FATALISM AND ITS ROLE IN POST CARDIAC SURGERY DEPRESSION

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ABSTRACT

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Depression following cardiac surgery is more common than appreciated and can adversely impact length of stay, recovery, and quality of life. The purpose of this study was to identify those at increased risk of developing post-operative depression and to intervene early to decrease the mortality and morbidity associated with post-operative depression. This study prospectively analyzed various patient characteristics, socio-economic factors, and fatalism to determine their relationship to post-operative depression. If a correlation was identified, then pre-operative intervention could be initiated to mitigate the adverse effects of depression on recovery.

Consecutive patients scheduled for coronary bypass or valve surgery were screened for inclusion in the study. Patients under the age of 40, those with pre-existing depression, and patients needing reoperation were excluded. One hundred twenty-five patients who met criteria were followed over a 12-week period. Baseline data relating to heart surgery (Euroscore), socio-economic demographics, depression score (PHQ9), and a fatalism scale were collected. Follow-up assessments for depression occurred at 6 weeks and at 12 weeks post-surgery. Data were collected by chart review and direct face-to-face interviews, and were analyzed utilizing SAS software.

Eighty-four men and 41 women met the inclusion criteria. One hundred fourteen (91%) completed follow-up at 6 weeks, and 105 (84%) completed the

follow-up at 12 weeks. The mean fatalism score was 49.4 (22-88), and the mean depression score was 4.0(0-11). Fatalism, Euroscore, baseline PHQ-9 score, gender, race, marital status, education level, church membership, and diabetes explained 22% of the variability in PHQ-9 scores at both 6 and 12 weeks. However, this was not significant (p=> 0.05).

Fatalism was found to be associated with depression, but socio-demographic factors explained more variability in depression at 6 weeks and 12 weeks. Further studies to identify other determinants of postoperative depression are warranted. The results suggest that pre-operative interventions to limit subsequent depression should be explored.

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INTRODUCTION

This study sought to identify patients with a diagnosis of cardiac disease that was severe enough to warrant heart surgery and who then ultimately develop post-operative depression. More specifically, this study examined the role of fatalism and if fatalism predisposed an individual undergoing cardiac surgery to develop postoperative depression. The purpose of this study was to identify those at increased risk of developing post-operative depression and to intervene early to decrease the mortality and morbidity associated with post-operative depression. It was hoped this study would identify cues, namely, fatalism, to alert the healthcare team to the increased risk of certain cardiac surgery patients who are predisposed to develop post-operative depression. It was believed the knowledge generated would potentially improve the care and outcomes of cardiac surgery patients. This research employed a prospective series research design utilizing patients who have undergone heart surgery at Mt. Sinai-St. Luke's Hospital in New York City. This study examined 125 patients who underwent heart surgery and measured their level of fatalism and their level of post-operative depression. The framework that was utilized was the Transactional Model of Stress and Coping (Lazarus & Folkman, 1984).

Background

Coronary artery disease is the leading cause of death and disability among men and women of all ethnic groups in the United States. Twenty-six percent of deaths in the United States can be attributed to coronary artery disease, and in 2006, half of these deaths occurred in women. The cost of coronary artery disease in 2010 was estimated to be greater than $6 billion and continues to rise (Centers for Disease Control and Prevention, 2012; Post-Myocardial Infarction Depression Clinical Practice Guideline Panel, 2009). A major intervention for coronary artery disease is Coronary Artery Bypass Grafting (CABG). There are over half a million heart surgeries performed in the United States yearly. Revascularization has been shown to provide a significant long-term survival advantage, especially when individuals present with other contributing factors, including severely decreased left ventricular dysfunction. Today, more so than a decade ago, the risk factors for CABG surgery have increased with an aging population, re-operations, and a greater number of patients with cardiac dysfunction (Ai, Wink, Tice, Bolling, & Shearer, 2009).

Cardiac surgery patients who report symptoms of depression tend to have a slower improvement in health related quality of life following surgery compared to non-depressed patients. The post-operative course ranges from 6 to 12 weeks and is highly variable. Physical impairment and activity restrictions are normal in the initial post-operative period. A common and not infrequent complaint is post-operative depression. Depression has been identified as an important predictor of mortality and morbidity associated with coronary heart disease. It is estimated that 65% of patients having had an acute myocardial infarct experience some form of depression, and of this group 15-22% will experience major depression. Tully and Baker (2012) stated that there is evidence that approximately 30% to 40% of

patients undergoing CABG surgery experience some form of psychological depression immediately leading up to surgery and in the post-operative period.

Depression following heart surgery is debilitating not only for the patient but for the family as well. It is anticipated that by 2020 the burden of coronary artery disease and depression will exceed all other medical issues. The reality of this anticipated problem underscores the importance of identifying the problem of depression and its causes (Post-Myocardial Infarction Depression Clinical Practice Guideline Panel, 2009; Tully, Baker, Turnbull, Winefield, & Knight, 2009). Has the medical team addressed the needs of the patient? Have the patient's fears and anxieties been addressed? Is there a component of fatalism, or is this a chronic medical problem that will affect the patient and the family for the rest of their lives? In the United States, depression and anxiety are two of the major leading causes of illness and death. People who are depressed and anxious have a decreased quality of life and social functioning as well as increased disability. Those with a diagnosis of depression are at a higher risk of developing chronic diseases such as diabetes, asthma, obesity, and cardiovascular disease (Centers for Disease Control and Prevention, 2012). It has been reported that post-operative emotional changes, which include depression, have been recorded to be present in from 19% to 61% of cardiac patients (Thorton et al., 2005).

Fear and anxiety prior to CABG surgery are common and are predictive of the number of complications following surgery, including depression. Patients who experience a decrease in anxiety have an improved quality of life and improved mortality five years following CABG surgery. Depression in patients with a diagnosis of coronary heart disease is three to four times more common than in the general population (Koivula, Hautamamaki-Lamminen, & Astedt-Kurki, 2010).

Recent research has shown an increase in the importance of fatalism as both an independent and dependent variable in health behavior. Fatalistic attitudes are

correlated to lower intentions to change health behaviors and with negative health outcomes. Keeley, Wright, and Condit (2009) suggest that fatalistic statements may function as a means of making sense of health outcomes and managing health uncertainties and stress.

The human heart is associated with vitality and capability. The heart is the basic core of the individual, and therefore it is not surprising that diseases of the heart or surgery on the heart may lead to depression. In chronic conditions of the heart, such as congestive heart failure, the incidence of depression is as high as 40%, which has been seen as a strong predictor of worsening heart failure symptoms. Studies have also shown a higher incidence of depression in women as compared to men. The research has not clearly shown how depression influences outcomes among various subgroups of patients. Depression has been shown to have a negative impact on physical functioning of patients undergoing a CABG. Poor health status itself may, in turn, lead to an increase in depressive symptoms, or a component of fatalism may exist in the individual, leading to feelings of powerlessness, hopelessness, and meaninglessness that contribute to depression (Kendel et al., 2010; Shen, Condit, & Wright, 2009). Sui et al. (2009) studied the effects of cardio-respiratory fitness and depression in both men and women and found that poor cardio-respiratory fitness was a predictor of depressive symptoms in both sexes. A comprehensive cardiac rehabilitation program has been shown to decrease cardiac morbidity and mortality. This is due to the improvement of cardiovascular risk factors such as improved physical activity and decreased body mass index. Studies have shown that cardiac rehabilitation has reduced cardiac deaths by as much as 31%. Exercise has been shown not only to improve physical health, but also mental health and the symptoms of depression. Physically active people have been shown to be less depressed as compared to sedentary people. Initiating an exercise program can reverse the symptoms of depression. Exercise

has also been shown to be as effective as antidepressant medication (Egger, Schmid, Schmid, Saner, & von Kanel, 2008).

The goals of *Healthy People 2020* include achieving health equity, eliminating disparities, and improving the health of all groups; to attain high quality, longer lives free of preventable disease, disability, injury, and premature death; and to promote quality of life, healthy development, and healthy behaviors across all life stages. A new objective for *Healthy People 2020* is Health Related Quality of life (HRQoL) and Well-Being. This objective is a multi-dimensional concept that includes physical, mental, emotional, and social functioning of the individual and focuses on the impact that health has on the quality of life and well-being. This objective assesses the positive aspects of a person's life, such as positive emotions and life satisfaction. This objective will assess HRQoL and well-being through the Patient Reported Outcomes Measurement Information System Global Health Measure, which comprises "self-rated questions pertaining to health, physical HRQoL, mental HRQoL, fatigue, pain, emotional distress, social activities and roles" (United States Department of Health and Human Services, 2012). Other measures will include a Well-Being Measure that will gauge the positive aspects of people's daily lives, including relationships, positive emotions, their resilience, and how the individual perceives their potential. The final measure is the Participation Measure, which reflects the individual's assessments of their personal health on their social participation within their environment. Participation in one's environment should still be positive, enjoyable, and productive in spite of functional physical limitations, including, but not limited to, loss of vision, physical mobility issues, or intellectual disability (United States Department of Health and Human Services, 2012).

Other goals and objectives relevant to this dissertation from *Healthy People 2020* include mental health and mental disorders and heart disease and stroke. The mental health and mental disorder objective is to improve mental health through

prevention and ensuring that the individual has access to appropriate mental health services. The objective for heart disease and stroke has a goal of improving cardiovascular health through prevention, early detection, and treatment of risk factors for heart attacks and strokes. This objective for heart disease and stroke further expands the goal by encouraging early treatment for the treatment of cardiac events and strokes and preventing future cardiovascular events.

Problem Statement

Cardiac disease continues to be a disease that affects both men and women of all ethnic groups. Depression has been seen to be a major predictor of mortality and morbidity following a cardiac event. Identifying those individuals who are fatalistic early on in the health care plan and examining the linkage of depression and fatalism and directing their plan of care in order to reduce the incidence of post-operative depression associated with cardiac surgery will potentially improve their HRQoL and in turn reduce the mortality and morbidity rates among cardiac surgery patients.

Health care in the United States may be in a state of crisis, and there is currently a movement to provide reimbursement based on performance criteria, such as patients being re-admitted within 30 days of discharge, and on patient satisfaction. Patients who fail to progress after surgery due to depressive behavior and report conditions to their healthcare providers requiring re-admission will be flagged during the admission, and the idea in the near future is that those re-admissions will not be reimbursed. It hence becomes necessary to identify patients at risk for developing post-operative depression and to intervene early to reduce the risk of depression and maximize overall health.

Thus, the problem addressed in this study was: Does fatalism increase the individual's risk of developing depression following cardiac surgery?

Purpose and Research Questions

The purpose of this study was to explore selected characteristics of an individual, including fatalism, and the impact fatalism may have on individuals who have undergone heart surgery and who then go on to develop post-operative depression. It was anticipated that, by identifying individuals who are at greater risk of developing post-operative depression, the health care team would have the ability to intervene and provide the necessary interventions needed to reduce this risk and improve quality of life. The following research questions were addressed:

1. What is the incidence of post-operative depression in the sample?
2. Do individuals who are fatalistic have an increased risk of developing post-operative depression from cardiac surgery?
3. Are socio-demographic factors predictive of post-operative depression?

Research Approach

After having obtained Internal Review Board (IRB) approvals from a large inner city cardiac program and Teachers College, Columbia University, 125 patients who were determined to require heart surgery, met study criteria, and agreed to participate were interviewed. Demographic information was obtained, and all were screened for their level of fatalism and a baseline depression score was obtained in the preoperative stage. At 6 weeks and at 12 weeks following surgery, participants in the study had their level of depression assessed.

The instruments utilized in this study included a Demographic Survey developed in part from the University of Wisconsin-Cooperative Extension Program Development and Evaluation, a Fatalism Scale developed by Shen et al. (2009), and the Patient Health Questionnaire (PHQ-9) (Kroenke, Spitzer, & Williams, 2001). The initial pilot study involving approximately 10 patients was conducted in the summer of 2013, followed by the main study, which ran from the summer of 2013 through to the spring of 2014.

Delimitations

1. Only cardiac patients who had surgery at a single center at a large inner city cardiac program were studied.
2. Only the selected instruments outlined were utilized for this study.
3. Only men and women over the ages of 40 were studied.
4. Only patients requiring coronary artery bypass grafting and/or valve repair/replacement were included.

Assumptions

Based on the clinical experiences and observations of the researcher, the following assumptions were made: that individuals undergoing heart surgery are not properly screened for the potential of developing post-operative depression; that it is essential to provide comprehensive care to improve the HRQoL of individuals undergoing heart surgery. Risk factors for heart disease go beyond genetic and physiological components such as family history, elevated cholesterol, diabetes and hypertension; the psychological component of the individual greatly

affects the individual's perception of their health, well-being, and future productivity.

Rationale and Significance

The rationale for the study evolved from clinical observations of patients who have undergone heart surgery and who fail to exhibit an improved quality of life. Patients undergoing heart surgery are faced with the fears of dying or developing a disastrous complication that will affect the rest of their lives like a cerebral vascular accident that may incapacitate them, possibly for the rest of their lives. A patient with a surgically successful operation with no physical complications should be able to continue their life and interact with their environment in a positive way. If this fails to happen due to the development of post-operative depression, this truly is not a successful intervention.

Identifying those at risk of developing post-operative depression has implications for both the patient and the community at large, along with the emotional well-being of the patient. The mortality and morbidity associated with depression are well documented in the literature. The financial implications associated with chronic diseases, namely, depression, continue to burden society at an ever-alarming rate.

Identifying those at risk of developing post-operative depression and of providing comprehensive care to patients undergoing heart surgery is essential to enhancing the quality of life of cardiac patients. Identifying those individuals who are more fatalistic and intervening early in the process of health care delivery may lead to a decrease in mortality and morbidity and improved quality of life. To undergo an expensive procedure that impacts the patient on a fiscal, physical, and emotional level and not achieve an enhanced quality of life is costly to society as a

whole. The individual needs to see and experience the positive attributes of heart surgery.

The Researcher

At the time of this study, the researcher was a nurse practitioner in cardiac surgery and had observed the detrimental effects of depression on the individual and the family following heart surgery. It was thought that examining some of the characteristics that make up the individual, for example, fatalism, may identify those individuals who require additional interventions during their hospital admission and possibly in the post-operative period. The researcher brings to this study professional experience working with patients for over 30 years. The successes of surgeries or medical treatments are very much diminished by the patient not expressing or experiencing an improved quality of life. Health care has always addressed quality measures, but possibly one of the most important measures has been overlooked, and that is the perception of the individual in regard to the outcome and how depression may impact that perception.

Definitions

Anxiety is the inability to relax. The person with anxiety will experience a decrease in concentration, uncontrollable worrying, difficulty sleeping, and may have physical symptoms of tremors, aches and pains, and headaches, to name a few (National Institute of Mental Health, 2012).

Cardiac surgery, commonly referred to as "open heart surgery," involves surgery on the heart and adjacent major blood vessels. The types of surgeries include those directed toward myocardial revascularization--coronary artery bypass

grafting, endarterectomy, and open angioplasty; cardiac valve repair and/or replacement-–aortic, mitral, tricuspid and pulmonic, repair of aortic and ventricular aneurysms and aortic dissections; MAZE procedures and septal myomectomy and the removal of cardiac tumors.

Coronary artery bypass grafting involves making new conduits to supply adequate blood flow to the heart or cardiac muscle. Related procedures are directed to relieve coronary artery obstruction.

Depression is defined by the World Health Organization (2012) and for the purpose of this dissertation as feelings of sadness, loss of pleasure, isolation, and loss of interest.

Fatalism is perceived as a lack of control over external events. Individuals feel a sense of powerlessness, hopelessness, and meaninglessness (Hall et al., 2008).

Health-related quality of life refers to health status, functional status, and quality of life. Health ranges from negative valued aspects of life, including death, to the more positive aspects, including role function and happiness (Guyatt, Feeny, & Patrick, 1993).

Myocardial infarction is a lack of blood supply to the myocardium due to a blockage or blockages in the coronary arteries resulting in injury or death to the muscle of the heart.

Valve repair or replacement involves a procedure to repair a torn or incompetent valve. Valves that are incompetent do not open or close properly. If a successful repair cannot by accomplished due to a valve that is beyond repair, infection, or that there is a calcium buildup or scarring causing the valve opening to become small, then the valve is replaced with a mechanical valve or a tissue valve that comes from a pig or a cow.

Summary

In summary, the patient undergoing heart surgery is under enormous stress. The patient undergoing heart surgery may be the sole supporter of his or her family, may be the primary care giver to children or elderly or other sick or disabled family members, and may have other personal responsibilities that add to the stress of a diagnosis of coronary heart disease. Unknown fears and consequences occurring from heart surgery may be the basis for the increase in post-operative depression and anxiety, and fatalism may be a contributing factor to post-operative depression and anxiety. The individual needs to feel that there has been an improvement in their quality of life following heart surgery; if this is hindered by post-operative depression, then this is not a successful intervention. It is important to intervene early in the care of the patient undergoing heart surgery to decrease the mortality and morbidity rates that accompany depression in the post-operative period.

Organization of the Dissertation

Chapters II through V will highlight the concepts discussed. Chapter II provides a detailed review of the literature on the topics of heart disease, depression, anxiety, fatalism, and various characteristics of the individual that will influence the incidence of depression and anxiety, for example, coping and social support. Chapter III discusses the methodology of the study. Chapter IV provides a discussion of the results and an analysis of the findings. Finally, Chapter V discusses the limitations of the study and the implications of the findings for the care of the cardiac surgery patient.

Chapter II

REVIEW OF THE LITERATURE

Coronary artery disease (CAD) has been associated with being the primary killer of both men and women in the past century, claiming approximately 300,000 lives annually. In the United States, CAD costs $108.9 billion each year. This figure includes the costs associated with health care and the loss of productivity (CDC, 2014). Coronary artery disease is the leading cause of mortality and morbidity in developed countries across the world. Low socioeconomic status is also an important predictor of CAD, no matter what indicator is utilized to measure socioeconomic status--education, income, wealth, or employment status. The reasons for an increase in CAD in low socioeconomic groups are their unhealthier lifestyles and decreased access to health care. Coronary artery disease involves the narrowing or total occlusion of the arteries due to plaque formation along the lining of the arteries that supply both nutrients and oxygenated blood to the cells of the heart. The symptoms of CAD include chest pain, which can occur at rest or from exertion, shortness of breath, fatigue, and sudden death. Treatment options may include a combination of medication, surgery, angioplasty, diet, and exercise. An important component of the treatment of CAD is the patient's beliefs about their illness and the treatment options. These beliefs strongly influence the physical and emotional trauma associated with the treatment of cardiac diseases and the outcomes (Hirani, Patterson, & Newman, 2008; Kuper et al., 2006).

In the context of coronary artery disease, the Review of the Literature will explore the following topics: depression related to anxiety; faith; emotions; coping; the operational use of the Transactional Model of Stress and Coping; social support; fatalism; and health-related quality of life.

Depression and Anxiety

There are more and more studies that now recognize the importance of psychological factors that directly influence the recovery of patients from medical procedures, namely, CABG. Recovery is not just limited to physical elements or medical treatments, but is very much dependent on the social and psychological attributes of the patient in determining post-operative recovery and long-term recovery. Up to one-half of post-CABG patients report some form of mood disturbance. Psychosocial factors such as depression, anxiety, and self-rated health have been reported in the literature as a cause for the onset and progression of CAD, an important predictor of morbidity and mortality in patients with coronary artery heart disease following a myocardial infarct (MI) and the post-operative recovery process following CABG surgery. Depression has been linked to prolonged hospitalizations, slower post-operative recovery, and poorer adherence to treatments designed to eliminate smoking, heavy alcohol use, physical inactivity, and difficulties with returning to normal life. The World Health Organization predicts that by the year 2020, CVD and major depression will become the two leading contributors to the global burden of disease (Khawaja, Westermeyer, Gajwani, & Feinstein, 2009). The observed correlation between depression and subsequent coronary events has increased the awareness for the need for further research and to develop guidelines for the detection and management of persons with depression following a cardiac event (Ai, Rollman, & Berger, 2010; Blumenthal,

2011; ENRICHD Investigators, 2001; Green, Nease, Campos-Outcalt, Schoof, & Jeff-Pera 2009; Lett et al., 2004; Rollman, Belnap, & Hum, 2011;Schrader et al., 2004; Schroder, 2003; Szekely et al., 2007).

Anxiety and depressive symptoms often co-exist. Patients with depressive symptoms usually exhibit anxiety symptoms, and similarly, patients with some degree of anxiety disorders will have a sub-threshold level of depressive symptoms. The combination of depressive symptoms with a degree of symptomatic anxiety has been shown to result in significant distress and may interfere with personal functioning. This combination of anxiety and depressive symptoms is known as mixed anxiety. It is uncertain why anxiety and depressive symptoms coexist, but some researchers believe this to be a natural reaction to stress. Patients with mixed anxiety, the combination of depression and anxiety, exhibit symptoms of worrying, sleep disturbances, nervous tension, fatigue, depressed mood, loss of interest in life, decreased energy, decreased concentration, and somatic symptoms (Malyszczak & Pawlowski, 2006).

Studies performed with cardiac patients from Montreal, Canada assessed the impact of depression on two groups of acute myocardial infarction (MI) patients, stable angina, patients undergoing CABG, and patients with a diagnosis of heart failure. In the follow-up evaluations, MI patients with elevated depressive symptoms had a threefold increased risk of cardiac mortality controlling for other multivariate factors. Patients with stable angina were followed for 19.4 years and found that patients with moderate to severe depression had a 69% greater risk for cardiac death and 78% greater risk for all deaths. Patients who underwent CABG surgery, followed for 12 years, were found to have a two- to three-fold increased risk of death controlling for other variables. The heart failure patients with depression were found to be a highly vulnerable group, with one in five patients having a diagnosis of clinical depression. Patients with heart failure and increased symptoms

of depression, independent of clinical symptoms, have worse outcomes, increased rates of death, or cardiovascular hospitalizations (Blumenthal, 2011). It has been observed that depression is seen both in the pre-operative and post-operative periods. As much as 47% of patients awaiting CABG surgery experience some form of depression, and 61% following surgery (Chocron et al., 2013).

Depression has been observed in varying forms of cardiovascular disease and is under-recognized. Self-reported depressive symptoms correlate with other psychological variables, including anxiety and hostility (Tully, Baker, & Knight, 2008). In congestive heart failure, patient's depression has a prevalence rate of up to 40% and has been shown to be a strong predictor of worsening heart failure symptoms. The incidence of preoperative depression associated with cardiac surgery ranges between 7.5% and 47%, and perioperative depression was reported to impact functional status, initial overall functioning, and increase mental fatigue (Ai, Rollman, & Berger, 2010). One in five patients with a diagnosis of coronary disease or who are recovering from an MI will have major depression, and another one in five will have minor depression. It has been observed that women, younger patients, and those patients who are socially isolated have an increased risk of depression following CABG. There are thoughts that depression develops not necessarily because of the actual operation, but is due to a component of poor health status leading to a life of chronic illness and decreased physical functioning. Depression is observed to be present at a threefold higher rate in cardiac patients having experienced an MI than in the general public. Kendel et al. (2010) observed an increase in depressive symptoms and systolic heart failure, predicting a decrease in physical functioning following heart surgery. There are also theories that depressive symptoms play a significant role in the development and/or progression of heart disease, immune system abnormalities, and breast cancer (Carney, Freedland, Miller, & Jaffe, 2002; Schroder, 2003). Research suggests that anxiety is

frequently observed to co-exist with depression in CAD patients in the outpatient setting, and anxiety symptoms correlate with depression (Tully, Baker, & Knight, 2008). There is an association with depressed patients being non-compliant in the context of recommended lifestyle changes and medical treatment recommendations. The caregivers for a patient who is depressed are known to have an increased risk of developing depression themselves (Shroder, 2003).

The study by Tully et al. (2008) suggested a need to broaden the approach to identifying psychological distress pre- and post-cardiac surgery since anxiety was shown to correlate closely with depression. They also noted the strong relationship between physical disease processes and negative affective states. Patients with phobic anxiety and depressive symptoms had an increased risk of arrhythmias and health behaviors, which may explain the increased mortality risk, including non-adherence to medications, and physical activity, sedentary lifestyle, and smoking.

The association between depression and cardiovascular disease is believed to predict the onset of heart disease and to influence the poor prognosis, and is influential in the development of cardiac risk factors and behaviors that include smoking, as well as non-compliance with medication and the plan of care. Cardiac surgery is a stressful event that, in turn, threatens the individual's homeostasis. Stress is a known cardiac risk factor that is closely related to anxiety and depression (Ai, Rollman, & Berger, 2010). Despite treatment options for the relief of CAD symptoms, patients with symptoms of depression have an increased risk of cardiac morbidity, including re-hospitalizations and fatal cardiac events despite a satisfactory surgical result. Previous studies highlight the importance of noting the patient's mood state in relation to cardiac surgery outcomes (Rollman, Benlap, & Hum, 2011; Tully et al., 2008). Another area of concern is the patient's belief in the treatment. Four factors related to a patient's belief in the treatment of CAD include the perceived treatment value (benefit of the treatment in controlling the disease);

treatment concerns (anxiety and worry about the treatment); decisions satisfaction (in one's own satisfaction with treatment mode); and cure (ability of treatment to remove the disease) (Hirani, Patterson, & Newman, 2008).

One study conducted in Brazil looked at anxiety and depression following coronary artery bypass surgery and utilized a nursing consultation program to decrease the incidence of the emotional disorders following CABG surgery. This study's goal was to control the economic burden and decrease the mortality rate associated with chronic diseases, namely, cardiovascular disease (CVD). It has been observed that the problems associated with CVD are one of the principal causes of prolonged hospital stays leading to increased resources being allocated for hospitalizations in Brazil. The health and economic burden of CVD has grown exponentially in recent years. In Brazil, following CABG surgery, patients go through a rehabilitation process that is described as dynamic and health-orientated. The goal of the program is to achieve an acceptable quality of life with dignity, self-esteem, and a sense of independence (Lima, de Araújo, Serafirm, & Custódio, 2010).

The study performed in Brazil found that 17%of patients having undergone heart surgery had some form of psychological disorder that persisted for one year in varying intensities post-surgery. The psychological disorders included memory deficits, problem solving difficulties, problems with attention and concentration, insomnia, depression, intellectual changes, and crying spells. This study identified the need for the healthcare professionals caring for these patients to be alert to mood changes, for example, anxiety and depression that will hinder the rehabilitation process of those patients undergoing CABG surgery. Anxiety and depression have been associated with the individual's ability to change and maintain behaviors conducive to cardiovascular health, such as adapting a healthy diet and exercise routine and cessation of smoking (Lima et al., 2010). Tully et al. (2008) found that anxiety symptoms increased all–cause mortality risk. The

symptoms of depression associated with CABG surgery are more somatic and vegetative rather than affective, meaning that sleep disturbances were the most common depressive symptom observed (Tully et al., 2008).

Thornton et al. (2005) looked at the impact of quality of life in relationship to neuropsychological deficits (NTB) following CABG. This study found that 42%of patients suffered from some form of NTB at the two-month follow-up point and 22% at the six-month follow-ups. The study utilized the Short Form-36 Quality of Life Scale. The pre-operative assessments revealed that most patients rated problems with their physical role more highly than their general mental health. Post-operative scores found an improvement in physical health, physical limitations, and energy/ vitality at both the two- and six-month follow-ups. There was no statistically significant improvement in the emotional, social roles or general mental health until the six-month follow-up. The most significant findings associated with NTB were in relation to the psychological outcomes as reported by the patients' close relatives or friends, who reported poorer HRQoL as compared to the patients themselves. Patients appear to report improved HRQoL in relation to physical status, but their mood may be affected and they may be unaware of cognitive changes that have occurred since surgery. Patients may be concerned by uncharacteristic tearful and what are referred to as sad moments in association with movies. Many times these events are reported more frequently by a spouse or loved one. Patients and spouses do not see this as a medical concern, but these changes in mood relate back to the self-image of the patient. Improved physical status and reduced cardiac morbidity are the goal of the medical community, but on the emotional and cognitive levels, the changes following surgery may well overshadow the ultimate outcome intended after cardiac surgery.

Depression is associated with post-MI angina, poor long-term psychosocial outcomes, increased risk of future mortality, and greater use of health care services.

Patients who have undergone a CABG are twice as likely to develop cardiac symptoms twelve months following surgery than not. The reasons for these negative outcomes in depressed cardiac patients are unclear. Suggestions for increased depression may be both biological and physiological in nature. Reasons may include serotonin-mediated platelet disturbances, sympathetic nervous system dysfunction, poor patient compliance to medication and treatment, and decreased motivation to health behavior changes. Studies have supported the relationship between CAD and depression and have found a disproportionately high prevalence of depression in CAD patients as compared to the general population (ENRICHD Investigators, 2001; Lett et al., 2004; Schrader et al., 2004; Szekely et al., 2007). Prior studies do agree that there is a strong correlation between psychosocial stressors and key physiological pathways involved in regulating the individual's response to illness and depression (Ai, Pargament, Appel, & Kronfol, 2010). Most of the research on depression and cardiac disease revolves around the depression following an MI. The literature does support the strong association between post-MI depression and cardiac-related mortality and further suggests that there is a direct relation between the severity of depression and the probability of death (Green et al., 2009). Numerous studies concentrating on chronic heart failure that have looked at mortality as the outcome have found that depression and social isolation were associated with a poor prognosis that is independent of biomedical risk factors (Spaderna et al., 2010).

Schroder (2003) discusses the diathesis-stress model of depression. The diathesis-stress model is defined in relation to the theories on hopelessness and helplessness. Depression is likely to occur if a depressogenic attribution style exists ("which is a global, stable, internal attributions of negative events, as well as perceived uncontrollability of these events") along with stressful events that can then trigger feelings of depression. Depression that is caused by helplessness and

hopelessness has been observed to have an increased association with the progression of chronic diseases and mortality. Depression that is associated with hopelessness is treatable with cognitive-behavioral interventions. In clinical practice utilizing the diathesis-stress model, clinicians providing comprehensive care should thus be alerted to patients with a chronic disease that is associated with chronic symptoms of stress, for example, pain, who will need a buffer variable to overcome feelings of depression.

Green et al.'s (2009) review of the literature revealed the need to identify the time course of depression, for example, whether there is a diagnosis of depression that was present prior to the cardiac event and continues on, or whether there is a recurrent event of depression that was considered to be in remission and now has reoccurred, and an incident of depression following a cardiac event with a spontaneous recovery, and finally an individual identified as having depression for one month or longer in the post-cardiac period, known as incident depression. The Evidence-based Practice Center at Johns Hopkins University has identified that the incidence of depression for one month or longer following MI ranges from 36.7% to 60%; other studies have shown an incidence of 35.45%.

Cognitive dysfunction following cardiac surgery has been frequently described in the literature. Rudolph et al. (2010) looked at the variability in measurement and definitions for postoperative cognitive dysfunction (POCD), which is defined as a decline in cognitive function. Postoperative cognitive dysfunction has been described as a common outcome following cardiac surgery and has the potential to adversely affect the individual's quality of life. The problem is that there is marked variability in the measurement instruments and definitions of POCD. Deiner and Silverstein (2009) looked at post-operative delirium and POCD and believe them to be entirely different entities. Delirium is described as a change in mental status and characterized by a reduced awareness of their environment and an alteration in

attention. Deiner and Silverstein describe POCD as a deterioration in cognition associated with surgery. Delirium requires a detection of symptoms, while POCD requires pre-operative neuropsychological testing. Delirium has a significant correlation with patient risk factors, including age, use of pre-operative narcotics, severe illness, alcohol use, visual impairment, and depressive symptoms, to name a few. These studies have looked at components during the surgical course, including cardiopulmonary bypass time, aortic cross clamp times, whether the procedure was performed on or off pump, post-operative complications, if blood products were transfused, and various medications utilized, to name a few, and the same was done in this study.

Faith and Depression

Ai, Pargament, et al. (2010) looked at the coping and faith factors in relation to depression and postoperative depression following heart surgery. This research group investigated the indirect effects of pre-operative anxiety on post-operative maladjustment. The researchers suggested that excessive cytokines, which are hormone-like messengers that facilitate communication between various components of the immune system, and stress are common in both cardiac conditions and depression. There is a suggestion that cytokines such as Interleukin-6 may have a significant impact on stress and depression in cardiac disease. Life stressors have been closely associated with immunity. Cytokines have been found to play a significant role in physical aspects of disease such as wound healing as well as the pathophysiology of various psychiatric conditions including depression (Mosovich et al., 2008). Increased levels of interleukin-6 have been associated with increased depression following total knee replacements, poor

outcomes following open heart surgery, and a decrease in cardiac function after hemorrhage related to trauma (Ai, Pargament, et al., 2010).

Studies have looked at the role religious support plays in health and well-being. Religion is seen as giving meaning to life. Spirituality and religious beliefs may affect the individual's perception of pain, symptoms, their belief in why they may have become ill, and the course of the illness. Spirituality is viewed as the framework in which individuals define their lives. Most studies have seen the relationship between religion/spirituality and health as positive. Three mechanisms that explain the positive relationship between religion and health include positive physiological and emotional reactions to religious activities, the social support that is associated with participation in religious organizations, and the belief systems established by religious organizations and their ability to promote health behaviors with the congregation (Schlundt et al., 2008). Studies have shown that in minority populations and women, spirituality and religious beliefs may pervade all aspects of everyday life, including health decisions and the mechanisms used to make these decisions. Spiritual beliefs have been associated with both negative and positive behaviors. Most studies have seen positive health behaviors associated with spirituality, possibly due to the relaxation response associated with religious practices and the social support provided by religious congregations and positive health practices associated with religious organizations. There have been some studies that showed that religious beliefs might inhibit healthy behaviors, and one way is through fatalistic beliefs (Franklin, Schlundt, & Wallston, 2008).

Hope has been seen as a protective factor against post-operative depression and has also been influential in decreasing pre-operative distress. Hope is defined as the individual's belief that they are able to do what is needed to realize their desired expectations; this involves both internal and external means to achieve their goals. Hope includes a sense that one is able to sustain the drive to achieve one's goal. In

terms of health, a sense of hope is seen as an indication of improved mental health and absence of depression in the presence of severe or chronic illness. Hope is seen as assisting patients to adjust to chronic illness and decrease depression in cancer patients. On the other hand, hopelessness is related to fatal and nonfatal CAD and decreased participation in rehabilitation programs following cardiac events (Ai, Pargament, et al., 2010).

Religious support has been observed as being similar to that of social support. Psychosocial mechanisms of religion are important for self-esteem, self-efficacy, and coping. There are similarities with compliance with medical treatments and with individuals seeking preventive care. Studies have shown that, in times of low stress, support from religious groups may increase self-esteem, increase feelings of control, and provide feelings of community with both strong and weak ties. Religious support has been observed to assist the individual in preventing stress from occurring in certain instances or to assist the individual in coping with a stressful situation or event (Idler et al., 2003). Those attending religious services have been seen to have a decreased incidence of depression and improvement in physical and mental health, lower blood pressure, improved immune systems, and overall improved quality of life. Research has shown that elderly populations who attend religious services have improved physical and mental health and decreased mortality rates (Schlundt et al., 2008).

Studies have looked at the use of prayer in decreasing the negative outcomes of depression and anxiety following heart surgery. Studies of older adults who have undergone heart surgery found that prayer in determining postoperative depression was subjective and influenced by marital status, hope, and religiousness (Ai, Ladd, et al., 2010). Other studies have documented the stress-exacerbating effects of spiritual struggle on health outcomes. Traditional religiousness or spirituality, also called faith matters, has been seen as a positive form of coping

when dealing with illness or a stressful life event (Tully et al., 2009). But, other studies have seen some forms of spirituality that have been associated with a decrease in physical and psychological health. At times spirituality has been seen as a conflict for the individual (Ai, Ladd, et al.., 2010).

Research on spirituality and religiosity, in relation to health, reveals that a large number of Americans, in particular elderly Americans, believe religion may be an important component of their lives. In the United States, 59% of the population and 73% of individuals over the age of 65 attest to the fact that religion is very important to them. Fifty-three percent of older Americans and 43% of adults overall attend weekly services, and over 50% of Americans pray at least once a day. Large numbers of Americans believe there is a connection between religion and health and believe that God will answer prayers for healing and incurable diseases. Interestingly, 64% of individuals who pray think that their doctors should pray with the patient upon request (Idler et al., 2003). Research on faith matters reveals that within the general population, faith matters are associated with a significant decrease in mortality for at-risk CVD populations as compared to those with a diagnosis of cancer. One needs to look beyond the traditional idea of religion that is associated with religious denominations, churches, synagogues, and mosques. Today, the landscape of American religion includes the traditional forms of religion and a secular spirituality. Since the 1960s, many Americans define themselves as spiritual and not necessarily religious. There has been a decline in those who are affiliated with a formal religion, thereby leading to a need to address religion in a broader sense and look at the faith-health connection (Ai et al., 2009).

Studies on depression associated with CABG surgery have looked at faith factors, physical activity, levels of reported pain, and the role of social support following heart surgery (Ai et al., 2009;Idler et al., 2003). Researchers are now looking into the role of fatalism in health. Fatalistic beliefs are associated with

negative health outcomes in cancer, cardiovascular disease, diabetes, and extreme stress. Fatalism has been identified as being disproportionately more prevalent in low income and minority populations (Shen et al., 2009).

Other factors relating to poor outcomes may be rooted in the health disparities associated with various cultural groups, for example, the Hispanic population. Coronary heart disease is the leading cause of death among all Hispanics regardless of their gender or country of origin. It was estimated in 2000 that 24% of all Hispanic deaths could be attributed to coronary artery disease. There have been significant decreases in heart disease mortality rates, but in the United States it is estimated that 20% of all adult deaths can be attributed to coronary artery disease. The American Heart Association in 2002 cites this devastating statistic and projects its costs to the United States economy at over $111 billion per year (Urizar & Sears, 2006).

Cotter and Lachman (2010) studied the older population and the impact physical fitness has on the psychosocial and behavioral components of health. The aging process is associated with an increased risk of developing chronic diseases that can lead to physical and financial burdens on the elderly. The elderly are faced with the idea of losing a sense of control over their lives. Research by Lachman (2004) and Ruthig, Chipperfield, Perry, Newall, and Swift (2007) has shown that maintaining a sense of control in the older population leads to improved overall physical health exhibited by a decrease in the number of acute and chronic diseases, improved physical functioning, a higher self-rated physical status, and better psychological health, which is seen as lower levels of depression, higher quality of life,, and less negative emotions. A low sense of control in the elderly is associated with low motivation for change or action leading to fewer health-promoting behaviors, in turn leading to a negative effect on health (Cotter & Lachman, 2010).

Further studies have observed a correlation between psychosocial factors, including depression and low social support, and the development, intensity, and prognosis of coronary heart disease. Studies on coronary heart disease have observed 20-40% of these patients exhibiting depressive symptoms, and of that group, 18% met the criteria for major depression. Approximately 42% of cardiac patients who exhibit depressive symptoms will go on to develop major depression (Urizar & Sears, 2006).

Emotions, Coping, and Depression

Emotions, especially negative emotions, play a significant role in the recovery of patients who have had an MI. It has been recognized that the rate of depression may range from 17 to 27% in hospitalized patients with coronary heart disease. Depressive symptoms have often been under-recognized. Depression is associated with increased rates of mortality and morbidity in both men and women (Brink, Persson, & Karlson, 2009; Norris et al., 2010). Issues that have been addressed in relation to depression following a diagnosis of heart disease are gender differences, coping styles, and social support (Koivula et al., 2002). Negative emotions such as anger, anxiety and depression, which lead to general distress and irritability, have been observed to be key factors that are associated with coronary heart disease risk. These three negative emotions have been associated in various ways with coronary artery disease. Anxiety was seen to be predictive of difficult coronary heart disease outcomes and fatal and non-fatal myocardial infarction, where anger had a stronger association to angina pectoris. Depression, on the other hand, had an independent association with angina and overall coronary heart disease (Kubzansky et al., 2006).

Recent research has been looking at factors that help protect the individual from co-morbid heart disease and mental health symptoms. Behavioral scientists

have related optimism and self-efficacy to positive mental health and improved outcomes with cardiovascular disease. Optimistic patients had fewer hospitalizations following an MI, faster rates of recovery, and better quality of life, whereas pessimism was considered a predictor of death. Positive emotions can lessen the physiological reaction that is evoked by negative emotions and may alter the damaging effects that negative emotions have on the cardiovascular system. Other studies looked at adaptive coping measures and hope. Hope is seen as a goal-oriented and action-determined expectation that is indicative of stable and self-serving beliefs about the self and the future. Hope is seen to incorporate emotional and motivational mechanisms as compared to optimism (Ai, Rollman, & Berger, 2010; Versteeg et al., 2009).

Coping is an essential element in research on adaptation and health and involves the individual's evaluation and management of stressful situations. According to the Transactional Model of Stress and Coping, there are actual strategies used to mediate primary and secondary appraisals. The strategies include problem management or problem-focused coping and emotion-focused coping efforts. Problem management or problem–focused coping involves strategies directed at changing the stressful situation. Examples are active coping, problem solving, and information seeking. Emotion-focused coping efforts are efforts directed at changing the way one thinks or feels about a stressful situation; examples are seeking social support and venting feelings, avoidance, and denial. According to the Transactional Model, problem-focused coping strategies are utilized for stressors that are changeable, and emotion-focused strategies are most adaptive when the stressor is unchangeable or when this strategy is used in conjunction with problem–focused coping strategies (Glanz, Rimer, & Viswanath, 2008).

Research reveals that patients having an admission for a first-time cardiac event tend to view their illness as less threatening and utilize different coping

strategies compared to patients with multiple cardiac admissions. It has also been hypothesized that patients with a strong sense of internal coping capacity tend to be able to adapt more readily to stressful situations such as an MI (Brink, Karlson, & Hallberg, 2002).

A person's belief in their own self-efficacy is an indicator of the person's ability to perform or change certain behaviors. When the perceived severity of the stressors is highly threatening, a person is likely to use disengaging strategies such as distancing, cognitive avoidance (such as "not thinking about it"), behavioral avoidance, distraction, and denial. These behaviors shift the attention away from the stressor. This behavior can lead to increased stress over time and keep the person from developing healthier coping strategies (Glanz et al., 2008; refer to Figure 1).

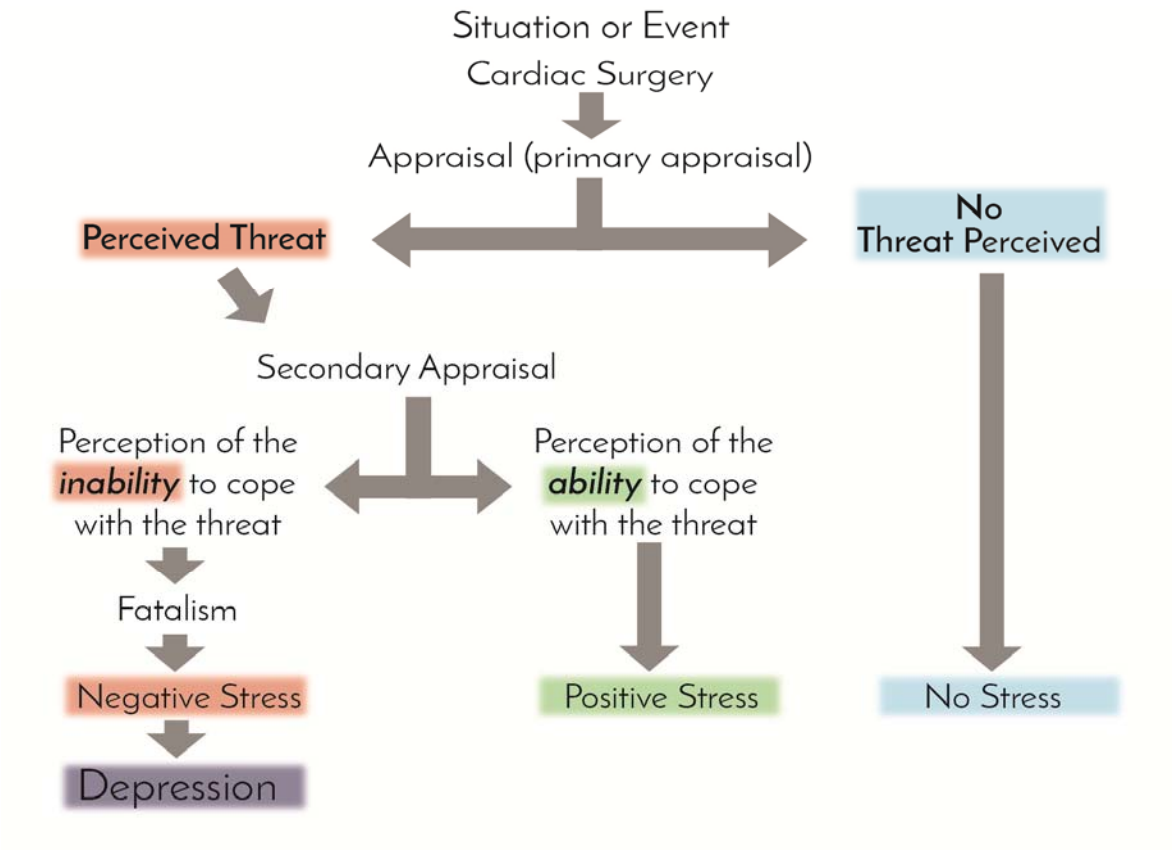

Figure 1. The Operational Use of the Transactional Model of Stress and Coping in This Study (Glanz, Rimer, &Viswabatg, 2008; Lazarus & Folkman, 1984)

If a stressor is perceived as controllable, the person may have favorable self-efficacy beliefs and may therefore look to engaging positive coping strategies such as active coping, planning, problem solving, information seeking, and utilizing social support (Glanz et al., 2008).

There is research that describes the relationship between cognitive coping and the individual's adjustment of life goals following an MI that may influence general well-being and the incidence of post MI depression. There is evidence that supports the relationship of depression to ongoing psychological distress related to chronic diseases and MI and maladaptive coping. An important coping determinant observed in patients with stressful health-related events relates to the nature of the cognitive coping strategies employed. Cognitive coping, which is also referred to as cognitive emotion regulations strategies, is defined as those conscious mental strategies used by the individual to handle the intake of emotionally arousing information. Examples of cognitive coping strategies include rumination, catastrophizing, and goal adjustment (Garnefski et al., 2009).

Rumination is when an individual thinks repetitively and inactively about the negative feelings and thoughts about one's situation or disease process. Ruminative thinking is associated with a diminished sense of well-being, especially in patients with chronic diseases. A catastrophizing cognitive strategy is an exaggeration of the perceived terror and experience. Catastrophizing coping strategy is related to maladaptation, emotional distress, and depression and is most often observed in patients with chronic pain and cardiovascular disease. Goal adjustment strategies occur when there is a change in physical functioning and lifestyle changes that may be associated with various health conditions such as an MI (Garnefski et al., 2009). The self-regulatory theory describes the importance of personal goals (Garnefski et al., 2009). Personal goals are seen in various aspects of the individual's life from health, work, leisure activities, personal care, and social relationships. Personal

goals have been seen to give people a sense of meaning and identity that is vital for psychological well-being. Studies have shown that patients who have had an MI experience a variety of goal disturbances and the extent of goal disturbances has a strong correlation to depressive symptomatology. An important point is that goals are rated by the individual as important, and having to extricate oneself from high-order personal goals such as autonomy can prove more difficult than extricating oneself from a lower-level goal such as exercising weekly (Garnefski et al., 2009).

On the other hand, positive reappraisal occurs when the patient attaches a positive meaning to the situation in terms of personal growth. The use of positive coping strategies decreases the incidence of depression in patients who have had an MI, even though the results of this research were not strong (Garnefski et al., 2009).

Coping competence is based on the helplessness and hopelessness theories of depression. Coping competence is a one-dimensional characteristic embodying one to cope well, irrespective of the individual's method or coping style utilized to adapt to a difficult situation. The most significant component of coping competence is the ability to offer a resistance to a depressogenic attributional style, which was discussed earlier, and associated motivational deficits in times of stress and crisis. Coping competence adds to the scope of existing personal resource factors with enhancements. One attribute is the idea of being action-oriented. Examples of an action-oriented individual include the concepts of self-efficacy and internal control beliefs. The individual asserts himself or herself and mobilizes their ability to successfully perform behaviors or manipulate situations based on the individual's actions. Studies have shown evidence for action-oriented factors to improve health behaviors, recovery, and/or adaptation to the situation. In situations where the disease is uncontrollable, progressing, or where a state of permanent stress prevails, the action orientation approach may not be as beneficial as other coping methods (Schroder, 2004).

In situations where there is a strong potential for depression among the chronically ill and it is necessary to adapt physically and emotionally to the disease, dispositional optimism may be a stronger predictor of depression than other factors. Dispositional optimism is a generalized belief that looks at the positive rather than the negative aspects of a situation. Dispositional optimism is highly predictive of surgical stress, recovery, physical functioning, symptomatic stress, re-adjustment back to one's normal lifestyle, social satisfaction, and overall quality of life with chronic disease patients (Schroder, 2004).

Major differences between coping competence and dispositional optimism, self-efficacy beliefs, and locus of control are contingent on generalized expectations. Dispositional optimism and self-efficacy are based on positive beliefs. Self-efficacy is limited to the inner self and a person's belief in their ability to make changes and achieve their ultimate goals. On the other hand, optimism looks at the glass as being half full; no matter what the question is, the outcomes can be based on good luck or religion. This implies trust in one's social support network, self-reliance, and other various forms of support. The concept of health locus of control is based on the individual's belief in their internal and external control of their health (Schroder, 2004).

Social Support

Social support is defined as having three components--emotional, informational, and tangible--and these are provided by a social network and received by an individual. A social network can include family, friends, neighbors, co-workers, or other close people and professionals, for example, nurses that the individual feels are close to them. Social support plays an important part in the preoperative period for patients awaiting heart surgery. Social support is based on

the amount and the intensity of support the patient will receive. To elaborate on this point, a patient may have many children and siblings, but they live a distance away, so their support amount and intensity are considered low. The social network is a system of people with whom the patient has regular contact. Spousal support is considered the best source of emotional support due to the emotional bond. A weak source of social support is better for information and substantial aid (Koivula et al., 2002).

Low social support or social isolation is associated with high anxiety. There has been an association between patient education and social support prior to heart surgery. The patients who perceive the information and the support they received as good or excellent have been shown to have lower fear and anxiety prior to surgery. Improved cardiac recovery is associated with the number of people in the patient's social network (Koivula et al., 2002). The Enhancing Recovery in Coronary Heart Disease (ENRICHD), which looked at depression and low social support following post-myocardial infarction (MI), has shown that low social support has been linked to an increase in mortality and morbidity independent of disease severity with patients with a diagnosis of CAD or MI. Following an MI, men who viewed their situation as being low in social support and high in life stress had a four times greater risk of mortality. Patients who were married at the time of the MI were shown to have a significantly lower incidence of dying during the hospitalization and in the initial follow-up period than their unmarried peers. In the elderly, both men and women who perceived themselves as having emotional support prior to an MI found that this was the most powerful predictor of survival (ENRICHD, 2001; Urizar & Sears, 2006).

Aggarwal et al. (2010) looked at the importance of social support in relation to adherence to a cardiac diet in a cardiovascular disease lifestyle intervention trial. This study found that ethnically diverse populations and low social support were

independent predictors of a lack of dietary adherence in a trial lasting one year in a lifestyle intervention for families and patients with cardiac disease. An important finding in relation to social support was the patient's perception of social support. Feeling loved, cared about, and valued are more important than just the presence of a spouse, partner, or significant other. Close relationships that are considered social support are generally thought to be favorable in terms of cardiac risk, but negative relationships may increase the risk of cardiovascular disease. Married couples whose marriage exhibits poor marital qualities have an increased risk coronary events.

The social environment for individuals has an important impact on heath and general well-being. Social relationships are identified as social support that has a positive impact on the individual and social strain that includes the negative aspects of relationships. Social support has a positive relationship with physical and psychological well-being, which encourages positive health behaviors, and the opposite is true with social strain (Cotter & Lachman, 2010).

Social isolation is observed more with elderly women, in part, because they naturally live longer than men, and this may explain why women with coronary heart disease have higher rates of depression when controlling for other variables, including age, severity of their disease, and other co-morbidities. In relation to women, Hispanic women reported less social support than Hispanic men (Urizar & Sears, 2006).

Fatalism

Fatalism has been seen to have a role in explaining health behavior, both as an independent and dependent variable. Fatalistic beliefs have been associated with a decrease in intention to change behavior leading to negative health outcomes in

relation to cancer, cardiovascular disease, coping with extreme stress, smoking, and HIV. Fatalism is perceived as a lack of control over external events. Those with fatalistic behaviors believe that luck, destiny, and predetermination play a role in their disease process. Fatalistic individuals feel a sense of powerlessness, hopelessness, and meaninglessness when diagnosed with a health problem (Shen et al., 2009). Definitions on fatalism are widespread and can differ by study, context, method, and measurement (Hall et al., 2008).

Fatalism has been studied heavily in relation to a diagnosis of cancer and how various ethnic groups respond to the diagnosis of cancer and less so with cardiac disease. There is a growing interest to identify culturally based factors, including attitudes, beliefs, values, and fatalistic ideas, that account for the differences in cancer screening. In relation to cancer, fatalistic people believe a diagnosis of cancer is a death sentence that in turn then becomes a deterrent to preventive cancer screening. Fatalism has now been identified as an independent, culturally specific variable that affects individuals seeking health care. Research on cancer fatalism suggests that with Latinos and African Americans, fatalism is very much a deterrent to cancer screening. A study of colorectal cancer screening among elderly African Americans found that fatalism was the only significant predictor of participation in fecal occult blood testing when controlling for other variables, including age, education, and income. Similar results were seen regarding breast cancer screening controlling for the same variables, in that poorer, less educated individuals with increased fatalistic scores contributed to the sharp decline in screening by race (Florez et al., 2009; Hall et al., 2008).

The initial studies on fatalism utilized the Powe Fatalism Inventory (PFI), which is a 15-item instrument. There have been some concerns about the limitations of the PFI, since it was original performed only on African Americans. The PFI is based on four philosophical components: fear, predetermination,

pessimism and eventual death. Concerns arose from the generalizability to other cultures, especially those of Chinese heritage. Then there was the component of fear and how it should not be a sub-division, since fatalism is cognitive in nature and fear is an affect. Cognition and affect are two distinctly different constructs, and therefore it would be more appropriate to conceptualize fear as a consequence of fatalism (Shen et al., 2009). A new scale was developed by Shen et al. (2009) that measures fatalism using a combination of predetermination, pessimism, and luck.

Numerous studies have looked at the combination of religiosity, spirituality, and cancer fatalistic beliefs. A study by Gullatte, Brawley, Kinney, Powe, and Mooney (2010) looked at these variables in relation to African American women and breast cancer. African American women have an increased incidence of presenting with an initial diagnosis of breast cancer at a later stage as compared to other racial or ethnic groups, even though breast cancer is the most common cancer among African American women. The overall incidence of breast cancer is 12% lower in African American women as compared to Caucasian women, but when adding the variable of being under the age of 40, African American women have an increased incidence. Statistics from 2007 revealed that there are an estimated 19,000 new cases of breast cancer and nearly 6,000 deaths that can be attributed to breast cancer in African Americans.

Factors contributing to late-stage diagnosis and seeking medical care for breast cancer in African American women include failure to disclose breast symptoms, lower socioeconomic status, having never been married, being uninsured, and lack of transportation. Other predictors for delaying the seeking of medical care leading to late-stage diagnosis of breast cancer include non-adherence to screening guidelines, fear, denial, poor education about breast cancer, alternative methods of care, and religious, spiritual, and cancer fatalism beliefs (Gullatte et al., 2010). African American women have been seen as more religious than Caucasian

women in various regions of the United States. In comparing medical treatments to religious beliefs in a higher power and the belief in the power of prayer and the laying on of hands, African American women have a greater tendency toward the latter, in turn leading to late-stage diagnosis of breast cancer. But in contrast, for minor illnesses, religion and spirituality have a positive correlation with seeking medical care among African American women (Gullatte et al., 2010).

Peek, Sayad, and Markwardt (2008) studied African American women and the role that fear and fatalism have on breast cancer screening. African American women have the highest risk of breast cancer death rates of all racial and ethnic groups in the United States, but have much lower mammogram rates than the general population. The reasons for this disparity are multifactoral. Reasons for this disparity include lack of insurance, poor access to health care, lower socioeconomic status, transportation, and childcare. Other less studied causes for low screening rates include fear, cultural attitudes, beliefs, and fatalism. Spirituality and religion are major determinants of fatalism as seen in women who turn their situation over to God, leading to a loss of control over their health.

Peek et al. (2008) revealed that fear stemmed not just from fear of the unknown but also from fear and mistrust in the health care system and clinicians. Fear is also based on a lack of knowledge and education about the screening process for breast cancer, namely, mammograms. Another major deterrent to obtaining a mammogram was the psychological response associated with negative feelings and fear, which are denial and repression. These feelings are very common, especially when the individual feels powerless to control her situation. Denial is oftentimes seen as a coping mechanism to deal with the fear associated with a diagnosis of cancer.

A study by Hall et al. (2008) revealed that cancer fatalism is grounded in the idea that a diagnosis of cancer is a self-fulfilling prophecy, which in turn leads to

late-stage diagnosis, limited treatment options, and ultimately poor outcomes. The research further elaborated on the relationship between a "web of poverty and perceptions of fatalism," meaning that individuals of lower socioeconomic status have a lower level of trust in the health care system than individuals of higher socioeconomic status. This study elaborated on the historical social oppression of African Americans--stemming from the time of slavery, discrimination, segregation, and poverty--that is woven into the social makeup of their culture. These injustices have possibly led this group to have a detrimental experience in accessing health care, leading to a mistrust of the overall health care system and a decreased level of knowledge of the importance of screening and treatment for cancer.

In order to understand cancer fatalism, more researchers have looked to assess the predictors of fatalistic attitudes and beliefs. Researchers have found that cancer fatalism has a strong correlation with minority status, older age, less education, and lower socioeconomic status. Other important factors associated with cancer fatalism include personal health care history, the individual's perception of the health care industry, knowledge about cancer screening and treatment, and being African American--and more so an African American female, as opposed to a male (Gullatte et al., 2010; Hall et al., 2008). Individuals with a fatalistic view of cancer consider a diagnosis of cancer to be a death sentence.

Fatalism has been identified as a parameter of concern when looking at health promotion in developing countries. Dixey (1999) was investigating an epidemiological transition in developing countries. In Nigeria, a relative decline in mortality and morbidity associated with infectious diseases was observed, but a new health concern was the importance of fatal and non-fatal injuries associated with road traffic accidents. In Nigeria, deaths by accidents now far exceed those from communicable diseases. When addressing this health care need, Dixey found that many African cultures have beliefs that particular diseases have a simple

natural cause and others are caused by supernatural causes. Supernatural causes are due to forces outside the individual that are predetermined. Concepts of outside forces are the basis of various African philosophies on everyday life that provide an explanation for misfortunes, and in turn the individual believes there is no need to take precautions. Dixey identifies the need to identify traditional beliefs in stressful times. It appears one that freeing the individual from the responsibility for human failure or success leads to the idea that the individual is guiltless or dependent, which is known to cause psychological disturbances. Lack of knowledge about the causation of injuries in conjunction with low levels of education has led to an increase in fatalistic beliefs that injuries are just acts of God (Dixey, 1999).

Franklin, Schlundt, and Wallston (2008) looked at the relationship of religious beliefs and fatalism among an African American faith community. These researchers were looking at the barriers to improving health behaviors among African Americans. The researchers observed the enormous impact the "Black Church" has on its congregation. This study supported their hypothesis that African Americans are more likely to support fatalistic beliefs compared to Caucasians. African Americans perceive religious fatalism as a belief system more so than other ethnic groups. This belief therefore supports research that emphasizes the importance of cross-cultural differences in religion/health research (Franklin et al., 2008).

The driving demographic variables behind fatalism were education and income. Lower education and lower socioeconomic status are associated with increased degrees of fatalism. Another contributing factor to higher degrees of fatalism beyond income and education, as described by Shen et al. (2009), was race. Hispanics and African Americans were seen as the most fatalistic of all ethnic groups. In the study by Shen et al., individuals from various geographic regions of the United States did not differ in their levels of fatalism. From this observation, Shen et al. concluded that income and education, rather than race or ethnicity,

should be the foundation for interventions intended at reducing fatalism and improving behavioral changes.

Prior studies, including the ENRICHD study, have not been able to provide clear evidence on the usefulness of physiological or pharmacological interventions with depressive MI patients to reduce the incidence or improve treatment of depressive symptoms or cardiac events. It is clear that this is a real problem that is poorly screened for and identified, leading to an increased risk of adverse health outcomes (Schrader et al., 2004).

Health-related Quality of Life

Health-related quality of life (HRQoL) is not a new concept in health care delivery. Since 1993, this has become a benchmark for measuring how individuals perceive the impact of their health status on their lives. HRQoL is a multi-dimensional concept that encompasses the physical, mental, emotional, and social function of individuals. HRQoL looks beyond so called illness and causes of death to the impact of the individual's health status on the overall quality and well-being of their life. Addressing well-being is to assess the positive aspects of the individual's life and their satisfaction with their life (US Department of Health and Human Services, 2010).

Patient satisfaction is not just a measure of how a facility is maintained and cleaned; if the meals are served hot and are tasteful, it now includes a self–reported health status. This is an outcome measure that hospitals are putting greater emphasis on today and very much so in relation to cardiac disease. Patients are not just concerned that the hospital they have chosen provides the state of the art care ,but they expect to have a reasonably improved quality of life. Health status is associated with increased mortality and re-hospitalizations in patients with CAD

and chronic heart failure. Components of health status include positive or negative affect. Negative affect includes emotions and feelings of depression and anxiety and is strongly associated with perceived stress and health complaints. Positive affect is described as feelings of joy, activity, and happiness and has an increased relationship to social activity and exercise. Positive affect is not just the opposite of negative affect, and negative and positive affects may be experienced concurrently. Studies that have looked at the influence of positive and negative affect that occurs simultaneously in CAD patients have observed that a positive affect has moderated the harmful effects of a depressed affect on health outcomes. Most patients will not just describe themselves in terms of negative emotions alone. The initial results of the few studies on positive and negative affect reveal that both affects uniquely contribute to health status outcomes in CAD patients, but the findings are independently associated with health status (Versteeg et al., 2009). Brink, Karlson, and Hallberg's (2002) study looking at HRQoL five months following an MI looked at themes of coping, including self-trust, problem-focusation, acceptance, social trust, fatalism, resignation, and protest. Their findings revealed that fatalism and protest had a negative correlation with both mental and physical components of the individual, and increased degrees of fatalism and protest were associated with decreased HRQoL.

Versteeg et al. (2009) found that the most important indicator of 12-month overall health status was baseline health status followed by positive affect and age. The one group to show a difference was the elderly. The elderly as a group showed a stronger association between health status and positive affect. This study investigated the influence of both types of affect on health status domains, including physical, social, and mental, and pain/discomfort. At the 12-month follow-up, patients who experienced problems in each of the health status domains were those patients reporting a high negative affect as opposed to those reporting a low

negative affect at baseline. Patients who reported low baseline scores on positive affect had with problems with self-care and usual activities. These results support the notion that positive and negative affects are not just mere opposites, which leads to the importance of a separate measure for both positive and negative affects. The final conclusion was that low positive affect was associated with impaired health status above and beyond negative affect. It is important to note that a positive affect may have a protective role for health status in light of a negative affect (Versteeg et al., 2009). Tully et al. (2008) suggest that psycho-education in regard to anxiety and mood be incorporated into cardiac rehabilitation. A reduction of negative emotions may come from individually tailored interventions.

Some researchers have studied patients' profiles based on known symptom clusters to identify patients that would impact post-operative functioning. Symptom clustering in medicine has been used for over 300 years and refers to clustering symptoms as concurrent and related symptoms that may or may not have a common etiology (Zimmerman et al., 2010). Many studies conducted on the symptoms associated with cardiac patients have been studied as individual symptoms when, in actuality, symptoms occur in clusters, for example, preoperative chest pain, angina, and shortness of breath. In the post-operative period, symptoms of pain, fatigue, trouble sleeping, appetite problems, depression, anxiety, palpitations, and shortness of breath may occur and greatly influence post-operative recovery and quality of life. Abbott, Barnason, and Zimmerman (2010) identified influential factors that impact symptoms and psychosocial functioning following cardiac surgery. These factors include functional capacity, self-efficacy, gender, level of education, co-morbidities, baseline level of function, and marital status.

Zimmerman et al. (2010) looked at patient recovery following CABG in relation to profiling patient symptoms at the time of hospital discharge to identify those patients at risk for poor physical functioning and physical activity at 6 weeks,

3 months, and 6 months following surgery. Zimmerman et al.'s study adds to improving clinical practice. The researchers did state that regardless of the symptom clusters identified, patient functioning did improve over time. The one patient group that was identified who could possibly benefit the most from this form of evaluation are the elderly due to their increased co-morbidities, numerous medications, and recurrent hospitalizations for cardiac-related problems. Basically symptom clustering can be used as a screening tool to determine the symptom burden profile prior to discharge in order to provide additional therapies or interventions to improve overall function following heart surgery (Zimmerman et al., 2010). Once again, as seen by Versteeg et al. (2009), it is found that the elderly appear to stand out as a group that requires a varied assessment of their care to achieve an improved quality of life.

Summary

The human heart is closely associated with the individual's emotions, liveliness, and the ability to embrace life. Culture, music, and literature refer often to the heart as the core of the individual and how closely related the heart is to the very being of the individual; therefore, it seems only natural that violating this precious organ by operating on it can lead to feelings of depression. When the heart is operated on, not only is skin disrupted, but also the skeleton and muscles must be disrupted to finally get to the core of the individual, the heart. With no understanding of anatomy and physiology, the individual patient is well aware that having heart surgery is not a minor undertaking. Patients with cardiac disease and depression may exhibit many of the same symptoms, such as loss of appetite, sleeplessness, and loss of energy. Developing depression is a real and debilitating problem following heart surgery. Characteristics that appear to have a significant

role in the development of postoperative depression include fatalism, social support, and the individual's association with religion, spirituality, prayer, and emotions (Ai, Ladd, et al., 2010; Dixey, 1999; Koivula et al., 2002; Schlundt et al., 2008).

Identifying the individual's coping abilities and strategies may assist the health care team in developing a plan of care to assist the patient, family, or social support system of the patient in attaining optimum health outcomes. Identifying patients who are at increased risk for developing depression due to a weak or negative social support system or determinants to health care due to low socioeconomic status is essential to providing the patient with the support system that may be developed by community agencies such as nursing, physical therapy, clergy, and Meals-on-Wheels, to name a few, in order to have an improved quality of life.

Identifying individuals who are at greater risk of developing depression following heart surgery is beneficial on numerous levels, including self-reported quality of life, risk of future cardiac events, burden of chronic disease to the individual and the population as a whole, and the financial impact of depression associated with cardiac surgery.

Chapter III

METHODOLOGY

This chapter describes the research design of the study. It includes a description of the study sample, the measures, the recruitment procedures, the study protocol, the instruments that were utilized in the study, and the procedures for data collection and analysis. Ethical considerations are discussed.

The purpose of this study was to explore selected characteristics of an individual, including fatalism, and the impact that an increased level of fatalism may have on individuals who have undergone heart surgery and who go on to develop post-operative depression. The study also looked at socio-demographic factors and the correlation they had on post-operative depression following cardiac surgery.

Research Design

This research project employed a prospective series research design with baseline and follow-up surveys that gathered quantitative information on patients undergoing heart surgery, including measuring their level of depression and fatalism. This study addressed the following research questions:

1. What is the incidence of post-operative depression in the sample?
2. Do individuals who are fatalistic have an increased risk of developing post-operative depression from cardiac surgery?
3. Are socio-demographic factors predictive of post-operative depression?

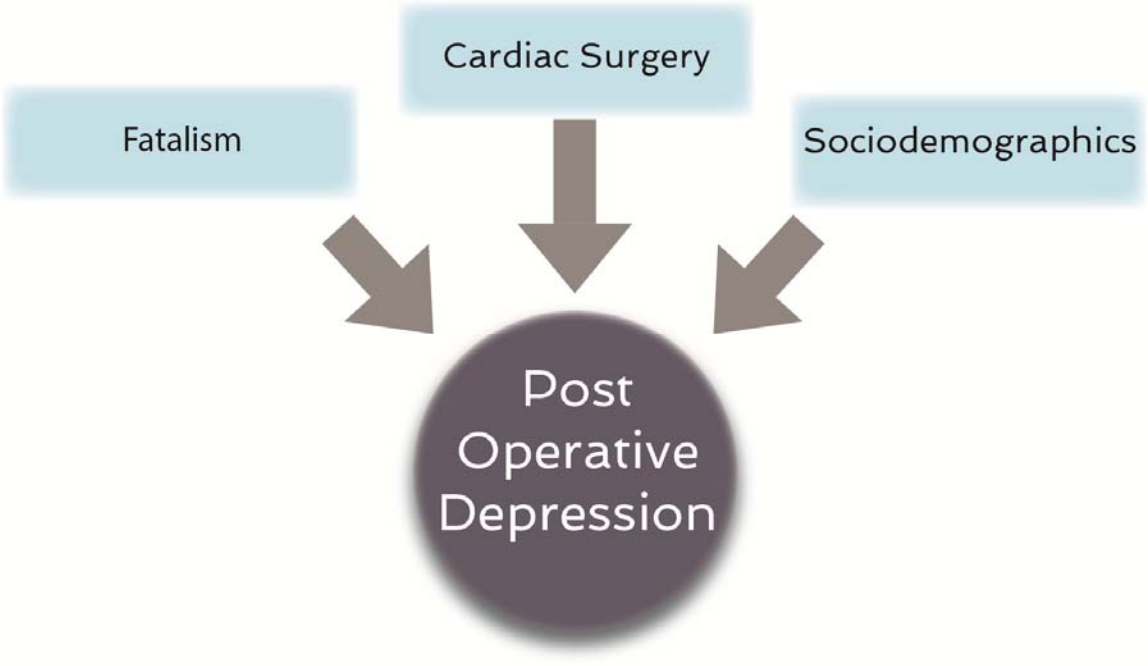

Figure 2. The Hypothesized Relationship between Depression, Fatalism, and Cardiac Surgery as seen in the Depression Model

Setting, Participants, and Sample

The study sample comprised patients who underwent heart surgery, namely, CABG and or valve repair/replacement, at a single center in a large inner-city cardiac program. This center serves a diverse community that is composed of a large group of patients who are insured by Medicaid, managed care insurance, or private insurance, and a large population of uninsured individuals who may or may not have a legal right to be in this country. This population has many individuals who experience numerous health disparities due to their low socioeconomic status, unemployment status, language barriers, housing concerns, poor access to primary care, and low levels of education.

This cardiac program performs approximately 230 cardiac surgeries yearly. The types of surgeries that are considered cardiac surgeries are coronary artery

bypass surgery, endarterectomy and open angioplasty; cardiac valve repair or replacement- aortic, mitral, tricuspid and pulmonic, repair of aortic and ventricular aneurysms and aortic dissections; MAZE procedures and septal myomectomy and the removal of cardiac tumors. Only patients who had cardiac surgery bypass grafting and/or valve repair/replacement were asked to participate in the study. Patients who spoke a language other than English were provided an interpreter, and if an interpreter was not available, they were excluded from enrollment in the study. This was a purposeful sample from those patients awaiting heart surgery at Mt. Sinai-St. Luke's.

Inclusion Criteria

1. The participants were patients undergoing first time cardiac surgery at a single center in a large inner-city cardiac program who required coronary artery bypass grafting and/or valve repair/replacement.
2. Only those patients who provided informed consent were included.
3. Participants were eligible if they spoke English, Spanish, or a language where an interpreter could be provided.
4. Patients with all educational levels were accepted. Patients older than 40 years of age were included.
5. Patients with varied socioeconomic levels were invited to participate.
6. Patients who scored less or equal to 11 on the baseline PHQ-9 scale.

Exclusion Criteria

1. History of treatment of depression within past five years or score greater than 11 on the PHQ-9.
2. Patients under 40 years of age.
3. Patients not being operated on at the study hospital site.
4. If an appropriate interpreter could not be found.

5. Patients undergoing all other types of cardiac surgery.
6. Patients presenting for re-operations for cardiac surgery.

All subjects were required to give informed consent (see Appendices A & B). Participation was strictly voluntary, and all participants were informed that they might withdraw at any time during the study without repercussions or a change in their care.

Measures

The instruments for this study included a demographic survey, a fatalism scale, and the Patient Health Questionnaire (PHQ9). The instruments were completed by paper and pencil method, and included the following:

1. Demographic Survey (Appendix D)
2. Fatalism Scale (Appendix E)
3. Patient Health Questionnaire (PHQ9) (Appendix F)
4. Euroscore (Appendix G)
5. Consensus Criteria (Appendix H)
6. Medical and Intra-operative Data Collection Sheet (Appendix I)

Demographic Survey

The Demographic Survey was a 13-item survey designed to provide background information on the participants, including age, race, ethnicity, socioeconomic status, housing, education level, social support, and religion. The Demographic Survey was derived in part from the University of Wisconsin-Coorperative Extension Program Development and Evaluation (2004) and www.surveymonkey.com.

Fatalism Scale

The Fatalism Scale was developed and tested by Shen et al. (2009). The overall reliability of the Fatalism Scale was Cronbach's α of 0.88 as observed by Shen et al. Three external variables, one potential cause, and two possible outcomes of fatalism were utilized to investigate the construct validity of the scale and demonstrated evidence for the construct validity of the fatalism scale (Shen et al., 2009). The 20-item scale is scored on a Likert scale (1 =strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 =strongly agree). The total scores on the Fatalism Scale range from 20 to 100, or low to high fatalism.

Patient Health Questionnaire

The PHQ-9 is a brief instrument that can be completed within minutes and quickly scored by clinicians or researchers. The PHQ-9 can be administered frequently to reflect improvement or worsening depression. A PHQ-9 score of $\geq$10 has a sensitivity of 88% and a specificity of 88% for major depressive symptoms. Scores of 5, 10, 15, and 20 represent mild, moderate, moderately severe, and severe depressive symptoms (Kroenke, Spitzer, & Williams, 2001). It was determined that a cutoff score of 11 would be utilized for this study. In a study conducted by Manea, Gilbody, and McMillan (2012), there were no significant differences in the diagnostic properties of the PHQ-9 utilizing cut-off scores between 8-11. Manea et al. pooled the sensitivity and specificity results of 14 studies and found that 11 were the best trade-off between sensitivity and specificity. It is important to note that there were patients that would be classified as having mild to moderate depressive symptoms at baseline as scored by the PHQ-9. This is supported by Manea et al. It was just that the patient did not report having been treated for depression within the last 5 years and carried a clinical diagnosis of depression as reported by the patient during their history and physical prior to surgery and screening for inclusion in the study.

Clinical Factors

A range of medical factors on each subject was also recorded, including a diagnosis of hypertension, diabetes, and peripheral vascular disease (Appendix H). A Euroscore was calculated. The Euroscore stands for European System for Cardiac Operative Risk Evaluation. This is a measure for calculating predictive operative mortality for patients undergoing cardiac surgery (Appendix F). Additional intra-operative characteristics include the type of surgery, number of grafted vessels, cardiopulmonary bypass (CPB), and aortic cross clamp time. Noted was the need for an intra-aortic balloon pump, if the patient required blood products, duration of intensive care unit stay, overall length of hospital stay, and disposition (Appendix I). The consensus criteria (Appendix H) include all data that were collected.

In reviewing the literature on cognitive function following heart surgery, researchers have identified risk factors that have proved significant in multivariate analysis for post-operative delirium. These factors have been classified as predisposing or precipitating factors related to cardiac surgery. Predisposing risk factors that were noted were atrial fibrillation, cognitive impairment, depression, history of cerebral vascular accident, peripheral vascular disease, diabetes, and an elevated Euroscore. Some of the precipitating risk factors mentioned included blood transfusion, low cardiac output, the use of an Intra Aortic Balloon Pump, and inotropic medications (Cserėp et al., 2010; Koster, Hensens, Schuurmans, & van derPalen, 2011; Rudolph et al., 2010).

Procedures

The study began in the Summer of 2013 after IRB approval was obtained from the study hospital and Columbia University Teachers College (Appendices A and B). The initial pilot study involving 11 subjects was conducted in Summer 2013

followed by the main study with 125 participants. The results of the pilot study revealed a mean scores of 48.91 on the fatalism scale, 3.82 on the baseline PHQ-9, 7.09 on the 6-week PHQ-9, and 5.0 on the 12- week PHQ-9. A Pearsons r was calculated between the 6-week PHQ-9 scores and fatalism. The results suggested a correlation that was significant at 0.46 utilizing a p–value of 0.05. At that time no significant changes were made to the study.

The main study ran from the Summer of 2013 through the Summer of 2014. There were 155 patients that met initial criteria for the study. Of those 155 patients, 125 were enrolled. Of the other 20, 4 refused to participate, and 10 either scored greater than 11 on the initial PHQ-9 or had been actively treated for depression within the last 5 years. The residual group of 6 were either emergencies or performed when I was not available. The power analysis was calculated, and a sample size of 96 would achieve an 85% power to detect a difference of -0.3 between the null hypothesis correlation of 0.00 and the alternative hypothesis correlation of 0.3 with a significance level of 0.05 using a two-sided hypothesis test (Graybill, 1961; Guenther, 1977; Zar, 1984).

After it was determined that the patient would require coronary artery bypass grafting and or valve repair/replacement, they were approached to participate in the study. This period is after a cardiac workup that may include various forms of cardiac imaging, primary cardiology appointments, and finally a cardiac catheterization. This is the basic cardiac workup that is performed prior to patients being referred for cardiac surgery. All cardiac surgery patients are referred from cardiologists. Patients were asked to participate in the study once they had been informed of their need for surgery. Prior to filling out the questionnaires, an explanation of the purpose of the study was provided to each participant, and that this was a voluntary form of participation in a research project that would not influence or impact their care in any negative way whether or not they chose to

participate. If they agreed, the patient signed a study consent form (Appendix C) along with any consent that would normally be required for surgery. All participants understood that they were participating voluntarily and they had the ability to withdraw at any time during the study without repercussions involving their care. It was anticipated that there would be no physical or emotional discomfort from participating in the study.

Once the consent forms were signed, they were stored in a separate location from the survey and questionnaires to ensure the confidentiality of the participants. After the consent forms were signed, those agreeing to participate completed the Demographic Survey (Appendix D) (most of these questions were answers obtained from the history and physical) and the Fatalism Scale (Appendix E), which was administered by the investigator in the patient's room. Each session took approximately 20 minutes. Whenever necessary, a translator was provided. At three points during the study--the pre-operative period, week 6, and then again at week 12--the subjects completed the Patient Health Questionnaire (PHQ9) (Appendix F), which was read to the patient by the investigator. All of the surveys and questions are included in Appendices D, E, and F. If the patient scored above 11 on the PHQ-9 at the baseline assessment, they were excluded from the study.

All of the data were collected, coded, and filed to ensure patient confidentiality. The coding information and the data were stored in locked cabinets in the investigator's office. The coding information was filed separately to ensure confidentiality.

Data Analysis

The investigator accomplished the first step, data gathering and entry. Missing data were just excluded, since it could not be determined why some participants did

not follow up. After the data were acquired, the data were entered into an Excel spreadsheet by the investigator, and the data were run through the SAS 9.4 system for data analysis by a hospital statistician.

The data analysis began with performing a descriptive analysis; baseline characteristics and continuous measures (PHQ-9 and fatalism) were presented as means and standard deviation; and categorical measures as percentages (Table 1).

There were two outcomes, one for 6-week depression and then another for 12-week depression, that were analyzed by utilizing a univariate relationship between the baseline characteristics. This analysis was selected because 6-week and 12-week PHQ-9 scores were non-normal; therefore, non-parametic univariate tests were appropriate for this analysis. Associations between 6-week and 12-week PHQ-9 scores with continuous variables were assessed by Spearman's Correlation Coefficient (Table 2).

Associations of 6-week and 12-week PHQ-9 scores with categorical variables were assessed via Wilcoxon signed-rank and Kruksal-Wallis one-way analysis of variance tests. Then two multivariable models were created to discover whether fatalism predicts 6-week and 12-week PHQ-9 scores adjusting for baseline PHQ-9 scores, the Euroscore, gender, age, and race. The second model included fatalism, the Euroscore, the baseline PHQ-9 score, gender, race, marital status, employment status, education level, and whether or not the participant prayed (Tables 4, 5, 8, & 9). All models utilized a significance value of .05.

Chapter IV

RESULTS

This chapter presents the results of the study. A pilot study was initially completed in the summer of 2013. Eleven patients were included in the pilot study, and after assessment of the pilot study, there were no changes made to the main study, which was completed in the summer of 2014. Following the descriptive statistics analysis in the main study, univariate analysis was performed to examine whether or not there was a relationship between fatalism, depression, and socio-demographics in relation to cardiac surgery.

Characteristics and Descriptive Results

The following tables show the results of the study. able 1 reports the demographics and characteristics of the participants. A total of 125 people were included in the study. The majority of the participants were male (67.2%), and most were Non-Hispanic White (39.2%) and Hispanic (28.8%). The mean age of the participants was 66.8 years old. Most of the participants were married (40.3%) and retired (44%). The annual income was less than $20,000 a year (42.4%). The mean fatalism score was 49.4, the mean baseline PHQ-9 score was 4, and the mean Euroscore was 7.7.

The 125 participants did complete the baseline PHQ-9 and the fatalism scale. At 6 weeks, only 114 participants completed the PHQ-9, and at 12 weeks, only 105

participants completed the PHQ-9. This attrition can be attributed to failure of patients following up due to death (2), health events preventing follow up, or the researcher being unable to contact participants after numerous attempts. Four patients refused to follow up without giving a reason.

The following tables show the results of the study. Table 1 reports the characteristics and demographics of the participants.

Table 1

Baseline Characteristics and Continuous Measures are Presented as Mean ± SD and Categorical Measures are Presented as n (%)

Characteristics	Mean and ± sd
Age (years)	66.8 ± 10.9
Male	84 (67.2)
Race	
American Indian/Alaskan	1 (0.8)
Asian	9 (7.2)
Black	30 (24.0)
Hispanic	36 (28.8)
Non-Hispanic White	49 (39.2)
Marital Status	
Married	50 (40.3)
Separated	11 (8.9)
Divorced	18 (14.5)
Widowed	18 (14.5)
Unmarried Couple	3 (2.4)
Never Married	24 (19.4)

Table 1 (continued)

Characteristics	Mean and ± sd
Employment Status	
Employed	40 (32.0)
Self-Employed	10 (8.0)
Out of work > 1 yr	2 (1.6)
Out of work < 1 yr	1 (0.8)
Homemaker	4 (3.2)
Retired	55 (44.0)
Unable to work	13 (10.4)
Education	
Did not finish high-school	30 (24.0)
High school graduate	26 (20.8)
Some college or tech school	27 (21.6)
College graduate	17 (13.6)
Graduate school graduate	25 (20.0)
Member of Church	60 (48.0)
Prays	99 (79.2)
Income ($)	
<20	53 (42.4)
21-40	22 (17.6)
41-60	20 (16.0)
61-80	7 (5.6)
81-100	9 (7.2)
101-199	6 (4.8)
>200	8 (6.4)
Fatalism Score (range 20-100)	49.4 ± 12.2
Baseline PHQ-9 (range 0-27)	4.0 ± 3.2
6-week PHQ-9	6.0±5.0
12-week PHQ-9	3.0±4.0
Euroscore (range 0-100)	7.7 ± 9.1

Table 1 (continued)

Characteristics	Mean and ± sd
Hypertension (Y/N)	111 (90.2)
Diabetes (Y/N)	63 (50.8)
Intra aortic balloon pump	6 (4.8)
Peripheral vascular disease	35 (28.7)
ICU stay (days)	5.8 ± 6.3
Hospital Stay (days)	13.2 ± 9.1

Note. The sample of the study is N=125.

Research Questions

1. What is the incidence of post-operative depression in the sample?
2. Do individuals who are fatalistic have an increased risk of developing post-operative depression from cardiac surgery?
3. Are socio-demographic factors predictive of post-operative depression?

Research Question 1: Incidence of Post-operative Depression

Table 2

Mean PHQ-9 Scores and Percentage of Depression

	Cases	PHQ-9	Percent of Depression
Female			
Mean base	41	4.22	10.30
Mean 6-week	38	6.76	17.80
Mean 12-week	34	4.98	14.64
Male			
Mean base	84	3.85	4.58
Mean 6-week	76	5.16	6.79
Mean 12-week	71	2.50	3.52
Race			
White Base PHQ-9	49	3.06	6.24
Non-White Base PHQ-9	76	4.55	6.00

Note. The p-value for gender is 0.65 and for race is 0.012.

This study did see an increase in depressive symptoms in both males and females based on the mean PHQ-9 scores for both males and females. Females did show the greatest increase at the 6-week mark following heart surgery, and both males and females did appear to improve by 12 weeks. Only 18% of females showed depressive symptoms at 6 weeks and 7% of males at the same time, which is still 25% of the 114 participants who did complete the PHQ-9 at 6 weeks. At baseline, 15% of patients had some depressive symptoms. This rose to approximately 25% at the 6-week mark and dropped to 18% at the 12-week mark, which is still greater than the baseline percentage of depression.

There were 4 patients who were treated with antidepressants during the 6-week time period that may have impacted the PHQ-9 scores at the 12-week mark. One patient was offered the name of a psychiatrist, but it was uncertain if the individual utilized this information.

Research Question 2: Fatalism and the Correlation to Post-operative Depression

Table 3

Association of PHQ-9 and Fatalism

	Base PHQ-9	6 week PHQ-9	12 week PHQ-9
Correlation Coefficient	1.00	0.30	0.35
Sig (2-tailed)	0.01	.001	0.00
N	125	114	105

Note. P <.05.

Research question 2: Whether individuals who are fatalistic have an increased risk of developing post-operative depression from cardiac surgery was observed to a statistically significant level in this study when looking at depression and fatalism alone.

Research Question 3: Socio-Demographics and Post-operative Depression

The following analysis was performed through regression models to examine whether fatalism predicts 6-week and 12-week PHQ-9 scores. This analysis was selected because 6-week and 12-week PHQ-9 scores are non-normal; therefore, non-parametric univariate tests were appropriate for this analysis. Associations

between the 6-week and 12-week PHQ-9 scores with continuous variables were assessed by Spearman's Correlation Coefficient. Association of 6-week and 12-week PHQ-9 scores with categorical variables were assessed via Wilcoxon signed-rank and Kruksal-Wallis one- way analysis of variance tests. The residuals of this model were normally distributed, indicating that linear regression was the appropriate approach for this research question.

Table 4

Outcome 1: Association of 6-Week Depression Continuous Variables via Spearman's Correlation Coefficient

	Correlation with 6 week depression	P-value
Age (years)	0.02	0.83
ICU stay (days)	0.05	0.65
Hospital Stay (days)	-0.02	0.86
Fatalism Score	0.30	0.00
Baseline PHQ-9	0.30	0.00
Euroscore	-0.06	0.53
CPB time	-0.02	0.84

Note. The sample of this 6–week point is N=114.
Cardiopulmonary bypass time (CPB)

Table 5

Association of Categorical Variables and 6-Week PHQ-9 Scores Assessed via Wilcoxon Single Rank and Kruksal-Wallis One–way Analysis of Variance

Characteristics	Mean 6 week PHQ-9 Score	P-value
Sex		0.09
Male	5.2 ± 4.8	
Female	6.8 ± 5.1	
Race		0.01
American Indian/Alaskan	5.0	
Asian	10.2 ± 9.0	
Black	5.5 ± 4.8	
Hispanic	7.2 ± 4.6	
Non-Hispanic White	4.1 ± 4.0	
Race 2		0.00
Non-Hispanic White	4.1 ± 4.0	
Other	6.8 ± 5.2	
Marital Status		0.08
Married	5.2 ± 5.3	
Unmarried couple	12.0 ± 8.5	
Never married	4.7 ± 3.1	
Marital Status 2		0.01
Separated/Widowed	7.5 ± 4.7	
Other	5.1 ± 4.9	
Employment Status		0.06
Employed	4.8± 4.3	
Self-Employed	2.5± 2.6	
Out of work >1 year	2.5 ± 0.7	
Out of work > 1 year	6.0	
Homemaker	4.7 ± 2.9	
Retired	6.6 ± 5.6	
Unable to work	8.2 ± 4.8	

Table 5 (continued)

Characteristics	Mean 6 week PHQ-9 Score	P-value
Employment Status 2		0.04
Employed/self/home	7.3 ± 4.7	
Retired	6.6 ± 5.6	
Education		0.56
Not finish High School	6.9 ± 6.0	
High School graduate	6.2 ± 5.2	
Some college or tech school	5.7± 4.8	
College graduate	3.9± 2.6	
Graduate School graduate	4.7 ± 4.3	
Education 2		0.10
Did not finish college	6.3 ± 5.3	
Finished college	4.4 ± 3.7	
Member of Church		0.04
Yes	6.5 ± 4.9	
No	4.9 ± 4.8	
Prays		0.35
Yes	5.5 ± 6.2	
No	5.7 ± 4.6	
Income		0.32
<20	6.7 ± 5.2	
21-40	5.2 ±5.1	
41-60	5.9 ±5.3	
61-80	4.8 ± 4.0	
81-100	5.0 ± 4.4	
>100	3.6 ±3.9	

Table 5 (continued)

Characteristics	Mean 6 week PHQ-9 Score	P-value
Income 2		0.10
<20	6.7 ± 5.2	
21-60	5.5 ± 5.1	
>60	4.3 ± 4.0	
Hypertension		0.14
Yes	6.0 ± 5.0	
No	3.6 ± 3.5	
Diabetes		0.03
Yes	6.7 ± 5.2	
No	4.7 ± 4.4	
Intra aortic balloon pump		1.00
Yes	5.7 ± 4.9	
No	6.7 ± 6.9	
Peripheral Vascular Disease		0.20
Yes	6.7 ± 5.6	
No	5.3 ± 4.6	

Note. N= 114 that is 91.2% completed 6- week PHQ-9

Multivariable Model 1: Pre-specified Analysis

Does fatalism predict 6-week PHQ-9 scores adjusting for baseline PHQ-9 scores, Euroscore, gender, age, and race? The backwards selection was used to reduce the model to 6 predictors (5 additional covariates with the fatalism score). Results of this model are shown below in Table 6.

The residuals of this model are normally distributed, indicating that linear regression is an appropriate approach for the research question.

Table 6

Multivariable Model 1 Results 6-Week

Parameter	Estimate	Standard Error	t Value	P-value
Intercept	-2.28	3.30	-0.69	0.50
Fatalism Score	0.07	0.04	1.92	0.06
Baseline PHQ-9 Score	0.34	0.15	2.33	0.02
Euroscore	-0.04	0.05	-0.69	0.50
Female	0.85	1.03	0.82	0.41
Age	0.03	0.04	0.68	0.50
Not non-Hispanic white	1.53	0.97	1.58	0.12

Note. N=114. Residuals are normally distributed indicating linear regression.

The r^2 for this model is 0.177, indicating that this model accounts for 17.7% of the variability in 6-week PHQ-9 scores. Adjusting for baseline PHQ-9 score, Euroscore, sex, age, and race, a one-unit increase in fatalism score corresponds to a 0.074 increase in 6-week PHQ-9 score. This association was not significant ($p = 0.0571$).

Multivariable Model 2

Model 1, the 6-variable model, accounted for only 17.7% of variation in the outcome; therefore, a second multivariable model based on univariate analyses was designed. Green et al. (1991) states that for regression equations using six or more predictors, an absolute minimum of 10 participants per predictor variable is appropriate. Using Green's rule of thumb to select the total number of predictors in the model, a multivariable model using backward selection was designed. Variables that yielded univariate p-values of 0.15 or less and variables that were clinically relevant in the pre-specified analysis were added to a multivariable model of

6-week PHQ-9 with fatalism as a predictor. One hundred thirteen patients had data for all potential predictors and 6-week PHQ-9; therefore, backwards selection was used to reduce the model to 11 predictors (10 covariates with fatalism score). The final model includes fatalism, Euroscore, baseline PHQ-9 score, gender, race, marital status, employment status, education level, church membership, and diabetes. The resulting model is shown below in Table 7.

Table 7

Multivariable Model 2 Results 6-Week

Parameter	Estimate	Standard Error	t Value	P-value
Intercept	-0.72	1.90	-0.38	0.71
Euroscore	-0.05	0.05	-0.90	0.37
Fatalism Score	0.06	0.04	1.36	0.18
Baseline PHQ-9 Score	0.39	0.16	2.46	0.02
Female	0.67	1.10	0.61	0.55
Not non-Hispanic white	0.80	1.28	0.63	0.53
Widowed/Separated	0.39	1.17	0.33	0.74
Retired vs. Employed/Self-Employed/Homemaker	1.18	1.05	1.12	0.27
Out of work/Unable vs Employed/Self-Employed/Homemaker	-	1.50	0.52	0.60
Did not graduate college	-0.38	1.25	-0.30	0.77
Member of church	1.43	0.90	1.60	0.11
Diabetes	1.39	0.95	1.47	0.15

The r^2 for this model is 0.222, indicating that this model accounts for 22.2% of the variability in 6-week PHQ-9 scores. Adjusting for Euroscore, baseline PHQ-9 score, gender, race, marital status, employment status, education level, church

membership, and diabetes, a one unit increase in fatalism score corresponds to a 0.06 increase in 6-week PHQ-9 score. This association was not significant (p = 0.18).

Outcome 2: 12-Week Depression

Table 8

Continuous Variables--Associations of 12-Week PHQ-9 Scores Using Spearman's Correlation Coefficient

	Correlation with 12 week depression	P-value
Age	-0.05	0.62
ICU stay	0.07	0.59
Hospital Stay	0.07	0.49
Fatalism Score	0.21	0.03
Baseline PHQ-9	0.35	0.00
Euroscore	-0.03	0.78
CPB time	-0.12	0.27

Note. Value <0.05

Multivariable Model 1: 12-Week: Pre-specified Analysis

Does fatalism predict 12-week PHQ-9 scores adjusting for baseline PHQ-9 scores, Euroscore, gender, age and race? Results of this model are shown below in Table 9. The residuals of this model are normally distributed, indicating that linear regression is an appropriate approach for the research question.

Table 9

Associations of Categorical Variables -12 Week PHQ-9 Scores Assessed via Wilcoxon Single Rank and Kruksal-Wallis One–way Analysis of Variance

Characteristics	Mean 12 week PHQ-9 Score	P-value
Sex		0.00
Male	2.5 ± 2.8	
Female	4.8 ± 4.5	
Race		0.00
American Indian/Alaskan	6.0	
Asian	2.2 ± 3.3	
Black	4.2 ± 4.8	
Hispanic	4.6 ± 3.7	
Non-Hispanic White	1.8 ± 2.0	
Race 2		0.00
Non-Hispanic White	1.8 ± 2.0	
Other	4.2 ± 4.1	
Marital Status		0.26
Married	2.5 ± 2.7	
Separated	5.6 ± 5.6	
Divorced	3.2 ± 3.7	
Widowed	4.8 ± 4.6	
Unmarried Couple	2.0	
Never Married	2.9 ± 3.1	
Marital Status 2		0.01
Separated/Widowed	5.1 ± 4.9	
Other	2.7 ± 3.0	

Table 9 (continued)

Characteristics	Mean 12 week PHQ-9 Score	P-value
Employment Status		0.15
Employed	2.5 ± 2.6	
Self-Employed	1.8 ± 2.1	
Out of work > 1 yr	2.0	
Out of work < 1 yr	3.0	
Homemaker	1.3 ± 1.2	
Retired	3.8 ± 4.4	
Unable to work	5.3 ± 3.5	
Employment Status 2		0.02
Employed/Self-employed/homemaker	2.3 ± 2.4	
Looking for work/Unable to work	4.9 ± 3.4	
Retired	3.8 ± 4.4	
Education		0.37
Did not finish high-school	3.7 ± 4.1	
High school graduate	4.0 ± 3.8	
Some college or tech school	3.6 ± 4.4	
College graduate	1.9 ± 2.7	
Graduate school graduate	2.4 ± 1.7	
Education 2		0.13
Did not finish college	3.8 ± 4.0	
Finished college	2.2 ± 2.1	
Member of Church		0.45
Yes	3.6 ± 3.9	
No	3.0 ± 3.3	

Table 9 (continued)

Characteristics	Mean 12 week PHQ-9 Score	P-value
Prays		0.02
Yes	3.7 ± 3.8	
No	1.7 ± 1.9	
Income		0.09
<20	4.2 ± 3.8	
21-40	4.2 ± 5.1	
41-60	2.2 ± 2.3	
61-80	2.6 ± 2.4	
81-100	1.3 ± 1.0	
>100	1.7 ± 1.8	
Income 2		0.02
<20	4.2 ± 3.8	
21-60	3.3 ± 4.1	
>60	1.7 ± 1.7	
HTN		0.15
Yes	3.4 ± 3.7	
No	1.8 ± 2.3	

Note. N=105. Categorical variables were assessed using Wilcoxon signed-rank and Kruksal-Wallis one-way analysis of variance tests

Table 10

Multivariable Model 1 Results: 12-week

Parameter	Estimate	Standard Error	t Value	P-value
Intercept	0.69	2.36	0.29	0.77
Fatalism Score	0.012	0.03	0.43	0.67
Baseline PHQ-9 Score	0.28	0.11	2.60	0.01
Euroscore	-0.17	0.05	-3.16	0.00
Female	2.15	0.72	2.98	0.00
age	0.01	0.032	0.16	0.87
Not non-Hispanic white	1.66	0.69	2.41	0.02

Note. P<.05. Residuals are normally distributed indicating linear regression.

The r^2 for this model is 0.275, indicating that this model accounts for 27.5% of the variability in 12-week PHQ-9 scores. Adjusting for baseline PHQ-9 score, Euroscore, sex, age and race, a one-unit increase in fatalism score corresponds to a 0.012 decrease in 12-week PHQ-9 score. This association was not significant (p = 0.6682).

Multivariable Model 2: 12–Weeks

Since the pre-specified 6-variable model accounted for only 27.5% of variation in the outcome, a second multivariable model based on univariate analyses using the Green et al. (1991) rule was constructed. Using this rule of thumb to select the total number of predictors in the model, we fit a multivariable model using backward selection. Variables that yielded univariate p-values of 0.15 or less and variables that were pre-specified as clinically relevant in the pre-specified analysis were added to a multivariable model of 12-week PHQ-9 with fatalism as a predictor. One hundred five patients had data for all potential predictors and 12-week PHQ-9; therefore, backwards selection was used to reduce the model to 10 predictors

(9 covariates with fatalism score). The final model included fatalism, the Euroscore, the baseline PHQ-9 score, gender, race, marital status, employment status, education level, and prayer. The resulting model is shown below in Table 11.

Table 11

Multivariable Model 2 Results: 12-Week

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	0.60	1.39	0.43	0.67
Euroscore	0.21	-0.05	-3.88	0.00
Fatalism Score	0.00	-0.03	-0.07	0.94
Baseline PHQ-9 Score	0.30	0.11	2.71	0.00
Female	1.61	0.77	2.08	0.04
Not non-Hispanic white	0.79	0.91	0.87	0.39
Widowed/Separated	1.26	0.85	1.49	0.14
Retired vs. Employed/Self-Employed/Homemaker	1.19	0.75	1.59	0.12
Out of work/Unable to work vs Employed/Self-Employed/Homemaker	1.87	1.038	1.80	0.08
Did not graduate college	0.60	-0.87	-0.69	0.50
Prays	1.73	0.87	1.99	0.05

Note. N= 105 which is 84% completed the 12-week PHQ-9.

The r^2 for this model is 0.344, indicating that this model accounts for 34.4% of the variability in 12-week PHQ-9 scores. Adjusting for the Euroscore, baseline PHQ-9 score, gender, race, marital status, employment status, education level, and prayer, a one-unit increase in fatalism score corresponds to a 0.001 decrease in 12-week PHQ-9 score. This association was not significant ($p = 0.95$).

Research question 3 looked at whether or not socio-demographic characteristics impacted depression. Utilization of univariate analysis explores each variable individually. From the multivariant models, gender, race, marital status, employment status, low income, church membership, the Euroscore, and diabetes had an association with depression at 6 weeks but is not statistically significant. The r^2 of this model explained 22% of the variability in 6-week depression scores. Model 2 has an r^2 of 0.22, which indicates that the variables included in that model account for 22.2% of the variability in PHQ-9 scores at 6 weeks adjusting for the Euroscore, baseline PHQ-9 scores, gender, race, marital status, employment status, education level. This is a small to moderate correlation, meaning a one unit increase in fatalism score corresponds to a 0.06 increase in 6 weeks PHQ-9 score, overall a small correlation.

The r^2 for Model 1 is 0.28, indicating that this model accounts for 28% of the variability in 12-week PHQ-9 scores. Adjusting for baseline PHQ-9 score, the Euroscore, sex, age and race, a one-unit increase in fatalism score corresponds to a 0.01 decrease in 12-week PHQ-9 score. This would be a small correlation.

In Model 2 for the association of depression and 12-week depression scores, the r^2 for this model is 0.34, indicating that this model accounts for 34% of the variability in 12-week PHQ-9 scores, adjusting for the Euroscore, baseline PHQ-9 score, gender, race, marital status, employment status, education level, and prayer. This model would therefore show a moderate correlation; a one unit increase in fatalism score corresponds to a 0.001 decrease in 12-week PHQ-9 score.

Chapter V

DISCUSSION, IMPLICATIONS, AND CONCLUSIONS

This chapter presents a discussion of the results, including the implications and conclusions of the research. The implications of this study are discussed, along with recommendations for clinical practice, future study, and finally, a conclusion.

This study explored the role of fatalism in depression following cardiac surgery. There were three research questions:

1. What is the incidence of post-operative depression in the sample?
2. Do individuals who are fatalistic have an increased risk of developing post-operative depression from cardiac surgery?
3. Are socio-demographic factors predictive of post-operative depression?

Discussion

Based on the research questions, the researcher believed that if an individual undergoing heart surgery were fatalistic, they would have an increased risk of developing post-operative depression. The question is not whether or not depression is a problem in the post-operative period, as it is well documented in the literature to be a problem. Tully and Baker's (2012) study revealed that there is evidence that approximately 30%-40% of patients undergoing CABG surgery experience some form of psychological depression immediately leading up to

surgery and in the post-operative period. The association between depression and cardiovascular disease is believed to predict the onset of heart disease and influence the poor prognosis, and it is influential in the development of cardiac risk factors and behaviors that include smoking non-compliance with medication and the plan of care. Cardiac surgery is a stressful event that in turn threatens the individual's homeostasis. Stress is a known cardiac risk factor that is closely related to anxiety and depression (Ai, Rollman, & Berger, 2010).

Studies have shown a higher incidence of depression in women (Kendel et al., 2010; Shen et al., 2009), which was also observed in this study. Poor health status itself may in turn lead to an increase in depressive symptoms, or a component of fatalism may exist in the individual, leading to feelings of powerlessness, hopelessness, and meaninglessness that contribute to depression (Kendel et al., 2010; Shen et al., 2009). Participants in this study reported risk factors including hypertension (90.2%), diabetes (50.8%), and peripheral vascular disease (28.7%). Participants in this study at baseline were chronically ill, and hence at increased risk of developing post-operative depression.

Research question 2 looked at the correlation between fatalism and PHQ-9 scores. Alone there is a statistically significant correlation between fatalism and PHQ-9 scores, but it is underscored by the socio-demographic characteristics of the individual. Fatalistic individuals are at baseline more depressed at baseline but return to that level of depressive symptoms by 12 weeks.

Research question 3 looked at the correlation of socio demographics and depression. In social and behavioral sciences, a correlation of +1 indicates a perfect positive correlation, -1 indicates a perfect negative correlation, and 0 shows no correlation in linear regression. In this study, the residuals are normally distributed, indicating linear regression. A correlation of 0.1 is considered small, 0.3 is moderate, and 0.5 is a large correlation in social and behavioral science (Kenny, 1987). Overall,

in the social and behavioral sciences, small correlations are the most common (Kenny, 1987). Even though these present findings are mostly modest, they do explain some of the key factors associated with post-operative depression associated with cardiac surgery, including fatalism, and socio-demographic characteristics that include overall risk for surgery (Euroscore), baseline PHQ-9, gender, marital status--especially being widowed or separated, employment, education, chronic illness, and prayer.

An interesting observation from the data showed that 48% of the participants stated that they were members of a religious organization and 79% pray. Prayer was not identified as to whether or not it was daily. Schlundt et al. (2008) explains the positive relationship between religion and health, and they include positive physiological and emotional reactions to religious activities, the social support that is associated with participation in religious organizations, and the belief systems established by religious organization and their ability to promote health behaviors with the congregation. A high percentage of participants had some form of spirituality in their lives, and this may account for the improvement in depressive symptoms at the 12-week period and may have impacted the level of depressive symptoms at the 6-week period.

Depression has been established as a risk factor for recurrent cardiac events and increased mortality. Khawaja et al. (2009) describes depression and coronary artery disease as having a bidirectional relationship. A bidirectional relationship means that depression is an independent risk factor for coronary artery disease and coronary artery disease can cause depression. There is a strong association between depression and acute cardiac conditions that require hospitalization. Negative psychological states have also been associated with development and progression of cardiac disease and cardiac related deaths. In contrast, positive psychological states, such as optimism, have been shown to have an improvement in cardiovascular

outcomes (Huffman et al., 2011). Huffman et al. cited the Women's Health Initiative, which had over 97,000 female participants, and found that those with increased levels of dispositional optimism had significantly decreased overall mortalities related to illness, including cardiac disease, as opposed to those women with lower levels of optimism.

The possibility that this study did not show a stronger correlation between fatalism, depression, and cardiac surgery when socio demographic predictors were included may be due to how various cultures are influenced more by fatalism that affects whether or not individuals seek health care. Also the most depressed patients, including those who had been treated for depression in the past five years ,were excluded from the study. It could be hypothesized that these were the most fatalistic. Also the exclusion of other various types of surgeries, for example, hypertrophic obstructive cardiomyopathy patients and patients who needed a re-operation for cardiac surgery, may also have omitted the most fatalistic individuals, and that could have impacted the outcome. Research involving patients with cancers has suggested that fatalism among Latinos and African Americans may cause them to put off cancer screening procedures. A study of colorectal cancer screening among elderly African Americans found that fatalism was the only significant predictor of participation in fecal occult blood testing when controlling for other variables including age, race, education, and income (Florez et al., 2009; Hall et al., 2008). Morgenstern et al. (2011) studied the association of fatalism, spirituality, optimism, and depressive symptoms in stroke patients and found depressive symptoms and fatalism to have the strongest association with increased risk of stoke recurrence and mortality.

Patients who perceive the information and the support they receive as good or excellent have been shown to have lower fear and anxiety prior to surgery. Improved cardiac recovery is associated with the number of people in the patient's

social network (Koivula et al., 2002). The Enhancing Recovery in Coronary Heart Disease (ENRICHD) looked at depression and low social support following post-myocardial infarction (MI) patients. The ENRICHD study showed that low social support is linked to an increase in mortality and morbidity that is independent of disease severity with patients with a diagnosis of CAD or MI. Those individuals who perceived themselves as having emotional support prior to an MI found that this was the most powerful predictor of survival (ENRICHD, 2001; Urizar & Sears, 2006). In this present study, 43% of the participants were either married or part of an unmarried couple, 40% had some form of employment, and 48% belonged to a formal religious organization. These are all components of some form of social support that has been associated with improved outcomes.

A post hoc analysis to examine the power to detect the R-Squared for 6-week PHQ-9, fatalism, the Euroscore, gender, age, and race that had 114 participants achieved 83% power value to detect an R-Squared of 0.06 that attributes one independent variable using an F-Test with a significance of 0.05. The variables have an R-Squared of 0.27.

The post hoc analysis of the sample to detect an R-squared with an association to fatalism is between 0.01 and 0.1; adjusting for the other 5 covariates in the model for 12 weeks had a sample size of 104 that achieved 86% power in order to detect an R-squared of 0.06 attributed to 1 independent variable using an F-Test with a significance level of 0.05. The variables tested were adjusted for an addition 5 independent variable model with an R-squared of 0.27.

Since power was calculated at 96, it was decided that the goal of 125 participants would be enrolled, hoping to balance out the attrition factor. The attrition rate for the 6-week respondents was 8.8% and at 12 weeks was 16.8%. Some of the attrition rate was due to deaths, refusal to follow up, and inability to contact some of the participants. Since most of the participants did show an

improvement in depressive symptoms at the 12-week mark, it is hypothesized that this refusal to participate was not due to depressive symptoms. It could be hypothesized that those that were lost to follow-up that were not deceased could be due an increased level of depressive symptoms. At least one person did have a significant cerebral vascular accident that precluded him from continued participation. All efforts were made to contact family and friends to follow up, but some patients did move away or were relocated by family members out of state, and follow-up was not achieved in spite of letters and calls. A Cronbach's Alpha was calculated for this study for the PHQ-9 and the Fatalism Score, and the result was .821.

The sample was diverse in terms of socioeconomic status that was observed to be dependent on education. Participants in the study had educational levels ranging from no schooling to post-graduate education. Education has been shown to have a positive correlation with socioeconomic status and health behaviors (Winkleby, Jatulis, Frank, & Formann, 1992). Mainly the population this hospital serves suffers from numerous health disparities, including, but not limited to homelessness, poverty, isolation, and chronic illnesses. Therefore, this study has the ability to impact the larger population, even though this was on a small scale. The small sample had the ability to touch on numerous cultural and socioeconomic ranges that lend this study to be generalized to the greater population. This study did have participants with various levels of education, social support, and chronic illnesses that can be seen in a much larger population. The participants wanted to participate in the study and may have felt that they were getting special attention; patients want to feel that someone is watching out for them, so here again we see the impact of social support.

Even though this is a small site, it is in a major city that serves a diverse population. The location of this hospital lends itself to serve the needs of the local

community, but also is situated near a major university and is in a city that prides itself on tourism, which enhanced the diversity of participants in the study. The researcher was able to include patients from other countries and states. Participants in the study were from groups who experience many health disparities from homelessness, poor access to health care, and low-socio economic status, to others who have a job, adequate social support, and insurance. This study did include an ethnically diverse sample and therefore lends itself to be generalized to the overall population.

In the Transactional Model of Stress and Coping, there are actual strategies used to mediate primary and secondary appraisals. The strategies include problem management or problem-focused coping and emotion-focused coping efforts. Problem management or problem–focused coping involves strategies directed at changing the stressful situation. According to the Transactional Model, problem-focused coping strategies are utilized for stressors that are changeable, and emotion-focused strategies are most adaptive when the stressor is unchangeable or when this strategy is used in conjunction with problem-focused coping strategies (Glanz et al., 2008). Assisting patients in identifying strategies to cope with stressful situations, such as cardiac surgery, has the ability to provide patients with the tools needed to see their situation in a more positive light, therefore leading to positive stress and in turn decreasing the individual's incidence of developing post-operative depression. Depression that is caused by feelings of helplessness and hopelessness has been shown to have an increased association with the progression of chronic diseases and mortality (Schroder, 2003). Providing the individual information and coping strategies will assist the individual moving through the primary and secondary appraisals of stress and coping.

Depression following heart surgery is debilitating not only for the patient but for the family as well. It is anticipated that by 2020, the burden of coronary artery

disease and depression will exceed all other medical issues. The reality of this anticipated problem underscores the importance of identifying the problem of depression and its causes (Post-Myocardial Infarction Depression Clinical Practice Guideline Panel, 2009; Tully, Baker, Turnbull, Winefield, & Knight, 2009).

The *CBS Sunday Morning* television show on 19 October 2014 presented a piece about two patients who underwent heart transplants in upstate New York and failed to progress following their surgeries. The patients both voiced to their doctors that they were depressed. They refused cardiac rehabilitation exercises and did not interact with their environments. Unknown to their doctors, they had found each other, and they both started to improve. Their overall health and outlook on life started to take a positive turn. It was not just medications and cardiac rehabilitation that put them on the road to recovery; it was love and social support. Improved quality of life is an expectation of the general population for patients undergoing a medical procedure so much so that the national initiative *Healthy People 2020* has identified Health Related Quality of Life and Well-Being as an objective. This is a multidimensional concept that includes physical, mental, emotional, and social functioning. The focus of this objective is the impact health status has on quality of life (United States Department of Health and Human Services, 2012, www.healthypeople.gov). This concept that is not only found in medical and nursing textbooks and journals; it is what is expected following medical procedures by the general population. This is such an important outcome for patients that it has made the news programs.

The definition of health, as defined by the World Health Organization (1948), is: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." Taking this definition into account, having patients who develop depression following heart surgery is not healthy. They are experiencing a lack of mental and social well-being. These patients are not

having positive stress and are not interacting positively with their environment; as seen by referring back to Lazarus and Folkman's model of Stress and Coping (1984), this is an example of negative stress. Many individuals do not perceive the stress of cardiac surgery as positive stress, and they are not able to develop positive coping mechanisms to diminish post-operative depression, moving toward the ultimate state of health. Patients are more than the sum of their parts. Keeping this in mind, healthcare professionals need to have a more holistic view of health. Healthcare professionals are not here to judge or determine what is an acceptable level of quality of life (www.healthypeople.gov). It is the job of all healthcare professionals to assist patients in developing positive coping skills to achieve their optimum goal of health and acceptable quality of life.

The study did not show a strong correlation between fatalism and post-operative depression among individuals undergoing cardiac surgery when adding socio-demographic variables into the equation. Looking at just depressive symptoms and fatalism at baseline, 6-, and 12-week marks, there are statistically significant correlations, but these are very much underscored by other predictors, such as the individual's baseline risk for surgery, social support, education, and income. This study did add to the body of knowledge about the need to address this complication--depression following cardiac surgery that impacts the health-related quality of life of the individual undergoing heart surgery.

Limitations

1. This was a small study that examined at patients at only one hospital setting.
2. The study limited the participants to those undergoing coronary artery bypass surgery, valve surgery, and or a combination of both.

3. Bias may be of concern since the interviewer was the investigator. This is believed to be small, since nurses are trained not to be judgmental, to make patients feel comfortable in expressing their feelings and provide a trusting environment so that patients do not feel threatened, and help patients feel comfortable about opening up about delicate information. The interviewer was neutral, but caring to the needs and concerns of the participants.
4. The fatalism constructs were not assessed separately.
5. Depression was not verified; some participants were treated for depressive symptoms at the 6-week and 12-week periods.
6. This was not a cross-sectional study.

Implications

Depression is a problem that is under-recognized following cardiac surgery. Patients undergoing cardiac surgery who then go onto develop post-operative depression do not voice that they have an improved quality of life. Patients report physical symptoms ranging from decreased exercise tolerance, fatigue, shortness of breath, to feelings of sadness, to name a few. Patients return for their post-operative follow-up and are visibly not interacting with their environment in a positive way. There is a disconnect with their family, friends, and self. Many of the participants in this study are vulnerable to post operative depression because of their health disparities, lack of social support, and low socio economic status. This is a sample that was not just without depressive symptoms at baseline that can very much be attributed to stress, chronic illness, low social support, and low socioeconomic status.

This study did not identify one cue to identify individuals who are at greatest risk of developing post-operative depression from cardiac surgery. There may not be just one variable to measure in the pre-operative period to alert the healthcare team to patients who are at risk of developing post-operative depression. Some variables that stood out were being female, individuals looking for employment, those who do not pray, and those who do not have a good social support, for example, not being married. Research reveals that patients having an admission for a first-time cardiac event tend to view their illness as less threatening and utilize different coping strategies compared to patients with multiple cardiac admissions. It has also been hypothesized that patients with a strong sense of internal coping capacity tend to be able to adapt more readily to stressful situations, such as an MI (Brink, Karlson, & Hallberg, 2002). Many patients undergoing heart surgery have had numerous admissions for chronic illness, such as diabetes, which was shown in this study to be a predictor for depression and may be the reason that increased risk of developing post-operative depression is associated with poor coping skills.

A larger sample may identify a strong correlation with one variable that clinicians may identify to flag the individual prone to an increased risk of post-operative depression, but this study did show how socio demographic characteristics, baseline levels of depressive symptoms, and social support impact patients undergoing heart surgery. Health educators can play a significant role in clinics where individuals are receiving care for chronic illness by educating patients on how to develop good coping skills to help deal with their chronic illness and make healthy choices to maintain or improve their level of health and quality of life.

Recommendations for clinical practice would include screening all patients for depression pre-operatively, identifying those with depression, and making a plan to address their depression from the initial visit. Programs for cardiac surgery practices should be implemented that would utilize more of the support services,

such as chaplaincy, hospital volunteers, and medical and nursing students to visit the patients during their hospital stay. Patients would then be screened during the post-operative visit to assess the patient's level of depression. If there are persistent depressive symptoms, phase 2 of the program would be sending the patient to group support for patients having undergone heart surgery. This phase 2 group could be run by health educators along with nurse practitioners to assist patients with worsening or persistent depressive symptoms following heart surgery.

Recommendations for Future Research

This study should be replicated by increasing the number of participants, varying the instruments, and considering a depression examination. It would be interesting to look further into the associations between race, culture, and fatalism and how fatalism impacts health behaviors in everyday life, leading to various health choices that may impact the prevalence of chronic illness in various ethnic groups and then will predispose individuals of various ethnic groups to an increased incidence of depression. The baseline depression associated with chronic illnesses will only compound depressive symptoms associated with cardiac disease. Fatalism could also be looked at from the standpoint of the dependent variable rather than the independent variable and its impact on depression.

Looking into another site that serves a more affluent population that is not impacted by health disparities may reveal that fatalism is less impacted by socio-demographics than was seen in this study. Depression may even be more prevalent in this population.

Conclusion

Depression is an under-recognized problem that impacts the care of the patient having undergone heart surgery. As seen in this study, patients who have undergone heart surgery are at increased risk of developing post-operative depression. This study revealed that 25% of the participants or 1 in 4 patients developed post-operative depression. If 1 in 4 patients who have heart surgery are re-admitted within 30 days of surgery, this will have an enormous financial impact on hospital reimbursement. This is not saying that every readmission has a depression component to it, but many times depressive symptoms are manifested in physical complaints. If the healthcare team can recognize those individuals at highest risk and implement programs to assist the patient in achieving their optimum level of health, this will provide the patient with tools to help them feel they have the ability to cope with this threat and have positive stress.

Socio-demographics impact depression following heart surgery. Women with low social support who do not pray, have lower education, low social support, and who are diabetic are more at risk of developing post- operative depression. The small to modest correlations as seen in this study between heart surgery, depression, fatalism, and socio-demographics that explain some of the behavior following heart surgery are consistent with social and behavioral sciences. Identifying key socio-demographic profiles of patients has the potential of identifying individuals who may be at greatest risk of developing post-operative depression. This may not be the one identifying cue, but establishing patient profiles with the highest risk of developing post-operative depression may help develop programs directed at certain patient populations.

Lastly, fatalism may not have been the one identifying cue, but it is a characteristic that has been seen in other diseases that impacts mortality and

morbidity. Fatalism does appear to impact health in a negative way. Possibly looking at fatalism more closely with depression and at other socio-demographic predictor variables individually may provide additional insight into the impact fatalism may have on depression.

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Appendix A

IRB Approval Form Mt.Sinai-St.Luke.s

St. Luke's – Roosevelt Hospital Center
Institute for Health Sciences
Institutional Review Board
432 West 58th Street, Room 207, New York NY 10019
Telephone (212) 523-4370, 212-523-7253 Fax (212) 523-7442

Memo – Approval of New Research Study

To: Peggy Trainor-O'Malley, NP.

From: Theodore Bania, MD., IRB Co-Chair
Charles W. Paley, MD., IRB Co-Chair

Date: March 22, 2013

Re: Approval of New Research Study by Expedited Review

IRB# 12-119

Title: Depression Associated with Cardiac Surgery and the Role of Fatalism

I am pleased to inform you that the Institutional Review Board has approved the above-cited protocol by expedited review. This approval will be reflected in the minutes of the IRB meeting on **April 17, 2013.** Please note that for all sponsored research, approval by the Grants Office must be obtained in addition to the IRB approval prior to starting the research.

The proposed research qualifies for expedited review and approval under 45CFR46.110 since it is research on individual or group characteristics or behavior employing survey interview, program evaluation, human factors evaluation or quality assurance methodologies.

The IRB has approved the following individuals to be responsible for obtaining informed consent:

1. Peggy Trainor-O'Malley, NP.
2. Melvin Gilbert, MD.

Additionally the Privacy Board has reviewed and approved the Research Authorization forms to be given to patients enrolled in the above-cited research project. Your stamped IRB/Privacy Board approved informed consent and authorization forms are enclosed.

Further changes in the protocol or consent may not be made without IRB review and approval. The only exception would be if these changes were necessary to eliminate apparent immediate hazards to the human subjects. Any serious unanticipated adverse events or unexpected reactions including death, loss of limb, need for major operation etc., should be reported by the Principal Investigator in writing to the IRB within 48 hours of occurrence or receipt of report of occurrence.

Your study will be due for continuing review on or before **March 21, 2014.** You will receive a notice of reminder at least one-month prior to that time.

FDA regulations require that you notify the IRB when your study is completed.

All correspondence concerning this matter should be submitted electronically to the IRB office via irbsubmit@chpnet.org. If you should have any questions, please contact the IRB Coordinator at 523-4370 or 523-7253.

Appendix B

IRB Approval Form Teachers College Columbia University

TEACHERS COLLEGE
COLUMBIA UNIVERSITY
OFFICE OF SPONSORED PROGRAMS

Institutional Review Board

June 6, 2013

Peggy Trainor-O'Malley
174 Meadow Street
Garden City, NY 11530

Dear Peggy,

Please be informed that as of the date of this letter, the Institutional Review Board for the Protection of Human Subjects in Research (IRB) at Teachers College, Columbia University has reviewed your study entitled "*Depression Associated with Cardiac Surgery and the Role of Fatalism*" under **Expedited Review (Categories 4 and 7).**

The approval is effective until **June 5, 2014.**

The IRB Committee must be contacted if there are any changes to the protocol during this period. **Please note:** If you are planning to continue your study, a Continuing Review application must be filed six weeks prior to the expiration of the protocol. The IRB number assigned to your protocol is **13-257.** Feel free to contact the IRB Office [212-678-4105 or hersch@tc.edu] if you have any questions.

Please note that your consent form bears an official IRB authorization stamp. Copies of this form with the IRB stamp must be used for your research work.

Best wishes for your data collection.

Sincerely,

Karen Froud, Ph.D.
Associate Professor of Speech and Language Pathology
Chair, IRB

cc: File, OSP

Appendix C

Consent

IRB APPROVED CONSENT FORM
MAR 2 2 2013

St. Luke's-Roosevelt Hospital Center

CONSENT FOR PARTICIPATION IN RESEARCH

_____ Peggy Trainor-O'Malley, NP.
Print name of subject — Principal Investigator

Depression Associated with Cardiac Surgery and the Role of Fatalism
Title of Project

IRB # 12-119

Attached to this form is a full description of the study in which we are asking you to participate. The description tells you about the reason for the study; the procedures, interviews and drugs or devices which may be involved; the duration of the study; and any risks or benefits to you. The description also gives you information about other medical treatments you may receive if you do not want to participate in this study.
If you have questions concerning this research project or your rights as a research subject, or if you have a research-related injury, you may telephone:

Patient Representative at: (212) 523-3700 Principal Investigator at: 212-523-2798

CONSENT TO PARTICIPATE -- ADULT

I have read the attached study description. The purpose of the study, the risks of the study and what it means to participate in the study have all been explained to me, and my questions have been answered. I agree to participate in the study and agree to take all of the tests or procedures mentioned in the study description. If I am injured in the study, I understand only immediate essential medical treatment will be provided free of charge. I understand that participating in the study is voluntary, that I can decline to participate, and that I can stop participating at any time. I also understand that my decision to participate in or to withdraw from the study will not affect the health care I receive, now or in the future. I have been told that records of this investigation will be kept confidential to the extent permitted by law but are subject to inspection by the U.S. Food and Drug Administration and study sponsors.

_____ _____ _____ _____
signature of subject — date — signature of witness — date

_____ _____ _____
signature of authorized representative — date — relationship to subject

May only be used to enroll subjects until:
MAR 21 2014

I, _____, have clearly and fully explained to the above subject (or person giving consent) the nature, requirements and risks of the study.

_____ _____
Signature of researcher — date

DISTRIBUTION:
Original to Research Records, copies for subject (or person giving permission), investigator, and Hospital Chart and Pharmacy where appropriate.

REV 4/19/07

TEACHERS COLLEGE, COLUMBIA UNIVERSITY
INSTITUTIONAL REVIEW BOARD
Protocol # 13-257
Consent form approved until 6/5/2014
IRB Signature SH/KA

PRIVACY BOARD APPROVED
MAR 2 2 2013

ST. LUKE'S-ROOSEVELT HOSPITAL CENTER

RESEARCH AUTHORIZATION

Patient Name: _____ **ID Number:**_____
IRB Study Number: __12-119_____

We understand that information about you and your health is personal, and we are committed to protecting the privacy of that information. Because of this commitment, we must obtain your written authorization before we may use or disclose your protected health information for the research purposes described below. This form provides that authorization and helps us make sure that you are properly informed of how this information will be used or disclosed. Please read the information below carefully before signing this form.

USE AND DISCLOSURE COVERED BY THIS AUTHORIZATION

You or your representative should read the information on this form before signing it. A representative of St. Luke's-Roosevelt-Hospital Center *must have filled in the answers to the questions below before providing this authorization form to you and must answer any questions you may have before you sign the form. DO NOT SIGN A BLANK FORM.*

Who will disclose, receive, and/or use the information? All of the following person(s), class(es) of persons, and/or organization(s) listed in Part A and those indicated by a checked box in Part B may disclose, use, and receive the information and they may use the information and disclose it to the other parties on this list, to you or your personal representative, or as required by law.

Part A

- This Hospital Center's research staff and medical staff
- Every health care provider who provides services to you in connection with this study
- Any laboratories and other individuals and organizations that analyze your health information in connection with this study in accordance with the study's protocol
- The United States Food and Drug Administration and any other government agency that oversees research
- The members and staff of the hospital's affiliated Institutional Review Board
- The members and staff of the hospital's affiliated Privacy Board
- Principal Investigator: Peggy Trainor-O'Malley_____
- Study Coordinator: Mairead Casey and Dr. K Omidvari_____
- Members of the Research Team and the physician fellows and data managers at St. Luke's-Roosevelt Hospital Center who are assisting the Principal Investigator on this research project.

TEACHERS COLLEGE, COLUMBIA UNIVERSITY
INSTITUTIONAL REVIEW BOARD
Protocol # 13-257
Consent form approved until 6/5/2014
IRB Signature SH/KA

Part B

- o All other research sites for this study, including each site's research staff and medical staff
- ☐ The following research sponsor(s):_____
- ☐ Contract Research Organization:_____
- ☐ Data Safety Monitoring Board/Clinical Events Committee
- ☐ Others (as described below):

_____

_____

Note: The name of the sponsor or the contract research organization may change through mergers, assignments or sale of assets.

What information will be used or disclosed? The appropriate boxes must be checked below and the descriptions should be in enough detail so that you (or any organization that must disclose information pursuant to this authorization) can understand what information may be used or disclosed.

- ☐ The entire research record

xAny medical records held by the hospital may be used and disclosed.

xThe following information:

Medical history, length of hospital stay and unit stay, blood transfusions, bypass time, cross clamp time and disposition

_____

- ☐ HIV-related information, which includes any information indicating that you have had an HIV-related test, or have HIV infection, HIV-related illness or AIDS, or any information which could indicate that you have been potentially exposed to HIV.

Notice Concerning HIV-Related Information

If you are authorizing the release of HIV-related information, you should be aware that the recipient(s) is prohibited from redisclosing any HIV-related information without your authorization unless permitted to do so under federal or state law. You also have a right to request a list of people who may receive or use your HIV-related information without authorization. If you experience discrimination because of the release or disclosure of HIV-related information, you may contact the New York State Division of Human Rights at (212) 480-2493 or the New York City Commission of Human Rights at (212) 306-7450. These agencies are responsible for protecting your rights.

PRIVACY BOARD APPROVED
MAR 2 2 2013

SPECIFIC UNDERSTANDINGS

By signing this research authorization form, you authorize the use and/or disclosure of your protected health information described above. The purpose for the uses and disclosures you are authorizing is to conduct the research project explained to you during the informed consent process and to ensure that the information relating to that research is available to all parties who may need it for research purposes. Your information may also be used as necessary for your research-related treatment, to collect payment for your medical (and research-related) treatment (when applicable), and to run the business operations of the hospital.

St. Luke's-Roosevelt staff members and physicians who are performing this research will use and disclose your information only as described earlier. However, once we disclose it to others for research purposes, St. Luke's-Roosevelt cannot directly control their future uses and disclosures of it. For this reason, St. Luke's-Roosevelt has requested that the research sponsor and its agents use your information only for this research and not for other purposes. You have the right to request to review your medical records but for the duration of this study (if it is blinded) you agree to waive your right to review any aspect of the research record that would result in your knowing to which of the research groups you have been assigned.

You have a right to refuse to sign this authorization. While your health care outside the study, the payment for your health care, and your health care benefits will not be affected if you do not sign this form, you will not be able to participate in the research described in this authorization. If you sign this authorization, you will have the right to revoke it at any time, except to the extent that the hospital has already taken action based upon your authorization or needs the information to complete analysis and reports of data for this research. This authorization will never expire unless and until you revoke it. To revoke this authorization, please write to the Principal Investigator, _Peggy O'Malley NP, at St. Luke's-Roosevelt Hospital Center, 1111 Amsterdam Ave, Suite A, M2, New York, New York 10025.
You will receive a copy of this form after you have signed it.

SIGNATURE

I have read this form and all of my questions about this form have been answered. By signing below, I acknowledge that I have read and accept all of the above.

Signature of Subject or Personal Representative	Date
Print Name of Subject or Personal Representative	Address of Subject or Personal Representative
Description of Personal Representative's Authority	Telephone Number(s) of Subject or Personal Representative

THE SUBJECT OR HIS OR HER PERSONAL REPRESENTATIVE MUST BE PROVIDED WITH A COPY OF THIS FORM AFTER IT HAS BEEN SIGNED.

TEACHERS COLLEGE, COLUMBIA UNIVERSITY
INSTITUTIONAL REVIEW BOARD
Protocol # 13-257
Consent form approved until 6/5/2014
IRB Signature SH/KA

Informed Consent

1. PURPOSE

You are being invited to participate in this study because of your diagnosis of cardiac disease that requires heart surgery.

This study looks to identify patients with a diagnosis of cardiac disease that is severe enough to warrant heart surgery and who then ultimately develop post - operative depression. This study will also examine the role of fatalism and how the level of fatalism may predispose an individual to develop postoperative depression. The purpose of this study is to identify those at increased risk of developing post-operative depression and to intervene early to decrease the incidence of depression associated with cardiac surgery. The knowledge generated will potentially improve the care of cardiac surgery patients. This study will examine at least 200 patients who will undergo heart surgery and measure their level of fatalism and their level of post-operative depression.

Fatalism is defined as a loss of internal control over external events in particular cardiac surgery. People who are fatalistic believe that fate, luck and destiny play a role in health and illness.

This study will measure your level of fatalism, depression; will gather general demographic information and data from your health history and operative procedure.

2. DURATION

The duration of the study will be from January 2013 through August 2013 or until 200 participants are enrolled. Your personal time in the study will be approximately 12 weeks. Prior to the study you will be asked to fill out 3 surveys. One survey will gather general demographic data that includes age, race, and education, for example. The next two surveys measure an individual's level of depression and the individual's level of fatalism. The initial encounter will take about 20 minutes and the following 2 encounters will last approximately10-15 minutes where you will just complete the survey on depression.

If you score greater than an 11 on the initial PHQ-9 you will be excluded from the study. The reason for this is that patients who have a baseline level of depression may alter the study results. If you do score an 11 or greater on the PHQ-9, on the first encounter and request a referral to a psychiatrist the Primary Investigator will assist you with this request. Please be assured that your exclusion from the study will not impact on your future surgery or any aspect of your care.

Other information during your hospital stay will also be collected. That information includes your length of stay in the Open Heart Recovery, your length of stay in the hospital, whether or not you are a diabetic or hypertensive, and various components

of the actual operation to name a few. If you want to know every piece of data being collected that can be explained to you.

3. RISKS

Your participation in the study will add no additional risk to you or your procedure. You may experience some discomfort or anxiety while completing the study assessments and reflecting upon your upcoming procedure. The risks associated with the surgery remain the same and will be explained to you when you sign your surgical consent.

4. BENEFITS

The knowledge generated will potentially improve the care of cardiac surgery patients.

5. ALTERNATIVES

There are no alternative procedures or treatments whether or not you choose to participate in the study or not.

6. CONFIDENTIALITY

If you consent to participate in this research, your personal information will be kept confidential and will not be released without your written permission, except as required by law. Your personal information may be shared, to the extent necessary, among the research staff, with the Institution Review Board and research oversight staff, and/or with your treating physician or your other health care providers.

Your name will not be reported in any publication; only the data obtained as a result of your participation in this study will be make public. If you wish to know the results of the study you contact me, Peggy Trainor-O'Malley NP at 212-523-2798. The anticipated conclusion of the study and analysis of the data will be January 2014. If at anytime during the study you have any questions about the study please feel free to contact me at the same number.

7. INJURY

There is no risk of bodily injury related to this study. If you choose to participate in the study and develop depression and feel you need psychiatric help you will be referred to the Psychiatric Department at St. Luke's.

8. CONTACT

If at anytime during or after the study you have questions about the study you may contact the Primary Investigator- Peggy Trainor-O'Malley NP at 212-523-2798 or on pager at St. Luke's 212-523-5678 beeper 39965.
You may also contact the Patient Representative at 212-523-3700 if you have any questions.

9. VOLUNTARY PARTICIPATION

This is a voluntary participation that will not influence your care whether you choose to participate or not. You may withdraw from the study at anytime without repercussions.

10. COMPENSATION

There is no monetary compensation for participation in this study.

11. QUESTIONS

All participants in the study will have had the opportunity to ask questions and receive satisfactory answers.

12. COPY

All patients agreeing to participate in the study will receive a copy of their signed consent.

13. TERMINATION

Once the participant signs the consent to participate in the study all participants will take the survey for depression called the PHQ-9 if you score greater than an 11 on the survey you will be excluded from the study. This in no way will impact your present or future care.

14. COSTS TO SUBJECT

There are no additional costs to the patient, their families and their insurance company will not be billed any further expenses for participation in this study.

15. WITHDRAWAL BY SUBJECTS

You may withdraw from the study at anytime without repercussions. It would be greatly appreciated if you would notify the Primary Investigator, Peggy O'Malley NP if you wish to withdraw from the study at anytime during the study. If you choose to withdraw you will continue your care without any changes.

16. SUBJECT'S SIGNATURE

Sign_____

Witness_____

Date_____

Appendix D

Demographic Survey

The demographic scale was derived in part from the University of Wisconsin-Corperative Extension Program Development and Evaluation and www.surveymonkey.com.

Instructions: Please answer all questions to the best of your ability. Please mark your answer by circling the answer or fill in the blank. Thank you for your participation.

Demographic Scale

1. **Age**
   - What is your age? _____
2. **Sex**
   - Male
   - Female
3. **Race/ethnicity**
   - Black or African American
   - Hispanic decent, such as Mexican, Puerto Rican, Cuban or other Spanish background
   - Non-Hispanic White
   - American Indian or Alaska Native
   - Hawaiian or Other Pacific Islander
   - Asian or Asian American
4. **Marital Status** – are you:
   - Married
   - Divorced
   - Widowed
   - Separated
   - Never been married
   - A member of a unmarried couple
5. **Employment Status** -are you currently:
   - Employed for wages
   - Self-employed
   - Out of work for more than 1 year
   - Out of work for less than 1 year
   - A homemaker
   - A student
   - Retired
   - Unable to work

6. **Education completed**- What is the highest grade you completed?
    - Never attended school or only attended kindergarten
    - Grades 1-8 (Elementary)
    - Grades 9-11 (Some high school)
    - Grade 12 or GED (High school graduate)
    - College 1 to 3 years (Some college or technical school)
    - College 4 years (College graduate)
    - Graduate school (Advanced Degree)
7. **What is your religious preference?**
    - Mormon
    - Muslim
    - Protestant
    - Roman Catholic
    - An Orthodox church such as the Greek or Russian Orthodox Church
    - Seventh-Day Adventist
    - Christian Scientist
    - Jewish
    - Something else (please specify)
8. **Do you happen to be a member of a church, synagogue, mosque, or other organized religious group?**
    - Yes
    - No
9. **Do you pray?**
    - Yes
    - No
10. **What is your annual income?**
    - Under $20,000
    - $21,000- $40,000
    - $41,000-$60,000
    - $61,000-$80,000
    - $81,000-$100,000
    - Above $100,000
    - Above $200,000
11. **Do you have health insurance?**
    - Private insurance
    - Medicaid
    - Medicare
    - No insurance

12. Who do you live with?

- Alone
- Alone but with a home heath aide part-time
- Spouse of significant other
- Grown children
- Other family members
- Friends
- Roommate

13. Do you live in a

- Apartment
- House
- Shelter
- Homeless
- Nursing facility

Appendix E

Fatalism Scale

The Fatalism Scale developed and tested by Shen, Condit, & Wright (2009).
Instructions: Please mark the corresponding number on the scale next to each statement.

Questions	**Strongly Disagree**	**Disagree**	**Neither Disagree or Agree**	**Agree**	**Strongly Agree**
1. If someone is meant to get a serious disease, it doesn't matter what kinds of food they eat, they will get that disease anyway.	1	2	3	4	5
2. If someone is meant to get a serious disease, they will get it no matter what they do.	1	2	3	4	5
3. If someone gets a serious disease, that's the way they were meant to die.	1	2	3	4	5
4. If someone is meant to have a serious disease, they will get that disease.	1	2	3	4	5
5. If someone has a serious disease and gets treatment for it, they will probably still die from it.	1	2	3	4	5
6. If someone has a serious disease, it doesn't matter what doctors and nurses tell them to do, they will get the disease anyway.	1	2	3	4	5
7. How long I live is predetermined.	1	2	3	4	5
8. I will die when I am fated to die.	1	2	3	4	5
9. My health is determined by fate.	1	2	3	4	5
10. My health is determined by something greater than myself.	1	2	3	4	5
11. I will get diseases if I am unlucky.	1	2	3	4	5

12. My health is a matter of luck.	1	2	3	4	5
13. How long I live is a matter of luck.	1	2	3	4	5
14. I will stay healthy if I am lucky.	1	2	3	4	5
15. Everything that can go wrong for me does.	1	2	3	4	5
16. I will have a lot of pain from illness.	1	2	3	4	5
17. I will suffer a lot from bad health.	1	2	3	4	5
18. I often feel helpless in dealing with the problems of life	1	2	3	4	5
19. I sometimes I feel that I'm being pushed around in life.	1	2	3	4	5
20. There is really no way I can solve some of the problems I have.	1	2	3	4	5

Appendix F

Patient Health Questionnaire (PHQ-9)

Kroenke, Spitzer, and Williams (2001).

PATIENT HEALTH QUESTIONNAIRE (PHQ-9)

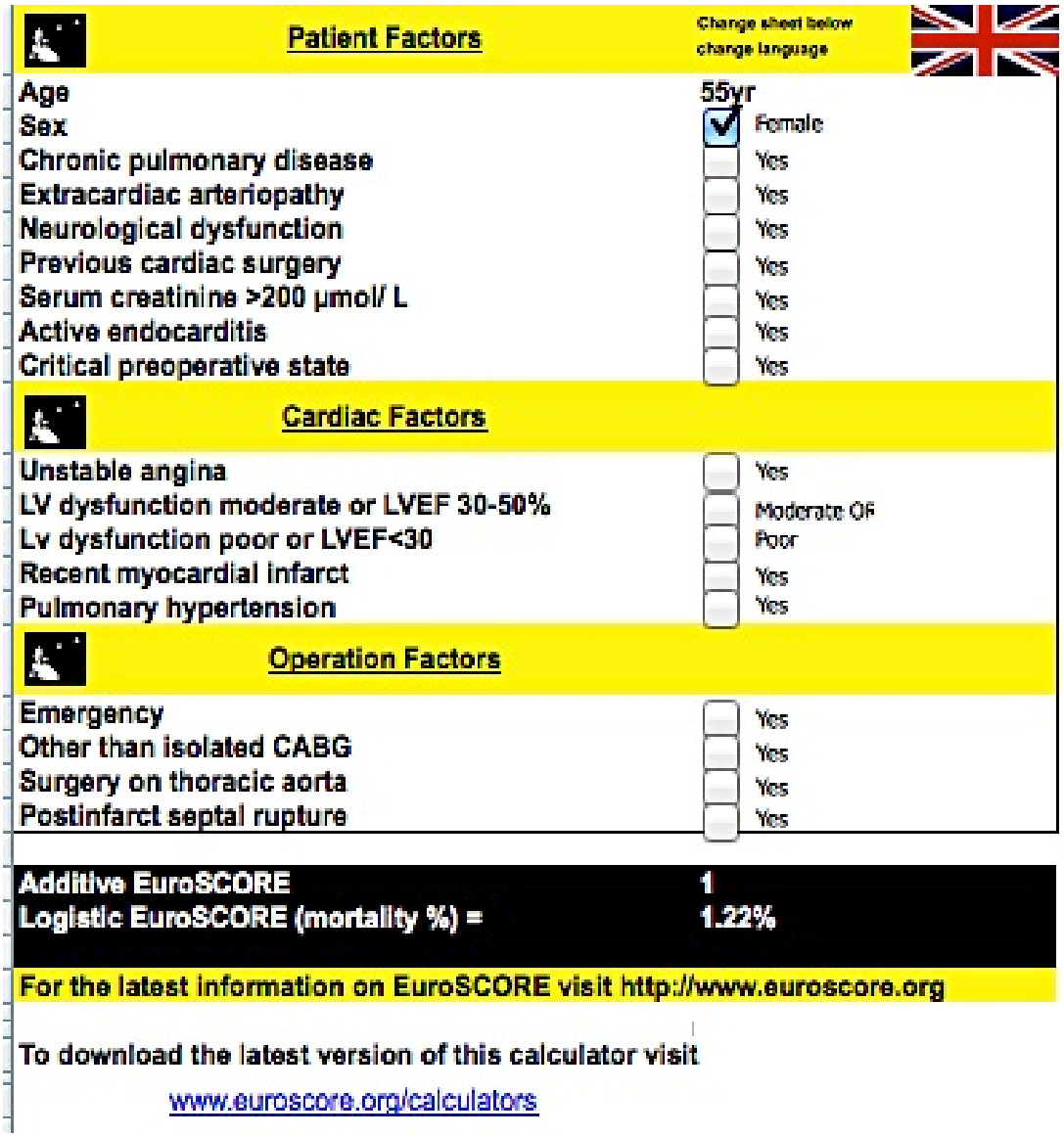
NAME:_____ DATE:_____

Over the last 2 weeks, how often have you been bothered by any of the following problems? *(use "✓" to indicate your answer)*	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed. Or the opposite — being so figety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead, or of hurting yourself	0	1	2	3
	add columns		+	+
(Healthcare professional: For interpretation of TOTAL, please refer to accompanying scoring card).		TOTAL:		

10. If you checked off *any problems*, how *difficult* have these problems made it for you to do your work, take care of things at home, or get along with other people?	
	Not difficult at all _____
	Somewhat difficult _____
	Very difficult _____
	Extremely difficult _____

Appendix G

Euroscore



Patient Factors	Change sheet below change language
Age	55yr
Sex	☑ Female
Chronic pulmonary disease	☐ Yes
Extracardiac arteriopathy	☐ Yes
Neurological dysfunction	☐ Yes
Previous cardiac surgery	☐ Yes
Serum creatinine >200 µmol/ L	☐ Yes
Active endocarditis	☐ Yes
Critical preoperative state	☐ Yes
Cardiac Factors	
Unstable angina	☐ Yes
LV dysfunction moderate or LVEF 30-50%	☐ Moderate OR
Lv dysfunction poor or LVEF<30	☐ Poor
Recent myocardial infarct	☐ Yes
Pulmonary hypertension	☐ Yes
Operation Factors	
Emergency	☐ Yes
Other than isolated CABG	☐ Yes
Surgery on thoracic aorta	☐ Yes
Postinfarct septal rupture	☐ Yes
Additive EuroSCORE	**1**
Logistic EuroSCORE (mortality %) =	**1.22%**

For the latest information on EuroSCORE visit http://www.euroscore.org

To download the latest version of this calculator visit

www.euroscore.org/calculators

Appendix H

Consensus Criteria

Depression Assessment PHQ-9 pre-op, 4-6 weeks post-op, and 12 weeks post-op

Fatalism Assessment prior to surgery

Demographic Survey prior to surgery

Medical and Intra-operative Data

Appendix I

Medical and Intra-operative Data Collection Sheet

Hypertension	Yes	No	
Diabetes	Yes	No	
Peripheral Vascular Disease	Yes	No	
Blood Transfusion	Yes	No	
Cross Clamp Time			
CPB			
Euroscore			
ICU Duration			
Hospital Duration			
Disposition	Home	SNF	Rehab
CABG	Yes vessels	No	
Valve Repair/replacement	Yes	No	Aortic Y/N
Repair/replacement			Mitral Y/N
Repair/replacement			Tricuspid Y/N