PREOPERATIVE DEPRESSION AND POSTOPERTIVE OUTCOMES IN OLDER ADULT CARDIAC SURGERY PATIENTS

by

ALAINA MICHELLE TELLSON

Presented to the Faculty of the Graduate School of

The University of Texas at Arlington in Partial Fulfillment

of the Requirements

for the Degree of

DOCTOR OF PHILOSOPHY

THE UNIVERSITY OF TEXAS AT ARLINGTON

May, 2016

Acknowledgements

I would like to express my sincerest gratitude to my committee. Thank you to Dr. Barbara Raudonis for countless hours spent as my committee chair and for all the endless efforts to inspire me and mentor me. You have walked my journey with me and I have grown in many ways because of you. Thank you to Dr. Cipher and Dr. John for also serving on my committee. Your input and insight are invaluable to me. I hope to make you all proud.

To all the faculty who influenced me along the way, thank you. Each one of you provided encouragement and elevated the quality of my work as I progressed. Thank you also to the Kyba Fellowship for the support and funding.

Thank you to my family for walking this journey with me. I would like to especially thank my son, Cameron Cyr, for all the sacrifices he made along the way. To my husband, Michael Tellson, your love and support were invaluable. You believed in me even when I didn't. Additionally, I would like thank my mother, who edited countless papers.

I would like to thank Baylor Scott & White Health System for support and funding as I went through this program. I cannot leave out the numerous friends, family, and colleagues who provided support, words of encouragement, and at times chocolate to help me realize my dream.

Finally, I thank God for guiding me and leading me to this day.

April 8, 2016

Abstract

PREOPERATIVE DEPRESSION

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ADULT CARDIAC SURGERY PATIENTS

Alaina Tellson, PhD

The University of Texas at Arlington, 2016

Supervising Professor: Barbara Raudonis

Depression following cardiac surgery has been reported in older adults; however, the evidence to date does not clearly specify the onset of depression and its relationship to cardiac surgery. The purpose of this descriptive, correlational study was to examine the association between preoperative depression and selected postoperative outcomes in older adults following CABG surgery. The five selected postoperative outcomes were 30 day readmission rate, hospital length of stay, intensive care unit length of stay, ventilator time, and 30 day mortality. A sample size of 87 older adult cardiovascular surgery patients was selected for this study. Thirteen (14.9%) of the participants had preoperative depression in. There were no significant relationships between preoperative depression and the postoperative outcomes of ICU length of stay, ventilator time,

hospital length of stay, 30-day readmission, and 30-day mortality in older adults in this study who underwent CABG. Multiple studies have been conducted with results that indicate postoperative depression is associated with poorer postoperative outcomes. It remains unclear if preoperative depression is associated with postoperative outcomes in this population. The gap in knowledge related to the presence of depression preoperatively and postoperative outcomes needs further exploration.

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Chapter 1

Introduction

The aging population of the United States is a "silver tsunami" creating a critical public health challenge (Morrison, 2013). As recently as 2012, a work group of the American Geriatrics Society and the American Academy of Hospice and Palliative Medicine (AGS & AAHPM) reported that individuals with multiple chronic illnesses (comorbidities) are living longer as an outcome of advances in technology and life prolonging care. Comorbidities are associated with decreased quality of life, declining functional status, and increased health care utilization (Aminzadeh & Dalziel, 2002; Ritchie & Zulman, 2013; Samaras, Chevalley, Samaras, & Gold, 2010).

The primary cause of death for older adults is cardiovascular disease (American Heart Association, 2013; Samaras et al., 2010). Comorbidities, such as depression, further complicate the treatment of cardiovascular disease in older adults (Aminzadeh & Dalziel, 2002; Samaras et al., 2010). Depression has been reported as being present following cardiac surgery in older adults; however, the evidence to date does not clearly specify the onset of depression and its relationship to cardiac surgery (Rosborough, 2006).

Chapter one includes discussion of the background and significance of the problem of depression in relationship to cardiac surgery in older adults. The

study's research framework, propositions, purpose, research questions, and assumptions are also discussed in chapter one.

Background and Significance

Demographics of the Aging Population

There are more people in the United States over the age of 65 than ever before, and this trend is anticipated to continue as the Baby Boom generation ages (Kurlowicz, Outlaw, Ratcliffe, & Evans, 2005; U.S. Census Bureau, 2013). The older adult population is the fastest growing population in the United States with an estimated 40.2 million Americans who were aged 65 or older in 2010 that accounted for 13% of the total population (U.S. Census Bureau, 2013). The number of males over the age of 65 increased more rapidly than the number of females. The number of males increased by 20.5% and females increased by 11.3% between 2000 and 2010 (U.S. Census Bureau, 2013). It is estimated that by 2030, approximately 19% of the U.S. population will be aged 65 or older (Administration on Aging, 2014). The number of older adults aged 85 or older is the fastest growing component of the aging population and increased 29.9% from 2000 to 2010 (U.S. Census Bureau, 2013).

Comorbidities and Aging

Physiological changes normally occur as a person ages. A common change in older adults is decreased sensory perception with potential decreases in hearing, taste, sight, smell, and touch (Capezuti, Zwicker, Fulmer, Boltz, & O'Meara, 2012). Mobility often decreases, making the older adult more susceptible to falls (Aminzdeh

& Dalziel, 2002; Samaras et al, 2010). In addition to the normal changes of aging, many older adults experience both physical and mental health issues (Capezuti et al., 2012). One of the most common diagnoses in the older adult is cardiovascular disease (Aminzadeh & Dalziel, 2002, Samaras et al., 2010), and coronary artery bypass graft (CABG) surgery is one of the most common surgical treatments (DeFrances & Hall, 2004; Go et al., 2014).

As people age, they frequently experience multiple chronic illnesses. The presence of comorbidities further increases the risk for a myriad of health complications and higher healthcare utilization (Aminzadeh & Dalziel, 2002; Samaras et al., 2010). Common comorbidities in the older adult population include diabetes, respiratory illnesses, arthritis, cardiovascular disease, and mental illness, such as depression (Blanchette et al., 2009; Yancik et al., 2007). These diagnoses increase the risk for older adults to have more frequent outpatient medical visits, emergency department visits, and hospital admissions than younger persons (Aminzadeh & Dalziel, 2002; Samaras et al., 2010). Treatment for the above chronic illnesses frequently includes the use of multiple medications. The use of three or more medications, polypharmacy, increases the risk for complications in the older adult population (Mizokami, Koide, Noro, & Furuta, 2012; Richardson, Ananou, Lafortune, Brayne, & Matthews, 2011).

Cardiovascular Disease in Older Adults

Thirty percent of all diagnosed myocardial infarctions are in older adults over the age of 75, and over 60% of patients hospitalized for unstable anginas are aged 65 or greater (Samaras et al., 2010). Eighty-five percent of all deaths caused by cardiovascular disease occur in older adults (American Heart Association, 2013; Samaras et al., 2010).

One of the most common treatments for cardiovascular disease, such as those related to atherosclerosis or myocardial infarction is CABG surgery (DeFrances & Hall, 2004; Go et al., 2014). Out of the approximate 7.5 million cardiovascular procedures performed annually, over a million are CABGs (DeFrances & Hall, 2004; Go et al., 2014).

Depression and Cardiovascular Disease

Comorbidities such as depression in the older adult are known to increase the risk for the development of cardiovascular disease and cardiac arrhythmias (Lloyd-Jones et al., 2006). Cardiovascular disease and cardiac surgery are often complicated by comorbidities such as depression (Peters et al., 2010). The presence of depression is associated with increases in mortality risk, the risk for postoperative complications, and long term recovery following cardiac surgery (Ahto, Isoaho, Puolijoki, Vahlberg, & Kivela, 2007; Chunta, 2009; Dolansky & Moore 2007; Rosborough, 2006; Thombs et al., 2008).

Mental illnesses such as depression can also affect the health and quality of life of older adults. Depression is not a normal part of the aging process but is often under recognized and under treated in older adults (Law, Laidlaw, & Peck, 2010; National Institutes of Mental Health, 2013). Approximately 15% of older adults suffer from some form of depression (Geriatric Mental Health Foundation, 2014). Depression has been reported in approximately 36% of all patients following myocardial infarction or cardiac surgery (Ahto et al., 2007; Dolansky & Moore, 2007; Rosborough, 2006). An association between postoperative depression and poor outcomes such as increased time on a ventilator, readmissions, and increased length of stay following cardiovascular surgery has been documented in the literature (Elderon & Whooley, 2013; Navaro-Garcia et al., 2011, Peters et al., 2010). In addition, depression is the leading cause of disability in older adults who are vulnerable following hospitalization for surgery, with 80% of all depressed persons reporting difficulty in functioning following surgery due to depression (Dolansky & Moore, 2007; Hybels, Pieper, & Blazer, 2009).

There has been limited research related to preoperative screening for depression in older adults undergoing cardiac surgery. It is unknown if the reported depression after surgery was actually present prior to the surgical procedure Research is needed to determine if there is an association between preoperative depression in older cardiovascular surgery patients and postoperative

outcomes (ventilator time, ICU length of stay, hospital length of stay, hospital readmission, and mortality).

Framework

The theoretical framework for this descriptive correlational study was Roy's Adaptation Model (Roy, 2009). The basic premise of Roy's Adaptation Model (figure 1) is that external and/or internal stimuli evoke a response. A person's coping mechanisms or lack thereof affect his/her ability to adapt and have an effective response to the stimuli (Andrews & Roy, 1986). Roy (2009) postulated that stimuli provoke responses mediated by coping mechanisms in an individual.

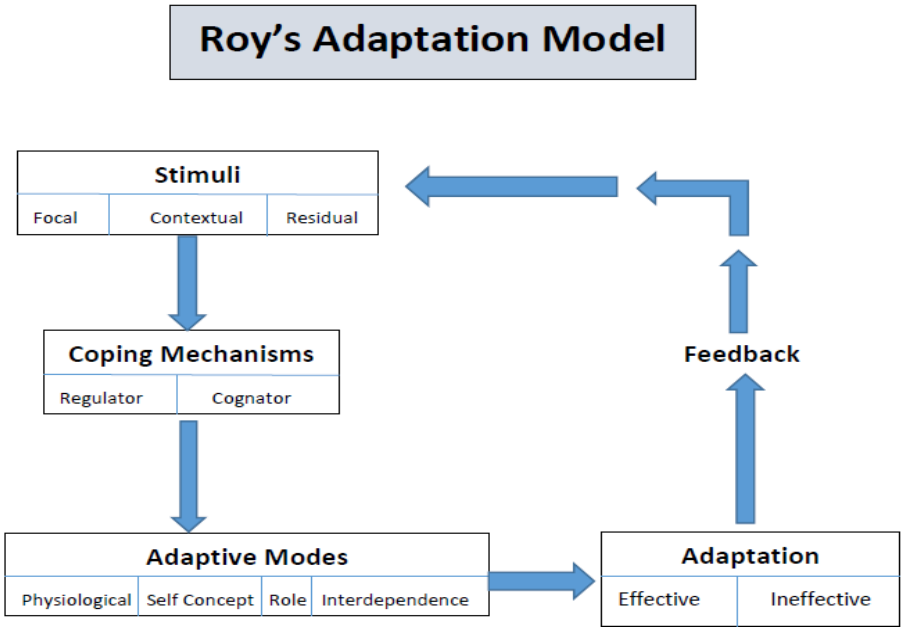

Figure 1: Roy's Adaptation Model. Adapted from Roy, S. C, & Andrews, H. A. (1991). *The Roy Adaptation Model: The definitive statement.* East Norwalk, CT: Appleton & Lange. John, L. D. (1997). *Quality of life in patients receiving curative radiation therapy for non-small cell lung cancer.* (Doctoral dissertation, Texas Women's University, Denton, TX).

Roy's Adaptation Model (Figure 1) depicts a person as a system that adapts either effectively or ineffectively to stimuli via coping mechanisms and adaptive modes (Roy, 2009). There are three types of stimuli: focal, contextual, and residual (Roy & Andrews, 1999). Focal stimuli are internal or external factors which most readily confront a person and vie for the most attention and adaptive energy. Contextual stimuli are all the other stimuli present that either

positively or negatively add to the focal stimuli. Residual stimuli include other environmental factors that may affect the person's response to focal stimuli, but they are not readily identifiable. Residual stimuli affect the focal stimuli, but the effects are unclear (Roy, 2009).

Coping mechanisms are the control processes a person utilizes in response to stimuli (Roy & Andrews, 1991; Roy & Andrews, 1999). Coping mechanisms are either innate or acquired methods of responding to stimuli and are categorized as the regulator and the cognator subsystems (Roy, 2009; Roy & Andrews, 1999). The regulator subsystem responds primarily through neurological, chemical, and endocrine processes. cognator subsystem responds through cognitive-emotional processes (Roy, 2009).

The resulting behaviors from the coping mechanisms are observed through four adaptive modes: physiological, self-concept, role function, and interdependence (Roy, 2009; Roy & Andrews, 1991). The physiological adaptive mode is comprised of the ways people interact with their environment through physiological processes in order to meet the basic needs for life. The self-concept adaptive mode relates to a person's desire to know who he/she is and how to act within society. A person's self-concept is comprised of beliefs or feelings about him/herself. The role function adaptive mode describes the expectations about how a person is to conduct him/herself within society. The interdependence adaptive mode describes the interactions of people in society. The purpose of the

four adaptive modes is to achieve physiological, psychological, and social integrity (Roy, 2009; Roy & Andrews, 1991).

Adaptation is comprised of the responses that result from the adaptive mode activity (Roy, 2009; Roy & Andrews, 1999). Effective adaptation promotes integrity and wholeness of persons as adaptive systems and occurs when a person responds positively to stimuli (Roy & Andrews, 1991; Roy & Andrews, 1999). Adaptation leads to feedback adding further input to the person as an adaptive system. This feedback allows a person to determine the need to increase or decrease coping mechanisms in response to stimuli (Roy, 2009; Roy & Andrews, 1999).

Application of the Roy Adaptation Model to the Study

Stimuli such as depression, older age, cardiovascular disease, and hospitalization evoke a response from those undergoing cardiovascular surgery. Coping mechanisms are activated through both physiological and cognitive-emotional processes via the regulator and cognator subsystems. For instance, immune and inflammatory responses are activated due to illness and the surgical procedure. The four adaptive modes mediate a response to the stimuli (Roy, 2009). In persons undergoing cardiovascular surgery, the four adaptive modes are potentially activated. The physiological adaptive mode involves ways in which the person responds to the physical needs of the body such as immune and

inflammatory responses due to cardiovascular disease and subsequent surgery (Ader, 2007; Karu et al., 2010; Whitson et al., 2011).

The self-concept adaptive mode, role function adaptive mode, and the interdependence adaptive mode may be used to process reactions to changes in lifestyle due to cardiovascular disease and surgery. Effective coping mechanisms increase the chances for adaptive responses to occur such as recovery from cardiovascular surgery (Roy, 2009). Although the relationship of acute postoperative depression with postoperative outcomes in cardiovascular surgery patients has been well documented in the literature, the association of these outcomes with preoperative depression has yet to be established.

Research Framework for this Study

The focus of this study was the relationship between the contextual stimulus (depression status) and adaptation (postoperative outcomes: ventilator time, ICU length of stay, hospital length of stay, hospital readmission and mortality) (Figure 2). The focal stimuli were CABG surgery and cardiovascular disease.

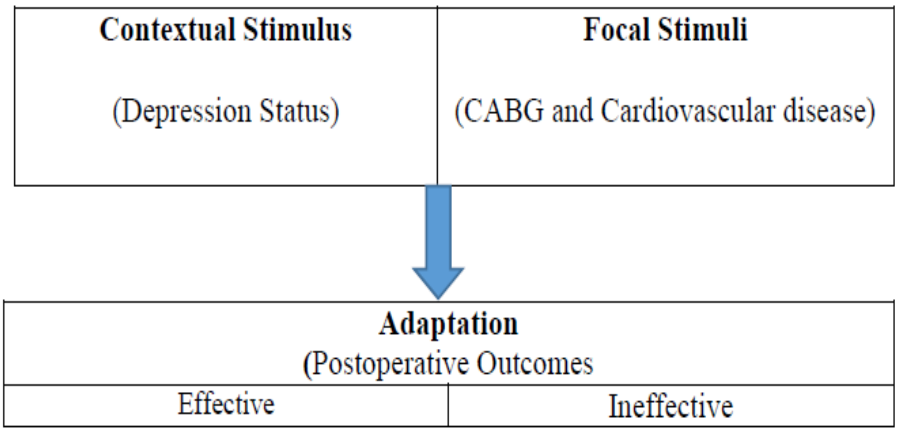

Figure 2: Study's Research Framework Based on Roy's Adaptation Model

The research variables related to the selected concepts are defined in Table 1.

The operational definitions for the variables of interest are described in Chapter 3.

Table 1
Conceptual definitions of the variables

Variable	Conceptual Definition of Variables
Depression	A contextual stimulus characterized by cognitive, affective, and somatic symptoms
30 day readmission	Ineffective adaptation reflected by hospital readmission within 30 days following CABG surgery
30 day mortality	Ineffective adaptation reflected by death within 30 days following CABG surgery
ICU length of stay	Level of adaptation reflected by number of hours patient spent in an ICU during the hospitalization
Hospital length of stay	Level of adaptation reflected by number of days a patient was hospitalized following CABG surgery
Ventilator time	Level of adaptation reflected by the number of hours patient spent on a ventilator following CABG surgery

Propositions

Based on the research framework the following is the proposition for the study:

1. A contextual stimulus (depression) is related to the level of adaptation (postoperative outcomes).

Purpose

The purpose of this descriptive, correlational study was to examine the association between preoperative depression and selected postoperative outcomes in older adults following CABG surgery. The five selected postoperative outcomes were 30 day readmission rate, hospital length of stay, intensive care unit length of stay, ventilator time, and 30 day mortality.

Research Questions

The following research questions were addressed in this study:

For older adult patients following CABG surgery:

1. What is the association between preoperative depression and 30 day readmission rates?
2. What is the association between preoperative depression and hospital length of stay?
3. What is the association between preoperative depression and ICU length of stay?
4. What is the association between preoperative depression and the time the patient is on the ventilator postoperatively?

5. .What is the association between preoperative depression and 30 day mortality rates?

Assumptions

The following assumptions are related to the research framework and the study design.

1. Older adults undergoing cardiac surgery respond to stimuli from their internal and external environments
2. Older adults undergoing cardiac surgery can adapt and respond effectively or ineffectively to internal and external stimuli.
3. Some older adults experience depression before cardiac surgery.

Summary

This chapter included a discussion of the background and significance of the problem of depression in older adults undergoing CABG and supports the need for research related to preoperative depression and its association with postoperative outcomes. A description and discussion of the use of Roy's Adaptation Model as a framework for this study was included. The purpose, research questions, and assumptions were also described in this chapter as well.

Chapter 2

Critical Review of the Relevant Literature

There are more people in the United States over the age of 65 than ever before, and this trend is expected to continue due to the aging of the Baby Boom generation (Administration on Aging, 2014; U.S. Census Bureau, 2013). As people age, they frequently experience more than one chronic illness. The presence of comorbidities further increases the risk for a myriad of health complications and higher healthcare utilization (Aminzadeh & Dalziel, 2002; Samaras et al., 2010). Common comorbidities in the older adult population include diabetes, respiratory illnesses, arthritis, cardiovascular disease, and mental illness, such as depression (Blanchette et al., 2009; Yanick et al., 2007).

Cardiovascular disease is the primary cause of death in the United States, especially in adults over the age of 65 (American Heart Association, 2013). Cardiovascular disease is often further complicated by other comorbidities. Decreasing the development of and complications from cardiovascular disease is important in improving the health status of the older adult population (Page, Ghushuchyan, & Nair, 2011).

Mental illnesses such as depression can also affect the health and quality of life of older adults. Approximately 15% of older adults suffer from some form of depression (Geriatric Mental Health Foundation, 2014). Depression has been reported in approximately 36% of all patients following myocardial infarction or

cardiac surgery (Ahto et al., 2007; Dolansky & Moore, 2007; Rosborough, 2006). An association between postoperative depression and poor outcomes from cardiovascular surgery has been documented in the literature (Elderon & Whooley, 2013; Peters et al., 2010). Recently, the U.S. Preventive Services Task Force (2016) recommended screening the adult population, including older adults, routinely for depression and recommended that systems be in place to assist with diagnosis, treatment, and follow-up. The prevalence of existing depression prior to cardiac surgery is unknown. This chapter will include descriptions of two common comorbidities in the older adult population, depression and cardiovascular disease, and the association between depression and cardiovascular surgical outcomes.

Population: Older Adults

The older adult population is the fastest growing population in the United States with an estimated 40.2 million Americans aged 65 or older in 2010 that accounted for 13% of the total population (U.S. Census Bureau, 2013). It is estimated that by 2030 approximately 19% of the U.S. population will be aged 65 or older (Administration on Aging, 2014).

Physiological changes normally occur as a person ages. A common change in older adults is decreased sensory perception with potential decreases in hearing, taste, sight, smell, and touch (Capezuti et al., 2012). In addition to the

normal changes of aging, many older adults experience both physical and mental health issues (Capezuti et al., 2012).

The most common diagnoses in older adults include cardiovascular disease, depression, diabetes, obesity, acute cerebrovascular accidents, pneumonia, osteoporosis, and injuries related to falls (Centers for Disease Control and Prevention, 2013). Comorbidities in older adults also lead to increased use of healthcare resources (Federal Interagency Forum on Aging-Related Statistics, 2012; Page et al., 2011). These diagnoses increase older adults' risk for more frequent outpatient medical visits, emergency department visits, and hospital readmissions compared to that in younger persons (Aminzadeh & Dalziel, 2002; Centers for Disease Control and Prevention, 2013; Samaras et al., 2010). Treatment for the above diseases frequently includes the use of multiple medications. The use of three or more medications, polypharmacy, increases the risk for complications in the older adult population (Mizokami et al, 2012; Richardson et al., 2011).

Cardiovascular Disease

Prevalence and Costs

Common comorbidities such as depression in older adults have been associated with an increased risk for the development of cardiovascular disease and cardiac arrhythmias (Page et al., 2011). Cardiovascular disease is the leading cause of death for persons aged 65 or older (American Heart Association, 2013;

Federal Interagency Forum on Aging Related Statistics, 2012). Thirty percent of all diagnosed myocardial infarctions are in older adults over the age of 75, and over 60% of patients hospitalized for unstable anginas are aged 65 or greater. Eighty-five percent of all deaths caused by cardiovascular disease occur in older adults (American Heart Association, 2013). Cardiovascular disease has the highest costs of any diagnostic group and accounts for over $297.7 billion in medical costs per year (Page et al., 2011; Roger et al., 2012).

Types of Cardiovascular Disease

Cardiovascular disease is a broad term referring to disease of the heart and/or blood vessel(s) which can be slow in progression or have a sudden onset (Page et al., 2011; Skaggs et al., 2007). Cardiovascular disease includes but is not limited to atherosclerosis, myocardial infarction, valvular disease, cardiac arrhythmias, and heart failure (American Heart Association, 2013; Page et al., 2011). Most cardiovascular diseases are related to atherosclerosis. Atherosclerosis occurs when there is a development of plaque buildup within the walls of arteries. The plaque buildup causes a narrowing of the arteries which partially or completely obstructs the flow of blood through the artery (American Heart Association, 2013; Leeper, Cyr, Lambert, & Martin, 2011).

Myocardial infarctions, commonly known as heart attacks, occur when the flow of blood to a portion of the heart is either completely or partially occluded by a blood clot or plaque formation in the coronary arteries (American Heart

Association, 2013). The surrounding cardiac muscle can become ischemic if the artery is completely blocked which can potentially lead to cardiac arrest (American Heart Association, 2013).

Heart failure occurs when the heart is not sufficiently pumping blood due to structural disease processes such as cardiomyopathy or valvular disease. Heart failure is often characterized by exercise intolerance, breathlessness, nocturnal dyspnea, and fluid retention. If left untreated, heart failure progressively worsens (Albert, 2012; American Heart Associations, 2013; Son, Lee, & Song, 2011).

Cardiac arrhythmia is a term used to describe an abnormal heart rhythm caused by an electrical abnormality in the heart (American Heart Association, 2013; Langseth, Sheperd, Thomason, & Lord, 2012). There are a variety of cardiac arrhythmias which vary in severity (Langseth et al., 2012). Common arrhythmias include bradycardia and tachycardia. Bradycardia refers to a heart rate that is less than 60 beats per minute, and tachycardia refers to heart rates over 100 beats per minute (American Heart Association, 2013). Cardiac arrhythmias can lead to a variety of conditions that are potentially fatal if left untreated (American Heart Association, 2013; Langseth et al., 2012).

Valvular disease occurs when the valves in the heart fail to open or close properly (American Heart Association, 2013). Failure of a valve to close properly causes regurgitation, allowing blood to flow back through the valve. Stenosis occurs when valves fail to open properly due to hardening of the valve which does

not allow the blood to flow in the proper manner. Another condition, mitral valve prolapse, is a bulging or prolapse of the leaflet of the mitral valve back into the atrium allowing blood to flow backwards through the mitral valve (American Heart Association, 2013; Piaschyk et al., 2011).

Management

Cardiovascular disease is managed in a variety of ways. Treatments for cardiovascular disease include both non-surgical and surgical methods. Optimally, individuals are treated non-surgically before surgical methods are used; however, invasive procedures are often performed to diagnose a variety of cardiovascular diseases (American Heart Association, 2013).

Non-Surgical. Medications are often used to treat cardiac disease by preventing clot formation, breaking down cholesterol, altering abnormal heart rhythms, and/or preventing plaque buildup in the arteries (American Heart Association, 2013). The goal of treatment of cardiac arrhythmias is to alter the heart rhythm to a more normal state (Langseth et al., 2012; Sargent, 2009). Cardiac arrhythmias are treated with antiarrhythmic medications and/or cardioversion (American Heart Association, 2013; Langseth et al., 2012; Sargent, 2009). Heart failure is managed with medications to improve heart function and diuretic therapy to decrease sodium and water retention (Gaggin et al., 2012; McMurray et al., 2012). A low sodium diet is used in the management of heart failure and other cardiac diseases. A low sodium diet has been associated with

symptom relief and a longer survival rate in those with heart failure (Son et al., 2011). In addition, lifestyle modifications such as increased exercise and a low fat diet are useful in the management and treatment of cardiac disease (American Heart Association, 2013; Gaggin et al., 2012; McMurray et al., 2012).

Surgical/Invasive Procedures. Surgical intervention is often indicated for heart valve disease (American Heart Association, 2013). Surgeries to treat heart valve disease include valve reconstructions, valve repair, or valve replacement depending on the extent of the disease (National Heart, Lung and Blood Institute, 2016). Cardiac arrhythmias are treated with several invasive procedures such as cardiac ablation, pacemaker, and/or cardiac defibrillator placement (American Heart Association, 2013; Langseth et al., 2012; Sargent, 2009). In addition to non-surgical methods, heart failure patients may also be treated with implantable cardiac devices such as cardiac defibrillators and pacemakers to control or prevent potentially fatal arrhythmias (McMurray et al., 2012). Severe heart failure may be treated with cardiac surgery including CABG for revascularization of the heart to improve blood flow. In end-stage heart failure, heart transplants or mechanical circulatory support may be indicated (McMurray et al., 2012).

The most common treatment for cardiovascular disease such as those related to atherosclerosis or myocardial infarction is myocardial revascularization such as percutaneous coronary interventions (PCI) and CABG surgery (Levine et

al., 2011). PCI is used to revascularize the heart and includes angioplasty which displaces the plaque buildup in the vessel and enlarges the vessel often with the use of an inflated balloon. Additionally stents are often placed to prevent closure of the vessel (Levine et al., 2011). Approximately 30% of persons who underwent PCI have a reocclusion of the vessel or a return of symptoms and will need to have a CABG performed (Levine et al., 2011). Approximately 10% of the estimated 4.5 million interventional cardiovascular procedures annually are CABGs (Centers for Disease Control and Prevention, 2016).

Recovery/Complications

Following cardiac surgery, patients are often in the intensive care unit for a day or two for hemodynamic and cardiac monitoring (Piaschyk et al., 2011; South, 2011). The individual may or may not be intubated depending on the length of the surgery and previous respiratory status. If intubated, it is optimal to remove the breathing tube as soon as possible because the presence of the tube can lead to further complications such as ventilator associated pneumonia and increased length of stay (Piaschyk et al., 2011; South 2011). Activity is essential to the recovery process. As soon as the individual is able, activities such as sitting up in a chair, leg exercises (flexing the feet and toes), and ambulating in the hallway are encouraged (Piaschyk et al., 2011). Activity decreases the likelihood of blood clot formation and helps to expand the lungs, decreasing the potential for respiratory complications (Piaschyk et al., 2011).

Following cardiac surgery, persons younger than 65 years of age have a mortality rate of 2.7% to 4.1% compared to older adults with a mortality rate of 5.8% to 11% (Richards, 2007). Compared to their younger counterparts, older adults are at an increased risk for mortality after undergoing cardiac surgery due to a higher risk for developing complications such as pneumonia, prolonged ventilator time, increased rate of hypertension, and decreased functional status as compared to their younger counterparts (Curiel-Balsera et al., 2013; Peters et al., 2010).

Secondary prevention is an important component of recovery. Lifestyle changes may be needed to decrease the risk of further cardiovascular disease or complications due to diabetes, diet, obesity, depression, or other risk factors (Piaschyk et al., 2011). Patients typically need cardiac rehabilitation following cardiac surgery. Continuation of exercise following cardiac rehabilitation is vital to long-term recovery; however, 25% of older adult patients report no longer exercising following completion of cardiac rehabilitation, increasing their risk for complications, disability, and future cardiac events (Schulz, Zimmerman, Barnason, & Nieveen, 2005). In a study of 225 cardiac rehab patients, participants with depression were five times more likely to not complete a cardiac rehab program than their non-depressed counterparts (Beckie, Beckstead, Schocken, Evens & Fletcher, 2011).

Depression has been associated with an increase in complications of cardiovascular disease and cardiac surgery (Peters et al., 2010). The presence of depression postoperatively may also complicate the long-term recovery following cardiac surgery (Ahto et al., 2007; Chunta, 2009; Thombs et al., 2008). Multiple researchers have reported a relationship between the development of depression postoperatively and poor outcomes (fatigue, mortality, and functional limitations) in adult cardiac surgery patients (Barnason et al., 2008; Carney et al., 2005; Dolansky & Moore, 2007; Jokinen, Hippel, Turpeinen, Pitk, & Hartikainen, 2010; Tully, Baker, Turnbull, & Winefield, 2008).

Depression

Prevalence and Costs

Depression has been reported in approximately 20-25% of all hospitalized patients (Baker, Andrew, Schrader, & Knight, 2001; Draper, 2000). Fifteen to twenty percent of general CABG patients experience depression (Tully & Baker, 2012). Although depression is not a normal part of the aging process, it is often under recognized and under treated in older adults (Law et al., 2010; National Institutes of Mental Health, 2013). Approximately 15% of older adults suffer from some form of depression (Geriatric Mental Health Foundation, 2014). Depression has been reported in 5-9% of persons younger than 65 (American Psychiatric Association, 2000). In addition, the annual cost of treating depression exceeds $83 billion (Pratt & Brody, 2010).

Description

Clinically, depression is defined as the following:

Depressed mood and/or loss of interest or pleasure in life activities for at least two weeks and at least five of the following symptoms that cause clinically significant impairment in social, work, or other important areas of functioning almost every day.

- Depressed mood most of the day
- Diminished interest or pleasure in all or most activities
- Insomnia or sleeping too much
- Agitation or psychomotor retardation noticed by others
- Fatigue or loss of energy
- Feelings of worthlessness or excessive guilt
- Diminished ability to think or concentrate, or indecisiveness
- Recurrent thoughts of death (American Psychiatric Association, 2000, p. 356).

In research studies, depression is frequently defined as a disorder characterized by cognitive, affective, and somatic symptoms. Common characteristics of depression include sadness, changes in appetite, altered sleep patterns, feelings of hopelessness, pessimism, a sense of failure, lack of satisfaction, feelings of guilt, a sense of punishment, suicidal ideations, social

withdrawal, low energy, and loss of libido (Martin & Haynes, 2000; Schienthal, Steer, Griffin, & Beck, 2001; Yesavage et al., 1986).

Preoperative Depression

There is a dearth of research related to preoperative depression and postoperative outcomes. Navarro-Garcia and associates (2011) conducted a study to identify risk factors associated with the development of preoperative anxiety and/or depression and rates of ventilator support, presence of arrhythmias, postoperative pain, intensive care unit readmissions, length of stay, and mortality in 100 adult cardiac surgery patients. The researchers used the Hospital Anxiety and Depression Scale which includes a subscale specific to depression. Nineteen percent of the subjects were found to be depressed preoperatively. The researchers found that the average length of stay for those with depression was five days compared to three days for those who were not depressed. There were no significant findings in this study among the patients with depression and those without depression related to ventilator support, presence of arrhythmias, postoperative pain, readmission to the ICU, or mortality (Navarro-Garcia et al., 2011).

A study was conducted by Tully and associates (2008) to determine the association between pre- and postoperative depression, anxiety, stress, and readmission rates in 222 adult patients following cardiac surgery (mean age 63). Depression was measured both preoperatively and postoperatively while the

patients were still hospitalized using the Depression Anxiety Stress Scale (DASS). The DASS includes a subscale specific to depression. Twenty percent of the subjects were found to suffer from depression preoperatively. The researchers found a positive association between preoperative depression scores and readmission rates ($p = .04$). It is not clear if the presence of high depression scores was the primary reason for readmission or if it was the combination of anxiety and depression.

Tully and Baker (2012) conducted a review of literature, from 2000-2011, related to depression, anxiety, and cardiac morbidity outcomes after CABG. They reported that multiple researchers have recommended routine postoperative screening for depression. They concluded that there is a lack of evidence to support the need for routine preoperative depression screening in CABG patients (Tully & Baker, 2012).

Poole and associates (2014) conducted a secondary analysis on data collected for the Adjustment and Recovery after Cardiac Surgery Study (ARCS) conducted from June 2010-July 2012. The mean age of the 310 study participants included in the study was 67 years. The purpose of this secondary analysis was to explain the association between pre-operative depression and hospital length of stay in patients undergoing CABG and the role of socioeconomic status. The subjects in the study completed the Beck Depression Inventory (BDI) prior to surgery. The BDI is a 21-item questionnaire used to assess depressive symptoms.

The researchers found that 30.3% of subjects had some form of depression prior to surgery. Following surgery, those patients with higher scores on the BDI before surgery had longer hospital length of stays (Poole et al., 2014).

Mortality has been reported to be higher in depressed patients compared to non-depressed patients. A study conducted to examine preoperative depression and mortality in coronary artery bypass surgery patients concluded that depressed patients were more likely to die within two years of surgery (Baker, Andrew et al., 2001). The researchers administered the Depression Anxiety Stress Scale (DASS) to 158 preoperative CABG patients and found that 12.5% (24) suffered from depression. Within two years of surgery, 15.2% of the depressed subjects had died compared to 2.2% of those who were non-depressed ($p = 0.046$).

Major adverse cardiac and cerebrovascular events (MACCE) have been found to have a higher prevalence in patients found to be depressed preoperatively (Cserep et al., 2010). The postoperative outcomes used to define MACCE included angina, congestive heart failure, myocardial infarction, percutaneous coronary angioplasty, survived cardiac arrest, and death due to cardiac causes, stroke, repeated CABG, and valve replacement.

Screening for depression preoperatively is not currently a standard of practice. Initial preoperative assessments should include screening for feelings of hopelessness, worthlessness, and suicidal ideations to meet Joint Commission

standards for assessing suicide risk, but no assessment specific to depression is routinely conducted nor required (Joint Commission, 2016).

A few researchers have recommended that older adult patients be screened for depression and appropriate referrals made to decrease the impact depression has on recovery from a variety of disease processes and/or procedures (Cully et al., 2005). For example, Cully and associates (2005) conducted a study to examine the association between functional ability and depression in both stroke and non-stroke patients (n = 509). They found that depression was negatively associated with functional status regardless of the patient's medical diagnosis. They recommended routine screening for depression prior to implementing a rehabilitation program for patients (Cully et al., 2005).

Consequences of Postoperative Depression

Depression has been reported in approximately 36% of all patients following myocardial infarction or cardiac surgery (Ahto et al., 2007; Dolansky & Moore, 2007; Rosborough, 2006). Depression is the leading cause of disability in older adults who are vulnerable following hospitalization for surgery. Eighty percent of all depressed persons report difficulty in functioning due to depression following surgery (Hybels et al., 2009). Sorenson and Wang (2009) found a significant inverse relationship (r = -.64, p = 0.000) between depression and functional status post-operatively in a study of 70 older adults (mean age 72) who underwent CABG surgery.

Fatigue is often reported in older adult patients following surgery and is associated with depression. Fatigue is a barrier to participation in physical activity and social functioning and increases the risk for disability (Barnason et al., 2008). Disability leads to an increased burden on family members and other caregivers who must provide care for disabled older individuals (Barnason et al., 2008).

Concurrent Depression and Cardiovascular Disease

Depression is a cause of concern in the older adult population with cardiovascular disease due to the relationship between depression and increased risks for complications and mortality following cardiac surgery (Hybels at al., 2007). Researchers have reported relationships between depression and the following variables: hospital readmission rates, delayed hospital discharges, increased mortality, decreased functional status, increased risk for future cardiac events, acute illnesses, and decreased productivity following cardiovascular surgery and acute cardiac events such as myocardial infarctions (Blanchette et al., 2009; Chunta, 2009; Jokinen et al., 2010; Navarro-Garcia et al., 2011).

Depression has been reported as an independent predictor of hospital readmission rates. Patients with depression are at an 8% increased risk for readmission (Tully et al., 2008). Approximately 51% of patients who are suffering from depression after being discharged from the hospital following a cardiac event or cardiac surgery will be readmitted within one year. About 56%

of patients suffering from depression following hospitalization for a cardiac event or cardiac surgery will visit an emergency room within one year. Another 19% will visit an acute care center within one year following the original event or surgery (Blanchette et al., 2009). In addition, persons suffering from depression are more likely to be non-adherent with medications, cardiac rehabilitation, and life styles changes than their non-depressed counterparts (Beckie et al., 2011; Tully et al., 2008).

Depression can potentially be associated with higher mortality rates. Carney and associates (2008) conducted a study on the association of depression and five year mortality rates in persons who suffered an acute myocardial infarction (n = 766). They found that depression was an independent risk factor for decreased survival following acute myocardial infarctions. Tully and Baker (2012) found that depression increases the risk for mortality in patients who underwent CABG while still hospitalized following surgery.

Summary

This chapter included descriptions of two common comorbidities in the older adult population, depression and cardiovascular disease, and the association between depression and cardiovascular surgical outcomes.

Chapter 3

Methods and Procedures

This chapter includes a description of the methods and procedures which were used to examine the association between preoperative depression and postoperative outcomes in older adults following CABG surgery. The five selected postoperative outcomes were ventilator time, ICU length of stay, hospital length of stay, 30 day readmission rate, and 30 day mortality. The chapter also includes a description of the research design, sample, setting, measurement methods, procedures, ethical considerations, data analysis, and delimitations.

Research Design

A descriptive, correlational design was used for this study. The purpose of the study was to examine the association between preoperative depression and selected postoperative outcomes in older adults following CABG surgery. A correlational design fit the purpose of this study because few researchers have examined the associations between these variables.

A correlational design allows the researcher to examine the association or relationship between variables. The analysis results in a description of the direction (positive or negative) and strength of the relationship between the variables (Zar, 2010). Positive relationships occur when variables increase or decrease in the same direction; negative relationships increase or decrease in

opposite directions (Zar, 2010). Correlational designs are used to develop a description of a relationship between variables rather than determination of cause and effect (Hulley, Cummings, Browner, Grady, & Newman, 2007). Understanding the relationships between variables is required before a researcher can develop hypotheses and interventions to be tested in future research studies (Hulley et al., 2007).

Sample Population

The target population for this study included adults 65 years or older who were scheduled for CABG surgery at a selected cardiovascular specialty hospital in North Central Texas. An estimated 26.4 million persons residing in Texas were aged 65 or older in 2013 and accounted for 10.19% of the total state population. In Collin County where the cardiovascular specialty hospital in this study is located, the population in 2013 was 854,778 with 8.7% of this population being aged 65 or older (U.S. Census Bureau, 2013). An estimated 30.4% of the patients at the cardiovascular specialty hospital are aged 65 or older (The Heart Hospital Baylor Plano, 2014). In 2013, 616 CABG surgeries were performed in this hospital (The Heart Hospital Baylor Plano, 2014).

Sample Size Calculations

An *a priori* power analysis using G*Power software version 3.1 (Faul, Erdfelder, Buchner & Lang, 2009) resulted in an estimated minimum sample size of 87 participants for this study. This estimation was based on a two-tailed test,

alpha = .05, power = .80, and a medium effect size with an OR = 2.5. The medium effect size was based on previous research studies conducted using similar patient populations (Sanjuan, Arranz, & Castro, 2012; Sinikallio et al., 2010). A study conducted to examine coping strategies as a predictor for depression in coronary heart patients (N = 99) had a medium effect size of 0.27 (Sanjuan et al., 2012). Another study conducted to examine the association of preoperative depression and surgical outcomes in lumbar spinal stenosis patients (N = 96) had a medium effect size of 0.28 (Sinikallio et al., 2010). The cross sectional design of the study did not require follow-up with the participants.

Inclusion and Exclusion Criteria

Participants in this study included adults who were 65 years or older; cognitively intact as reported by the patient's primary nurse; able to speak, read, and write English; and admitted to a cardiovascular specialty hospital for CABG surgery. Individuals with self-reported past or current medical diagnosis of depression were not excluded from participation in the study. Patients with a known diagnosis of mental illness other than depression were excluded from this study. This information was verified with the Registered Nurse caring for the patient.

Setting

The study was conducted in a for-profit cardiovascular specialty hospital that is a member of a large healthcare system in north central Texas. Participants

were consented and completed the HADS-D prior to surgery in the day surgery unit or inpatient unit.

Measurement Methods

Pre-operative depression and selected postoperative outcomes were the variables of interest in this study. The conceptuall definitions of the variables are listed in Table 1 in Chapter one. The conceptual definitions were based on Roy's Theory of Adaptation, the research framework for this study. The postoperative outcome variables were operationalized as listed in Table 2. Demographic information regarding participants' age, gender, ethnicity, and comorbidity diagnoses was also collected (Appendix A).

Table 2

Operational Definitions of Study Variables

Study Variable	Operational definition
Depression	Operationalized by the total score on the HADS-D.
30 day readmission	Operationalized as medical record documentation of a hospital admission within 30 days following CABG surgery.
30 day mortality	Operationalized as medical record documentation of death within 30 days following CABG surgery as determined by CMS guidelines for 30 day mortality
ICU length of stay	Operationalized as medical record documentation of the patient's hours spent in an ICU during the hospitalization.
Hospital length of stay	Operationalized as medical record documentation of the number of days a patient was hospitalized following CABG surgery
Ventilator time	Operationalized as medical record documentation of the number of hours a patient was on a ventilator following CABG surgery

The HADS-D was used to establish the presence or absence of pre-operative depression and the severity of depression if present. The HADS-D is a subscale of the Hospital Anxiety Depression Scale (HADS) (Zigmond & Snaith, 1983). HADS is a self-assessment scale designed for use in non-psychiatric hospitalized patients to identify anxiety and depression. The scale was designed to eliminate somatic symptoms that may be related to the physical illness rather than the psychological state of the patient. The depression subscale (HADS-D) has seven questions related to symptoms of depression. Each question is scored on a scale of 0-3. The scores of each question are summed for an overall score measuring the level of depression in the respondent (Zigmond & Snaith, 1983). A score of 0-7 is considered normal (not depressed). A score of 8-10 indicates mild depression, 11-14 moderate depression, and 15-21 severe depression (Smarr & Keefer, 2011; Zigmond & Snaith, 1983). The tools for administering the HADS-D were purchased from GL Assessment Ltd. by the researcher (Appendix B).

The HADS has been psychometrically tested and found to have Cronbach's alphas of 0.67- 0.90 and correlation coefficients of 0.49 - 0.74 (Bjelland, Dahl, Haung, & Neckelmann, 2002; Smarr & Keefer, 2011). The HADS-D has been used in numerous studies with diverse populations, including older adults having cardiac surgery, patients with arthritis, breast surgery patients, outpatient psychiatric patients, and a various other patient populations (Bambauer,

Locke, Aupont, Mullan, & McLaughlin, 2005; Bjelland et al., 2002; Chandarana, Eals, Steingart, Bellamy, & Allen, 1987; Smarr & Keefer, 2011).

Recruitment Plan

Institutional Review Board (IRB) approval was received from the University of Texas at Arlington (UTA) and the Baylor Scott &White Health Northern Region IRB. After IRB approval, the researcher determined the eligibility of all patients presenting for CABGs at the cardiovascular specialty hospital. The study, including the risks and benefits from participation, was explained to all eligible patients.

Procedure

The researcher obtained daily copies of the Monday through Friday surgical schedule during the data collection period. Based on a review of the daily schedules, patients 65 years or older scheduled for a CABG procedure were identified by the researcher. The researcher verified eligibility of the potential participants by:

- Review of the surgery schedule for age and procedure
- Verifying with the patient's registered nurse that the potential participant
    - Is cognitively intact as reported by the primary nurse
    - Speaks, reads and writes English

- Has not received any pain medication, sedative, or other medication that would impair the patient's ability to understand and give informed consent
- Does not have mental illness other than depression

Eligible patients were invited to participate in the study prior to their surgical procedure in either the day surgery unit or an inpatient unit as applicable to the individual patient. A log with a running total of the number of CABG patients invited to participate in the study was maintained by the researcher (Appendix C). After the required sample size was obtained, no further participants were enrolled in the study.

The researcher or the trained research assistant explained the study and obtained written informed consent from eligible patients who were willing to participate in the study (Appendix D). Each participant was assigned a participant number so that the data from the HADS-D, the demographic data, and the outcome data collected from the medical records could be analyzed together.

The researcher or the research assistant administered and scored the HADS-D during the same visit as informed consent was obtained. The HADS-D was administered using pencil and paper. The researcher or the research assistant read the instructions to the participant and asked that he/she indicate answers on the form provided. Any participant with a score indicative of severe depression, a score of 15 or greater, was referred for mental health follow up per hospital

protocol. The researcher also recorded demographic information on a form designed for this study (Appendix A). These data were obtained directly from the participants and their medical records.

Thirty days following the participant's discharge from the hospital, a chart review was conducted to obtain information related to ICU length of stay, hospital length of stay, and ventilator time. At the same time, the researcher obtained information from the hospital's healthcare improvement department related to any hospital readmissions of study participants or deaths during this time frame.

All data were entered into an encrypted, electronic database maintained by the researcher. All identifying data were removed prior to data analysis. The database was password protected. Any paper documentation related to this study, including HADS-D forms, demographic data forms, and outcome data, was stored separately from the signed informed consents in a locked cabinet in a locked office at the researcher's work site. Documents related to this study will be destroyed via crosscut shredding at the end of three years following completion of the study.

Ethical Considerations

Written IRB approval was obtained for this study from the UTA IRB and Baylor Scott & White Health Northern Region IRB. Written informed consent was obtained from all participants prior to the data collection process. There was minimal risk identified for the participants in this study. There was no risk for

physical harm posed by this study. Participants were informed that they might experience emotional distress when completing the HADS-D as they answer questions about their personal psychological/emotional state. The researcher and the research assistant were not members of the participant's care team. The researcher and the research assistant provided support during the administration of the HADS-D such as a quiet, private location to complete the questionnaire and assurance that their information will be kept confidential and reported only as aggregate data. The researcher and the researcher's dissertation committee were the only persons with access to the questionnaires, signed consent forms, demographic forms, and data. Participants could refuse to answer any of the questions or withdraw from the study at any time. Any participant with a score indicative of severe depression or suicidal ideation was referred for mental health follow up per hospital protocol. There were no immediate benefits from participation in this study; however, future patients may benefit from the knowledge obtained from the results of the study.

Data Analysis

Preparation for Data Analysis

Prior to statistical analysis, the data were examined for missing elements and any other inconsistencies. Nominal data were coded as indicated in Table 3. Statistical analysis was completed using the Statistical Package of Social Science 19 (SPSS).

Description of the Sample

Descriptive statistics were used to analyze demographic variables in order to describe the sample of the study and for comparison to the target population. Demographic data measured at the nominal level were described using frequencies, percentages, and mode (Table 3). Age of the participants was measured at the interval level using numerical values depicting their age in years. Age was described using frequency, percent, range, mean, median, mode, and standard deviation. Comorbidities were coded into generalized categories such as lung disease, diabetes, and hypertension (Table 3).

Table 3

Descriptive Statistics of Demographic Variables Measured at the Nominal Level

Demographic Variable	Response	*n* (%)
Gender	Male (coded as 1) Female (coded as 0)	
Ethnicity	White (coded as 0) Black (coded as 1) Hispanic (coded as 2) Asian (coded as 3) Other (coded as 4)	
Marital status	Never been married (coded as 0) Married (coded as 1) Divorced (coded as 2) Widowed (coded as 3)	
Education	Less than high school graduate (coded as 0) High school graduate (coded as 1) Associates degree (coded as 2) Bachelor's degree (coded as 3) Graduate degree (coded as 4)	

Demographic Variable	Response	*n* (%)
Comorbidities	No comorbidity (coded as 0) Lung disease (coded as 1) Diabetes (coded as 2) Hypertension (coded as 3)	
Smoking status:	Never smoked (coded as 0) Currently smokes (coded as 1) Past smoker (coded as 2)	

Research Variables

The research variables were operationalized as described in Table 2. The predictor variable for this study was total depression score as determined by the HADS-D. Numerical values for the variables collected from the measures (Table 4) were entered into an electronic database. Data were analyzed with logistic and multiple regression controlling for the presence of identified comorbidities using SPSS 19.0 software (Field, 2009; Nunnally & Bernstein, 1994). Due to low rates of readmission and mortality, univariate logistic regression was used for the research questions with binary variables, and multiple regression analysis was performed for the research questions with continuous variables as described in Table 5. Data were analyzed according to each research question.

Table 4

Research Variables

Study Variable	Level of Measurement	Measurement Value
Depression	Interval	Total score on the HADS-D
ICU Length of Stay	Ratio	Number of hours spent in the ICU during hospitalization
Hospital Length of Stay	Ratio	Number of days patient was hospitalized following CABG surgery
Ventilator Time	Ratio	Number of hours patient was on ventilator following CABG surgery
Readmission within 30 days	Nominal	Yes (1) No (0)
Expired within 30 days	Nominal	Yes (1) No (0)

Research Questions

The research questions that were answered in this study are listed in Table 5. The method of statistical analysis for each research question is also listed in Table 5.

Table 5

Statistical Analysis Methods per Research Questions

Research Question	Statistical Analysis Method
1. What is the association between preoperative depression and 30 day readmission rates in the older adult following CABG?	Univariate logistic Regression
2. What is the association between preoperative depression and hospital length of stay?	Multiple Regression
3. What is the association between preoperative depression and ICU length of stay?	Multiple Regression

Research Question	Statistical Analysis Method
4. What is the association between preoperative depression and the time patient is on the ventilator postoperatively?	Multiple Regression
5. What is the association between preoperative depression and 30 day mortality rates?	Univariate logistic Regression

Regression analyses were chosen due to the potential multiple causes or risk factors for the outcomes of interest. The use of regression analyses allowed the researcher to determine if the HADS-D scores were independently associated with the outcomes and predict the odds of the occurrence of the outcome of interest (Katz, 2011; Maxwell & Delaney, 2007). Univariate logistic regression was used with dichotomous dependent variables. Multiple regression was used for those research questions with continuous dependent variables (Zar, 2010).

An alpha of 0.05 was used to determine significance in this study. The avoidance of Type 1 errors assisted the researcher in correctly interpreting the associations sought in this study. A Type II error would occur if the null hypothesis were accepted and should not have been (Murphy, Myors, & Wolach, 2009). To avoid a type II error, power was set at .80 for this study. *Post-hoc* power analysis was performed using G*Power version 3.1 with 5 predictors, known sample size, and known effect size. The *post-hoc* analysis indicated the study was under powered which may have resulted in a type II error.

There were assumptions considered for the regression analyses. The three primary assumptions for univariate logistic regression analysis are linearity, normality, and homogeneity. Multiple regression analysis assumptions include independence, linearity, normality, and homogeneity (Nunnally & Bernstein, 1994; Zar, 2010). All tests for the assumptions were met.

Delimitations

The study findings are only generalizable to older adult cardiovascular surgery patients in a cardiovascular specialty hospital in North Central Texas. The use of a convenience sample at one hospital may be non-representative of the older adult cardiovascular surgery patients outside of this hospital. Obtaining samples of older adult cardiovascular surgery patients from multiple cardiovascular specialty hospitals and non-specialty hospitals would increase the generalizability of the findings.

Chapter Summary

This chapter included a description of the methods and procedures which were used in this study. The study research design, sampling method, setting, measurement methods, and data analyses were described. Ethical considerations and delimitations were also described.

Chapter 4

Findings

The findings of this correlational study are presented in this chapter. Descriptive statistics for the variables and results of the data analyses used to address each research question are reported. This chapter concludes with a summary of the findings.

Sample Description

The sample included 87 older adult patients who underwent CABG surgery from November 2014 to February 2016 at a suburban cardiovascular specialty hospital located in North Central Texas. Four potential participants declined participation in the study. Thirteen (14.9%) of the participants had a HADS-D score indicative of depression. A post hoc power analysis was conducted and yielded a power of .41 for this study. The desired power for this study was .80. The calculated sample size based on post hoc analyses was 188.

The range of HADS-D scores was 0-12 with a mean of 3.44 and a median of 3. In this study the HADS-D score was used as a continuous variable. The age range of participants was from 65 to 86 years old with a mean age of 72 and a standard deviation of 5.5. The frequency distribution is included in Figure 3. Participants were mostly white, married males with at least a high school education. The most common comorbidity reported by participants was diabetes, and most of the participants were non-smokers at the time of the study.

Descriptive statistics for nominal level variables are included in Table 6 and Table 7.

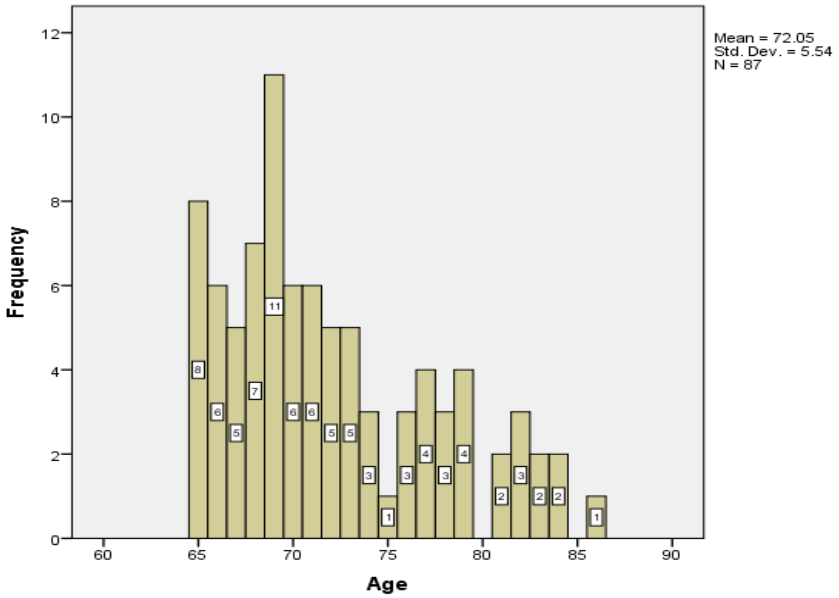

Figure 3: Distribution Frequency of Age

Table 6

Descriptive Statistics for Demographic Variables Measured at the Nominal Level

Demographic Variable	Response (*n* = 87)	*n*	*%*
Gender	Male	71	81.6%
	Female	16	18.4%
Ethnicity	White	78	89.7%
	Black	3	3.4%
	Hispanic	2	2.3%
	Asian	3	3.4%
	Other	1	1.1%
Marital status	Never been married	2	2.3%
	Married	71	81.6%
	Divorced	7	8%
	Widowed	7	8%

Demographic Variable	Response (n = 87)	n	%
Education	Less than high school graduate	8	9.2%
	High school graduate	36	41.4%
	Associates degree	8	9.2%
	Bachelor's degree	19	21.8%
	Graduate degree	16	18.4%

Table 7

Descriptive Statistics for Other Variables Measured at the Nominal Level

Variable		N	Percent (n = 87)
30-day readmission		4	4.6
30-day mortality		4	4.6
Comorbidities*	No comorbidity	24	27.6
	Lung disease	30	34.5
	Diabetes	40	46
	Hypertension	15	17.2
Smoking status:	Never smoked	42	48.3
	Currently smokes	9	10.3
	Past smoker	36	41.4

* 21 patients had 2 or 3 comorbidities

Readmission

Univariate logistic regression was performed to examine the association between 30-day readmission and preoperative depression. Univariate logistic regression was used due to the low rate of 30-day readmissions (n = 4). There was no statistically significant association found (X^2 (1) = 1.39, p = .238). None

of those patients who were readmitted within 30 days of surgery suffered from depression according to their HADS-D score. There was no statistically significant association between preoperative depression and 30-day readmission rates in older adults following CABG (OR=.533, 95% CI (.237, 1.202), p = .129).

Mortality

Univariate logistic regression was performed to examine the association between 30-day mortality and preoperative depression. Univariate logistic regression was used due to the low 30-day mortality rate (n = 4). There was no statistically significant association found (X^2 (1) = .019, p = .890). None of the patients who expired within 30-days of surgery were suffering from depression before surgery based on their HADS-D scores. There was no statistically significant association between preoperative depression and 30-day mortality rates in older adults following CABG (OR = .974, 95% CI (.671, 1.414), p = .891).

Comorbidities

Smoking status

Univariate logistic regression was performed to examine the association between smoking status of current smoker and preoperative depression. There was no statistically significant association found (X^2 (1) = .018, p = .893). There was no statistically significant association between preoperative depression and

smoking status of current smoker in older adults following CABG (OR = .990, 95% CI (.906, 1.238), p = .474).

Univariate logistic regression was also performed to examine the association between smoking status of past smoker and preoperative depression. There was no statistically significant association found (X^2 (1) = 1.199, p = .274). There was no statistically significant association between preoperative depression and smoking status of past smoker in older adults following CABG (OR = 1.136, 95% CI (.910, 1.419), p = .260).

Lung disease

Univariate logistic regression was performed to examine the association between lung disease and preoperative depression. There was no statistically significant association found (X^2 = .510, p = .472). There was no statistically significant association between preoperative depression and lung disease in older adults following CABG (OR = 1.059, 95% CI (.906, 1.238), p = .474).

Diabetes

Univariate logistic regression was performed to examine the association between diabetes and preoperative depression. There was no statistically significant association found (X^2 = .432, p = .511). There was no statistically significant association between preoperative depression and diabetes in older adults following CABG (OR = 1.052, 95% CI (.904, 1.224), p = .512).

Hypertension

Univariate logistic regression was performed to examine the association between hypertension and preoperative depression. There was no statistically significant association found (X^2 = .414, p = .520). There was no statistically significant association between preoperative depression and hypertension in older adults following CABG (OR = 1.065, 95% CI (.881, 1.288), p = .514).

Table 8

Descriptive Statistics for Continuous Variables

Variable	Range	SD	Mean	Median
Ventilator time (hours)	1 - 21.10	5.05	7.03	5.7
ICU length of stay (hours)	1.72 – 138.73	29.42	64.41	65.28
Hospital Length of Stay (days)	3 – 14	2.66	7	7

ICU Length of stay

Multiple regression was performed to examine the association between preoperative depression and ICU length of stay when controlling for presence of comorbidities. Outliers were deleted prior to analysis. There was no heteroscedasticity or multicollinearity present. There was no significant

association between preoperative depression and ICU length of stay in older adult CABG patients ($\beta = .128$, $p = .210$, $R^2 = .089$).

Ventilator Time

Multiple regression was performed to examine the association between preoperative depression and ventilator time. Outliers were identified and deleted prior to analysis. There was no heteroscedasticity or multicollinearity present. There was no significant association between preoperative depression and ventilator time in older adult CABG patients ($\beta = .148$, $p = .190$, $R^2 = .055$).

Hospital Length of Stay

Multiple regression was performed to examine the association between preoperative depression and hospital length of stay. Outliers were identified and removed prior to analysis. There was no heteroscedasticity or multicollinearity present. There was no significant association between preoperative depression and hospital length of stay in older adult CABG patients ($\beta = .158$, $p = .165$, $R^2 = .043$).

Summary

The findings of this correlational study were presented in this chapter. Descriptive statistics for the variables and results of the data analyses used to address each research question were reported.

Chapter 5

Discussion

This chapter will include a discussion of the findings of this study. It will include interpretation of the findings related to the literature and to the Roy Adaptation Model which provided the framework for this study. Limitations, conclusions, implications for practice and recommendations for future studies will be discussed.

Interpretation of Findings

In the sample of 87 older adult CABG patients, analyses revealed no statistically significant associations between the study variables and preoperative depression. The framework for this study was Roy's Adaptation Model (figure 2), which suggests that a contextual stimulus such as depression and focal stimuli such as CABG and cardiovascular disease lead to either ineffective or effective adaptation such as postoperative outcomes. Based on the findings of this study, the participants exhibited effective adaptation. Roy's Adaptation Model (figure 1) identifies coping mechanisms which a person utilizes in response to stimuli and which may be observed through adaptive modes (Roy & Andrews, 1991; Roy & Andrews, 1999). A person with a support system in place, may have coping mechanisms which promote effective adaptive responses. The participants in this study were from an affluent community and were primarily white, educated males. The researcher noted that when recruiting potential participants for this

study, there were multiple persons in the participant's hospital room the day of surgery to provide support. Based on the composition of the study population, one potential explanation for the findings of this study is that the participants in this study may have had support systems in place which promoted effective adaptation. Because the contextual stimuli of socioeconomic status and support systems were not specifically measured in this study, their interaction with participants' coping mechanisms and association with subsequent levels of adaptation are unknown. Other contextual stimuli such as post-operative complications, limited social support, and lower socioeconomic status that may be associated with ineffective adaptation and therefore poor outcomes in older adults following CABG were not measured in this study.

Demographics

More participants in this study were male (n = 71) than female (n = 16). This is consistent with reports of prevalence of diagnosed heart disease, with more males than females diagnosed nationally (American Heart Association, 2015). The racial composition of participants was predominately White (89.7%). This is higher than the 74.2% White racial composition of the county in which this study took place. Participants reported completion of a bachelor's degree or higher at a rate of 49.4%. The 2014 census data indicate that 40.2% of the residents of the area completed a bachelor degree or higher (U.S. Census Bureau, 2014). The participants in this study were predominately white, educated, males.

This population may have had additional contextual stimuli (support systems) which facilitated effective coping mechanisms and thus promoted effective adaptation (good outcomes) following CABG.

Thirteen (14.9%) of the participants in the study had a HADS-D score indicative of depression. The percentage of participants with depression in this study was consistent with published data regarding depression in the older adult population in the United States which reflect that approximately 15% of older adults suffer from some form of depression (Geriatric Mental Health Foundation, 2014).

Readmission

There was no significant association between readmission rates and preoperative depression identified in this study, but the power attained in this study was insufficient to find an association if it existed. This study finding is consistent with similar findings in a study conducted by Navarro-Garcia and associates (2011). Conversely, Tully and associates (2008) found a positive association between preoperative depression scores and readmission rates following cardiac surgery ($p = .04$). In that study, it was not clear if the presence of only depression or a combination of anxiety and depression preoperatively that was associated with readmission. The reasons for postoperative readmission were not reported by Tully and colleagues; therefore, it is unclear if depression

itself was the primary reason for readmission or if depression was associated with complications that resulted in readmission.

Only four of the participants in this study were readmitted, suggesting that participants in this study may have had effective adaptation. Effective adaptation may have been observed due to the demographic composition of the participants. The participants in this study were from an affluent community and readily had access to postoperative care and cardiac rehab which potentially decreased their risk for readmission.

Mortality

There was no significant association found between 30 day mortality and preoperative depression in this study, but the power attained in this study was insufficient to find an association if it existed. These findings are consistent with those of Navarro-Garcia and associates (2011), who also found no significant association between mortality and preoperative depression. In contrast, Tully and Baker (2012) found that depression increased risk for mortality in patients who were still hospitalized following CABG surgery, and Baker and colleagues (2001) found that depressed CABG surgery patients were more likely to die within two years of surgery. The present study was limited to 30 day mortality. A longitudinal study may have yielded a higher mortality rate as evidence from previous research suggests that mortality occurs within two years of surgery.

ICU Length of Stay

Identifying phenomena associated with ICU length of stay is important to the outcomes of patients such as rehabilitation after surgery, lack of complications, and survival rates. The earlier a patient is stabilized and is able to leave the ICU, the shorter the patient's overall hospital stay and the better the outcomes (Kramer & Zimmerman, 2011). In this study, there was no significant association between ICU length of stay and preoperative depression in older adults following CABG surgery, but the power attained in this study was insufficient to find an association if it existed. This study finding is consistent with findings in the study conducted by Navarro-Garcia and associates (2011). The potential support systems of the participants in this study may have led to effective adaptation, thus average ICU length of stay.

Ventilator Time

If a patient is on a ventilator, it is optimal to remove the breathing tube as soon as possible because the presence of the tube can lead to further complications such as ventilator associated pneumonia and increased length of stay (Piaschyk et al., 2011; South 2011). Identifying phenomena associated with increased ventilator time is important to improving patient outcomes. In the present study, there was no significant association between preoperative depression and ventilator time, but the power attained in this study was insufficient to find an association if it existed. This was consistent with the

findings of Navarro-Garcia and associates (2011) who explored preoperative depression and outcomes. Similar ventilator times in the present study between those participants who were depressed preoperatively and those who were not may have been associated with effective coping mechanisms of the participants.

Hospital Length of Stay

Hospital length of stay was not significantly associated with preoperative depression in this study, but the power attained in this study was insufficient to find an association if it existed. In contrast to the present study findings, researchers conducting previous studies found significant associations between preoperative depression and hospital length of stay (Navarro-Garcia et al, 2011; Poole et al., 2014). This inconsistency is suggestive of other contributing factors which may influence hospital length of stay. Contributing factors such as support systems, socioeconomic status, and postoperative complications were not explored in this study. Because participants in this study had effective adaptation, it may be concluded that the participants had effective coping mechanisms which were facilitated by the contextual stimulus of effective support systems.

Limitations

There were limitations to this study. The study findings are only generalizable to older adult cardiovascular surgery patients in a cardiovascular specialty hospital in North Central Texas. The use of a convenience sample at one hospital may be non-representative of the older adult cardiovascular surgery

patients outside of this hospital. Obtaining samples of older adult cardiovascular surgery patients from multiple cardiovascular specialty hospitals and non-specialty hospitals would increase the generalizability of the findings.

Although a power analysis performed prior to conducting the present study resulted in a sample size estimate of 87, post hoc power analysis revealed that this study was under powered. In order to achieve the desired .80 power, a sample size of 188 was needed. A larger sample size would strengthen the power of the study and decrease the chances of Type II errors. Any conclusions regarding the non-significant associations between preoperative depression and post-operative outcomes must be made with the caveat that the power was insufficient to find associations if they existed.

Depression can have a negative connotation within society. Participants were aware that the researcher was assessing for depression using the HADS-D. They might have responded to the items on the HADS-D by selecting the response they believed would suggest they were not depressed. This could have occurred because the participants wanted the researcher to view them in a positive manner and may have believed that being depressed was a negative character trait; thus causing a "halo effect" in this study. They may also have believed that responding in a way that might suggest that they were depressed might have resulted in cancellation of their scheduled surgery.

None of the study variables were found to have a significant association with depression. Although the power in this study was not sufficient to find an association even if one existed, the findings by themselves are suggestive of effective adaptation in the study participants. It is likely that other variables that were not measured in this study including the presence of depression postoperatively and postoperative complications contribute to untoward outcomes in older adult cardiovascular surgery patients. Exploring contextual stimuli such as a participants' support system and socioeconomic status which potentially facilitate coping mechanisms and promote effective adaptation would be of value. Additionally, only the depression subscale of the HADS was utilized in this study. Utilization of the anxiety subscale and the HADS total score may be beneficial in exploring the association of other emotional states, such as anxiety, with patient outcomes.

Conclusions

There have been few studies identifying an association between preoperative depression and postoperative outcomes particularly in the older adult population. There were no significant relationships found between preoperative depression and the postoperative outcomes of ICU length of stay, ventilator time, hospital length of stay, 30-day readmission, and 30-day mortality, in older adults who underwent CABG in this study. These findings were similar to study findings by Navarro-Garcia and associates (2011). The purpose of their study

was to identify risk factors associated with the development of preoperative anxiety and/or depression and rates of ventilator support, presence of arrhythmias, postoperative pain, intensive care unit readmissions, length of stay, and mortality in adult cardiac surgery patients. Although they found that the average length of stay for those with depression was five days compared to three days for those who were not depressed, there were no significant findings in their study among the patients with depression and those without depression related to ventilator support, presence of arrhythmias, postoperative pain, readmission to the ICU, or mortality (Navarro-Garcia et al., 2011). Other factors, such as the presence of anxiety prior to surgery, support systems, and postoperative complications need to be explored to identify associations with postoperative outcomes for this population.

The findings of this study added to the body of knowledge through the exploration of preoperative depression and postoperative outcomes in older adult CABG patients. In previous studies which have been conducted, findings have been inconsistent, suggesting that more research is needed. Multiple studies have found that postoperative depression is associated with poorer postoperative outcomes. It remains unclear if preoperative depression is associated with postoperative outcomes in this population. The gap in knowledge related to the presence of depression preoperatively needs further exploration.

Implications for Nursing Practice

Recognizing factors which may lead to poor patient outcomes is important to nursing practice. Although the findings of this study were not statistically significant, an association between postoperative depression and poor outcomes from cardiovascular surgery has been documented in the literature (Elderon & Whooley, 2013; Peters et al., 2010). Recent recommendations by the U.S. Preventive Services Task Force (2016) call for healthcare providers to screen for depression in the general adult population, including the geriatric population. The recommendations also include the need for adequate support systems to be in place for diagnosis, treatment, and follow-up for depression. Nurses should recognize the signs and symptoms of depression and identify resources for patients to receive appropriate diagnosis, treatment, and follow-up.

Recommendations for Future Studies

Preoperative depression was not associated with the postoperative outcomes of ICU length of stay, ventilator time, hospital length of stay, 30-day readmission or 30-day mortality, in older adult CABG patients in this study although the power was insufficient to find associations if they existed. Replicating this study with a larger sample size would improve the power of the study and potentially yield different results. Only the depression subscale of the HADS was used in this study. A future secondary data analysis including the anxiety subscale and total HADS score may provide valuable insight regarding

possible associations between the concurrent presence of anxiety and depression or the presence of anxiety alone and postoperative outcomes in this sample.

Although the presence of postoperative depression has been shown to have an association with selected postoperative outcomes, further research needs to be conducted to determine if there are associations between preoperative depression and postoperative outcomes, such as acute kidney failure or pneumonia. Studies should also be conducted to examine the possible association between preoperative anxiety and postoperative outcomes. Because individuals may suffer from both anxiety and depression, studies should include explorations of associations between preoperative depression in conjunction with anxiety and postoperative outcomes. Support systems may facilitate coping mechanisms that can promote effective adaptation and should also be studied as a contributing factor in future studies related to depression and/or anxiety in older adult cardiovascular surgery patients.

Summary

This chapter included a discussion of the findings of this study. It included interpretation of the findings related to the literature and to the Roy Adaptation Model which provided the framework for this study. Limitations, conclusions, implications for practice, and recommendations for future studies were also discussed.

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Appendix A

Data Collection Form

<table>
<tr><td>Participant Number:</td><td>Age:</td></tr>
<tr><td>Gender:</td><td>Marital Status (Circle):
• Never been married
• Married
• Divorced
• Widowed</td></tr>
<tr><td>Highest educational level:
• Less than high school graduate
• High school graduate
• Associate degree
• Bachelor’s degree
• Graduate degree</td><td rowspan="2">Ethnicity (circle):
• White
• Black
• Native American
• Hispanic
• Pacific Islander
• Asian
• Other _____</td></tr>
<tr><td>Smoking (circle):
• Current
• Past
• Never Smoked</td></tr>
<tr><td colspan="2">Comorbidities:</td></tr>
<tr><td>HADS-D Score:</td><td>ICU Length of Stay (hours):</td></tr>
<tr><td>Hospital Length of Stay (days):</td><td>Ventilator time (hours):</td></tr>
<tr><td>Readmitted within 30 days (yes/no):</td><td>Expired within 30 days (yes/no):</td></tr>
</table>

Appendix B

Agreement to use the HADS-D

MEMORANDUM OF AGREEMENT, made on the date of this document between GL Assessment Limited of 9th Floor East, 389 Chiswick High Road, London W4 4AL (hereinafter called 'the Publishers') and the LICENSEE as defined on the first page of this agreement.

NOW IT IS MUTUALLY AGREED between the parties hereto as follows:

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10. The Licensee undertakes to and shall procure that all permitted users of the Materials shall exercise the utmost vigilance in protecting the Publishers' copyright privileges on the material involved, both in the English language and as translated. Unauthorised persons must not be given access to these materials and the Copyright Notice must appear in full on each copy of the Material.

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13. The Licensee shall not assign or in any way transfer this licence without the prior written consent of the Publishers.

14. This Agreement shall be terminated without further notice in any of the following circumstances:

    (a) If the Licensee fails to make any payment specified in this Agreement on the due date;

(b) If the Licensee shall at any time be in breach of any of the terms and conditions of this Agreement and if capable of being remedied, such breach is not remedied within 15 days of receipt of written notice thereof, or

(c) If the Licensee is declared insolvent or bankrupt or goes into liquidation (other than voluntary liquidation for the purpose of reconstruction only) or if a Receiver is appointed or if the Licensee is subject to any similar event anywhere in the world

Termination shall be without prejudice to any monies which may be due to the Publishers from the Licensee and without prejudice to any claim which the Publishers may have for damages and/or otherwise

Upon termination of this Agreement for any reason the Licensee shall immediately cease to use the Material

15 This Agreement constitutes the entire agreement between the parties in respect of the Material and supersedes all prior oral or written proposals, agreements or undertakings concerning the same

16 This Agreement shall not be amended or modified in any way other than by an agreement in writing and signed by both parties or their duly authorised representatives and shall come into effect on receipt of the payment in full as specified above and a counter-signed copy of this Agreement

17 This Agreement shall be governed by and construed in all respects in accordance with English Law and the courts of England and Wales shall have exclusive jurisdiction to settle any dispute arising out of or in connection with this Agreement, its subject matter and formation, including non-contractual disputes or claims

AS WITNESS THE HANDS OF THE PARTIES
hereto the day and year first above written

Signed on behalf of GL Assessment Limited

Joanne Archer

Joanne Archer

Signed by the Licensee ***Please print this page, sign, and attach this signature page as a scanned document along with your typed User Agreement form, sent as a Word doc***

User's Signature (handwritten)	**Company/Organisation Stamp (if applicable):**
Title PhD Student	
Company/Organisation University of Texas at Arlington	
Date Sept 10 2014	

Appendix C

Example of log of patients approached for participation

	Participating	Refused
1		
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16		
17		

Appendix D

Consent Form

IRB Project Number 013- Date May 10, 2014

BAYLOR RESEARCH INSTITUTE
The Heart Hospital Baylor Plano
Plano, Texas

PARTICIPATION EXPLANATION AND CONSENT FORM

PROJECT TITLE: Associations between preoperative depression and postoperative outcomes in older cardiac surgery patients.

INVESTIGATORS: Alaina Tellson, RN, BSN, NE-BC

TELEPHONE NUMBER: 469-814-4627

INTRODUCTION:

Before you say that you will be in this research study you need to read this form. It is important for you to understand all the information in this form. This form will tell you what the study is about and how it will be done. It will tell you about some problems that might happen during the study. It will also tell you about the good things that might happen for you during the study. When you read a paper like this to learn about a clinical trial it is called "informed consent." The people who are doing this research study are giving you very important information about the study. When you give your consent for something, it is the same as giving your permission. This consent form may contain words that you do not understand. Please talk with someone from the research staff if you have questions. Do not sign this consent form unless all your questions have been answered and you feel comfortable with the information you have read. You will be given a copy of the form to keep.

You are being asked to take part in this study because you are going to be having coronary artery bypass graft surgery and are 65 years of age or older.

Why Is This Study Being Done?

The purpose of the study is to determine the association between preoperative depression and selected postoperative outcomes in older adults following CABG surgery

What is the Status of the Procedures or Techniques Involved in this Study?

The researcher will ask you to complete the Hospital Anxiety Depression Scale depression subscale (HADS-D) and will collect demographic information. This should only take 5-10 minutes of your time. The researcher will read the instructions to you and ask that you circle yes or no for each item on the inventory form provided. If you are unable to read or write, you will be read the items and the researcher investigator will mark the response on the form and repeat the response to you to verify it is the response you wish selected. If you score at a level that

suggests you may have severe depression will be referred for mental health follow up per hospital protocol.

Thirty days following your discharge from the hospital, a chart review will be conducted to obtain information related to ICU length of stay, hospital length of stay and ventilator time. At the same time, researcher will obtain information related to any hospital readmissions or death during this time frame from the hospital's healthcare improvement department.

How Many People Will Take Part In The Study?

About 95 people will take part in this study worldwide/nationwide. About 95 of these people will take part at this location.

What Is Involved In The Study?

You will be asked to allow the researcher to review your medical records and copy the information from these records into his/her research charts for this project. This information will be reviewed by the researcher and his/her staff to answer the specific question as outlined above.

You will be asked to complete an inventory which will ask you questions about your feelings in the last two weeks. Once you have completed this inventory you will give it to the researcher so that it can be reviewed for the research report.

How Long Will I Be In The Study?

You will be in the study for only today.

The researcher may decide to take you off the study if s/he feels that it is in your best interest, if you are not able to follow the rules of the study, if the study is stopped before it is finished or if new information becomes available that indicates it would be best for you to stop being in the study.

You can stop taking part in this study at any time. If you decide to stop taking part in the study, you should let the researcher or his/her staff know so that they can make sure you are safely taken out of the study.

What Are The Risks, Benefits and Options of The Study?

There are no risks or benefits to you for being in the study. We hope that what we learn in this study will help others with your condition in the future. Your other option is to not be in the study.

What About Confidentiality?

You have a right to privacy. This means that all the information about you from this study will only be shown to the people working on the study. The results of this study may be published in

a scientific book or journal. If this is done, your name will not be used. All information about you from this research project will be kept in a locked office or other locked area. Information that is kept on computers will be kept safe from access by people who should not see it.

The privacy law requires that Baylor Research Institute get your permission before giving any of your health information to other people. There are people who need to review your information to make sure the study is done correctly. These people may look at or copy your information while they are doing this review. When you sign this form you give permission to Baylor Research Institute to give other people information about your health as needed for the research project. These groups include people who work for Baylor Research Institute (including the Institutional Review Board), University of Texas at Arlington Institutional Review Board, the US Food and Drug Administration, the Office for Human Research Protections and the Association for the Accreditation of Human Research Protection Programs. Even though we usually remove your name from the information, the people who get this information may be able to figure out who you are. The kinds of health information that might be given to these people include results from the surveys you complete, notes from the doctor doing the research or other similar events.

You do not have to give this permission and it is all right to refuse to sign this form. Your doctor will still treat you and your insurance company will still pay your medical bills (according to their policy) even if you do not give your permission for us to release this information. However, since it is important for the people listed above to have access to your information, if you do not sign this form, you cannot be in the research study.

If you give permission to Baylor Research Institute to give other people information about your health and the other people are not part of the group that must obey this law, your health information will no longer be protected by the privacy law. However, we will take all reasonable measures to protect your information from being misused.

If you change your mind and later want to withdraw your permission, you may do so. You must notify Baylor Research Institute in writing at 3310 Live Oak, Suite 501, Dallas, TX 75204. If you decide to do this, it will not apply to information that was given before you withdrew your permission and you will no longer be able to take part in the study.

You may not be allowed to look at your health information during this study. However, at a later time, you will be able to look at this information. This later time will be sometime after the study is completed.

Unless permission is withdrawn, this permission will expire at the end of the research study.

What Are the Costs and Will I be Paid?

There are no costs to you for being in the study and you will not be paid for being in the study.

What are My Rights As a Participant?

Taking part in this study is voluntary. You may choose not to take part or may leave the study at any time. If you agree to take part and then decide against it, you can withdraw for any reason.

Deciding not to be in the study, or leaving the study early, will not result in any penalty or loss of benefits that you would otherwise receive.

We will tell you about any new information that may affect your health, welfare, or willingness to stay in this study.

All of the people working on the project must be careful not to carelessly harm you. If you are hurt during this project, you have the right to seek legal counsel. Nothing in this consent form takes away that right if you are hurt during this research.

Whom Do I Call If I have Questions or Problems?

If you have concerns, complaints or questions about the study or have a research-related injury, contact Alaina Tellson at 817-437-7020. Must include phone numbers where someone can be reached 24 hours a day, seven days a week.

For concerns, complaints or questions about your rights as a research subject or if you simply wish to speak with someone who is not a part of the research staff, contact Lawrence R. Schiller, M.D., IRB Chair, at 214-820-2687.

Statement of Person Obtaining Consent:

I have explained to _____ the purpose of the research project, the procedures required and the possible risks and benefits to the best of my ability. They have been encouraged to ask questions related to taking part.

_____	_____	_____
Signature of Person Obtaining Consent	Date	Time

Confirmation of Consent by Research Subject:

You are making a decision about being in this research study. You will be asked to give your written consent if you want to be in the study. Giving consent is like giving permission. You should not give your permission to be in this study until you have read and understood all the pages in this form. If you cannot read, then someone can read the form to you. Make sure that all your questions about this research project have been answered before you sign this form. When you sign this form, you are giving your permission to be in the study. By signing this form, you have not given up any of your legal rights or released anyone from liability for negligence.

Alaina Tellson has explained to me the purpose of the research project, the study procedures that I will have, and the possible risks and discomforts that may happen. I have read (or have been

read) this consent form. I have been given a chance to ask questions about the research study and the procedures involved. I believe that I have enough information to make my decision. I have also been told my other options. To the best of my knowledge, I am not in any other medical research. Therefore, I agree to give my consent to take part as a subject in this research project.

Signature of Subject	Date	Time
Signature of Witness (short form process only)	Date	Time

Biographical Information

Alaina Tellson received her BSN from Midwestern State University in 2002. She has held leadership positions in nursing for the last 10 years. Currently she is the Director of Professional Practice for The Heart Hospital Baylor Plano and The Heart Hospital Baylor Denton. Alaina holds certification in nursing professional development and as a nurse executive. In addition, she holds a certificate in the Fundamentals of Magnet®. Alaina serves as the secretary for the Dallas Fort Worth Affiliate of the Association for Nursing Professional Development. She is also a member of the American Organization of Nurse Executives, and the Southern Research Nursing Society. She has given local, regional, national and international presentations on a variety of clinical nursing and administrative topics. Her work has been published in various nursing journals.

Alaina has conducted research studies on a variety of topics including cardiopulmonary resuscitation, bacterial loads on rings worn by healthcare workers, educational modalities, and depression in adults. Alaina was a recipient of a Kyba Fellowship to conduct her research. After graduation, Alaina will continue her career in nursing leadership and research. She plans to continue her research on depression in older adults experiencing cardiovascular disease.