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Caregiver Burden and Emergency Room Utilization for Enhanced Recovery Surgery Cancer Patients

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Abstract

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MS, Walden University, 2008

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Dissertation Submitted in Partial Fulfillment
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Doctor of Philosophy
Public Health, Community Health Education

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Abstract

Advances in surgical technique and medical management have led to fundamental changes in surgical care allowing for a paradigm shift from inpatient to outpatient surgery. Enhanced recovery pathways have moved surgical recovery from inpatient to outpatient settings requiring informal caregiver support. The purpose of this study was to determine the prevalence of caregiver burden in this patient population and to explore whether caregiver burden contributes to preventable use of emergency room services. The conceptual framework supporting this retrospective cross-sectional study was Andersen's behavioral model of health services utilization. Data collected from 28 urologic patient/caregiver pairs were analyzed using descriptive statistics and linear and logistic regression. Findings indicated measurable caregiver burden in 2 of the 5 Caregiver Reaction Assessment (CRA) subscales: impact on schedule and impact on health. Findings also indicated a measurable protective effect of high socioeconomic status of caregivers and the CRA subscale of impact on finances, and a possible protective effect of caregiver self-esteem as measured by the CRA subscale and emergency room utilization within the first 30 days after enhanced recovery surgery. Social change implications include improving the surgical experience of patients and caregivers and enhancing the use of health care resources.

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Dedication

The role of a caregiver can be all encompassing and difficult to navigate. This work is dedicated to all caregivers, and especially to Sandra Risack Sovel, who was the inspiration for my topic. She has played the role of caregiver many times over to parents, spouse and children with a never ending display of time, effort and support. Mom, you should know that your tireless energy is invaluable (even if we complain about it)!

This work is also dedicated to my father, Charles Sovel. Dad, I am sorry you are not here to share in my accomplishment but have relied on your “never give up” attitude to get me to this point on my educational journey. I know how proud you would be.

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There are many people that I would like to thank for their support during this process. In the adage “it takes a village”, I would never have completed this program without my village. To my family and friends, I promise to never utter the phrase “I can’t, I have school work” ever again (though I do know some of you have bets on that). It has been a long road and I truly appreciate the support and ear when I needed them.

Dr. Palmer, thank you for pushing me and hanging in with me through the starts and stops. Without you setting early goals for me I would still be working on my literature review. My final product is so much more than I expected it to be at the beginning of this process. Dr. Oestmann and Dr. Nasr, thank you for your input over the years and supporting me in this journey.

Dr. Leitao and Dr. Laudone, thank you for listening to my research ideas and opening your clinics to enroll patients and caregivers. Without your support this project would never have gotten off the ground. I learned invaluable lessons about being a principle investigator through this study. And Jean Jordan, there are no words to accurately capture your impact, as I may not have enrolled in the doctoral program without your encouragement and there were times when I almost gave up, you gave me the ability to take the next step.

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Chapter 1: Introduction to the Study

Medical practitioners seek to improve the health of an individual through various methods including relieving suffering, curing disease, and repairing damage. The field of surgery is based on reaching these goals by helping the patient through physical intervention to the patient (Gawande, 2012). The surgical profession has developed from one offering little hope to one using the most recent technological advances over the last two centuries (Gawande, 2012). The Centers for Disease Control and Prevention (n.d.) noted that over 51 million surgical procedures are performed yearly within the United States, demonstrating the need for appropriate surgical management from a health and health care cost perspective.

One major focus within the U.S. health care system is cost control. Health care costs continue to rise in the United States (Center for Medicare and Medicaid Services, 2013). The Center for Medicare and Medicaid Services reported that the United States spent 2.7 trillion dollars on health care, with 850 billion dollars spent on hospital costs in 2011, matching the 18% growth rate seen in recent years of the U.S. gross domestic product. All branches of medicine face rising costs and are under pressure to find ways to control health care costs. In the surgical field, technology has played a major role in the evolution of surgical technique and patient management ranging from computer-aided approaches to better patient pain control. These technological advances have led to a shift from inpatient to outpatient surgery through the enhanced recovery surgical pathway model (Wilmore & Kehlet, 2001). The Center for Medicare and Medicaid Services introduced new reimbursement rules limiting reimbursement for surgical care in the inpatient setting for hospital stays less than 24 hours in an attempt to control health care costs in the surgical arena (Zimmerman, 2009). Surgical patients, however, require care outside of the immediate surgical procedure. This new surgical management approach requires an active caregiver during the immediate postsurgical period.

Emergency room utilization has been identified as one of the major drivers of health care costs. In 2007, there were over 116 million visits to U.S. emergency rooms, which equates to 222 visits every minute (Niska, Bhuiya, & Xu, 2010). Niska et al. noted that emergency room use immediately following hospital discharge is a measure of inpatient medical care. Using data from the National Hospital Ambulatory Medical Care Survey (NHAMCS) for 2005-2006, Niska et al. stated that 2% of all emergency room visits (2.3 million) were by patients discharged within 7 days from an inpatient setting and that 1 in 10 of these emergency room visits were related to medical or surgical complications.

Understanding the full experience of the surgical patient and his or her caregiver as well as the relationship of the caregiver to other health care utilization may help reduce unnecessary costs by allowing appropriate selection of surgical patient/caregiver pairs for the enhanced recovery surgery pathway. Findings from this study may be used to improve the surgical experience for patient/caregiver pairs and potentially improve surgical outcomes by providing information on the patient and the caregiver to the medical team. Results of this study may provide a resource to medical providers including surgeons, nurses, hospital administrators, and policymakers by supplying information that may impact the health outcomes of surgical patients, their caregivers, and the use of health care resources. This chapter includes the background, problem statement, purpose of the study, research questions, hypotheses, conceptual framework, study design, definitions, assumptions, scope, limitations, and study significance.

Background

Surgery continues to be a significant part, and cost driver, of medical care (Newhous, 1992). New Medicaid guidelines require certain procedures to be done on an outpatient basis to control cost of surgical care (Medicare et al., 2013; Zimmerman, n.d.). This change in surgical management is due to technological advancements over the last two decades in how surgery is performed and how patients are cared for during surgery and the immediate time period following surgery (Wilmore & Kehlet, 2001). MacLellan, Smyth, Cregan, Lizzio, and Watt (2012) noted that the changing surgical recovery paradigm from the inpatient to outpatient setting is focused on the goal of better patient care management, better patient satisfaction, and a reduction in health care costs.

The decision regarding the most appropriate surgical care for the patient rests with the surgeon. Postsurgical patient management within the enhanced recovery surgical model takes the patient away from the inpatient hospital setting early in the recovery process requiring the caregiver to be an active participant in the immediate surgical recovery period. This represents a change in the role of informal caregiver to a more active medical management and recovery oversight role (Majasaari, Sarajärvi, Koskinen, Autere, & Paavilainen, 2005). In this model, caregivers observe the surgical patient within the active recovery period, which requires basic medical judgment on the part of the caregiver. The surgeon must determine whether the enhanced recovery pathway is an appropriate approach for the patient/caregiver pair in terms of patient care management.

Removing the surgical patient from the inpatient hospital setting also requires access to emergency medical services to address issues that arise during the recovery process. Emergency room utilization places a significant burden on the health care system in terms of providing appropriate continuation of care to patients and being a cost driver within the U.S. health care system. Data from the National Hospital Ambulatory Medical Care Surveys (NHAMCS) and National Hospital Discharge Surveys (NHDS) for 2005 and 2006 demonstrated that 2.3 million emergency room visits were from patients who had been hospitalized within the previous 7 days with only 10% of these visits related to surgical or medical complications (Burt, McCaig, & Simon, 2008). This supports the need to understand what brings patients who are in immediate postsurgical recovery to the emergency room, and to ensure that patients undergoing surgery and their caregivers in the enhanced recovery model are selected appropriately to reduce use of emergency rooms for nonmedical reasons following surgery.

The concept of caregiver burden has been well defined across chronic and traumatic diseases and is known to affect the health of the caregiver, the health of the patient, and health care utilization (Kelly & Hewson, 2000; Saunders, 2008; Wolff et al., 2010). Pediatric studies have demonstrated a link between caregiver burden and increased emergency room utilization for children (Taft, Ballou, & Keefer, 2012). Understanding the level of caregiver burden in this population, and whether caregiver burden influences emergency room utilization in the enhanced recovery surgical model, is important from both patient/caregiver satisfaction and cost perspectives. Answering this question may help surgeons identify the most appropriate patient/caregiver pairs for this surgical management approach, may decrease the health care utilization of emergency rooms for nonmedical emergencies, and may help reduce health care costs in these patients.

Problem Statement

Rapid technological changes in surgical and patient management have resulted in a shift away from inpatient hospital admission for surgical recovery. Aimed at improving the overall care experience of the patient and reducing health care costs, enhanced recovery pathways are now mandated by reimbursement guidelines from the Center for Medicare and Medicaid Services. Although literature demonstrates the safety of this surgical management approach (Wilmore & Kehlet, 2001), little is known about the changing role of the informal caregiver and how caregiver burden may affect health care utilization of these surgical patients in the immediate postoperative period. Understanding whether caregiver burden influences emergency room utilization during the first 30 days following surgery within the enhanced recovery model could better equip surgeons in choosing the right patient/caregiver pairs for this approach, could reduce emergency room visits, and could decrease associated health care costs.

Purpose of the Study

The purpose of this study was to determine the prevalence of caregiver burden in the enhanced recovery surgical patient population and to determine the relationship between caregiver burden and health care utilization in the immediate postsurgical period for cancer patients treated within enhanced recovery pathways. Enhanced recovery pathways have been proven safe and effective for cancer surgery but require informal caregivers to play an active role in the immediate postsurgical period. It was not clear whether caregiver burden existed in this population and how caregiver burden contributed to increased health care utilization, and thereby health care costs, during this period. This study helped fill the gap in the literature by addressing the prevalence of caregiver burden and the relationship between caregiver burden and emergency room visits of cancer patients undergoing enhanced recovery pathway surgery. For this study, a cross-sectional survey was used to examine caregiver burden and explore the association between caregiver burden and emergency room utilization in this surgical population in the immediate postsurgical period for patients undergoing surgery on the enhanced recovery pathway.

Research Questions and Hypotheses

The following research questions (RQs) and hypotheses were addressed:

RQ_1: Do caregiver demographics (gender, age, race, education, income, relationship to patient, health care experience, spirituality) predict caregiver burden within the enhanced recovery surgery pathway?

$H1_0$: Caregiver demographics do not predict caregiver burden for this caregiver population.

$H1_a$: Caregiver demographics predict caregiver burden for this caregiver population.

RQ_2: Does caregiver burden post patient surgery predict patient emergency room utilization within 30 days?

$H1_0$: There is no relationship between caregiver burden and emergency room utilization that does not result in hospital readmission of the patient who underwent surgery in the enhanced recovery pathway model.

$H1_a$: There is a relationship between caregiver burden and emergency room utilization that does not result in hospital readmission of the patient who underwent surgery in the enhanced recovery pathway model.

RQ_3: Do caregiver demographics (gender, age, race, education, income, relationship to patient, health care experience, spirituality), patient demographics (gender, age, race), cancer type, or surgical procedure predict post surgery emergency room utilization?

$H1_0$: There is no difference between caregiver burden and emergency room utilization that does not result in hospital readmission of the patient who underwent surgery in the enhanced recovery pathway model based on the demographics of the caregiver, demographics of the patient, type of patient's cancer, or surgical procedure.

$H1_a$: There is a difference between caregiver burden and emergency room utilization that does not result in hospital readmission of the patient who underwent surgery in the enhanced recovery pathway model based on the demographics of the caregiver, demographics of the patient, type of patient's cancer, or surgical procedure.

Conceptual Framework

Andersen’s behavioral model of health services utilization was the conceptual framework used to support this study. Andersen’s model provides a roadmap of factors that lead to health care utilization (Andersen, 1995; Babitsch, Gohl, & von Lengerke, 2012). This model includes predisposing factors, enabling factors, and needs factors to determine the likelihood that an individual will choose to use health care (Babitsch et al., 2012). The original model was devised to predict as well as explain the family unit use of outpatient and inpatient medical care (Andersen, 1995). Andersen noted more recent versions of the model have focused on the individual.

There is significant research focused on the health care utilization of caregivers due to caregiver burden for chronic and traumatic diseases including Alzheimer’s disease, stroke, and cancer. There is little research on caregiver burden and health care utilization of the patient, and less on the enhanced recovery surgery patient. The pediatric literature indicates a connection between maternal caregiver stress, maternal depression, and higher health care utilization with the children (Kelly & Hewson, 2000; Zimmer, Walker, & Minkovitz, 2006). The full discussion of research related to enhanced recovery surgery, caregiver burden, and the relationship to health care utilization is presented in Chapter 2. Understanding the role of caregiver burden in subsequent health care utilization offers a unique opportunity to intercede and reduce unnecessary emergency room use.

Nature of the Study

I used a retrospective, cross-sectional study to determine the prevalence of caregiver burden in the enhanced recovery surgical model for cancer treatment and to evaluate the effect of caregiver burden on emergency room utilization in the immediate postoperative period for patients undergoing enhanced recovery pathway surgery. Understanding the level and effect of caregiver burden on the enhanced recovery surgical approach may provide information for allocation of health care resources for surgical patients. The study sample consisted of cancer patients undergoing enhanced recovery pathway surgery and their caregivers at a major New York City academic cancer center during 2014 and 2015. I used data collected directly from caregivers as well as health care utilization data maintained by the hospital on the surgical patients. Descriptive statistics regarding the levels of caregiver burden were used to analyze the data. Additionally, data were analyzed using linear and logistic regression to determine whether caregiver burden influenced emergency room utilization that did not result in inpatient hospital admission. I used emergency room visits not resulting in hospital readmission as the dependent variable and caregiver burden as the independent variable. Caregiver age and gender as well as type of patient's cancer were covariate variables.

Definitions

The following terms were used throughout this study and are defined as follows:

Ambulatory extended recovery: Medical treatment for surgery provided within the approved Centers for Medicare and Medicaid Services guidelines for outpatient surgery lasting approximately 24 hours (Medicare et al., 2013).

Caregiver burden: The combined physical, psychological, and economic costs of providing care for an individual with medical problems and limitations in activities of daily living as experienced by a nonpaid (informal) caregiver (Carretero, Garcés, Ródenas, & Sanjosé, 2009).

Enhanced recovery surgery: The multimodal patient management approach to surgery aimed at reducing trauma to the human system, optimizing time to recovery and pain control (Wilmore & Kehlet, 2001). The literature indicated this approach in a variety of ways including “fast tracked,” “enhanced recovery,” “short stay” “23 hour recovery,” and “ambulatory extended recovery” with all of these labels focusing on optimizing surgical management and shifting the care paradigm from the inpatient to outpatient setting.

Inpatient admission: Entrance into a hospital or health care facility that provides medical care that cannot be managed in the patient’s home or permanent living quarters.

Surgery: Medical intervention that requires patient sedation with the goal of removal or repair of a diseased organ or system (“Surgery,” n.d.).

Assumptions

The first assumption was that caregiver burden was measurable in this patient population. The second assumption was that caregivers of surgical patients would answer questions regarding caregiver burden in a truthful manner, allowing for baseline caregiver burden to be established. Further assumptions included that both content validity and reliability demonstrated for the caregiver burden questionnaire would be consistent with published literature on this measure allowing for accurate measurement of caregiver burden. Additionally, I assumed that the decision to admit a surgical patient to the hospital was based on medical, not social, necessity and that a patient would not be sent home if there was a true medical need for the patient to be in the hospital. This assumption supported the idea that patients sent home from the emergency room did not require significant medical care and that the medical concerns could be managed outside of the hospital.

Scope and Delimitations

The study population included surgical patients and their caregivers at an academic medical center in New York scheduled to have surgery in 2014 and 2015. The patient population was further delimited to patients undergoing surgery for cancer who, along with their caregiver, were willing to participate in the study to answer RQ1, RQ2, and RQ3. Caregiver demographics were also a delimitating factor required to address RQ1 and RQ3. Chapter 3 presents a full discussion of the research methodology.

There was little previous research addressing the prevalence of caregiver burden in this population and the role of caregiver burden and health care utilization after surgery, with a focus on oncology. Surgery for cancer may be curative in nature or aimed at improving quality of life. Generalizability was limited to the cancer enhanced recovery model surgical population, but findings may be important across the cancer disease spectrum.

Limitations

There are inherent limitations in a cross-sectional design. The cross-sectional design is considered observational and versatile, and allows research that could not be conducted in an experimental fashion (Schuster & Powers, 2005). However, cross-sectional studies are not able to establish a causal relationship between variables and are open to bias due to lack of participant response as well as incorrect participant response (Schuster & Powers, 2005). In addition to the assumptions mentioned above, certain limitations existed within this study in regards to patient/caregiver enrollment, data completeness, and use of retrospective hospital records. Measures were taken to address limitations and reduce potential for bias arising from these limitations. With respect to patient/caregiver enrollment, all ambulatory extended recovery surgical patient and caregiver pairs were eligible for the study. It was not be possible to determine whether surgical patient and caregiver pairs chose not to participate due to higher levels of caregiver burden.

A second limitation in regard to surgical caregivers was missing data on the caregiver burden questionnaire. Additionally, there were instances in which patients sought care outside of the hospital system where they had surgery, and these data were not available for analysis and could underrepresent the use of emergency services and the medical need for hospital admission. All of these limitations were addressed with sample size, appropriate data management practices, and review of medical records.

Significance

The United States spends more on health care with health outcomes worse than other developed countries (Institute of Medicine (US) Roundtable on Evidence-Based Medicine, 2010). Understanding factors that lead to this overall outcome is important from a public health perspective. As more health care is pushed into the community setting in an effort to control costs, it is important to understand when this would, and would not, be appropriate in terms of the best possible health outcomes. Understanding the role of caregiver burden on the recovery of the surgical patient offers a unique view on use of hospitalization resources.

Surgeons and caregivers are being asked to play new roles in this surgical model. Surgeons must make the decision whether the patient is an appropriate candidate for immediate postoperative recovery at home, but surgeons do not have tools to help them determine whether recovery will be assisted or impeded in the home-based scenario. Additionally, caregivers are faced with decisions regarding the normal course of recovery that may include issues such as pain control, wound infections, or more serious complications with little guidance outside of “call your doctor, or go to the emergency room.”

The main goal of this study was to effect positive social change by improving the surgical experience for the patient and caregiver. Results of this study may provide a resource to medical providers across the care spectrum including surgeons, nurses, hospital administrators, and policymakers by supplying information that may impact the health outcomes of the surgical patient, their caregiver, and the use of health care resources. Impacting this aspect of medical care represents one way to positively influence health care costs.

Summary

Chapter 1 presented the background of factors leading to the paradigm shift from inpatient surgical management to outpatient surgical management via the enhanced recovery model. Based on the goals of improving the patient care experience and reducing health care costs, technology has allowed more surgical procedures to be managed in the outpatient setting. The lack of knowledge regarding caregiver burden in this population, including the impact of this surgical management approach and subsequent health care utilization, was identified along with the specific research questions and study significance aimed at supporting surgeons in appropriate patient selection for this surgical approach.

Chapter 2 presents an in-depth discussion of the literature surrounding the technological and medical advancements present in the enhanced recovery surgical model, the use of this surgical approach in general and oncologic surgery, caregiver burden, and the relationship between caregiver burden and health care utilization. Chapter 3 focuses on the detailed discussion of the study population, research design, rationale, and methodology. Chapter 4 presents the results of the study, and Chapter 5 presents the interpretation and conclusions as well as recommendations for future research.

Chapter 2: Literature Review

MacLellan et al. (2012) noted the future of surgery includes changing the paradigm to short stay surgical approaches where appropriate. This model represents the integration of new technology into a high volume surgical approach aimed at reducing inpatient capacity, reducing health care costs, and increasing the overall patient experience (MacLellan et al., 2012). One hallmark feature of this approach is caregiver involvement in the immediate postsurgical period (Majasaari et al., 2005). Caregiver burden is an established construct that has been studied in a variety of chronic disease settings; both caregiver stress and caregiver burden have been found to increase with frequent patient hospital readmissions (Saunders, 2008; Wolff et al., 2010). However, little is known about the relationship between caregiver burden and emergency room utilization within the enhanced recovery surgical model pathway.

This study focused on the prevalence of caregiver burden within the enhanced recovery surgical model and the relationship between caregiver burden and emergency room utilization for cancer patients following this pathway. This chapter presents the evolution of the enhanced recovery surgical model allowing more surgery to be performed in the outpatient setting and caregiver burden across a variety of illnesses. This literature review demonstrates the lack of knowledge regarding caregiver burden within this patient population and the impact of caregiver burden on emergency room use within this surgical model.

Presented in this chapter is the literature search strategy for the enhanced recovery surgical model, caregiver burden in chronic and traumatic disease models, and what is currently known about caregiver burden and emergency room utilization. Also presented are the conceptual framework for this study and the summary of relevant literature related to the enhanced recovery surgical model, caregiver burden, and the relationship between the two.

Literature Search Strategy

This literature review presents a summary of the prevailing research on three main topics: the enhanced recovery surgical model, caregiver burden, and the relationship between caregiver burden and emergency room utilization. The process of transitioning surgery from the inpatient to outpatient environment is detailed for multiple surgical specialties. Caregiver burden within cancer and caregiver health care utilization is reviewed. This evidence was obtained by using multiple search engines including PubMed, Google Scholar, and Summon. Summon is the search engine for the academic medical center's library where the research was conducted. This academic medical center is a tertiary care academic medical center focused on the care of cancer, and the library has access to over 5,000 medical journals and over 3,000 medical books.

The key words used for the literature review on the enhanced recovery surgical model included *ambulatory extended recovery*, *enhanced recovery surgery*, *anesthesia management and ambulatory surgery*, *minimally invasive surgery*, and *enhanced pathway surgery*. The key words used for the literature review on caregiver burden included *definition of caregiver burden, Alzheimer's disease and caregiver burden*, *caregiver burden and stroke, caregiver burden*, and *cancer*. The key words used for the literature review on emergency room utilization included *caregiver burden and health* *care utilization*, *emergency room utilization*, *caregiver physician visits*, and *health care needs of caregivers*. This literature review focused on peer-reviewed journals from 2000 to 2013 with the exception of an initial presentation of topics dating to the 1960s.

Conceptual Framework

The conceptual framework for this study was Andersen's behavioral model of health services utilization. First presented through Andersen's dissertation in 1968, this model includes factors that lead individuals to seek, or not seek, medical care (Andersen, 1995). Widely recognized within the context of health care utilization models, Andersen's behavioral model of health services utilization is used to outline and connect factors that lead to health care utilization (Andersen, 1995; Babitsch et al., 2012).

Andersen's model relies on three primary factors that lead to health care utilization: predisposing factors, enabling factors, and needs factors. Predisposing factors consist of the demographic (age, sex), social (education), and mental (health care beliefs) status of the individual (Andersen, 1995). Enabling factors consist of income, presence of regular medical care, ease of seeking medical care, ease of obtaining medical care, and cost of medical care (Andersen, 1995). Needs factors consist of the individual's perceived need for care as well as the medically documented need for care (Andersen, 1995).

Babitsch et al. (2012) conducted a systematic review of studies published between 1998 and 2011 using Andersen's model. The model has gone through iterations over the last 4 decades; however, most studies identified for this review included the 1995 version (Babitsch et al., 2012). Babitsch et al. identified 16 studies published in this time frame meeting the requirements of the Anderson's Model being used as the theoretical basis, specific data on each factor, and quantitative results. Results of this review indicated that no single factor determined health care utilization, though a variety of factors do predict health care utilization (Babitsch et al., 2012). Within the predisposing factor category, age, gender, ethnicity, education level, marital status, cultural norms, and belief in medical institutions all play a role in health care utilization (Babitsch et al., 2012). High and low income, insurance status, regular health care, diagnosed physical and mental health issues, and perceived needs within the enabling factors and needs factors categories also played a role in determining health care utilization (Babitsch et al., 2012).

Andersen's model has not been used to study emergency room utilization based on caregiver burden. However, this model has been used to study health care utilization and quality of life for adults over 65, overnight hospital surgical admissions for minority populations, and mental health utilization (Baernholdt, Hinton, Yan, Rose, & Mattos, 2012; Clay, Roth, Safford, Sawyer, & Allman, 2011; Lindamer et al., 2012; Oser et al., 2011). These topics relate well to the current study of examining caregiver behavior toward health care utilization. Predisposing, enabling, and needs factors will, or will not, be identified that result in patient health care utilization. This model supports the study of caregiver burden on these factors that lead to the choice to seek care in an emergency room.

Enhanced Recovery Surgery

Over the last 2 decades, advances in both surgical technique and medical management have led to fundamental changes in surgical care (Wilmore & Kehlet, 2001, Fukuda et al., 2005). The care paradigm shift from inpatient to outpatient surgery is based on a multimodal patient management approach including more specific anesthesia targets, refined surgical approaches, and patient management focused on reducing organ stress (Wilmore & Kehlet, 2001). The result of these changes has pushed surgery, and surgical recovery, for many procedures into the outpatient setting (Wilmore & Kehlet, 2001). The literature indicates this approach in a variety of ways including "fast tracked," "enhanced recovery," "short stay," "23 hour recovery," and "ambulatory extended recovery," with all of these labels focusing on optimizing surgical management and shifting the care paradigm from the inpatient to outpatient setting.

Anesthesia, surgical technique, and patient management have made this paradigm shift possible. Anesthesia has advanced in both anesthetic agents and delivery. Monitored anesthesia includes different drugs with a lighter anesthetic level (Majholm et al., 2012). Majholm et al. demonstrated that monitored sedation anesthesia results in faster recovery time when compared to general anesthesia based on return to pre anesthetic mental state, earlier mobilization, and hospital discharge supporting the use of this type of anesthetic approach within the ambulatory surgery paradigm. In conjunction with advancements in anesthesia, the last decade has seen an increase in both robotic and laparoscopic surgery. These surgical techniques are considered minimally invasive due to smaller incisions to the body and the aid of cameras and computers that allow surgeons to see inside without cutting wide openings (Mack, 2001). Mack noted that using a minimally invasive approach reduces pain, mobility limitations, and postsurgical complications related to large body incisions allowing these techniques to support ambulatory surgery. These care pathways also seek to reduce unnecessary drains and long periods of immobility, as well as change nursing and presurgical patient preparation guides (Wilmore & Kehlet, 2001; Ni et al., 2013). New approaches to anesthesia and surgery result in less trauma to the body allowing overall faster recovery (Fukuda et al., 2005; Mack, 2001; Wilmore & Kehlet, 2001b).

This surgical approach has been shown to work across a variety of surgical procedures in fields of orthopedics, gynecology, general surgery, urology, and head/neck procedures (Wilmore & Kehlet, 2001). Identifying barriers to this management paradigm has been the focus of several studies across many surgical specialties. Fukuda et al. (2005) studied 726 consecutive surgical patients across a surgical department to identify reasons surgical patients were not able to leave the hospital within the outpatient time frames. Results of this study demonstrated that both medical and social reasons prevented patients from leaving the hospital (Fukuda et al., 2005). From a medical standpoint, postsurgical pain, bleeding, new onset cardiac conditions, and other events (fever, abdominal tenderness) required longer hospitalizations (Fukuda et al., 2005). From a social standpoint, patient request, doctor request and lack of clear discharge processes contributed to longer hospitalizations (Fukuda et al., 2005).

Looking at surgical types, studies within subspecialties have supported the safety and efficacy of this approach. Savaridas et al. (2013) reported on the safety of an enhanced recovery program for orthopedic arthroplastic surgery with a series of 4500 cases. Results demonstrated lower long-term morbidity and mortality, better pain management, and shorter hospital stays (Savaridas et al., 2013). Wilmore and Kehlet

(2001) stated that the fundamental surgical approach to hospital length of stay will continue to change as patient management and surgical techniques improve, resulting in a further shift to outpatient short stay surgery. One major focus of these enhanced recovery pathways is oncology.

Enhanced Recovery Surgery for Cancer

The World Health Organization (2013) stated that most cancer deaths can be attributed to lung, breast, colorectal, stomach, and prostate cancers making these types of cancers important targets for treatment. Surgery continues to be a curative approach to many cancers, and oncologic surgeons have adopted the ambulatory extended recovery model (Ni et al., 2013). This surgical paradigm is now common in the management of breast, colorectal, gastric, gynecological, urological, hepatic, and head/neck cancers (Ni et al., 2013).

Marla and Stallard (2009) noted that breast cancer surgery represents an ideal target for ambulatory extended recovery surgery and described a literature review regarding the pros and cons of this surgical approach. Results supported the safety and feasibility of this surgical management approach, but individual studies were small and covered a wide range of surgical procedures making comparison difficult. Marla and Stallard suggested further research to study patient outcomes and quality of life issues.

Weber et al. (2011) stated that breast cancer surgery performed in an ambulatory extended recovery model is safe and does not affect the quality of surgical care resulting in faster recovery, better mobility, less postoperative pain, and reduced health care costs. Hainsworth et al. (2013) noted a wide range of surgical management for breast cancer patients ranging from breast conserving to mastectomy. Hospital length of stay has varied from less than 1 day to 6 days (Hainsworth et al., 2013). Weber et al. described the development of the ambulatory extended recovery surgical pathway implemented at Memorial Sloan Kettering Cancer Center. This care pathway was developed to standardize care delivery; management of postoperative nausea, vomiting, and pain; and patient education.

Over a 1-year period, 444 breast cancer patients underwent mastectomy with and without immediate reconstruction on the ambulatory extended recovery pathway (Weber et al., 2011). Patients did as well as or better than a comparison group of patients before implementation of this pathway (Weber et al., 2011). Similarly, 61 breast cancer patients were treated prospectively on an ambulatory extended recovery pathway in the United Kingdom; 83% of patients who completed the pathway were discharged in less than 1 day with a reduction in postoperative wound occurrences from 7% to 2% (Hainsworth et al., 2013). Hainsworth et al. and Weber et al. stated the biggest barrier to instituting this surgical pathway is administrative because patient screening and preoperative, intraoperative, and postoperative care need to be addressed requiring strong communication across the care delivery team.

Historically, colorectal surgery has required an inpatient hospital stay up to 11 days with published surgical complication rates up to 20% (Teeuwen et al., 2010). Literature supports the design and implementation of enhanced recovery pathways for colorectal cancer surgery. Consensus recommendations by Lassen, Soop, Nygren et al. (2009) support this approach as appropriate evidence-based management. Counihan and

Favuzza (2009) focused on the implementation of an enhanced recovery pathway and noted that this surgical management paradigm is both technically feasible and cost effective with development steps similar to those seen in breast cancer. Studies also support the implementation of this surgical management paradigm. Teeuwen et al. conducted a matched cohort design trial to determine whether enhanced pathways reduced hospital length of stay and improved surgical complication outcomes. Teeuwen et al. included 183 patients, 61 on the enhanced recovery pathway and 128 matched controls, for medical record review. Results indicated that the control group was 3.4 times more likely to develop a postoperative complication making this surgical approach appropriate for colon and rectal resections (Teeuwen et al., 2010).

The enhanced recovery surgical management approach has also gained acceptance in specialty surgical disciplines including gynecology, urology, and head/neck cancers (Wodlin & Nilsson, 2013). Kalogera et al. (2013) studied the effects of an enhanced recovery pathway in 241 gynecologic surgical procedures. Results indicated that hospital length of stay, self-administered pain reduction medication, and health care costs were reduced in the enhanced recovery model while complication rates, readmission rates, and mortality rates were equivalent between the enhanced pathway group and the standard group (Kalogera et al., 2013).

Turning to the urologic specialty, prostate surgery is an ideal target for enhanced recovery pathways due to the minimally invasive surgery approach. (Sohn, Lee, & Ahlering, 2013) presented a review on the use of robotic surgery for prostate and bladder procedures. Robotic assisted prostatectomy is now the surgical approach most used to treat prostate disease (Sohn et al., 2013). Mukhtar, Ayres, Issa, Swinn, and Perry (2013) studied the implementation of an enhanced recovery pathway in urologic patients and found a reduction in length of stay, a reduction in time to full meals, and no difference in postsurgical complications.

Head and neck surgery has a long standing tradition of outpatient surgery. Gerfo, Gates, and Gazetas (1991) present a series of 134 patients who safely completed outpatient and short stay recovery surgery. More recently Tuggle, Roman, Udelsman, and Sosa (2011) presented a series of more than 6700 patients undergoing outpatient thyroidectomy. Results of this case series review note that the enhanced pathway approach is safe with appropriate care pathways and patient monitoring (Tuggle et al., 2011).

Enhanced recovery pathways have been proven safe and effective; more types of surgery are being moved into this model requiring more postsurgical care outside of the hospital. With much of the literature focused on the patient safety approach of the enhanced pathways; quality of life for the patient and caregiver is growing in importance. Savaridas et al. (2013) studied how the enhanced recovery surgical approach influenced health-related quality of life in 83 colorectal surgical patients. In this observational study, Savaridas et al. noted the enhanced recovery pathway results in shorter postsurgical hospital stays but by two weeks there was no difference in health related quality of life between the enhanced recovery group and the standard of care group bringing up questions regarding the recovery process, caregiver burden, and other recovery factors.

Caregiver Burden

When ill patients require care. This care is provided in a variety of settings and by a variety of people. Traditional care is often provided by trained medical professionals, social workers, and other types of roles that provide formal training in caring for those with physical or mental illness. Care provided by these trained professionals may be delivered in a hospital, skilled care facility, or within the community. Care provided by trained professionals is often referred to as formal care. Alternatively, care can be provided by family, relatives, or friends within the home. Care provided by untrained professionals is referenced as informal care.

Caregiver burden exists within both the formal and informal care settings. The term "formal caregiver" refers to a person trained to provide medical, social, or psychiatric care (Angermeyer, Bull, Bernert, Dietrich, & Kopf, 2006). Focusing on mental illness, Angermeyer et al. noted that patients receive care in an inpatient setting from nurses and other trained professionals. This type of care differs from informal caregiving as the timelines, time off, and association with the patient are based in terms of employment (Angermeyer et al., 2006). While formal caregivers are paid to care for the patient and informal caregivers are not, both groups face physical and psychological challenges such as stress and burnout in providing care (Angermeyer et al., 2006). Cohen-Mansfield, Golander, and Heinik (2013) studied the difference in Alzheimer's disease symptom reports of delusions and with goal of distinguishing differences in how formal and informal caregivers perceive what is occurring with the patient. This study included 151 patients and informal caregiver pairs and 90 formal caregivers who completed a series of quantitative and qualitative measures. Quantitative data demonstrated that informal caregivers reported more delusions and hallucinations than formal caregivers, ($p < .05$ across the different delusion and hallucination measures) raising the question as to perception verse caregiver training (Cohen-Mansfield et al., 2013).

Miyamoto, Tachimori, and Ito (2010) studied 445 formal caregivers in skilled nursing facilities focused on Alzheimer's disease to determine if higher levels of patient physical and behavioral issues resulted in higher levels of formal caregiver burden. Results of this study found that age, gender, aggression, and other inappropriate behavior of the patient resulted in higher levels of formal caregiver burden (Miyamoto et al., 2010). Miyamoto et al. and Cohen-Mansfield et al. (2013) noted that the majority of caregivers were women, 80% of the formal caregivers and 73% of the informal caregivers, respectively. Navaie-Waliser, Spriggs, and Feldman (2002) studied the differences of providing care for both males and females in the informal caregiver capacity. Telephone surveys conducted with 4,874 households where an adult had provided or arranged for care for a family member or friend within the last 12 months netted a 65% response rate (Navaie-Waliser et al., 2002). Results of this study supported that women are the predominant caregivers (Navaie-Waliser et al., 2002). Navaie-Waliser et al. also noted that these female caregivers were more likely to be black, educated, and currently not working outside the home. Men and women differed statistically significantly in age, race, marital status, and employment, highlighting the gender differences in providing care. Bivins (2013) studied the effect of gender differences on caregiver burden within early to moderate Alzheimer's disease. Analysis of 114 caregivers supported that stage of disease was more predictive of caregiver burden that was caregiver gender (Bivins, 2013). Studies with different results demonstrate that the relationship of gender and disease to caregiver burden has not been fully explored, and this topic has not been looked at in the surgical population.

As surgical recovery shifts to the outpatient setting there is a greater dependency on informal care. Teschendorf et al. (2007), Carretero et al. (2009), and Erder et al. (2012) noted that the field of medicine has become more community based requiring informal caregiving become a mainstay of patient treatment. Carretero et al. defined informal care as care provided by someone not formally trained or paid to provide care. Informal caregivers can be family members, friends, or neighbors (Carretero et al., 2009). Caregivers play an integral role in the recovery process. Mitnick et al. (2010) recognized up to 90% of community based patients with both acute and chronic medical and mental conditions are assisted by informal caregivers.

There is no single definition of caregiver burden. Caregiver burden was first described in the 1960's by Grad and Sainsbury and defined as the combined physical, psychological and economic costs of providing care (Carretero et al., 2009). Further defined in the 1980's, the term caregiver burden was expanded to include the persistent risk to the physical and psychological health of the person providing care and more recently with a distinction between subjective and objective aspects (Carretero et al., 2009). The role of an informal caregiver is multifaceted including patient limitations and perceived burden by the caregiver (Erder et al., 2012).

Many patients wish to remain at home during an illness and many families choose to care for a loved one at home when faced with chronic and end of life illnesses. Informal caregiving is one type of support for the patient to remain at home (Anderson, Linto, & Stewart-Wynne, 1995; Carretero et al., 2009). Carretero et al. noted that the informal caregiving is a major stress event on those who provide care. The role of caregivers and the physical and psychological burden of providing care has been well documented in both chronic diseases such as Alzheimer's and traumatic disease such as stroke and cancer.

Caregiver Burden and Cancer

The concept of caregiver burden has been well defined in the cancer literature. Most patients undergoing cancer treatment are cared for in some capacity by an informal caregiver with up to 80% of all home based care falling into this model (Teschendorf et al., 2007). Anderson et al. (1995) and Applebaum and Breitbart (2013) proposed that this high volume of informal caregivers is possibly due to increasing health care costs, family values, and the desire to keep patients at home as long as possible.

Teschendorf et al. (2007) and Applebaum and Breitbart (2013) focused on the idea that most informal caregivers are unprepared for the reality of this role. Qualitative work by Teschendorf et al. supported cancer caregiver needs over multiple domains including the physical requirements, the emotional stress, individual health decline, self-directed coping strategies, and the ultimate satisfaction of being able to provide care. Collins and Swartz (2011) noted that cancer caregivers exhibit higher levels of depression than the patients they care for supporting the need to acknowledge caregiver health.

With surgery a significant curative approach to cancer and the shift of patient recovery from the inpatient to outpatient setting, understanding caregiver burden after surgery is necessary. The enhanced recovery surgery pathway shifts care from the inpatient environment to the home environment (Bryson et al., 2013). Bryson et al. demonstrated that patient function is poorest in the immediate post-surgery period (up to the first 7 days after surgery) and that poor patient function results in greater caregiver stress for patients over 65 years of age. Juarez, Ferrell, Uman, Podnos, and Wagman (2008) studied caregiver burden in the context of palliative surgery. Results of this prospective descriptive study indicated that caregivers were more stressed than patients in the pre-operative setting and that both patients and caregivers had worse quality of life in the first two weeks after surgery (Juarez et al., 2008). Understanding the role of caregiver burden within this surgical approach will provide information that can influence the course of surgical recovery.

Impact of Caregiver Burden on Health Care Utilization

Often cited caregiver burden in chronic disease represents a significant burden on the caregiver and results in caregiver health care utilization. Health care utilization is the term used to cover any health care related service provided across the range of social support to inpatient hospitalization. Acting as a caregiver has been linked to increased heart disease, stroke, and mortality (Haley, Roth, Howard, & Safford, 2010; Schulz & Beach, 1999). Christakis and Allison (2006) reviewed Medicare data to research the link between health outcomes and hospitalization of a spouse. Results of this review summarized that hospitalization of a spouse over a variety of diseases is related to death of the partner (Christakis & Allison, 2006).

Looking at specific diseases, Burton et al. (2012) studied 139 patient/caregiver pairs across the disease spectrum and found that concerns of caregivers are similar independent of disease. This longitudinal cohort study found that caregivers who noted caregiver burden were more anxious than caregivers who indicated less burden highlighting the need to understand the stress level of individual caregivers (Burton et al., 2012).

Schubert et al. (2008) noted caregivers of Alzheimer's disease patients are more likely to suffer psychiatric and physical illness than non-caregivers. Studying 153 patient and caregiver pairs, Schubert et al. found 24% of caregivers were seen in an emergency room or hospitalized as a result of providing care. Kannan, Bolge, Del Valle, Alvir, and Petrie (2011) studied 1,077 Alzheimer patient and caregiver pairs to understand how disease severity affected caregiver outcomes. Findings in this study demonstrated an increase in caregiver health care utilization as patients require higher levels of care (Kannan et al., 2011).

Similar trends are seen in the stroke literature. Sit, Wong, Clinton, Li, and Fong (2004) conducted a cross sectional cohort study to examine stroke caregiver social support. This study included 102 stroke caregivers and results indicated that physical symptoms manifested within caregivers within three months of providing care, with 40% of this sample seeking medical help for symptoms related to caregiver burden (Sit et al., 2004). White, Poissant, Coté-LeBlanc, and Wood-Dauphinee (2006) studied 52 stroke caregivers in Canada. Results of this study demonstrated that the health related quality of life of the caregivers were below that of age-matched controls with physician visits being the most used caregiver health care service (White et al., 2006). Less often researched is the impact of caregiver burden on the health of the patient.

Impact of Caregiver Burden on Patients Undergoing Enhanced Recovery Surgery

There is little research on the impact of caregiver stress and health care utilization in the ambulatory extended recovery surgical model across cancer types. A phenomenological study by Norlyk and Martinsen (2013) presented the lived experience of a colon cancer patient undergoing enhanced recovery surgery. Conclusions of this study revealed unique caregiver burden themes of supervision, acting as the health care provider, and patient oversight (Norlyk & Martinsen, 2013). Norlyk and Martinsen concluded one must view the caregiver as separate from the patient with different needs in the immediate post surgery time frame.

In a similar qualitative study, Majholm et al. (2012) studied 11 surgical patient and caregiver pairs to understand the caregiver experience in this surgical model. Results of this study support the use of the enhanced recovery surgical model by caregivers, but that some caregivers are more able to fulfill the required role than others. Wells et al. (2004) conducted a prospective randomized study in 108 breast cancer patient and caregiver pairs to measure patient and caregiver quality of life. Results of this study found no difference between the early discharge group and standard of care group on quality of life, though caregivers in the early discharge group raised concerns over at home care that were not apparent in the standard of care group (Wells et al., 2004).

Though missing from these studies is the impact of caregiver burden and health care utilization in the immediate postsurgical recovery phase.

Understanding the connection between caregiver burden and health care utilization is important from patient/caregiver satisfaction and cost perspectives. Emergency room use is one type of health care utilization, and emergency room visits have been steadily increasing over the last two decades (Tang, Stein, Hsia, Maselli, & Gonzales, 2010). There are several reasons why surgical patients utilize emergency room services in the immediate (up to 30 days) post operative period. These include a range of complaints that require a range of interventions from pain, post operative nausea and vomiting, fever, wound infections, and surgical complications requiring medical/surgical care (Abarca, Saclarides, & Brand, 2011). Abarca et al. (2011) conducted a retrospective review of 358 (56% confirmed cancer diagnosis) patients seen in the emergency room of a major urban academic medical center. Results of this study demonstrated that 26% of patients required medical/surgical follow up after minimally invasive surgery highlighting the potential burden to existing emergency rooms (Abarca et al., 2011).

The question of the impact of caregiver burden on emergency room visits in the immediate post surgical period has not been answered. Looking at other health care arenas, caregiver factors have been associated with increased emergency room visits. Doctoral research conducted at Walden University demonstrated that caregiver health care literacy and asthma knowledge influenced emergency room use for children (Davis, 2013). Additionally, there is growing evidence in the pediatric arena that caregiver burden has a causal relationship to emergency room utilization for children (Kelly & Hewson, 2000; Zimmer, Walker, & Minkovitz, 2006). Maternal depressive symptoms have been linked to emergency room use for children (Zimmer et al., 2006) and maternal depression and general burden have been identified with increased hospitalizations for children (Kelly & Hewson, 2000; Taft et al., 2012). Exploring if this model carries over to adult surgery may help identify caregivers unable to support the care needs of patients undergoing enhanced recovery surgery.

Conclusion

This chapter described the development of the enhanced recovery surgical model and the transition from inpatient to outpatient surgery for appropriate procedures, the safety profile of this surgical model and the required caregiver needs to support this transition. This transition from inpatient to outpatient surgery has been possible due to advances across the surgical spectrum from anesthesia techniques to technology and represents state of the art thinking within the surgical profession.

The caregiver burden construct was also presented. There are many situations where caregivers are required with varying patient needs and varying levels of caregiver involvement. Caregiver burden has been extensively studied across a variety of settings but this chapter highlights the lack of evidence of how caregiver burden may play a role in surgical recovery within the enhanced recovery surgical model. Caregiver burden has been linked to other health care areas where caregiver burden is now being recognized in relation to patient health care utilization. This knowledge gap represents both an economic and social burden to caregivers and patients being cared for within this surgical model. The enhanced recovery surgical model has been shown to be surgically effective, cost effective, and increase patient satisfaction so furthering this model is important across these domains. This study may help determine if caregiver burden affects the patient's recovery within the enhanced recovery surgical model and may provide guidance as to patient/caregiver dyads appropriate for this surgical approach. Chapter 3 describes the research design, research setting, research sample, data collection, and analysis.

Chapter 3: Research Method

The purpose of this study was to determine the prevalence of caregiver burden in the enhanced recovery surgical population and to explore the relationship between caregiver demographics and caregiver burden as well as caregiver burden and potentially preventable emergency room visits during the immediate postoperative period for patients undergoing surgery within enhanced recovery pathways. Preventable emergency room visits represent a target for decreasing health care costs for this patient population as well as increasing patient and caregiver satisfaction with the surgical experience. This chapter presents the research methodology used to explore these relationships. Specific areas include the research design and rationale, study population, study instruments, participant recruitment, data management and analysis, and ethical considerations.

Research Design and Rationale

This secondary review of data from a cross-sectional study included emergency room readmission as the dependent variable; caregiver burden as the independent variable; and caregiver age, gender, relationship to patient, race, education and income as covariate variables to explore the relationship between caregiver burden and health care utilization. Emergency room visits not resulting in hospital admission are potentially preventable because they represent visits in which medical care was not required or where care could have been delivered in a lower level capacity (e.g., home, regular office visit). There were three main research questions and hypotheses used to explore these relationships:

RQ$_1$: Do caregiver demographics (gender, age, race, education, income, relationship to patient, health care experience, spirituality) predict caregiver burden within the enhanced recovery surgery pathway?

$H1_0$: Caregiver demographics do not predict caregiver burden for this caregiver population.

$H1_a$: Caregiver demographics predict caregiver burden for this caregiver population.

RQ$_2$: Does caregiver burden post patient surgery predict patient emergency room utilization within 30 days?

$H1_0$: There is no relationship between caregiver burden and emergency room utilization that does not result in hospital readmission of the patient who underwent surgery in the enhanced recovery pathway model.

$H1_a$: There is a relationship between caregiver burden and emergency room utilization that does not result in hospital readmission of the patient who underwent surgery in the enhanced recovery pathway model.

RQ$_3$: Do caregiver demographics (gender, age, race, education, income, relationship to patient, health care experience, spirituality), patient demographics (gender, age, race), cancer type, or surgical procedure predict post surgery emergency room utilization?

$H1_0$: There is no difference between caregiver burden and emergency room utilization that does not result in hospital readmission of the patient who underwent surgery in the enhanced recovery pathway model based on the demographics of the caregiver, demographics of the patient, type of patient’s cancer, or surgical procedure.

$H1_a$: There is a difference between caregiver burden and emergency room utilization that does not result in hospital readmission of the patient who underwent surgery in the enhanced recovery pathway model based on the demographics of the caregiver, demographics of the patient, type of patient’s cancer, or surgical procedure.

This study included secondary data to establish caregiver burden levels in the immediate postsurgical period for patient/caregiver pairs undergoing enhanced recovery surgery for cancer and to investigate whether caregiver demographics influenced the level of caregiver burden in this caregiver population. I also investigated the relationship between caregiver burden and emergency room utilization not resulting in hospitalization for patients undergoing enhanced recovery surgery. The retrospective cross-sectional study design allowed for measuring the prevalence of caregiver burden in this cancer population, and logistic regression was used to determine the relationship between caregiver demographics, caregiver burden, and emergency room use that does not result in inpatient admission. A cross-sectional approach was required to measure caregiver burden within the immediate post surgery period, and this approach is recognized as an appropriate way to identify outcomes associated with a specific risk factor (Schuster & Powers, 2005). This study design allowed for caregiver burden measurement at the conclusion of the immediate surgical recovery period and review of patient emergency room use.

Methodology

Population

I used secondary data collected from a cross-sectional study of cancer patients undergoing surgery in the enhanced recovery model and their caregivers. The methodology was aimed at establishing prevalence of caregiver burden in this patient population and determining the relationship between caregiver demographics, caregiver burden, and emergency room utilization not resulting in hospitalization. The dependent variable was emergency room visits not resulting in hospitalization. The independent variable was caregiver burden. Caregiver gender, age, race, education, and income as well as patient cancer type were explored as confounding variables.

The target population was cancer patients undergoing enhanced recovery surgery and their caregivers. The study setting, a major academic medical center, offered the appropriate patient/caregiver population. This academic medical center performs over 20,000 surgical procedures yearly, with approximately 6,000 of these procedures representing enhanced recovery pathway models across breast, gynecologic, head/neck, and urologic cancers. Patients are evaluated for enhanced recovery surgery models based on the type of surgery to be performed and for general appropriateness by the individual surgeons. The most common reasons for not placing a patient on these pathways are patient age, patient health, and the potential for additional surgical needs. Currently, there is no measure of caregiver burden and limited review of the ability for the caregiver to provide postsurgical care.

Sampling and Sampling Procedures

Data from the academic medical center for 2013 indicated a 10% rate of emergency room visits within 30 days of enhanced recovery surgery and an admission rate of less than 2% for this subset. Published studies indicated that up to 50% of caregivers exhibit enough caregiver burden to seek medical care for themselves. Sit et al. (2004) conducted a cross-sectional study of stroke patient caregivers that supported the notion that moderate levels of caregiver burden will result in health care utilization. To answer my research questions, I used a stratified sample from the four disease areas selected based on disease organ type (breast, prostate, thyroid, uterine cancers). Specific surgical procedures for these diseases included laparoscopic and robotic hysterectomies and prostatectomies, unilateral and bilateral mastectomies, and thyroidectomies. Both linear and logistic regressions were conducted to answer Research Questions 1, 2, and 3.

Linear regression was used to address Research Question 1. A sample size of 208 caregiver/patient pairs were required for a stratified linear regression analysis of moderate effect size at 80% power with an α level of .05 (Soper, n.d.) A moderate effect size was chosen based on caregiver research in other disease areas and the structure of the Caregiver Reaction Assessment. The difference of mild to moderate caregiver burden may result in a 2-point difference on each subscale, resulting in large overall numerical differences. Research Questions 2 and 3 were analyzed with logistic regression. LeBlanc and Fitzgerald (2000) noted that at least 30 participants per predictor should be gathered. With five total predictors for the exploratory logistic regression model to address Research Question 2, at least 150 participants were needed. This study included

220 caregiver/patient pair participants, which was larger than the required sample size for the both regression models to allow an equal distribution between the four disease types of 55 caregiver/patient pairs per group.

Data Collection

Surgical patient and caregiver pairs undergoing enhanced recovery pathway surgery at the academic medical center were given the opportunity to participate in MSKCC IRB study # 15-145. The goals of the MSKCC study were to understand factors associated with caregiver burden in this patient population. Data collected in this study included caregiver demographic information and caregiver burden. Results of this study, and access to the patient's medical records, were approved by the MSK and Walden IRBs for this retrospective cross-sectional study.

Caregiver demographics were collected on the caregiver demographic collection form (Appendix A), and caregiver burden was identified by the Caregiver Reaction Assessment (Appendix B). Trained research assistants contacted the caregiver by phone to complete both the caregiver demographic form and the Caregiver Reaction Assessment 15 days after the patient's surgery (+/- 3 day study window). Additional information was collected from the patient's medical record, including patient demographics, type of cancer, surgical information, hospitalization information (admission, discharge, surgical complications), and hospital service use for 30 days after surgery (emergency room visits).

Instrumentation

The caregiver demographic tool was used to collect information in six areas aimed at general demographics and socioeconomic status. Caregiver demographic information included date of birth (day, month, year), gender (male, female), relationship to patient (spouse, child, parent, relative, partner, other), race (American Indian/Alaskan Native, Asian, Black, Native Hawaiian/Pacific Islander, White, other, and undeclared), education level [under 12 years of school, high school or GED, some college, 2-year college/technical degree, 4-year college degree, postgraduate degree (MA/MS), advanced post graduate degree (MD/JD/PhD)], family income level (under \$50,000; \$50,000-\$100,000; \$100,001-\$125,000; \$125,001-\$150,000; \$150,001-\$175,000; \$175,001-\$200,000; and over \$200,000), health care experience (employed or not employed in a health care field), and spirituality (engage in prayer - never, monthly, weekly, several times per week, daily).

Caregiver burden was identified by the Caregiver Reaction Assessment (CRA). The CRA was first published in 1992 and focused on caregiver burden for those caring for patients with physical disabilities, Alzheimer’s disease, and cancer (Given et al., 1992). This 24-item multidimensional scale consists of four negative domains and one positive domain including caregiver’s esteem, lack of family support, impact on finances, impact on schedule, and impact on health (Given et al., 1992). The initial published study conducted on 377 cancer and Alzheimer’s disease patient/caregiver pairs indicated strong reliability with a pilot, and separate longitudinal comparisons demonstrated statistically significant chi-square results at the $p < .001$ for the individual subscales as well as the composite (Given et al., 1992). Test validity was also demonstrated against the CES-D depression scale and activities of daily living with Cronbach's alpha scores over .8 (Given et al., 1992). Given et al. concluded that the CRA is appropriate for measuring caregiver burden differences and measuring the change in caregiver burden over time. Additional studies support the feasibility and consistency of the CRA. Nijboer, Triemstra, Tempelaar, Sanderman, and van den Bos (1999) demonstrated feasibility of the CRA with a 97% completion rate. Additionally internal consistency for the CRA was demonstrated across the subscales with Cronbach's alpha scores ranging from .62 to .83 with the strongest correlations between disrupted schedule and health problems ($p < .001$) (Nijboer et al., 1999).

The CRA is a series of questions in the five domains scored on a 5-point Likert scale ranging from strongly disagree to strongly agree (Lipscomb, Gotay, & Snyder, 2005). Scores are computed at the subscale level by averaging the responses within each domain: caregiver's esteem ($n = 7$), lack of family support ($n = 5$), impact on finances ($n = 3$), impact on schedule ($n = 5$), and impact on health ($n = 4$) with scores ranging from 1 to 5 and higher scores indicating greater caregiver burden (Lipscomb et al., 2005).

The CRA has been used extensively in cancer patients within the community through end of life and has been translated and validated in multiple languages for use in measuring caregiver burden as both a self-report tool and as a guided discussion tool (Daly, Douglas, Lipson, & Foley, 2009; Milbury, Badr, Fossella, Pisters, & Carmack, 2013; Misawa et al., 2009; Nijboer et al., 1999; Tang et al., 2010; Utne, Miaskowski, Paul, & Rustøen, 2013; Yoon, Kim, Jung, Kim, & Kim, 2014). Published studies demonstrated feasibility, internal consistency, and validity of this scale (Nijboer et al., 1999) supporting the use of the CRA to measure caregiver burden in this study. The academic medical center has an unlimited license to use the CRA for research.

Data Analysis

Data for this study were examined with descriptive statistics, and hypothesis testing was analyzed using SPSS software, as noted in Table 1. All data are presented descriptively and all described analyses were conducted with 80% power to detect a statistical difference with a *p* value greater than .05. Data were analyzed as an aggregate sample as well as stratified by the four disease types of breast cancer, prostate cancer, thyroid cancer, and uterine cancer.

Table 1

Research Questions and Variable Summary

Research Question	Analysis	Independent Variable	Independent Variable Coding	Dependent Variable	Dependent Variable Coding
1	Linear regression	Race (nominal)	0 = AI/AN 1 = Asian 2 = Black 3 = NH/PI 4 = White 5 = other 6 = undeclared	Caregiver Burden (ordinal)	Ranges from 1 (no caregiver burden to 5 (high level of caregiver burden) on each of the 5 CRA subscales
		Education (ordinal)	Ranges from 0 (under 12 years) to 6 (advanced post graduate degree)		
		Family Income (ordinal)	Ranges from 0 (under $50,000) to 7 (> 200,000)		
		Health care experience (dichotomous)	0 = no 1 = yes		
		Spirituality (nominal)	0 = never 1 = monthly 2 = weekly 3 = several times per week 4 = daily		
2	Logistic regression	Caregiver Burden (ordinal)	Ranges from 1 (no caregiver burden to 5 (high level of caregiver burden) on each of the 5 CRA subscales	Emergency Room Use not resulting in inpatient admission (nominal)	0 = no emergency room use 1 = emergency room use with IPA 2 = emergency room use without IPA
3	Logistic regression	Age: Patient and Caregiver (ratio)	Ranges from 15 to 100	Emergency Room Use not resulting in inpatient admission (nominal)	0 = no emergency room use 1 = emergency room use with IPA

Table continues

Research Question	Analysis	Independent Variable	Independent Variable Coding	Dependent Variable	Dependent Variable Coding
3	Logistic regression	Gender: Patient and Caregiver (dichotomous)	0 = male 1 = female		2 = emergency room use without IPA
		Relationship to patient (nominal)	0 = spouse 1 = child 2 = parent 3 = relative 4 = partner 5 = other		
		Race: Patient and Caregiver (nominal)	0 = AI/AN 1 = Asian 2 = Black 3 = NH/PI 4 = White 5 = other 6 = undeclared		
		Education (ordinal)	Ranges from 0 (under 12 years) to 6 (advanced post graduate degree)		
		Family Income (ordinal)	Ranges from 0 (under $50,000) to 7 (> 200,000)		
		Health care experience (dichotomous)	0 = no 1 = yes		
		Spirituality (nominal)	0 = never 1 = monthly 2 = weekly 3 = several times per week 4 = daily		
		Cancer Type (nominal)	0 = Breast 1 = GYN 2 =Head/Neck 3 = Urologic		
		Cancer Procedure	Descriptive		

Research Question 1 aimed to quantify the level of caregiver burden within this patient population and determine if caregiver demographics and socioeconomic status predict caregiver burden. The rate of caregiver burden in this population was measured on the Caregiver Reaction Assessment and was described as was demographic and socioeconomic variables. Scores on this ordinal assessment are continuous (range from 0 to 5) within the five domains of caregiver's esteem, lack of family support, impact on finances, impact on schedule, and impact on health. Research Question 1 further sought to determine if caregiver demographics predict caregiver burden in this population. Linear regression was used to determine if specific caregiver demographic information (age, gender, relationship to patient, race, education level, or income level) predicts caregiver burden. For this analysis age was captured as a continuous measure and gender, relationship to patient, race, education, and income level were captured as categorical measures. Secondary analyses looking at the difference between caregiver subcategory burden scores on ≤ 2 (low caregiver burden) and ≥ 4 (high caregiver burden) were conducted using standard t tests to determine differences between these two groups.

Research Question 2 aimed to determine if caregiver burden predicts patient emergency room use within 30 days of surgery. Patient emergency room visits and subsequent patient disposition (admitted/not admitted) were captured as categorical measures (yes/no). Logistic regression was used to test the association between caregiver burden as measured by the Caregiver Reaction Assessment, emergency room use, and patient disposition.

Research Question 3 sought to determine if caregiver demographics and/or patient demographics, the patient's cancer type or the surgical procedure predict post surgical emergency room utilization and subsequent patient disposition. Caregiver demographics were operationalized similar to RQ1. Patient cancer type was determined by medical record review and was classified as categorical to the body system. Logistic regression was used to test the association between caregiver demographics, patient cancer type, emergency room use, and patient disposition.

Threats to Validity

This secondary review of data from a cross sectional study will add to the literature by presenting information about the relationship, if any, between caregiver burden and potential preventable patient emergency room utilization. This research will also present information about the level of caregiver burden in this patient population that will help inform surgeons on the appropriate patient selection for these surgical models. Frankfort-Nachmias and Nachimias (2008) noted that cross sectional methodology is used to demonstrate how variables interact. However, there were inherent threats to both external and internal validity in this study design to be addressed.

External validity refers to the generalizability of results outside of the specific study (Schuster & Powers, 2005). Recognized as a methodologic weakness in cross sectional studies, the inability of being able to establish a causal relationship allows for potential bias (Schuster & Powers, 2005). There were two main threats to external validity in this study. First, external validity may be affected by using data collected at one hospital. Schuster and Powers noted that external validity can be strengthened by including a variety of subjects and limiting enrollment criteria not related to the desired outcome. Second, there was the potential that patient/caregiver pairs will self-select out of the study due to high levels of caregiver burden. I addressed external validity by including multiple enhanced recovery surgical models and not limiting study inclusion on patient or caregiver factors to ensure a diverse set of patient/caregiver pairs.

Internal validity refers to the ability of the study to measure what it is designed to measure (Schuster & Powers, 2005). Threats to internal validity include instrumentation bias, selection bias due to non-random sampling as well as incomplete and incorrect caregiver burden data. Instrumentation bias was addressed by using a caregiver burden measurement that has been extensively studied from a reliability and validity perspective. As previously mentioned, the Caregiver Reaction Assessment has been studied extensively as a measure for caregiver burden.

The logistic regression approach for the statistical analysis has assumptions to be addressed. The main research question focused on the hypothesis that high levels of caregiver burden will predict more emergency room visits within 30 days of the patient's surgical procedure that are not medically necessary and do not result in inpatient hospital admission. Data was analyzed with logistic regression. Logistic regression is a statistical approach for studying the effects of a predictor variable an outcome (Institute for Digital Research and Education - UCLA, n.d.). The main assumption with this model is that there are no assumptions regarding normal distribution, the observations are independent of each other, and the variables are not combinations of each other; other assumptions included no missed variables and variables are measured correctly (Institute for Digital

Research and Education - UCLA, n.d.). Conclusion validity can be questioned if these assumptions are not met.

Ethical Procedures

All aspects of this study were conducted under the oversight of both the Walden University and the academic medical center institutional review boards (IRB). The secondary data used in this study was collected under the academic medical center IRB approved protocol (IRB # 15-145) and by the Walden University IRB (IRB # 08-16-16-0042020). Through the informed consent process, caregivers approved the use of the study data for other research. Due to the nature of the study, data collected during this study will not be anonymous during the data collection phase. To protect patient/caregiver information, all participants were assigned a study number. Data was stored on a password protected network drive and patient/caregiver information was maintained separately from study data. Access to data was limited to the researcher and others as required by the IRB. Data will be stored for 10 years after completion of the study, or until all secondary projects are completed. All study data was entered into Excel for data management purposes and analyzed with SPSS.

Other ethical issues to consider included conducting this research at the hospital where the researcher is employed. Current job responsibilities include supporting the successful development of the enhanced recovery pathway surgery program. While these research questions can provide valuable information to supporting the successful development of an enhanced recovery surgical program, the directionality of the results (positive or negative) do not affect the overall impact of the study. Positive results would help determine needs to support caregivers of these surgical patients and negative results would help support the argument that patients can recover successfully at home after surgery irrespective of differences in caregiver burden reducing ethical concerns regarding the researcher and the study.

Summary

The purpose of this study was to determine the prevalence of caregiver burden in this patient population and explore the relationship of caregiver burden to the enhanced recovery surgery patient's emergency room utilization in the first 30 days after surgery. This retrospective cross sectional study answered the questions of levels of caregiver burden in this population and if increased emergency room use not resulting in inpatient admission is correlated with caregiver burden or other caregiver demographics. To address these questions 220 patient/caregiver pairs were planned to be enrolled. Caregiver burden was measured with a published, validated questionnaire 15 days after the patient's surgery and patient outcomes will be followed for 30 days post surgery. Descriptive statistics and logistic regression were used to describe and explore these relationships.

This study provided information on patient/caregiver pairs best suited to undergo enhanced recovery surgery to maximize wellbeing for both the surgical patient and caregiver as well as identify patient/caregiver pairs who are more at risk for unnecessary emergency room use. This chapter introduced the study and outlined the research design, methodology, instrumentation, data analysis plan, and ethical considerations. Chapters 4 and 5 will present the results, conclusions, and recommendations of this study.

Chapter 4: Results

The purpose of this retrospective cross-sectional study was to determine the prevalence of caregiver burden in the enhanced recovery surgical population and to explore the relationship between caregiver demographics, caregiver socioeconomic status, and patient demographics to potentially preventable emergency room visits during the immediate postoperative period for patients undergoing surgery within enhanced recovery pathways. The null hypothesis for this study was that caregiver demographics would not predict caregiver burden in this patient population. The alternative hypothesis was that caregiver demographics would predict caregiver burden in this patient population, and subsequently caregiver burden would predict potentially preventable emergency room visits in the first 30 days following enhanced recovery short stay surgery. Due to significant enrollment delays in the study supplying data for this research, only the urologic cohort is presented. This chapter includes descriptive analyses, correlation and regression analyses, and a summary of findings.

Conceptual Base

The conceptual construct used for this study was Andersen’s behavioral model of health services utilization. For this study, predisposing factors (caregiver and patient demographics and caregiver socioeconomic status) and needs factors (caregiver burden) were evaluated to determine the likelihood that a patient would use health care services (emergency room) during the first 30 days following enhanced recovery short stay surgery. Andersen’s model was used to determine factors that may lead to a person choosing to seek medical care and whether caregiver burden was a factor in postsurgical health care utilization.

Analysis: Research Question 1

RQ_1: Do caregiver demographics (gender, age, race, education, income, relationship to patient, health care experience, spirituality) predict caregiver burden within the enhanced recovery surgery pathway?

$H1_0$: Caregiver demographics do not predict caregiver burden for this caregiver population.

$H1_a$: Caregiver demographics predict caregiver burden for this caregiver population.

Research Question 1 addressed the level of caregiver burden within this patient population to determine whether caregiver demographics and socioeconomic status predicted caregiver burden. The rate of caregiver burden in this population was measured using the Caregiver Reaction Assessment. Scores on this ordinal assessment are continuous (ranging from 1 to 5) within the five domains of caregiver's esteem, lack of family support, impact on finances, impact on schedule, and impact on health. Research Question 1 further sought to determine if caregiver demographics predicted caregiver burden in this population.

Descriptive Statistics

Forty five urologic patient/caregiver pairs consented to the parent study MSK IRB 15-145. Twenty eight patient/caregiver pairs (62%) completed all study requirements and were analyzed for this study. Of the remaining 17 patient/caregiver pairs, one caregiver did not provide enough information for the Caregiver Reaction Assessment to be scored, two caregivers declined to provide demographic information, and the 14 remaining caregivers did not complete the post surgery interview. Demographic information on all 45 patient/caregiver pairs is presented below.

As described in Chapter 3, data were transformed into categorical values for analysis. Specific coding included gender (female = 1, male = 0), relationship to patient (spouse = 0, child = 3, partner = 4), race (Black = 2, White = 4, other = 5), education (1 = under 12 years of school, 2 = high school or GED degree, 3 = some college, 4 = 2-year college/technical degree, 5 = 4-year college degree, 6 = postgraduate degree [MA/MS], 7 = advanced post graduate degree [MD/JD/PhD]), family income (1 = under $50,000; 2 = $50,000-$100,000; 3 = $100,001-$125,000; 4 = $125,001-$150,000; 5 = $150,001-$175,000; 6 = $175,001-$200,000; 7 = over $200,000), employed in a health care field (1 = yes, 0 = no), use of prayer (0 = never, 1 = less than once a month, 2 = once a week, 3 = several times per week, 4 = daily).

Descriptive, statistical, and group difference *t*-test and chi-square statistics were run using Statistical Package for the Social Sciences (SPSS) Version 24. Descriptive statistics are presented as means and frequencies. All statistical tests were evaluated with an alpha level of .05 with a 95% confidence level. There was a statistically significant difference in the age of the caregivers who completed the study requirements and those who did not ($p = .04$). There were no other statistical differences between the caregiver/patient pairs who completed all study 15-145 requirements and those who did not. Table 2 presents the descriptive statistics of the patient/caregiver pairs used in this analysis and the difference between this cohort and the patient/caregiver pairs that did not provide enough data for analysis.

Table 2

Patient and Caregiver Demographics

	Completed Study 15-145	*N*	(%)	Did Not Complete Study 15-145	*N*	(%)	*p*
Caregiver							
N	28			17			
Age	60 (44-71)			52 (31-70)			.04
Gender	Female	28	(100%)	Female	17	(100%)	
Relationship to Patient	Spouse	28	(100%)	Spouse	12	(71%)	
	Partner	0	(0%)	Partner	2	(12%)	
	Child	0	(0%)	Child	1	(6%)	
	Not Reported	0	(0%)	Not Reported	2	(12%)	
Race	White	25	(89%)	White	14	(82%)	.16
	Black	2	(7%)	Black	0	(0%)	
	Other	1	(4%)	Other	1	(6%)	
	Not Reported	0	(0%)	Not Reported	2	(12%)	
Education Level	< 12 Years of School	0	(0%)	< 12 Years of School	0	(0%)	.16
	High School/GED	4	(14%)	High School/GED	1	(6%)	
	Some College	0	(0%)	Some College	1	(6%)	
	2 Yr College/Technical	2	(7%)	2 Yr College/Technical	3	(18%)	
	4 Yr College	11	(39%)	4 Yr College	3	18%)	
	Post Graduate (MA/MS)	9	(32%)	Post Graduate (MA/MS)	6	(35%)	
	Advanced Post Graduate (MD/JD/PhD)	2	(7%)	Advanced Post Graduate (MD/JD/PhD)	1	(6%)	
	Not Reported	0	(0%)	Not Reported	2	(12 %)	
Family Income	< $50,000	3	(11%)	< $50,000	2	(12%)	.16
	$50,000-$100,000	1	(4%)	$50,000-$100,000	1	(6%)	
	$100,000-125,000	3	(11%)	$100,000-125,000	3	(17%)	
	$125,001-$150,000	3	(11%)	$125,001-$150,000	1	(6%)	
	$151,000-$175,000	2	(7%)	$151,000-$175,000	1	(6%)	
	$175,001-$200,000	2	(7%)	$175,001-$200,000	0	(0%)	
	Over $200,000	11	(39%)	Over $200,000	7	(41%)	
	Not Reported	3	(11%)	Not Reported	2	(12%)	
Employed Health care	Yes	2	(7%)	Yes	3	(18%)	.16
	No	26	(93%)	No	11	(65%)	
	Not Reported	0	(0%)	Not Reported	3	(18%)	
Use of Prayer	Never	5	(18%)	Never	3	(18%)	.16
	< Once a Month	2	(7%)	< Once a Month	1	(6%)	
	Once a Week	4	(14%)	Once a Week	1	(6%)	
	Several times per Week	2	(7%)	Several times per Week	0	(0%)	
	Daily	14	(50%)	Daily	9	(53%)	
	Not Reported	1	(4%)	Not Reported	3	(18%)	

Table continues

	Completed Study 15-145	*N* (%)	Did Not Complete Study 15-145	*N* (%)	*p*
Patient					
N	28		16		
Age	63 (43-73)		NA		
Gender	Male	28 (100%)	Male	16 (100%)	

Data on 28 urologic patient/caregiver pairs were used to answer Research Question 1. All of the caregivers were female and self-identified as patient spouses. The mean age of the caregivers was 60 years (range 44 to 71), and the mean age of the patients was 63 (range 43 to 73). Eighty nine percent of the caregivers were White, 7% were Black, and one (4%) identified as other. Seventy eight percent of the caregivers had completed a 4-year college degree, postgraduate degree, or advanced postgraduate degree, and 39% of the caregivers indicated family income of over $200,000 per year. Fifty percent of caregivers reported use of prayer daily, and 93% were not employed in a health care field.

Caregiver Reaction Assessment

The CRA was used to identify the level of caregiver burden in this patient population. The CRA consists of five subscales, four of which are negative and one positive. The negative subscales have higher scores indicating higher level of burden, rated from 1 (strongly disagree) to 5 (strongly agree). The four negative subscales are impact on schedule, impact on health, lack of family support, and impact on finances. The positive subscale, caregiver’s self-esteem, has lower scores indicating higher levels of burden rated from 1 (strongly disagree) to 5 (strongly agree). Results of the CRA subscales are presented in Table 3.

Table 3

Caregiver Reaction Assessment

	Caregiver's Self Esteem	Lack of Family Support	Impact on Finances	Impact on Schedule	Impact on Health
Caregiver					
N	28	28	28	28	28
Score	3.81	1.79	2.21	3.18	3.35
Range	2.57-4.43	1.20-3.00	.33-3.67	1.80-5.00	2.43-4.75
Std Deviation	.45	.40	.71	.88	.55

Results of this analysis demonstrated measurable caregiver burden in two of the five subscales: impact on schedule (μ = 3.18) and impact on health (μ = 3.35). Individual item scores indicated that all of the questions in the schedule category with the exception of bothered by constant interruptions demonstrate high levels of burden. The specific questions asked in the impact on schedule subscale included the topics of activity centered on providing care (μ = 3.93), need to stop work to provide care (μ = 3.19), spent less time with family and friends (μ = 3.25), eliminated plans during the caregiving period (μ = 3.43), and care resulted in constant interruptions (μ = 2.32). The specific questions asked in the impact on health category centered on tiredness (μ = 2.86), worsening health (μ = 1.68), enough physical strength to provide care (μ = 4.36), and whether the caregiver felt he or she was healthy enough to provide care (μ = 4.46). Table 4 presents the individual item results for the subscales of impact on schedule and impact on health.

Table 4

Caregiver Reaction Assessment Subscale Mean Results Impact on Schedule and Impact on Health

Impact on Schedule	μ	Impact on Health	μ
Individual Items	*N* = 28	Individual Items	*N* = 28
Stop work to provide care	3.19	Have enough physical strength	4.36
Eliminate things from schedule	3.43	Healthy enough to provide care	4.64
Activities centered on providing care	3.93	Health has gotten worse	1.68
Visit with friends/family less	3.25	Tired all the time	2.86
Constant interruptions	2.32		

Correlation coefficients were reviewed and linear regression was used to determine whether specific caregiver demographic information (age, gender, relationship to patient, race, education level, or income level) predicted caregiver burden. For this analysis age was captured as a continuous measure, and gender, relationship to patient, race, education, and income level were captured as categorical measures with caregiver burden as measured by the CRA as the dependent variable and caregiver demographic/ socioeconomic factors as the independent variable. Results of these analyses did not indicate statistically significant predictive factors for CRA subscales of impact on health or impact on schedule where caregiver burden was identified, or for the subscales of caregiver's self-esteem or lack of family support. However, the association of family income and impact on finance was significant ($p = .01$). Other significant correlations included caregiver education level and family income ($p = .02$). Caregiver education levels and impact on schedule may be trending toward significance (p = .10). Table 5 presents the Pearson correlations associated with Research Question 1 for the CRA.

Table 5

Caregiver Reaction Assessment Pearson Correlations

	Caregiver's Self Esteem		Lack of Family Support		Impact on Finances		Impact on Schedule		Impact on Health	
Caregiver										
Pearson Correlation (p)										
Age	-.04	(.85)	.01	(.94)	.09	(.65)	-.26	(.19)	-.10	(.59)
Gender*	-		-		-		-		-	
Relationship to Patient*	-		-		-		-		-	
Race	.15	(.46)	.13	(.52)	.18	(.36)	-.08	(.69)	.01	(.97)
Education	-.04	(.82)	.08	(.69)	-.27	(.17)	.317	(.10)	.11	(.59)
Family Income	-.17	(.43)	-.23	(.27)	-.49	(.01)	.30	(.14)	.21	(.31)
Health care Experience	.16	(.41)	-.14	(.49)	.05	(.81)	-.28	(.15)	-.12	(.55)
Use of Prayer	.01	(.95)	.28	(.15)	-.23	(.25)	.06	(.76)	-.13	(.52)

Note. All caregivers were female and identified as patient spouse.

Linear regression was used to examine the relationship between caregiver demographic/socioeconomic factors and caregiver burden as measured by the Caregiver Reaction Assessment subscales of impact on finance, impact on schedule, and impact on health. The CRA subscales of impact on schedule and impact on health identified caregiver burden and there was a statistically significant correlation between family income and the CRA subscale of impact on finance. The regression analysis confirmed the relationship between family income (independent variable) and CRA subscale impact on finance (dependent variable) (r^2 = .235, f = 7.06, t = 2.66, p = .01). The remaining caregiver demographics were not related to the impact on finance CRA subscale. The remaining caregiver demographic/ socioeconomic factors were not related to the impact on schedule or impact on health CRA subscales. Table 6 presents the linear regression analysis for Research Question 1 for the CRA subscale impact on finance and caregiver family income.

Table 6

Linear Regression CRA Impact on Finance and Caregiver Socioeconomic Status

		r^2	Adjusted r^2	*f*	*t*	*p*
Caregiver Variable	CRA Subscale					
Family Income	Impact on Finance	.235	.202	7.06	-2.66	.01

Analysis: Research Question 2

RQ$_2$: Does caregiver burden post patient surgery predict patient emergency room utilization within 30 days?

$H1_0$: There is no relationship between caregiver burden and emergency room utilization that does not result in hospital readmission of the patient who underwent surgery in the enhanced recovery pathway model.

$H1_a$: There is a relationship between caregiver burden and emergency room utilization that does not result in hospital readmission of the patient who underwent surgery in the enhanced recovery pathway model.

Research Question 2 addressed whether caregiver burden predicted patient emergency room use not resulting in inpatient admission within 30 days of surgery. For this analysis, patient emergency room visits and subsequent patient disposition (admitted /not admitted) were captured as categorical measures (yes/no).

Of the 28 patient/caregiver pairs who completed the study requirements, six had emergency room visits during the 30-day period immediately following surgery. Of those six patients, two were subsequently admitted to the hospital. One was readmitted for urinary retention and underwent cystoscopy, and the other was admitted to fix a hernia that was discovered during the patient's prostatectomy.

Correlation coefficients were reviewed and logistic regression were used to test the association between caregiver burden as measured by the Caregiver Reaction Assessment, emergency room use, and patient disposition. Pearson correlation demonstrated a statistically significant associated between caregiver self-esteem and emergency room use not resulting in inpatient admission (*p* = .05). There were no other statistically significant correlations between emergency room use and caregiver burden as measured by the Caregiver Reaction Assessment. Table 7 presents the Pearson correlations and logistic regressions associated with Research Question 2 for emergency room use and the Caregiver Reaction Assessment.

Table 7

Pearson Correlations Emergency Room Use Not Resulting in Inpatient Admission

	Pearson Correlation	*p*
Caregiver Reaction Assessment		
Caregiver's Self Esteem	.37	.05
Lack of Family Support	.15	.45
Impact on Finances	.07	.72
Impact on Schedule	-.25	.20
Impact on Health	-.12	.52

Logistic regression was used to confirm the association between emergency room use not resulting in an inpatient admission and caregiver burden as measured by the

Caregiver Reaction Assessment. The CRA subscale of caregiver self-esteem approached significance (*p* = .06) suggesting that the CRA subscale of caregiver self-esteem may inversely predict emergency room use in the first 30 days after surgery. However it is difficult to draw conclusions from this analysis due to the small sample size. Table 8 presents the results of the logistic regression analysis associated with research question 2.

Table 8

Logistic Regression CRA Subscales and Emergency Room Use not resulting in Hospital Admission

		B	S.E.	*Wald*	*p*
CRA Subscale	Emergency Room Visit not resulting in Inpatient Admission				
Caregiver Self Esteem		4.07	2.16	3.57	.06
Impact on Family Support		.488	1.54	.100	.75
Impact on Finance		-.640	1.14	.314	.57
Impact on Schedule		.032	.81	.002	.97
Impact on Health		-2.43	1.71	2.02	.16

Analysis: Research Question 3

RQ_3: Do caregiver demographics (gender, age, race, education, income, relationship to patient, health care experience, spirituality), patient demographics (gender, age, race), cancer type, or surgical procedure predict post surgery emergency room utilization?

$H1_0$: There is no difference between caregiver burden and emergency room utilization that does not result in hospital readmission of the patient who underwent surgery in the enhanced recovery pathway model based on the demographics of the caregiver, demographics of the patient, type of patient’s cancer, or surgical procedure.

H1_a: There is a difference between caregiver burden and emergency room utilization that does not result in hospital readmission of the patient who underwent surgery in the enhanced recovery pathway model based on the demographics of the caregiver, demographics of the patient, type of patient's cancer, or surgical procedure.

Research Question 3 looked to determine if caregiver demographics and/or patient demographics, the patient's cancer type or the surgical procedure predict post surgical emergency room utilization and subsequent patient disposition. For this patient/caregiver cohort all patients were male, had a diagnosis of prostate cancer and underwent robotic prostatectomy. Therefore, the only patient demographic measure presented is age. For this analysis caregiver and patient age were captured as continuous measures and gender, relationship to patient, race, education, and income level were captured as categorical measures.

As described in Chapter 3, and presented earlier in this chapter, data were transformed into categorical values for analysis. Specific coding included gender (female = 1, male = 0), relationship to patient (spouse = 0, child = 3, partner = 4), race (Black = 2, White = 4, other = 5), education (1 = under 12 years of school, 2 = high school or GED degree, 3 = some college, 4 = 2-year college/technical degree, 5 = 4-year college degree, 6 = postgraduate degree [MA/MS], 7 = advanced post graduate degree [MD/JD/PhD]), family income (1 = under $50,000; 2 = $50,000-$100,000; 3 = $100,001-$125,000; 4 = $125,001-$150,000; 5 = $150,001-$175,000; 6 = $175,001-$200,000; 7 = over $200,000), employed in a health care field (1 = yes, 0 = no), use of prayer (0 = never, 1 = less than once a month, 2 = once a week, 3 = several times per week, 4 = daily).

Pearson correlations and logistic regression were used to test the association between caregiver demographics, patient age, emergency room use, and patient disposition. There was an association between caregiver education and emergency room use not resulting in inpatient admission. No other correlations suggested relationships between caregiver demographic/ socioeconomic status and patient age. Table 9 presents the Pearson correlations associated with Research Question 3 for emergency room use and patient/caregiver demographics.

Table 9

Pearson Correlations Caregiver Demographic & Socioeconomic Status, Patient Age, Emergency Room Use not Resulting in Inpatient Admission

		Emergency Room Visit Resulting in Admission	
		Pearson Correlation	*p*
Caregiver			
	Age	.31	.11
	Race	.08	.69
	Education	-.50	.01
	Family Income	-.25	.23
	Health care Experience	.28	.14
	Use of Prayer	-.11	.59
Patient			
	Age	.23	.25

Logistic regression was used to confirm there was no statistical difference between emergency room use not resulting in an inpatient admission and caregiver demographic/socioeconomic status and patient age. Table 10 presents the results of the logistic regression analysis associated with research question 3.

Table 10

Logistic Regression Demographic & Socioeconomic Status, Patient Age, Emergency Room Use not Resulting in Inpatient Admission

		B	*S.E.*	*Wald*	*p*
Caregiver	Emergency Room Visit not resulting in Hospital Admission				
Age		-.06	.28	.041	.84
Race		-9.52	17422.6	.000	1
Education		-23.17	6713.4	.000	1
Family Income		11.11	3356.7	.000	1
Health care Experience		35.12	49266.8	.000	1
Use of Prayer		.08	.53	.024	.88
Patient					
Age		.36	.49	.56	.46

Summary of Findings

The main objective of this study was to determine if there was a relationship between caregiver demographics, socioeconomic status and caregiver burden in the ambulatory extended recovery surgical pathway and to determine if caregiver burden predicted post surgical health care utilization.

From the demographic and socioeconomic descriptive statistics, this caregiver population is predominantly white, well-educated, has a high annual income, and engages regularly in faith based activities. The analysis of the Caregiver Reaction Assessment demonstrated that caregiver burden is measurable in this surgical patient population in the scale domains of impact on schedule (μ = 3.18) and impact on health (μ = 3.35). The remaining scale domains of impact on finances (μ = 2.21), lack of family support (μ = 1.79) and caregiver's esteem (μ = 3.81) demonstrated little to no caregiver burden in this patient population. Within the CRA subscale of impact on schedule, 4 of the 5 questions demonstrated high levels of caregiver burden (> 3) indicating that caregivers in this patient population spent considerable time providing care within the first two weeks after the patient’s surgery.

Pearson correlation coefficients and linear regression were used to test for a relationship between caregiver demographics and caregiver socioeconomic status against caregiver CRA subscales. Results indicate no statistical associations between caregiver demographics and the CRA subscales of impact on schedule and impact on health where the most burden was measured. However, there was a statistically significant association between family income and the CRA subscale of impact on finances (*p* =.01). This result indicated that the high socioeconomic status of this caregiver cohort may protect against financial caregiver burden. Lastly, caregiver education level and CRA impact on schedule suggest a trend toward significance (*p* = .10).

Next, Pearson correlation coefficients and logistic regression were used to test for a relationship between the CRA subscales against emergency room use not resulting in an inpatient admission. Pearson correlation demonstrated a statistically significant associated between the CRA subscale caregiver self-esteem and emergency room use not resulting in inpatient admission (*p* = .05) which approached significance on logistic regression (*p* = .06). This finding may represent a protective factor where caregivers who score high on the CRA subscale of caregiver self-esteem use the emergency room less in the first 30 days following surgery. Results indicate no other statistical associations the CRA subscales, emergency room use and patient disposition.

Lastly, Pearson correlation coefficients and logistic regression were used to test for a relationship between caregiver demographics, caregiver socioeconomic status and patient age against emergency room use not resulting in an inpatient admission in the first 30 days following surgery. Pearson correlation demonstrated a statistically significant association between the CRA subscale of caregiver education and emergency room use not resulting in inpatient admission (*p* = .01). However, logistic regression did not support this association. Results indicate no other statistical associations between caregiver demographics, caregiver socioeconomic status, patient age and emergency room use resulting in patient's not being admitted to the hospital. While caregiver burden can be measured in this patient population, it is difficult to make any statements about the relationship of caregiver demographics, socioeconomic status and patient demographics to emergency room use not resulting in patient admission due to the small sample size.

Chapter five includes further discussion, recommendations for future research and interpretations of findings.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this retrospective cross-sectional study was to determine the prevalence of caregiver burden in the enhanced recovery surgical population and to explore the relationship between caregiver demographics and patient demographics and potentially preventable emergency room visits during the immediate postoperative period for patients undergoing surgery within enhanced recovery pathways. The main study hypothesis was that caregiver demographics would not predict caregiver burden in this patient population or predict emergency room use in the first 30 days after surgery not resulting in an inpatient admission.

The study caregiver population was mostly White, well educated, high income, and regularly participated in faith-based prayer. This study demonstrated caregiver burden can be measured in two domains of the Caregiver Reaction Assessment (CRA): impact on schedule and impact on health. Other results demonstrated a protective effect against caregiver burden measured by the CRA domain of impact on finances and possibly a protective effect against caregiver burden measured by the CRA domain of caregiver self-esteem and emergency room use not resulting in inpatient hospital admission. No other relationships between caregiver demographics, patient age, and caregiver burden were identified. This chapter presents the interpretation of results for the urologic cohort of this study as well as study limitations, recommendations for future research, and conclusions.

Interpretation of Results

Sundbom and Hedberg (2016) noted that minimally invasive surgery is now the norm in the eyes of surgeons and patients. Enhanced recovery surgical models have continued to develop, and recent literature has indicated the safety profile of this approach across diseases (Atashkhoei, Bilehjani, Nazari, & Fakhari, 2016; Brix, Thillemann, & Nikolajsen, 2016). Nelson et al. (2016) noted that this surgical approach has significantly reduced length of hospital stay and complications in colon cancers and has provided guidelines for gynecologic cancers. Chen, Zou, Chen, Huang, and Li (2015) conducted a meta-analysis of randomized clinical trials between 1995 and 2013 for enhanced recovery technique in gastric surgery. Results matched other studies demonstrating reduced hospitalization without effecting morbidity, mortality, and rehospitalization rates (Chen et al., 2015). Chen et al. concluded that this is an appropriate surgical management approach with selected patient populations. The overall acceptance of this surgical approach has led to the development of the Enhanced Recovery after Surgery Society.

Caregiver Burden

As previously discussed, caregiver burden has been an established construct and has been studied in a variety of chronic disease settings. Kim, Carver, Shaffer, Gansler, and Cannady (2015) noted that cancer caregivers exhibit long-term health risks. Acting as a caregiver has been linked to increased heart disease, stroke, and mortality (Haley et al., 2010; Schulz & Beach, 1999; Zhu et al., 2015). Oakley et al. (2015) conducted a study of 48 geriatric gynecologic patient/caregiver pairs. Results indicated caregiver burden 2 weeks after surgery, and Oakley et al. noted the need to council caregivers regarding the post surgery recovery period.

There is little information about the level of caregiver burden in the enhanced recovery surgical model and less information about the relationship of caregiver burden on emergency room utilization within this surgical pathway. Krogsgaard, Dreyer, Egerod, and Jarden (2014) conducted a hermeneutic phenomenological study of seven colon cancer patients undergoing enhanced recovery surgery. Results indicated that recovery continues at home and patients may experience a wide range of postoperative symptoms (Krogsgaard et al., 2014). Results of my study presented in Chapter 4 support these findings based on measurable caregiver burden.

Caregiver burden was identified by the CRA in the areas of impact on schedule and impact on health. Scores on these two subscales demonstrated moderate caregiver burden. Maguire, Hanly, Hyland, and Sharp (2016) found similar results studying caregiver burden in colorectal cancer patients with the caregiver burden measured in the CRA subscales of impact on schedule and impact on health demonstrating that caregivers report disruption to their normal routines to provide care for enhanced recovery surgical patients and raise concerns over their health during the caregiving period.

The remaining CRA subscales of caregiver self-esteem, lack of family support, and impact on finance demonstrated minimal caregiver burden in this patient population. In this study, there was a relationship between family income and the CRA impact on finance subscale ($p = .01$), and the regression analysis confirmed the relationship between family income (independent variable) and CRA subscale impact on finance (dependent variable) (*p* = .01). These results show that the high socioeconomic status of this caregiver population reduced the amount of caregiver burden resulting from health care financial concerns.

Low caregiver burden focused on health care finances is in contrast to other published studies examining caregiver burden in cancer patients. Azzani, Roslani, and Su (2016) studied a cohort of cancer patients in all stages of disease. Results indicated that most cancer patients were concerned about paying for cancer care and needed to use income and savings to pay for care (Azzani et al., 2016). Additionally, Maguire et al. (2016) found significant caregiver burden as measured on the CRA subscale of impact on finances with burden due to finances being equal to burden due to caregiver health in the studied group. Stage of disease may play a role with financial concerns later in the course of the disease, but this should be further explored.

Other factors to note in this caregiver population included the high education level and the correlation between caregiver education level and family income (*p* = .02). The correlation between caregiver education level and CRA subscale impact on schedule may be trending toward significance (*p* = .10). Linear regression was used to examine the relationship between caregiver demographic factors and caregiver burden as measured by the CRA subscales of impact on finance, impact on schedule, and impact on health. The remaining caregiver demographics were not related to any of the CRA subscales.

Emergency Room Utilization

Research Questions 2 and 3 addressed the relationship between caregiver demographics, patient demographics, and caregiver burden and the association with emergency room utilization in the first 30 days following surgery. Bonin-Guillaume et al. (2015) identified caregiver burden as a predictive factor of unplanned patient hospitalizations following emergency room visits. Vashi et al. (2013) conducted a study of 4,028,555 patients discharged from acute care hospitals in three states. Within this patient cohort, 18% of patients required medical care within 30 days of discharge, and 40% of those encounters were in emergency rooms (Vashi et al., 2013). Peter et al. (2011) demonstrated that improved care coordination reduced emergency room visits, inpatient admissions, and length of stay for children with significant care needs. These studies all support the role that emergency rooms play in providing health care, and that caregiver burden and caregiver support may help to reduce emergency room visits.

My study provides support for the role of the caregiver, and caregiver burden, in helping to reduce emergency room utilization that does not result in inpatient admission and could represent care that could be provided at a clinic visit or other less costly setting. Results of this study indicated a statistically significant correlation for Research Question 2 between the CRA subscale of caregiver self-esteem and emergency room utilization not resulting in inpatient admission ($p = .05$). The CRA subscale of caregiver self-esteem is the positive subscale in which higher scores indicate less caregiver burden suggesting a protective effect in this relationship. The results indicated that caregivers who endorsed wanting to provide care, who felt that caregiving was important, who enjoyed providing care, and who did not resent having to provide care were less likely to visit the emergency room for a visit that did not result in an inpatient admission within 30 days of surgery. Regression analysis was used to confirm this association, which approached significance ($p = .06$).

Research Question 3 addressed predictive variables of caregiver demographics and patient demographics to emergency room utilization not resulting in inpatient admission within the first 30 days after surgery. Results indicated a statistically significant negative correlation between caregiver education level and emergency room utilization not resulting in inpatient admission ($p = .01$), identifying a possible protective factor. Regression analysis was used to further test this association, and no statistically significant results were found. No additional predictive variables were identified.

Limitations of the Study

There are inherent limitations in both cross-sectional and retrospective study designs. The cross-sectional design is observational and is not able to determine cause and effect (Schuster & Powers, 2005). The premise behind cross-sectional designs is to observe and report on a representative sample (Sedgwick, 2014) and to allow statements about associations to a specific event (Carlson & Morrison, 2009). Cross-sectional studies are used to evaluate a large sample to allow for generalization to the population under study (Carlson & Morrison, 2009; Sedgwick, 2014). Additional limitations in both the cross-sectional and retrospective designs are lack of participant response and potential incorrect participant response (Schuster & Powers, 2005; Sedgwick, 2014).

For this study, the main limitation was the reliance on previously collected data. This study required retrospective data and was therefore limited in sample size due to slow enrollment in the study providing data for this analysis. The parent study experienced significant delays due to research staff funding and the inability to accurately capture patients and caregivers during patient visits. Due to these issues, only the urologic cohort was complete 2 years after study initiation. The parent study expected to enroll about 10 patient/caregiver pairs per week for the duration of the enrollment period. In actuality, the urology cohort was able to enroll two to three patient/caregiver pairs weekly when research assistants were available, resulting in a smaller sample than originally planned affecting the analysis of Research Questions 2 and 3. The small sample presented limitations in terms of statistical power to adequately determine results. The small sample also had the potential to yield statistically significant results that were not accurate (Button et al., 2013).

A second limitation in this study was data completeness and use of retrospective hospital records. There were some instances of surgical caregivers missing data on the caregiver burden questionnaire, which resulted in these data being excluded from analysis, and instances when patients sought care outside of the hospital system where they had surgery, making these data unavailable for this study. Finally, although all patient/caregiver pairs were eligible for the enhanced recovery pathway, determination of reasons for patient/caregiver pairs not participating in the pathway was not captured.

Additional study limitations focused on the timing of caregiver burden measurement. Patients and caregivers received information on the curative aspect of surgery and the need for further cancer treatment between the time of surgery and the time of administration of the caregiver burden questionnaire. More caregiver burden may be found in those caregiver/patient pairs who need to receive additional cancer treatment.

Mental distress has also been shown to fluctuate with winter weather (Johnsen, Wynn, & Bratlid, 2012) creating the possibility that caregiver burden levels were different between caregivers who completed the parent study during winter months and those who completed the parent study during the remainder of the year.

Recommendations

The study presented options for future research in multiple areas including the prevalence of caregiver burden in the enhanced recovery model, the role of caregiver burden in emergency room utilization in the first 30 days after surgery, and how to best support caregivers to improve the patient/caregiver surgical experience. Caregiver burden was measured within the urologic cohort, but enrollment in the main study did not allow for measurement of caregiver burden in the other three disease areas (breast cancer, gynecologic cancer, and thyroid cancer). Caregiver burden may be different across these groups and should be explored to better understand the prevalence of caregiver burden in the enhanced recovery surgical model. The study results indicated a protective relationship between high socioeconomic status and financial caregiver burden. This finding contradicts other published research and should be further explored. Additionally, patients in this urologic cohort were discharged with catheters, which represents an area for further study to determine whether catheter maintenance at home influences caregiver burden during home-based recovery.

Although it was difficult to examine associations between caregiver burden and caregiver/patient characteristics and emergency room utilization not resulting in inpatient admission due to the small sample size, the research presented here should be followed with future work on understanding the influence of caregiver self-esteem and use of medical services. This study demonstrated associations between caregiver education and caregiver financial status, caregiver education and impact on schedule, and caregiver education and emergency room utilization not resulting in inpatient admission. The results indicated a protective effect against high levels of caregiver burden due to education level, socioeconomic status, and self-esteem in this caregiver cohort that should be studied in different settings.

The study should be followed with research aimed at reducing caregiver burden in this surgical population and providing additional support to caregivers in this patient population. Study participants self-reported significant use of prayer with over 70% of caregivers engaging in prayer weekly or more frequently, highlighting one area where interventions could be developed to further support caregivers. Condon, Lycan, Duncan, and Bushnell (2016) studied a nurse-led program to reduce readmissions in stroke patients that included nurse practitioner phone calls within 2 days after discharge as well as structured visits for patients within 30 days. Results indicated that patients who received phone calls were more likely to show up for follow-up visits, and those who showed for follow-up visits were less likely to be readmitted to the hospital (Condon et al., 2016). Piette et al. (2015) studied an interactive voice response approach that provided post hospitalization care information to better support caregivers and patients in a proactive fashion that fully involved the informal caregiver to reduce caregiver burden and stress. Patients undergoing enhanced recovery surgery also received phone calls and follow-up visits, but research on how to provide additional support from a faith-based perspective and how to further engage the communication between the medical team and the informal caregiver is warranted.

Implications

The findings from my study affect positive social change by working to improve the overall experience of patients undergoing surgery in an enhanced recovery model and their associated caregivers. By understanding the level of caregiver burden in this enhanced recovery surgical population and identifying what impact caregiver burden may have on the use of health care resources in the immediate post surgical period of the surgical patient directly supports the overall recovery of the patient and potentially identifies an approach to reduce unnecessary health care costs by reducing unnecessary emergency room utilization. As technological changes in both surgical and patient management have resulted in a shift away from inpatient hospital stays following surgery, the burden of care has shifted from skilled to non-skilled support. Understanding the level and impact of caregiver burden can provide insight on how to improve the patient recovery process and how to best support patients and their caregivers once at home.

Results demonstrated that caregiver burden does exist in the urologic patient cohort undergoing enhanced recovery surgery. If a significant relationship between caregiver burden and caregiver or patient demographics and socioeconomic status had been found, it would allow for physicians to pre-identify caregiver/patient pairs most at risk for high levels of burden, requiring more support in the post surgical period. And if a relationship between caregiver demographics and socioeconomic status, patient demographics, caregiver burden and emergency room use there would be a way to pre-identify patients most at risk for using emergency rooms allowing for more directed support in the post surgical period potentially identifying issues sooner, redirecting caregivers and patients to the physician's office and decreasing emergency services and cost.

The conceptual framework for this study was Andersen's behavioral model of health services utilization. Andersen's model looks at factors that lead individuals to seek, or not seek, medical care (Andersen, 1995). The model is built on three primary factors that lead to health care utilization; predisposing factors, enabling factors, and needs factors. Predisposing factors consist of demographic, social and mental status of the person seeking or not seeking care (Andersen, 1995). Enabling factors consist of income, presence of regular medical care, ease of seeking medical care, ease of obtaining medical care, and cost of medical care (Andersen, 1995). Needs factors consist of the individual's perceived need for care as well as the medically documented need for care (Andersen, 1995). Prior to this study Andersen's model had not been used to study emergency room utilization based on caregiver burden. Results of my study support that Andersen's factors may impact the decision to seek, or not seek emergency room care in the first 30 days after undergoing enhanced recovery surgery.

Lastly, findings from this study provide information that has not been previously available in this patient population published research. Additional research should be conducted in the other disease areas where enhanced recovery surgery is performed to determine if there are any differences between groups. Further research should also be conducted on a greater number of caregiver and patient pairs to adequately address Research Questions 2 and 3 in this study.

Conclusions

This novel study measured caregiver burden in the urologic short stay enhanced recovery surgical pathway and tested potential relationships between caregiver demographics, caregiver socioeconomic status, patient demographics, and emergency room use within the first 30 days following surgery not resulting in inpatient admission. Previously, there was no published data exploring the existence of caregiver burden in this patient population prompting this research.

Results of this research demonstrate measurable caregiver burden in two domains, Caregiver Reaction Assessment impact on schedule and impact on health. Additionally, the high socioeconomic status of the caregivers studied demonstrated a protective effect against caregiver burden related to impact on finances as measured by the Caregiver Reaction Assessment. No other relationships were found between caregiver demographics/socioeconomic status and caregiver burden nor was a relationship found between caregiver burden and emergency room use within the first 30 days following surgery that did not result in an inpatient admission or with caregiver demographics/socioeconomic status, patient demographics, and emergency room use within the first 30 days following surgery that did not result in an inpatient admission.

Other findings include that this caregiver cohort engaged regularly in prayer, representing an avenue of potential caregiver support. This, along with the study limitations discussed above, present avenues for future research to further explore caregiver burden and its impact on the patient/caregiver recovery process in this surgical population.

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Appendix A: Caregiver Demographics

1. Date of Birth	_ _/_ _ _/_ _ _ _ (DD/MMM/YYYY)
2. Gender (circle one)	M F
3. Relationship to Patient (circle one)	Spouse Child Parent Relative Partner Other
4. Race (circle one)	American Indian/Alaskan Native Asian Black Native Hawaiian/Pacific Islander White Other Undeclared
5. Highest Education Level (circle one)	Under 12 years of school High school or GED degree Some college 2-year college/technical degree 4-year college degree Post-graduate degree (MA/MS) Advanced post graduate degree (MD/JD/PhD)
6. Family Income (circle one)	Under $50,000 $50,000-$100,000 $100,001-$125,000 $125,001-$150,000 $150,001-$175,000 $175,001-$200,000 Over $200,000
7. Use of Prayer (circle one)	Never Less than once a month

Once a week
Several times per week
Daily

8. Employed in a health care field (circle one) Yes No

Appendix B: Caregiver Reaction Assessment Instrument

		SA STRONGLY AGREE	A AGREE	U UNDECIDED	D DISAGREE	SD STRONGLY DISAGREE
1.	I feel privileged to care for ___.	SA	A	U	D	SD
2.	Others have dumped caring for ___ onto me.	SA	A	U	D	SD
3.	My financial resources are adequate to pay for things that are required for caregiving.	SA	A	U	D	SD
4.	My activities are centered around caring for ___.	SA	A	U	D	SD
5.	Since caring for ___, it seems like I'm tired all of the time.	SA	A	U	D	SD
6.	It is very difficult to get help from my family in taking care of ___.	SA	A	U	D	SD
7.	I resent having to take care of ___.	SA	A	U	D	SD
8.	I have to stop in the middle of work.	SA	A	U	D	SD
9.	I really want to care for ___.	SA	A	U	D	SD
10.	My health has gotten worse since I've been caring for ___.	SA	A	U	D	SD
11.	I visit family and friends less since I have been caring for ___.	SA	A	U	D	SD
12.	I will never be able to do enough caregiving to repay ___.	SA	A	U	D	SD

13.	My family works together at caring for ___.	SA	A	U	D	SD
14.	I have eliminated things from my schedule since caring for ___.	SA	A	U	D	SD
15.	I have enough physical strength to care for ___.	SA	A	U	D	SD
16.	Since caring for ___, I feel my family has abandoned me.	SA	A	U	D	SD
17.	Caring for ___ makes me feel good.	SA	A	U	D	SD
18.	The constant interruptions make it difficult to find time for relaxation.	SA	A	U	D	SD
19.	I am healthy enough to care for ___.	SA	A	U	D	SD
20.	Caring for ___is important to me.	SA	A	U	D	SD
21.	Caring for ___ has put a financial strain on the family.	SA	A	U	D	SD
22.	My family (brothers, sisters, children) left me alone to care for ___.	SA	A	U	D	SD
23.	I enjoy caring for ___.	SA	A	U	D	SD
24.	It’s difficult to pay for ___’s health needs and Services.	SA	A	U	D	SD