแบบความสม่ำเสมอในการดูแลตนเองของผู้ป่วยโรคหลอดเลือดหัวใจ

ชื่อผู้วิจัย กุสุมา คุววัฒนสัมฤทธิ์ นักศึกษาระดับปริญญาเอก สาขาการพยาบาล คณะแพทยศาสตร์ มหาวิทยาลัยมหิดล

สถานที่ คลินิกโรคหัวใจ ผู้ป่วยนอกอายุรกรรม คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี

บุคคลและวิธีการติดต่อเมื่อมีเหตุฉุกเฉินหรือความผิดปกติที่เกี่ยวข้องกับการวิจัย

กุสุมา คุววัฒนสัมฤทธิ์ โทรศัพท์ที่ติดต่อ 1149-920-01 หรือ 7771-589-02

ผู้สนับสนุนการวิจัย อยู่ในระหว่างดำเนินการขอทุนจากสำนักงานกองทุนสนับสนุนการส่งเสริมสุขภาพ (สสส) ความเป็นมาของโครงการ

การศึกษานี้เป็นส่วนหนึ่งของการวิจัยเพื่อทำวิทยานิพนธ์ระดับปริญญาเอก การศึกษานี้ จะทำให้เรียนรู้ปัจจัยที่มีผลต่อความสม่ำเสมอในการดูแลตนเองของผู้ป่วยโรคหลอดเลือดหัวใจ ท่านเป็นผู้หนึ่งในจำนวนผู้ป่วยโรคหลอดเลือดหัวใจจำนวนประมาณ 290 คน ที่ได้รับการคัดเลือกในการให้ข้อมูลเพื่อการศึกษาครั้งนี้

วัตถุประสงค์

ศึกษาปัจจัย และความสัมพันธ์ระหว่างปัจจัยที่มีผลต่อความสม่ำเสมอในการดูแลตนเองของผู้ป่วยโรคหลอดเลือดหัวใจ และทดสอบรูปแบบความสม่ำเสมอในการดูแลตนเองของผู้ป่วยโรคหลอดเลือดหัวใจ

รายละเอียดที่จะปฏิบัติต่อผู้เข้าร่วมการวิจัย

ขอความร่วมมือในการตอบแบบสอบถาม ซึ่งจะใช้เวลาในการตอบประมาณ 45 นาที – 1 ชั่วโมง ขอบข่ายของคำถามคือ ความคิดเห็นของท่านเกี่ยวกับความสม่ำเสมอในการดูแลตนเอง ความมั่นใจในการดูแลตนเอง ความรู้เกี่ยวกับโรคหัวใจและการดูแลตนเอง และแรงสนับสนุนจากครอบครัว เพื่อน และบุคลากรทางการแพทย์ ตลอดจนข้อมูลส่วนตัวบางประการ เช่น อายุ การศึกษา และอาชีพ

ประโยชน์และผลข้างเคียงที่จะเกิดแก่ผู้เข้าร่วมการวิจัย

การศึกษานี้จะเป็นประโยชน์ต่อเจ้าหน้าที่ที่ให้การดูแลผู้ป่วยโรคหลอดเลือดหัวใจ และเข้าถึงปัจจัยที่มีผลต่อความสม่ำเสมอในการดูแลตนเอง การศึกษานี้ไม่ทำให้เกิดผลข้างเคียง แต่อาจจะทำให้เสียผู้วิจัยเสียเวลาในการตอบแบบสอบถาม

การเก็บข้อมูลเป็นความลับ

ข้อมูลใดๆที่ท่านให้มานี้จะถูกเก็บเป็นความลับ จะไม่มีการระบุชื่อของท่านในแบบสอบถามแต่จะใช้เลขรหัสแทน ข้อมูลที่รวบรวมได้ทั้งหมดจะนำมารายงานในลักษณะเป็นกลุ่ม และจะไม่มีการระบุชื่อของท่านในรายงานใดๆ

**หนังสือยินยอมโดยได้รับการบอกกล่าวและเต็มใจ
(Informed Consent Form)**

ชื่อโครงการ รูปแบบความสม่ำเสมอในการดูแลตนเองของผู้ป่วยโรคหลอดเลือดหัวใจ

ชื่อผู้วิจัย นางสาว กุสุมา คุววัฒนสัมฤทธิ์

ชื่อผู้เข้าร่วมการวิจัย.....

อายุ.....เลขที่เวชระเบียน.....

คำยินยอมของผู้เข้าร่วมการวิจัย

ข้าพเจ้า นาย/นาง/นางสาว ได้ทราบ

รายละเอียดของโครงการวิจัยตลอดจนประโยชน์และข้อเสี่ยงที่จะเกิดขึ้นต่อข้าพเจ้าจากผู้วิจัยแล้ว
อย่างชัดเจน ไม่มีสิ่งใดปิดบังซ่อนเร้นและยินยอมให้ทำการวิจัยในโครงการที่มีชื่อข้างต้น และ
ข้าพเจ้ารู้ว่าถ้ามีปัญหาหรือข้อสงสัยเกิดขึ้นข้าพเจ้าสามารถสอบถามผู้วิจัยได้ และข้าพเจ้าสามารถไม่
เข้าโครงการวิจัยนี้เมื่อใดก็ได้ โดยไม่มีผลกระทบต่อการรักษาที่ข้าพเจ้าพึงได้รับ นอกจากนี้ผู้วิจัยจะ
เก็บข้อมูลเฉพาะเกี่ยวกับตัวข้าพเจ้าเป็นความลับและจะเปิดเผยได้เฉพาะในรูปที่เป็นสรุปผลการวิจัย
การเปิดเผยข้อมูลเกี่ยวกับตัวข้าพเจ้าต่อหน่วยงานต่างๆที่เกี่ยวข้องกระทำได้เฉพาะกรณีจำเป็นด้วย
เหตุผลทางวิชาการเท่านั้น

ลงชื่อ.....(ผู้เข้าร่วมวิจัย)

.....(พยาน)

.....(พยาน)

วันที่.....

คำอธิบายของผู้วิจัย

ข้าพเจ้าได้อธิบายรายละเอียดของโครงการ ตลอดจนประโยชน์ของการวิจัย รวมทั้งข้อเสี่ยง
ที่อาจจะเกิดขึ้นแก่ผู้เข้าร่วมวิจัยทราบแล้วอย่างชัดเจนโดยไม่มีสิ่งใดปิดบังซ่อนเร้น

ลงชื่อ.....(ผู้วิจัย)

วันที่.....

APPENDIX E

Assumption Testing: Multicollinearity Testing

Table D.1 Correlation Matrix of All study Variables (N = 285)

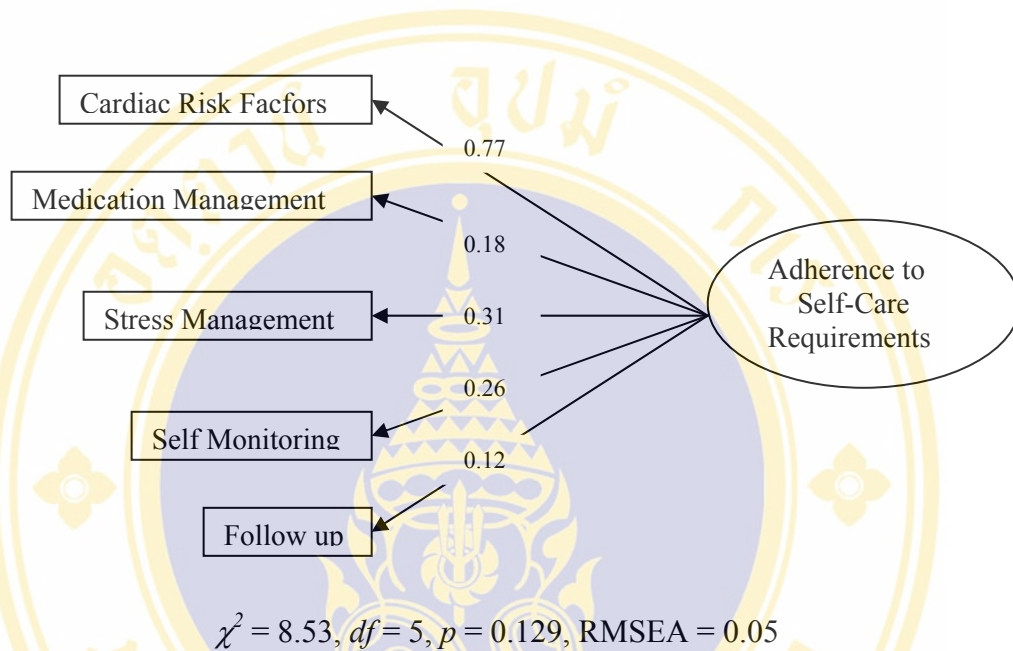
	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	X1	X2	X3	X4	X5
Y1	1																				
Y2	.362**	1																			
Y3	.412**	.184**	1																		
Y4	.286**	.173**	.151*	1																	
Y5	.683**	.380**	.360**	.298**	1																
Y6	.105	.018	.141*	.037	.040	1															
Y7	-.009	.043	.018	-.045	.024	.332**	1														
Y8	.201**	.093	.247**	.117*	.155**	.480**	.170**	1													
Y9	.029	.027	.055	.065	.026	.357**	.272**	.337**	1												
Y10	.086	-.009	.109	.110	.019	.477**	.194**	.426**	.433**	1											
Y11	.038	-.003	.043	-.001	.017	.377**	.214**	.317**	.382**	.388**	1										
Y12	.182**	.119*	.153**	.176**	.092	.405**	.248**	.397**	.357**	.268**	.157**	1									
Y13	.060	-.019	.078	.064	.075	.117*	.093	-.034	.026	-.028	.062	.156**	1								
Y14	.127*	.035	.125*	.024	.086	.216**	.060	.230**	.130*	.315**	.098	.232**	-.066	1							
Y15	.037	.051	.072	.076	.057	.191**	.083	.221**	.047	.167**	.107	.192**	.045	.163**	1						
Y16	.062	-.009	-.026	.019	-.023	.169**	.054	.149*	.002	.110	.094	.093	.045	.058	-.022	1					
X1	.038	.001	.000	.098	.080	.145*	.147**	.233**	.197**	.164**	.392**	.182**	.024	.127*	.101	.022	1				
X2	.023	-.014	-.009	.112	-.023	.022**	.103	.185**	.105	.190**	.110	.213**	.009	.141*	.021	.137*	.380**	1			
X3	.049	.020	.024	.149*	.012	.196**	.060	.256**	.068	.220**	.158**	.117*	-.004	.109	.075	.054	.329**	.426**	1		
X4	.056	.091	-.024	.169**	.063	.147*	.121*	.162**	.075	.085	.038	.128*	-.027	.078	.043	.108	.136*	.213**	.169**	1	
X5	.129*	.162**	.080	-.019	.173**	.022	-.017	.004	-.061	-.037	.018	-.007	-.055	-.060	.071	.003	-.050	.057	-.068	.083	1
Mean	11.02	1.94	1.44	0.30	4.23	31.96	20.16	31.76	40.58	15.30	16.19	74.89	6.41	9.02	14.01	6.57	22.62	18.40	14.01	0.13	0.81
SD	4.04	1.25	0.97	0.61	2.70	9.53	5.64	14.99	11.65	6.64	3.86	10.75	1.54	4.22	5.15	0.90	5.07	5.88	6.45	0.34	0.39

Note: Y1= knowledge of cardiac risk factors, Y2= knowledge of medication management, Y3= knowledge of stress management, Y4= knowledge of self monitoring, Y5= knowledge of treatment of heart disease, Y6= self-efficacy of diet, Y7= self-efficacy of alcohol consumption, Y8= self-efficacy of exercise, Y9= self-efficacy of smoking cessation, Y10= self-efficacy of stress management, Y11= self-efficacy of medication management, Y12= adherence to cardiac risk factors, Y13= adherence to medication management, Y14= adherence to stress management, Y15= adherence to self monitoring, Y16= adherence to follow up, X1= family support, X2= health care providers support, X3= friends support, X4= participation in cardiac rehabilitation program, X5= hospitalization.

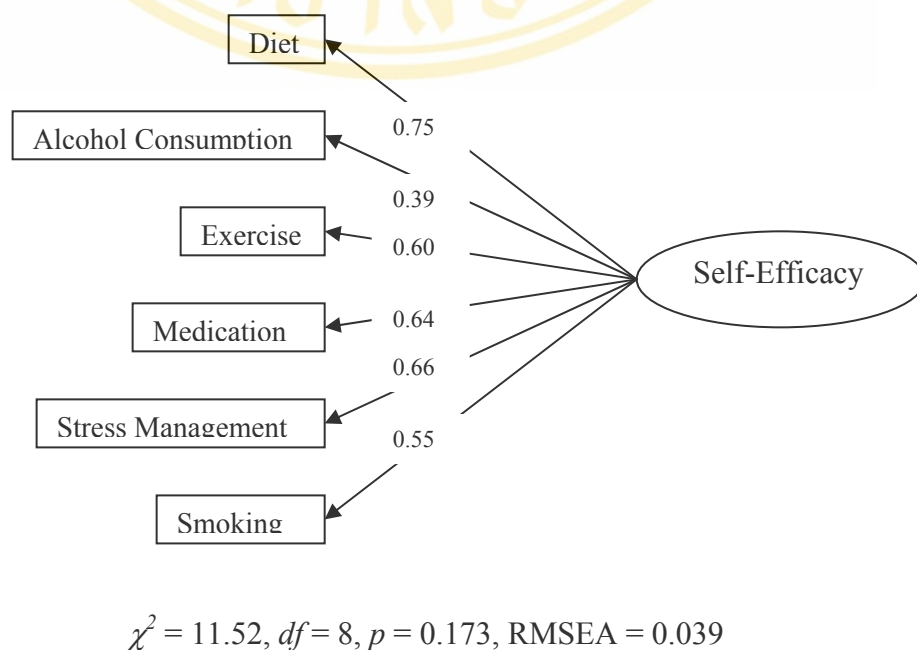
APPENDIX F

The Measurement Model of Adherence to Self-Care Requirements

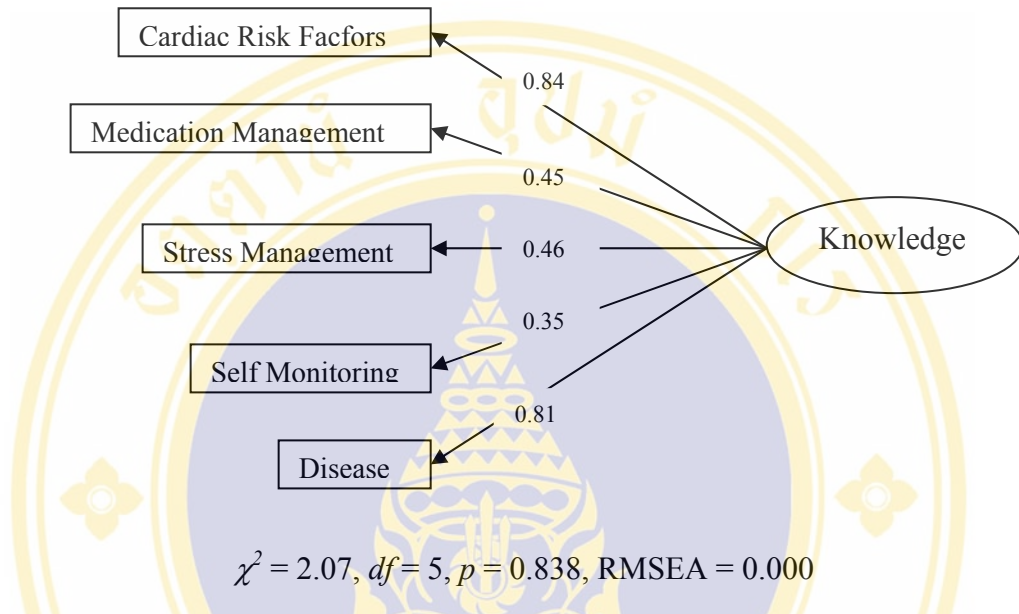
The Measurement Model of Adherence to Self-Care Requirements (N = 285)



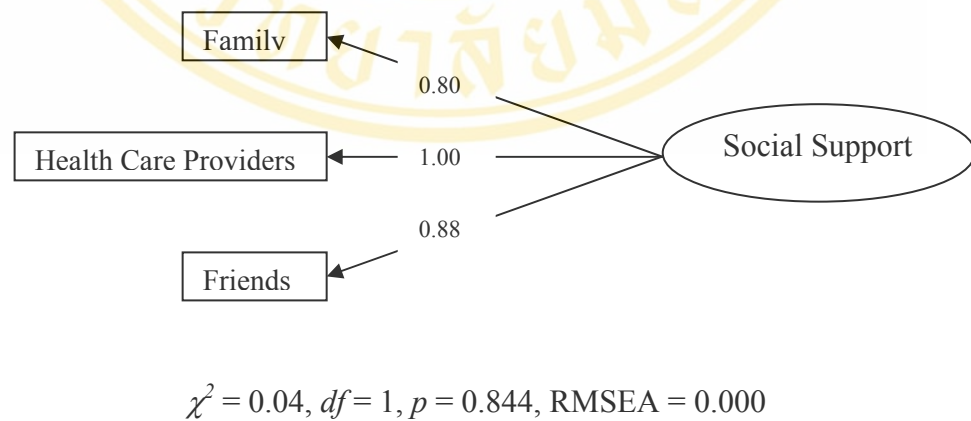
The Measurement Model of Self-Efficacy (N = 285)



The Measurement Model of Knowledge



The Measurement Model of Social Support



BIOGRAPHY

NAME	Ms. Kusuma Khuwatsamrit
DATE OF BIRTH	24 August 1959
PLACE OF BIRTH	Bangkok, Thailand
INSTITUTIONS ATTEND	Ramathibodi School of Nursing, Faculty of Medicine Ramathibodi Hospital, Mahidol University, (1979-1983) Bachelor of Science (Nurse & Midwifery) Ramathibodi School of Nursing, Faculty of Medicine Ramathibodi Hospital, Mahidol University, (1994-1996) Master of Nursing Science (Adult Nursing) Ramathibodi School of Nursing, Faculty of Medicine Ramathibodi Hospital, Faculty of Nursing, Mahidol University, (2001-2006) Doctor of Philosophy in Nursing
SCHOLARSHIP	The Commission of Higher Education, Ministry of Education
RESEARCH GRANT	Thai Health Promotion Foundation
POSITION & OFFICE	Instructor, Department of Nursing, Faculty of Medicine Ramathibodi Hospital, Mahidol University. E-mail: rakkw@mahidol.ac.th