FACTORS ASSOCIATED WITH PATIENT SYMPTOMS IN ISCHEMIC HEART PATIENTS AWAITING CORONARY ARTERY BYPASS GRAFTING

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Thesis
entitled

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ABSTRACT

This is a cross-sectional correlational descriptive study and aimed to investigate the correlation between the left ventricular ejection fraction (LVEF), waiting time, co-morbidity, depression and patient symptoms in ischemic heart patients awaiting coronary artery bypass grafting. The sample consisted of 88 coronary artery disease patients (50 patients were extended hours service CABG and 38 patients awaiting CABG during office hours.) aged 18 years old or older and were admitted at Siriraj hospital in the first day of admission. Data were collected by interview and questionnaires regarding sociodemographic and clinical characteristics, co-morbidity, modified symptom inventory, and depression. Data were analyzed using a statistical analysis program by descriptive statistics, while the correlations between variables were analyzed by Pearson's product-moment correlation.

The majority of participants were male (69.3%) with an average age of 67.9 ± 10.1 years. The LVEF was an average of 52.6% (SD = 16.4). The average waiting time was 34.6 days (SD = 35.9). The most frequently reported co-morbid disease was hypertension. Depression score was an average of 9.1 points (SD = 5.6), and the most common symptoms during waiting for CABG were shortness of breath and chest pain, respectively. Factors significantly associated with symptoms of health problems during waiting for CABG were comorbidity, waiting time, and depression ($r = .256$; $p < .05$, $r = .283$; $p < .01$, $r = .476$; $p < .01$), but no significant associated were found between LVEF and symptoms of health problems while awaiting CABG ($r = -.031$; $p = .775$).

This study suggests that nurses should be preparing patients by developing interventions or guidelines of nursing care to manage symptoms of health problems while awaiting CABG. These guidelines should consider left ventricular ejection fraction, waiting time, co-morbidities and depression.

KEY WORDS: ISCHEMIC HEART PATIENTS / PATIENT SYMPTOMS / AWAITING CORONARYARTERY BYPASS GRAFTING

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ปัจจัยที่มีความสัมพันธ์กับอาการของผู้ป่วยโรคหลอดเลือดหัวใจที่รอผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจ

FACTORS ASSOCIATED WITH PATIENT SYMPTOMS IN ISCHEMIC HEART PATIENTS AWAITING CORONARY ARTERY BYPASS GRAFTING

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บทคัดย่อ

การวิจัยครั้งนี้เป็นการศึกษาเชิงบรรยายภาคตัดขวางตามช่วงเวลาใดเวลาหนึ่งเพื่อศึกษาความสัมพันธ์ระหว่างอัตราส่วนร้อยละของปริมาณเลือดที่บีบตัวออกจากหัวใจห้องล่างซ้าย, ระยะเวลารอผ่าตัด, ภาวะโรคร่วม, ภาวะซึมเศร้า, และอาการของผู้ป่วยโรคหลอดเลือดหัวใจที่รอผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจ กลุ่มประชากร คือ ผู้ป่วยโรคหลอดเลือดหัวใจที่เข้าพักรักษาเพื่อรอผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจแบบวางแผนล่วงหน้าเป็นวันแรกในหอผู้ป่วยในโรงพยาบาลศิริราช อายุ 18 ปีขึ้นไปทั้งเพศชายและหญิง จำนวน 88 ราย (ผู้ป่วยผ่าตัดนอกเวลาราชการจำนวน 50 ราย และผ่าตัดในเวลาราชการจำนวน 38 ราย) เก็บข้อมูลโดยใช้แบบสัมภาษณ์ข้อมูลส่วนบุคคล การเจ็บป่วยและการรักษา แบบประเมินโรคร่วม แบบสอบถามอาการแสดงที่เป็นปัญหาสุขภาพระหว่างรอผ่าตัด และแบบประเมินภาวะซึมเศร้า วิเคราะห์ข้อมูลทั่วไปโดยสถิติเชิงบรรยาย และวิเคราะห์ความสัมพันธ์ระหว่างตัวแปรที่ศึกษาโดยสัมประสิทธิ์สหสัมพันธ์เพียร์สัน

ผลการศึกษาพบว่ากลุ่มตัวอย่างส่วนใหญ่เป็นเพศชายร้อยละ 69.3 อายุเฉลี่ย 67.9 $\pm$ 10.1 ปี อัตราส่วนร้อยละของปริมาณเลือดที่บีบออกจากหัวใจห้องล่างซ้ายโดยเฉลี่ย 52.6% มีระยะเวลารอผ่าตัดเฉลี่ยอยู่ที่ 34.6 วัน โรคร่วมที่พบมากที่สุดคือ โรคความดันโลหิตสูง คะแนนภาวะซึมเศร้าเฉลี่ยอยู่ที่ 9.1 คะแนน อาการแสดงที่เป็นปัญหาสุขภาพระหว่างรอผ่าตัดที่พบมากที่สุดคือ อาการหายใจลำบากหรือไม่เต็มอิ่ม และอาการเจ็บหน้าอก ตามลำดับ เมื่อวิเคราะห์ความสัมพันธ์ระหว่างตัวแปรพบว่า ภาวะโรคร่วม ระยะเวลารอผ่าตัด และภาวะซึมเศร้ามีความสัมพันธ์กับอาการที่เป็นปัญหาสุขภาพระหว่างรอผ่าตัดอย่างมีนัยสำคัญทางสถิติ ($r = .256$; $p < .05$, $r = .283$; $p < .01$, $r = .476$; $p < .01$) ตามลำดับ แต่อัตราส่วนร้อยละของปริมาณเลือดที่บีบออกจากหัวใจห้องล่างซ้ายไม่มีความสัมพันธ์กับอาการแสดงที่เป็นปัญหาสุขภาพระหว่างรอผ่าตัดอย่างมีนัยสำคัญทางสถิติ ($p = .775$)

จากการศึกษามีข้อเสนอแนะว่า ควรมีการเตรียมความพร้อมของผู้ป่วยโดยพัฒนาการปฏิบัติการพยาบาลเพื่อจัดการกับอาการแสดงที่เป็นปัญหาสุขภาพระหว่างรอผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจโดยควรคำนึงถึงอัตราส่วนร้อยละของปริมาณเลือดที่บีบออกจากหัวใจห้องล่างซ้าย, ระยะเวลารอผ่าตัด, ภาวะโรคร่วม และภาวะซึมเศร้า

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CHAPTER I
INTRODUCTION

1.1 Background and Significance of the Study

Coronary artery disease (CAD) or Ischemic heart disease (IHD) is a major public health problem in developed and developing countries. World Health Organization (WHO, 2013) reported that ischemic heart disease was ranked as the first leading cause of death among people around the world, accounting for approximately 7 million (11.2%) deaths in 2011. In Thailand, CAD was ranked as the fourth leading cause of death. The report from Bureau of non communicable disease department of disease control ministry of public health (NCD, 2013) the death rate by CAD per 100,000 people in 2010, 2011 and 2012 was increased by 20.47%, 22.47% and 23.45% respectively.

Coronary artery bypass grafting (CABG) is a surgical which is an effective treatment for people with CAD. The goals of CABG are to relief angina pectoris, prolongs life and improve quality of life (Hawkes, Nowak, Bidstrup & Speare, 2006; Kutty & Nair, 2008). Currently, CAD patients in Thailand who underwent CABG in public and private hospitals is likely to increase, the number of those patients were 4,402 cases in 2011 and increased up to 4,756 cases in 2012. According to the number patients who underwent CABG in Siriraj hospital were 531 cases in 2011 and increased up to 562 cases in 2012 (The Society of Thoracic Surgeons of Thailand, 2013). The number of patients who require CABG is increasing while the resources such as available hospital beds, available intensive-care beds, available operating room including staff (surgeons, anesthesiologists and nurse) who caring for them are limited. From these reasons are affecting CAD patients to wait for CABG long time. Furthermore, the long waiting time depend on the patient's preoperative health status which the possible causes, for example, decreasing body mass index (BMI) or controlling comorbidity such as diabetes mellitus (DM), hypertension (HT), renal disease etc. to be normal before undergo surgery (Ivarsson, Larsson, & Sjoberg, 2004).

Long waiting time for CABG probably decrease quality of life (Sampalis, Boukas, liberman, Reid & Dupuis, 2001). Moreover, long waiting time have negative effects on patient's health status include physical, psychological and social problems (Fitzsimons, Richardson & Scott, 2000; Ketterer et al., 2010; Koivula, Ilmonen, Trakka, Trakka & Laippala, 2001; McCormick, Naimark & Tate, 2002; McCormick, Naimark & Tate, 2006; Sampalis et al., 2001). Especially, physical impact because of CAD has not been resolved and the progression of CAD continues, leading to the suffering from cardiac complication or cardiac adverse events. Patients who waiting for CABG have symptoms which cause by pathological of CAD and stress during waiting time. They express the suffering symptoms such as fatigue, shortness of breath, chest pain, palpitation etc. (Fitzsimons, Richardson & Scott, 2000; Ketterer et al., 2010; Koivula et al., 2001; McCormick et al., 2002; McCormick et al., 2006; McSweeney et al., 2003; Nakon, Sindhu, Utriyaprasit & Laksanabunsong, 2010; Sampalis et al., 2001). The previous studies, Sampalis and colleagues (2001) were found that patients awaiting CABG over 3 months had symptoms of health problems while awaiting CABG as chest pain, and dyspnea more than patients awaiting CABG less than 3 months. In addition, the other studied in patients awaiting CABG average 3-6 months reported the prominent symptoms of health problems while awaiting CABG were chest pain , shortness of breath, fatigue , palpitations (Fitzsimons et al., 2000; McCormick et al, 2002; McCormick et al., 2006; Koivula et al., 2001; Sampalis et al., 2001). Especially, chest pain is an important symptom which have negative influence on physical activity, work and activity daily life. For instance, walking in a short distance, impossible to run or lift heavy objects (Fitzsimons et al., 2000; McCormick et al., 2006) However, during waiting for CABG may occur severe cardiac complication were myocardial ischemia or myocardial infarction (Cesena, Favarato, Cesar, De Oliveira, & Da Luz, 2004) and risk for mortality increased if the waiting time is prolonged (Koomen et al., 2001). Symptoms of health problems during waiting for CABG and complications get worse as the severity of disease is greater and the severity of the disease can be assessed by left ventricular ejection fraction (LVEF) (Bosch & Theroux, 2005).

LVEF is an indicator of the capacity of the heart contraction which represent the volumetric fraction of blood pumped out of the left ventricle of the heart

with each contraction which can be used to assess the severity of disease. In addition, LVEF is a high performance predictor of mortality and severity of disease to evaluate the occurrence of acute myocardial infarction and stable angina among CAD patients (Bosch & Theroux, 2005). LVEF is usually expressed as percentage and a normal LVEF range from 55-70% (American Heart Association, 2013). In the study of Cesena and colleagues (2004) among 574 Brazilian CAD patients found that the patients with LVEF equal to or lower than 35% showed the high occurrence of sudden or cardiac death (HR 5.62, 95% CI 1.42-4.07, $P < 0.01$).

Additionally, not only the severity of CAD influenced to deteriorate of the capacity of the heart contraction but the CAD patients have one or more comorbid conditions. The most common cormobidities in CAD patients awaiting CABG were hypertension, diabetes mellitus, dyslipidemia, renal dysfunction (Banason et al., 2007; Kang, Yang & Kim, 2010; Kayani et al., 2011; Kreatsoulas, Natarajan, Khatun, Velianou & Anand, 2010; Pepine et al., 2006; Hengcharoensuwan, Utriyaprasit, Sindhu & Laksanabunsong, 2010; Sampalis et al., 2001; Thanavaro, Thanavaro & Delicath, 2010; Nakon et al., 2010) and chronic obstructive pulmonary disease (COPD) (Adabag et al., 2010; Nishiyama et al., 2010). These comorbidities are the important risk factors associated with the development of CAD that accelerates the progression of the disease during the waiting period. Moreover, the comorbidities associated with poor recovery after CABG (Banason et al., 2007; Halkos et al., 2008; Kreatsoulas et al., 2010; Pepine et al., 2006 ; Sampalis et al., 2001; Nakon et al., 2010). During the long waiting for CABG if patient's comorbid conditions can not be controlled to the normal range which is a major risk factor affect to the severity of the progession of CAD (Kreatsoulas et al., 2010; Pepine et al., 2006). Therefore, poor comorbitidies associated with adverse outcome and delay recovery after CABG (Banason et al., 2007; Halkos et al., 2008; Nakon et al., 2010) because of hypertention, diabetes mellitus and dyslipidemia lead to impairment endothelial function and result in development of an inflammatory process and vascular remodeling that accelerates regression of the atherosclerotic lesion (Mahmood, 2009; Silbergnagl & Lang, 2006). Pepine and colleagues (2006) determined predictors for adverse outcome in hypertensive patients with CAD noted that these patients with diabetes mellitus had higher adverse outcome than patients without diabetes mellitus including all – cause

death, nonfatal myocardial infarction and nonfatal stroke (HR 1.77, 95% CI 1.62 - 1.93, P < 0.001). Moreover, Halkos and colleagues (2008) studied in 3,555 patients after CABG found that the patients with HbA1C level equal to or more than 7 mg% before CABG was associated with a significant increase in in-hospital mortality and myocardial infarction after CABG than the patients with HbA1C level less than 7 mg% before CABG. Thus, the comorbidities in CAD patients awaiting for CABG to have direct and indirect impact on patients in during the waiting period and postoperative period because of comorbidities contribute to the severity of disease lead to many adverse outcomes such as higher mortality, reduce physical functioning, poor quality of life and the high cost of treatment (Fitzsimons et al., 2000; Halkos, 2008; Kreatsoulas et al., 2010; McCormick et al., 2006; Pepine et al., 2006; ; Sampalis et al., 2001; Nakon et al., 2010).

Long time for CABG have been associated with an increased number of physical problems. In addition, during the long wait, patients may have psychological and emotional problems as well and depend on the physical problems especially the suffering from symptoms of health problems while awaiting CABG which make the patients feel that their lives are threatened and that situation also adversely affects on patient's psychological dimension. The previous studied found that patients while awaiting CABG may experience uncertainty, stress, anxiety, depression and fear (McCormick et al, 2002; McCormick et al, 2006; Koivula et al., 2001; Sampalis et al., 2001). Particularly, depression which found in CAD patients and it is an important risk factor affect to the severity of the progession of CAD because of activation of sympathetic nervous system and inadequate parasympathetic nervous system which may promote myocardial ischemia, ventricular tachycardia and platelet activation and pletelet aggregation also which play a central role in acute coronary syndrome (ACS) lead to symptoms of health problems during waiting for CABG such as chest pain, fatigue, dyspnea or palpitation (Bhattacharyya, Molly &Steptoe, 2008; Carney & Freedland, 2008; Kim et al., 2009). Bhattacharyya and collegues (2008) studied in 76 CAD patients found that CAD patients with depression were 42.7%. Furthermore, Kim and collegues (2009) studied in CAD patients found that CAD patients with depression were 33.5%. Moreover, in Thailand, Nakon and collegues (2010) studied in

88 the diabetic ischemic heart patients following CABG surgery found that these patients with depression during preoperative period were 26%.

CAD patients during waiting for CABG is the critical event and patients need to be adapted to cope with the problem then manifested in behaviors can be observed which attempts reestablish adaptation (Roy, 2009). The severity of disease is focal stimuli while waiting time, comorbidity and depression are contextual stimuli that contribute focal stimuli directly to adaptation lead to manifest behaviors can be observed in the physiologic mode (Roy, 2009) which is symptoms of health problems while awaiting CABG.

In Thailand, the study about factors associate with patient symptoms in patients awaiting coronary artery bypass grafting has never been studied and the most studies examined in postoperative CABG period. For instance, Nakon and collegues (2010) examined factors associated with recovery of diabetic ischemic heart patients following coronary artery bypass grafting reported to a percentage of LVEF, comorbidity, the health problems before surgery and depression before CABG surgery. However, this study focused on the relationship of variables on recovery at day 7 after CABG or day of discharge but it did not focus on symptoms of health problems while awaiting CABG and it did not report the average waiting time of CABG.

Hence, factors associated with patient symptoms in ischemic heart patients awaiting coronary artery bypass grafting are the worth to study. This study was guided by Roy adaptation model and was investigated the variable that reflected in physiologic mode which is symptoms of health problems during waiting for CABG. The severity of disease or LVEF as focal stimuli while waiting time comorbidity and depression as contextual stimuli that contribute focal stimuli directly to adaptation lead to manifest behaviors of the physiologic mode because of recognising the importance of the long waiting time for CABG is the situation that the patients have to cope with their health problems and suffered from chest pain, myocardial ischemia or myocardial infarction and the high risk of death from these suffering. Moreover, during waiting for CABG probably influenced to the comorbid condition get worse or control is not as good as it should. Prolonged waiting time for CABG is a situation that affects patient's psychological problems. Particularly, depression which is an important risk factor that

affects to the severity of the progession of CAD. The findings of this study can assist nurses understand the condition of the patients during waiting for CABG includes patient's physical and psychological status. Moreover, the results of the study provide informations that nurses and other health care provider can be used to prepare or develop program of care for patients in this group which can be managed the suffering in accordance with the patient’s problems directly.

1.2 Research Questions

1. What are the LVEF, waiting time, comorbidity depression and patient symptoms while awaiting CABG?

2. Are the relationship between LVEF, waiting time, comorbidity, depression and patient symptoms while awaiting CABG?

1.3 Research Objectives

1. To investigate the LVEF, waiting time, comorbidity, depression and patient symptoms while awaiting CABG.

2. To examine the relationship between LVEF, waiting time, comorbidity, depression and patient symptoms while awaiting CABG.

1.4 Hypotheses

1. There are negative relationship between LVEF and patient symptoms while awaiting CABG.

2. There are positive relationship between waiting time and patient symptoms while awaiting CABG.

3. There are positive relationship between comorbidity and patient symptoms while awaiting CABG.

4. There are positive relationship between depression and patient symptoms while awaiting CABG.

1.5 Conceptual Framework of the Research

The conceptual framework used in this study is Roy adaptation model. Roy (2009) presented the person as a holistic adaptive system in constant interact with the internal and the external environment. The interact between the person and environment as the person adapts to environmental stimuli. It mean the illness stimulate the person to response to the stimuli and the person need to be adapted to cope with the problem via coping processes were the regulator subsystem and cognator subsystem then manifested in behaviors can be observed in one or more of four categories or adaptive modes were physiologic mode, self-concept mode, role function mode and interdependence mode which attempts reestablish adaptation. The stimuli result in adaptation for coping with the problem called input such as focal stimuli is the internal and the external stimuli most immediately in adaptation, contextual stimuli are all other stimuli that contribute directly to adaptation and residual stimuli are other unknown factors that may contribute to adaptation include attitudes, value and belief.

CAD is atherosclerosis, in which arteries become narrow and hardened because of cholesterol plaque information effect to decrease blood flow reaching to heart may be insufficient lead to angina pectoris or myocardial ischemia (Kutty & Nair, 2008; Silbergnagl & Lang, 2006) and CAD patients have one or more comorbid conditions such as hypertension, diabetes mellitus, dyslipidemia, renal dysfunction etc. (Banason et al., 2007; Kang et al., 2010; Kayani et al., 2011; Kreatsoulas et al., 2010; Pepine et al., 2006; Hengcharoensuwan et al., 2010; Sampalis et al., 2001; Thanavaro, Thanavaro & Delicath, 2010; Nakon et al., 2010) which are the important factors are the important risk factors associated with the development of CAD that accelerates the progression of the disease. While awaiting CABG, CAD has not been resolved and the progression of CAD continues, leading to suffering from cardiac complication. In addition, patients may have stress also. Symptoms of health problems while awaiting CABG related to the severity of disease and this factor can assess from percentage of LVEF which is focal stimuli as this factor affect directly to adaptation. Waiting time, comorbidity and depression are contextual stimuli as these factors contribute directly to adaptation. All of stimuli when enter to adaptation system as the severity of disease, waiting time, and coomorbidity via the regulator subsystem while depression via

cognator subsystem then output is adaptive response to cope with the problem in physiologic mode. Adaptive response promote integrity and help to meet the goals of adaptation but behaviors that expressed in the symptoms of health problems are the reproductive of ineffective response does not promote integrity of individual, in this study is the symptoms of health problems while awaiting CABG such as fatigue, shortness of breath, chest pain, palpitation etc. (Fitzsimons et al., 2000; McCormick et al, 2002; McCormick et al., 2006; McSweeney et al., 2003; Koivula et al., 2001; Sampalis et al., 2001) which manifested in behaviors can be observed.

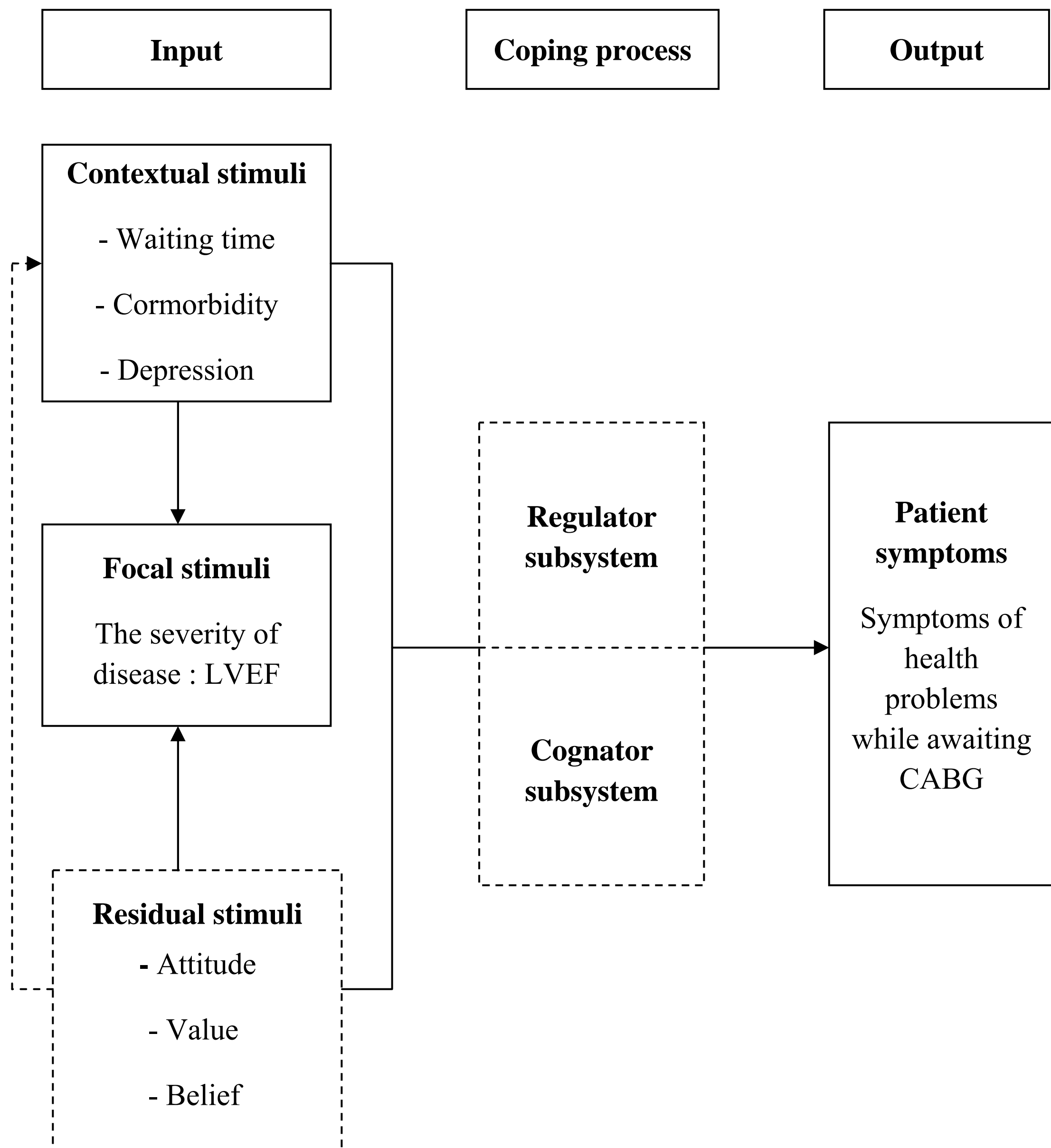

Figure 1.1 The applied conceptual framework of Roy Adaptation Model (Roy, 2009)

1.6 Scope of the Research

This study was cross-sectional correlation descriptive study aimed to describe factors associated with patient symptoms in ischemic heart patients awaiting coronary artery bypass grafting. The population in this study consisted of women and men with coronary artery disease aged 18 years old or older were admitted at Siriraj hospital in the first day of admission and wait for extended hours service and during office hours coronary artery bypass grafting from 23 December 2012 - 20 May 2013.

1.7 Definition of Terms

Left ventricular ejection Fraction (LVEF) is defined as the measurement represent the volumetric fraction of blood pumped out of the left ventricle of the heart with each contraction which usually expressed as percentage and a normal LVEF range from 55-70% (American Heart Association, 2013). In this study assess from echocardiogram or history of special examination

Waiting time is defined as the time when the official added patients in to the waiting list as the start of the period until they admitted at Siriraj hospital in the first day of admission to wait for coronary artey bypass grafting

Comorbidity is defined as the other illness that affects to the patient (Utriyaprasit & Moore, 2009). In this study were the other diseases in coronary artery patients and affects to physical functioning during waiting for coronary artery bypass grafting

Depression is defined as the feeling that the coronary artery patient awaiting coronary artery bypass grafting that response to situation during the waiting period and report of sign and symptoms such as agitation, social withdrawal, loss of appetite, insomnia or difficulty in concentration etc. (Parisson et al., 2007) and assess from The Center for Epidemiologic Study-Depression scale (CES-D) (Radloff, 1977) which modified and transtated in Thai by Kuptniratsaikul & Ketman (2002).

Patient symptoms is defined as observation of patients, the person experiencing the evidence of disease or physical disturbance. It can only be known through patients report. (Ceeland, 2007). In this study is symptoms of health problems awaiting coronary artery bypass grafting and assess from Thai Modified Symptoms

Inventory (Nakon et al., 2010) which developed and refer to the original Symptoms Inventory by Artinian (1993)

1.8 Expected outcomes and benefits

1. The research will help nurse to understand symptoms and other factors which contribute the progression of disease in coronary artery patients awaiting coronary artery bypass grafting.

2. The research will provide important informations for nurses and other health provider can be used to develop program and manage to the health care system for caring the coronary artery disease during waiting for coronary artery bypass grafting.

3. The finding of research can be used as baseline information for health care provider to do and develop the research in the future.

CHAPTER II
LITERATURE REVIEW

This study is a cross-sectional correlational descriptive study and aimed to investigate factors associated with patient symptoms in ischemic heart patients awaiting coronary artery bypass grafting. The literature review focuses on concepts of theory and the research which related to the variables of study as follows.

1. The incidence of coronary artery disease and the waiting for coronary artery bypass grafting
2. Coronary artery disease and Treatments
3. Impact of waiting for coronary artery bypass grafting on patients
4. Factors associated with patient symptoms in ischemic heart patients awaiting coronary artery bypass grafting based on Roy adaptation model.
5. Conclusions

2.1 The incidence of coronary artery disease and the waiting for coronary artery bypass graft surgery

Coronary artery disease (CAD) or ischemic heart disease (IHD) is a major public health problem because of CAD is a chronic disease that occurs in both men and women which the rate of hospitalization and mortality rate increased in the developed and developing countries. World Health Organization (WHO, 2013) reported that ischemic heart disease was ranked as the first leading cause of death among people around the world, accounting for approximately 7 million (11.2%) deaths in 2011. In Thailand, CAD was ranked as the fourth leading cause of death. The reports from Bureau of non communicable disease department of disease control ministry of public health (NCD, 2013) the death rate by CAD per 100,000 people in 2010, 2011 and 2012 was increased by 20.47%, 22.47%, and 23.45%, respectively.

Coronary artery bypass grafting (CABG) is a surgical which provide effective treatment for people with CAD . The goals of CABG are to relief angina pectoris, prolongs life and improve quality of life (Hawkes et al., 2006; Kutty & Nair, 2008). CABG in each countries that can not respond the needs of the patients because of the resorces such as available hospital beds, available intensive-care beds, available operating room including staff (surgeons, anesthesiologists and nurse) who caring for them and are limited and these limitation affect on CAD patients to wait for CABG long time (Ivarsson et al., 2004). In Australia, reported that the number of CAD patients who waiting for CABG in public hospitals were 3,926 cases per year and the range of waiting time were 76-365 days (Australian Institute of Health and Welfare, 2012). In Sweden, reported that the number of CAD patients who waiting for CABG approximately 2,873 cases per year and the range of waiting time were 31-60 days (average 45 days) (Friberg & Nilsson, 2012). In Canada, reported that the range of waiting time were 2-26 weeks (average 6 weeks) (Canadian Institute for Health Information, 2012). Moreover, the studies about mortality rate, causes of death and complications in CAD patients who waiting for CABG as Rexius and colleagues (2006) studied in 5,864 CAD patients who waiting for elective CABG (January 1995 – June 1999) found that mortality incidence on waiting lists were 6.2 deaths per 100 patients year in women and 4.5 deaths per 100 patients year in men and causes of death were acute myocardial infarction, heart failure and cerebrovascular disease. In addition, Cesena and collegues (2004) studied in 574 CAD patients who waiting for elective CABG (1January 1998 – 12 July 1999) found that the number of patients who sudden or cardiac death during wait for CABG were 12 cases (25%), 5 cases (1.1%) had fatal ST elevation myocardial infarction, 87 cases (18.7%) had unstable angina or non fatal non-ST elevation myocardial infarction and 93 cases (20%) admitted in hospital due to cardiac cause for at least 24 hours.

In Thailand, the study to examine the average waiting time, mortality rate, and complications in CAD patients awaiting CABG has never been studied.

2.2 Coronary artery disease and treatments

2.2.1 Coronary artery disease

Coronary artery disease is atherosclerosis, in which arteries become narrow and hardened. The pathophysiology of atherosclerosis is progressed further with associated endothelial dysfunction causing to low density lipoprotein (LDL) was rapidly transported to extracellular subendothelial space and LDL was oxidized called oxidized LDL, damage to endothelial cells trigger an inflammatory response in which monocytes migrate into endothelial cells. The monocytes differentiate into macrophages and ingest the oxidized LDL, accumulation of LDL within the macrophages transforms them into foam cells that deposit within the endothelium and develop to the plaque formation which characteristic of atherosclerosis leads to vascular remodeling, progressive narrowing and abnormal blood flow results in myocardial ischemia. Moreover, if a plaque rupture may result in thrombus formation, partial or complete occlusion of the vessel lead to acute myocardial infarction result in the cause of death (Mahmood, 2009; Schrijvers, Meyer, Herman & Martinet, 2006; Silbergnagl & Lang, 2006).

Sign and symptoms of coronary artery disease

Atherosclerosis leads to vascular remodeling, progressive narrowing and abnormal blood flow results in myocardial ischemia causing to angina pectoris which is the most common symptom of CAD. Typically, angina can be described as a feeling of tightness in the middle of chest or substernal pain and may spread to the jaw or inner left arm. It is usually triggered by exertion or emotional stress. Normally angina is relieved within 3-5 minutes by rest or taking sublingual nitroglycerin which is a potent vasodilator. Moreover, angina may be accompanied by nausea and sweating in some cases. However, in some cases are possible to have myocardial ischemia without experiencing angina but have breathlessness on exertion only. (Croft & Thomas, 2007; Jone, Somerville, Feder & Foster, 2010; Mahmood, 2009; Silbergnagl & Lang, 2006; Tillmans, Erdogan & Sedding, 2009).

Presently, the classification of severity of angina according to Canadian Cardiovascular Society Angina Classification (CCS) (Kutty & Nair, 2008) as follows

Class 0: No angina

Class 1: Angina with severe exertion

Class 2: Angina with moderate exertion

Class 3: Angina with mild exertion such as walking 1-2 level blocks at normal pace or climbing 1 flight of stairs at normal pace

Class 4: Angina at rest

Additionally, classify the severity of symptoms according to the New York Heart Association (NYHA) (American Heart Association, 2013) as follows

Class 1: Patients with cardiac disease but resulting in no limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, dyspnea or anginal pain.

Class 2: Patients with cardiac disease resulting in slight limitation of physical activity. they are comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnea or anginal pain.

Class 3: Patients with cardiac disease resulting in marked limitation of physical activity. They are comfortable at rest. Less than ordinary activity causes fatigue, palpitation, dyspnea or anginal pain.

Class 4: Patients with cardiac disease resulting in inability to carry on any physical activity without discomfort. Fatigue, palpitation, dyspnea or anginal pain may be present even at rest. If any physical activity is undertaken, discomfort increases.

However, the severity of heart disease can also be estimated from left ventricular ejection fraction (LVEF). A normal LVEF ranges from 55-70% (American Heart Association, 2013). In the studies of Bosch & Theroux (2005) found that LVEF is a high performance predictor of mortality and severity of disease to evaluate the occurrence of acute myocardial infarction and stable angina among CAD patients. LVEF can be classified into four groups as follows (American Heart Association, 2013; Thongchareon & Laksanabunsong, 2008)

Good function	means LVEF greater than 50%
Mild impairment	means LVEF greater than 40 to 50%
Moderate impairment	means LVEF between 30 to 40%
Severe impairment	means LVEF between 20 to 30%
Poor function	means LVEF less than 20%

There are important risk factors that result in CAD can be classified as modifiable coronary artery disease risk factors such as hypertension, diabetes mellitus, dyslipidemia, obesity, smoking, lack of exercise and stress. Non-modifiable coronary artery disease risk factors such as age, sex, heredity (McMahan, Gidding & McGill, 2008; Kutty & Nair, 2008; Tillmanns et al., 2009).

2.2.2 The treatments of coronary artery disease

Therapeutic options for coronary artery disease are based on two principles were medical therapy and revascularization. Currently, the two primary modalities for revascularization are percutaneous transluminal coronary intervention (PCI) and coronary artery bypass grafting (CABG) (Martin & Turkelson, 2006; Kutty & Nair, 2008; Tillmanns et al., 2009).

2.2.2.1 Medical therapy medicines used to treat CAD as follows (Kutty & Nair, 2008; Tillmanns et al., 2009)

1) Nitrate such as nitroglycerin which works to dilate or widen the coronary arteries and to relax the veins, attenuate myocardial oxygen consumption by reduction of cardiac preload and afterload, increasing blood flow to the heart muscle. It can relieve angina.

2) Beta-adrenergic blocking agents such as propranolol, metoprolol and atenolol. These medications help control symptoms and reduce the incidence of infarction. Medications that relax the blood vessels and slow the heart rate. It thereby improves blood flow to the heart, decreases blood pressure, reduce myocardial oxygen demand and improvement of exercise tolerance

3) Calcium channel blocking agents such as amlodipine, verapamil, diltiazem, nifedipine and nisoldipine. They are the chemical that disrupts the movement of calcium through heart muscle, vascular and smooth muscle which also help widen (dilate) coronary arteries, slow heart rate and lower blood pressure to reduce the heart's workload and so the amount of oxygen required by the heart decreases accordingly. This can help ameliorate symptoms of ischaemic heart disease such as angina pectoris.

4) Angiotensin-Coverting Enzyme Inhibitor (ACEI) such as captopril, enaril, zesinopril. They are coronary vasodilators that reduce and prevent the

incidence of heart failure, reduced reinfarction, reduce plaque rupture and increased survival.

5) Antiplatelet such as aspirin, clopidogrel, ticlopidine and GPIIb/IIIa agents (abciximab). These medications can inhibit the formation of blood clots by decreasing the occurrence of larger platelet aggregates. They may also help reduces the incidence of myocardial infarction and mortality.

6) Anticoagulant such as unfractionated heparin, low-molecular- weight heparin (LMWH). They are drugs used to prevent clot formation or to prevent a clot that has formed from enlarging. They inhibit clot formation by blocking the action of clotting factors or platelets.

7) Statin such as simvastatin, atrovastatin etc. It means of lowering LDL cholesterol a slower progression of coronary atherosclerosis. Moreover, they are anti-inflammatory agents and may also help reduces infarct size and the incidence of cardiovascular events.

However, the method of treatment of coronary artery disease depends on the severity of disease. Initial treatment, doctors often treated with medication but if the severity of disease increased and medications are not able to control symptoms, the doctor may recommend the interventional procedures such as PCI or CABG.

2.2.2.2 Percutaneous transluminal coronary intervention (PCI) is a non-surgical treatment procedure that unblocks narrowed coronary arteries may include, using a balloon catheter to dilate the coronary artery from within (percutaneous transluminal coronary angioplasty: PTCA) or using a balloon catheter to dilate the coronary artery and to place a stent at the site of blockage to permanently open the coronary artery (PTCA with stent) which improves blood flow (Taggart, 2007; Tillmanns et al., 2009). Restenosis is an important clinical problem which cause the patients repeat PCI is necessary in this cases and some patients need to be treated with surgery instead (Taggart, 2007).

2.2.2.3 Coronary artery bypass grafting (CABG) is the high performance treatment of coronary artery disease which used to treat chest pain and gives longer life in patients with severe coronary artery (Martin & Turkelson, 2006; Kutty & Nair, 2008; Tillmanns et al., 2009). It is the one way to treat the

blocked or narrowed arteries is to bypass the blocked portion of the coronary artery with another piece of blood vessel, arteries or veins from elsewhere in the patient's body, and to create new pathway for improving the blood supply to coronary circulation supplying the heart muscle (Martin & Turkelson, 2006; Kutty & Nair, 2008). The CAD patients who have the important indication for CABG, the doctor will be considered with regard to symptoms, coronary anatomical pathology and left ventricular function. The practice guideline of 2011 American College of Cardiology Foundation and American Heart Association for CABG (Hillis et al., 2011) are summarized indications for coronary artery bypass grafting in large groups as follows

1. Symptom indication
    - 1.1 Disabling angina / medical refractory angina
    - 1.2 Unstable angina / ongoing ischemia
    - 1.3 Persistent or recurrent ischemia
    - 1.4 Hemodynamic instability
2. Pathological indication
    - 2.1 Significant left main coronary artery disease
    - 2.2 Left main equivalent
    - 2.3 Three vessels disease
    - 2.4 Two vessels disease with significant proximal LAD and LVEF < 50%
    - 2.5 Proximal LAD stenosis with one-vessel or two vessels disease
    - 2.6 One-vessel or two-vessels disease with large area of viable myocardium
    - 2.7 Poor LV function with significant viable myocardium
    - 2.8 Life-threatening ventricular arrhythmias

Currently, the most acceptable CABG divided into the procedure to use of the cardiopulmonary bypass machine is known as open heart surgery or on pump CABG or conventional CABG and the procedure is performed with heart beating and without the use of the cardiopulmonary bypass machine, which helps reduce complications from heart and lung machine, it called close heart surgery or off-pump CABG. In the CABG, the doctor will open the chest via a median sternotomy and the

healthy arteries or viens from the body, frequent conduits are the sphenous vein, mammary artery or radial artery, is grafted and bypass to the blocked portion of the coronary artery which for creating the new path for oxygen-rich blood to flow to the heart muscle . One end of each graft is sewn on to the coronary arteries beyond the blockages and the other end is attached to the aorta (Kutty & Nair, 2008; Livesey, 2006, Miller, 2010).

In Thai CAD patients were diagnosed from Cardiologist and Cardiac surgeon that should be treated with CABG. Before going into the surgical process, each CAD patient should to be prepared physically and mentally before going on CABG. Especially, physical preparation which need to be further examination such as chest X-Ray, Electrocardiography (ECG), laboratory blood sampling etc. To search for the health problems and comorbidities of patients and corrected to normal before surgery to achieve better results and prevent postoperative complications that may arise as a consequence. (Weisberg, Weisberg, Wilson & Collard, 2009). The health problems and cormorbidities if it is not resolved to the normal range which is the important risk factors that may affect to the severity of the progression of CAD (Kreatsoulas et al., 2010; Pepine et al., 2006). Therefore, it may result in adverse outcomes and delayed recovery after CABG (Banason et al., 2007; Halkos et al., 2008; Kreatsoulas et al., 2010; Nakon et al., 2010; Pepine et al., 2006 ; Sampalis et al., 2001). In addition, the CAD patients during the waiting period should to be advised to lifestyle modification in terms of eating, exercise, medication and risky behavior such as smoking cessation etc. It can resolve and control the health problems or comorbidities are not so severe which may affect to the postoperative outcome were improved (Goodman et al., 2008).

In conclusion, CAD is atherosclerosis which progressed further with associated endothelial dysfunction due to the build-up of cholesterol and other material such as inflammatory cells, called plaque, in which arteries become narrow and hardened that lead to decrease blood flow results in myocardial ischemia causing to angina pectoris. Therapeutic options for coronary artery disease are based on two principles were medical therapy and revascularization. Currently, the two primary modalities for revascularization are PCI and CABG. The goals of CABG are to relief angina pectoris, prolong life and improve quality of life. Presently, the most

acceptable CABG divided into the procedure to use of the cardiopulmonary bypass machine and the procedure is performed with heart beating and without the use of the cardiopulmonary bypass machine. However, preparing of the physical and mental may include to resolve and control the health problems or comorbidities during preoperative period to normal range have to depend on the times. In addition, the limitation of resources such as available hospital beds, available intensive-care beds, available operating room including staff (surgeons, anesthesiologists and nurse) which are affecting CAD patients to wait for CABG long time. Prolonged waiting time for CABG is a situation that affects patient's physical and psychological problems because of CAD has not been resolved the pathological of disease and the progression of CAD continues and the patients have to cope with their health problems while waiting for CABG which is the cardiac symptoms lead to psychological stress as well.

2.3 Impact of waiting for coronary artery bypass grafting

CAD is progressed further with associated endothelial dysfunction. This disease is caused by gradual cholesterol plaque build-up along the inner walls of the coronary arteries develop atherosclerosis, in which become narrow, swollen and hardened lead to reduces blood flow to the heart muscle (Mahmood, 2009; Schrijvers, Meyer, Herman & Martinet, 2006; Silbergnagl & Lang, 2006). If the severity of the progression of CAD develop which lead to left ventricular dysfunction and result in the capacity of ventricle decreased and patients had a higher risk of mortality from myocardial infarction (Cesena et al., 2004).

Prolonged waiting time for CABG have negative effects on patient’s physical dimension directly because of pathological of the coronary arteries dysfunction is still remain and has not been resolved and comorbidities of patient contribute and accelerates the severity of the progression of the development of CAD (Banason et al., 2007; Kreatsoulas et al., 2010; Pepine et al., 2006; Sampalis et al., 2001). These reasons that reflected in physiologic mode and expressed in term of patient symptoms, which is the symptoms of health problems while awaiting CABG. The previous studies reported the prominent symptoms of health problems while awaiting CABG were fatigue, chest pain, shortness of breath, palpitation, sleep

disturbance (Fitzsimons et al., 2000; McCormick et al., 2002; McCormick et al., 2006; Nakon et al., 2010; Ketterer et al., 2010; Koivula et al., 2001; Sampalis et al., 2001).

Chest pain is the prominent symptom was found 25 to 94% and it is the main symptom that disturb patients awaiting CABG (Fitzsimons & Richardson, 2000; McCormick et al., 2002; Lindsay, Smith & Wheatley, 2001). The study in 360 CAD patients who waiting for CABG found that 33 CAD patients need to be admitted immediately due to unstable angina (Koomen et al., 2001). Angina pectoris or chest pain associated with myocardial ischemia due to coronary blood flow to the heart muscle decreased. It occurs when there is an imbalance between the myocardial oxygen supply and the myocardial oxygen demand (Kutty & Nair, 2008; Silbernagl & Lang, 2006). Chest pain is often brought on by exertion or stress because of during the hard-working heart muscle requires greater amounts of oxygen but the delivery of blood to the heart muscle through the coronary artery stenosis is not sufficient or when the patient stress will cause chest pain as well as exertion because stress will stimulate the body to secrete the cathecholamine substance out more and causing to tachycardia and myocardial oxygen demand increases (Kutty & Nair, 2008; Silbernagl & Lang, 2006). The descriptive prospective study done by Jonsdottir & Baldursdottir (1998) which studied in 72 CAD Icelandic patients who had the mean time on the CABG waiting list was 5 to 6 months found that chest pain associated with the exertion accounted for 67.1% and emotional changes accounted for 42.9%. Consistent with the study done by Bengston and colleagues (1996) found that CAD patients who had the mean waiting time was 5 to 8 months reported chest pain occurs while the patient stress accounted for 80% and anxiety accounted for or 74%. Moreover, chest pain is the most common symptom in CAD patients with DM due to the high blood sugar levels cause blood viscosity which result in the heart to work harder lead to the myocardial ischemia. In addition, blood glucose level greater than 200 mg/dl before surgery also affects wound healing after surgery due to the chance of infection is high. Moreover, it cause neurological and kidney complications (Patel, 2008).

Shortness of breath is the prominent symptom was found 28 to 93% in CAD patients awaiting CABG (Fitzsimons et al., 2000; McCormick et al., 2002; Lindsay et al., 2001; Arnold et al., 2009). The prospective study done by Fitzsimons and colleagues (2000) aimed to describe the clinical characteristics in 175 CAD

patients while awaiting CABG was 6 months found that 133 CAD patients (76%) have shortness of breath. For 24 (13%) patients became shortness of breath at rest, 50 (29%) whilst walking at their own pace on the level, 49 (28%) whilst hurrying on level ground and 10 (6%) whilst climbing hills. Shortness of breath on exertion found in CAD patients who had left ventricular dysfunction due to myocardial ischemia (Silbernagl & Lang, 2006). However, the previous study found that shortness of breath in CAD patients while awaiting CABG associated with the several factors were psychosomatic, sleep disturbance and chest pain (Arnold et al., 2009; Fitzsimons et al., 2000). In addition, the previous study found that shortness of breath was reported by CAD patients preoperatively more than CAD patients postoperatively due to the anginal relived as a result of CABG (Lindsay et al., 2001).

Fatigue is the prominent symptom was found 29 to 42.9% (McCormick et al., 2002; McSweeney et al., 2003). It is characterized by a lessened capacity or motivation for work and is usually accompanied by feelings of weariness and sleepiness (Nelesen, Dar, Thomas & Dimsdale, 2008). Fatigue found in CAD patients caused by myocardial ischemia causes left ventricular dysfunction as a result the blood volume out of the heart per minute (cardiac output) decreases and it can be cause by a lack of oxygen in skeleton muscle and anaerobic metabolism result in fatigue (Nelesen et al., 2008). The study done by McSweeney and colleagues (2003) examined the symptoms in 155 acute myocardial ischemia women patients reported the common symptom was unusual fatigue to 42.9%. Fatigue during waiting for CABG may be caused by several reasons such as chest pain, heart failure, anemia, insomnia etc (McSweeney et al., 2003; Nelesen et al., 2008).

Sleep disturbance found during the waiting CABG surgery and an important symptoms that cause significant sleep disturbance of patients is chest pain. The prospective study done by Fitzsimons and colleagues (2000) aimed to describe the clinical characteristics in 175 CAD patients during awaiting CABG was 6 months found that 163 CAD patients (93%) reported angina and 74 patients (42%) stated that it had woke woken them from their sleep. Moreover, the prospective study done by Gallagher & McKinley (2007) examined to anxiety in 172 CAD patients showed that while awaiting CABG surgery found that patients with high levels of anxiety could disturb the sleep of patients.

In conclusion, during waiting for CABG have negative impact on physical directly due to CAD is still has not been resolved and lead to manifest patient symptoms which is the symptom of health problems during waiting for CABG such as chest pain, shortness of breath, fatigue, sleep disturbance etc. The CAD patients during waiting for CABG as in the event of crisis and patients will have to adapt to cope with the problems in physical to promote stability.

2.4 Factors associated with patient symptoms in ischemic heart patients awaiting coronary artery bypass grafting based on Roy adaptation model

Roy (2009) said that when a change or crisis in life such as illness, the person will have to adapt by using the coping processes were the regulator subsystem and cognator subsystem in response to the changes that occur to maintain the physical, mental and social integrity then expressed in behaviors can be observed as the patients with CAD due to atherosclerosis, in which arteries become narrow and hardened due to gradual cholesterol plaque build-up lead to reduces blood flow to the heart muscle results in myocardial ischemia causing to chest pain in the CAD patients (Kutty & Nair, 2008; Mahmood, 2009; Silbernagl & Lang, 2006). If the severity of the progression of CAD develop which lead to left ventricular dysfunction and result in the capacity of ventricle decreased and patients had a higher risk of mortality from myocardial infarction (Cesena et al., 2004). Adaptive behaviors in the physiologic mode of patients awaiting CABG which is adaptation and manifest in symptoms of health problems while awaiting CABG and the symptoms are more or less dependent on the stimuli (Roy, 2009). Patients with severe disease will express symptoms of health problems during the waiting period more than patients with non-severe disease (Bosch & Theroux, 2005). Thus, the severity of disease as the focal stimuli because it is the most important stimuli inducing behavioral physiological responses which is symptoms of health problems while awaiting CABG. While the severity of the disease is more or less dependent on other factors that affect patients at that time. The other factors affect the focal stimuli which is contextual stimuli and it will contribute it will

contribute the focal stimuli which is the severity of disease more intense. In this study, the factors that contribute the severity of CAD more intense include the waiting time, comorbidity and depression. All of four inputs when enter to adaptation system as the severity of disease, waiting time, and coomorbidity via the regulator subsystem while depression via cognator subsystem then output is adaptive response to cope with the problem in physiologic mode. Adaptive response promote integrity and help to meet the goals of adaptation but behaviors that expressed in symptoms of health problems are the reproductive of ineffective response does not promote integrity of individual, in this study is the symptoms of health problems while awaiting CABG such as fatigue, shortness of breath, chest pain, palpitation etc (Fitzsimons et al., 2000; Ketterer et al., 2010; Koivula et al., 2001; McCormick et al., 2002; McCormick et al., 2006; McSweeney et al., 2003; Nakon et al., 2010; Sampalis et al., 2001). These important factors were the severity of disease, waiting time, comorbidity and depression which the details as follow

2.4.1 Focal stimuli

2.4.1.1 The severity of disease which can be assessed by LVEF and a normal LVEF range from 55-70% (American Heart Association, 2013). It is the focal stimuli because this stimuli influencing physiological adaptation directly. CAD causing myocardial ischemia due to coronary blood flow decreased and an imbalance between the myocardial oxygen supply and the myocardial oxygen demand (Kutty & Nair, 2008; Silbernagl & Lang, 2006). In addition, It causes left ventricular dysfunction which result in the capacity of ventricle decreased (Silbernagl & Lang, 2006). The study done by Bosch & Theroux (2005) among 1,104 patients with non-ST segment elevation acute coronary syndrome (ACS) found that LVEF was the high performance predictor of mortality and the severity of disease that used to identify the occurrence of acute myocardial infarction and stable angina in patients with CAD and this study reported the in hospital death rate was 2.7% (30 patients) and the odd ratio for mortality associated with an EF ≤ 48% adjusted for the thrombolysis in myocardial infarction (TIMI) risk score, was 3.3 (95% CI 1.5-7.3, P = .003). It is consistent with the study done by Cesena and colleagues (2004) among 574 Brazilian patients with CAD during waiting for CABG found that the patients with LVEF equal to or lower

than 35% showed the high occurrence of sudden or cardiac death (HR 5.62, 95% CI 1.42-4.07, $P < 0.01$). In addition, the percentage of LVEF before CABG affects the recovery after CABG, the patients with EF ≤ 40% will recover slowly and the length of stay in hospital longer than patients with EF > 40% (Peterson et al., 2002). It is consistent with the study done by Topkara and colleagues (2005) among 55,515 patients who underwent CABG between 1997 to 1999. Patients were stratified into 1 of the 4 EF groups as follows: Group 1 (EF ≤ 20%), Group 2 (EF 21% to 31%), Group 3 (EF 31% to 40%) and Group 4 (EF > 40%). Patients in group 1 (EF ≤ 20%) had higher in-hospital mortality (6.5%) and after discharge from the hospital, these patients need care or be admitted to the nursing home care than patients in the other groups due to these patients had a high incidence of preoperative comorbid conditions, previous myocardial infarction, previous congestive heart failure etc. Additionally, duration of the use of the cardiopulmonary bypass machine of patients in this group longer than patients in the other groups during perioperative stage.

In Thailand, the studies was reported to the severity of CAD patients awaiting CABG. However , the most studies tend to focus on the recovery after CABG as well as the study done by Nakon and colleagues (2010) studied the factors associated with recovery of diabetic ischemic heart patients following coronary artery bypass grafting among 88 samples showed that EF <30% of the 14 patients (12.8%), EF 30-50% of the 23 patients (21.1%), EF> 50% in the 72 patients (66.1%), EF correlated positively with the recovery after CABG at 7 days of discharge and the first follow-up after surgery ($r = .435$; $p < .01$; $r = .286$; $p < .01$) but they did not study the relationship of EF with symptoms of health problems while awaiting CABG.

2.4.2 Contextual stimuli

2.4.2.1 Waiting time: During waiting for CABG, patients still living with CAD and suffering from symptoms of health problems while awaiting CABG were fatigue, shortness of breath, chest pain, palpitation etc (Fitzsimons, Richardson & Scott, 2000; Ketterer et al., 2010; Koivula et al., 2001; McCormick et al., 2002; McCormick et al., 2006; McSweeney et al., 2003; Nakon et al., 2010; Sampalis et al., 2001). They are the important symptoms which have negative influence on physical activity, work and activity daily life. For instance, walking in a

short distance, impossible to run or lift heavy objects (Fitzsimons et al., 2000; McCormick et al., 2006). Long waiting time for CABG probably decrease quality of life (Sampalis et al., 2001) and risk for severe cardiac complication such as myocardial ischemia, myocardial infarction, cardiac death (Cesena et al., 2004; Koomen et al., 2001). The prospective cohort study done by Koomen and colleagues (2001) described morbidity and mortality in patients waiting for CABG and to assess determinants for the occurrence of these complications among 360 CAD patients found that patients suffering with myocardial infarction and unstable angina. Additionally, it was also found that the patients died due to chest pain for too long. The study done by Cesena and colleagues (2004) among 574 CAD patients awaiting CABG found that 48% of complications occurred within 60 days and 72% within 120 days of waiting. In addition, sudden or cardiac death occurred in 12 patients (2.5%) and it occurred to patients during the waiting period average 222 days.

2.4.2.2 Co-morbid: CAD is atherosclerosis which progressed further with associated endothelial dysfunction due to the build-up of cholesterol and other material such as inflammatory cells, called plaque, in which arteries become narrow and hardened. Additionally, atherosclerosis may be due to hypertension, diabetes and dyslipidemia because all of them cause changes in the inner endothelial cells and arteries become narrow and hardened results in myocardial ischemia (Kutty & Nair, 2008; Mahmood, 2009; Silbernagl & Lang, 2006). In addition, CAD is a common cause of myocardial ischemia due to the blood supply to the heart muscle decreases. It causes left ventricular dysfunction which as a result the blood volume out of the heart per minute (cardiac output) decreases (Kutty & Nair, 2008; Silbernagl & Lang, 2006) and it is a direct affect on the reduction of renal blood supply, causing renal function decrease. The previous study in CAD patients with renal dysfunction (GFR < 75 ml/min/1.73 m^2) found that these patients were the elderly women with dyslipidemia, the low hemoglobin, high BMI and had comorbidities were diabetes and hypertension (Barrios et al., 2008; Hailpern, Cohen & Alderman, 2005).

The most common cormobidities in CAD patients awaiting CABG were hypertension, diabetes mellitus , dyslipidemia, renal dysfunction (Banason et al., 2007; Hengcharoensuwan et al.,2010; Kang et al., 2010; Kayani et al., 2011; Kreatsoulas et al., 2010; Nakon et al.; 2010; Pepine et al., 2006; Sampalis et al.,

2001; Thanavaro et al., 2010) etc. Which is the factors that accelerate the progression of the disease and the severity of the disease is greater while awaiting CABG. It causes left ventricular dysfunction which result in the capacity of ventricle decreased lead to the cardiac output decrease and it can be caused a lack of oxygen in the tissue of the body (Silbernagl & Lang, 2006). It may cause chest pain, fatigue. Those symptoms often limits in their physical activity and daily life, impaired physical capacity. For instance, walking in a short distance, impossible to run or lift heavy objects (Fitzsimons et al., 2000; McCormick et al., 2006). Moreover, if co-morbid that can not be controlled to the normal range which result in adverse outcomes and delayed recovery after CABG (Banason et al, 2007; Halkos et al., 2008; Nakon et al., 2010). The study of Topkara and colleagues (2005) among 55,515 patients who underwent CABG between 1997 to 1999 found that the patients with EF $\leq$ 20% had a high incidence of preoperative co-morbid conditions which cause delayed recovery after surgery. The study of Bengston and colleagues (1996) found that CAD patients who had the mean waiting time was 5 to 8 months reported chest pain which is the most common symptom in CAD patients with DM due to the high blood sugar levels cause blood viscosity which result in the heart to work harder lead to the myocardial ischemia causing to chest pain. Additionally, Halkos and colleagues (2008) studied in 3,555 patients after CABG found that the patients with HbA1C level equal to or more than 7 mg% before CABG was associated with a significant increase in in-hospital mortality, myocardial infarction and deep sternal wound infection after CABG greater than the patients with HbA1C level less than 7 mg% before CABG surgery. Moreover, the study done by Maisel and colleagues (2001) found that co-morbid is a factor that contributes to the atrial fibrillation after cardiac surgery, especially hypertension causes fibrosis and dispersion of atrial which effect to reduce the refractory period in tissue of atrium.

The study in Thailand done by Nakon and colleagues (2010) studied the factors associated with recovery of diabetic ischemic heart patients following coronary artery bypass grafting among 88 samples at 7 days of discharge and the first follow-up after surgery showed that EF had a negative relationship with recovery at both time indicators after surgery ($r = -.230$; $p < .05$; $r = -.334$; $p < .01$) respectively.

Conclude that the co-morbid is one factor that related to patient symptoms which is symptoms of health problems while awaiting CABG because the factors can be caused the severity of disease is greater.

2.4.2.3 Depression is a common symptom in patients with chronic illness. CAD often have co-morbid may be one or more always such as HT, DM, DLP, RD and COPD etc. These diseases are chronic diseases that is persistent or otherwise long-lasting in its effects and requiring the continuous treatments. Prolonged waiting time may be often have psychological and emotional problems due to the illness of heart disease remain and continues which as a result of the patient's psychological problems such as stress and depression. The study done by Bhattacharyya and colleagues (2008) found that 44.2% of CAD patients reported depression. The study done by Kim and colleagues (2009) found that 33.5% of CAD patients reported depression. The study in Thailand done by Nakon and colleagues (2010) found that 26% of diabetic ischemic heart patients reported depression. Depression affects on pathophysiology and behavior of patients with CAD. It found that when CAD patients had depression, activation of sympathetic nervous system and inadequate parasympathetic nervous system which may be disturbed cortisol regulation. Cortisol is involved in the pathophysiological processes contributing to atherogenesis including disturbed metabolism, abdominal adiposity, insulin resistance, prothrombotic response and vascular inflammation. Heightened cortisol output is partly responsible for vascular endothelial dysfunction in depressed individual which play a central role in acute coronary syndrome (ACS). It result in the risk for myocardial infarction, left ventricular arrhythmias and induce platelet aggregation in CAD patient lead to cardiac symptoms such as chest pain, fatigue, dyspnea or palpitation (Bhattacharyya, Molly &Steptoe, 2008; Carney & Freedland, 2008; Kim et al., 2009). The study done by Watkins and colleagues (2006) examined whether phobic anxiety is associated with ventricular arrhythmias in 940 patients with CAD hospitalized for diagnostic cardiac catherization found depression was significantly correlated with phobic anxiety ($r = 0.44$. $p < .001$) and was also related to ventricular arrhythmias (OR 1.40, 95% CI 1.1-1.8, $p = .012$) that phobic anxiety may be related to increased risk of ventricular arrhythmias. Additionally, the study done by Strik and colleagues (2003) examined to compare symptoms of depression and anxiety as

predictor of incomplete recovery after a first myocardial infarction among 318 men CAD patients found that symptoms of depression and anxiety were associated with cardiac events (fatal or non-fatal MI) . Symptom of depression was associated with cardiac events (HR 2.32, 95% CI 1.04-5.18; p = 0.039).

However, relationship between depression and physiologic responses of patients awaiting coronary artery bypass surgery in Thailand has never been studied before. Only the study of Nakon and colleagues (2010) studied the factors associated with recovery of diabetic ischemic heart patients following coronary artery bypass grafting among 88 samples reported a depression and the symptoms of health problems before surgery that affects to recovery after surgery at day 7 or day of discharge but did not study the relationship of depression symptoms to the symptoms of health problems before surgery. So, the researcher is interested in studying about the relationship between depression and patient symptoms while awaiting CABG.

From the above it can be concluded that the factors are related to patient symptoms during awaiting CABG, focal stimuli was the severity of disease and contextual stimuli includes waiting time, co-morbid (such as HT, DM, DLP, RD etc.) and depression. In addition, the previous studies showed that prolonged waiting time is a factor will result in patients with CAD expressed symptoms of health problems while awaiting CABG surgery greater.

2.5 Conclusion

CAD was ranked as the first leading cause of death among people around the world and the trend of patients with CAD are increasing every year. Presently, therapeutic options for coronary artery disease are based on two principles were medical therapy and revascularization and the two primary modalities for revascularization are PCI and CABG. However, the method of treatment of coronary artery disease depends on the severity of disease. Initial treatment, doctors often treated with medication but if the severity of disease increased and medications are not able to control symptoms, the doctor may recommend the interventional procedures such as PCI or CABG. CABG is a surgical which provide effective treatment for people with CAD and the goals of CABG are to relief angina pectoris, prolongs life

and improve quality of life. The doctor will be considered with regard to indications for CABG were severe acute myocardial infarction, obstruction of a coronary artery in the left main more than 50%, two-vessels or three-vessels disease with significant the important position of stenosis and LVEF less than 50% , one-vessel or two-vessels disease with large area of viable myocardium. Currently, the number of patients who require CABG is increasing while the resources such as available hospital beds, available intensive-care beds, available operating room including staff (surgeons, anesthesiologists and nurse) are limited. From these reasons are affecting CAD patients to wait for CABG long time. Long waiting time probably decrease quality of life and have negative impact on adaptation to maintain the integrity of physical, psychological and social. In addition, the severity of disease or LVEF as focal stimuli while waiting time, comorbidity and depression as contextual stimuli that contribute focal stimuli directly to adaptation while awaiting CABG. Patient symptoms in this study is symptoms of health problems while awaiting CABG. However, the previous studies in Thailand examined recovery after CABG surgery but very few studies have examined in particular during waiting for CABG which is the time that patients have to cope with the problems and suffered from symptoms of health problems. Thus, researcher is interested in studying about factors associated with patient symptoms in ischemic heart patients awaiting coronary artery bypass grafting due to this study can assist health care providers understand the condition of the patients while awaiting CABG includes patient's physical and psychological status. Moreover, the results of the study provide informations that nurses and other health care provider can be used to prepare or develop program of care for patients in this group which can be managed the suffering in accordance with the patient’s problems directly.

CHAPTER III
METHODOLOGY

3.1 Research Design

This research was a cross-sectional correlational descriptive study designed aimed to investigate factors associated with patient symptoms in ischemic heart patients awaiting coronary artery bypass grafting.

3.2 Population and Sampling

The population of this study was aged 18 years old or older and composed male and female coronary artery disease patients who were scheduled for coronary artery bypass graft surgery but were on waiting lists and admitted to the ward on the first day and waiting for extended hours service and during office hours coronary artery bypass grafting at Siriraj Hospital.

The sample of this study were patients who had the same characteristics as the population. The sampling method was all subjects of those who met the following criteria were consecutively approached for recruitment.

Inclusion Criteria

1. Coronary artery bypass graft surgery for the first time
2. To literate in the Thai language

3.3 Sample size

To estimate the needed sample size for this study was determined using by the table of power analysis, guidelines suggested by Polit & Beck (2008) were used. Given a conventional level of power of 0.80, a moderate effect size of 0.30 (Nakon et

al., 2010) and with a statistically significant level of 0.05 (α), a sample size of 88 were approached to participate in the study.

3.4 Setting

The setting of this study collected data from the Faculty of Medicine Siriraj Hospital at Mahidol University. It is a largest university hospital was having 2,223 beds (Faculty of Medicine Siriraj Hospital at Mahidol University, 2011).and medical center treatment in Thailand and provides exemplary medical services with state-of-the-art technology for all disease treatment, including cardiovascular disease. In addition, it has been consistently ranked at the top in the nation for research as well. It is an academic institute for producing physicians, nurses and medical personnel. The patients with coronary artery disease receive the investigation and treatment from medical cardiologist at medical outpatient department of the Faculty of Medicine Siriraj Hospital at Mahidol University. It has a medical service on Monday to Friday from 8.00-12.00 am. Initial treatment, the doctors often treated with medication but if the severity of disease increased and medications are not able to control symptoms, the doctor may recommend the interventional procedures such as PCI or may be refer to the cardiac surgeon to perform coronary artery bypass grafting. Patients awaiting coronary artery bypass grafting were on the waiting list respectively and admitted to wards 1-2 days before surgery. In this study the researcher collected information on patients who admitted to coronary artery bypass surgery on the first day.

3.5 Instruments

The research instruments in this study consisted of 4 parts:

Part 1: This questionnaire was developed by the researcher which consist of the sociodemographic characteristics questionnaire gathering information about age, gender, education level, marital status, religion, occupation, income, economic status, medical health coverage and residence. The clinical characteristic and open-ended questionnaire which is interview form contained blank to complete about type of illness and treatment informations were medical diagnosis, waiting time, NYHA

classification, CCS classification, LVEF and open-ended questions that asked about the needs of patients while awaiting CABG. The data in this part were collect from medical record and by interview.

Part 2: Cormorbidity was measured using Charlson's Comorbidity Index that reflects the functional burden of illness conditions. The researcher can be assessed and collected data from the patient's medical record. It comprised 20 comorbidities, such as congestive heart failure, the peripheral vascular disease, cerebovascular disease etc. Each disease is scored from 1 to 4 points. A higher scores indicated a poor condition. In this study, the researcher used the Charlson Criteria Checklist that translated into Thai version by Utriyaprasit (2001).

Part 3: Modified symptom inventory: This instrument was modified from the Thai version Modified Symptom Inventory questionnaire for assessment of symptoms of health problems before CABG by Nakon and colleague (2010). They developed the instrument from the Symptom Inventory (SI), which is a questionnaire using to assess the frequency of the symptoms of health problems during the recovery period after cadiac surgery by Artinain (1993). The questionnaire consists of 23 items, each item is scaled ranging from 0-7. This instrument was measured for reliability by trial in patients undergoing CABG surgery, the result of the Chronbach's alpha coefficient was 0.78-0.80 (Artinain, 1993). The questionnaire translated into Thai version by Utriyaprasit (2001) for measuring recovery symptoms in the 2 weeks after discharge in Thai patients undergoing CABG surgery, the result of the Chronbach's alpha coefficient was 0.83. Nakon and colleagues (2010) used the Thai version Modified Symptom Inventory questionnaire for assessment of symptoms of health problems before CABG surgery and exclude 8 items that were not related, which retained 15 items, the result of the Chronbach's alpha coefficient was 0.82. In this study the researcher excluded 3 items because it was redundant with other instrument that used to collect data in this study, which retained 12 items, the Chronbach's alpha coefficient was 0.74. A total score is calculated by summing the items scores and the higher scores indicate more symptoms or severe heart disease.

Part 4: Depression Questionnaire used the Center for Epidermiologic Study-depression scale (CES-D) is a self-report scale designed to measure depressive symptoms in the general population (Radloff, 1977). It was translated and modified

into Thai version by Kuptniratsaikul & Ketman (1997) which was measured for reliability by trial in 96 healthcare personnel and 30 psychiatric patients of Department of Psychiatry, Siriraj Hospital, The result of the Chronbach's alpha coefficient was 0.91. The Thai version CES-D is a self-report questionnaire on mood and behavior that often occurs in the past week and consists of 20 items divided into 4 positive questions and 16 negative questions, divided into 4 major dimensions: 7 items on depression effects, 4 items on positive effects, 7 items on somatic and retarded activity, and 2 items on interpersonal relationships. Each answer is rated on a 4-point scale rating as follow:

Rarely or none of the time (less than 1 day), score = 0 point.

Some or a little of the time (1-2 days), score = 1 point

Occasionally or a moderate amount of time (3-4 days), score = 2 points

Most or all of the time (5-7 days), score = 4 point

The values were reversed for the positive question items (item 4, 8, 12 and 16).

The total score of the 20 items ranges from 0 to 60 and a cut point of 19 or higher suggesting that an individual has depression and higher scores indicating more depressive symptoms. In this study, the researcher will refer the respondents to psychiatric unit, reported any disorders to the physician who cared for them if the researchers found that the respondents had more than 19 point.

3.6 Validity and Reliability

The reliability of the instruments, only the Modified Symptom Inventory and Center for Epidemiologic Study-depression scale (CES-D) were tested in 30 patients with CAD awaiting CABG surgery who had the same characteristics as the eligible population. Reliability was measured by Cronbach's alpha coefficient and was found to be 0.74 and 0.73, respectively.

3.7 Data collection

In this study, the researcher collected all data by herself following these procedures.

1. A letter from the Faculty of Graduate studies, Mahidol University, was sent to the director of Siriraj Hospital for permission to conduct data collection with a research proposal for consideration and approval by the ethics committee of the hospital.

2. Researchers approached the head of Cardiothoracic Division, Department of Surgery, Faculty of Medicine, Siriraj Hospital, Mahidol University and the head of the inpatient wards of Siriraj hospital and nursing staff involved in the study to introduce myself and explained of the purpose of study and ask for cooperation in data collection after receiving permission.

3. The researcher collected data by performing the following steps.

3.1 The researcher explored the name lists of patients with CAD awaiting coronary artery bypass grafting were admitted on the first day and reviewed the patients who met inclusion criteria from the medical record

3.2 The researcher asked the patients for cooperation in data collection by introducing herself. The researcher explained the purpose of the study, data collecting steps including to inform them of the protection of human rights that they had a right to withdraw from the process study at any time and no need to explain for any reason, as they wish then asked for their participation in the research.

3.3 When the patients were willing to participate in this study, the researcher started collecting data as follow

- The researcher asked them to sign the informed consent form.
- The researcher interviewed the patients by using the sociodemographic characteristics questionnaire by the researcher but the clinical characteristics questionnaire, the researcher collected data from patients's medical record.
- The researcher evaluated co-morbidity of patients by using Charlson's Comorbidity Index. The researcher collected co-morbidity data from patients's medical record and by interviewed.
- The researcher collected data about the symptoms of health problems while awaiting CABG by using the Modified symptom inventory questionnaire by clarifyng how patients assess their symptoms of health problems

while awaiting CABG surgery and then asking patients to read and answer questionnaire by themselves.

- The researcher measured depression by using the Center for Epidemiologic Study-depression scale (CES-D) which was translated and modified into Thai version, by clarifying how patients respond to the questions and then asking patients to read and answer questionnaire by themselves.

- In cases that patients was unable to read or had visual impairment, the researcher interviewed the patients by myself.

- The researcher checked the completion of response all of the questionnaires before obtained data was analyzed with statistical computer program.

3.8 Protection of Human Rights of the Subjects

In this study, the researcher conducts the study with an awareness the human rights on participants including the risk from the research, the benefits of research and confidentiality of data by following the procedure for approval from the Human Research Ethics Committee of Siriraj Hospital, once approved, the researcher began the study. The researcher introduced myself and explained the purpose and steps of the study and duration of data collection including asked for their cooperation in the study and explained about the right to continue or refuse participation depends on the willingness of the patients and they has the right to withdraw from the process research at any time, as they wish and It would not have any effect on the medical and nursing care. This study does not pose any risk to the patients but they may need some time to do cooperate in the study and the results of the study will be beneficial to patients awaiting coronary artery bypass grafting for using as a basis for determining the approach to care planning for patients awaiting coronary artery bypass grafting and relatives to be more efficient in the future. In addition, the results gained from this study would be kept confidential and it is presented or published with no reference to specific individual but it is presented an overall picture. Access to the data would be used code system that assigned by the researcher and if the patients and relatives in doubt, can be queried directly from the researcher at any time. When a sample has been described to understand and know the purpose of the study then asked for them signed consent form as evidence.

3.9 Data analysis

The researcher checked the completion of the obtained data and analyzed it with statistical computer program as follow

1. Sociodemographic and clinical characteristics were analyzed by frequency distribution and percentage but left ventricular ejection fraction, age and waiting time were analyzed by range, mean and standard deviation.

2. Comorbidity, depression and symptoms of health problems while awaiting CABG were analyzed by range, mean , mode and standard deviation.

3. Relationships between left ventricular ejection fraction, waiting time, comorbidity, depression and patient symptoms were analyzed by using Pearson's product-moment correlation coefficient.

CHAPTER IV
RESULTS

This study is a cross-sectional correlational descriptive study and aimed to investigate the patient symptoms which means the symptoms of health problems during the waiting period in patients awaiting coronary artery bypass grafting and factors associated with patient symptoms in ischemic heart patients awaiting coronary artery bypass grafting were left ventricular ejection fraction, waiting time, comorbidity and depression. In this study, the researcher collected data from patients with coronary heart disease awaiting coronary artery bypass grafting who admitted on the first day on the ward in a large university hospital in December 2012 to May 2013. The sample composed of 97 patients with coronary artery disease who met the inclusion criteria were approached. However, nine patients who refused participation due to the reasons were the patient needs rest 3 cases, dislike answering questions 2 cases and need privacy 4 cases. The final sample composed of 88 patients, it consists of 50 patients who were awaiting extended hours service CABG and 38 patients awaiting CABG during office hours. The results of this study are present in the two parts as follow

Part 1: Sociodemographic and clinical characteristics of the sample awaiting coronary artery bypass grafting.

Part 2: Result analysis of research questions.

Part 1: Sociodemographic and clinical characteristics of the sample

Table 4.1 Number and percentage of the sample classified by Sociodemographic and clinical characteristics (n = 88)

Characteristics	Number	Percentage (%)
Age range 42-85 years		
Mean = 67.9, SD = 10.1		
Gender		
Male	61	69.3
Female	27	30.7
Marital status		
Single	3	3.4
Married	69	78.4
Widow	16	18.2
Religion		
Buddhism	85	96.6
Islam	3	3.4
Education level		
No education	3	3.4
Primary school	28	31.8
Junior high school	9	10.2
High school	12	13.6
Certificate / Diploma	13	14.8
Bachelor degree	18	20.5
Master degree or more than	5	5.7

Table 4.1 Number and percentage of the sample classified by Sociodemographic and clinical characteristics (n = 88) (cont.)

Characteristics	Number	Percentage (%)
Occupation		
Not working	36	40.9
Retired government official	16	18.2
Government/semi-government officials	11	12.5
Personal business	9	10.2
Employees	3	3.4
Merchant	8	9.1
Agricultural workers	5	5.7
Income (baht/month)		
2,000-4,999	1	1.1
5,000-9,999	7	8.0
10,000-14,999	15	17.0
15,000-19,999	11	12.5
>20,000	54	61.4
Economic status		
Not enough income for family needs	3	3.4
Adequate income but no fills	27	30.7
Adequate income and some fills	58	65.9
Medical health coverage		
Government/semi-government support	57	64.8
Universal coverage card	15	17.0
Self support	13	14.8
Social security fund	1	1.1
Others	2	2.3
Residence		
Rural	42	47.7
Bangkok	37	42.0
Suburban	9	10.2

Table 4.1 Number and percentage of the sample classified by Sociodemographic and clinical characteristics (n = 88) (cont.)

Characteristics	Number	Percentage (%)
NYHA class		
Class I	24	27.3
Class II	49	55.7
Class III	15	17.0
CCS class		
Class 0	16	18.2
Class I	33	38.5
Class II	36	40.9
Class III	3	3.4
Medical diagnosis		
CAD	63	71.6
CAD with valve	22	25.0
CAD with aneurysm	2	2.3
CAD with valve with aneurysm	1	1.1

In table 4.1, The sample consisted of patients with coronary artery disease and the majority of the patients were elderly with a mean age of 67.9 years (SD = 10.1). They were primarily men more than women in the ratio was 2.3:1. They were predominantly Buddhist, married, and had an education level of primary school. Most of the study sample were not employed followed by the retired government official but they perceived that they had an adequate income and some fills, a family income more than 20,000 bahts per month. Majority of patients used medical health coverage were the government/semi-government support followed by used the universal coverage card. Among the sample who lived in rural and Bangkok has a nearby number and they had the severity of symptoms in NYHA class 2 and CCS class 2. It was also found that the sample of the inquiry with open-ended questions about information or services provided by doctors, nurses or medical staff during waiting for CABG found that all of the samples were received practical guide leaflet for patients before heart surgery. The open-ended questions about the need or expectation to receive from

doctors, nurses or other medical staff during waiting for surgery found that patients only 34% who have a need or expectation and what is expected to be about the management strategies of the disease in appropriate way was 13.6%, risk and safety in surgery were 11.4%, symptoms and their life after surgery were 5.7%, and caring, empathy and encouragement during waiting for surgery were 3.4%, respectively. However, satisfaction of the overall sample for the health service has been found that most of sample were satisfied with the high level of 63.6%.

Part 2: Result analysis of research questions

Research question 1: What are the LVEF, waiting time, comorbidity depression and patient symptoms while awaiting CABG ?

Result of this study found that LVEF, waiting time, comorbidity depression and patient symptoms (symptoms of health problems while awaiting CABG) during waiting for CABG, details are shown in Table 4.2.

Most of the sample had good LVEF with an average of 52.6% (SD = 16.4), comorbidity score with an average of 1.7 points and the three most reported were hypertension (88.6%), dyslipidemia (76.1%) and diabetes mellitus type 2 (39.8%). In addition, the other comorbid diseases can not be assessed from Charlson's Comorbidity Index include essential thrombocytosis, neurocysticercosis and Kawasaki's disease accounting for 1.1%. Additionally, in the table 4.2, the sample with an average of waiting time was 34.6 days (SD = 35.9), depression score with an average of 9.1 points (SD = 5.6), and the symptoms of health problems while awaiting CABG with an average of 29.9 points (SD = 8.3) shown in table1.

The top five symptoms of health problems while awaiting CABG that frequently occurring includes shortness of breath, chest pain, sleep disturbance, constipation, and dizziness, respectively. In addition, the least frequently occuring symptom is nausea or vomiting (table 4.3).

Table 4.2 Possible range, actual range, mean, standard deviation, median and mode of studies variable (n = 88)

Variables	Possible range	Actual range	Mean (± SD)	Median	Mode
Left ventricular ejection fraction (LVEF) (%)		20.8-82	52.6 (±16.4)	56.0	65.0
LVEF < 30% n = 7 (8%)					
LVEF 30-49% n = 31 (35.2%)					
LVEF ≥ 50% n = 50 (56.8%)					
Waiting time (day)		2-145	34.6 (±35.9)	19.5	3.0
Comorbidity scores	0-33	0-8	1.7 (±1.7)	1.0	0
Depression	0-60	0-21	9.1 (±5.6)	9.0	10.0
Patient symptoms	12-84	12-50	29.9 (±8.3)	30.0	29.0

Table 4.3 The patient symptoms while awaiting CABG (n = 88)

The patient symptoms while awaiting CABG	Mean	SD
Shortness of breath	0.73	0.45
Chest pain	0.69	0.46
Sleep disturbance	0.66	0.48
Constipation	0.64	0.48
Dizziness	0.64	0.48
Dyspnea	0.59	0.49
Palpitation	0.48	0.50
Headache	0.41	0.49
Lack of appetite	0.36	0.48
Fatigue	0.26	0.44
Diarrhea	0.11	0.32
Nausea vomiting	0.07	0.25

Research question 2: Are the relationship between LVEF, waiting time, cormobidity, depression and patient symptoms while awaiting for CABG ?

Result of this study found that three factors were associated with patient symptoms (symptoms of health problems while awaiting CABG) including waiting time, comorbidity and depression that confirm the hypothesis. However, LVEF that do not confirm to the hypothesis as shown in table 4.4.

Table 4.4 The factors associated with the patient symptoms by Pearson's Product Moment Correlation Coefficient (n = 88)

Variables	1	2	3	4	5
1. Left Ventricular Ejection Fraction	1				
2. Waiting time	-0.28	1			
3. Comorbidity score	-.252*	.191	1		
4. Depression	.215*	.102	.005	1	
5. Patient symptoms	-.031	.283**	.256*	.476**	1

** $p < .01$; * $p < .05$

In the table 4.4, the result revealed that the relationships among LVEF, waiting time, comorbidity, and depression and the patient symptoms by Pearson's Product Moment Correlation Coefficient found that factors significant associated with the patient symptoms were found three factors including comorbidity, waiting time and depression. Comorbidity and waiting time were significant weakly positively associated with the patient symptoms ($r = .256$; $p < .05$ and $r = .283$; $p < .01$ respectively). While depression was moderately positively associated with the patient symptoms ($r = .476$; $p < .01$). However, no significant associated were found between LVEF and the patient symptoms ($r = -.031$; $p = .775$).

In this study also found additional issue, LVEF was weakly negatively associated with comorbidity and weakly positively associated with depression.

CHAPTER V
DISCUSSIONS

This study is a cross-sectional correlational descriptive study and aimed to investigate the patient symptoms which means the symptoms of health problems in patients awaiting coronary artery bypass grafting and factors associated with patient symptoms in ischemic heart patients awaiting coronary artery bypass grafting were left ventricular ejection fraction, waiting time, comorbidity and depression. Discussion of the findings are as follows

Characteristic of the sample

In this study, it was found that patients with coronary artery disease who admitted on the first day and waiting for elective coronary artery bypass grafting. The majority of the patients were elderly with a mean age of 67.9 years (SD = 10.1). They were primarily men more than women in the ratio was 2.3:1. It consistent with previous studies in patients with coronary artery disease (Kayami et al., 2010; Kreatsoulas et al., 2009; McCormic et al., 2006; Nakon et al., 2010) found that most of patients were elderly due to the physiological transformation of various systems when older (Smeltzer & Bare, 2004) and found in males more than females which might be due to the fact that male had behavior as a risk factor for cardiovascular disease more than female such as smoking (Pauker-Sharon et al., 2013; Kayami et al., 2010). Because of the smoking habits as a risk factor that can cause coronary heart disease because of nicotine from smoking causes coronary artery vascular resistance increased, blood flow to the heart muscle decreases. Thus, it resulted in myocardial oxygen demand increases. In addition, leading to platelet activation and aggregation. Moreover, smoking causes decreased level of HDL in the blood (Ambrose & Barua, 2004; Pyrgakis, 2009). Most of the participants had graduated from primary school

and not working but they had a family income of more than 20,000 baht per month and perceived that they had an adequate income and some fills which consistent with the study done by Blom and colleagues (2007) found that patients with CAD as patients who had the good family status of the economy and higher annual income. Compulsory education in the past of Thailand was at least for the primary education and the elderly who older than 60 years will be in the official retirement age. It was the period that their children have to repay the kindness for showing sincere gratefulness includes take care of the parents and give some money to them. From these reasons can be explained these participants who were elderly but had higher income. However, another reason can be explained that was the medical health coverage, in this study, the most of patients had no problem with medical payment because of they used the governments/semi-government support which is the reason that patients and their family did not assume the patient expenses. Most of the participants had the severity of symptoms in NYHA class 2 consistent with previous studies (Hengcharoensuwan et al., 2010; Koch et al.,2008; Nakon et al., 2010) and most of participants had the severity of symptoms in CCS class 2 consistent with previous studies (Cesena et al., 2004; Kang et al., 2010; Koomen et al., 2001) which means patients can do activity by themselves.

During the waiting period of CABG, CAD has not been resolved the pathological of disease and the progression of CAD continues, leading to suffering from cardiac complication caused by the pathological of disease and stress during the waiting period. Changing or crisis in life such as illness, the person will have to adapt by using the coping processes were the regulator subsystem and cognator subsystem in response to the changes that occur to maintain the physical, mental and social integrity then expressed in behaviors can be observed. The stimuli result in adaptation for coping with the problem called input such as focal stimuli, contextual stimuli, and residual stimuli (Roy, 2009). As the patients with CAD, the symptoms are more or less dependent on the stimuli. Patients with severe disease will express symptoms of health problems during the waiting period more than patients with non-severe disease (Bosch & Theroux, 2005). Thus, the severity of disease as the focal stimuli because it is the most important stimuli inducing patient symptoms which is symptoms of health problems while awaiting CABG that dependent on the severity of disease. Adaptive

behaviors in the physiologic mode of patients awaiting CABG which is adaptation and manifest in symptoms of health problems while awaiting CABG due to CAD remains and has not been resolved the pathological of disease. In this study, it was found that the symptoms of health problems while awaiting CABG score has a range between 12-50 (total score was 84), an average score was 29.9 (SD = 8.3) and the most frequently occurring symptoms of health problems while awaiting CABG were shortness of breath with an average of 0.73 (SD = 0.45), chest pain with an average of 0.69 SD = 0.46), sleep disturbance with an average of 0.66 (SD = 0.48), consistent with the previous studies (Fitzsimons et al., 2000; Lindsay et al., 2001) found that patients with CAD awaiting CABG had the most prominent symptoms were shortness of breath and chest pain. The reason can be explained that CAD remains and has not been resolved the pathological of disease which leading to coronary blood flow to the heart muscle decreased and resulted in an imbalance between the myocardial oxygen supply and the myocardial oxygen demand (Kutty & Nair, 2008; Silbernagl & Lang, 2006).

But the study done by McCormick and colleagues (2002) found that fatigue was the most frequently occurring symptom that caused suffering and disturbed their daily life which was different from this study. The reasons may be explained that the most of the participants in this study had the severity of symptoms in NYHA and CCS class 2, the patients can do activity by themselves which means the severity of symptoms not greater and good ventricular functioning that can be pumped the blood out of the heart to various parts of the body as usual. Thus, the participants in this study found fatigue symptom not much. While the study done by McCormick and colleagues (2002) found that the most of the participants had the severity of symptoms in CCS class 3-4. Additionally, when considering EF of the most participant found that it less than 50%. Fatigue in patients with CAD caused by myocardial ischemia causes left ventricular dysfunction as a result the blood volume out of the heart per minute (cardiac output) decreases and it can be cause by a lack of oxygen in skeleton muscle and anaerobic metabolism result in fatigue (Nelesen et al., 2008). From these reasons, the severity of disease or ventricular functioning effect to the patient symptoms or the symptom of health problems while awaiting CABG as focal stimuli or stimuli that induce directly to the symptoms of health problems while

awaiting CABG. In this study, it means LVEF and found that the most of samples had LVEF with an average of 52.6% (SD = 16.4) which indicates the efficiency of cardiac contraction of the most of samples is good (American Heart Association, 2013), which consistent with the previous studies in Thailand (Hengcharoensuwan et al., 2010; Nakon et al., 2010) found that patients with CAD who admitted for elective CABG had good LVEF with an average of 52.3% and 54.36% respectively. When considering with the severity of symptoms in NYHA and CCS class of the most samples were class 2 and the patients can do activity by themselves which means the severity of disease not greater. It possibly due to advances in medical technology at the present, makes the diagnosis with accuracy. In addition, the medicines that used in the treatment of heart disease at present, it is very effective. Moreover, including attention to self care of patients about diseases by search for information on the Internet in appropriate self-care such as controlling factors that promote or cause the disease. It is another reason that help the severity of disease of the majority of the sample is not seriously.

The factors affect directly to focal stimuli which are contextual stimuli that contribute the severity of the disease which is the focal stimuli has more severe. In this study, waiting time, comorbidity and depression are factors that promoted to the severity of coronary heart disease to be more severe. These are contextual stimuli that will encourage the severity of coronary artery disease is the more severe. Waiting time of CABG surgery in this study ranged from 2-145 days, mean of 34.6 days (SD = 35.9) and the result was shorter than the previous studies. The study done by Henpin and colleagues (2004) studied in 574 patients with CAD awaiting elective CABG in Brazil found that average waiting time was 170 days (SD = 159). The study done by McCormick and colleagues (2006) studied in 42 patients with CAD awaiting CABG in Canada found that average waiting time was 97 days (SD = 61) and the study done by Rexius and colleagues (2004) studied in 5,864 patients with CAD awaiting elective CABG in Sweden found that patients with CAD both male and female had average waiting time of 82 days (SD = 86 in males and SD = 89 in females), respectively. However, these studies were the previous studies that done more than 5 years and studied in the western sample. Thus, in this study found that the waiting time shorter than the previous studies may be due to the hospitals in Thailand currently are

providing extended hours service surgery as an alternative for patients who need to be treated with surgery faster and do not want to wait for surgery for a long time. Moreover, these patients had a good economic status and had a high family income per month. They can access to extended hours service surgery that to charge the high surgical services because access to extended hours services surgery depending on the patient's economic status and income which consistent to the previous studies (Laudicella, Sciciliani & Cookson, 2012; Monstad, Engesæter & Espehaug, 2014) found that patients awaiting surgery and had a high socioeconomic status which may mean in terms of income or education were more likely to wait for surgery is less than patients with lower socioeconomic status. In this study found that number of patients who underwent extended hours service CABG surgery (n = 50) greater than number of patients who underwent CABG surgery during office hours (n = 38) that is why the waiting time for CABG surgery in this study was shorter than the previous studies and had a wide range.

Most of the sample had comorbidity score with an average of 1.7 points (SD = 1.7) and the three most reported were hypertension (88.6%), dyslipidemia (76.1%) and diabetes mellitus type 2 (39.8%). This results consistent with the previous studies found that patients with CAD had comorbidity as mentioned above (Kang et al., 2010; Kayani et al., 2011; Nakon et al., 2010; Thanavaro et al., 2010). The study done by Nakon and colleagues (2010) studied in CAD patients with diabetes mellitus following CABG reported the most frequently co-morbid disease was hypertension (90.9%). In accordance with the study done by Thanavaro and colleagues (2010) determined health promotion behavior in women with chest pain found that the three most frequently co-morbid disease were hypertension (69.2%), dyslipidemia (33.3%), and diabetes mellitus (28.2%), respectively. The reasons that can be explained as hypertension, dyslipidemia, and diabetes are all risk factors that will make the progression of CAD faster and the severity of disease greater during the waiting CABG surgery due to hypertension, dyslipidemia, and diabetes are the factors that accelerate the progression of the disease and the severity of the disease is greater while awaiting CABG because all of them cause the pathophysiologic of vessels change in the inner endothelial cells and arteries become narrow and hardened which characteristic of atherosclerosis leads to vascular remodeling, progressive narrowing

and abnormal blood flow results in myocardial ischemia. It causes left ventricular dysfunction which result in the capacity of ventricle decreased lead to the cardiac output decrease and it can be caused a lack of oxygen in the tissue of the body (Silbernagl & Lang, 2006). It may cause the symptoms of health problems while awaiting CABG such as chest pain, fatigue etc.

In this study, the sample had depression score ranged from 0-21 points, mean of 9.1 points (SD = 5.6). A cut point of 19 or higher score indicate that an individual has depression (Kuptniratsaikul & Ketman, 1997). The average score of 9.1 indicates that the majority of sample in this study have depression score in normal level which were different from the previous study in patients with coronary artery disease (Bhattacharyya et al., 2008; Kim et al., 2009) found that 44.2% and 33.5% of patients reported depression, respectively and the study in Thailand done by Nakon and colleagues (2010) found that 26% of CAD patients with diabetes mellitus following CABG surgery reported depression before surgery. However, the study done by Bhattacharyya and colleagues (2008) was the study in the patients with CAD in England, while the study of Kim and colleagues (2009) was the study in patients with CAD in Korea. Thus, the reasons can be explained that the samples are different cultural, beliefs and lifestyles. Particularly, religious beliefs is greatly influence due to the most of Thai people are buddhists and Buddhism is a religion that taught to believe in karma, or past actions. Whatever makes life be happy or unhappy is the result of karma which resulted in the next life and no one can not change. Illness and disease in present also as a result of karma or past actions. Moreover, Buddhism also teaches eliminate suffering in mind by living with present and let go of whatever happened (Payutto, 2010). The study of Sooksawat, Joanwantanakul, Tencomnao & Pensri (2013) examined the relationship between the religious beliefs and practices of Buddhism and disability and psychological stress in 463 office workers with chronic low back pain found that the religious beliefs and practices of Buddhism were significantly associated with psychological stress and workers with high religious beliefs and practices of Buddhism had lower psychological stress. Moreover, the sample in present study showed that the waiting time of CABG was shorter than the previous studies because patients who had prolonged waiting time often have psychological problems include uncertainty, stress, anxiety, depression, and fear

(McCormick et al, 2002; McCormick et al, 2006; Koivula et al., 2001; Sampalis et al., 2001). Additionally, when considering with the severity of symptoms and the severity of disease not seriously, the patients can do activity by themselves. It is the reason that why the sample in the present study showed less depression score. The study done by Nakon and colleagues (2010) even studied in Thai samples, no differences in cultural, beliefs and lifestyles but the study studied in CAD patients with diabetes mellitus only. Because the high blood sugar levels cause blood viscosity which result in the heart to work harder lead to the myocardial ischemia and depression was associated with cardiac events include fatal or non-fatal MI (Strik et al., 2003). From this reason that why the study found that patients had preoperative depression higher than the present study.

The relationship between factors and patient symptoms while awaiting coronary artery bypass grafting

In this study, according to Roy's adaptation model mentioned that when a change or crisis in life such as illness, the person will have to adapt in order to maintain integrity then expressed in behaviors can be observed as the patients with CAD on adaptive behaviors in the physiologic mode, which manifests itself in the form of symptoms of health problems while awaiting CABG such as shortness of breath, chest pain etc. The symptoms are more or less dependent on the stimuli. The study on the relationship of these factors includes the severity of disease can be assessed by LVEF which is the focal stimuli, waiting time, comorbidity and depression as contextual stimuli on patient symptoms in CAD patients while awaiting CABG, it was expressed in the symptoms of a health problems while awaiting CABG. Results in this study revealed that waiting time and depression significant association with the patient symptoms which means the symptoms of health problems while awaiting CABG ($P < .01$). Comorbidity significant association with the symptoms of health problems during awaiting CABG surgery ($P < .05$). However, LVEF no significant association with the symptoms of health problems during awaiting CABG. The details are as follows:

The relationship between comorbidity and patient symptoms while awaiting CABG

In this study found that comorbidity was significant weakly positively associated with the symptoms of health problem while awaiting CABG (r = .256; p < .05) (table 4) because comorbid conditions in a patient with CAD may affect outcome directly or indirectly by reducing the patient's physiologic reserve and thereby increasing the risk of adverse outcome of coronary disease (Hlatky, 2004). In accordance with the study of Kreatsoulas and colleagues (2010) determined factors associated with the presence of severe coronary artery disease among women and men who were referred for first diagnostic angiogram found that factors indepentdently associated with severe coronary artery disease included diabetes (OR = 2.00; 95% CI 1.86 - 2.18, P < 0.01) and dyslipidemia (OR = 1.50; 95% CI 1.39 - 1.61, P < 0.01). The study done by Pepine and colleagues (2006) determined predictors for adverse outcomes in hypertensive patients with coronary artery disease found that diabetes was at risk of adverse outcomes included all - cause death, nonfatal MI, nonfatal stroke (HR 1.77, 95% CI 1.62 - 1.93, P <0.001) because of hypertension, dyslipidemia, and diabetes are all risk factors that will make the progression of CAD faster and the severity of disease greater during waiting for CABG due to hypertension, dyslipidemia, and diabetes are the factors that accelerate the progression of the disease and the severity of the disease is greater during waiting for CABG because all of them cause changes in the inner endothelial cells and arteries become narrow and hardened which characteristic of atherosclerosis leads to vascular remodeling, progressive narrowing and abnormal blood flow results in myocardial ischemia. It causes left ventricular dysfunction which result in the capacity of ventricle decreased lead to the cardiac output decrease and it can be caused a lack of oxygen in the tissue of the body (Silbernagl & Lang, 2006). It may cause the symptoms of health problems while awaiting CABG such as chest pain, fatigue etc which consistent with the study done by Bengston and colleagues (1996) found that CAD patients who had the mean waiting time was 5 to 8 months reported chest pain which is the most common symptom in CAD patients with DM due to the high blood sugar levels cause blood viscosity which result in the heart to work harder lead to the myocardial ischemia causing to chest pain.

The relationship between waiting time and patient symptoms while awaiting CABG

Results in this study revealed that waiting time was significant weakly positively associated with the symptoms of health problems while awaiting CABG ($r = .283$; $p < .01$) (table 4.4) which in accordance with the previous studies (Fitzsimons et al., 2000; Koomen et al., 2001; Sampalis et al., 2001). The study done by Sampalis and colleagues (2001) were found that patients awaiting CABG over 3 months had cardiac symptoms as chest discomfort, and dyspnea more than patients awaiting CABG less than 3 months. Consistent with the study done by Jackson and colleagues (1999) studied in patients awaiting CABG more than 4 months found that 34% of 257 people re-hospitalized with chest pain. The prospective study done by Fitzsimons and colleagues (2000) aimed to describe the clinical characteristics in 175 CAD patients during waiting for CABG surgery was 6 months found that 133 CAD patients (76%) have shortness of breath. For 24 (13%) patients became shortness of breath at rest, 50 (29%) whilst walking at their own pace on the level, 49 (28%) whilst hurrying on level ground and 10 (6%) whilst climbing hills. Moreover, the prospective cohort study done by Koomen and colleagues (2001) described morbidity and mortality in patients waiting for CABG surgery and to assess determinants for the occurrence of these complications among 360 CAD patients found that patients suffering with myocardial infarction and unstable angina. Additionally, it was also found that the patients died due to chest pain for too long. In addition, the present study found that waiting time was shorter than the previous studies, mean of 34.6 days (SD = 35.9) only. However, the present study showed the relationship between waiting time and the symptoms of health problems while awaiting CABG and the patients still face with suffering from illnesses due to CAD remains and has not been resolved. Therefore, finding ways to deal with the symptom of health problems while awaiting CABG to the patients which is a very interesting to study in the future to alleviate suffering to the patients and promote a better quality of life to the patients.

The relationship between depression and patient symptoms while awaiting CABG

The present study found that depression was moderately positively associated with patient symptoms ($r = .476$; $p < .01$) (table 4.4) because depression affects on pathophysiology and behavior of patients with CAD. It found that when CAD patients had depression, activation of sympathetic nervous system and inadequate parasympathetic nervous system which may be disturbed cortisol regulation. Cortisol is involved in the pathophysiological processes contributing to atherogenesis including disturbed metabolism, abdominal adiposity, insulin resistance, prothrombotic response and vascular inflammation. Heightened cortisol output is partly responsible for vascular endothelial dysfunction in depressed individual which play a central role in acute coronary syndrome. It result in the risk for myocardial infarction, left ventricular arrhythmias and induce platelet aggregation in CAD patient lead to cardiac symptoms such as chest pain, fatigue, dyspnea or palpitation (Bhattacharyya, Molly &Steptoe, 2008; Carney & Freedland, 2008; Kim et al., 2009). In accordance with the study done by Ketterer and colleagues (2008) examined the relationship between the emotional distress with cardiac symptoms in 109 patients with CAD found that depression was positively associated with dyspnea ($r = 0.257$; $p < 0.01$), palpitations ($r = 0.249$; $p < 0.01$), presyncope ($r = 0.176$; $p < 0.05$), and chest pain ($r = 0.156$; $p < 0.05$). As well as the study of Watkins and colleagues (2006) examined the relationship between phobic anxiety, depression with ventricular arrhythmias in 940 patients with CAD who hospitalized for diagnostic cardiac catheterization found that depression was significantly correlated with phobic anxiety ($r = 0.44$, $p < .001$) and was also related to ventricular arrthymias (OR = 1.40; 95% CI 1.1-1.9, P = .006). Moreover, the study done by Strik and colleagues (2003) compared symptoms of depression and anxiety as predictor of cardiac events of incomplete recovery after a first myocardial infarction in 318 patients found that symptoms of both depression and anxiety were associated with cardiac event, fatal or non-fatal MI (HR = 2.32; 95% CI 1.04 - 5.18, p = 0.039 and HR = 3.01; 95% CI 1.20 - 7.60, p = 0.019, respectively) which consistent with the study done by Whooley and colleagues (2008) studied the relationship of depression with the risk of cardiovascular events in patients with coronary heart disease of 4876 people found that patients with

depression occurred heart failure, myocardial ischemia or myocardial infarction than patients without depression (HR = 1.50; 95% CI 1.16-1.95, p = .002) which resulted in the patients had dyspnea or chest pain.

Findings in this present study which particularly interesting. Although an average of depression score was not in the criteria that indicate depressive symptom but it reported the relationship between depression and the symptoms of health problems during awaiting CABG. Thus, the care of CAD patients during awaiting CABG could take care of both physical and psychological distress. They are very important because both of them affect to the symptoms of health problems while awaiting CABG.

The relationship between left ventricular ejection fraction and patient symptoms while awaiting CABG

In this study, LVEF as focal stimuli are likely to significant associated with patient symptoms but it was found that no significant associated were found between LVEF and the symptom of health problems while awaiting CABG (r = -.031; p = .775) (table 4.4). The reasons can be explained that most of the sample had good LVEF with an average of 52.6% (SD = 16.4). which indicates the efficiency of cardiac contraction of the most of samples is good (American Heart Association, 2013) when considering with the severity of symptoms in NYHA class of the most samples were class 2 and the patients can do activity by themselves which means the severity of disease not seriously and good ventricular functioning that can be pumped the blood out of the heart to various parts of the body sufficiently. In accordance with the previous studies, it was found that the symptoms of health problem or adverse events are found in samples with a percentage of LVEF < 50%. Consistent with the study done by Bosch & Theroux (2005) among 1,104 patients with non-ST segment elevation acute coronary syndrome (ACS) found that LVEF was the high performance predictor of mortality and the severity of disease that used to identify the occurrence of acute myocardial infarction and stable angina in patients with CAD and this study reported that in hospital death rate was 2.7% (30 patients) and the odd ratio for mortality associated with an EF ≤ 48% adjusted for the thrombolysis in myocardial infarction (TIMI) risk score, was 3.3 (95% CI 1.5-7.3, P = .003) as well as the study

done by Cesena and colleagues (2004) among 574 Brazilian patients with CAD while waiting for CABG found that the patients with LVEF equal to or lower than 35% showed the high occurrence of sudden or cardiac death (HR 5.62, 95% CI 1.42-4.07, $P < 0.01$).

In conclusion, the patients awaiting CABG is faced with their own health problems and suffering with the symptoms of health problems while awaiting CABG and those symptoms are more or less which dependent on the severity of disease as focal stimuli. Therefore, taking care and control over CAD for slow progressive of disease during the waiting CABG surgery could to consider the factors that make a more serious disease as contextual stimuli included waiting time, comorbidity and depression to reduce suffering or discomfort both physically and mentally included the cardiac adverse events that may occur during waiting for CABG. Moreover, the conceptual framework used in this study is Roy Adaptation model. It was found that focal stimuli even no significant associated with patient symptoms during waiting for CABG while the contextual stimuli (waiting time, comorbidity and depression) significant associated with patient symptoms during waiting for CABG. The possible reasons can be explained that most of the sample had good LVEF with an average of 52.6% (SD = 16.4). which indicates the efficiency of cardiac contraction of the most of samples is good (American Heart Association, 2013) when considering with the severity of symptoms in NYHA class of the most samples were class 2 and the patients can do activity by themselves which means the severity of disease not seriously and had a good ventricular functioning that can be pumped the blood out of the heart to various parts of the body sufficiently. Thus, controlling and caring contextual stimuli while awaiting CABG is very important due to it directly affects the focal stimuli. The patients had symptoms more or less while awaiting CABG, depending on the factors mentioned above.

CHAPTER VI
CONCLUSIONS

6.1 Summary of the study

This study is a cross-sectional correlational descriptive study and aimed to investigate factors associated with patient symptoms in ischemic heart patients awaiting coronary artery bypass grafting. The main finding of the study were summarized as follows:

The population in this study consisted of women and men with coronary artery disease who were equal to or older than 18 years old and admitted at Siriraj hospital in the first day of admission and wait for coronary artery bypass graft surgery from 23 December 2012 - 20 May 2013. The final sample who met inclusion criteria was composed of 88 patients.

Researcher collected data by using the research instruments which consisted of 4 parts as follows:

Part 1 A sociodemographic characteristics questionnaire garthering information about age, gender, education level, marital status, religion, occupation, income, economic status, medical health coverage and residence. A clinical characteristic and open-ended questionnaire which is interview form contained a blank to complete about type of illness and treatment informations were medical diagnosis, waiting time, NYHA classification, CCS classification, LVEF and open-ended questions that asked about the needs of patients during the waiting period.

Part 2 Co-morbidity was measured using Charlson's Comorbidity Index

Part 3 Modified symptom inventory

Part 4 Depression questionnaire used the Center for Epidermiologic Study-depression scale (CES-D)

The reliability of the instruments, only the Modified Symptom Inventory and Center for Epidermiologic Study-depression scale (CES-D) were tested in 30

patients with CAD awaiting CABG who had the same characteristics as the eligible population. Reliability was measured by Cronbach's alpha coefficient and was found to be 0.74 and 0.73, respectively.

The descriptive data were analyzed by frequency distribution and percentage, range, mean, standard deviation, median, mode and relationship between left ventricular ejection fraction, waiting time, comorbidity, depression and patient symptoms were analyzed by using Pearson's product-moment correlation coefficient with statistical computer program.

6.2 Demographic and clinical characteristics

The majority of the patients were elderly with a mean age of 67.9 years (SD = 10.1). They were primarily men more than women in the ratio was 2.3:1. They were predominantly Buddhist, married, and had an education level of primary school. Most of the study sample were not employed followed by the retired government official but they perceived that they had an adequate income and some fills, a family income more than 20,000 bahts per month. Majority of patients used medical health coverage were the government/semi-government support followed by used the universal coverage card. Among the sample who lived in rural and Bangkok has a nearby number and they had the severity of symptoms in NYHA class 2 and CCS class 2.

Data of study variables

Most of the sample had good LVEF with an average of 52.6% (SD = 16.4), comorbidity score with an average of 1.7 points and the three most reported were hypertension (88.6%), dyslipidemia (76.1%) and diabetes mellitus type 2 (39.8%). The sample with an average of waiting time was 34.6 days (SD = 35.9), depression score with an average of 9.1 points (SD = 5.6), and the symptoms of health problems while awaiting CABG with an average of 29.9 points (SD = 8.3). The top five symptoms of health problems while awaiting CABG that frequently occurring include shortness of breath, chest pain, sleep disturbance, constipation, and dizziness, respectively.

Factors associated with patient symptoms in ischemic heart patients awaiting coronary artery bypass grafting :

The relationship between the variables studied include LVEF, waiting time, comorbidity, and depression and the patient symptoms (symptom of health problems while awaiting CABG). In this study, it was found that comorbidity, waiting time and depression were significant positively associated with the patient symptoms ($r = .256$; $p < .05$, $r = .283$; $p < .01$, $r = .476$; $p < .01$), respectively. However, no significant associated were found between LVEF and the patient symptoms ($r = -.031$; $p = .775$).

6.3 Implication and Recommendation

1. In this study, it was revealed that ischemic heart patients awaiting CABG have to cope with their suffering from the symptoms of health problems include shortness of breath, chest pain, sleep disturbance, constipation and dizziness, and dyspnea. The results of this study, nurse and health care team can use the information to make recommendations and to deal with the symptoms of health problems to patients who face problems while awaiting CABG at home.

2. The results of this study found that comorbidity, waiting time, and depression were associated with the symptoms of health problems during the waiting period. Therefore, nurses should be preparing patients awaiting CABG both of physically and psychologically. In addition, the planning of care for patients in this group with an interdisciplinary team by developing the guidelines to deal with depression and the practice to control comorbidity to help control the symptoms and the severity of symptoms in CAD patients awaiting CABG.

6.4 Recommendations for further research

1. Further study should do experimental design to test the program or guidelines of nursing care for patients awaiting CABG to manage and reduce the symptoms of health problems while awaiting CABG.

2. Further study should focus on comparison of the waiting time and mood state between the patients who wait for coronary artery bypass grafting during office hours and the patients who wait for extended hours service coronary artery bypass grafting in order to have an appropriate care to both of them.

6.5 Limitations of the study

The limitations of this study were as follows:

This study was studied in patients with coronary artery disease who underwent coronary artery bypass grafting during office hours and extended hours service and collect data in one hospital. Therefore, It may be limited to generalized to the ischemic heart patients in Thailand.

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APPENDICES

APPENDIX A
PARTICIPANT INFORMATION SHEET

เอกสารหมายเลข 3ก

เอกสารชี้แจงผู้เข้าร่วมการวิจัย

(Participant Information Sheet)

ในเอกสารนี้อาจมีข้อความที่ท่านอ่านแล้วยังไม่เข้าใจ โปรดสอบถามหัวหน้าโครงการวิจัย หรือผู้แทนให้ช่วยอธิบายจนกว่าจะเข้าใจดี ท่านอาจจะขอเอกสารนี้กลับไปอ่านที่บ้านเพื่อปรึกษาหารือกับญาติพี่น้อง เพื่อนสนิท แพทย์ประจำตัวของท่าน หรือแพทย์ท่านอื่น เพื่อช่วยในการตัดสินใจเข้าร่วมการวิจัย

ชื่อโครงการวิจัย ปัจจัยที่มีความสัมพันธ์กับการตอบสนองทางสรีระในผู้ป่วยที่รอผ่าตัดทำทางเบี่ยงหลอดเลือด หัวใจ

ชื่อหัวหน้าโครงการวิจัย นางสุภาวดี ภูมิประเสริฐโชค

สถานที่วิจัย หอผู้ป่วยในโรงพยาบาลศิริราช

สถานที่ทำงานและหมายเลขโทรศัพท์ของหัวหน้าโครงการวิจัยที่ติดต่อได้ทั้งในและนอกเวลาราชการ ตึก 84 ปีชั้น 7 ตะวันออก งานการพยาบาลผู้ป่วยพิเศษ ฝ่ายการพยาบาล โรงพยาบาลศิริราช คณะแพทยศาสตร์ ศิริราชพยาบาล โทร 02-4197255-6, 081-1435090

ผู้สนับสนุนทุนวิจัย ไม่มี

ระยะเวลาในการวิจัย ระยะเวลาที่ทำการเก็บข้อมูลตั้งแต่ได้อนุญาตจากคณะกรรมการจริยธรรมการวิจัยในคน จนกระทั่งสำเร็จการศึกษารวมระยะเวลาประมาณ 6 เดือน

โครงการวิจัยนี้ทำขึ้นเพื่อ ศึกษาถึงปัจจัยที่มีความสัมพันธ์กับการปรับตัวด้านสรีระในผู้ป่วยโรคหลอดเลือดหัวใจที่รอทำผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจ

ประโยชน์ของงานวิจัย

1. สามารถนำผลที่ได้จากการศึกษาครั้งนี้ไปใช้เป็นข้อมูลพื้นฐานให้แก่พยาบาลและทีมสุขภาพในการเตรียมการ/วางแผนในการให้ข้อมูลและคำแนะนำเพื่อพัฒนาในการจัดทำ

โปรแกรมการดูแลผู้ป่วยและการจัดระบบทีมการดูแลสุขภาพผู้ป่วยโรคหลอดเลือดหัวใจที่รอผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจ

2. ใช้เป็นแนวทางแก่ผู้สนใจและต้องการศึกษาวิจัยในกลุ่มผู้ป่วยโรคหลอดเลือดหัวใจที่รอผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจเพื่อสร้างองค์ความรู้ให้กว้างขวางมากขึ้น

ท่านได้รับเชิญให้เข้าร่วมการวิจัยนี้เพราะ ท่านเป็นผู้หนึ่งที่มีคุณสมบัติตามเกณฑ์การคัดเลือกประชากรเข้าเป็นกลุ่มตัวอย่างในครั้งนี้คือท่านเป็นผู้ป่วยโรคหลอดเลือดหัวใจที่รอผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจโดยมีอายุ 18 ปีขึ้นไป

จะมีผู้เข้าร่วมการวิจัยนี้ทั้งสิ้นประมาณ 88 คน

หากท่านตัดสินใจเข้าร่วมการวิจัยแล้ว จะมีขั้นตอนการวิจัยดังต่อไปนี้คือ

ให้ท่านตอบแบบสอบถาม จำนวน 4 ชุด รวมข้อคำถาม 52 ข้อ ใช้เวลาในการตอบแบบสอบถามประมาณ 30-45 นาที

1. แบบสอบถามข้อมูลส่วนบุคคล การเจ็บป่วยและการรักษา จำนวน 19 ข้อ
2. แบบสอบถามอาการแสดงที่เป็นปัญหาสุขภาพระหว่างรอผ่าตัด จำนวน 13 ข้อ
3. แบบประเมินภาวะซึมเศร้า จำนวน 20 ข้อ

ความเสี่ยงที่อาจจะเกิดขึ้นเมื่อเข้าร่วมการวิจัย ขณะทำการตอบแบบสอบถามไม่มีความเสี่ยงใดๆ เกิดขึ้นแต่อาจส่งผลให้ผู้เข้าร่วมวิจัยเสียเวลาและอาจอึดอัดใจในการตอบคำถามบางข้อซึ่งท่านสามารถจะไม่ตอบคำถามข้อนั้นได้

หากท่านไม่เข้าร่วมในโครงการวิจัยนี้ ท่านก็จะได้รับการตรวจเพื่อการวินิจฉัยและรักษาโรคของท่านตามวิธีการที่เป็นมาตรฐานคือ ท่านก็จะได้รับการตรวจเพื่อการวินิจฉัยและรักษาโรคของท่านตามวิธีการที่เป็นมาตรฐาน

หากมีข้อข้องใจที่จะสอบถามเกี่ยวข้องกับการวิจัย หรือหากเกิดผลข้างเคียงที่ไม่พึงประสงค์จากการวิจัย ท่านสามารถติดต่อ ผู้วิจัย คือ นางสุภาวดี ภูมิประเสริฐโชค ตามหมายเลขโทรศัพท์ที่ระบุไว้ตอนต้นของเอกสาร

ท่านจะได้รับการช่วยเหลือหรือดูแลรักษาการบาดเจ็บ/เจ็บป่วยอันเนื่องมาจากการวิจัยตามมาตรฐานทางการแพทย์ โดยผู้รับผิดชอบค่าใช้จ่ายในการรักษาคือตามสิทธิการเบิกจ่ายค่ารักษาพยาบาลของท่าน

ประโยชน์ที่คิดว่าจะได้รับจากการวิจัย โครงการวิจัยอาจไม่ได้รับประโยชน์โดยตรงต่อท่านแต่ผลการวิจัยที่ได้จะเป็นประโยชน์ต่อส่วนรวมในอนาคต

ในการเข้าร่วมวิจัยนี้ ผู้เข้าร่วมวิจัยไม่ต้องเสียค่าใช้จ่ายใดๆ ทั้งสิ้น

หากมีข้อมูลเพิ่มเติมทั้งด้านประโยชน์และโทษที่เกี่ยวข้องกับการวิจัยนี้ ผู้วิจัยจะแจ้งให้ทราบโดยรวดเร็วและไม่ปิดบัง

ข้อมูลส่วนตัวของผู้เข้าร่วมการวิจัย จะถูกเก็บรักษาไว้โดยไม่เปิดเผยต่อสาธารณะเป็นรายบุคคล แต่จะรายงานผลการวิจัยเป็นข้อมูลส่วนรวมโดยไม่สามารถระบุข้อมูลรายบุคคลได้ ข้อมูลของผู้เข้าร่วมการวิจัยเป็นรายบุคคลอาจมีคณะบุคคลบางกลุ่มเข้ามาตรวจสอบได้ เช่น ผู้ให้ทุนวิจัย สถาบัน หรือองค์กรของรัฐที่มีหน้าที่ตรวจสอบ รวมถึงคณะกรรมการจริยธรรมการวิจัยในคนเป็นต้น

ผู้เข้าร่วมการวิจัยมีสิทธิ์ถอนตัวออกจากโครงการวิจัยเมื่อใดก็ได้ โดยไม่ต้องแจ้งให้ทราบล่วงหน้า และการไม่เข้าร่วมการวิจัยหรือถอนตัวออกจากโครงการวิจัยนี้ จะไม่มีผลกระทบต่อการบริการและการรักษาที่สมควรจะได้รับตามมาตรฐานแต่ประการใด

หากท่านได้รับการปฏิบัติที่ไม่ตรงตามที่ได้ระบุไว้ในเอกสารชี้แจงนี้ ท่านสามารถแจ้งให้ประธานคณะกรรมการจริยธรรมการวิจัยในคนทราบได้ที่ สำนักงานคณะกรรมการจริยธรรมการวิจัยในคน ตึกอดุลยเดชวิกรม ชั้น 6 ร.พ.ศิริราช โทร. (02) 419-6405-6 โทรสาร (02) 419-6405

ลงชื่อ.. ผู้เข้าร่วมโครงการวิจัย / วันที่............................

(..)

APPENDIX B
INFORMED CONSENT FORM

เอกสารหมายเลข 3ข

หนังสือแสดงเจตนายินยอมเข้าร่วมการวิจัย

(Consent Form)

วันที่............. เดือน................................ พ.ศ. ....

ข้าพเจ้า ....อายุ ....ปี อาศัยอยู่บ้านเลขที่ .... ถนน..............................แขวง/ตำบล...............................เขต/อำเภอ ....จังหวัด...รหัสไปรษณีย์ .... โทรศัพท์ ....

ขอแสดงเจตนายินยอมเข้าร่วมโครงการวิจัยเรื่อง ปัจจัยที่มีความสัมพันธ์กับการตอบสนองทางสรีระในผู้ป่วยที่รอผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจ

โดยข้าพเจ้าได้รับทราบรายละเอียดเกี่ยวกับที่มาและจุดมุ่งหมายในการทำวิจัย รายละเอียดขั้นตอนต่างๆ ที่จะต้องปฏิบัติหรือได้รับการปฏิบัติ ประโยชน์ที่คาดว่าจะได้รับของการวิจัย และความเสี่ยงที่อาจจะเกิดขึ้นจากการเข้าร่วมการวิจัย รวมทั้งแนวทางป้องกันและแก้ไขหากเกิดอันตรายขึ้น ค่าใช้จ่ายที่ข้าพเจ้าจะต้องรับผิดชอบจ่ายเองหรือตามสิทธิการเบิกจ่ายค่ารักษาพยาบาลของตนเองเมื่อต้องได้รับการตรวจประเมินร่างกายชนิดต่างๆก่อนผ่าตัด โดยได้อ่านข้อความที่มีรายละเอียดอยู่ในเอกสารชี้แจงผู้เข้าร่วมการวิจัยโดยตลอด อีกทั้งยังได้รับคำอธิบายและตอบข้อสงสัยจากหัวหน้าโครงการวิจัยเป็นที่เรียบร้อยแล้ว

ข้าพเจ้าจึงสมัครใจเข้าร่วมในโครงการวิจัยนี้

หากข้าพเจ้ามีข้อข้องใจเกี่ยวกับขั้นตอนของการวิจัย หรือหากเกิดผลข้างเคียงที่ไม่พึงประสงค์จากการวิจัยขึ้นกับข้าพเจ้า ข้าพเจ้าจะสามารถติดต่อกับ นางสุภาวดี ภูมิประเสริฐโชค

หอผู้ป่วยพิเศษตึก 84 ปี ชั้น 7 ตะวันออก งานการพยาบาลผู้ป่วยพิเศษ ฝ่ายการพยาบาล โรงพยาบาลศิริราช คณะแพทยศาสตร์ศิริราชพยาบาล โทรศัพท์ 081-1435090 ได้ 24 ชั่วโมง

หากข้าพเจ้าได้รับการปฏิบัติไม่ตรงตามที่ระบุไว้ในเอกสารชี้แจงผู้เข้าร่วมการวิจัย ข้าพเจ้าสามารถติดต่อกับประธานคณะกรรมการจริยธรรมการวิจัยในคนได้ที่ สำนักงานคณะกรรมการจริยธรรมการวิจัยในคน ตึกอดุลยเดชวิกรม ชั้น 6 ร.พ.ศิริราช โทร. (02) 419-6405-6 โทรสาร (02) 419-6405

ข้าพเจ้าได้ทราบถึงสิทธิ์ที่ข้าพเจ้าจะได้รับข้อมูลเพิ่มเติมทั้งทางด้านประโยชน์และโทษจากการเข้าร่วมการวิจัย และสามารถถอนตัวหรืองดเข้าร่วมการวิจัยได้ทุกเมื่อโดยไม่ต้องแจ้งล่วงหน้าหรือระบุเหตุผล โดยจะไม่มีผลกระทบต่อการบริการและการรักษาพยาบาลที่ข้าพเจ้าจะได้รับต่อไปในอนาคต และยินยอมให้ผู้วิจัยใช้ข้อมูลส่วนตัวของข้าพเจ้าที่ได้รับจากการวิจัย แต่จะไม่เผยแพร่ต่อสาธารณะเป็นรายบุคคล โดยจะนำเสนอเป็นข้อมูลโดยรวมจากการวิจัยเท่านั้น

ข้าพเจ้าได้เข้าใจข้อความในเอกสารชี้แจงผู้เข้าร่วมการวิจัย และหนังสือแสดงเจตนายินยอมนี้โดยตลอดแล้ว จึงลงลายมือชื่อไว้

ลงชื่อ..ผู้เข้าร่วมการวิจัย/ผู้แทนโดยชอบธรรม/วันที่.................

(...)

ลงชื่อ..........................ผู้ให้ข้อมูลและขอความยินยอม/หัวหน้าโครงการวิจัย/วันที่..........

(...)

ในกรณีผู้เข้าร่วมการวิจัยอ่านหนังสือไม่ออกผู้ที่อ่านข้อความทั้งหมดแทนผู้เข้าร่วมการวิจัย คือ..

จึงได้ลงลายมือชื่อไว้เป็นพยาน

ลงชื่อ.. พยาน/วันที่...

(...)

APPENDIX C
INSTRUMENTS

เครื่องมือที่ใช้ในการเก็บรวบรวมข้อมูล

ลำดับที่...................

วัน/เดือน/ปี................................

ส่วนที่ 1 แบบสอบถามข้อมูลส่วนบุคคล การเจ็บป่วยและการรักษา

คำชี้แจง: ให้ทำเครื่องหมาย ✓ ลงใน ( ) หรือเติมคำลงในช่องว่างตามข้อมูลที่เป็นจริง

1. เพศ

   ( ) ชาย ( ) หญิง

2. อายุ............................ปี
3. สถานภาพสมรส

   ( ) โสด ( ) สมรส ( ) หย่า ( ) หม้าย

4. นับถือศาสนา..
5. ระดับการศึกษา

   ( ) ต่ำกว่าประถมศึกษา หรือไม่ได้รับการศึกษา

   ( ) ประถมศึกษา

   ( ) มัธยมศึกษาตอนต้น

   ( ) มัธยมศึกษาตอนปลาย

   ( ) อาชีวศึกษา / อนุปริญญา

   ( ) ปริญญาตรี

   ( ) ปริญญาโท หรือสูงกว่า

6. ปัจจุบันมีอาชีพ...

7. รายได้เฉลี่ยของครอบครัว / เดือน

( ) ต่ำกว่า 1,000 บาท

( ) 2,000 - 4,999 บาท

( ) 5,000 - 9,999 บาท

( ) 10,000 - 14,999 บาท

( ) 15,000 - 19,999 บาท

( ) มากกว่า 20,000 บาท

8. ฐานะทางเศรษฐกิจ

( ) รายได้ไม่พอใช้จ่ายในครอบครัว

( ) รายได้เกือบไม่พอใช้จ่ายในครอบครัว

( ) รายได้พอใช้จ่ายในครอบครัวแต่ไม่เหลือเก็บ

( ) รายได้พอใช้จ่ายในครอบครัวและมีเหลือเก็บ

9. ประเภทสิทธิในการรักษา

( ) จ่ายเอง

( ) เบิกจากต้นสังกัด

( ) ประกันสังคม

( ) ประกันสุขภาพถ้วนหน้า หรือ 30 บาท

( ) อื่นๆ ระบุ..

10. แหล่งที่อยู่

( ) กรุงเทพฯ

( ) เขตปริมณฑล (สมุทรปราการ, นนทบุรี, ปทุมธานี)

( ) ต่างจังหวัด (โปรดระบุ)...

11. การวินิจฉัยโรค...

12. ภาวะโรคร่วม...

13. ระยะเวลารอผ่าตัด..

14. NYHA class...

15. CCS class..

16. Ejection fraction (ขณะรอผ่าตัด)...

17. ข้อมูล หรือการบริการที่ได้รับจากแพทย์ พยาบาล หรือบุคลากรทางการแพทย์อื่นขณะที่รอผ่าตัด

....

....

18. ความต้องการ หรือความคาดหวังที่จะได้รับจากแพทย์ พยาบาล หรือบุคลากรทางการแพทย์อื่น ขณะที่รอผ่าตัด

....

....

19. ความพึงพอในภาพรวมต่อบริการสุขภาพที่ได้รับ

☐ น้อยที่สุด ☐ น้อย ☐ ปานกลาง ☐ มาก ☐ มากที่สุด

ส่วนที่ 2 แบบประเมินโรคร่วม

คำชี้แจง: ผู้วิจัยนำข้อมูลการมีโรคร่วม ที่ได้จากการสัมภาษณ์และข้อมูลจากแฟ้มเวชระเบียนผู้ป่วยมาให้คะแนนตามรายละเอียดดังนี้

ให้ 1 คะแนน ถ้าผู้ป่วยมีอาการต่อไปนี้ (อย่างน้อย 1 อาการ)

โรคกล้ามเนื้อหัวใจขาดเลือด (MI): ____________

- ได้รับการวินิจฉัยหรือสันนิษฐานว่ามีโรคกล้ามเนื้อหัวใจขาดเลือดไปเลี้ยงอย่างน้อย 1 ครั้ง (โปรดระบุถ้ามากกว่า 1 ครั้ง:____________ครั้ง)
- พบความผิดปกติของ ECG ขณะเข้ารับการรักษาในโรงพยาบาล และ/หรือ มีการเปลี่ยนแปลงในระดับเอนไซม์ของหัวใจ (Cardiac enzyme) ถ้าตรวจพบการเปลี่ยนแปลงของ ECG เพียงอย่างเดียวไม่ถือว่ามีภาวะกล้ามเนื้อหัวใจขาดเลือดไปเลี้ยง

ภาวะหัวใจล้มเหลว (CHF): ____________

- ผู้ป่วยมีอาการหอบเหนื่อยเมื่อออกแรง (Extertional dyspnea) หรือมีอาการหอบเหนื่อยจนต้องตื่น (Paroxysmal nocturnal dyspnea) และผู้ป่วยที่มีการตอบสนองทางอาการ หรือจากการตรวจร่างกายต่อยากระตุ้นหัวใจ (Digitalis) ยาขับปัสสาวะ (Diuretic) หรือ ยา Afterload agent (ทั้งนี้ไม่รวมถึงผู้ป่วยที่รับการรักษาด้วยยา แต่ไม่ตอบสนองต่อการรักษา)

โรคของหลอดเลือดโลหิตส่วนปลาย (PVD): ____________

- ผู้ป่วยที่มีอาการปวดขาเป็นพักๆ (Intermittent claudication) หรือผู้ป่วยที่ได้รับการผ่าตัดต่อเส้นโลหิตเนื่องจากมีปัญหาเกี่ยวกับเส้นโลหิตแดง (Arterial insufficience) เนื้อตาย (Gangrene) หรือมีปัญหาเกี่ยวกับเส้นโลหิตแดงอย่างเฉียบพลัน (Acute arterial insufficience) และผู้ป่วยที่มีเส้นโลหิตโป่งพองในช่องอกหรือช่องท้อง (Thoracic or abdominal aneurysm) ขนาด 6 ซม.ขึ้นไปและยังไม่ได้รับการรักษา

โรคของหลอดโลหิตในสมอง (CVD): ____________

- ผู้ป่วยที่มีประวัติโรคอุบัติเหตุของหลอดเลือดสมอง (CVA) และผู้ป่วยที่มีภาวะสมองขาดเลือดชั่วคราว (Transient ischemic attacks)

โรคความจำเสื่อม (Dementia) ____________

- ผู้ป่วยที่มีภาวะบกพร่องทางด้านความคิดและความเข้าใจชนิดเรื้อรัง (Chronic cognitive deficit)

โรคปอดชนิดเรื้อรัง (Chronic lung disease): ____________

- ชนิดไม่รุนแรง: ผู้ป่วยมีอาการหายใจลำบากเมื่อมีกิจกรรมพอประมาณและไม่ได้รับการรักษา หรือผู้ป่วยที่มีอาการหายใจลำบากเฉพาะเมื่อมีอาการหอบหืดเท่านั้น
- ชนิดรุนแรงปานกลาง: ผู้ป่วยมีอาการหายใจลำบากเมื่อมีกิจกรรมเพียงเล็กน้อย (ไม่ว่าเมื่อได้รับการรักษา หรือไม่) หรือผู้ป่วยที่มีอาการหายใจลำบากเฉพาะเมื่อมีกิจกรรมพอประมาณแม้ว่าจะได้รับการรักษา

โรคของเนื้อเยื่อเกี่ยวพัน (Connective tissue disease) ____________

- ผู้ป่วยโรคลูปัส (SLE), โรคกล้ามเนื้ออักเสบหลายส่วน (Polymysitisis), โรคของเนื้อเยื่อเกี่ยวพันแบบผสม (Mix connective tissue disease), อาการปวดข้อต่อและกล้ามเนื้อ (Polymalgia rheumatic), โรคปวดข้อเรื้อรังชนิดรุนแรงปานกลางถึงรุนแรงมาก (Mix severe rheumatic arthritis)

โรคแผลในกระเพาะอาหาร (PUD): ____________

- ผู้ป่วยที่ต้องรับการรักษาจากโรคแผลในกระเพาะอาหาร รวมถึงผู้ป่วยที่เคยมีเลือดออกในกระเพาะเนื่องจากแผลในกระเพาะอาหาร

โรคตับชนิดไม่รุนแรง (Mild liver disease): ____________

- ผู้ป่วยที่เคยเป็นโรคตับแต่ไม่มีภาวะความดันโลหิตสูงที่หลอดเลือดดำที่เข้าตับ (Portal HTN) หรือผู้ป่วยตับอักเสบชนิดเรื้อรัง (Chronic hepatitis)

โรคเบาหวาน (Diabetes): ____________

- ชนิดไม่รุนแรง: ผู้ป่วยได้รับการรักษาด้วยอินซูลิน หรือยาลดระดับกลูโคสในเลือดชนิดรับประทาน (ไม่รวมผู้ป่วยเบาหวานที่รับการรักษาด้วยการควบคุมอาหารเพียงอย่างเดียว)
- ชนิดรุนแรงปานกลาง: ผู้ป่วยที่เคยเข้ารับการรักษาแบบผู้ป่วยในเนื่องจากมีการสะสมของสารคีโตนในร่างกาย (Ketoacidosis), ผู้ป่วยที่หมดสติเนื่องจากความผิดปกติของความเข้มข้นของน้ำตาล

(Hyperosmolar coma), ผู้ป่วยที่ต้องเข้ารับการควบคุมน้ำตาลในโรงพยาบาล และผู้ป่วยชนิดที่เป็นในเด็ก (Juvenile DM), หรือชนิดควบคุมได้ยาก (Brittle diabetes)

ให้ 2 คะแนน ถ้าผู้ป่วยมีอาการต่อไปนี้ (อย่างน้อย 1 อาการ)

โรคอัมพาตครึ่งซีก (Hemiplegia): ______________

- ผู้ป่วยอัมพาตครึ่งซีก หรืออัมพาตส่วนล่างของร่างกาย (Paraplegia) ซึ่งเกิดจากโรคอุบัติเหตุของหลอดเลือดสมอง หรือจากสาเหตุอื่นๆ

โรคเบาหวานในระยะสุดท้าย (Diabetes end organ damage): ______________

- ผู้ป่วยมีอาการเสื่อมอย่างรุนแรงของเรตินา (retinopathy), ระบบประสาท (Neuropathy), ไต (Nephropathy)

โรคไต (Renal disease): ______________

- ชนิดรุนแรงปานกลาง: ตรวจพบซีรั่มครีเอตินินมากว่า 2 มิลลิกรัมเปอร์เซ็นต์ ในผู้ป่วย
- ชนิดรุนแรง: ผู้ป่วยที่ต้องรับการรักษาโดยวิธีล้างไต (Dialysis), ได้รับการเปลี่ยนไต (transplant), และผู้ป่วยที่มีความบกพร่องของไตที่ทำให้โลหิตมีสารของปัสสาวะและทำให้เกิดภาวะเป็นพิษขึ้นได้ (Uremia)

เนื้องอก (Any tumor): ______________

- ผู้ป่วยที่มี Solid tumor ที่ยังไม่มีการแพร่กระจายแต่ได้รับการรักษาครั้งแรกภายในระยะเวลา 5 ปีที่ผ่านมา (รวมถึงเนื้องอกที่เต้านม, ลำไส้, ปอด และอื่นๆ)

โรคเม็ดโลหิตขาวผิดปกติ (Leukemia): ______________

- ผู้ป่วยที่มีภาวะเม็ดโลหิตขาวผิดปกติเนื่องจากความผิดปกติของเนื้อเยื่อระบบน้ำเหลืองชนิดเฉียบพลันและเรื้อรัง (Acute and chronic lymphocytic leukemia)
- ผู้ป่วยที่มีภาวะเม็ดโลหิตขาวผิดปกติเนื่องจากความผิดปกติของเนื้อเยื่อไขกระดูกชนิดเฉียบพลันและเรื้อรัง (Acute and chronic myelogenous leukemia)

โรคความบกพร่องของการเจริญเติบโตของเนื้อเยื่อน้ำเหลือง (Lymphoma): ______________

- ผู้ป่วยโรคต่อมน้ำเหลืองอักเสบเรื้อรัง (Hodgkin), โรคมะเร็งของเนื้อเยื่อน้ำเหลือง (Lymphosarcoma), โรคเนื้องอกที่ประกอบด้วยเซลล์ไขกระดูก (Myeloma), ผู้ป่วยที่มีพลาสมาโปรตีนขนาดใหญ่ (Waldenstrom's macroglobulinemia), และผู้ป่วยที่มีความบกพร่องของการเจริญเติบโตของเนื้อเยื่อน้ำเหลืองชนิดอื่นๆ

ให้ 3 คะแนน ถ้าผู้ป่วยมีอาการต่อไปนี้ (อย่างน้อย 1 อาการ)

โรคตับ (Liver disease): ______________

- ชนิดรุนแรงปานกลาง: ผู้ป่วยที่มีตับแข็ง (Cirrhosis), มีภาวะความดันโลหิตสูงที่หลอดโลหิตดำที่เข้าตับ (Portal HTN) แต่ไม่มีประวัติเลือดออกจากหลอดเลือดโป่งพองในหลอดอาหาร (Variceal bleeding)
- ชนิดรุนแรงมาก: ผู้ป่วยที่มีตับแข็ง (Cirrhosis), มีภาวะความดันโลหิตสูงที่หลอดโลหิตดำที่เข้าตับ (Portal HTN) และมีประวัติเลือดออกจากหลอดเลือดโป่งพองในหลอดอาหาร (Varicoceal bleeding)

ให้ 4 คะแนน ถ้าผู้ป่วยมีอาการต่อไปนี้ (อย่างน้อย 1 อาการ)

โรคเอดส์ (AIDS): ______________

- ผู้ป่วยได้รับการวินิจฉัย หรือสันนิษฐานว่าเป็นโรคเอดส์

โรคมะเร็งระยะที่มีการแพร่กระจาย (Metastatic solid cancer): ______________

- มีเนื้องอกในระยะที่มีการแพร่กระจาย (รวมถึงเนื้องอกที่เต้านม, ปอด, ลำไส้ใหญ่, หรือที่อื่นๆ)

คะแนนรวม______________

ส่วนที่ 3 แบบสอบถามอาการที่พบก่อนผ่าตัด (Modified Symptom Inventory)

คำชี้แจง: อธิบายอาการดังต่อไปนี้ว่าเกิดบ่อยครั้งเพียงใดภายในระยะ 2 สัปดาห์ที่ผ่านมานี้โดยให้วงกลมรอบตัวเลขที่ตรงกับความเป็นจริง

1 หมายถึง ไม่เกิดขึ้นเลย
2 หมายถึง เกิดขึ้นเพียงครั้งเดียว
3 หมายถึง เกิดอาการนานๆครั้ง
4 หมายถึง เกิดอาการเป็นบางครั้ง
5 หมายถึง เกิดอาการบ่อยครั้ง
6 หมายถึง เกิดอาการบ่อยมาก
7 หมายถึง เกิดอาการตลอดเวลา

อาการ	ไม่เกิดขึ้นเลย	เกิดขึ้นเพียงครั้งเดียว	เกิดอาการนานๆครั้ง	เกิดอาการเป็นบางครั้ง	เกิดอาการบ่อยครั้ง	เกิดอาการบ่อยมาก	เกิดอาการตลอดเวลา
1. มีอาการเหนื่อย	1	2	3	4	5	6	7
2. นอนหลับยาก	1	2	3	4	5	6	7
3. หายใจลำบากหรือหายใจไม่เต็มอิ่ม	1	2	3	4	5	6	7
4. เจ็บหน้าอก	1	2	3	4	5	6	7
5. ใจสั่น	1	2	3	4	5	6	7
6. เบื่ออาหาร	1	2	3	4	5	6	7
7. ท้องผูก	1	2	3	4	5	6	7
8. ท้องเสีย	1	2	3	4	5	6	7
9. คลื่นไส้อาเจียน	1	2	3	4	5	6	7

อาการ	ไม่เกิดขึ้นเลย	เกิดขึ้นเพียงครั้งเดียว	เกิดอาการนานๆครั้ง	เกิดอาการเป็นบางครั้ง	เกิดอาการบ่อยครั้ง	เกิดอาการบ่อยมาก	เกิดอาการตลอดเวลา
10. ปวดศีรษะ	1	2	3	4	5	6	7
11. มึนงง	1	2	3	4	5	6	7
12. อาการอื่นๆ	1	2	3	4	5	6	7

13. ท่านมีอาการอื่นๆ นอกเหนือจากที่กล่าวมาหรือไม่ ☐ มี ☐ ไม่มี

ถ้ามีกรุณาอธิบายอาการดังกล่าวที่เกิดขึ้นกับตัวท่าน..

ส่วนที่ 4 แบบประเมินภาวะซึมเศร้า

คำชี้แจง: ทำ ✓ ลงในช่องคำตอบที่ตรงกับตัวท่านมากที่สุดเพียงคำตอบเดียวในแต่ละข้อ

ไม่เลย หมายถึง ไม่มีความรู้สึกตรงกับข้อความนั้นเลย (<1วัน/สัปดาห์)

นานๆครั้ง หมายถึง มีความรู้สึกตรงกับข้อความนั้นนานๆครั้ง(1-2 วัน/สัปดาห์)

ค่อนข้างบ่อย หมายถึง มีความรู้สึกตรงกับข้อความนั้นค่อนข้างบ่อย (3-4 วัน/สัปดาห์)

บ่อยครั้ง หมายถึง มีความรู้สึกตรงกับข้อความนั้นบ่อยๆ (5-7 วัน/สัปดาห์)

ข้อความ	รู้สึกบ่อยครั้ง	รู้สึกค่อนข้างบ่อย	รู้สึกนานๆ ครั้ง	ไม่มีความรู้สึก
1. ฉันรู้สึกหงุดหงิดง่าย				
2. ฉันรู้สึกเบื่ออาหาร				
3. ฉันรู้สึกว่าฉันไม่สามารถขจัดความหม่นหมองออกไปแม้ว่าจะมีคนในครอบครัวหรือเพื่อนคอยช่วยเหลือ				
4. ฉันรู้สึกตนเองมีความคิดดีทัดเทียมคนอื่นๆ				
5. ฉันรู้สึกลำบากใจในการตั้งสมาธิเพื่อทำสิ่งใดสิ่งหนึ่ง				
6. ฉันรู้สึกหดหู่ใจ				
7. ฉันรู้สึกว่าทุกๆสิ่งที่ฉันกระทำต้องฝืนใจทำ				
8. ฉันรู้สึกมีความหวังเกี่ยวกับอนาคต				
9. ฉันรู้สึกว่าชีวิตฉันมีแต่ความล้มเหลว				
10. ฉันรู้สึกหวาดกลัว				

ข้อความ	รู้สึก บ่อยครั้ง	รู้สึก ค่อนข้าง บ่อย	รู้สึก นานๆ ครั้ง	ไม่มี ความรู้สึก
11. ฉันรู้สึกนอนไม่ค่อยหลับ				
12. ฉันรู้สึกมีความสุข				
13. ฉันพูดคุยน้อยกว่าปกติ				
14. ฉันรู้สึกอ้างว้าง เดียวดาย				
15. ฉันรู้สึกผู้คนทั่วๆไปไม่มีความเป็นมิตร				
16. ฉันรู้สึกว่าชีวิตนี้สนุกสนาน				
17. ฉันมักร้องไห้				
18. ฉันรู้สึกไม่มีความสุข				
19. ฉันรู้สึกว่าผู้คนรอบข้างไม่ชอบฉัน				
20. ฉันรู้สึกท้อถอยในชีวิต				

APPENDIX D
PERMISSION LETTER FOR USING THE INSTRUMENT

คณะแพทยศาสตร์ศิริราชพยาบาล
สำนักงานรองคณบดีฝ่ายวิจัย
บางกอกน้อย กรุงเทพฯ 10700
โทร. 0 2419 2680

ที่ ศธ 0517.07/ **685**
วันที่ 10 มกราคม 2556
เรื่อง ยินดีให้ความอนุเคราะห์ข้อมูลประกอบการทำวิทยานิพนธ์

เรียน คณบดีคณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล
อ้างถึง หนังสือ หลักสูตรพยาบาลศาสตรมหาบัณฑิต คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล ที่ ศธ 0517.05/01451 ลงวันที่ 27 เมษายน 2555

ตามที่ หลักสูตรพยาบาลศาสตรมหาบัณฑิต คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล ได้ขอความอนุเคราะห์ให้ นางสุภาวดี ภูมิประเสริฐโชค นักศึกษาหลักสูตรพยาบาลศาสตรมหาบัณฑิต สาขาการพยาบาลผู้ใหญ่ แผน ก คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล เข้าใช้เครื่องมือวิจัย คือ แบบประเมินภาวะซึมเศร้า The Center for Epidemiologic Studies-Depression scale (CES-D) ฉบับที่แปลและดัดแปลงเป็นภาษาไทย โดย รศ. พญ.วิไล คุปต์นิรัติศัยกุล ภาควิชาเวชศาสตร์ฟื้นฟู และ รศ. นพ.พนม เกตุมาน ภาควิชาจิตเวชศาสตร์ คณะแพทยศาสตร์ศิริราชพยาบาล มหาวิทยาลัยมหิดล เพื่อเป็นข้อมูลประกอบการทำวิทยานิพนธ์ เรื่อง "ปัจจัยที่มีความสัมพันธ์กับการตอบสนองทางสรีระในผู้ป่วยที่รอผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจ" ความละเอียดดังแจ้งแล้วนั้น

คณะแพทยศาสตร์ศิริราชพยาบาล มหาวิทยาลัยมหิดล พิจารณาแล้วยินดีอนุมัติให้ นางสุภาวดี ภูมิประเสริฐโชค เข้าใช้เครื่องมือได้ตามที่ขอความอนุเคราะห์มา ทั้งนี้ในส่วนของรายละเอียดขอให้ประสานงานโดยตรงได้ที่ภาควิชาเวชศาสตร์ฟื้นฟู โทรศัพท์ 0 2419 7508-9 และภาควิชาจิตเวชศาสตร์ โทรศัพท์ 0 2419 4293-4

จึงเรียนมาเพื่อโปรดทราบ

ขอแสดงความนับถือ

(ศาสตราจารย์ นายแพทย์ประสิทธิ์ วัฒนาภา)
รองคณบดี ปฏิบัติงานแทน
คณบดีคณะแพทยศาสตร์ศิริราชพยาบาล

APPENDIX E
CERTIFICATE OF APPROVAL

2 PRANNOK Rd. BANGKOKNOI
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MAHIDOL UNIVERSITY
Since 1888

Siriraj Institutional Review Board

Certificate of Approval

COA no. ***Si*** **370/2012**

Protocol Title : FACTORS ASSOCIATED WITH PHYSIOLOGIC RESPONSE IN ISCHEMIC HEART PATIENTS AWAITING CORONARY ARTERY BYPASS GRAFT SURGERY

Protocol number : 103/2555(EC1)

Principal Investigator/Affiliation Mrs.Supawadee Poomiprasertchok
Faculty of Nursing, Mahidol University

Research site : Faculty of Medicine Siriraj Hospital

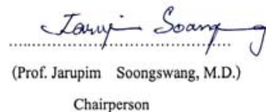
Approval includes :

1. SIRB Submission Form
2. Participation Information Sheet
3. Informed Consent Form
4. Questionnaire
5. Principle Investigator's curriculum vitae

Approval date : July 11, 2012

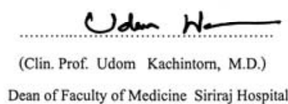
Expired date : July 10, 2013

This is to certify that Siriraj Institutional Review Board is in full Compliance with international guidelines for human research protection such as the Declaration of Helsinki, the Belmont Report, CIOMS Guidelines and the International Conference on Harmonization in Good Clinical Practice (ICH-GCP).



(Prof. Jarupim Soongswang, M.D.)
Chairperson

July 11, 2012
date



(Clin. Prof. Udom Kachintorn, M.D.)
Dean of Faculty of Medicine Siriraj Hospital

17 JUL 2012
date

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หน่วยพิมพ์โรงพยาบาลศิริราช 2341 / 3,000 แผ่น / ก.ย 51 / Mat. 10023252

คณะแพทยศาสตร์ศิริราชพยาบาล
สำนักงานรองคณบดีฝ่ายวิจัย
บางกอกน้อย กรุงเทพฯ 10700
โทร. 0 2419 2680

ที่ ศธ 0517.07/ 28776

วันที่ ๒ ธันวาคม 2555

เรื่อง ยินดีให้ความอนุเคราะห์ข้อมูลประกอบการทำวิทยานิพนธ์

เรียน คณบดีคณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล

อ้างถึง หนังสือ หลักสูตรพยาบาลศาสตรมหาบัณฑิต คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล
ที่ ศธ 0517.05/00260 ลงวันที่ 25 มกราคม 2555

ตามที่ หลักสูตรพยาบาลศาสตรมหาบัณฑิต คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล ได้ขอความอนุเคราะห์ให้ นางสุภาวดี ภูมิประเสริฐโชค นักศึกษาหลักสูตรพยาบาลศาสตรมหาบัณฑิต สาขาการพยาบาลผู้ใหญ่ คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล เข้าเก็บข้อมูลด้วยวิธีการตอบแบบสอบถามกับผู้ป่วยโรคหลอดเลือดหัวใจที่เข้าพักรักษาเป็นวันแรก เพื่อรอผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจที่หอผู้ป่วยในโรงพยาบาลศิริราช อายุตั้งแต่ 18 ปีขึ้นไป ทั้งเพศหญิงและเพศชาย เพื่อเป็นข้อมูลประกอบการทำวิทยานิพนธ์ เรื่อง "ปัจจัยที่มีความสัมพันธ์กับการตอบสนองทางสรีระในผู้ป่วยที่รอผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจ" ความละเอียดดังแจ้งแล้วนั้น

คณะแพทยศาสตร์ศิริราชพยาบาล มหาวิทยาลัยมหิดล พิจารณาแล้วยินดีอนุมัติให้ นางสุภาวดี ภูมิประเสริฐโชค เข้าเก็บข้อมูลได้ตามที่ขอความอนุเคราะห์มา ทั้งนี้ได้ผ่านการรับรองโครงการวิจัยจากคณะกรรมการจริยธรรมการวิจัยในคน คณะแพทยศาสตร์ศิริราชพยาบาล เมื่อวันที่ 11 กรกฎาคม 2555

จึงเรียนมาเพื่อโปรดทราบ

ขอแสดงความนับถือ

(ศาสตราจารย์ นายแพทย์ประสิทธิ์ วัฒนาภา)
รองคณบดี ปฏิบัติงานแทน
คณบดีคณะแพทยศาสตร์ศิริราชพยาบาล

BIOGRAPHY

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