2008

Determining preoperative and postoperative predictors of physical health status in open -heart surgery patients

Kristy S. Chunta
West Virginia University

Follow this and additional works at: <https://researchrepository.wvu.edu/etd>

Recommended Citation

Chunta, Kristy S., "Determining preoperative and postoperative predictors of physical health status in open -heart surgery patients" (2008). *Graduate Theses, Dissertations, and Problem Reports*. 2701.
<https://researchrepository.wvu.edu/etd/2701>

This Dissertation is protected by copyright and/or related rights. It has been brought to you by the The Research Repository @ WVU with permission from the rights-holder(s). You are free to use this Dissertation in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you must obtain permission from the rights-holder(s) directly, unless additional rights are indicated by a Creative Commons license in the record and/ or on the work itself. This Dissertation has been accepted for inclusion in WVU Graduate Theses, Dissertations, and Problem Reports collection by an authorized administrator of The Research Repository @ WVU. For more information, please contact researchrepository@mail.wvu.edu.

Determining Preoperative and Postoperative Predictors
of Physical Health Status in Open-Heart Surgery Patients

Kristy S. Chunta

Dissertation submitted to the
School of Nursing
at West Virginia University
in partial fulfillment of the requirements for the degree of

Doctor of Philosophy
in
Nursing

Morgantown, West Virginia
2008

Committee Members
Susan McCrone, PhD, APRN, BC, Chair
Rose Ann DiMaria, PhD, RN, CNSN
Nan Leslie, PhD, RNC, CRNP
Teresa Shellenbarger, DNSc, RN, CNE
Irene Tessaro, MA, MSN, DrPH

Keywords: open-heart surgery, expectations, anxiety, depression, physical health status
Copyright 2008 Kristy S. Chunta

ABSTRACT

Determining Preoperative and Postoperative Predictors of Physical Health Status in Open-Heart Surgery Patients

Kristy S. Chunta

Background: Studies that have explored the experiences of open-heart surgery patients have reported that incongruent or unrealistic expectations have lead to negative feelings of anger, disappointment, and frustration. Physical Health Status (PHS) limitations after open-heart surgery have resulted in negative emotions such as anxiety and depression. Depressive symptoms have been correlated with lower improvement in PHS and decreased physical and emotional recovery after surgery.

Purpose: The purpose of this research was to examine the relationship among expectations, anxiety, depression, and PHS and to determine predictors of postoperative PHS in open-heart surgery patients.

Methods: A convenience sample ($N = 54$) was recruited from two hospitals, one in Pennsylvania, and one in West Virginia. The sample included participants who were undergoing coronary artery bypass graft (CABG) or valve replacement surgery for the first time. The study used a longitudinal design and data was collected preoperatively in the hospital or surgeons' offices and four weeks postoperatively by phone interviews. Participants were asked to complete three questionnaires: *The Medical Outcomes Study 36-Item Short Form Health Survey (SF-36)*, *The Future Expectations Regarding Life with Heart Disease Scale*, and *The Hospital Anxiety and Depression (HAD) Scale*. The questionnaires measured expectations, anxiety, depression, and PHS. Subjects were also asked three open-ended questions postoperatively regarding their expectations of surgery and recovery.

Findings: Repeated Measures ANOVA indicated that expectations improved after surgery ($p = .246$), while PHS decreased slightly after surgery ($p = .323$), but the findings were not significant. Anxiety and depression scores decreased postoperatively and the findings were significant ($p = .002$ anxiety, $p = .026$ depression). Pearson Product Moment Correlations revealed positive preoperative expectations were associated with better preoperative PHS ($p = .008$). In contrast, preoperative expectations were negatively correlated with anxiety ($p = .000$) and depression ($p = .000$). Preoperative depression was also negatively correlated with preoperative PHS ($p = .006$). Postoperative expectations were associated with better postoperative PHS ($p = .047$). In contrast, postoperative expectations were negatively correlated with postoperative anxiety ($p = .000$) and postoperative depression ($p = .000$). Postoperative depression was also negatively correlated with postoperative PHS ($p = .017$). Multiple regression analyses indicated that preoperative expectations, anxiety, depression, and PHS contributed to 38% of the variance of postoperative PHS, and the findings were statistically significant ($p = .000$). Postoperative expectations, anxiety and depression only contributed to 8% of the variance of postoperative PHS and the findings were not significant ($p = .075$).

Conclusions: The findings support the need for interventions to assist patients in developing realistic expectations. The findings also support the need for clinicians to screen patients before and after surgery for anxiety and depression. Future research needs to measure PHS at various times postoperatively to identify continued limitations after surgery.

DEDICATION

In memory of my son, Lucas Matthew Chunta.

ACKNOWLEDGEMENTS

I would like to acknowledge several people who helped me with my dissertation and throughout my doctoral program. First I would like to thank Dr. Susan McCrone, Chairperson of my Dissertation Committee. Thank you for your patience, support, encouragement, wisdom, and guidance that you provided me over the past four years. I was truly blessed to have you as my chair and mentor. You have made this dissertation process a great experience for me and I thank you so much. Thank you to Dr. Rose Ann DiMaria for your expertise in research with open-heart surgery patients. I appreciate all of the feedback that you provided. I would also like to thank Dr. Nan Leslie for your support and helpful comments that always made me smile. Thank you to Dr. Irene Tessaro for helping me with my pilot study and for your continued feedback on my dissertation. Finally, I would like to thank Dr. Teresa Shellenbarger. You have been an excellent mentor and have left a lasting impression on my professional career. Thank you for encouraging me on to doctoral studies and for your continued support over the years. Thank you to my entire committee for helping me to complete this research and for your high expectations.

I would also like to express my gratitude to Dr. E. Jane Martin and Dr. Mary Jane Smith for your efforts to initiate a doctoral program at West Virginia University and then to pursue the change to a PhD. I will be forever appreciative of the tuition waivers that you graciously provided throughout this program. Thank you to the doctoral faculty who helped me to learn and grow over the past five years. I have had a remarkable learning experience.

Thank you to my classmates for your laughter and smiles over the years. I especially want to thank Jamey and Roger. I don't believe that I would have made it through this program without you. We have had a lot of really fun times together and I thank you for those memories.

I would especially like to thank my family. To my parents, Dr. Richard and Bonnie Frazer, thank you for loving and encouraging me, and especially for all of your prayers. To my siblings and their families, thank you for all of your support and encouragement. Finally, to my husband, Bob, and our children, Mitchell and Julia, thank you for your continued love and support over the past five years. I know there were difficult days and times when it seemed this would never end. I appreciate the sacrifices that we have all made and hope that you are as proud of me as I am of all of you. I am so grateful to have you as my family. Thank you. I love you all so very much!

I would especially like to thank God for His continued blessings and for granting me the wisdom, knowledge, and perseverance to complete this degree.

TABLE OF CONTENTS

ABSTRACT.....	ii
DEDICATION.....	iii
ACKNOWLEDGEMENTS.....	iv
TABLE OF CONTENTS.....	vi
LIST OF TABLES.....	viii
LIST OF FIGURES.....	ix
CHAPTER 1: INRODUCTION.....	1
Background of Study.....	2
Statement of Purpose.....	4
Research Questions.....	4
Hypotheses.....	5
Conceptual Framework.....	5
Nature of Transitions.....	6
Types and Patterns of Transitions.....	6
Properties of Transitions.....	7
Transition Conditions: Facilitators and Inhibitors.....	8
Personal Conditions.....	8
Community and Societal Conditions.....	9
Patterns of Response.....	10
Process Indicators.....	10
Outcome Indicators.....	11
Nursing Therapeutics.....	11
Significance of the Problem.....	12
Definition of Terms.....	14
Expectations.....	14
Anxiety.....	14
Depression.....	14
Physical Health Status.....	14
Assumptions.....	15
Limitations.....	15
CHAPTER 2: REVIEW OF LITERATURE.....	16
Theoretical Review.....	16
Expectations.....	19
Pilot Study.....	20
Expectations of Benefit.....	23
Expectations in Other Patient Populations.....	24
Open-Heart Surgery Experience.....	25
Perceptions of Open-Heart Surgery.....	27
Recovery and Open-Heart Surgery.....	29
Anxiety and Open-Heart Surgery.....	34
Depression and Open-Heart Surgery.....	36
Anxiety, Depression, and Open-Heart Surgery.....	38
Physical Health Status and Open-Heart Surgery.....	43

Conclusions	46
CHAPTER 3: METHODOLOGY	48
Research Questions	48
Design	48
Setting	49
Sample	49
Inclusion Criteria	51
Exclusion Criteria	51
Instrumentation	52
Procedures	55
Data Analysis	58
CHAPTER 4: RESULTS	60
Sample Description	60
Research Question One	73
Research Question Two	76
Research Question Three	79
Research Question Four	82
Qualitative Findings	84
Summary	85
CHAPTER 5: SUMMARY, DISCUSSION, AND IMPLICATIONS	87
Summary and Discussion of Results	87
Expectations	88
Anxiety	92
Depression	93
Physical Health Status (PHS)	95
Conceptual Framework	96
Study Limitations	101
Implications for Practice	103
Recommendations for Future Research	107
Conclusions	108
APPENDIX A	109
APPENDIX B	115
APPENDIX C	117
APPENDIX D	120
APPENDIX E	123
APPENDIX F	124
APPENDIX G	125
APPENDIX H	126
REFERENCES	127

LIST OF TABLES

Table 1	Participant Recruitment and Retention Rates	50
Table 2	Demographic Characteristics of the Sample.....	62
Table 3	Descriptive Summary of the Preoperative Variables.....	64
Table 4	Descriptive Summary of the Postoperative Variables	65
Table 5	Comparison of Anxiety and Depression Subscale Scores	66
Table 6	Repeated Measures ANOVA of Expectations, Anxiety, Depression, and PHS.....	69
Table 7	Repeated Measures ANOVA of Anxiety and Depression Scores for Subjects with Borderline or Abnormal Preoperative Scores	70
Table 8	T-Test Comparisons of Subscales Physical Functioning, Role Physical, Bodily Pain, and General Health	72
Table 9	Preoperative Pearson Product Moment Correlation Coefficients.....	75
Table 10	Postoperative Pearson Product Moment Correlation Coefficients	77
Table 11	Regression Analysis of Preoperative Expectations, Anxiety, Depression and PHS on Postoperative PHS	81
Table 12	Regression Analysis of Postoperative Expectations, Anxiety, and Depression on Postoperative PHS	83

LIST OF FIGURES

Figure 1	6
----------------	---

CHAPTER 1: INTRODUCTION

This chapter includes an introduction to the problems associated with recovery after open-heart surgery. The chapter presents background information that describes the problem, the purpose of the study, research questions and hypotheses. The chapter also describes the conceptual framework, significance of the problem, and definition of terms.

Coronary heart disease (CHD) affects approximately 15.8 million people in the United States and remains the leading cause of mortality for both sexes (American Heart Association, 2007). The American Heart Association defines CHD as a diagnosis of acute myocardial infarction, acute and chronic ischemic heart disease, angina, and/or atherosclerotic heart disease. Management of this chronic condition with myocardial revascularization options such as coronary artery bypass graft (CABG) surgery has become a conventional method of treatment. Heart surgery has also been used for the treatment of valvular disorders contributing to over half a million open-heart surgical procedures performed each year (American Heart Association). Surgery has been used to improve patient outcomes related to cardiac symptoms, prolonged life, and health-related quality of life (Czajkowski et al., 1997). Although these surgical outcomes are beneficial, research has suggested that the experience and the recovery process may be more complex than anticipated, and present challenges that continue well after discharge (Lindsay, Smith, Hanlon, & Wheatley, 2000; Tolmie, Lindsay, & Belcher, 2006). Furthermore, postoperative hospital length of stay has decreased significantly over the past 10 to 15 years (Cowper et al., 2007) leaving the bulk of patient recovery to occur at home. Additional research is needed to understand recovery that continues after discharge at a time when patients transition from hospital to home.

Background of Study

Recovery after open-heart surgery may be further complicated by patients' preoperative expectations. It is known that patients develop specific expectations about their surgical experience (Doering, McGuire, & Rourke, 2002), but little research has fully explored this relationship with recovery. Conceptual definitions of expectations have also varied providing inconsistent explanations. The concept of expectations has been linked as a primary determinant of patient satisfaction (Thompson & Sunol, 1995), but insufficient data exist to support this conclusion. In addition, few studies have examined expectations outside of the paradigm of satisfaction or in relation to specific populations such as open-heart surgery patients.

Studies that have explored the experiences of open-heart surgery patients have reported that incongruent or unrealistic expectations have lead to negative feelings of anger, disappointment, and frustration (Doering, Moser, Lemankiewicz, Luper & Khan, 2005; Hunt, 1999; Lindsay et al., 2000; Theobald & McMurray, 2004). Patients have described not being prepared for the magnitude of the surgical experience and its impact on their physical and psychosocial recovery. More specifically, patients have struggled with physical health status (PHS) limitations or have become anxious and depressed about the future (Hamalainen et al., 2000).

PHS after open-heart surgery includes the resumption of physical activities such as lifting, climbing, bending, walking, and bathing. The inability to carry out physical roles leads to a discrepancy between one's ideal and actual self (Theobald & McMurray, 2004). These postoperative limitations have resulted in negative emotions and been linked to anxiety and depression (Plach & Heidrich, 2001; Theobald & McMurray, 2004).

Research has noted that delayed recovery after open-heart surgery clearly affects psychological status (Gardner, Elliot, Gill, Griffin, & Crawford, 2005). Depression has been found in 20% to 25% of patients undergoing CABG surgery and contributes to higher mortality, readmission rates, and postoperative cardiac events (Mallik et al., 2005). Depressive symptoms have been reported to be highest immediately after surgery and continue for as long as four to six weeks after discharge (Doering et al., 2005; McCrone, Lenz, Tarzian, & Perkins, 2001). Higher depressive symptoms before and after surgery has also been correlated with lower improvement in physical status and decreased physical and emotional recovery (Doering et al., 2005; Mallik et al., 2005). Anxiety has also been identified postoperatively and it has been suggested that levels may increase when patients experience a discrepancy between their expected and actual recovery (McCrone et al., 2001).

In summary, qualitative research has provided preliminary groundwork describing patient expectations related to open-heart surgery (Doering et al., 2002; Hunt, 1999; Lindsay et al., 2000; Theobald & McMurray, 2004). However, significant gaps still exist in viewing expectations as separate from satisfaction with care and in understanding the impact of expectations on the recovery experience. Research using a quantitative design is needed to provide additional empirical evidence that may be more generalizable to patient populations. Further work is also needed to examine PHS limitations that may exist after discharge and to explore if a relationship exists among anxiety, depression, and PHS in these patients. Finally, the majority of these studies have occurred in countries outside the United States, supporting the need for research conducted on American patients.

Statement of Purpose

Patient expectations need to be measured with quantitative scales separate from an evaluation of care. Research that examines the relationship between expectations and recovery from open-heart surgery will provide a better understanding of the concept using a specific patient population. Measuring anxiety and depression will provide relevant information about the effects of preoperative and postoperative emotions in relation to physical health status (PHS). Therefore, the purpose of this study was to examine the relationships among expectations, anxiety, depression, and PHS in patients undergoing open-heart surgery, and to determine preoperative and postoperative predictors of PHS.

Research Questions

This research study was designed to answer the following questions:

- 1) What are the relationships among preoperative expectations, preoperative anxiety, preoperative depression, and preoperative PHS in open-heart surgery patients?
- 2) What are the relationships among postoperative expectations, postoperative anxiety, postoperative depression, and postoperative PHS in open-heart surgery patients?
- 3) To what extent do preoperative expectations, preoperative anxiety, preoperative depression, and preoperative PHS as a group predict postoperative PHS in open-heart surgery patients?
- 4) To what extent do postoperative expectations, postoperative anxiety, and postoperative depression as a group predict postoperative PHS in open-heart surgery patients?

Hypotheses

- 1) There is a relationship among preoperative expectations, preoperative anxiety, preoperative depression, and preoperative PHS in open-heart surgery patients.
- 2) There is a relationship among postoperative expectations, postoperative anxiety, postoperative depression, and postoperative PHS in open-heart surgery patients.
- 3) Preoperative expectations, preoperative anxiety, preoperative depression, and preoperative PHS as a group predict postoperative PHS in open-heart surgery patients.
- 4) Postoperative expectations, postoperative anxiety, and postoperative depression as a group predict postoperative PHS in open-heart surgery patients.

Conceptual Framework

Expectations have been linked to transitions in nursing. Schumacher and Meleis (1994) originally described transitions as a concept in nursing and categorized four types of transitions that may result in significant life-alterations: developmental, situational, health-illness, and organizational. All transitions may be affected by several conditions including meanings, expectations, level of knowledge and skill, the environment, level of planning, and emotional and physical well-being. Expectations have been described as a subjective component of transitions that influence the transition experience. Patients may develop initial expectations during transition that may or may not be realistic. Unrealistic or incongruent expectations can result in additional stress during the transition experience (Schumacher & Meleis).

Meleis et al. (2000) later developed a middle range Theory of Transitions. The theory described Nature of Transitions, Transition Conditions, and Patterns of Response (Refer to

Figure 1 adopted from Meleis et al.). The Nature of Transitions can be described by type, patterns, and properties. Transition Conditions have facilitators or inhibitors and can be affected by personal, community, and societal conditions. Patterns of Response include process and outcome indicators. Throughout the transition process, Nursing Therapeutics may be implemented to assist patients and family through the transition experience.

Adopted from: Meleis, A. I., Sawyer, L. M., Im, E. O., Hilfinger Messias, D. K., Schumacher, K. (2000).

Experiencing transitions: An emerging middle-range theory. *Advances in Nursing Science* 23(1), 12-28.

Figure 1

Nature of Transitions

Types and Patterns of Transitions

This study can be linked to the theory of transitions. Meleis et al. (2000) described transitions as resulting from changes in one's life, health, relationship, and environment. Patients' undergoing open-heart surgery experience transitions because surgery is a change in health. The type of transition that open-heart surgery patients experience may be health-illness

or situational. A health-illness transition may exist during hospitalization or as patients move from the hospital to home environment. Situational transitions may occur as patients experience role changes related to their PHS. Transition patterns are complex as patients may experience more than one type of transition simultaneously or at varying times (Meleis et al., 2000).

Therefore, patients recovering from open-heart surgery may experience a health transition when being discharged from the hospital to home, and a situational transition due to change in roles or work status.

Properties of Transitions

The Transitions Theory identified several interrelated properties of the transition process. These properties include: awareness, engagement, change and difference, time span, and critical points and events (Meleis et al., 2000). Patients undergoing open-heart surgery may experience several of these properties during a health-illness or situational transition. Awareness has been described as recognition of the transition experience based on perceptions and knowledge (Meleis et al.). As patients prepare for the surgical event they become engaged and begin to form expectations about surgery. These expectations are based on their perceptions, knowledge, and prior experiences. Change and difference are properties that relate to new roles and situations that emerge throughout the process. These areas may be influenced by variables such as expectations, anxiety, depression, and PHS. Patients who develop unrealistic expectations may be confronted with reality and face necessary changes during this time. An open-heart surgery patient who expected to resume prior physical activities in six weeks, but is unable to do so must make changes to accept this health-illness or situational transition. Lindsay et al. (2000) described negative feelings of change such as shock and disappointment when patients' experienced unrealistic or incongruent expectations. In contrast, change and differences

between expectations and reality may not always be negative since some patients may be pleasantly surprised with their surgical experience and recovery process.

The property of time span from the transition model suggests that all transitions occur over time (Meleis et al., 2000). Although transitions may have a specific beginning and end point, the process may not always follow a predicted chronological path. Likewise, open-heart surgery and recovery may vary with each patient resulting in traditional or non-traditional paths of recovery. Open-heart surgery patients may experience faster or slower rates of recovery and therefore experience shorter or longer health-illness or situational transitions. Critical points and events represent specific times during the transition process that may be marked with uncertainty or change. Critical points during open-heart surgery may be the initial time before surgery as patients prepare for the surgical event and experience an awareness of the upcoming event. Another critical point may occur at the time of discharge. Patients may anticipate changes related to new medications, postoperative routines, or lifestyles changes. These changes may result in uncertainty. Patients may also experience feelings of anxiety and depression during these periods of uncertainty. Research needs to further explore recovery after discharge to understand patients' experiences during this critical point of transition.

Transition Conditions: Facilitators and Inhibitors

Personal Conditions

Transitions are also influenced by personal, community, and societal conditions that facilitate or inhibit progress. Meleis et al. (2000) described meanings, cultural beliefs and attitudes, socioeconomic status, and preparation and knowledge as facilitators or inhibitors during transition. Meleis et al. suggested positive, negative, or neutral meanings may influence transition before or during the process. Cultural beliefs may also affect how one responds to a

health-illness or situational transition. Socioeconomic status and lack of adequate knowledge or preparation may inhibit a health transition. It is thought that expectations are influenced by similar conditions such as perceptions, beliefs, knowledge, and prior experiences. Realistic perceptions, adequate knowledge, and positive beliefs may facilitate patients' transition during open-heart surgery and recovery. Likewise, positive expectations of open-heart surgery and recovery may be a facilitator to assist patients through their health-illness or situational transition, while unrealistic expectations may inhibit transition. Patients with incongruent expectations from delayed recoveries or physical limitations may allow negative feelings to interfere with recovery. Similarly, anxiety and depression may inhibit the transition process. Difficulties with emotional well-being may negatively impact patients as they move through health-illness or situational transition before surgery or during recovery. Although these variables can be viewed from the framework of this model, further research is needed to completely understand how these variables facilitate or inhibit open-heart surgery patients during their health-illness or situational transition.

Community and Societal Conditions

Transitions are also influenced by community and societal conditions (Meleis et al., 2000). Meleis et al. suggested that community resources may facilitate or inhibit transitions. Community resources such as home health services and cardiac support groups may facilitate recovery. Communities in rural areas may have limited resources which inhibit transitions. Limited family resources may be inhibitors of transitions for some patients. Societal conditions may also positively or negatively influence transitions (Meleis et al.). This study has included patients from the United States, so patients may not have significant stigmatism related to their health as in non-western countries. However, Medicare or other health care reimbursement

limitations may influence the number of home health visits and inhibit transition after open-heart surgery. Decreased length of stays after surgery may also be an inhibitor as the bulk of the patient's recovery occurs at home.

Patterns of Response

Process Indicators

Transitions are also characterized by process and outcome indicators (Meleis et al., 2000). Process indicators include feeling connected, interacting, location and being situated, and developing confidence and coping. Feeling connected may influence anxiety and depression as patients experience situational or health-illness transitions. Continued services such as home health nursing or cardiac support groups may provide patients with additional resources that allows them to feel connected with other health care providers or patients who have had similar experiences. Likewise, interacting with physicians, nurses, and family may allow patients to describe their feelings and concerns. It may also provide opportunities for patients to discuss their expectations and for nurses to recognize unrealistic expectations of recovery. Location and being situated may be influenced by patients who are discharged to extended care facilities or who reside with their children or other family members during recovery. Being in a strange environment may affect their transition process. Likewise, patients in rural locations may have limited resources that inhibit transition. Developing confidence and coping is the final component of process indicators. Meleis et al., (2000) stress the need for patients to be able to develop confidence to progress during transition. Patients must all develop confidence in their abilities during transition from discharge to home. Patients must learn new medications, signs of wound infections, and adhere to postoperative limitations.

Outcome Indicators

Outcome indicators include mastery and fluid integrative identities. Successful outcomes usually include mastery of new skills to assist individuals in managing the transition and reaching a healthy transition outcome (Meleis et al., 2000). Outcomes from transitions may also result in changes in individual identities, termed fluid integrative identities. Postoperative expectations, anxiety, depression, and PHS all represent outcomes of transition. Recovery after open-heart surgery may result in mastery of the health-illness or situational transition. For example, an open-heart surgery patient may experience mastery of the health-illness or situational transition by resuming prior physical activities and roles. Patients who are unable to achieve mastery may develop new identities. An open-heart patient who is unable to resume prior work roles may experience necessary changes and develop new identities during transition.

Nursing Therapeutics

The transitions theory also suggests that nursing interventions may be implemented throughout the transition process to assist patients through their health status changes during open-heart surgery. Adequately preparing patients for surgery and recovery will provide patients with appropriate knowledge to assist them in developing more realistic outcomes. Nurses can also intervene at critical points when patients are moving through the transition process by providing necessary education, referrals, and support services. Assessing for anxiety and depression may lead to the identification of problems with emotional well-being that may inhibit the transition process. Recognizing facilitators and inhibitors may allow nurses to appropriately intervene and provide care that assists patients in achieving better physical and emotional health. Assisting patients with process indicators such as feeling connected and interacting may also assist patients to develop mastery during their transition. Achieving positive outcomes will

allow patients to successfully master the transition experience or assist them to develop necessary lifestyle changes and new identities. Research will provide data that can be examined in the framework of this model to provide nurses with a better understanding of the transitions that open-heart surgery patients' experience.

Significance of the Problem

This research is important because it will identify areas that influence the care of open-heart surgery patients. Findings from the study could allow nurses to better assist patients and could lead to the development of new standards of care for nursing practice. Nurses participate in the perioperative care of open-heart surgery patients. Research that examines expectations, anxiety, depression, and PHS could provide information on how these variables affect patients throughout their surgical experience.

It is understood that most patients form expectations about their surgical event and that incongruent expectations have lead to frustration and disappointment. Nurses can assist patients to develop more realistic expectations of surgery and recovery by talking to patients about their expectations. Patients may face uncertainty when they experience delays in recovery or discharge. Teaching could focus on unanticipated delays and assist patients to realize that recovery is varied for all patients.

Nurses should also be aware that emotions such as anxiety and depression may affect the recovery process. It is known that anxiety and depression are common in open-heart surgery patients, but continued research is needed to better understand the effects of these emotions on recovery. Nurses could implement preoperative and postoperative screening tools to identify significant anxiety and depression in open-heart surgery patients. Nurses could also implement

postoperative screenings for high-risk patients, make referrals, and provide additional support services that could continue after discharge.

Patients may also experience difficulties with PHS after open-heart surgery. Prior research has suggested that emotional disorders may impact physical recovery after discharge. Continued research is needed to provide preoperative and postoperative comparisons of PHS in relation to expectations, anxiety, and depression. Nurses need to recognize patients with postoperative physical limitations and understand that these limitations may have a significant impact on their recovery. Nurses may also need to provide patients with additional teaching about physical limitations and explain that limitations may exist for weeks or months after discharge. Nurses need to provide patients with information about what they will experience during their hospitalization, but patients also need to receive clear preoperative instructions about postoperative limitations. Patients need to understand that they will have significant lifting restrictions postoperatively and that they will not be allowed to resume moderate activities until at least four to six weeks postoperatively. Nurses may also need to make referrals for physical therapy services that could assist patients during recovery.

In summary, qualitative studies have identified that patients develop expectations about open-heart surgery (Doering et al., 2002; Hunt, 1999; Lindsay et al., 2000), but little research has fully explored this concept separate from satisfaction using quantitative methods. Additional research is needed to better understand expectations and the implications of unrealistic expectations on recovery. Prior research has suggested that patients struggled with incongruent expectations related to physical health status limitations and that these limitations were also influenced by anxiety and depression (Chunta, 2006). Research using mixed methods will provide a foundation to view patient expectations in relation to other variables using the

transitions theory. These findings can be used to guide future research opportunities and to develop nursing practice standards for the care of open-heart surgery patients.

Definition of Terms

Expectations

Expectations were defined as dynamic, cognitive perceptions about a health care event influenced by beliefs, values, experiences, and knowledge. Expectations were measured with the Future Expectations Regarding Life with Heart Disease Scale (Axelrad, 1981).

Anxiety

Anxiety was defined as an emotional disorder characterized by being worried or uneasy about what may happen. Anxiety was measured using a subscale of the Hospital Anxiety and Depression (HAD) Scale (Zigmond & Snaith, 1983).

Depression

Depression was defined as an emotional disorder characterized by sadness, hopelessness, and inactivity. Depression was measured using a subscale of the Hospital Anxiety and Depression (HAD) Scale (Zigmond & Snaith, 1983).

Physical Health Status

PHS was defined as a measurement of the capacity and performance of health status including physical function, role function, pain, and general health status. Physical functioning will include moderate and vigorous activities, lifting, climbing, bending, walking, and bathing. PHS was measured with the Physical Component Scale (PCS) of the SF-36 which includes

physical functioning, role activities, bodily pain, and general health (Stewart, Hays, & Ware, 1988).

Assumptions

It was assumed for this study that patients undergoing open-heart surgery developed expectations about the surgery and recovery experience. It was also assumed that patients may exhibit symptoms of anxiety and/or depression about their surgery or recovery experience. The study also assumed that the recovery for patients undergoing CABG or valve replacement was similar and therefore patients having either type of surgery were included in the study. Finally, it was assumed for this study that patients provided truthful and accurate data.

Limitations

The study was limited to a convenience sample of English-speaking patients who underwent elective open-heart surgery for the first time. Participants experiencing a repeat open-heart surgery may have different expectations than those undergoing surgery for the first time, and hence were excluded from the study. The study was also limited to patients from two hospitals, one in Pennsylvania and one in West Virginia. The use of two hospitals from rural locations is also a limitation.

CHAPTER 2: REVIEW OF LITERATURE

This chapter provides a review of the literature related to expectations, anxiety, depression, and PHS. The chapter includes a review of the conceptual literature that describes expectations, and qualitative and quantitative studies related to expectations and open-heart surgery recovery. The chapter also includes a review of studies that have examined anxiety, depression, and physical health status in open-heart surgery patients.

Open-heart surgery has been studied using multiple variables and qualitative and quantitative methods of research. A review of the literature found studies that examined variables such as experiences, perceptions, recovery, and quality of life in open-heart surgery patients, but few have described patient expectations of the surgical event. Furthermore, the literature lacks a mutual definition for expectations, leaving inconsistent findings that are difficult to generalize to patient populations.

Theoretical Review

Thompson and Sunol's (1995) metasynthesis of 18 articles revealed data on expectations from multiple fields including psychology, sociology, marketing, and health care. The discipline of psychology has conceptualized expectations in terms of the relationship between an evaluation of one's beliefs and resulting behavior, while sociologists have viewed expectations in terms of constructed realities and social interaction. The field of marketing based its approach from psychology, defining expectations as something that can be met when providing goods or services. Expectations have also been linked to patients and health care by focusing on quality assurance and service quality topics, suggesting that expectations are a component of patient satisfaction.

Thompson and Sunol (1995) concluded that prior research identified cognitive and affective factors related to expectations. Expectations are based on beliefs and therefore occur through a cognitive process. In contrast, those same expectations when used as determinants of satisfaction, lead to an affective state of evaluation. In relation to health care, expectations have been described as an expected service that the patient will receive, but little empirical data has provided consistent findings to support this definition.

From their synthesis, Thompson and Sunol (1995) proposed four types of expectations: Ideal, Predicted, Normative, and Unformed. Ideal expectations represent wants or preferred outcomes, Predicted expectations usually relate to service encounters, and Normative expectations represent what should happen. The concept of Unformed expectations suggests that some patients may not be able to describe their expectations because prior experiences or knowledge may not be present for all patients. Therefore, expectations may be “epiphenomenal” or waiting to take place as the experience occurs (p. 131). Although it is unclear if overlapping boundaries exist among the types of expectations, the definitions provided preliminary, conceptual meanings upon which to build future research.

Conceptual definitions have also emerged from studies related to satisfaction with practitioners, clinical practice, and nursing care. Kravitz et al. (1996) defined expectations as individualized, perceived vulnerabilities, prior experiences, and stored knowledge that leads to an expected response by the practitioner. Baker (1998) considered expectations to be transformed by experiences and influences, continually created from one’s beliefs and values, and based on anticipation and perceptions. However, expectations are separate from preferences, suggesting that postoperative pain may be anticipated and expected, but not preferred. Buetow (1995) used the term expectations to represent patient wants and predictions of their general

practitioners, while Like & Zyzanski (1987) suggested that expectations differed from patient requests and related to how the patient hoped to be assisted.

Expectations in nursing have emerged from research related to patient satisfaction and have been studied according to structure, process, and outcomes (Uzun, 2001). Staniszewska (1999) reported that most researchers have agreed upon a global definition that defines expectations as beliefs resulting from a cognitive process, but later concluded that expectations really represent “an umbrella term” (p.102) that masks the complex relationship of patient experiences and perceptions in relation to their health. Uzun (2001) defined expectations as the desires or demands that result from predetermined ideas related to the type of care a patient wishes to receive.

Disagreement also exists in defining the relationship between patient expectations and satisfaction. Thompson and Sunol (1995) concluded from their metasynthesis that satisfaction can be explained more from the evaluation of perceptions of service than by accounting for other cognitive determinants. They suggested that to understand and influence satisfaction, perceptions of service should be measured directly while avoiding other related concepts such as expectations and preferences. Mahon’s (1996) conceptual analysis concluded that satisfaction is multidimensional, influenced by expectations, perceptions, and prior experiences, and used in the evaluation of quality of care. Studies on satisfaction have suggested that patients focus on expectations related to outcomes of care, the nurse, the physician, the facility, and the patient’s own expectations related to their participation with care (Thompson & Sunol 1995, Staniszewska & Ahmed, 2000).

Overall, satisfaction literature reflects the lack of an established definition for the concept. Further arguments recognize that there is an assumed relationship between expectations

and satisfaction, but insufficient findings exist to support these conclusions (Staniszewska & Ahmed 2000; Uzun 2001). Expectations have varying definitions or have not been supported by theoretical models or empirical data suggesting the need for future research that solely measures expectations separate from satisfaction with care (Staniszewska & Ahmed, 2000).

Expectations

Some research has explored expectations using qualitative methods. Three studies examined expectations of open-heart surgery patients (Chunta, 2006; Hunt, 1999; Staniszewska, 1999). In a study by Hunt (1999) patients' experiences and their expectations of nursing care in the intensive care unit (ICU) were explored following elective CABG surgery. Pre and postoperative interviews of 12 patients took place following discharge from ICU. The semi-structured interviews were audio-taped and transcribed. Thematic analysis was used to identify major and minor themes. A comparison of preoperative and postoperative data concluded that patients anticipated vigilance and personalized nursing care. Patients identified specific expectations of their nursing care and recovery experience. Postoperative interviews also revealed that unexpected occurrences resulted in anxiety and fear. Patients described unanticipated circumstances or delays that caused apprehension and disappointment. The study provided initial findings that explored the expectations and experiences of CABG patients. The study also identified that incongruent expectations resulted in negative consequences. However, the study's purpose was to investigate patient satisfaction with care and therefore the findings are limited within this context.

Staniszewska (1999) studied expectations of cardiac patients (N=33) using semi-structured interviews upon admission and prior to discharge. The study was designed to explore the concept of expectations in patients undergoing CABG surgery, angioplasty, valve

replacement, pacemaker, and cardiac catheterization. Patient expectations were then used to construct a questionnaire related to patient satisfaction. Expectations were explored by focusing on needs, knowledge, and expectations in relation to the patient's diagnosis. Transcripts were reviewed by two coders, and inter-rater reliability between the two was 94%. Content analysis identified 34 themes related to patient expectations.

The themes were narrowed to four main types of expectations: outcomes of care, expectations of the doctor, expectations of the nurse, and patient's participation in their own care. The author reported that expectations of outcomes differed from the other findings because patients' placed value on them, and they represented what the patient hoped or wanted in relation to their hospital stay. The author also concluded that expectations may represent a more complex concept related to experiences and perceptions of one's health (Staniszewska, 1999). A strength of the study included the isolated measurement of patient expectations. However, the use of cardiac patients with varying diagnoses made it difficult to generalize the findings because patients undergoing a cardiac catheterization may have different expectations than patients undergoing CABG surgery.

Pilot Study

A pilot study using a qualitative design was conducted using three focus groups to explore expectations (Chunta, 2006). This study design was used to allow patients to describe their expectations of CABG surgery and recovery since little research has focused solely on patient expectations separate from satisfaction with care. The pilot study included a convenience sample ($N = 18$) from the Cardiac Rehabilitation and Wellness Department at a medical center in Johnstown, Pennsylvania, who had undergone CABG or valve replacement surgery within the past five years. The primarily homogenous sample consisted of 13 males and 5 females with the

majority of subjects (89%) being between the ages of 50 and 79. All participants had undergone open-heart surgery for the first time.

After institutional review board (IRB) approval was obtained, participants were recruited by cardiac rehabilitation staff and through informational flyers posted in the department. The staff obtained informed consent and notified the investigator of interested participants. Three focus group sessions with three different groups were held in a private conference room within the department and scheduled at a convenient time. Group sessions were audio-taped and additional field notes were taken by the moderator. Each session began with an introduction and explanation of the research study. All participants were encouraged to respond to questions as they felt comfortable. Subjects were asked about their expectations of open-heart surgery, expectations that were most important to them, unrealistic expectations, and expectations that might have changed over time. The tape-recorded interviews were transcribed verbatim. The investigator reviewed the transcription multiple times and similar responses were grouped together into categories. Conceptual themes emerged from patterns and relationships within the data. Validation of the themes occurred with a co-investigator (Polit & Beck, 2004).

Five common themes occurred among all three focus groups describing the surgical experience from initial preoperative diagnosis through recovery after hospital discharge. Theme one, acknowledging the disease, focused on feelings of fear and shock as participants confronted their new diagnosis and treatment option. During this time, patients described surprise at being diagnosed with coronary artery disease (CAD) and requiring surgical intervention. Many had formed expectations of a normal catheterization or being treated with angioplasty and stents.

Theme two related to the preoperative perceptions that patients formed while waiting for surgery. Subjects described thoughts of being anxious or at peace. Anxious thoughts were

mediated for some by trust in their physician or God. The cognitive perceptions of the upcoming surgical event were based on prior experiences, knowledge, and beliefs. Subjects related to others who had recovered from cardiac surgery. Although this waiting period was often less than 24 hours, subjects used prior experiences and knowledge to form initial perceptions of their upcoming surgical event.

Theme three, identifying expectations, centered on patients' specific expectations of surgery and recovery. These expectations emerged when subjects were asked to describe what expectations were most important to them. Further analysis revealed that these expectations held hierarchical ranking that was consistent among the groups to: survive surgery, get better, care for self, and return to prior routines including work.

The fourth theme, health and illness transitions, was directed at the adjustment period during home recovery. Subjects struggled with unrealistic expectations and experienced frustration with their functional status such as independently caring for themselves, completing chores, and returning to work. Participants described disappointment when trying to perform activities that required assistance from others or additional time for completion. This incongruence between their expected and actual abilities resulted in feelings of anger, disappointment, and despair. The emotions that patients experienced during this time reflect the consequences of unrealistic expectations and incongruent outcomes.

Finally, theme five related to acceptance of recovery. This included allowances for new limitations and feelings of not reaching their prior expectations at this point in recovery. During this time patients realized that some initial expectations were unrealistic. Although subjects described acceptance with their limitations, this theme suggests that recovery from surgery may

take longer than anticipated for some or present new obstacles including life-compromising changes for others.

The findings from the pilot study suggested that 1) patients began forming expectations prior to surgery, 2) patients expressed negative emotions related to their unrealistic expectations, 3) patients experienced difficulties resuming functional activities, and 4) these problems occurred during the transition from hospital to home. Based on these findings, this study will use a mixed method design to examine the relationship between expectations, anxiety, depression, and functional status preoperatively and four weeks after surgery.

Expectations of Benefit

Research has also focused on expectations by examining expectations of benefit after open-heart surgery (Gortner, Jaeger, Harr, and Miller, 1994; Lindsay et al., 2000). Gortner et al. (1994) used a longitudinal approach to compare age to expected and realized benefits for 199 elderly subjects undergoing CABG, valve replacement, or combined surgeries. Participants were interviewed preoperatively, monthly for three months, and six months post operation. Data was available for 148 subjects, but because of the small sample sizes, logistic regression could only be calculated for the CABG group.

Analysis of the data reported no statistically significant findings related to gender, age, and benefits after CABG surgery. Patients did report higher expectations overall, including a prolonged life span, improved quality of life, and return to prior activities. A key implication from the study was the need for clinicians to provide a clear distinction between recovery expectations and outcome expectations such as anticipated benefits from surgery (Gortner et al., 1994). The study findings are limited to patients over age 70 years. Furthermore, the study focused on expected benefits from surgery, but did not describe expectations of recovery.

Lindsay et al. (2000) also examined expectations of benefit in a qualitative study of 183 subjects undergoing CABG surgery. Participants were interviewed preoperatively, postoperatively, and at home. The study provided views of preoperative and postoperative health, and expectations and experiences of CABG surgery. Thematic analysis revealed preoperative reports of dependency and anxiety related to the surgery. Patients waited approximately four weeks for surgery and this time was described as burdensome. Postoperative perceptions described feelings of freedom and relief. The description of patient experiences and expectations of CABG surgery also provided important findings. Patients reported not being prepared for the magnitude of the event and experiencing distress and anger with unrealistic expectations. The study presented landmark data that focused on expectations and the consequences of unrealistic outcomes. Limitations of the study include the data collection times. Patients waited up to four weeks for surgery, possibly contributing to their anticipation of the event. Although it is valuable to examine postoperative recovery, the mean length of time from surgery to data collection was 16.4 months, and may have altered patients' recollection of their experiences and expectations.

Expectations in Other Patient Populations

Expectations have also been studied in obstetrical and orthopedic populations. Expectations were measured in terms of events women thought would occur during labor and delivery. The study concluded that multiparas reported similar expectations to the actual event, supporting that prior experiences influenced the development of their expectations (Stolte, 1987).

Beck's (2002) metasynthesis reported four themes related to postpartum depression. The themes were incongruity between expectations and reality of motherhood, spiraling downward, pervasive loss, and making gains. The finding suggested that conflict occurred when

expectations were not congruent with patient outcomes of motherhood. Emotions such as despair and sadness lead to postpartum depression. Likewise, a pilot study ($N=5$) of orthopedic patients reported similar emotional findings while identifying postoperative needs of patients and spouses (Showalter, Burger, & Salyer, 2000). Content analysis described patients' feelings of discouragement and distress in relation to incongruent expectations. In addition, patients' perceptions of their recovery often contributed to unrealistic expectations.

A review of the literature examining expectations has provided data related to expectations and expected and realized benefits. The findings suggested that patients develop expectations about their recovery and attach value to them (Hunt, 1999; Staniszewska, 1999). Incongruent expectations have resulted in negative outcomes such as distress, despair, sadness, and anger in several patient populations (Beck, 2002; Chunta, 2006; Lindsay et al., 2000; Showalter et al., 2000). Since the aim of care should be to lessen the gap between a patient's expectations and reality (Staniszewska, 1999), research needs to focus solely on patient expectations separate from satisfaction with care. Although the qualitative studies have provided preliminary groundwork for understanding expectations, future work using quantitative methods is needed to further develop this concept.

Open-Heart Surgery Experience

Additional studies with heart surgery patients have focused on their experiences, perceptions, and recovery. Several studies have described the experience of open-heart surgery through qualitative techniques (Gardner, Elliott, Gill, Griffin, & Crawford, 2005; McCormick, 1999; Tolmie, Lindsay, & Belcher, 2006). McCormick (1999) conducted a literature review on the CABG experience and reported seven themes: expected versus realized benefits, survival, loss of control, improved functional status, "being fixed", psychosocial adjustment, and gender

differences. From these findings, the author suggested a need to bridge the gap between pre and post-operative perceptions and to analyze variations in patient outcomes.

Tolmie et al. (2006) used qualitative findings from a larger mixed-method study that examined health and well-being over time. Participants ($N=64$) were asked to describe their health and well-being since their CABG surgery, seven years ago. Audio-taped interviews were transcribed and imported into a software package (NUD*IST). Additional thematic analysis revealed four main themes: recovery and rehabilitation, seven years on, maintaining a positive approach, and health behavior change. Participants described challenges with returning to normal function, having unmet expectations, and postoperative emotional and behavioral changes. Patients reported distress, anxiety, and memory and behavioral changes after surgery that still existed seven years postoperatively. The authors concluded that recovery and recuperation are often delayed and more demanding than anticipated, and suggested that patients and their families need to be adequately prepared for challenges that may occur during this process. Although the findings were significant, the seven year postoperative time frame may have altered patients' recollection of the experience.

Gardner et al. (2005) also explored the experiences of participants ($N=8$) six months after cardiothoracic surgery. The study was part of a larger project that examined pain and health status after cardiac surgery. Semi-structured interviews asked subjects to describe their experiences in the ICU, and their memories, pain, and well-being since surgery. Audio-taped interviews were transcribed and then reviewed using content analysis. Seven themes emerged from the data: impressions of ICU, comfort/discomfort, being sick/getting better, companionship/isolation, hope/hopelessness, acceptance/apprehension, and life changes. The study reported significant findings related to postoperative feelings of depression. Participants

also reported apprehension with recovery and discharge. The authors concluded that surgery and delayed recovery clearly affected patients' psychological status and suggested screening for depression after surgery. Noteworthy findings of the study suggest that postoperative mental health concerns may exist up to six months after surgery.

Literature describing the open-heart surgery experience suggested that recovery may be more difficult than anticipated and results in unmet expectations and continued feelings of apprehension, distress, anxiety, and depression (Gardner et al., 2005; Tolmie et al., 2006). Further work is needed to explore the relationship between incongruent expectations and postoperative psychological sequelae such as anxiety and depression.

Perceptions of Open-Heart Surgery

Perceptions of open-heart surgery have been examined by focusing on educational needs, factors influencing recovery, and quality of nursing and medical care (Davies, 2000; Doering et al., 2002; Goodman, 1997). Goodman (1997) asked participants ($N=10$) to keep a diary for the first six-weeks after surgery. Subjects also participated in a taped interview that inquired about the initial recovery experience. Transcribed interviews were compared to the diaries and grouped into categories. Specific themes emerged and addressed the following issues: dietary needs, lack of information, limitations to recovery, medical concerns, exercising and medication, community support, and support links. Other concerns related to psychological issues such as negative psychological state, positive psychological state, different psychological state, and owning responsibility for care.

Participants reported feeling low, emotional, weepy, depressed, and having mood swings. They voiced reasons such as frustration with limitations, boredom, and inactivity, and realized that recovery may be a slow process. The author concluded that a link exists between recovery

and mood, suggesting that inactivity contributes to depression and being able to participate in normal activities leads to feelings of joy (Goodman, 1997). Although the investigator used diaries and interviews, the study is limited by the self-reported data that the subjects provided.

Perceptions were also examined by asking patients ($N=60$) and their caregivers about recovery after cardiac surgery (Davies, 2000). Postal surveys were mailed at one-week post surgery and six-weeks later. Patients completed the Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983) and a questionnaire that addressed satisfaction with care and discharge information. Patients and their caregivers reported higher anxiety and depression at one week than at six weeks. Anxiety was more marked than depression for both groups, but was not statistically significant. Limitations of the study include the high attrition rate since only 27 subjects completed their questionnaire at six weeks, and the lack of reliability and validity data for the questionnaire.

Doering et al. (2002) examined cardiac surgery patients' perceptions of the quality of their nursing and medical care. The study was part of a larger repeated-measures design that evaluated length of stay and use of outpatient resources. Participants ($N=89$) responded to open-ended questions via telephone interviews at one and six weeks after discharge. A software package (NUD*IST) was used to identify themes from the data. Four major themes emerged from the analysis: being satisfied, not being cared for, having unmet physical needs, and having unmet informational needs. Participants reported incongruent expectations that did not match their surgical experience, delayed recoveries, surprise with the magnitude of the experience, informational needs, and the need for continued care after discharge.

The authors (2002) concluded that clinicians should assist patients to develop realistic expectations for postoperative recovery and to understand the magnitude of the surgical

experience. Although the findings provided significant data about patients' perceptions of surgery and recovery, the research questions were directed at quality of care. Future studies need to independently focus on expectations and not their relation to satisfaction with care.

Recovery and Open-Heart Surgery

Recovery after open-heart surgery has been studied by examining postoperative problems and informational needs, concerns, experiences, and social support (Hamalainen et al., 2000; Hartford, 2005; Jaarsma, Kastermans, Dassen, & Philipsen, 1995; Savage & Grap, 1999; Theobald & McMurray, 2004; Wu, 1995). Semi-structured interviews were used to describe recovery of MI and CABG patients ($N=82$) during the first six months after discharge (Jaarsma et al., 1995). Patients were asked about problems they experienced and informational needs. Patients reported problems with emotional reactions, changes in physical condition, effects of treatment, and convalescence. Informational needs included effects of treatment, physical condition, risk factors, convalescence, and knowledge of the disease. Participants reported expectations of the future such as uncertainty and being afraid. Emotional reactions included being anxious, frightened, and feeling sad and depressed. The findings supported that patients have significant recovery needs that continue after discharge. Further work is needed to explore individual expectations of recovery and the relationship between expectations and emotional reactions.

Post-discharge concerns have also been investigated through telephone calls (Wu, 1995). During a three-year time span, 196 patients recovering from CABG surgery made calls to nurse clinicians. A total of 445 reported concerns were analyzed for patterns. The three most common issues included leg incision healing, pain, and medications. A noteworthy finding was that 75% of the concerns occurred during the first two weeks and only 10% occurred after the fifth week.

The authors concluded that 24 hour a day support should be available to patients within the first 2 weeks after discharge. The study is limited by the self-reported data described in the phone calls and may not be applicable to all CABG patients.

Savage and Grap (1999) also used telephone monitoring to determine patient concerns during early recovery after cardiac surgery. Participants ($N=342$) were interviewed by a clinical nurse specialist 7 to 14 days after discharge. Subjects were asked about their surgical incisions, physical signs and symptoms, appetite, and activity. Data was then collapsed into categories. Leg edema (48%) was the most common concern. Less than two percent of patients described feelings of depression. Participants (21%) also reported feeling that their recovery was slower than expected. The authors concluded that the first two weeks after surgery may be the most difficult for patients and suggested ongoing telephone follow-up to provide teaching and support.

Hartford (2005) published a study using qualitative interviews that addressed patient concerns related to nursing care. The study was part of a larger randomized control trial that implemented follow-up interventions to address postoperative learning needs and spousal and family concerns. A purposive sample ($N=10$) was selected from the treatment group for qualitative interviews. The telephone conversations were audio-taped, transcribed, and analyzed using a software program (NUD*IST) and additional content analysis. Three major themes were identified: physical concerns, affective concerns, and lifestyle changes. Participants reported anxiety related to short hospital stays and physical concerns such as shortness of breath and gastrointestinal problems during the first week. Affective concerns were related to unmet expectations, slow recoveries, and depression. The study was limited by the small sample size and the use of subjects from only the treatment group.

Social support and physical and psychological recovery were studied in patients who had experienced an MI ($n = 147$) and CABG surgery ($n = 159$) (Hamalainen et al., 2000). Support factors included formal services, semi-formal services and informal support and were measured at baseline and one-year later. Outcomes variables included functional activities, physical working capacity, anxiety, and depression. These outcomes were measured with the Duke Activity Status Index (DASI) (Hlatky, Boineau, Higginbotham et al., 1989), the bicycle ergo meter test, and the Symptom Check List-90 (Derogatis, 1977). Data collection for these variables occurred at baseline, 3 months, and 12 months after surgery. Study findings suggested that support factors had a limited role in physical and psychological recovery. Functional and psychological status at three months was the greatest determinant of recovery at one-year. Anxiety and depression also correlated with the DASI and physical working capacity, suggesting that decreased physical performance was associated with psychosocial distress. The study was limited by the lack of reliability and validity data for the support factors questionnaire and The Symptom Check List-90.

Theobald and McMurray (2004) also studied CABG patients one year after discharge. The study intended to explore perceptions of unmet needs one year after discharge. Semi-structured home interviews with 30 patients and their caregivers were conducted 4 to 5 weeks after discharge and 1 year after surgery. Thematic analysis identified five major themes: heart surgery as a wake-up call, making the decision to have surgery, personal changes due to surgery, shifting expectations, and discovering pathways to recovery.

Participants described disappointment with surgical outcomes after surgery and almost half described unexpected complications. Patients reported anger and frustration from changes in functional status including activities of daily living, while others described disappointment

with limitations and feeling depressed when relying on others. Some participants reported specific expectations while others described fear and uncertainty about the future. The authors concluded that the shock of surgery placed a huge burden on participants and their caregivers, especially when the surgery was unexpected. The authors also believed that postoperative complications contributed to additional physical and psychological problems, and stressed the need for adequate discharge instructions (Theobald & McMurray, 2004).

Randomized clinical trials have been used to examine the effects of education and nursing interventions on recovery after cardiac surgery (Shuldham, Fleming, and Goodman, 2002; Tranmer & Parry, 2004). Shuldham et al. used a preoperative education intervention versus traditional education to assess the effects of recovery in 356 subjects undergoing CABG surgery. The Medical Outcomes Study SF-36 (Ware and Sherbourne, 1992) the Hospital Anxiety and Depression (HAD) Scale (Zigmond & Snaith, 1983), a Visual Analog Scale, Cox and Gotts' General Well-Being Questionnaire, and a pain-scale were administered preoperatively, 3 days, 6 weeks, and 3 and 6 months after surgery. The study found no significant differences between the groups comparing measurements of pain ($p = .48$), anxiety ($p = .09$), depression ($p = .62$), and wellbeing ("worn out" $p = .11$; "tense and uptight" $p = .29$) at six months after surgery. Ironically, the experimental group had a longer length of hospital stay ($p = .01$) than the control group. Although the study did not show significant differences between the groups, the experimental design and random assignment were strengths of the study. However, further research is needed to explore the effects of preoperative education on postoperative outcomes.

Tranmer and Parry (2004) used an advanced practice nursing (APN) intervention to provide follow-up telephone calls versus traditional discharge information to subjects ($N=200$)

during the first five weeks after cardiac surgery. The Medical Outcomes Study SF-36 (Ware & Sherbourne, 1992) was used to examine health-related QOL and The Memorial Symptom Assessment Scale (Portenoy, Thaler, Kornblith, Lepore, Friedlander-Klar, & Kiyasu et al., 1994) was used to measure symptom prevalence and distress. Common cardiac symptoms were added to the scale. Subjects were also asked about their satisfaction with hospital care, discharge, and follow-up. Although there were no significant differences between the groups ($p > .05$), the experimental group did report greater satisfaction with recovery after discharge. Participants in both groups also reported a decrease in symptoms from week one to week five. The authors concluded that exclusion of subjects with major complications may have been a study limitation since those subjects could possibly have benefited the most from the APN intervention.

Research on recovery after heart surgery has found that patients experience physical concerns, especially during the first two weeks (Savage & Grap, 1999; Wu, 1995). Subjects have also reported a variety of emotions including anxiety, depression, fear, uncertainty, anger, frustration, and disappointment. These feelings have resulted from issues that occur during recovery such as limited activity and functional status, unanticipated recovery delays, unexpected complications, and relying on others (Hamalainen et al., 2000; Hartford, 2005; Jaarsma et al., 1995; Theobald & McMurray, 2004;). These findings suggest that patients have identified concerns that exist after discharge. Patients tend to focus on physical concerns during the first weeks after discharge, while affective concerns have been reported up to six months after surgery. Furthermore, these emotions have been related to physical and functional postoperative limitations. Additional research is needed to explore this relationship to better understand the recovery process after heart surgery.

Anxiety and Open-Heart Surgery

Specific emotional reactions such as anxiety and depression have been measured in cardiac surgery patients. Fear and anxiety were examined in patients ($N = 171$) before and after surgery at three different times: while awaiting surgery, immediately before, and three months after surgery (Koivula, Tarkka, MT, Tarkka, M, Laippala, & Paunonen-Ilmonen, 2002). Anxiety was measured with the State-Trait Anxiety Scale (STAI) (Spielberger, Gorusch, Lushane, Vagg, & Jakobs, 1983) and the HAD Scale (Zigmond & Snaith, 1983). Study findings noted that anxiety was highest during the waiting period prior to surgery and decreased in the hospital and three months later. State anxiety levels correlated with marital status ($p = .016$) and vocational education ($p = .032$). Trait anxiety levels ($p = 0.02$) correlated with age (less than 55) for subjects awaiting surgery. Using the HAD scale, a correlation existed between gender and anxiety as women ($M = 7.6$) reported slightly higher anxiety levels than men ($M = 5.6$) while awaiting surgery. It was surprising that in-hospital anxiety levels were lower than when patients awaited surgery at home, but it is unknown how long patients actually waited to undergo surgery. Anxiety levels continued to drop three months after surgery, although anxiety was not measured during the first three months of recovery for additional comparison. Further research is needed to examine anxiety during this recovery time.

Three randomized control trials also examined anxiety in cardiac surgery patients (Hartford, Wong, and Zakaria, 2002; Hattan, King, and Griffiths, 2002; Parent & Fortin, 2000). Male patients ($n = 27$) were paired with volunteers who had previously undergone CABG surgery to provide support during their hospitalization and recovery period (Parent & Fortin, 2000). Patients in the control group ($n = 29$) received traditional information on surgery and recovery. Anxiety was measured 48 and 24 hours preoperatively, 5 days, and 4 weeks

postoperatively using the STAI. Although the experimental group initially had higher anxiety levels than the control group, mean anxiety scores decreased significantly and remained lower than the control group 24 hours before surgery, 5 days, and 4 weeks after surgery ($p < .01$). Limitations of the study included the small sample size and participants' awareness of which group they were placed in during the study.

Hattan et al. (2002) used foot massage and guided relaxation to examine the effects on wellbeing in CABG patients. Subjects ($N = 25$) were randomly assigned to a control or one of two intervention groups that received either foot massage or guided relaxation. Psychological and physical variables were measured immediately before and after the intervention. Anxiety was measured with a visual analogue scale. Pretest and posttest measurements of anxiety were not significantly different ($p = .771$). Study limitations included the small sample size and the measurement times immediately before and after the intervention.

Hartford et al. (2002) used a telephone intervention to provide patients and their partners with information and assistance during recovery after CABG surgery. Subjects were randomly assigned to a treatment ($n = 63$) or control group ($n = 68$). The intervention consisted of a series of protocols delivered by a cardiac nurse at discharge and on days 1, 2, 4, 7, and at weeks 2 and 7. Subjects in the control group received standard care. The Beck Anxiety Inventory (BAI) (Beck, Epstein, Brown, & Steer, 1988) was used to measure anxiety at baseline (in hospital), on day 3, and at weeks 4 and 8. Anxiety levels for both groups were found to be moderate to severe prior to discharge ($p < .01$). Mean anxiety levels for the experimental group only had borderline significantly lower means than the control group at T2 and T3 and no differences existed between the group means at T3 and T4. Although the findings were not significant, additional

qualitative data from this study supported the need for protocols to provide additional assistance to patients and their partners after discharge.

Depression and Open-Heart Surgery

Longitudinal designs have been used to examine depression at six weeks, six months, and one year after open-heart surgery (Doering et al., 2005; Saur et al., 2001). Saur et al. (2001) examined depressive symptoms in 416 CABG patients. The study used a secondary data analysis from the Quality Measurement and Management Initiative (QMMI) Coronary Revascularization Project at Duke University Medical Center which collected clinical and administrative data from 12 prominent medical institutions in the United States. Data from the Mental Health scale of the SF-36 was correlated with hospital length of stay, readmission, and mortality. Questions related to being nervous, down-in-the-dumps, feeling calm and peaceful, feeling downhearted and blue, and being happy. Depressive symptoms before CABG surgery correlated with depressive symptoms at six-weeks for the down-in-the-dumps question ($p = .009$), the downhearted question ($p < .001$), and the overall Mental Health scale ($p < .001$). Median scores on the down-in-the-dumps question ($p = .007$) and the Mental Health scale ($p = .02$) were also significantly related to hospital readmission at six months. There was no relationship between depressive symptoms and hospital length of stay and mortality. The study provided relevant findings related to the presence of depressive symptoms before and after CABG surgery. However, these findings are limited because depressive symptoms were measured with the SF-36 and not a specific depression screening tool.

Doering et al. (2005) assessed depressive symptoms, emotional recovery, and physical recovery in CABG patients ($N = 72$) 48 hours after extubation, at discharge, and six weeks after discharge. The Short-Form 12 (Ware, Kosinski, and Keller 1996) was used to assess mental and

physical health. Participants also completed Wolfer-Davis Recovery Index (Wolfer & Davis, 1970) to measure perceived surgical recovery and the Six-Minute Walk Test (Lipkin, Scriven, Crake, Poole-Wilson, 1986) to assess functional status. Emotional recovery was measured with the Multiple Affect Adjective Check List (Zuckerman, Lubin, & Rinck, 1983). All instruments have well established reliability and validity data. Chart reviews were also completed to examine for wound complications defined as infections or wound-healing problems.

Patients with higher depressive symptom scores reported poorer emotional recovery ($p < .001$) and poorer physical recovery ($p = .007$), and completed shorter walking distances ($p < .001$) than patients with lower depressive symptom scores. Emotional and physical recovery scores remained lower at six weeks in subjects with higher depressive symptoms ($p < .001$). Infections and impaired wound healing were also associated with higher depressive symptoms ($p = .03$). The findings suggested that higher depressive symptoms contribute to poorer emotional and physical recovery, including delays in wound healing and infections. However, the study did not include preoperative assessment of depressive symptoms. It would be beneficial to know if these patients experienced depressive symptoms prior to surgery. Further research is needed using a larger sample size, multiple sites, and preoperative measurements of depressive symptoms.

Mallik et al. (2005) also examined depressive symptoms and functional status after CABG surgery. The Geriatric Depression Scale (GDS) developed by Sheikh and Yesavage and the Medical Outcomes Study SF-36 (Ware & Sherbourne, 1992) were used to measure depression and functional status, respectively. Participants ($N = 963$) were assessed at baseline (one month before surgery) and six months postoperatively. Study findings supported that depressive symptoms were a predictor of poorer functional status at six months ($p = .002$). The

authors concluded that the findings confirmed the relationship between depressive symptoms and functional status but also identified that depressive symptoms play a significant role in predicting outcomes after CABG surgery. A limitation of the study may be the use of the GDS to measure depression in younger participants. Although the study excluded subjects under age 30, use of the GDS in subjects between the ages of 31 and 55 may not be an appropriate assessment tool for depression in this age group. The authors also recommended future studies with objective measures of physical performance and use of multiple sites to improve the generalizability of the findings.

Depression has also been associated with higher mortality rates and cardiac events after open-heart surgery (Blumenthal et al., 2003; Connerney, Shapiro, McLaughlin, Bagiella, & Sloan, 2001). Blumenthal and colleagues (2003) studied 817 patients and reported that subjects with depression persisting from baseline to six months post-CABG had higher rates of death than those without depression ($p = .015$). Connerney and associates (2001) followed 309 patients for one year after CABG. The study findings associated depression with atherosclerotic cardiac events ($p < .0001$) such as angina, MI, and percutaneous transluminal coronary angioplasty (PTCA) that occurred within 12 months after surgery.

Anxiety, Depression, and Open-Heart Surgery

Anxiety and depression have also been examined together in open-heart surgery patients (Ben-Noun, 1999; McCrone et al., 2001; Rymaszewska, Kiejna, & Hadrys, 2003). Patients ($n = 132$) from a family practice and heart division who underwent CABG surgery between 1974 and 1989 were randomly selected to assess anxiety, depression, social functioning, and cardiac symptoms (Ben-Noun, 1999). A comparison group of medically treated cardiac patients ($n = 145$) was also included in the study. Anxiety and depression were measured with the HAD Scale

(Zigmond & Snaith, 1983). Significantly more medical patients reported anxiety than surgical patients ($p < .0001$). Likewise, significantly more medical patients reported depression ($p < .0001$) than surgical patients. The findings suggest that long-term psychological outcomes for patients with coronary artery disease were more favorable following CABG surgery than medical treatment. Although the findings were significant, the measurements of anxiety and depression at an average of 9.4 years postoperatively are not synonymous with measurements immediately before and after surgery.

Anxiety and depression were also studied in elderly patients ($N = 31$) who underwent CABG surgery to determine the influence of gender and age on psychological recovery (McCrone et al., 2001). Patients were assessed 2 to 3 days preoperatively and postoperatively and at 2, 4, 8, and 12 weeks using the STAI (Spielberger et al., 1983), and the Center for Epidemiological Studies-Depression (CES-D) Scale (Radloff, 1977). Reliability and validity have been well established for both instruments. Although not statistically significant, depression was noted in more women than men at all time periods. Younger subjects were noted to be more depressed than older subjects at each time period, but the findings were only statistically significant at 2 weeks and 4 weeks ($p < .05$). A pattern of depression was found as scores peaked 2 to 3 days postoperatively ($p < .001$), significantly decreased at 2 weeks post-op ($p < .05$), and returned to preoperative baseline at 4 weeks.

Trait anxiety was only measured preoperatively, and statistically significant differences occurred in comparison of gender, but not between younger and older subjects. Female gender differences were significant in trait anxiety preoperatively ($p < .05$) and state anxiety ($p < .05$) at 2 to 3 days, 2 weeks, and 8 weeks postoperatively. State anxiety was noted to be higher in

younger subjects throughout the study, but was only statistically significant at 2 and 4 weeks postoperatively ($p < .05$).

The study confirmed that a pattern of depression existed 2 to 3 days after surgery which decreased to baseline by 4 weeks post-op (McCrone et al., 2001). These findings support other research that suggests 20% of CABG patients are depressed postoperatively (Pirraglia, Peterson, Williams-Russo, & Charlson, 1999). As expected, anxiety was highest preoperatively and then steadily decreased after surgery. The authors concluded that the increase in anxiety at 12 weeks may occur when patients anticipate a faster recovery or experience difficulty in resuming prior tasks. These incongruent expectations may create anxiety during recovery (2001). Study limitations include the small sample size and the small number of women in the study.

Ryzmaszewska et al. (2003) also examined pre and postoperative anxiety and depression in CABG patients ($N = 53$). The STAI and BDI were used to measure anxiety and depression a few days before, after surgery, and three months later. Symptoms of depression were noted in 32% of patients preoperatively, but declined to 28.3% after surgery, and 26.4% three months later. High levels of anxiety were present in over half of the subjects (55%) preoperatively. Anxiety continued to decline postoperatively, but increased slightly at three months. These findings are consistent with McCrone et al. (2001) and may be related to the time in recovery when patients feel better and begin to resume prior activities. The authors concluded that depression was not significant in this group of CABG patients, but recognized that the tools used to measure depression in most studies have assessed somatic complaints such as sleep disturbances, loss of appetite, and fatigue which may be typical symptoms of postoperative patients.

The Post CABG Biobehavioral Study in the United States and Canada used a longitudinal approach to examine anxiety, depression, and physical and social functioning in men ($n = 405$) and women ($n = 269$) (Lindquist et al., 2003). Participants completed the STAI (Spielberger et al., 1983) and the CES-D (Radloff, 1977) the day before surgery and six weeks, six months, and one year after surgery. The Functional Status Questionnaire (FSQ) (Jette, Davies, Cleary et al., 1986) was used to measure physical and social function. Women reported more depressive symptoms at each time period than men ($p < .001$), but no differences were noted between genders on anxiety levels ($p = .44$). Women also reported lower scores than men in activities of daily living ($p < .001$), intermediate physical activities ($p < .003$), and social functioning ($p < .001$). The authors stated that although differences existed according to gender, quality of life scores showed improvement for both genders in terms of social, physical, emotional function, and life satisfaction at one year post surgery.

Oxlad et al. (2006) examined psychological risk factors for predictors of coronary heart disease (CHD) and readmission within six months after CABG surgery. Participants ($N = 119$) received telephone interviews prior to surgery and six months postoperatively, and face-to-face interviews at five to six days postoperatively. Anxiety and depression were measured with the Depression Anxiety Stress Scales (DASS) (Lovibond, P. & Lovibond, S., 1995). Depression was present preoperatively in 14.3% of patients and immediately postoperative in 15.7% of patients, but the findings were not statistically significant to predict CHD or readmission after CABG. Anxiety was present in 15.1% of patients preoperatively and increased to 30.6% in the immediate postoperative period. These findings were statistically significant ($p = .01$). Multivariate Cox regression analyses revealed that preoperative psychological function did not predict CHD or surgery-related admissions. However, in adjusted analyses, increased

preoperative depression predicted CHD and surgery-related readmissions ($p = .01$).

Postoperative anxiety was also found to be a predictor of CHD and surgery-related readmission in the unadjusted ($p = .02$) and adjusted analyses ($p = .04$). The authors reported the small sample size and short follow-up period as study limitations and recommended examining patients over a longer period of time.

Anxiety in open-heart surgery patients has been measured at different times during the perioperative period with mixed findings. As expected, high levels of anxiety have been present prior to surgery (Koivula et al., 2002; McCrone et al., 2001; Parent & Fortin, 2000; Ryzmaszewska et al., 2003), postoperatively (Oxlad et al., 2006), and prior to discharge (Hartford et al., 2002). Although anxiety levels have consistently declined over time (Hartford et al., 2002; Koivula et al., 2002; McCrone et al., 2001; Parent & Fortin, 2000; Ryzmaszewska et al., 2003) research has shown an increase at three months after surgery when patients may experience frustration when attempting to resume prior activities (McCrone et al., 2001; Ryzmaszewska et al., 2003). In some studies, anxiety occurred more frequently in women (Koivula et al., 2002; McCrone et al., 2001), while other data has shown no differences by gender (Lindquist et al., 2003).

Studies that have measured pre and postoperative depression have also reported varied conclusions. Depressive symptoms have been present preoperatively and postoperatively (Saur et al., 2001), and have been correlated with decreased emotional and physical recovery (Doering et al., 2005; Mallik et al., 2005), cardiac events (Connerney et al., 2001), and higher mortality rates (Blumenthal et al., 2003). Preoperative depression has also been linked to readmission after surgery (Oxlad et al., 2006), while postoperative depression has been reported more by women than men up to one year after surgery (Lindquist et al., 2003).

These findings suggest that emotional factors such as anxiety and depression are present before and after surgery and may differ according to gender. Although some anxiety may be anticipated prior to surgery, the presence of anxiety later in recovery may warrant further investigation. The presence of depressive symptoms may also contribute to negative recovery outcomes such as delayed physical recovery, readmissions, and even death. Further work is needed to examine the relationship between postoperative depression and physical recovery such as functional status.

Physical Health Status and Open-Heart Surgery

Although research has examined recovery after open-heart surgery, few studies have specifically focused on postoperative physical health status (Allen, Becker, & Swank, 1990; Barnason et al., 2000; DiMattio & Tulman, 2003; Elliott, Lazarus, & Leeder, 2006). Physical health status has been typically examined by measuring functional status abilities. Allen et al. (1990) assessed physical and social functioning in men ($N = 125$) one month before and one and six months following CABG surgery. The Functional Status Questionnaire (FSQ) (Jette et al., 1986) was used to measure physical, social and leisure activity. Reliability values for the scales ranged from 0.64 to 0.91. A self-efficacy scale and the mental health scale from the FSQ were used to determine predictors of functional status after CABG. Although functional status decreased at one month postoperatively, scores did improve by six months ($p = .0001$). However, 13% of subjects reported functional status disabilities with activities of daily living and social activities six months after CABG surgery. Multiple regression analysis revealed that self-efficacy was a significant predictor of physical ($p = .0004$) and social functional status at six months. Although the findings were significant, the study has decreased generalizability because of the limitation of the sample to males and the low reliability on the FSQ scales.

Barnason et al. (2000) also examined functional status in CABG patients ($N = 51$) using a repeated measures design. Functional outcomes were measured with the Medical Outcomes Study SF-36 (Ware & Sherbourne, 1992) and the Modified 7-Day Activity tool (Hellman & Williams, 1994). Baseline data was collected through patient interviews after CABG surgery. Telephone interviews were used for follow-up data at 3, 6, and 12 months postoperatively. Analyses revealed lower preoperative scores than at 3, 6, or 12 months after surgery in each of the subscales except the role-emotional scale. Role-emotional scores at 3 months were not statistically different when compared to preoperative scores, but were statistically different at 6 and 12 months ($p = .0001$). Lower role-emotional scores before surgery and at 3 months suggested that patients had difficulties with work or activities of daily living that resulted from emotional problems. Findings also indicated that postoperative function had stabilized by 6 months according to the 8 subscales. The Modified 7-Day Activity tool found no statistically significant differences in activity between 3, 6, and 12 months. Although overall functional status returned to normal by six months, the findings suggested that patients may have long-term difficulties with work roles and resuming daily activities. The findings, however, are limited by the small sample size.

DiMattio and Tulman (2003) also used a longitudinal approach to examine functional status in women ($N = 61$) following CABG surgery. Subjects were interviewed prior to discharge about their pre-surgical functional status. Telephone interviews were conducted postoperatively at 2, 4, and 6 weeks after discharge. Functional status was measured with Paier's (1994) Inventory of Functional Status in the Elderly (IFSITE) and subscales of the Sickness Impact Profile (SIP) (Damiano, 1996). Reliability data for the IFSITE ranged from 0.42 to 0.68. Validity scores ranged from 0.26 to 0.58. The SIP has well established reliability and validity.

Repeated measures analysis of variance (ANOVA) revealed significant increases in functional status over 6 weeks ($p < .0001$). Functional status improved the most from 2 to 4 weeks for all activities except for volunteer and work ($p < .05$). However, by six weeks IFSITE overall scores and subscale scores did not return to pre-surgical levels, except for the personal care subscale ($p < .05$). Repeated measures ANOVA of the SIP subscales showed significant improvement overtime ($p < .05$). Although the findings suggest functional improvement over time after CABG surgery, they are limited by the small, homogenous sample and the low reliability and validity scores for the IFSITE. Future studies should include both genders and also examine age implications related to functional status.

Elliott et al. (2006) used repeated measures to assess health outcomes in cardiac surgery patients ($N = 101$). The Medical Outcomes Study SF-36 (Ware & Sherbourne, 1992) and the 15 Dimensions of Quality of Life Questionnaire (Sintonen & Pekurinen, 1993) were used before surgery, at discharge, and six months post discharge. Significant improvements were noted in health status and physical function at six months post-discharge ($p < .0001$). However, the mental component scores (MCS) including mental health and social functioning were significantly lower at six months. As expected, physical component scores (PCS) decreased prior to discharge ($p < .0001$) when compared to pre-surgical scores, while the MCS scores improved slightly. The 15 dimension scores also showed significant improvement at six months ($p < .001$). The authors noted that participants experienced a significant change in functional status at hospital discharge, and recommended that additional care and support should be provided to patients during this recovery period. Although the study used a longitudinal design, additional research is needed to examine PHS during the initial months after discharge.

Research has also measured PHS in open heart patients at varying times during recovery. Some findings from these studies have shown an overall improvement in PHS by six months post-op (Allen et al., 1990; Barnason et al., 2000; DiMattio & Tulman, 2003; Elliott et al., 2006), while others have reported continued difficulties with physical and social activities, activities of daily living, and work activities. Impaired physical status has also been reported during the initial recovery period, suggesting that patients may continue to struggle with physical and social activities after discharge.

Conclusions

In summary, prior research has used varied approaches to examine the perioperative experience of patients undergoing open-heart surgery. Data from these studies suggests that patients develop specific expectations of recovery and feel anger and frustration when their expectations do not match the surgical experience. Research has described the open-heart surgical experience and recovery as a complex process that affects the patients' physical and psychosocial status. Studies have identified that some patients' experience anxiety and depression before and after surgery, which may negatively affect their long-term recovery. Furthermore, these emotions have occurred when patients encountered incongruent outcomes such as unanticipated delays and functional status limitations.

Significant gaps still exist in understanding the relationship between patient expectations and the actual recovery experience. Research is needed to explore expectations apart from the concept of satisfaction, using quantitative methods. Research is also needed to examine PHS after open-heart surgery since patients have clearly identified having specific expectations related to physical and social recovery (Chunta, 2006). Future research that includes measurements of anxiety and depression will provide data to better understand the relationship

between these variables and PHS. Research that addresses these gaps in the literature will provide nurses with information to assist patients in developing realistic expectations of their surgical experience and recovery thereafter.

CHAPTER 3: METHODOLOGY

The purpose of this study was to examine the relationships among expectations, anxiety, depression, and PHS in patients undergoing open-heart surgery and to determine predictors of postoperative PHS. This chapter presents the methodology of the study including the research questions, design, setting, sample, instrumentation, procedure, and data analysis.

Research Questions

The research questions for this study were:

1. What are the relationships among preoperative expectations, preoperative anxiety, preoperative depression, and preoperative PHS in open-heart surgery patients?
2. What are the relationships among postoperative expectations, postoperative anxiety, postoperative depression, and postoperative PHS in open-heart surgery patients?
3. To what extent do preoperative expectations, preoperative anxiety, preoperative depression, and preoperative PHS as a group predict postoperative PHS in open-heart surgery patients?
4. To what extent do postoperative expectations, postoperative anxiety, and postoperative depression as a group predict postoperative PHS in open-heart surgery patients?

Design

This descriptive study was conducted using a longitudinal design to examine the relationships among patients' expectations, anxiety, depression, and PHS, preoperatively and postoperatively, four weeks after open-heart surgery. The study also determined predictors of postoperative PHS. A mixed method design was used to provide quantitative measurements of expectations, anxiety, depression, and PHS, and qualitative descriptions of expectations.

Setting

The study was conducted at two hospitals over a period of seven months. The hospitals were a medical center located in Pennsylvania, and a university hospital located in West Virginia. The medical center is a teaching hospital that staffs over 600 beds and performs more than 450 open-heart procedures annually. The university hospital staffs over 500 beds and performs more than 750 open-heart procedures annually.

Sample

A power analysis was calculated to determine the sample size using a moderate effect size, a power of 0.70, and a significance level of 0.05 for multiple regression statistics. It was determined that a sample of 70 would be needed for four predictors based on this formula. However, Nunnally and Bernstein (1994) recommended having 10 subjects for each predictor variable. The study had four predictor variables: expectations, anxiety, depression, and PHS, and therefore needed 40 subjects. The aim was to recruit at least 52 subjects to account for postoperative attrition losses. The primary investigator and research assistants invited a total of 72 patients to participate in the study over a six month period. Only one male and two females declined, stating they “just did not want to participate.” Of the 69 subjects enrolled preoperatively, one female and one male subject dropped from the study, one male and two female subjects died after their surgery. One male and one female subject were hospitalized and could not participate in data collection at time two (T2), and four males and four females were never scheduled for surgery or underwent surgery after data collection was completed (See Table 1). The final sample size was $N = 54$, and the attrition rate was 22%.

Table 1

Participant Recruitment and Attrition Rates

	Males (n)	Females (n)
Total Invited to Participate	44	28
Declined to Participate	1	2
Withdrew from Study	1	1
Deceased (before T2)	1	2
Hospitalized	1	1
Surgery Delayed or Not Scheduled	4	4

Inclusion Criteria

Criteria for inclusion in the study were:

- 1) English speaking adults who were able to communicate responses to complete the questionnaires.
- 2) Community dwelling adults older than 18 years of age.
- 3) Participants who were scheduled to undergo elective or urgent open-heart surgery for the first time.

Exclusion Criteria

Exclusion criteria for the study were:

- 1) Persons with confusion, dementia, or unstable patients who were unable to complete the questionnaires.
- 2) Persons undergoing emergent open-heart surgery.
- 3) Persons undergoing repeat open-heart surgery.

Inclusion and exclusion criteria were based on the following rationale: Subjects needed to be alert, oriented, and stable enough to describe their expectations, anxiety, depression, and PHS. The referring nurses would be able to identify patients who were confused, demented, or unstable and therefore not able to participate in the study. However, this determination was based on the opinion of the health care professional and was not made through objective screenings. Participants who had already undergone open-heart surgery may have different expectations than first-time patients. In addition, having emergent surgery would not allow for patients to prepare for the surgical experience or to participate in the preoperative assessment due to the emergent nature of the surgery. Therefore, only participants who underwent their first,

elective or urgent open-heart surgery were included in the study. The study focused on adult patients and excluded participants under the age of 18.

Instrumentation

The following instruments were used for data collection: The MOS 36-Item Short-Form Health Survey (SF-36) (Stewart, Hays, & Ware, 1988) (See Appendix A), The Future Expectations Regarding Life with Heart Disease (Axelrad, 1981) (See Appendix B), and The Hospital Anxiety and Depression (HAD) Scale (Zigmond & Snaith, 1983) (See Appendix C). A subject information form was administered preoperatively to gather participants' demographic information and additional related data (See Appendix D). Demographic information included age, gender, ethnic background, marital status, education, and employment status. Participants were also asked: 1) Who did they live with prior to surgery? 2) Who will provide help after discharge? 3) What previous surgeries, type, and the year performed, and 4) Have they had experience helping with anyone who has had open-heart surgery such as a spouse or close family member?

Subjects were asked additional qualitative questions related to their expectations during data collection at four weeks post-op (See Appendix E). These questions were: 1) Can you describe any expectations that you had before surgery or during recovery? 2) Do you feel these expectations were unrealistic? and 3) Do you feel that your expectations changed over time? These questions were selected to identify specific expectations that patients had before surgery or during recovery. The questions were also included to understand if patients felt they had unrealistic expectations or if their expectations changed during the surgical experience. A qualitative approach using open-ended questions was selected to allow the researcher to gather

rich data that described the patients' expectations in their own words. Analysis of these questions will be presented in Chapter Four.

The Medical Outcomes Study 36-Item Short Form Health Survey (SF-36)

The SF-36 was designed to measure health concepts related to physical, mental, and general health perceptions (Stewart, Hays, & Ware, 1988). The 36-item scale assesses eight health concepts: limitations in physical activities because of health problems, limitations in social activities because of physical or emotional problems, limitations in usual role activities because of physical health problems, bodily pain, general mental health (psychological distress and well-being), limitations in usual role activity because of emotional problems, vitality (energy and fatigue), and general health perceptions (Ware & Sherbourne, 1992). The scale uses Likert responses that vary from five choice response scales "all of the time = 1" and "none of the time = 5", to three choice response scales "1 = limited a lot" or "3 = not limited at all". Total scores range from 0 – 100. Higher scores indicate better physical health status while lower scores indicate limited physical health status. The scale was normed from general populations in the United States, United Kingdom, Sweden, and Germany. Reliability with test-retest methods has provided alpha coefficients of 0.89 – 0.94 on the Physical Component Scale (PCS) and 0.84 – 0.91 on the Mental Component Scale (MCS). Validity was determined using theoretical foundations and cross-sectional and longitudinal studies. Relative validity coefficients ranged from 0.20 – 0.89 for the PCS and 0.30 – 1.00 for the MCS (Stewart et al., 1988). The Cronbach's alpha for participants in this study was $r = 0.960$.

The Future Expectations Regarding Life with Heart Disease Scale

The Future Expectations Regarding Life with Heart Disease Scale consists of 18 belief statements that measure subjects' expectations of successfully coping with their heart disease

(Axelrad, 1981). The instrument measures items related to future expectations for returning to prior work status and regular physical activity. Likert statements range from “strongly agree = 5” to “strongly disagree = 1.” Scoring for the instrument ranges from 18 to 90, with a higher score reflecting positive expectations. The scale was used in a study of 2,885 patients diagnosed with heart disease as determined by cardiac catheterization. Internal consistency reliability was reported at 0.88, but no validity values were reported (Bosworth et al., 1999). Cronbach’s alpha for participants in this study was $r = 0.887$. The scale was obtained from an unpublished doctoral dissertation and only one other published study has used the instrument. However, the scale was chosen because it specifically measures expectations of cardiac patients.

The Hospital Anxiety and Depression (HAD) Scale

The HAD Scale is a brief, 14-item self-report questionnaire that was developed using 100 adult patients in an outpatient medical clinic (Zigmond & Snaith, 1983). The scale has also been used with open-heart surgery patients (Ben-Noun, 1999; Davies, 2000; Koivula et al., 2002; Krannich et al., 2007; Shuldham et al., 2000; Underwood et al., 1993). The instrument contains two subscales which measure anxiety and depression separately. Participants are asked to reflect on how they have felt in the past week. Items alternate to assess anxiety and depression, and responses range from 0 to 3. Total subscale scores range from 0 to 21 with 8 to 10 indicating borderline abnormal and 11 or above indicating abnormal scores for anxiety or depression.

Internal consistency correlations for the anxiety items ranged from 0.41 – 0.76 ($p < .01$). The depression items ranged from 0.30 – 0.60 ($p < .02$). Validity coefficients were $r = 0.74$ ($p < .001$) for the anxiety scale and $r = 0.70$ ($p < .001$) for the depression scale (Zigmond & Snaith, 1983). Only one study reported reliability data with a sample of open-heart surgery patients. Koivula et al., (2002) reported Cronbach’s alpha values of $r = 0.83$ (Time 1) $r = 0.85$ (Time 2),

and $r = 0.84$ (Time 3) using the HAD at three data collection times. Cronbach's alpha on the Anxiety Subscale was $r = 0.88$ at Time 1, and $r = 0.84$ at Time 2. Cronbach's alpha on the Depression Subscale was $r = 0.83$ at Time 1 and Time 2. The scale was selected for use in this study because it provides a quick method to measure both anxiety and depression and it has been used before in outpatient settings and with open-heart surgery patients.

Procedures

Permission to conduct the study was obtained from the Institutional Review Boards (IRB) at West Virginia University and the medical center and university hospital (See Appendices F, G, and H). Trained research assistants assisted in data collection at both facilities. The Surgical Research Department at the medical center has trained nurses who specialize in research and data collection. Two nurses from the department were assigned to this research study to assist with data collection. A registered nurse from the university hospital also participated as a research assistant for this study. The nurse had prior data collection experience from another research study and was referred to the primary investigator by a faculty member at West Virginia University's School of Nursing. All of the research assistants had completed the required IRB training materials. The primary investigator met with the research assistants and provided a presentation about the research study. After the presentation, the research assistants individually met with the primary investigator and used a scripted patient scenario to simulate data collection with an actual patient. Each rater was asked to read every question from all of the questionnaires to the mock patient. After this process was completed, the responses were compared for consistency. Based on the responses, interrater reliability was 94.4%.

The data collection interviews occurred preoperatively on the nursing units or in the open-heart surgery clinics and four weeks after surgery via a telephone interview. Nursing staff

and staff at the clinics were provided with information that explained the inclusion criteria for the study. Nursing staff approached potential in-patient participants who met the inclusion criteria and asked them if they were interested in speaking to the primary investigator or research assistants about the study. Staff from the outpatient open-heart surgery clinics approached potential participants who met the inclusion criteria and asked them if they were interested in speaking to the primary investigator or research assistants about the study.

The primary investigator or trained research assistants then provided interested patients with an explanation of the study. Participants were also offered a brochure that provided additional information about the study and contact information for the researcher. Patients were told that they were not obligated to participate in the study and that refusing would not affect their medical care. Written consent was obtained before interested participants completed the interviews. Participants also completed a form providing their name, address, multiple phone numbers, and alternative contacts for the follow-up interview four weeks after surgery. The primary investigator and research assistants kept a calendar of the follow-up appointment dates and times.

During the interviews, all participants were asked to complete The Future Expectations Regarding Life with Heart Disease Scale, the SF-36, the HAD Scale, and the demographic information sheet preoperatively. The Future Expectations Regarding Life with Heart Disease Scale, the SF-36, the HAD Scale, and the three additional qualitative questions about patients expectations were also administered four weeks after surgery. The SF-36 was administered first as per recommendations of the manufacturer. The questionnaires were read by the primary investigator or research assistants at both data collection times to ensure consistency with

administration. All responses were recorded by the data collectors. The primary investigator completed all data collection at T2, four weeks after discharge.

Follow-up phone interviews at T2 occurred at a prearranged time that was scheduled with the patient during the preoperative interview, although most participants did not remember their appointment time. If the participants were not able to be reached by telephone after several attempts, they were mailed the surveys and a self-addressed, stamped envelope to return them to the investigator. Only one subject was not reached postoperatively for data collection at T2 by phone. The questionnaires were mailed to two subjects. One subject requested the questionnaires be mailed because she did not like to talk on the phone and one subject did not have a phone. The mailed questionnaires were returned for a response rate of 100%. A ten dollar gift card to Sheetz, Giant Eagle, or Wal-Mart Stores was provided as an incentive for subjects who participated and completed the entire study. Gift cards were mailed within a week after completion of the second interview.

Confidentiality was maintained by using a code number on all data forms. Participant names and telephone numbers were included for data collection at four weeks, but only the code number was included on the data collection materials. Participant addresses were used if surveys needed to be mailed to the participants. A code book was created and maintained by the primary investigator and included the participant's name, hospital, date of surgery, telephone number, address, and assigned code number. The code book was also used to track completion of the surveys at four weeks post-op and to ensure that the incentive gift cards were mailed. The code book and all additional data were kept in a locked filing cabinet that was accessible only to the primary investigator and the dissertation committee chairperson.

Data Analysis

Statistical Packaging for the Social Sciences (SPSS) was used to run descriptive, repeated measures ANOVA, correlational, and multiple regression analyses. Data screening was conducted prior to data analysis to identify any outliers or errors in data entry. Descriptive statistics were calculated for measures of central tendency, variability, and outliers on the demographic variables and preoperative and postoperative expectations, anxiety, depression, and PHS. Descriptive statistics, scatterplots, and histograms did not reveal any outliers or errors in data entry. Descriptive statistics of the variables expectations, anxiety, depression, and PHS revealed a normal distribution.

Repeated measures Analysis of Variance (ANOVA) was used to compare preoperative and postoperative variable means. Pearson Product Moment Correlations were used to determine the relationships among preoperative and postoperative expectations, anxiety, depression, and PHS. Multiple regression analysis was used to identify predictors of postoperative PHS. The data was examined for multicollinearity, normal distribution, and homoscedasticity. An alpha level of 0.05 was used to determine statistical significance.

Several items on the questionnaires needed to be recoded, and subscale and total scores needed to be computed for T1 and T2 data. Computations were completed to determine expectation total scores and anxiety and depression subscale scores. Recoding was also completed for the SF-36 using the *How to Score Version 2 of the SF-36 Health Survey* manual (Ware, Kosinski, & Dewey, 2000). After all of the items were recoded, the eight subscales were computed by calculating the sum for all items in that scale. Those raw scores were transformed to a 0 – 100 scale using a formula provided in the manual for all T1 and T2 data. Those scores were changed to a z score. The z scores were used to calculate aggregate T1 and T2 scores for

the Physical Component Summary (PCS) and Mental Component Summary (MCS) measures. T-score transformations were then completed to provide a PCS and MCS score that can be compared to a mean of 50 and a standard deviation of 10 in the 1998 general U.S. population (Ware et al., 2000). The researcher verified scores for all of the computations by completing paper and pencil calculations of select variables to ensure that the computations were entered correctly into SPSS. All computations were correct and identical to the SPSS computations.

Qualitative data were reviewed using content analysis. Similar responses were grouped into categories. Patterns and relationships among the categories were reviewed for any conceptual themes. Additional analysis of the categories was reviewed with the Dissertation Committee Chairperson for validation of themes.

CHAPTER 4: RESULTS

This chapter presents the data and related analyses for the demographic variables and research questions. The chapter provides a description of the sample and comparison of the preoperative and postoperative variables. The chapter also presents the research questions, hypotheses, results, and qualitative findings.

Sample Description

The sample size for the study was $N = 54$. From that sample, 14 participants (26%) were from the medical center and 40 participants (74%) were from the university hospital. Several patients from both facilities experienced extended hospitalizations (24%) and 12.9% of patients were readmitted within 30 days after discharge.

Demographic data and descriptive statistics of the sample are presented in Table 2. Of the 54 participants, 67% were male and 33% were female. Participants ranged in age from 40 to 83 years with a mean age of 63.46 years ($SD = 10.61$). Frequencies revealed that 59.3% were older than 60 years of age, indicating a mild negative skew for age. However, this age distribution is expected for subjects undergoing open-heart surgery. All of the participants were Caucasian (100%) which represents the geographical areas from which the sample was obtained. The majority of subjects were married, (66.7%), while 27.8% were divorced, separated, or widowed, and 5.6% were never married. Twenty eight percent of the subjects did not complete high school, 37.1% were high school or GED graduates, and 35.4% had post high school education. The majority of the sample (72.2%) was not employed, but 50% reported being the sole income provider. Almost all subjects (90.7%) reported having health insurance. More participants underwent bypass graft surgery (63.0%), while 20.4% had valve replacement and 16.7% had combined CABG/valve surgery. Statistical analysis revealed that demographic data

on subjects who did not participate did not differ significantly from those who did participate in the study.

Participants were also asked additional information about their experiences with someone who had open-heart surgery, preoperative teaching, living arrangements, and help after discharge. A majority of subjects (70.4%) reported having prior experience with a close spouse or family member who had open-surgery. Most subjects had previous surgeries (87%), and all reported receiving preoperative teaching (100%). Only 14.8% of subjects lived by themselves, and almost all participants (96.3%) reported having someone to provide help after discharge.

Table 2

Demographic Characteristics of the Sample (N = 54)

Variable	Category	n	(%)
Hospital Site	Memorial Medical Center	14	(25.9)
	Ruby Memorial	40	(74.1)
Gender	Male	36	(66.7)
	Female	18	(33.3)
Age (Mean age 63.46, SD = 10.61)			
	40-50	5	(9.3)
	51-60	17	(31.5)
	61-70	15	(27.8)
	71-80	15	(27.8)
	81 and >	2	(3.7)
Ethnic/Racial Identity	Caucasian	54	(100.0)
Marital Status	Married	36	(66.7)
	Never Married	3	(5.6)
	Divorced	8	(14.8)
	Separated	1	(1.9)
	Widowed	6	(11.1)
Education Level	Less than High School	15	(27.8)
	High School	17	(31.5)
	GED	3	(5.6)
	Some College Education	12	(22.3)
	College Graduate and Higher	7	(13.1)
Employment	Employed	15	(27.8)
	Not Employed	39	(72.2)
Health Insurance	No Insurance	5	(9.3)
	Insurance	49	(90.7)
Type of surgery	Bypass Graft (CABG)	34	(63.0)
	Valve	11	(20.4)
	CABG and Valve	9	(16.7)

Tables 3 and 4 provide a summary of the preoperative (T1) and postoperative (T2) descriptive analyses for the variables expectations, anxiety, depression, and PHS. Descriptive statistics revealed that the mean preoperative anxiety score ($M = 7.37$, $SD = 5.44$, range 0 – 19) was slightly higher than the normal range (0 – 7), and the mean preoperative depression score ($M = 6.17$, $SD = 4.56$, range 0 – 18) was within the normal range (0 – 7). Comparison of the scores also showed that 74% of subjects had borderline or abnormal scores for preoperative anxiety or depression (See Table 5). Participants reported preoperative expectation scores that ranged from 36 to 89 ($M = 66.39$, $SD = 11.06$) out of a total score of 90. The preoperative PHS mean score ($M = 32.50$, $SD = 12.54$, range 11.04 – 59.46) was less than the normed mean for the general population ($M = 50.0$) (Ware, Kosinski, & Dewey, 2000).

The mean postoperative anxiety score was lower than the mean preoperative anxiety score ($M = 5.13$, $SD = 4.19$, range 0 -16). The mean postoperative depression score was also slightly lower than the mean preoperative score ($M = 5.04$, $SD = 4.14$, range 0 – 19). Although the mean scores decreased postoperatively, over one fourth of subjects (27.8%) still had borderline or abnormal postoperative anxiety scores, and 20.4% had borderline or abnormal postoperative depression scores. The mean postoperative expectations scores were slightly higher ($M = 67.91$, $SD = 11.34$, range 57) than the mean preoperative scores. In contrast, postoperative mean PHS scores were lower ($M = 31.03$, $SD = 8.60$, range 11.31 – 50.45) than preoperative mean PHS scores and continued to be lower than the normed mean ($M = 50.0$).

Table 3

Descriptive Summary of the Preoperative Variables (N = 54)

Preoperative Variables (T1)	Mean	SD	Range
Anxiety	7.37	5.44	0 – 19
Depression	6.17	4.56	0 – 18
Expectations	66.39	11.06	36 – 89
PHS	32.50	12.54	11.04 – 59.46

Note: HAD Subscale scores range from 0-7 (normal), 8-10 (borderline abnormal), and 11-21 (abnormal)

Table 4

Descriptive Summary of the Postoperative Variables (N = 54)

Postoperative Variables (T2)	Mean	SD	Range
Anxiety	5.13	4.19	0 – 16
Depression	5.04	4.25	0 – 19
Expectations	67.91	11.34	33 – 90
PHS	31.03	8.60	11.31 – 50.45

Note: HAD Subscale scores range from 0-7 (normal), 8-10 (borderline abnormal), and 11-21 (abnormal)

Table 5

Comparison of Anxiety and Depression Subscale Scores (N = 54)

		Normal		Borderline Abnormal		Abnormal	
		n	%	n	%	n	%
Anxiety	Preoperative	32	(59.3)	6	(11.1)	16	(29.6)
	Postoperative	39	(72.2)	10	(18.5)	5	(9.3)
Depression	Preoperative	36	(66.7)	8	(14.8)	10	(18.5)
	Postoperative	43	(79.6)	6	(11.1)	5	(9.3)

Four separate one-way repeated measures Analysis of Variance (ANOVA) were conducted to compare the variables expectations, anxiety, depression, and PHS at T1 (preoperatively) and T2 (postoperatively) (See Table 6). The dataset was examined to ensure that the assumptions for ANOVA were met. The groups were mutually exclusive and the data was at the interval or ratio level. Preliminary analyses also confirmed no violation of the assumption of normality.

Postoperative expectation means were higher than preoperative, although the findings were not statistically significant ($p = .246$). Postoperative anxiety scores were lower than preoperative scores. The findings were statistically significant ($p = .002$) and the Partial Eta Squared value was .16 suggesting a large effect size (Cohen, 1988). Depression scores were decreased postoperatively and were statistically significant ($p = .026$) and the Partial Eta Squared value suggested a moderate effect size (.09). Likewise, PHS mean scores were decreased postoperatively, but the results were not statistically significant ($p = .323$).

Two separate one-way repeated measures ANOVAs were conducted to compare the postoperative anxiety and depression scores of those subjects who had abnormal or borderline scores preoperatively. Cases from the dataset were selected if the preoperative anxiety and preoperative depression variable scores were greater than 7 which indicated borderline or abnormal scores. Mean postoperative anxiety scores ($M = 7.00$, $SD 4.23$) were significantly lower than the mean preoperative anxiety scores ($M = 13.04$, $SD 3.54$) and the findings were statistically significant ($p = .000$) (See Table 7). Mean postoperative depression scores ($M = 8.67$, $SD 4.53$) were also lower than mean preoperative depression scores ($M = 11.50$, $SD 3.24$), although the mean scores still remained borderline abnormal. The findings were also statistically significant ($p = .035$). Frequencies using these selected cases for the variables anxiety and

depression suggested that of those subjects who had borderline or abnormal anxiety scores preoperatively, 45.3% still had borderline or abnormal scores postoperatively. Similarly, of those subjects with borderline or abnormal depression scores preoperatively, 55.7% still had borderline or abnormal scores postoperatively.

Table 6

Repeated Measures ANOVA of Expectations, Anxiety, Depression, and PHS (N = 54)

Variable	df	F	Preoperative Mean	Postoperative Mean	Partial Eta Squared ^a	p
Expectations	1	1.38	66.39	67.91	.03	.246
Anxiety	1	10.27	7.37	5.13	.16	.002**
Depression	1	5.28	6.17	5.04	.09	.026*
PHS	1	.99	32.50	31.03	.02	.323

^aNote: Effect sizes (0.01 = small, 0.06 = moderate, 0.14 = large; Cohen, 1988).

*p < 0.05

**p < 0.01

Table 7

Repeated Measures ANOVA of Anxiety and Depression Scores for Subjects with Borderline or Abnormal Preoperative Scores

Variable	df	F	Preoperative Mean	Postoperative Mean	Partial Eta Squared ^a	p
Anxiety (<i>N</i> = 22)	1	37.13	13.05	7.00	.64	.000***
Depression (<i>N</i> = 18)	1	5.22	11.50	8.67	.24	.035*

^aNote: Effect sizes (0.01 = small, 0.06 = moderate, 0.14 = large; Cohen, 1988).

**p* < 0.05

****p* < 0.001

Paired samples t-tests were conducted to compare preoperative and postoperative scores of the four subscales that were used to compute the Physical Component Summary (PCS) scale which is the measurement of PHS (See Table 8). The four subscales were physical functioning, role physical, bodily pain, and general health. Postoperative physical function scores ($M = 37.69$, $SD = 24.80$) were slightly lower than preoperative physical function scores ($M = 38.24$, $SD = 31.60$), but the findings were not significant $t(53) = .146$, $p = .884$ (two-tailed). However, postoperative role physical scores ($M = 25.46$, $SD = 22.77$) were significantly lower than preoperative role physical scores ($M = 43.06$, $SD = 36.50$) and the findings were significant $t(53) = 3.70$, $p = .001$ (two-tailed). Postoperative mean bodily pain scores ($M = 50.19$, $SD = 26.04$) were higher than preoperative mean bodily pain scores ($M = 47.89$, $SD = 30.18$) but the findings were not statistically significant $t(53) = -.599$, $p = .552$ (two-tailed). Postoperative general health scores ($M = 62.65$, $SD = 22.28$) were significantly higher than preoperative general health scores ($M = 52.17$, $SD = 23.85$), and the findings were statistically significant $t(53) = -4.050$, $p = .000$ (two-tailed). Eta squared effect size statistics were calculated for role physical scores (0.21) and general health (0.24). The values indicated a large effect size for both variables according to Cohen's (1988) guidelines.

Table 8

T-Test Comparisons of Subscales Physical Functioning, Role Physical, Bodily Pain, and General Health (N = 54)

Subscales	Preoperative (SD) Mean	Postoperative (SD) Mean	t	df	p
Physical Function	38.24 (31.60)	37.69 (24.80)	.15	53	.884
Role Physical	43.06 (36.50)	25.46 (22.77)	3.70	53	.001**
Bodily Pain	47.89 (30.18)	50.19 (26.04)	-.60	53	.552
General Health	52.17 (23.85)	62.65 (22.28)	-4.05	53	.000***

**p < .01

***p < .001

Research Question One

Research Question 1. What are the relationships among preoperative expectations, preoperative anxiety, preoperative depression, and preoperative physical health status (PHS) in open-heart surgery patients? The hypothesis for this question suggests that there is a relationship among preoperative expectations, preoperative anxiety, preoperative depression and preoperative physical health status in open-heart surgery patients.

The relationships among the variables were investigated using Pearson Product-Moment Correlation Coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. This was completed by examining scatterplots for each of the variables. Examination of the scatterplots verified that the assumptions were met and correlations could be computed.

Several preoperative (T1) correlations were statistically significant. Correlations existed among preoperative expectations, anxiety, and depression (See Table 9), but the strengths of the correlations were varied. Preoperative expectations were negatively correlated with preoperative anxiety ($r = -.69, p = .000$) and preoperative depression ($r = -.62, p = .000$). Therefore, higher preoperative anxiety and depression scores were associated with lower preoperative expectation scores. Finally, preoperative expectations were positively correlated with preoperative PHS ($r = .36, p = .008$). Higher preoperative expectations were associated with higher preoperative PHS scores.

Correlations also revealed relationships among preoperative anxiety, depression, and PHS. Preoperative depression had a negative correlation with preoperative PHS ($r = -.37, p = .006$). Therefore, higher preoperative depression scores were associated with lower preoperative

PHS scores. Likewise, preoperative anxiety was also negatively correlated with preoperative PHS ($r = -.13$, $p = .364$), although the results were not statistically significant.

The findings support that a relationship does exist among the preoperative variables expectations, anxiety, depression, and PHS. Only the relationship between preoperative anxiety and preoperative PHS was not statistically significant.

Table 9

Preoperative (T1) Pearson Product Moment Correlation Coefficients (N = 54)

	Expectations	Anxiety	Depression	PHS
Expectations				
Anxiety	-.69***			
Depression	-.62***	.68***		
PHS	.36**	-.13	-.37**	

Note: Strength of correlations: little if any ($r = 0.00 - 0.25$), low ($r = 0.26 - 0.49$), moderate ($0.50 - 0.69$), high ($0.70 - 0.89$), and very high ($0.90 - 1.00$) (Munro, 2005).

** $p < 0.01$

*** $p < 0.001$

Research Question Two

Research Question 2. What are the relationships among postoperative expectations, postoperative anxiety, postoperative depression, and postoperative physical health status in open-heart surgery patients? The hypothesis for this question suggests that there is a relationship among postoperative expectations, postoperative anxiety, postoperative depression and postoperative physical health status in open-heart surgery patients.

Postoperative (T2) correlations among the variables revealed statistically significant results (See Table 10). There were strong correlations among postoperative expectations, postoperative anxiety, and postoperative depression. Postoperative expectations were negatively correlated with postoperative anxiety ($r = -.66, p = .000$) and postoperative depression ($r = -.69, p = .000$). Therefore higher postoperative anxiety and depression scores were associated with lower postoperative expectation scores. Postoperative expectations were also correlated with postoperative PHS ($r = .27, p = .047$). Higher postoperative expectation scores were found to be related to higher postoperative PHS scores.

Correlations also existed among anxiety, depression, and PHS at T2. Postoperative depression was negatively correlated with postoperative PHS ($r = -.32, p = .017$). Higher postoperative depression scores were associated with lower postoperative PHS scores. Similarly, postoperative anxiety was also negatively correlated with postoperative PHS ($r = -.11, p = .236$), although the results were not statistically significant.

The findings support the hypothesis that a relationship exists among the postoperative variables expectations, anxiety, depression, and physical health status. Only the relationship between anxiety and PHS was not statistically significant.

Table 10

Postoperative (T2) Pearson Product Moment Correlation Coefficients (N = 54)

	Expectations	Anxiety	Depression	PHS
Expectations				
Anxiety	-.66***			
Depression	-.69***	.58***		
PHS	.27*	-.11	-.32*	

Note: Strength of correlations: little if any ($r = 0.00 - 0.25$), low ($r = 0.26 - 0.49$), moderate ($0.50 - 0.69$), high ($0.70 - 0.89$), and very high ($0.90 - 1.00$) (Munro, 2005).

* $p < 0.05$

*** $p < 0.001$

Additional analyses were used to evaluate the relationship among the preoperative variables expectations, anxiety, depression, and postoperative PHS. This was done to examine if a relationship existed among the variables since the preoperative variables would be used in the regression model to determine predictors of postoperative PHS.

The results suggested that preoperative anxiety had little association with postoperative PHS ($r = .08, p = .565$) and the findings were not statistically significant. Preoperative depression was negatively correlated with postoperative PHS, but the results also indicated little association ($r = -.22, p = .118$) and were not statistically significant. However, preoperative expectations were correlated with postoperative PHS ($r = .31, p = .021$) and the results were statistically significant and suggested a low correlation. These findings suggest that a relationship does not exist between preoperative anxiety, depression, and postoperative PHS, but there is a low correlation between preoperative expectations and postoperative PHS. Thus, higher preoperative expectations were associated with higher postoperative PHS.

Research Question Three

Research Question 3. To what extent do preoperative expectations, preoperative anxiety, preoperative depression, and preoperative physical health status as a group predict postoperative physical health status in open-heart surgery patients? The hypothesis for this questions states that preoperative expectations, preoperative anxiety, preoperative depression, and preoperative PHS predict postoperative PHS in open-heart surgery patients.

Standard multiple regression was used to assess the ability of the preoperative variables expectations, anxiety, depression, and PHS to predict postoperative PHS. The variables were placed as a group into the regression equation using the enter method. Preliminary analyses were conducted to ensure no violation of normality, linearity, multicollinearity, and homoscedasticity. Visual inspection of the Normal P-P plot and Scatterplot of standardized residuals indicated normal distributions, a linear distribution, no violation of homoscedasticity, and no outliers. Correlations, Tolerance, and Variance Inflation Factor (VIF) were evaluated to ensure that multicollinearity was not present. The correlations were examined to determine if the independent variables showed some relationship with the dependent variable PHS. The preferred range should be above 0.3, but not higher than 0.7. Values higher than 0.7 indicate problems with multicollinearity (Pallant, 2007). Preoperative anxiety and depression and postoperative anxiety and expectations were below 0.3. No predictor variables were above 0.7. Tolerance scores were $> .10$ and VIF was less than 10. These values were all found to be within the accepted ranges. Cook's Distance was also used to evaluate for any influential data points. The value was < 1 which is considered within normal limits. Thus collinearity was not a factor in the analysis.

The model summary revealed an R square of .42 and an Adjusted R square of .38. These findings suggest that the variables contributed to 38% of the variance in postoperative PHS, $F(4, 49) = 8.96, p = .000$. The Adjusted R square was only slightly less than the R square, indicating that the prediction model is valid and the findings are reliable. Standardized coefficients beta values suggested that preoperative anxiety ($\beta = .57, p = .002$) made the greatest contributions toward explaining postoperative PHS (See Table 11). Preoperative expectations ($\beta = .46, p = .007$) and preoperative PHS ($\beta = .36, p = .005$) also made significant contributions and were statistically significant. Semipartial correlation coefficients were examined to find the contribution of the variables to the total R square. Squared values for the part correlation coefficients suggested that preoperative anxiety uniquely contributed to 12.3% of the variance of PHS, while preoperative expectations and preoperative PHS uniquely contributed 9.4% and 10%.

Preoperative depression was not a significant predictor of PHS in the regression model ($\beta = -.19, p = .264$). However, data analysis was also conducted with depression removed from the model. The adjusted R square value was .37 which was slightly lower than the original model. These findings support that depression made a slight contribution to the overall model, but was not a significant predictor individually. Based on these analyses, the hypothesis that preoperative expectations, preoperative anxiety, preoperative depression, and preoperative PHS predict postoperative PHS was accepted since all the variables did contribute to the regression model.

Table 11

Regression Analysis of Preoperative Expectations, Anxiety, Depression, and PHS, on Postoperative PHS (N = 54)

Enter Method	R	R ²	Adjusted R ²	F	Standardized β	p
Model	.65	.42	.38	8.96		.000**
Preoperative Anxiety					.57	.002*
Preoperative Depression					-.19	.264
Preoperative Expectations					.46	.007*
Preoperative PHS					.36	.005*

**p < .001

*p < .01

Research Question Four

Research Question 4. To what extent do postoperative expectations, postoperative anxiety, and postoperative depression as a group predict postoperative physical health status (PHS) in open-heart surgery patients? The hypothesis for this question states that postoperative expectations, postoperative anxiety, and postoperative depression will predict postoperative physical health status in open-heart surgery patients.

Standard multiple regression was used to assess the ability of the postoperative variables expectations, anxiety, and depression to predict postoperative physical health status. The variables were placed as a group into the regression equation using the enter method. The model summary revealed an R square value of .13 and an adjusted R square of .08, indicating that the variables explained 8% of the variance in postoperative PHS, $F(3, 50) = 2.45, p = .075$ (See Table 12). Standardized coefficient beta values suggested that postoperative depression made the strongest contribution ($\beta = -.30, p = .113$) toward explaining the dependent variable, although the findings were not significant. The regression findings were not significant and suggested that postoperative expectations, anxiety, and depression accounted for only 8% of the variance in postoperative PHS. The hypothesis that postoperative expectations, anxiety, and depression predict postoperative PHS will be rejected based on the regression analysis, although there was a tendency for these variables to predict postoperative PHS.

Table 12

Regression Analysis of Postoperative Expectations, Anxiety, Depression on Postoperative PHS

(*N* = 54)

Enter Method	R	R ²	Adjusted R ²	F	Standardized β	p
Model	.36	.13	.08	2.45		.075
Postoperative Anxiety					.19	.297
Postoperative Depression					-.30	.113
Postoperative Expectations					.19	.362

Qualitative Findings

Participants were asked questions during T2 data collection to gather information that would help to specifically describe their expectations of surgery and recovery. Subjects were asked three questions after completing the questionnaires. The questions were: 1) Can you describe any expectations that you had before surgery or during recovery? 2) Do you feel these expectations were unrealistic? 3) Do you feel that your expectations changed over time?

The written responses taken during the phone interviews were then typed verbatim. The investigator reviewed the transcription multiple times and similar responses were grouped together into categories. Data from all three questions were reviewed for differences and similarities. Conceptual themes emerged from patterns and relationships within the data (Polit & Beck, 2004). Validation of these themes occurred with the dissertation chairperson.

Participants described expectations that were grouped into three types: vague events, congruent experiences, and unanticipated outcomes. Vague events related to the time before surgery for some patients who were not able to articulate their expectations or those who felt that they did not have specific expectations prior to surgery. One participant explained that it happened too quickly and “he didn’t have time to think about it.” Several subjects expressed feelings of shock that they even needed surgery and depicted the time before surgery as difficult to remember. One participant felt that the time before surgery was a “blur” while another subject recalled “everything was pretty much blank to me.”

Theme two related to patients’ perceptions that were consistent with their surgery and recovery. These expectations represented a traditional pathway of recovery and can be described as congruent experiences. Some subjects described that their surgery and recovery experience was consistent with what they had anticipated. One subject responded “everything that he [the

surgeon] said would happen did happen. Everything went as I expected.” Subjects were able to describe specific expectations that they formed about surgery and recovery. “I knew it would be a long recovery and I would have a lot of limitations.” Another participant recalled “What I expected was the way it went.” Several participants who described congruent expectations mentioned that they trusted in God and in their physician. “I was in the Lord’s hands and in the doctor’s hands.”

Finally, theme three related to participants’ experiences with unanticipated outcomes. These expectations focused on difficulties with recovery such as extended hospitalizations and complications. One subject recalled “I didn’t expect that [kidney complications] to happen or to be in the hospital that long. I wouldn’t go through it again. It was too much.” Other subjects expressed frustration with their hospitalization being longer than what they were told preoperatively. “I did not expect to be in the hospital 12 days. I really expected to be there 4 days.” Another participant recalled that the time frame of recovery in the hospital was to be 7-10 days. He explained “I was in there over 30 [days]. Then they said recovery would be 6-8 weeks. The time they gave me didn’t match up.” Participants also described frustration when their recoveries were inconsistent with what they had expected. Subjects expressed disappointment with delays. “I expected I would be a little bit further along in recovery, especially the activity part.” Another subject described “I didn’t expect to have it get me down as much as it did. I expected to be back a lot quicker. I expected to be doing more and recover a lot faster.”

Summary

Chapter four presented the data analysis results. The chapter reviewed the demographic characteristics of the participants. Descriptive statistics and repeated measures ANOVA’s were also reported on the preoperative (T1) and postoperative (T2) data. Correlations and regression

analyses were used to examine the relationships among the variables and to determine predictors of postoperative PHS. The chapter also included qualitative data that described three types of expectations that participants experienced before surgery and during recovery. The results of these findings will be discussed in Chapter Five along with implications for practice and recommendations for future research.

CHAPTER 5: SUMMARY, DISCUSSION, AND IMPLICATIONS

This study used a longitudinal design to examine expectations, anxiety, depression, and physical health status (PHS) in open-heart surgery patients. The main focus of the research was to determine the relationships among preoperative and postoperative expectations, anxiety, depression, and PHS, and to determine predictors of postoperative PHS. This chapter presents a summary and discussion of the results and analyses, implications for practice, and recommendations for future research.

Summary and Discussion of Results

Multiple statistical analyses were used to examine the quantitative data. Repeated Measures ANOVA's were used to compare mean scores for the variables at T1 and T2. Pearson Product Moment Correlations were used to determine relationships among the preoperative and postoperative variables, and Multiple Regression analyses were used to determine predictors of postoperative PHS. Comparison of the variables at T1 and T2 revealed that mean expectation scores were higher postoperatively, and mean PHS scores decreased postoperatively, although the findings were not significant. Anxiety and depression scores were lower postoperatively and these findings were statistically significant.

Correlation comparisons of the preoperative variables suggested that strong correlations existed among preoperative expectations, anxiety, depression, and PHS. Higher preoperative anxiety and depression scores were associated with lower preoperative expectations. Likewise, higher preoperative anxiety and depression correlated with lower PHS scores. Higher preoperative expectation scores were associated with higher preoperative PHS scores. The findings were all statistically significant except for the relationship between preoperative anxiety

and preoperative PHS. Postoperative comparisons of the variables revealed the same findings. Higher postoperative anxiety and depression scores were associated with lower postoperative expectations, and higher postoperative anxiety and depression correlated with lower PHS scores, although the results were not statistically significant for anxiety. Finally, higher postoperative expectations were associated with higher postoperative PHS scores.

The regression analysis using the preoperative variables suggested that preoperative expectations, anxiety, depression, and PHS contributed to 38% of the variance of postoperative PHS, and the findings were statistically significant. The findings also suggested that preoperative anxiety made the greatest contribution to the model, followed by preoperative expectations and preoperative PHS. However, preoperative depression was not a significant predictor of postoperative PHS. The regression analysis using the postoperative variables suggested that postoperative expectations, anxiety, and depression only contributed 8% of the variance in postoperative PHS, and the findings were not significant. Finally, review of the open-ended questions lead to the development of three types of expectations. These included: vague events, congruent experiences, and unanticipated outcomes.

Expectations

This study provided quantitative data that examined patient expectations. Prior studies have used qualitative methods to explore this concept (Hunt, 1999; Chunta, 2006), or have examined expectations in relation to patient satisfaction (Staniszewska, 1999), but none have specifically measured expectations of open-heart surgery patients. The quantitative results of this study suggested three relevant findings related to expectations. Expectations were higher postoperatively than preoperatively, higher or more positive expectations were associated with

better PHS preoperatively and postoperatively, and higher anxiety and depression levels were associated with less positive expectations preoperatively and postoperatively.

First, expectations improved after surgery for participants in this study, but it is difficult to speculate why this occurred. Anxiety and depression scores decreased postoperatively which could have contributed to more positive expectations. Another reason for the findings could be that patients felt a sense of relief after surviving the surgery and returning home, and therefore reported more positive expectations postoperatively. Lindsay et al. (2000) reported that patients described similar feelings of freedom and relief in the postoperative period. Yet, during the qualitative interviews for this study only two patients described these types of feelings. One patient explained that “the surgery took a time bomb away” while another described relief because he survived the surgery. Although it could be expected that patients would feel relieved after surgery and have more positive expectations, there is not sufficient data from this study to support this thought.

Expectations may have improved after surgery because patients had resolution of symptoms such as shortness of breath, chest pain, or fatigue which may have allowed them to feel better overall. Yet some prior studies have reported that shortness of breath, fatigue, and incisional pain are common symptoms that occur for weeks or months after surgery (Lenz & Perkins, 2000; Lopez, Ying, Poon, & Wai, 2006). Although patients in this study were not asked about physical symptoms, they were asked about perceptions of their general health and reported higher postoperative scores on the General Health Subscale. Presumably patients may have felt that their general health improved after surgery and therefore reported more positive expectations.

Second, the study confirmed that positive preoperative and postoperative expectations were associated with better PHS preoperatively and postoperatively, and preoperative expectations were a significant predictor of postoperative PHS. These findings provide preliminary data that supports the relationship between expectations and PHS. Third, the study found that lower preoperative expectations were associated with increased anxiety and depression preoperatively and postoperatively. Furthermore, as anxiety and depression scores decreased postoperatively, expectations scores improved. These findings suggest that psychological symptoms such as anxiety and depression can negatively affect patients' expectations. Because no other studies have specifically examined expectations of open-heart surgery patients, future studies will be needed to validate this area of research.

Analysis of the open-ended questions provided an additional method to help define and better understand the concept of expectations. The qualitative responses suggested that patients described expectations that were grouped into three types: vague events, congruent experiences, and unanticipated outcomes. Thompson & Sunol's (1995) classic metasynthesis described four common types of expectations: ideal, predicted, normative, and unformed. The findings from this analysis matched their description of unformed and normative expectations. Some subjects were unable to articulate their expectations and did not identify specific expectations prior to surgery. Others described expectations that were consistent with what they believed would occur throughout their surgical experience and recovery. These patients followed the "norm" of recovery, and therefore their expectations were congruent with what they were told preoperatively. However, several participants also described unanticipated outcomes. Patients have reported similar findings in other qualitative studies (Chunta, 2006; Hunt, 1999; Lindsay et al., 2000; Showalter et al., 2000). Hunt (1999) and Chunta (2006) described incongruent

expectations related to unanticipated delays and unplanned complications. These resulted in feelings of disappointment and frustration. Subjects in this study described similar feelings when their expectations were inconsistent with what they expected of surgery and recovery. These findings suggest that a fifth type of expectation, incongruent expectations, could be added to Thompson and Sunol's definitions. This description would provide an explanation for unanticipated outcomes that result in incongruent expectations. The findings from this study also confirm Thompson and Sunol's suggestion that expectations may change over time. When asked about her expectations before surgery, one patient explained "I expected everything to go well and I didn't expect to have the complications [the wound infection and VAC]. These findings support that some patients develop normative expectations preoperatively, but have changes in their expectations when their surgical experience or recovery is incongruent with what they had anticipated.

It should also be mentioned that 54 subjects were asked about their expectations, and only one subject mentioned issues related to satisfaction with his care. These findings reinforce the conceptual definition that expectations are a separate component from patient satisfaction and should be studied in relation to specific patient populations such as open-heart surgery patients.

In summary the findings from this study reinforce that most patients form specific expectations and experience difficulties when these expectations are not consistent with their recovery experience. The findings also suggest that more positive expectations are associated with better PHS, and emotions such as anxiety and depression can contribute toward lower expectations.

Anxiety

The study also examined preoperative and postoperative anxiety. Preoperatively 40.7% of participants in the study reported borderline or abnormal anxiety levels. These findings could be anticipated since participants were either waiting in the hospital to have surgery or were at the physician's office to schedule their upcoming surgery at the time of data collection. Underwood et al. (1993) reported similar findings in a study of patients who were waiting for open-heart surgery. They suggested that preoperative anxiety was also associated with high expectations of surgery and recommended that surgeons assist patients to develop realistic expectations of their surgical outcomes.

Postoperatively mean anxiety scores declined, but over one fourth of subjects (27.8%) still had borderline or abnormal anxiety scores. These findings are also consistent with prior studies (Hartford et al., 2002; Koivula et al., 2002; Lindquist et al., 2003; McCrone et al., 2001; Parent & Fortin, 2002; Rymaszewska et al., 2003). It was expected that postoperative anxiety would decrease as patients returned to the familiarity of home for their continued recuperation. However, subjects who had limited resources after discharge may have had continued anxiety. Not having support in the home during recovery or having high family demands after discharge may have contributed to higher postoperative anxiety levels.

The postoperative anxiety scores provided evidence that some patients continued to struggle with anxiety as they recovered after discharge, even up to four weeks postoperatively. It should be noted that of those subjects who had borderline or abnormal anxiety scores preoperatively almost half continued to have elevated scores postoperatively. McCrone et al. found that patients had a decrease in anxiety four weeks after surgery, but an increase in anxiety levels at 12 weeks, and suggested this may occur as patients' experience difficulties when

resuming prior activities. Further research needs to further explore patterns of anxiety that continue to exist after surgery.

Anxiety was also a significant predictor of postoperative PHS in the regression analysis. Preoperative anxiety, depression, expectations, and PHS contributed to 38% of the variance of postoperative PHS, and anxiety made the greatest contribution in the model. These findings were unexpected because preoperative and postoperative anxiety scores were not significantly correlated with preoperative and postoperative PHS. Possible explanations may be that participants were anxious or more careful after discharge and afraid to participate in daily activities, and thus had lower PHS scores. Parent and Fortin (2000) reported that postoperative anxiety has been associated with decreased self-confidence in functional status abilities. Another explanation may be that participants had PHS limitations after surgery and these limitations contributed toward their increased anxiety. Although the study provided relevant findings, future research is needed to further explore preoperative anxiety as a predictor of postoperative PHS.

Depression

The study also had significant findings related to depression. Borderline or abnormal depression scores were noted in over one third of participants preoperatively. Mean postoperative depression scores decreased slightly, but 20.4% of participants still had borderline or abnormal scores. Of those subjects who had borderline or abnormal scores preoperatively, 56% still had borderline or abnormal scores postoperatively.

Rymaszewska et al. (2003) findings also showed a decrease in depressive symptoms postoperatively, while McCrone et al.'s (2001) study showed an increase in depression scores initially after surgery that returned to baseline by four weeks postoperatively. Their study also

noted patterns of depression across time. Future studies are needed to explore preoperative and postoperative incidence and patterns of depression in open-heart surgery patients.

This study also found higher depression to be associated with lower expectations and PHS both preoperatively and postoperatively. These findings suggest that negative emotions can affect one's expectations, although prior research has not been done to confirm these findings. Previous studies have examined the effects of depressive symptoms on PHS and postoperative recovery (Blumenthal et al., 2003; Connerney et al., 2001; Doering et al., 2005; Mallik et al., 2005; Rymaszewska et al., 2003; Saur et al., 2001). These studies found that preoperative and postoperative depressive symptoms contributed towards decreased functional status, higher readmission rates, postoperative complications, and mortality. Mallik et al. confirmed that depressive symptoms predicted functional status in CABG patients. In this study depression only made a slight contribution to the model as a predictor of postoperative PHS, and was the only variable that was not statistically significant in the regression model. These findings were surprising because of the high correlation between preoperative and postoperative depression and preoperative and postoperative expectations and PHS. However, the preoperative and postoperative mean scores for depression were relatively low in this sample and suggested that approximately one third or less of participants reported borderline or significant depression scores. A low incidence of depression in this study could be one reason why depression was not a significant predictor of postoperative PHS.

Another possibility for the findings could be that the anxiety and depression subscales were very highly correlated and did not separately measure anxiety and depression. To check for this, the 14 item HAD Scale was analyzed using principal components analysis and a weak correlation was found between the two factors ($r = .13$). These findings were consistent with

prior research on the HAD Scale (Zigmond & Snaith, 1983) and confirm that the scales separately measure anxiety and depression. Prior studies have used other instruments such as the Center for Epidemiological Studies-Depression Scale (CES-D) to measure depressive symptoms in open-heart surgery patients (Blumenthal et al., 2003; Lenz & Perkins, 2000; Lopez et al., 2006; & McCrone et al., 2001) but have found other concerns. One criticism is that the CES-D assesses somatic symptoms that are common physical symptoms after surgery. This makes it difficult to distinguish between depressive symptoms and expected symptoms of recovery. Other studies have used the HAD Scale with open-heart surgery patients and reported similar findings that anxiety and depression were present preoperatively, but decreased postoperatively (Davies, 2000; Underwood et al., 1993). Future studies should continue to examine depression as a predictor of postoperative PHS using a tool such as the HAD Scale that does not assess somatic symptoms that are common in postoperative patients.

Physical Health Status (PHS)

The study also examined preoperative and postoperative PHS. Mean scores showed that PHS declined postoperatively. Elliot et al. (2005) reported a similar decrease in physical functioning at discharge, 5 weeks, 6 weeks, and 3 months using the MOS Short Form Health Survey (SF 36). Other studies have noted an improvement in PHS postoperatively but the measurement scales and time frames have varied (Allen et al. 1990; Barnason et al. 2000; DiMattio & Tulman, 2003). Scores for the Role Physical subscale also showed a significant decrease postoperatively. Although one would expect that patients would have improved physical health after surgery, the timing of data collection may have affected these results. Many patients reported to the researcher that they were unable to do a lot of daily activities because of postoperative restrictions by the surgeon. Participants reported that they were told not to climb

stairs or lift anything over 5 pounds. The SF 36 asks questions about vigorous activities, moderate activities, lifting or carrying groceries, climbing stairs, walking, bending and kneeling, and bathing and dressing. Postoperative restrictions would not allow subjects to complete many of these activities and may have contributed to the decline in postoperative PHS scores.

Another interesting finding was that mean preoperative and postoperative PHS scores, as measured by the Physical Component Scale (PCS), were noted to be lower than the mean PCS scores for the U.S. general population ($M = 50$, $SD = 10$). Although these results are still within two SD's from the mean, the findings represent that overall preoperative and postoperative PHS scores were lower for this sample. Subjects in this study may have had existing co-morbidities that imposed limitations on their PHS or the findings may be related to activity restrictions that were specific to this sample of open-heart surgery patients. Future studies may need to consider these extraneous variables using a tool such as the Charlson Comorbidity Index (Charlson, Pompei, Ales, et al., 1987) or measure PHS at repeated times postoperatively.

As mentioned previously, PHS correlated with higher expectations and was negatively correlated with anxiety and depression. Furthermore, preoperative anxiety, expectations, and PHS were significant predictors of postoperative PHS for participants in this study. Future research is needed to further explore the relationship between expectations and PHS, to examine the affects of anxiety and depression on postoperative PHS, and to measure PHS at various times postoperatively.

Conceptual Framework

The findings from this study can be linked to Meleis et al.'s (2000) middle range Theory of Transitions. Meleis et al. described the nature of transitions as having types, patterns, and properties. Participants in this study experienced two types of transitions: health-illness and

situational. Preoperatively, participants described PHS limitations from being short of breath or fatigued. Some patients were limited in their ability to climb stairs or walk several feet. Patients also experienced health-illness transitions as they recovered from surgery, managed their pain, and resumed daily activities. Health illness transitions also occurred as patients transitioned from the hospital to home for continued recovery. Likewise, situational transitions existed preoperatively as some participants reported being off work until after their surgery or being limited in their daily activity roles. Postoperatively, patients also had restrictions that limited their daily activities or work status roles during recovery.

Meleis et al. (2000) also described properties of transitions. These included awareness, engagement, change and difference, transition time span, and critical points and events. Participants in this study experienced many of these properties throughout their surgical experience. Many subjects were becoming aware of their heart disease and need for surgery at the time that the researcher met with them. During this time patients prepared for surgery and became engaged in discussions about surgery and what they would experience. Many formed expectations about their surgical event as they were provided information from the surgeon, physician assistants, and nurses. Participants were also experiencing change and difference before and after surgery. Subjects experienced change in roles and daily routines during their hospitalization. Others were preparing for change as they waited for their upcoming surgery. Some subjects had already experienced role or work status changes and were anxious to have surgery and resume prior roles. Findings from the Role Physical Subscale support that patients also had a significant decrease in usual role activities postoperatively. Transition to home may have presented additional role adjustments that occurred after discharge.

Meleis et al.'s theory also identified that transitions occur over a time span and have critical points and events (2000). Likewise, open-heart surgery and recovery occur over a time span. For some patients that time was consistent with what they expected. Other patients reported significant delays in recovery and struggled with feelings of disappointment and frustration when their time span of recovery was longer than anticipated. Critical points and events may represent times of uncertainty or change. Critical points for patients undergoing open-heart surgery include: the time before surgery, the actual surgery, and discharge home. These critical points may also occur after discharge as patients gradually resume prior roles and activities at home.

Transition conditions have facilitators and inhibitors and can be affected by personal, community, and societal conditions. Expectations, anxiety, and depression represent facilitators or inhibitors of the transition process. Based on the study's findings, positive expectations can be viewed as a facilitator to the patients' health-illness or situational transition. Positive expectations were strongly correlated with PHS both preoperatively and postoperatively. Meleis et al. (2000) suggested that many personal, community, and societal factors may facilitate or inhibit the transition process. Patients who had surgery and were discharged with good support systems may have reported positive expectations postoperatively that would facilitate transition.

However, expectations may also be an inhibitor to transition. Participants described frustration and disappointment when their expectations were not consistent with recovery. Incongruent or unrealistic expectations represent inhibitors to the transition process. Likewise, anxiety and depression represent inhibitors of transitions. Higher anxiety and depression were correlated with lower expectations and lower PHS scores. Difficulties with emotional well-being

may negatively impact patients as they move through health-illness or situational transitions before, during, or after surgery.

Meleis et al. (2000) suggested that personal influences such as meanings, cultural beliefs and attitudes, socioeconomic status, and preparation and knowledge represent facilitators or inhibitors during transition. One half of participants in the study reported that they were the sole income provider while 72% were not employed. Although the mean age was 63, some participants may have been off work or unemployed due to their heart condition and surgery. Unemployment and surgical expenses may cause additional financial burdens. Although almost all subjects reported having health insurance, deductibles or other health-related expenses could be additional inhibitors during transition.

Another inhibitor or facilitator during transition is knowledge and preparation. All of the subjects reported that they received open-heart teaching prior to their surgery and 70% of subjects reported having experience with someone who had open-heart surgery. Adequate knowledge and prior experiences with family members who had successful outcomes could be additional facilitators for patients during transition. However, as patients prepare for discharge they may not comprehend all of the discharge materials that are presented and lack essential knowledge to assist them during this transition. Continued teaching from home health nurses or follow-up phone calls could facilitate transition that occurs during recovery at home.

Transitions are also influenced by community and societal conditions (Meleis et al., 2000). Home health services that provide follow-up visits after discharge would assist patients during this time of transition. Cardiac support groups, church groups, or other community services could provide continued assistance after discharge. However, patients in rural areas may struggle if their community resources are limited. Societal influences such as Medicare

restrictions that limit home health visits may also inhibit transition when patients could benefit from additional services after discharge.

The transition theory also includes process and outcome indicators which represent mastery of the health-illness or situational transition (Meleis et al., 2000). Meleis et al. described process indicators as feeling connected, interacting, location and being situated, and developing confidence and coping. Patients who felt connected with clinicians during their hospitalization were provided with support that would assist them during their hospitalization. However, some patients may be reluctant to leave the secure environment of the hospital setting where nurses and physicians are constantly present. Follow-up visits with the surgeon and home health services after discharge would remind patients that health care professionals are still available to meet their needs during transition after discharge. Patients may struggle with their transition experience if they were discharged to a strange environment such as an extended care facility, although almost all subjects in this study reported having someone to care for them after discharge. Patients need to develop confidence as they transition home and accept temporary or new limitations. Some patients discussed complications after surgery that required dialysis treatment or new medications. These patients would benefit from additional support to assist them as they develop confidence and cope with these new treatments.

PHS represented outcome indicators for this study. PHS scores declined postoperatively which may suggest that patients did not fully master their health-illness transition at this time. As mentioned earlier, these findings may be related to activity restrictions at the time of data collection or because of other existing co-morbidities. However, changes in preoperative and postoperative expectations, anxiety, and depression did represent successful outcome indicators. For participants in this study, expectations improved after surgery while anxiety and depression

scores decreased. These findings suggest that patients achieved mastery of their health-illness or situational transition through positive perceptions and emotional well-being.

Finally, nursing therapeutics in transitions theory represents nursing interventions that could be implemented to assist patients throughout their transition process. These interventions will be discussed in the implications section of this chapter.

Study Limitations

There were several limitations of this study. The study used a convenience sample of open-heart surgery patients who met the inclusion criteria, but participants were not specifically screened for dementia with the Mini-Mental Status Exam (MMSE) which could be a limitation. The sample was from two hospitals in rural locations, one in Pennsylvania and one in West Virginia which limits the generalizability of the findings. However, data from the National Hospital Discharge Survey (DeFrances & Hall, 2007) reported that the percentage of patients who had CABG surgery in 2005 was 69% males and 31% females. In this study, 67% of the sample was male and 33% of the sample was female. This data supports that the sample from this study was representative of the population undergoing CABG surgery in the U.S. However, future research should try to obtain random samples from hospitals outside of rural areas.

Another major limitation of the study is the timing of data collection. Time 2 data collection occurred four weeks after surgery. Subjects were recovering at home but were limited in their daily activities and physical roles by postoperative restrictions, making it difficult to interpret the findings related to PHS. Many subjects felt that they could perform the activities that were described in the SF 36, but reported that they were limited in those areas because they were following postoperative activity restrictions. These limitations were reflected by the decrease in postoperative Role Physical Subscale scores.

Another concern is that the SF 36 asks patients about typical daily activities. This includes involvement in vigorous or moderate activities such as participating in strenuous sports or moving furniture. The mean age for participants in this study was 63.5. Patients at this age may not engage in these types of activities on a regular basis and therefore these questions might not accurately capture their physical health status. Perhaps the scale may not be the most appropriate tool to measure PHS with an older population. Future research should examine PHS using different measures and at different times postoperatively to provide data that presents a clearer picture of patients' physical health in the weeks and months after surgery.

Another limitation of the study is the self report data that patients provided about their PHS. Dolansky and Moore (2008) examined disability following a cardiac event and found that elders' perceptions of their limitations were not consistent with their objective physical performance. This study did not include objective measurements of PHS so the findings are based solely on self-reports. Although it may not have been feasible to follow-up with objectives measurements for this study, future research that includes subjective and objective measurements of PHS would provide more accurate data of physical limitations.

There were also some limitations with the *Future Expectations Regarding Life with Heart Disease Scale*. Nine items on the scale were negatively worded to prevent response bias, while others were positively worded. For example, the first statement read "my heart condition will have little or no impact on my ability to do work." The researcher noted that several participants had difficulties responding to the positively worded statements. Rewriting some of the statements may help patients to better understand the questions in future studies. Extensive research has not been done using *The Future Expectations Regarding Life with Heart Disease Scale*, and the restricted use of the instrument is another limitation of this study.

Another limitation of the study is the patients' limited responses to the open-ended questions. Some participants had minimal responses to the questions that were asked. This may be because the open-ended questions were read after completion of the three questionnaires. At this time, participants were probably tired and did not wish to provide more elaborate responses. The open-ended questions provided some meaningful data to enrich the studies' findings but descriptive responses were limited. Finally, the use of phone follow-up calls may also be a limitation. Participants may not have provided as in depth descriptions over the phone as they may have provided to the researcher in person. Distractions from their home environment may have also limited their responses.

Implications for Practice

The findings of the study provide nurses and other health care providers with information concerning expectations, anxiety, depression, and PHS in open-heart surgery patients. There are several implications for practice related to these findings.

The study results identified that positive expectations were linked to better PHS. Expectations were also negatively influenced by anxiety and depression. Data from the open-ended questions provided information that described three types of expectations: vague events, congruent experiences, and unanticipated outcomes. Based on these findings, nurses need to be aware that most patients develop expectations about their upcoming surgical event. Nurses and other health care providers can assist patients to develop realistic expectations of surgery and recovery. Helping patients to achieve realistic expectations can occur through three steps. First, patients need to be asked about their expectations by health care personnel. Having patients describe what they expect regarding their upcoming surgical event and postoperative recovery will allow nurses and physicians to intervene when patients describe unrealistic recoveries.

Second, patients need to be provided with specific guidelines for recovery. Participants frequently commented that their hospital stay was longer than what they expected. One patient explained “I really expected to be there 4 days, I did not expect to be in the hospital 12 days.” Hunt (1999) reported that unexpected occurrences or delays caused apprehension and disappointment. Many patients in this study were told that they would be discharged within a certain time frame such as four to seven days, yet 24% were hospitalized longer than one week. Although information regarding length of stay is important, patients need to clearly understand that all patients recover differently and that this time frame may change based on complications or unanticipated delays.

Finally, patients and their families need to be presented with repeated teaching preoperatively and postoperatively. This teaching should continue after the patient has been discharged to home through follow-up phone call interventions or visits from home health nurses. Lenz and Perkins (2000) provided a psychoeducational intervention to assist open-heart surgery patients after surgery. Although the findings were not significant, the study recognized the need for continued education and assistance as patients’ transition from hospital to home. Patients in this study described frustration from complications and activity limitations. All patients received preoperative teaching that addressed these areas, but it is difficult to assess if patients fully comprehended the material or were too nervous at the time of teaching. Teaching often occurs for hospitalized patients in a very short time span after the patients’ catheterization. It is impossible to cover all information related to surgery and recovery during this time. Repeated teaching and reinforcement of activity restrictions would help patients and their families to retain this information and develop more realistic expectations of recovery. Home health services could provide continued teaching after discharge.

The study also provided significant information related to anxiety and depression in open-heart surgery patients. Clinicians need to be aware that some patients enter into surgery with significant anxiety and depression. Furthermore, these emotions can have negative consequences on patient recovery. Preoperative and postoperative screening tools for anxiety and depression would identify high risk patients. The HAD Scale is a short tool that can be used quickly and effectively to separately measure anxiety and depression. This tool could be used to assess patients preoperatively and could be used again within the first several days after surgery. McCrone et al. (2001) identified that depression peaked 2-3 days after surgery. It would be beneficial to monitor patients at this time. Patients could also be screened prior to discharge and after discharge with follow-up phone calls or home health nursing.

Clinicians can also provide patient education materials that specifically focus on postoperative anxiety and depression symptoms. Postpartum patients are routinely provided with information related to the “baby blues.” Open-heart surgery patients should be provided with similar information that describes common emotional struggles during transition to home or as they resume prior activities. For some patients, open-heart surgery is a life-altering event that creates many emotional reactions. However, patients and their families should also be aware that these feelings usually subside over time and should be cautioned to seek help if the feelings do not diminish. Referrals to mental health care providers should be provided for continued support after discharge. Referrals to support groups for open-heart surgery patients can also provide psychosocial assistance to patients during recovery. These groups provide patients with an opportunity to talk about their illness and to gain support from others who have had similar experiences.

Finally, clinicians should also closely monitor the patients' PHS and encourage referrals to cardiac rehabilitation programs. It is expected that patients will gradually resume activities postoperatively and return to baseline or improve their PHS after surgery. However, shorter hospital stays have limited the time that nurses and therapists can assist patients to ambulate and resume daily activity roles. Referrals for outpatient rehabilitation services would provide continued care after discharge. Home health visits could also be used to assess additional areas of recovery such as physical symptoms and PHS limitations that persist after discharge.

Enrollment in cardiac rehabilitation programs can assist patients to improve their cardiovascular functioning and physical abilities in a supervised program. Patients also gain continued social support through meeting other cardiac patients. It is important for nurses to recognize the importance of these programs and encourage patients to participate. However, issues related to referral and participation rates in cardiac rehabilitation programs present additional problems that need to be considered, but are outside of the scope of this research.

It has been well documented that recovery after surgery may be a complicated process that continues well beyond discharge from the hospital (Doering et al., 2002; Gardner et al., 2006; Goodman, 1997; Jaarsma et al., 1995; Savage & Grap, 1995; Tolmie et al, 2005; & Wu, 1995). Patients have reported not being adequately prepared for surgery and or have continued to struggle with a multitude of physical and psychosocial problems that occurred for weeks or months after discharge. These implications provide some strategies for nurses to better assist patients and their families throughout this process and especially during transition after discharge.

Recommendations for Future Research

There are several areas where future research is needed to provide additional data related to the recovery of open-heart surgery patients. Continued research is needed to examine the concept of expectations using quantitative methods. No prior studies have specifically measured expectations separate from patient satisfaction. This area needs to be explored further to better understand how expectations influence open-heart surgery and recovery, and to better understand how expectations change over time. Future studies might also test the effectiveness of teaching materials that address expectations to better prepare patients for surgery. These materials would familiarize patients with the possibility of extended hospitalizations, complications, specific activity restrictions, and signs and symptoms of emotional problems. Studies could compare the revised teaching materials with traditional teaching methods to test their effectiveness.

PHS should also be measured at different times postoperatively to provide more accurate data related to postoperative PHS limitations. Patients may have activity restrictions that prohibit them from completing daily activities. Measuring PHS at time intervals that extend past four weeks postoperatively would provide data that is not influenced by these activity restrictions. Future research should also include objective measurements of PHS. However, it is important to ensure that preoperative baseline assessments of PHS are obtained. Some patients may have disabilities or co-existing disorders that limit their physical activity, and open-heart surgery is not expected to “fix” these physical limitations. Baseline PHS measurements could provide data for preoperative and postoperative comparisons, and objective measurements could provide a more accurate assessment of PHS.

Finally, future research could also examine high risk patients who were readmitted to the hospital after discharge or had extended hospital stays. A significant number of participants

(37%) were either readmitted within 30 days of surgery or had extended hospitalizations greater than 7 days. Additional research could provide measurements of patients' expectations, anxiety, and depression to make comparisons with patients who had typical postoperative recoveries. Future studies could also identify high risk patients who report significant anxiety and depression and follow those patients postoperatively over time. Studies could also include an intervention such as postoperative counseling or support groups for patients to compare the effects of these strategies with traditional recovery methods.

Conclusions

This study found that relationships existed among preoperative and postoperative expectations, anxiety, depression, and PHS in open-heart surgery patients. Furthermore, preoperative expectations, anxiety, depression, and PHS were predictors of postoperative PHS. The study provided preliminary quantitative data that examined expectations separate from patient satisfaction. The findings supported that anxiety and depression were present preoperatively and postoperatively and had negative effects on patient expectations and PHS. This research also examined recovery after discharge and found that PHS scores declined postoperatively.

The findings support the Transitions Theory that patients experience health illness or situational transitions during open-heart surgery and recovery (Meleis et al., 2000). These transitions may be influenced by facilitators or inhibitors of recovery such as expectations, anxiety, and depression. As patients continue to need open-heart surgery for the treatment of CAD and valvular disease, additional research is needed to understand this experience. Continued research that focuses on recovery before and after surgery will provide meaningful data related to patient expectations and emotional well-being and the effects of these on PHS.

APPENDIX A

Your Health and Well-Being

This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities. *Thank you for completing this survey!*

For each of the following questions, please mark an ☐ in the one box that best describes your answer.

1. In general, would you say your health is:

Excellent	Very good	Good	Fair	Poor
▼	▼	▼	▼	▼
☐ ₁	☐ ₂	☐ ₃	☐ ₄	☐ ₅

2. Compared to one year ago, how would you rate your health in general now?

Much better now than one year ago	Somewhat better now than one year ago	About the same as one year ago	Somewhat worse now than one year ago	Much worse now than one year ago
▼	▼	▼	▼	▼
☐ ₁	☐ ₂	☐ ₃	☐ ₄	☐ ₅

3. The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

Yes, limited a lot	Yes, limited a little	No, not limited at all
▼	▼	▼

- a Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports ☐₁ ☐₂ ☐₃
- b Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf ☐₁ ☐₂ ☐₃
- c Lifting or carrying groceries ☐₁ ☐₂ ☐₃
- d Climbing several flights of stairs ☐₁ ☐₂ ☐₃
- e Climbing one flight of stairs ☐₁ ☐₂ ☐₃
- f Bending, kneeling, or stooping ☐₁ ☐₂ ☐₃
- g Walking more than a mile ☐₁ ☐₂ ☐₃
- h Walking several hundred yards ☐₁ ☐₂ ☐₃
- i Walking one hundred yards ☐₁ ☐₂ ☐₃
- j Bathing or dressing yourself ☐₁ ☐₂ ☐₃

4. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
▼	▼	▼	▼	▼

- a Cut down on the amount of time you spent on work or other activities..... ☐₁ ☐₂ ☐₃ ☐₄ ☐₅
- b Accomplished less than you would like..... ☐₁ ☐₂ ☐₃ ☐₄ ☐₅
- c Were limited in the kind of work or other activities ☐₁ ☐₂ ☐₃ ☐₄ ☐₅
- d Had difficulty performing the work or other activities (for example, it took extra effort) ☐₁ ☐₂ ☐₃ ☐₄ ☐₅

5. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
▼	▼	▼	▼	▼

- a Cut down on the amount of time you spent on work or other activities..... ☐₁ ☐₂ ☐₃ ☐₄ ☐₅
- b Accomplished less than you would like..... ☐₁ ☐₂ ☐₃ ☐₄ ☐₅
- c Did work or other activities less carefully than usual..... ☐₁ ☐₂ ☐₃ ☐₄ ☐₅

6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

Not at all	Slightly	Moderately	Quite a bit	Extremely

☐ ₁	☐ ₂	☐ ₃	☐ ₄	☐ ₅

7. How much bodily pain have you had during the past 4 weeks?

None	Very mild	Mild	Moderate	Severe	Very Severe

☐ ₁	☐ ₂	☐ ₃	☐ ₄	☐ ₅	☐ ₆

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

Not at all	A little bit	Moderately	Quite a bit	Extremely

☐ ₁	☐ ₂	☐ ₃	☐ ₄	☐ ₅

9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks...

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
	▼	▼	▼	▼	▼
a Did you feel full of life?.....	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b Have you been very nervous?.....	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c Have you felt so down in the dumps that nothing could cheer you up?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
d Have you felt calm and peaceful?.....	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
e Did you have a lot of energy?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
f Have you felt downhearted and depressed?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
g Did you feel worn out?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
h Have you been happy?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
i Did you feel tired?.....	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
▼	▼	▼	▼	▼
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

11. How TRUE or FALSE is each of the following statements for you?

	Definitely true ▼	Mostly true ▼	Don't know ▼	Mostly false ▼	Definitely false ▼
a I seem to get sick a little easier than other people.....	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b I am as healthy as anybody I know	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c I expect my health to get worse	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
d My health is excellent	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

THANK YOU FOR COMPLETING THESE QUESTIONS!

APPENDIX B

The Future Expectations Regarding Life with Heart Disease Scale

Please indicate the extent to which you agree or disagree with each of the following statements. There are no right or wrong answers. Please be as accurate and honest with your answers as you can.

	Strongly Agree 1	Agree 2	Undecided 3	Disagree 4	Strongly Disagree 5
1. My heart condition will have little or no effect on my ability to do work...					
2. It is going to be very difficult for me to make an adjustment to my heart condition...	1	2	3	4	5
3. I expect that I may have more heart problems in the future...	1	2	3	4	5
4. Although this illness has slowed me down, I will be able to return to most of my usual activities...	1	2	3	4	5
5. I expect that I will have to avoid large groups of people and stimulating situations in the future...	1	2	3	4	5
6. I expect that my lifestyle will suffer because of my heart condition...	1	2	3	4	5
7. I doubt that I will ever fully recover from my heart condition...	1	2	3	4	5
8. My heart condition will have little impact on my sex life...	1	2	3	4	5
9. I expect that in six months to a year my life will be back to normal...	1	2	3	4	5
10. I should have little problem making any changes that are necessary to adjust to my heart condition...	1	2	3	4	5
11. My heart condition will have little impact on my financial status...	1	2	3	4	5

12. My heart condition will keep me from doing my usual hobbies and recreational activities...	1	2	3	4	5
13. Despite my heart condition, I expect that my relationship with my family will remain the same...	1	2	3	4	5
14. I think that it is likely that I will have to give up working around the house because of my heart condition...	1	2	3	4	5
15. I can still live a long and healthy life...	1	2	3	4	5
16. Because of my heart condition, I will probably have to give up a lot of the things that I enjoy most...	1	2	3	4	5
17. My heart condition will have a very negative effect on my family...	1	2	3	4	5
18. I am optimistic about my future and returning to a normal lifestyle...	1	2	3	4	5

APPENDIX C

Hospital Anxiety and Depression (HAD) Scale

Patients are asked to choose one response from the four given for each interview. They should give an immediate response and be dissuaded from thinking too long about their answers. The questions related to anxiety are marked “A” and to depression “D”. The score for each answer is given in the right column. Instruct the patient to answer how it currently describes their feelings.

A. I feel tense or “wound up”:

Most of the time	3
A lot of the time	2
From time to time, occasionally	1
Not at all	0

D. I still enjoy the things I used to enjoy:

Definitely as much	0
Not quite as much	1
Only a little	2
Hardly at all	3

A. I get sort of frightened feeling as if something awful is about to happen:

Very definitely and quite badly	3
Yes, but not too badly	2
A little, but it doesn't worry me	1
Not at all	0

D. I can laugh and see the funny side of things:

As much as I always could	0
Not quite as much now	1
Definitely not so much now	2
Not at all	3

A. Worrying thoughts go through my mind:

A great deal of the time	3
A lot of the time	2
From time to time, but not too often	1
Only occasionally	0

D. I feel cheerful:

Not at all	3
Not often	2
Sometimes	1
Most of the time	0

A. I can sit at ease and feel relaxed:

Definitely	0
Usually	1
Not often	2
Not at all	3

D. I feel as if I am slowed down:

Nearly all the time	3
Very often	2
Sometimes	1
Not at all	0

A. I get a sort of frightened feeling like “butterflies” in the stomach:

Not at all	0
Occasionally	1
Quite Often	2
Very Often	3

D. I have lost interest in my appearance:

Definitely	3
I don't take as much care as I should	2
I may not take quite as much care	1
I take just as much care as ever	0

A. I feel restless as I have to be on the move:

Very much indeed	3
Quite a lot	2
Not very much	1
Not at all	0

D. I look forward with enjoyment to things:

As much as I ever did	0
Rather less than I used to	1
Definitely less than I used to	2
Hardly at all	3

A. I get sudden feelings of panic:

Very often indeed	3
Quite often	2
Not very often	1
Not at all	0

D. I can enjoy a good book or radio or TV program:

Often	0
Sometimes	1
Not often	2
Seldom	3

Scoring (Add the As = Anxiety; Add the Ds = Depression).

0 – 7 = Normal

8 – 10 = Borderline Abnormal

11 – 21 = Abnormal

(Zigmond & Snaith, 1983)

APPENDIX D

“Determining preoperative and postoperative predictors of physical health status in open-heart surgery patients”
Information Data Sheet

Please circle the correct answer or fill in the blank.

1. What is your current age? _____
2. What is your gender?
 - A. Male
 - B. Female
3. What is your ethnic/racial identity?
 - A. Caucasian
 - B. African American
 - C. Native American
 - D. Latin
 - E. Asian/Pacific
 - F. Other
4. What is your marital status?
 - A. Never married
 - B. Married
 - C. Separated
 - D. Divorced
 - E. Widowed
 - F. Partnered
5. What is your highest education level?
 - A. Did not complete high school
 - B. High school diploma
 - C. GED
 - D. Certificate program
 - E. Associate degree
 - F. Baccalaureate degree
 - G. Master's degree
 - H. Doctorate degree
 - I. Other
6. Are you presently employed?
 - A. Yes
 - B. No

7. If you are not employed, which best describes your current situation:
- A. Retired
 - B. Disabled
 - C. Laid off
 - D. Homemaker
 - E. Never worked
8. If employed, what type of occupation/job do you have?
- _____
9. Are you the sole income provider for your family?
- A. Yes
 - B. No
10. Do you have health insurance and if so, what type (Medicare, Medicaid, Blue Cross, etc...)?
- A. No insurance
 - B. Yes, type _____
11. What type of surgery will you be having?
- A. Bypass graft surgery
 - B. Valve replacement surgery
 - C. Both bypass and valve replacement surgery
12. Have you had experience with anyone who has had open-heart surgery such as a spouse or close family member?
- A. Yes
 - B. No
13. What do you remember about the experience? _____
- _____
14. Did you receive information about your open-heart surgery? Please describe how it was given:
- A. Video
 - B. Booklet
 - C. Verbal explanation
 - D. Declined any information
 - E. Other
15. What previous surgeries have you had and when were they performed (Please list type and year of surgery)?
- A. None
 - B. _____

16. Who do you currently live with at this time?

- A. Spouse
- B. Significant Other
- C. Child(ren)
- D. Self
- E. Other _____

17. Is there someone to provide help after surgery?

- A. Yes
- B. No

18. Who will provide help for you after discharge?

- A. Spouse
- B. Significant Other
- C. Child(ren)
- D. Other relatives
- E. Friends
- F. Other _____

19. Where do you anticipate that you will go after surgery?

- A. Home
- B. Rehabilitation facility
- C. Family member/relatives house
- D. Other _____

20. Today's Date _____

21. Date of Surgery _____

APPENDIX E

Four Week Follow-up Qualitative Questions

1. Can you describe any expectations that you have had before surgery or during recovery?

2. Do you feel these expectations were unrealistic? _____

3. Do you feel that your expectations changed over time? _____

\$10 Gift Card Request WalMart

Sheetz

Giant Eagle

APPENDIX F

From: <wvuEcomp@apibraan.com>
Subject: BRAAN2: New IRB Protocol Approved
Date: Mon, 17 Sep 2007 16:53:13 -0400
To: <smccrone@hsc.wvu.edu>, <kchunta@iup.edu>

The following new IRB Protocol has been approved.

Tracking #: H-20398

PI: McCrone, Susan

Title: Determining preoperative and postoperative predictors of physical health status in open-heart surgery patients.

Approval Date: 09/17/2007

Expiration Date: 09/16/2008

The BRAAN2 website can be accessed by clicking the following link: [BRAAN2 Login](#)

APPENDIX G

INSTITUTIONAL REVIEW BOARD

FWA 0001706

July 6, 2007

Approval Expires: July 5, 2008

Study No.: 07-09

Minimal Risk

Accrual Goal-35

Initial Review – Expedited

Principal Investigator: Kristy S. Chunta, MSN, APRN, BC
 Memorial Medical Center
 Doctoral Student - West Virginia University School of Nursing

Title: 07-09 Determining preoperative and postoperative predictors of physical health status in open-heart surgery patients

Documents reviewed: IRB Application for Review of Research; E-mail indicating study support from Dr. Mavridis; Protocol; Pre-operative and Post-operative data collection tools; Consent; budget; e-mail Messages dated June 29, 2007 and July 6, 2007.

Action: Through an expedited review, the IRB approves this study for one year from the current date. This action is based on MMC IRB SOP II.B. 4. g. expedited review of “research on individual or group characteristics or behavior or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies”.

Your study has been granted the IRB tracking number 07-09. Please reference this number when corresponding with the IRB regarding this study. If you have any questions, contact Memorial Medical Center IRB at 814-534-1639.

Luis S. Gonzalez, III, PharmD, Chair

All Memorial Medical Center Investigators Must Comply With the Following:

Conduct the research as required by the protocol;

Use only the Consent Form bearing the Memorial Medical Center “*Approved*” stamp;

Obtain pre-approval from Memorial Medical Center IRB before any changes in research activity (except when necessary to protect human subjects; CFR 56.108(a)(3)); immediately report to Memorial Medical Center IRB any such emergency changes for the protection of human subjects;

Report to Memorial Medical Center IRB any new information that may adversely affect the safety of the subjects or the conduct of the trial;

Immediately report to Memorial Medical Center IRB the death, hospitalization, or serious illness of any study subject;

Provide reports to Memorial Medical Center IRB concerning the progress of the research when requested;

Obtain pre-approval of study advertisements from Memorial Medical Center IRB before use;

Conduct the informed consent process without coercion or undue influence, allow the potential subject sufficient opportunity to consider whether or not to participate, and provide a signed copy of the informed consent to the subject.

APPENDIX H

August 16, 2007

Kristy Chunta, MSN, APRN, BC, CMC
 Assistant Professor
 Department of Nursing and Allied Health
 Johnson Hall, IUP
 1010 Oakland Avenue
 Indiana, PA 15705

Dear Kristy,

This is to acknowledge receipt of your request in regards of research entitled "Determining preoperative and postoperative predictors of physical health status in open-heart surgery patients" to be conducted at West Virginia University Hospitals. My response is in the affirmative; you are granted permission to conduct your research, with the following stipulations:

- 1) Permission is granted based on the research being carried out precisely as defined in your methodology;
- 2) Permission is granted contingent upon approval and/or recommendations of the WVU Institutional Review Board;
- 3) At the completion of the study you are requested to share your findings with those most concerned with the outcomes.

I realize that you applying for permission for your study with the IRB. Should that body deny your permission to conduct this study or should they make extensive recommendations, which alter your original methodology, I would like to be apprised of these changes and/or recommendations.

Best wishes to you in this endeavor!

Cordially,

A handwritten signature in cursive script that reads 'Mary Fanning'.

Mary Fanning, RN, MSN, CCRN, CNAA, BC
 Director, Nursing Administration
 West Virginia University Hospitals

REFERENCES

- Allen, J. K., Becker, D. M., & Swank, R. T. (1990). Factors related to functional status after coronary artery bypass surgery. *Heart & Lung, 19*(4), 337-343.
- American Heart Association (2007). Heart disease and stroke statistics – 2007 update. *Circulation, 115*, 69-171.
- Axelrad, K. J. (1981). *Locus of control and causal attributions as they relate to expectations for coping with a heart attack*. Unpublished doctoral dissertation.
- Baker, S. K. (1998). *Managing patient expectations*. San Francisco: Jossey-Bass Publishers.
- Barnason, S., Zimmerman, L., Anderson, A., Mohr-Burt, S., & Nieveen, J. (2000). Functional status outcomes of patients with a coronary artery bypass graft over time. *Heart & Lung, 29*(1), 33-46.
- Beck, C. T. (2002). Postpartum depression: A metasynthesis. *Qualitative Health Research, 12*(4), 453-472.
- Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting Clinical Psychology, 56*(6), 893-897.
- Ben-Noun, L. (1999). Coronary artery bypass grafting: Long-term psychological and social outcomes. *Journal of Anxiety Disorders 13*(5), 505-512.
- Blumenthal, J. A., Lett, H. S., Babyak, M. A., White, W., Smith, P. K., Mark, D. B. et al., (2003). Depression as a risk factor for mortality after coronary artery bypass graft surgery. *The Lancet, 362*, 604-609.

- Bosworth, H. B., Siegler, I. C., Brummett, B. H., Barefoot, J. L., Williams, R. B., Vitaliano, P. P., et al., (1999). The relationship between self-related health and health status among coronary artery patients. *Journal of Aging Health* 11(4), 565-584.
- Buetow, S. (1995). What do general practitioners and their patients want from general practice and are they receiving it? A framework. *Social Science Medicine*, 40(2), 213-221.
- Charlson, M., Pompei, A. Ales, K., & MacKenzie, C. R. (1987). A new method of classifying prognostic comorbidity in longitudinal studies: Development and validation. *Journal of Chronic Disorders*, 40(5), 378-383.
- Chunta, K. S. (2006). *Using focus groups to explore expectations of open-heart surgery patients*. Unpublished manuscript.
- Cohen, J. W. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Connerney, I., Shapiro, P. A., McLaughlin, J. S., Bagiella, E., & Sloan, R. P. (2001). Relation between depression after coronary artery bypass surgery and 12-month outcome: A prospective study. *The Lancet*, 358, 1766-1771.
- Cowper, P. A., DeLong, E. R., Hannan, E. L., Muhlbaier, L. H., Lytle, B. L., Jones, R. H., et al. (2007). Is early too early? Effect of shorter stays after bypass surgery. *The Society of Thoracic Surgeons*, 83, 100-107.
- Czajkowski, S. M., Terrin, M., Lindquist, R., Hoogwerf, B., Dupuis, G., Shumaker, S., et al. (1997). Comparison of preoperative characteristics of men and women undergoing coronary artery bypass grafting (The Post Coronary Artery Bypass Grafting [CABG] Biobehavioral Study). *American Journal of Cardiology*, 79, 1017-1024.

- Davies, N. (2000). Patients' and carers' perceptions of factors influencing recovery after cardiac surgery. *Journal of Advanced Nursing*, 32(2), 318-326.
- DeFrances, C. J., & Hall, M. J. (2007). *2005 National hospital discharge survey*. U. S. Department of Health and Human Services. Retrieved March 24, 2008 from <http://www.cdc.gov>
- Derogatis, L. R. (1977). *The SCL-90 manual I: Scoring, administration, & procedures for the SCL-90*. Baltimore: Clinical Psychometric Research.
- DiMattio, M. J. K., & Tulman, L. (2003). A longitudinal study of functional status and correlates following coronary artery bypass graft surgery in women. *Nursing Research*, 52(2), 98-107.
- Damiano, A. M. (1996). *Sickness Impact Profile user's manual and interpretation guide*. Baltimore: John Hopkins University.
- Dolansky, M. A., & Moore, S. M. (2007). Older adults' early disability following a cardiac event. *Western Journal of Nursing Research*, 30(2), 163-180.
- Doering, L. V., McGuire, A. W., & Rourke, D. (2002). Recovering from cardiac surgery: What patients want you to know. *American Journal of Critical Care*, 11(4), 333-343.
- Doering, L. V., Moser, D. K., Lemankiewicz, W., Luper, C., & Khan, S. (2005). Depression, healing, and recovery from coronary artery bypass surgery. *American Journal of Critical Care*, 14(4), 316-324.
- Elliott, D., Lazarus, R., & Leeder, S. R. (2006). Health outcomes of patients undergoing cardiac surgery: Repeated measures using Short Form-36 and 15 Dimension of Quality of Life questionnaire. *Heart & Lung*, 35(4), 245-251.

- Gardner, G., Elliott, D., Gill, J., Griffin, M., & Crawford, M. (2005). Patient experiences following cardiothoracic surgery: An interview study. *European Journal of Cardiovascular Nursing*, 4, 242-250.
- Goodman, H. (1997). Patients' perceptions of their education needs in the first six weeks following discharge after cardiac surgery. *Journal of Advanced Nursing*, 25, 1241-1251.
- Gortner, S. R., Jaeger, A. A., Harr, J., & Miller, T. (1994). Elders' expected and realized benefits from cardiac surgery. *Cardiovascular Nursing*, 30(2), 9-14.
- Hamalainen, H., Smith, R., Puukka, P., Lind, J., Kallio, V., Kuttala, K., et al. (2000). Social support and physical and psychological recovery one year after myocardial infarction or coronary artery bypass surgery. *Scandinavian Journal of Public Health*, 28, 62-70.
- Hartford, K. (2005). Telenursing and patients' recovery from bypass surgery. *Journal of Advanced Nursing*, 50(5), 459-468.
- Hartford, K., Wong, C., & Zakaria, D. (2002). Randomized controlled trial of a telephone intervention by nurses to provide information and support to patients and their partners after elective coronary artery bypass graft surgery: Effects of anxiety. *Heart & Lung*, 31(3), 199-206.
- Hattan, J., King, L., & Griffiths, P. (2002). The impact of foot massage and guided relaxation following cardiac surgery: A randomized controlled trial. *Journal of Advanced Nursing*, 37(2), 199-207.
- Hellman, E. A., & Williams, M. A. (1994). Outpatient cardiac rehabilitation in elderly patients. *Heart & Lung*, 23(6), 506-512.

- Hlatky, M. A., Boineau, R. E., Higginbotham, M. B., Lee, K. L., Mark, D. B., Califf, R. M., et al. (1989). A brief self-administration questionnaire to determine functional capacity (The Duke Activity Status Index). *American Journal of Cardiology* 64(10), 651-654.
- Hunt, J. (1999). The cardiac surgical patient's expectations and experiences of nursing care in the intensive care unit. *Australian Critical Care*, 12(2), 47-53.
- Hunt, J. O., Hendrata, M. V., & Myles, P. S. (2000). Quality of life 12 months after coronary artery bypass graft surgery. *Heart & Lung*, 29(6), 401-411.
- Jaarsma, T., Kastermans, J., Dassen, T., & Philipsen, H. (1995). Problems of cardiac patients in early recovery. *Journal of Advanced Nursing*, 21, 21-27.
- Jette, A. M., Davies, A. R., Cleary, P. D., Calkins, D. R., Rubenstein, L. V., Fink, A. et al. (1986). The Functional Status Questionnaire: Reliability and validity when used in primary care. *Journal of General Internal Medicine*, 1, 143-149.
- Koivula, M., Tarkka, M. T., Tarkka, M., Laippala, P., & Paunonen-Ilmonen, M. (2002). Fear and anxiety in patients at different time points in the coronary artery bypass process. *International Journal of Nursing Studies*, 39, 811-822.
- Krannich, J. H. A., Weyers, P., Lueger, S. Herzog, M., Bohrer, T. & Elert, O. (2007). Presence of depression and anxiety before and after coronary artery bypass graft surgery and their relationship to age. *BMC Psychiatry*, 7(47), 1471-1477.
- Kravitz, R. L., Callahan, E. J., Paterniti, D., Antonius, D., Dunham, M., & Lewis, C. E. (1996). Prevalence and sources of patients' unmet expectations for care. *Annals of Internal Medicine*, 125(9), 730-737.

- Lenz, E. R., & Perkins, S. (2000). Coronary artery bypass graft surgery patients and their family member caregivers: Outcomes of a family-focused staged psychoeducational intervention. *Applied Nursing Research*, 13(3), 142-150.
- Like, R., & Zyzanski, S. J. (1987). Patient satisfaction with the clinical encounter: Social psychological determinants. *Social Science Medicine*, 24(4), 351-357.
- Lindquist, R., Dupuis, G., Terrin, M. L., Hoogwerf, B., Czajkowski, S., Herd, J. A., et al. (2003). Comparison of health-related quality-of-life outcomes of men and women after coronary artery bypass surgery through 1 year: Findings from the POST CABG Biobehavioral Study. *American Heart Journal*, 146(6), 1038-1044.
- Lindsay, G. M., Smith, L. N., Hanlon, P., & Wheatley, D. J. (2000). Coronary artery disease patients' perception of their health and expectations of benefit following coronary artery bypass grafting. *Journal of Advanced Nursing*, 32(6), 1412-1421.
- Lipkin, D. P., Scriven, A. J., Crake, T., & Poole-Wilson, P. A. (1986). Six minute walking test for assessing exercise capacity in chronic heart failure. *British Medical Journal*, 292, 653-655.
- Lopez, V., Ying, C. S., Poon, C. Y., & Wai, Y. (2006). Physical, psychological and social recovery patterns after coronary artery bypass graft surgery: A prospective repeated measures questionnaire survey. *International Journal of Nursing Studies*, 44, 1304-1315.
- Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behavioral Research Therapy*, 33(3), 335-343.
- Mahon, P. Y. (1996). An analysis of the concept 'patient satisfaction' as it relates to contemporary nursing care. *Journal of Advanced Nursing*, 24, 1241-1248.

- Mallik, S., Krumholz, H. M., Lin, Z. Q., Kasl, S. V., Mattera, J. A., Roumain, S. A., et al. (2005). Patients with depressive symptoms have lower health status benefits after coronary artery bypass surgery. *Circulation*, *111*, 271-277.
- McCormick, K. M. (1999). The coronary artery bypass graft experience: Themes from the literature. *Canadian Journal of Cardiovascular Nursing*, *10*(4), 16-21.
- McCrone, S., Lenz, E., Tarzian, A., & Perkins, S. (2001). Anxiety and depression: Incidence and patterns in patients after coronary artery bypass graft surgery. *Applied Nursing Research*, *14*(3), 155-164.
- Meleis, A. I., Sawyer, L. M., Im, E., Hilfinger Messias, D. K., & Schumacher, K. (2000). Experiencing transitions: An emerging middle-ranged theory. *Advanced Nursing Science* *23*(1), 12-28.
- Munro, B. H. (2005). *Statistical methods for health care research* (5th ed.). Baltimore: Lippincott Williams & Wilkins.
- Nunally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.
- Oxlad, M., Stubberfield, J., Stuklis, R., Edwards, J., & Wade, T. D. (2006). Psychological risk factors for cardiac-related hospital readmission within 6 months of coronary artery bypass graft surgery. *Journal of Psychosomatic Research*, *61*, 775-781.
- Paier, G. S. (1994). *Development and testing of an instrument to assess functional status in the elderly*. Unpublished Doctoral Dissertation, University of Pennsylvania.
- Pallant, J. (2007). *SPSS survival manual: A step-by-step guide to data analysis using SPSS version 15*. (3rd ed.). New York: McGraw-Hill.

- Parent, N., & Fortin, F. (2000). A randomized controlled trial of vicarious experience through peer support for male first-time cardiac surgery patients: Impact on anxiety, self-efficacy expectation, and self-reported activity. *Issues in Cardiovascular Care*, 29(6), 389-400.
- Pirraglia, P. A., Peterson, J. C., Williams-Russo, P., & Charlson, M. E. (1999). Depressive symptomatology in coronary artery bypass graft surgery patients. *International Journal of Geriatric Psychiatry*, 14, 668-680.
- Plach, S. K., & Heidrich, S. M. (2001). Women's perceptions of their social roles after heart surgery and coronary angioplasty. *Heart & Lung*, 30(2), 117-127.
- Polit, D. F., & Beck, C. T. (2004). *Nursing Research: Principles and Methods* (7th ed.). Philadelphia: Lippincott Williams & Wilkins.
- Portenoy, R. K., Thaler, H. T., Kornblith, A. B., Lepore, J. M., Friedlander-Klar, H. Kiyasu, E. et al. (1994). The Memorial Symptom Assessment Scale: An instrument for the evaluation of symptom prevalence, characteristics, and distress. *European Journal of Cancer*, 30A(9), 1326-36.
- Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1, 385-401.
- Rymaszewska, J., Kiejna, A., & Hadrys, T. (2003). Depression and anxiety in coronary artery bypass grafting patients. *European Psychiatry*, 18, 155-160.
- Saur, C. D., Granger, B. B., Muhlbaier, L. H., Forman, L. M., McKenzie, R. J., Taylor, M. C., et al. (2001). Depressive symptoms and outcome of coronary artery bypass grafting. *American Journal of Critical Care*, 10(1), 4-10.
- Savage, L. S., & Grap, M. J. (1999). Telephone monitoring after early discharge for cardiac surgery patients. *American Journal of Critical Care*, 8(3), 154-159.

- Schumacher, K. L., & Meleis, A. I. (1994). Transitions: A central concept in nursing. *Image: Journal of Nursing Scholarship*, 26(2), 119-127.
- Showalter, A., Burger, S., & Salyer, J. (2000). Patients' and their spouses' needs after total joint arthroplasty: A pilot study. *Orthopaedic Nursing*, 19(1), 49-57.
- Shuldham, C. M., Fleming, S., & Goodman, H. (2002). The impact of pre-operative education on recovery following coronary artery bypass surgery. *European Heart Journal*, 23(8), 666-674.
- Sintonen, H., & Pekurinen, M. (1993). A fifteen-dimensional measure of health-related quality of life (15D) and its applications. In: Walker S., Rosser, R. (Eds.), *Quality of life assessment: Key issues in the 1990s* (pp. 185-195). Dordrecht: Kluwer Academic.
- Spielberger, C., Gorusch, R., Lushane, R., Vagg, P., & Jakobs, G. (1983). *State-Trait Anxiety Inventory*. Mind Garden, Inc.: Palo Alto, CA.
- Staniszewska, S. (1999). Patient expectations and health-related quality of life. *Health Expectations*, 2, 93-104.
- Staniszewska, S., & Ahmed, L. (1999). The concepts of expectation and satisfaction: Do they capture the way patients evaluate their care? *Journal of Advanced Nursing*, 29(2), 364-372.
- Staniszewska, S., & Ahmed, L. (2000). Patient involvement in the evaluation of health care: Identifying key issues and considering the way forward. *Coronary Health Care*, 4(1), 39-47.
- Stewart, A. L., Hays, R. D., & Ware, J. E. (1988). The MOS short form general health survey: Reliability and validity in a patient population. *Medical Care* 26(7), 724-735.

- Stolte, K. (1987). A comparison of women's expectations of labor with the actual event. *Birth* 14(2), 99-103.
- Theobald, K., & McMurray, A. (2004). Coronary artery bypass graft surgery: Discharge planning for successful recovery. *Journal of Advanced Nursing*, 47(5), 483-491.
- Thompson, A. G. H., & Sunol, R. (1995). Expectations as determinants of patient satisfaction: Concepts, theory, and evidence. *International Journal for Quality in Health Care*, 7(2), 127-141.
- Tolmie, E. P., Lindsay, G. M., & Belcher, P. R. (2006). Coronary artery bypass graft operation: Patients' experience of health and well-being over time. *European Journal of Cardiovascular Nursing*, 1-9.
- Tranmer, J. E., & Parry, M. J. E. (2004). Enhancing postoperative recovery of cardiac surgery patients: A randomized clinical trial of an advanced practice nursing intervention. *Western Journal of Nursing Research*, 26(5), 515-532.
- Underwood, M. J., Firmin, R. K., & Hehu, D. (1993). Aspects of psychological and social morbidity in patients awaiting coronary artery bypass grafting. *British Medical Journal*, 69, 382-384.
- Uzun, O. (2001). Patient satisfaction with nursing care at a university hospital in Turkey. *Journal of Nursing Care Quality* 16(1), 24-33.
- Ware, J. E. & Sherbourne, C. D. (1992). The MOS 36-Item short-form health survey (SF-36): Conceptual framework and item selection. *Medical Care* 30(6), 473-483.
- Ware, J. E., Kosinski, M., & Dewey, J. E. (2002). *How to score version 2 of the SF-36 health survey*. Lincoln, RI: QualityMetric Incorporated.

- Ware, J., Kosinski, M. & Keller, S. D. (1996). A 12-Item Short-Form Health Survey: Construction of scales and preliminary tests of reliability and validity. *Medicine Care*, 34, 220-233.
- Wolfer, J. A., & Davis, C. A. (1970). Assessment of surgical patients' preoperative emotional condition and postoperative welfare. *Nursing Research*, 19, 402-414.
- Wu, C. Y. (1995). Assessment of post discharge concerns of coronary artery bypass graft patients. *Journal of Cardiovascular Nursing*, 10(1), 1-7.
- Zigmond, A. S., & Snaith, P. (1983). The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica* 67(6), 361-370.
- Zuckerman, M., Lubin, B., & Rinck, C. M. (1983). Construction of new scales for the Multiple Affect Adjective Check List. *Journal of Behavioral Assessment*, 5, 119-129.