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Predicting Patient Satisfaction Using Hospital Performance Characteristics

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This is to certify that the doctoral study by

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Abstract

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Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Performance related to patient satisfaction is becoming a significant factor in determining reimbursement for hospital-based services. Furthermore, consumers are increasingly accessing publicly available quality and patient experience information to make decisions about where to receive care. Understanding which hospital characteristics influence patient satisfaction is critical to the healthcare administrator to ensure the financial viability of the organization and to meet the needs and expectations of the community. Many studies have examined the relationship between a single performance characteristic and patient satisfaction. This secondary data quantitative study used regression analysis to analyze the relationship between three hospital performance characteristics (i.e., the incidence of medical or surgical complications, the provision of discharge instructions, and readmission rates) and hospital patient satisfaction. Andersen's model of healthcare utilization served as the theoretical foundation for the study. The findings indicated that medical or surgical complications, the provision of discharge instructions, and readmission rates predicted patient satisfaction. Of the three performance characteristics, the provision of discharge instructions best predicted patient satisfaction. Further research examining the relationship between additional hospital performance characteristics, as well as how structural (e.g., hospital size) and geographical factors influence patient satisfaction scores, are warranted. Understanding the factors that predict satisfaction leads to positive social change through improved quality of care, decreased health care costs, and enhanced population health.

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Dedication

This study is dedicated to my husband, who has championed my goals and aspirations over the years. Without his unwavering support, I could not have achieved this milestone.

Acknowledgments

I would like to acknowledge the members of my committee, Dr. Edessa Jobli and Dr. Donna Clews, for their constructive feedback, guidance, and encouragement throughout this journey. I also need to thank my colleagues and my employer for their support and assistance along the way.

Table of Contents

List of Tables

List of Figures

Section 1: Foundation of the Study and Literature Review

Introduction

Hospital patient satisfaction scores are increasingly viewed as indicators of the delivery of quality care (Al-Abri & Al-Balushi, 2014; Kraska et al., 2017). Also, payment models for hospital-based services include performance related to patient satisfaction scores as a component of reimbursement (Porter & Lee, 2016). Therefore, understanding how hospital performance characteristics influence patient satisfaction is critical to the hospital administrator to improve the patient experience and the organization's financial performance. The goal of this study was to determine if specific hospital performance characteristics (i.e., medical or surgical complications, readmission rates, and the provision of discharge instructions) could predict patient satisfaction. The health care leader can use this information to make changes within the hospital setting that improve the quality of services provided to members of the community. Improved quality of services results in better patient care and outcomes (e.g., decreased mortality rates), as demonstrated in numerous studies (Al-Abri & Al-Balushi, 2014; Birkelien, 2017; Huerta et al., 2016; Stanowski et al., 2015). Additionally, strengthening the organization's financial performance can ensure that critical hospital services continue to be available in the community. These factors can lead to positive social change through enhanced individual, community and population health.

The relevance of and goals for the study are introduced in the problem statement and purpose of the study. Also, the nature of the study and rationale for the theoretical foundation include definitions of the independent and dependent variables, identify the

database where the information was located, and describe how the hospital-level data were analyzed to answer the three research questions. Furthermore, the literature review provides a historical perspective and summarizes the recent research findings related to the relationship between hospital performance characteristics and patient satisfaction. Finally, the study assumptions, scope, and significance are outlined.

Problem Statement

Improving patient satisfaction has become a priority for hospital leaders (Mazurenko et al., 2017; Tevis et al., 2014). The reason for this increased focus on patient satisfaction is multifold. Foremost, patient satisfaction is an indicator of quality of care (Al-Abri & Al-Balushi, 2014; Kraska et al., 2017). A systematic review completed by Al-Abri and Al-Balushi (2014) showed that patient satisfaction scores are indicators of quality of care (e.g., nurse communication, comfort, and cleanliness) in the hospital setting and concluded that more research is needed to determine how different hospital performance characteristics impact quality outcomes. Likewise, Kraska et al. (2017) identified a correlation between patient satisfaction and the quality of care delivered in the hospital setting. In addition to reflecting quality of care, patient satisfaction scores are used to calculate reimbursement for hospital-based services by payers such as the Centers for Medicare and Medicaid Services (CMS). The hospital value-based purchasing model incorporates performance related to patient satisfaction scores into the total payment amount for each episode of care (Porter & Lee, 2016). Therefore, hospital leadership must consider ways in which patient satisfaction can be predicted by improving performance and other quality of care related performance outcomes.

Meanwhile, publicly reported hospital performance characteristics (e.g., readmission rates, infection rates, and mortality rates) are used by the consumer to make decisions associated with where to receive services, as they are indicators of quality (Medicare.gov, n.d.). A study conducted by Salinas (2017) revealed a negative correlation between patient satisfaction and readmission rates, indicating that higher patient satisfaction was associated with lower hospital readmission rates. Similarly, another study reported that improved quality of care (i.e., better coordination of care among providers, such as using discharge and medication reconciliation checklists) resulted in decreased hospital readmissions and improved patient satisfaction scores (Figueroa et al., 2018).

Although studies analyzing the relationship between patient satisfaction and hospital characteristics have been conducted, many have focused on a single possible predictor of satisfaction (Mazurenko et al., 2017). McFarland et al. (2017) examined the relationship between hospital size and patient satisfaction, concluding that smaller hospitals generated higher satisfaction scores. Likewise, Salinas (2017) identified an inverse relationship between patient satisfaction and readmission rates, supporting a correlation between readmission rates and patient satisfaction. Additionally, Craig et al. (2015) investigated and identified a positive relationship between effective pain management and patient satisfaction, further supporting a link between quality and satisfaction scores. However, no studies have addressed the relationship between the incidence of medical or surgical complications, the provision of discharge instructions, and readmission rates and patient satisfaction.

A better understanding of the factors that predict patient satisfaction is critical to the hospital leader. This information can help the leader design and implement successful initiatives that improve quality of care and enhance the patient experience.

Purpose of the Study

The purpose of this study was to determine if three hospital performance characteristics (i.e., the incidence of medical or surgical complications, the provision of discharge instructions, and readmission rates) could predict hospital patient satisfaction. Serious medical or surgical complications (e.g., respiratory failure, blood clots, postoperative wound dehiscence) are considered to be preventable and, therefore, indicators of quality care. CMS uses data related to the incidence of serious medical or surgical complications as a marker of quality care in the hospital setting. Additionally, although discharge instructions should routinely be provided before hospital discharge, the quality and comprehensiveness of the information may vary among providers and nursing staff (Waniga et al., 2016). Consequently, data related to the provision of discharge instructions is also used by CMS as an indicator of quality care in the hospital setting. Finally, unplanned hospital visits or readmission rates, reflective of the quality of care delivered in the hospital setting, are also used as a hospital performance characteristic (Medicare.gov, n.d.).

Using CMS data, I examined the relationship between three hospital performance characteristics (independent variables) and patient satisfaction (dependent variable), as measured by the Consumer Assessment of Healthcare Providers and Systems (HCAHPS) Survey question related to willingness to recommend the hospital to friends and family:

- Medical or surgical complications: Measured as a composite score, based on the rate of how often adult patients had certain serious complications related to medical or surgical inpatient hospital care (e.g., respiratory failure, blood clots, postoperative wound dehiscence).
- Discharge instructions: Measured as a score of individuals who reported "Yes" or "No" that they were given information about what to do during their recovery at home.
- Readmission rates: Measured as the rate of 30-day hospital-wide unplanned readmissions after an inpatient stay, regardless of diagnosis. (Medicare.gov, n.d.).

Research Questions and Hypotheses

Research Question 1: What is the relationship between medical or surgical complications (i.e., how often adult patients had certain serious complications related to medical or surgical inpatient hospital care) and hospital patient satisfaction (i.e., patient's willingness to recommend the hospital to friends and family)?

H_{01}: There is no statistically significant relationship between medical or surgical complications and hospital patient satisfaction.

Ha_1: There is a statistically significant relationship between medical or surgical complications and hospital patient satisfaction.

Research Question 2: What is the relationship between the provision of discharge instructions (i.e., whether patients were given information about what to do during their

recovery at home) and hospital patient satisfaction (i.e., patient's willingness to recommend the hospital to friends and family)?

H_{02}: There is no statistically significant relationship between the provision of discharge instructions and hospital patient satisfaction.

H_{a2}: There is a statistically significant relationship between the provision of discharge instructions and hospital patient satisfaction.

Research Question 3: What is the relationship between unplanned hospital readmission rates (i.e., rate of 30-day hospital-wide unplanned readmissions after an inpatient stay, regardless of diagnosis) and hospital patient satisfaction (i.e., patient's willingness to recommend the hospital to friends and family)?

H_{03}: There is no statistically significant relationship between unplanned hospital readmission rates and hospital patient satisfaction.

H_{a3}: There is a statistically significant relationship between unplanned hospital readmission rates and hospital patient satisfaction.

Theoretical Foundation

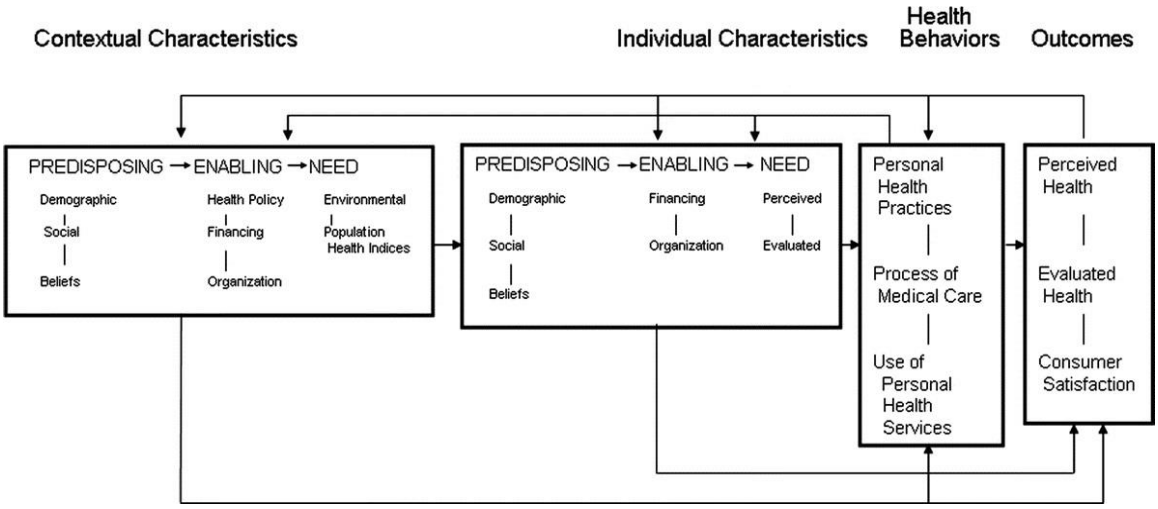
The theoretical framework for this study was Andersen's model of healthcare utilization – Phase 5 (Andersen, 2008). The framework has undergone several iterations since its inception in 1965. Early on, Andersen suggested that the utilization of healthcare services was determined at the individual level (Andersen & Newman, 2005). The original behavioral model (Phase 1) postulated that an individual's use of healthcare services is based on predisposing factors (e.g., social structures, health beliefs, and demographics), enabling factors (e.g., personal, family, and community), and need

factors (i.e., the perceived need for care; Andersen, 1995). As time went on, additional individual and societal factors that influenced access and utilization of healthcare services, such as the availability of resources and how they are organized in the healthcare system, individual health practices, and health status outcomes, were incorporated into the model (Andersen, 1995). Phase 2 of the model first identified the need to include consumer satisfaction as an outcome measure used to predict and analyze healthcare utilization (Andersen & Newman, 2005). Phase 3 incorporated factors associated with population health, and Phase 4 introduced health status outcomes as components of the model (Andersen, 2008). Finally, Phase 5 stressed the need to include contextual factors (in addition to individual factors), such as provider behavior and communication while delivering care, into the model (Andersen, 2008). Phase 5 of the model, as depicted in Figure 1, was used as the theoretical foundation for the study.

Andersen (1995) stated that the model could be used to explain and predict the utilization of healthcare services. Phase 5 of the model aligned with the research questions and the variables identified for the study. Hospital characteristics have been identified as enabling factors used to explain and predict utilization in the model (Andersen,1995). Furthermore, consumer (patient) satisfaction has been identified as an outcome measure used to predict healthcare use (Anderson, 2008; Anderson & Newman, 2005; Babitsch et al., 2012).

Figure 1

Anderson's Model of Healthcare Utilization – Phase 5



Note. A behavioral model of health services use, including contextual and individual characteristics. From "National Health Surveys and the Behavioral Model of Health Services Use," by R. M. Andersen, 2008, *Medical Care*, *46*(7), 647-653. https://www.jstor.org/stable/40221718. Copyright by Wolters Kluwer Health, Inc. (2008). Reprinted with permission (Appendix).

Therefore, medical or surgical complications, readmission rates, and the provision of discharge instructions (i.e., independent variables used in this study) are enabling factors that can be used to predict patient satisfaction.

The model has been used as a guiding framework in previous studies where researchers have examined the relationship between patient satisfaction and the use of healthcare services. A systematic review conducted by Babitsch et al. (2012) revealed that researchers predominantly used Andersen's behavioral model as their theoretical

framework when analyzing healthcare utilization. De Rosis and Barsanti (2016) and Son and Yom (2017) also used the framework when evaluating the relationship between patient satisfaction and emergency department visits. Jiang et al. (2020) did the same in their analysis of the correlation between patient satisfaction and e-health utilization. Therefore, the use of Andersen's model as the theoretical foundation for the current study was not only consistent with other studies analyzing the relationship between hospital characteristics and patient satisfaction but also built upon the understanding of how enabling factors influence this relationship. Although other theoretical frameworks were considered (i.e., satisfaction/dissatisfaction) for the study, these models did not align with the research questions and hypotheses.

Nature of the Study

The nature of this study was quantitative research using secondary data sets from CMS to analyze the relationship between three hospital performance characteristics (independent variables), which included medical or surgical complications, the provision of discharge instructions, and readmission rates, and patient satisfaction (dependent variable). The systematic review completed by Mazurenko et al. (2017) identified many studies that focused on a single possible predictor of patient satisfaction. The current study was conducted to determine if patient satisfaction could be reliably predicted from multiple hospital characteristics, including medical or surgical complications, the provision of discharge instructions, and readmission rates, which is an identified gap in the literature (i.e., no single study has included all three hospital characteristics). This

research addressed this gap and further analyzed the relationship between the three stated hospital performance characteristics and patient satisfaction.

Serious medical or surgical complications are hospital performance characteristics that can be indicators of the delivery of quality of care (Agency for Healthcare Research and Quality [AHRQ], 2019). They include preventable medical conditions that develop while the patient is hospitalized (e.g., pressure ulcers) and complications that arise after surgical procedures (e.g., surgical site infections). The data for Medicare beneficiaries who develop serious medical or surgical complications while being treated in the hospital setting are transmitted to CMS via the claim submission process. The information for 10 patient safety and adverse event measures are risk-adjusted to account for differences in patients' characteristics and presented as a composite score, identified as "Serious Complications" on the Hospital Compare website (Medicare.gov).

CMS has also used readmission rates as an indicator of the quality of care delivered by hospitals. In 2012, CMS implemented the Hospital Readmissions Reduction Program (HRRP). The program requires hospitals to report unplanned hospital visits within 30 days of a hospital inpatient stay for Medicare beneficiaries. The metric is risk-adjusted to account for factors that increase the likelihood for a return visit, such as the patient's age, past medical history, and comorbidities, before being posted on the Hospital Compare website as a percentage or rate of return (Medicare.gov, n.d.).

The HCAHPS survey tool is used to collect data related to the patients' perception of care received during a hospital stay. The survey consists of 19 care-related questions, including two questions regarding the provision of discharge instructions (i.e., "During

the hospital stay, did doctors, nurses, or other hospital staff talk with you about whether you would have the help you needed when you left the hospital?" and "During this hospital stay, did you get information in writing about what symptoms or health problems to look out for after you leave the hospital?"). Patients answer "yes" or "no," and a composite score (i.e., patients reporting that they were/were not given information about what to do during their recovery at home) is available on the Hospital Compare website.

The HCAHPS survey tool is also used to collect data related to the patient experience, including patient satisfaction. The survey, administered to random samples of recently discharged adult hospital patients, asks individuals if they would recommend the hospital to their friends and family. For this study, this question was used to reflect the level of patient satisfaction with the hospital stay (dependent variable). The data related to willingness to recommend is reported on the CMS website as a score (i.e., percentage answering "yes" and percentage answering "no").

Secondary data related to hospital performance characteristics and hospital patient satisfaction were used for the study. The CMS Hospital Compare website contains data for over 4,000 hospitals that participate in the Medicare program. The information is collected via various methods, including claims data, data directly submitted by the hospital, and data collected from third parties (e.g., HCAHPS survey vendors, The Centers for Disease Control and Prevention). The large volume of information is organized into multiple data sets in the CMS database. Hospital Compare data can be viewed directly on the website (medicare.gov/hospitalcompare) or viewed/downloaded as

data sets from the CMS data sets webpage found on Data.Medicare.gov. The information accessed for this study was as follows:

- Patient Safety and Adverse Events Composite (PSI-90-Safety) data set: Hospital-level data transmitted via Medicare enrollment and claims data and Veterans Health Administration (VHA) administrative data. (i.e., medical or surgical complications).
- Unplanned Hospital Visit data set: Hospital-level data transmitted via Medicare enrollment and claims data and VHA administrative data (i.e., 30-day readmissions; Medicare.gov, n.d.).
- Patient Surveys (HCAHPS) data set: Hospital-level data extracted from the HCAHPS survey conducted by hospitals (i.e., discharge information and willingness to recommend).

Literature Search Strategy

The Walden University Library, Catholic Health Initiatives library, and Google Scholar were used for the literature search. CINAHL, MEDLINE, and ProQuest databases were searched using keywords and phrases related to the topic of study (e.g., *hospital, hospital characteristics, patient satisfaction, patient experience, hospital quality, outcome measures, HCAHPS, readmission rates, medical or surgical complications, discharge instructions*). Searches were also refined to include full text, peer-reviewed articles published between 2015 and 2020. Citation chaining was also used to identify additional journal articles and publications relevant to the study.

Literature Review

Hospital performance related to patient satisfaction scores has become a priority for the healthcare leader. Data related to patient satisfaction are used by payers for reimbursement and consumers for decision-making and can impact a hospital's financial performance (Birkelien, 2017; Mehta, 2015). CMS has incorporated performance related to patient satisfaction into the reimbursement formula for various payment models. Additionally, patients use the Hospital Compare website to objectively evaluate quality and performance measures across hospitals and use this information to make informed decisions about where to receive care. Furthermore, patient satisfaction is increasingly used as a measure of the quality of care provided in the healthcare setting (Abbasi-Moghaddam et al., 2019; Figueroa et al., 2018; Hussain et al., 2019; Lobo Prabhu et al., 2018). Studies have indicated that hospitals with higher patient satisfaction scores also demonstrate better patient outcomes and performance related to quality metrics (Al-Abri & Al-Balushi, 2014; Birkelien, 2017; Huerta et al., 2016; Stanowski et al., 2015). Therefore, understanding which hospital performance characteristics predict patient satisfaction is critical for the healthcare leader, to identify effective interventions that can improve patient satisfaction scores and ensure hospital financial viability and an ongoing ability to provide services to the community (Huerta et al., 2016).

Patient Satisfaction

The practice of measuring patient satisfaction after an experience with a healthcare organization or healthcare provider is not new. Gill and White (2006) stated that many tools had been developed over the years to measure patient satisfaction and the

patient's perception of the quality of care received. Press Ganey was one of the first vendors to use a scientific approach to measure patient satisfaction, but many corporations and agencies have followed suit over the years, including CMS (Malpani et al., 2018). Regardless of the source, the data are used by the healthcare leader to make changes in how and where services are delivered, facilitating patient-centered care aimed at improving patient satisfaction (Birkelien, 2017; Davidson et al., 2016; Schmocker et al., 2015). For example, the quantitative retrospective study by Schmocker et al. (2017) revealed a statistically significant relationship ($p < 0.001$) between provider communication, readiness for discharge, and patient satisfaction, and suggested that health care providers examine processes related to the transition of care to improve the patient satisfaction. This perspective was echoed by Birkelien (2017), whose strategic framework for improving the patient experience in hospitals emphasizes the relationship between the delivery of quality care and patient satisfaction.

History

Defining and measuring satisfaction is not a straightforward task. The concept of satisfaction originated in the marketing field and was described early on as "a dynamic flow of multidimensional interactions in cognitive and affective domains after a service experience" (Kane, Maciejewski, & Finch, 1997, p. 715). Satisfaction has also been defined as "a psychological state, appearing after consumption (of a service) and compared to an initial baseline (services' expectation)" and as "the subjective comparison between expectations and perceptions of service performance" (Almeida et al., 2015, p. 12). Patient satisfaction was described by Shirley et al. (2016) as "a cognitive evaluation

and an emotional reaction to medical care that is strongly influenced by underlying expectations" (p. 12). The various definitions highlight the complexity and subjective nature of satisfaction, necessitating the need to take a multidimensional approach when determining how to measure this concept.

Measuring patient satisfaction following a hospital admission or an encounter with a physician is now a routine process. Patient satisfaction questionnaires originated in the 1980s and measured factors such as the patient's perception of the interpersonal skills of the professional staff, waiting times, and the cost associated with receiving care (Junewicz & Youngner, 2015; Kash & McKahan, 2017). The surveys evolved over the next 2 decades and incorporated questions that addressed factors such as the physical environment (e.g., comfort and lighting) and the technical aspects of the delivery of care (Kash & McKahan, 2017). Vendors such as Press Ganey and Pinnacle Quality Insight design and administer customized patient satisfaction surveys while also collecting, analyzing, and reporting data for the hospital (Shirley et al., 2016). Also, companies such as Arbor Associates, the RAND Corporation, and the Jackson Organization created generic tools to measure patient satisfaction data for hospitals and healthcare organizations (Malpani et al., 2018). Some of these surveys include the Patient Expectation Survey, the Patient Satisfaction Questionnaire, and the Patient Satisfaction and Loyalty Measurement System (Malpani et al., 2018). Although these evaluative measures provided valuable information related to the patient experience and patient satisfaction, the lack of one standardized tool did not allow for meaningful comparison across hospitals (Malpani et al., 2018). It was not until 2002 that CMS and the AHRQ

began collaborating to develop the first HCAHPS survey (Beattie et al., 2015). Since 2006, the HCAHPS survey has consistently been used to obtain feedback related to the patient experience, including patient satisfaction, after a hospital admission (Medicare.gov, n.d.). The survey is not limited to Medicare recipients and can be administered via various mediums (e.g., mail, telephone) to any adult patient, 48 hours to 6 weeks after an inpatient hospital stay. Although voluntary at first, since 2008 all hospitals admitting and treating Medicare patients are mandated to transmit data collected from the HCAHPS survey to receive payment. Finally, the HCAHPS survey tool can also be used by hospitals not participating in the Medicare program, and the information is included in the publicly reported data on the Hospital Compare website. The inclusion of this information allows for a standardized comparison of performance, related to quality outcomes and characteristics across hospitals, for the consumer (Almeida et al., 2015).

HCAHPS Survey

The HCAHPS survey is a tool used by the healthcare leader to analyze hospital patient satisfaction data. The findings from an initial pilot study conducted by the AHRQ and CMS concluded that the tool demonstrated reliability and construct validity, and, subsequently, the tool was endorsed by the National Quality Forum (NQF) for use when evaluating the patient's hospital experience (AHRQ, 2003). This perspective was also reflected in the findings of a systematic review by Almeida et al. (2015) where they analyzed the methodological qualities of thirty-four different patient satisfaction tools used in research studies. Though the researchers concluded that there was "no gold standard instrument" (p. 21) for measuring patient satisfaction, the HCAHPS survey tool

demonstrated good structural validity, internal consistency, and reliability. Also, data collected through the HCAHPS survey was used in a number of studies to analyze the relationship between patient satisfaction and hospital performance characteristics. Recently, Vovos et al. (2019) used HCAHPS data to investigate the level of inpatient satisfaction following total joint arthroplasty. Using correlation testing, Vovos et al. analyzed HCAHPS data for over 3,500 patients and identified a significant negative correlation between satisfaction and length of stay (LOS) and a positive correlation between satisfaction and distance to the medical center ($p < 0.001$). Similarly, Hopkins et al. (2019) used survey data to determine if patient satisfaction could be predicted following spine surgery. In this retrospective study of nearly 18,000 patients that had undergone a spinal procedure, the analysis of the HCAHPS data also identified a significant negative correlation ($p < 0.001$) with LOS. Furthermore, Chen et al. (2020) used HCAHPS survey data collected between July 2013 and March 2017 to analyze the relationship between patient satisfaction and readmission rates. After the data from over 2,700 hospitals was analyzed, the researchers identified a significant negative correlation ($p < 0.001$) between readmission rates and patient satisfaction. Furthermore, the HCAHPS survey has been used in numerous research studies analyzing the relationship between various hospital characteristics (e.g., size, cleanliness) and patient satisfaction (Al Amin et al., 2016; Davidson et al., 2016; Mazurenko et al., 2017; McFarland et al., 2015; McFarland et al., 2017; Puppala, 2020). For example, McFarland et al. (2015) used HCAHPS data to analyze the relationship between patient satisfaction, hospital structural factors (i.e., number of beds), and county demographics from over 3,900 hospitals. The

results of regression modeling revealed that hospital size and primary language significantly predicted lower patient satisfaction scores, and education and ethnicity significantly predicted higher patient satisfaction scores ($p < 0.001$). McFarland et al. (2017) conducted additional research about the relationship between patient satisfaction and hospital size. In their follow-up study, the researchers concluded that patient satisfaction was significantly higher ($p < 0.001$) in larger hospitals. However, it was not clear how the researchers categorized size in either study, making it difficult to generalize the findings to other hospitals. Puppala et al. (2020) also analyzed HCAHPS data against a number of patient variables (e.g., demographics, admission type, length of stay, insurance), from an eight-hospital tertiary medical center, using multivariate linear regression. The variables were categorized into those that correlated with high satisfaction (e.g., surgical admission, $p = 0.001$), low satisfaction (e.g., LOS > 7 days, $p < 0.001$), and neutral satisfaction (e.g., number of diagnostic procedures, $p = 0.561$). Again, generalizing the findings to all hospitals was difficult given the limited sample population.

The literature supports the assertion that the HCAHPS survey is a valid, reliable, and commonly used tool to measure hospital patient satisfaction. The HCAHPS survey consists of 19 care-related questions, seven demographic questions, and three screening questions (Medicare.gov, n.d.). The care related questions comprise 10 domains, including communication with doctors, communication with nurses, responsiveness of hospital staff, cleanliness of the hospital environment, quietness of the hospital environment, communication about medicines, discharge information, readiness for

discharge, overall rating of the hospital, and recommendation of the hospital to friends and family. Patients answer most questions using a 4-point Likert scale (always, usually, sometimes, and never) or respond “yes” or “no”. The information is summarized and publicly reported on the CMS Hospital Compare website. The website also makes available data related to hospital quality outcome measures such as mortality rates, readmission rates, and infection rates. Data on the Hospital Compare website is used by the consumer to make meaningful comparisons across hospitals and help with making decisions about where to receive care.

Predictors of Patient Satisfaction

Identifying the factors that can predict patient satisfaction is a daunting endeavor. A number of studies have examined the relationship between patient satisfaction and hospital and/or patient characteristics and outcomes (Hopkins et al., 2019; McFarland et al., 2015; McFarland et al., 2017; Puppala et al., 2020; Vovos et al, 2019). Furthermore, a systematic review by Mazurenko et al. (2017) revealed that many researchers have examined the relationship between patient satisfaction scores and patient characteristics (e.g., age, gender, marital status), hospital characteristics (e.g., ownership, bed size, length of stay, cleanliness, staffing levels), and geographic characteristics (e.g., rural versus urban, unemployment rates). The researchers concluded that of the three areas, healthcare leaders have the ability to enhance patient satisfaction by influencing hospital characteristics, as they are modifiable (Davidson et al., 2016; Mazurenko et al., 2017). Also, many hospital characteristics can be linked to performance related to quality outcome measures. For example, providing comprehensive discharge instructions to

patients can facilitate increased compliance with post-acute care and reduce hospital readmission rates, which in turn leads to increased patient satisfaction (Schmocker et al., 2015). Therefore, further investigation into the relationship between hospital characteristics and patient satisfaction can provide benefits to the healthcare leader in the form of improved financial performance and enhanced quality outcome measures.

Medical and Surgical Complications

CMS defines medical or surgical complications as preventable conditions that arise following inpatient hospital care (Medicare.gov, n.d.). These complications include, but are not limited to, the development of pressure ulcers, respiratory failure after surgery, a fracture from a fall after surgery, wound dehiscence, hospital readmission, and cognitive and functional impairments (Medicare.gov, n.d.; Schwarzkopf et al., 2019; Watt et al., 2018). The prevalence of medical or surgical complications as a result of hospital admission are not uncommon. Watt et al. (2018) identified a postoperative complication rate of 25.17% (95 CI, 18.03% - 33.98%) in a systematic review and meta-analysis of 44 studies that examined the incident of harm (i.e., medical or surgical complications) to individuals undergoing surgery. Although the combined sample size across the studies was large (>12,000), they only included older adults and those individuals undergoing elective surgeries. Schwarzkopf et al. (2019) also found that 20% of hospital readmissions were due to complications following total hip and knee arthroplasty. Claims data for over 66,000 individuals were analyzed for the retrospective study. When hospital readmission rates for total hip and knee arthroplasty were compared to readmission rates for nonsurgical diagnoses, there was a significantly higher

percentage of readmissions (at 30 and 90-day) in the surgical group ($p < 0.001$). Once again, the sample size was large and would indicate that the findings can be generalized to patients undergoing total hip and knee arthroplasty. Furthermore, Goepfert et al. (2017) found that complications resulted in increased hospital length of stay and readmission for patients undergoing total laryngectomy. In this retrospective study, the researchers identified 245 patients who experienced postoperative issues (i.e., death, complications associated with the wound, and complications associated with the development of a fistula). Readmission rates were significantly higher ($p < 0.001$) for patients experiencing complications associated with wounds. However, comorbidities and lifestyle may have also played a role in the clinical outcome and subsequent readmissions in this group. These studies support the concept that the occurrence of medical or surgical complications are considered to be hospital performance characteristics that can be used as indicators reflecting the delivery of quality of care (AHRQ, 2019). Consequently, data related to medical or surgical complications (e.g., pressure ulcers, postoperative respiratory failure, and postoperative sepsis) are publicly reported by the CMS and are considered to be key hospital quality performance measures (Medicare.gov, n.d.).

Researchers have evaluated the relationship between patient satisfaction and medical or surgical complications. Rochon et al. (2016) identified an inverse relationship between the incidence of surgical complications (i.e., surgical site infections) and the patient experience, which included satisfaction related to the level of instruction provided regarding postoperative care. The focus of the study was to examine the relationship between surgical site infections and the rate of readmissions for cardiac patients. A

comprehensive protocol was developed incorporating a photo of the surgical site incision (SSI), customized and evidenced-based education and discharge instructions related to care of the SSI, and patient evaluation of the discharge process. The study was initiated in May 2014 and over a 21-month period, data were collected from over 3,200 patients. When compared to historical data, the researchers found a statistically significant decrease in readmissions ($p < 0.03$) in this patient population and recommended that the protocol be modified and expanded to other diagnostic groups who experience SSIs. Rochon et al. also indicated that the findings supported an enhanced patient experience, but the survey (and the data) used to evaluate this component of the protocol was not provided, therefore making it difficult to generalize this aspect of the findings to the larger population. However, a link between patient satisfaction and the incidence of postoperative complications was reported by Lobo Prabhu et al. (2018). In this quantitative study, patient satisfaction surveys were provided (mail, in person, phone) to individuals undergoing general surgical procedures at a 272-bed urban teaching hospital between June 2012 and March 2015. The researchers used ordered regression analysis to determine if performance related to surgical complications could predict patient satisfaction. The results of the analysis produced statistically significant lower scores for patient satisfaction (*OR*: 0.35, 95% CI, 0.17 - 0.70) when 30-day postsurgical complications were present. However, the patient satisfaction survey tool consisted of only two questions (i.e., satisfaction with surgical services and willingness to recommend to family and friends), with no indication of its reliability or validity, leading one to question the value of the findings. In another study, Odom-Maryon et al. (2019)

investigated the relationship between the incidence of hospital-acquired pressure ulcers (HAPU) and patient satisfaction in Medicare patients. In a matched case-control design, data extracted from the HCAHPS survey for stroke patients who experienced HAPU were analyzed using conditional logistic regression. The analyses revealed a lower occurrence of HAPUs with performance related to certain questions on the HCAHPS survey (i.e., nursing communication, [*OR* = 1.397; 95% CI, 0.769 - 0.968; $p = 0.0116$] and quietness at night [*OR* = 0.879; 95% CI, 0.787 - 0.980; $p = 0.0205$]). In contrast, Kahn et al. (2015) found no correlation between patients experiencing complications and satisfaction. The retrospective review of HCAHPS survey data for 184 patients (79 trauma and 105 general surgery) from a Level 1 trauma center were analyzed using logistic regression. The researchers reported that the presence of a complication was not significantly associated with patient satisfaction. However, factors such as performance related to nurse and physician communication did significantly correlate ($p < 0.001$) with willingness to recommend the hospital and overall satisfaction with the hospital stay. The limited pool of patients and small sample size makes it difficult to generalize the results to other hospital types and size. In summary, the inconsistent study findings support the need for additional research to determine whether healthcare leaders can use the incidence of medical or surgical complications as a hospital characteristic that predicts patient satisfaction.

Readmission Rates

CMS has defined a readmission as any unplanned hospital visit within 30 days of a hospital inpatient stay (Medicare.gov, n.d.), and has used readmission rates as an

indicator of quality of care. Consequently, in 2012, the agency implemented the HRRP, which penalized hospitals for excessive readmission rates for specific diagnoses, such as congestive heart failure and chronic obstructive pulmonary disease (Medicare.gov, n.d.). The program has demonstrated success in reducing hospital readmissions. A retrospective cohort study conducted by Desai et al. (2016) found that hospitals subject to fines under HRRP significantly decreased readmission rates. The researchers used difference-interrupted time-series models to compare trends in readmission rates by condition and penalty. The data captured by HRRP and additional readmission data related to other diagnoses and procedures not captured by the program are available on the Hospital Compare website.

Data related to unplanned hospital readmission rates have been linked to quality of care and patient satisfaction. Kripalani et al. (2014) postulated that hospitals incorporating comprehensive discharge planning and care transition interventions are more likely to reduce readmission rates and improve patient satisfaction scores. Research findings also indicated that hospitals that have successfully reduced readmission rates through quality improvement initiatives (e.g., enhanced nurse communication) have also improved patient satisfaction scores. House et al. (2016) investigated the impact of the implementation of a quality initiative project aimed at decreasing readmission rates in a large academic healthcare setting. The researchers reported that improving the transition from the hospital to home for cardiac patients, which required the patient to follow discharge instructions and included the coordination of care between the hospital and community providers, resulted in decreased readmission rates. However, it is not clear

how the statistical analysis of the data (i.e., pre and post project implementation) was conducted or if the findings were significant. A retrospective cross-sectional study by Hachem et al. (2014) revealed a mixed association between readmission rates and data for eight HCAHPS questions. Binary logistic regression was used to analyze data from 10 different hospitals. The researchers reported that questions related to nursing and provider communication were significant predictors ($p < 0.01$) of 30-day readmission rates. Finally, Salinas (2017) examined the relationship between hospital readmission rates and patient satisfaction (i.e., willingness to recommend hospital to friends and family) using secondary data collected via the HCAHPS survey. In this study, a Pearson correlation test identified a statistically significant negative relationship ($r = 0.248$) between the variables (i.e., patient satisfaction scores increased when readmission rates were low). The sample size for the study was large (4,060), which would indicate the findings can be generalized to hospitals not included in the CMS database. In another prospective cohort study by Carter et al. (2018), the findings also pointed to an association between higher patient satisfaction scores and lower rates of readmission. Using data collected from 846 interviewer-administered surveys, correlation and regression modeling was conducted to examine the relationship between readmission rates and patient characteristics, and responses pertaining to satisfaction (e.g., satisfaction with inpatient care received). The researchers concluded that patients who reported they were very satisfied with their care had 39% less likelihood of being readmitted ($p = 0.045$), and those reporting good provider communication had a 32% less likelihood of being readmitted ($p = 0.049$). However, the researchers used a customized survey tool (although some items were

pulled directly from the HCAPHS survey), making it difficult to generalize the findings. In conclusion, although the research findings were mixed, healthcare leaders can use readmission rates as a hospital performance characteristic that predicts patient satisfaction.

Discharge Instructions

The patient's readiness for discharge following a hospital stay is enhanced by the provision of discharge information and instructions (Schmocker et al., 2015). Yet, the lack of a consistent approach related to how and when this information was provided to the patient prompted CMS to issue guidelines to hospitals to improve and standardize the process (Waniga et al., 2016). For example, the guidelines highlighted the need to use a multilingual and multimodal approach (e.g., verbal, written, and video) when providing discharge instructions to improve understanding of the materials (Waniga et al., 2016). Furthermore, researchers found that learning was optimal, and outcomes were better (e.g., reduced hospital readmission rates) when education was provided to surgical patients before the procedure (Hovsepian et al., 2017; Kang et al., 2019). The link between the provision of discharge instructions and patient outcomes prompted CMS to collect and publicly report data, via the HCAHPS survey tool, related to the patient's perception of readiness for discharge.

Several studies have addressed the correlation between the provision of hospital discharge instructions and patient outcomes. Early studies, such as the one conducted by Schmocker et al. (2015), investigated the relationship between the patient's readiness for discharge and patient satisfaction. The retrospective study included a sample of 318

patients who were either admitted to the hospital for a small bowel obstruction or had been admitted for greater than 20 days between 2009 and 2012. A multidisciplinary team had designed a discharge process that incorporated education related to self-care, medication management, equipment needs, and the need for follow-up appointments with community providers. Participants also completed the HCAHPS and institutional surveys. The researchers identified a statically significant correlation ($p < 0.001$) between the patient's perception of readiness for discharge and satisfaction with the hospital stay. As the scope of the participants were limited, both in terms of diagnoses and sample size, the need for additional investigation between the provision of discharge instructions and patient satisfaction was warranted. Likewise, a qualitative study conducted by Kang et al. (2019) revealed that a customized patient discharge plan and instructions delivered by a multidisciplinary team resulted in fewer complications after discharge and overall satisfaction with the hospital stay. The researchers interviewed 13 patients discharged from a hospital between August 2018 and November 2018, and used inductive content analysis to evaluate the data. Although the sample size was small, the findings revealed the impact of the provision of discharge instructions on patient satisfaction. Also, House et al. (2016) analyzed the effectiveness of a quality improvement initiative aimed at reducing readmission rates. They found that improving the transition from the hospital to home, which required the patient to follow discharge instructions and included the coordination of care between the hospital and community providers, resulted in decreased readmission rates and improvements in the percentile rankings of patient satisfaction scores, as measured by the Transitions of Care questionnaire. However, as the focus of

the study was on readmission reduction strategies, the researchers did not delve into the data pertaining to the impact on patient satisfaction, other than identifying the change in percentile rank. However, statistically significant ($p < 0.01$) improvements in patient satisfaction scores (i.e., overall assessment of the hospital as measured by the HCAHPS survey), were reported in a study by Waniga et al. (2016), after content changes were made to discharge instructions and the delivery model for discharge planning was modified. However, the study participants were limited to patients admitted to a 180-bed hospital in a Latino community, therefore making it difficult to generalize the findings to the larger population. The aforementioned studies highlight the need for additional research into the ability to predict patient satisfaction from data related to the provision of discharge instructions.

Research that further examined the relationship between hospital characteristics and patient satisfaction would assist healthcare organization leaders in finding ways to improve the patient experience and the delivery of quality care. Until recently, the patient's perception of the care received in the hospital setting was not considered a key performance measure (Mazurenko et al., 2017). However, this perspective has changed, and the need for healthcare organization leaders to identify and measure patient satisfaction has become pertinent. Many studies conducted to date have focused on exploring the relationship between a single hospital characteristic and patient satisfaction (Craig et al., 2015; Davidson et al., 2016; Lobo Prabhu et al., 2018; Mazurenko et al., 2017; McFarland et al., 2015; McFarland et al., 2017; Waniga et al., 2016; Salinas et al., 2017; Schmocker et al., 2015). However, none have examined the relationship between

patient satisfaction and the incidence of medical or surgical complications, the provision of discharge instructions, and hospital readmission rates.

A better understanding of which hospital performance characteristics predict patient satisfaction helps the healthcare leader make appropriate programmatic and policy changes. Furthermore, identifying the relevant hospital performance characteristics that predict patient satisfaction has significant implications related to quality outcomes and financial performance for the healthcare organization.

Definitions

Center for Medicare and Medicaid Services (CMS): The federal government agency responsible for managing the Medicare program, supporting State governments in operating Medicaid programs, and ensuring the delivery of quality care to eligible recipients (CMS.gov, n.d.)

Consumer Assessment of Healthcare Providers and Systems (HCAHPS) Survey: A survey used to collect data related to a patient's hospital stay. The tool is administered to a random sample of adult patients after discharge from a hospital setting (Medicare.gov).

Discharge instructions: Education and information provided to a patient that allows them to manage their care after discharge from a hospital inpatient stay (Kang et al., 2019).

Hospital Compare: A website that summarizes the performance of over 4,000 Medicare-certified hospitals and used by the consumer to make comparisons, using uniform measures, related to the delivery of care (Medicare.gov).

Hospital patient satisfaction: A measure of how well the patient's expectations were met during a hospital inpatient stay (Kraska et al., 2017).

Medical or surgical complications: Avoidable complications resulting from medical or surgical hospital care (Medicare.gov).

Readmission rate: Unplanned readmission to a hospital, regardless of the reason, within 30 days of hospitalization (Medicare.gov).

Assumptions

Data transmitted to CMS, for the collection period July 1, 2016 through June 30, 2018, were used for the study. This timeframe was selected because of its relevance to the focus of the study and inclusion of the independent and dependent variables (i.e., publicly reported) for analysis. More recent data may have become available but were not included for the study.

I assumed that the quality outcome data submitted to CMS were collected consistently across hospital sites, comprehensive, and accurate. The data have been risk-adjusted, and I assumed that CMS accurately and consistently adjusted and analyzed the data across all hospital sites. Finally, I assumed that patients were randomly selected to complete the HCAHPS survey and were provided no incentive to complete the survey or respond in a particular manner.

Scope and Delimitations

The study's scope was limited to analysis of the measures in the CMS database related to the three hospital characteristics (i.e., medical or surgical complications, readmission rates, and the provision of discharge instructions) and patient satisfaction for

Medicare beneficiaries. Hospital-level data for the reporting period of July 1, 2016 through June 30, 2018 was used. Quality outcome data (i.e., medical or surgical complications and readmission rates) for non-Medicare patients and those enrolled in Medicare managed plans were not included in this study. The data analysis was limited to those hospitals that reported information for the variables that were analyzed for this study. Finally, the data was not adjusted to account for hospital characteristics such as bed size, geographical location, and ownership type. The AHRQ (2008) categorizes hospitals as small, medium, and large based on bed size. However, these categories differ depending on the geographical location (i.e., Northeast, Midwest, Southern, and Western), rural and urban designation, and the hospital's teaching status. Ownership type includes state/local government, for-profit, and non-profit (Kaiser Family Foundation, 2018). Though these factors were not taken into account, the data was risk-adjusted by CMS based on patient factors (e.g., demographics, medical conditions).

Significance, Summary, and Conclusions

Hospital leaders continually seek to improve the ability to deliver quality healthcare. The concept that patient satisfaction can be used as an indicator of quality care has long been supported in the literature (Al-Abri & Al-Balushi, 2013; Kane et al., 1997; Marley et al., 2004; Mazurenko et al. 2017; Salinas, 2017). As a result, this perspective was adopted by payers, such as CMS, and performance related to patient satisfaction has become a component of the formula used to determine reimbursement for hospital-based services (CMS, 2019).

To improve patient satisfaction scores, hospital leaders must improve the delivery of quality care. A systematic review by Davidson et al. (2016) highlighted research findings supporting the relationship between improved quality of care outcomes (e.g., mortality rates, readmission rates) and patient satisfaction. Also, Anderson et al. (2020) reported a relationship between clinical outcomes in cardiac patients (e.g., fewer readmissions and emergency room visits) and patient satisfaction. The researchers concluded that information related to quality outcomes can be used to design and implement initiatives to improve hospital performance characteristics that enhance patient satisfaction. Therefore, targeting improvements in key hospital performance characteristics assists the healthcare leader in successfully enhancing patient satisfaction.

Many studies have examined the relationship between a single hospital characteristic and patient satisfaction (Craig et al., 2015; Davidson et al., 2016; Lobo Prabhu et al., 2018; Mazurenko et al., 2017; McFarland et al., 2015; McFarland et al., 2017; Waniga et al., 2016; Salinas et al., 2017; Schmocker et al., 2015). Craig et al. evaluated the relationship between patient satisfaction and pain management, while Lobo Prabhu et al. analyzed the relationship between patient satisfaction and surgical outcomes. In two separate studies, McFarland et al. looked at how patient satisfaction was influenced by hospital size (i.e., number of beds). Also, the association between patient satisfaction and discharge instructions, readiness for discharge, and readmission rates were studied by Waniga et al., Schmocker et al., and Salinas et al., respectively. Furthermore, the systematic reviews conducted by Davidson et al. and Mazurenko et al., synthesized the findings from studies that addressed the relationship between patient

satisfaction and a single hospital characteristic (e.g., nurse and provider communication, surgical volumes, size, geographic location, type, ownership, use of an electronic medical record) or patient characteristics (e.g., demographic factors, medical conditions). However, few studies have examined the impact of multiple performance characteristics on patient satisfaction**,** and none have explored the relationship between the incidence of medical or surgical complications, the provision of discharge instructions, and unplanned readmission rates and patient satisfaction. This study used CMS hospital-level data collected from July 1, 2016 through June 30, 2018 to address the gap in the literature.

Improving hospital performance characteristics enhances the delivery of services and quality of care, leading to a better quality of life for the individual. From a social change perspective, improving the quality of care provided by hospitals benefits the consumer on many levels. Better care results in improved healthcare outcomes at the individual and the population health levels (CMS, 2019). Additionally, improved quality of care results in decreased healthcare costs, which is achieved through improved standardization in the delivery of care (Huerta et al., 2016: Lee et al., 2016: Porter et al., 2016; Stanowski et al., 2015; Upadhyay et al., 2019). Reduced healthcare costs can lead to improved access to healthcare services and improved quality of life (Lee et al., 2016; Porter & Lee, 2016). This perspective was also shared by Marley et al. (2004) and Donabedian (1985; 2005). Donabedian spoke to the importance of identifying, measuring, and improving the factors that influence the delivery of quality care, to achieve the best outcomes at the societal level. Marley et al. indicated that health care leaders shape processes to improve quality and the patient experience, while also

decreasing the cost of care. Therefore, additional research into hospital performance characteristics that can predict patient satisfaction, such as the current study, benefits the individual, the healthcare organization, and society at large.

Section 2: Research Design and Data Collection

Introduction

The purpose of this study was to determine if hospital patient satisfaction can be predicted based on hospital characteristics. Researchers have linked performance related to patient satisfaction scores to hospital characteristics such as the number of beds, ownership type (e.g., private versus public), outcome measures, and data that reflect the quality of care delivered during a hospital stay (Kraska et al., 2017; Mazurenko et al., 2017, McFarland et al., 2015; McFarland et al., 2017). Outcome measures and data include, but are not limited to, performance characteristics such as mortality rates, emergency department care, and Medicare spending per beneficiary. Although researchers have examined factors that could predict patient satisfaction, none have explored the relationship between the incidence of medical or surgical complications, the provision of discharge instructions, and hospital readmission rates and patient satisfaction, which was the focus of this study. In this section, I identify the research design and rationale, describe the methodology (i.e., population, sampling, operationalization of constructs, and data plan analysis), and identify the threats to validity for the study.

Research Design and Rationale

In this study, I examined if medical or surgical complications, discharge instructions, and readmission rates (independent variables) are predictors of hospital patient satisfaction (dependent variable). A quantitative research design, using regression modeling, examined the relationship between the independent and dependent variables.

The quantitative approach incorporates a structured, systematic process to answer a research question (Bloomfield & Fisher, 2019; Creswell & Creswell, 2018). Once the research question is identified, a hypothesis is formulated. Rutberg and Bouikidis (2018) indicated that the hypothesis would describe "the anticipated result, relationship, or expected outcome from the question being researched" (p. 209). In the quantitative approach, objective, measurable data are collected and analyzed to test the hypothesis. Based on the findings, the researcher determines whether the hypothesis can be accepted or rejected. The quantitative research design aligned with the current study, where three research questions were identified to analyze the relationship between the independent and dependent variables.

Methodology

Population

The study's target population was adult patients admitted for an inpatient stay between July 1, 2016 and June 30, 2018 to hospitals participating in the Medicare program. Hospitals participating in the Medicare program report data identifying the incidence of serious medical or surgical complications and readmission rates to CMS. Additionally, a random sample of adult patients discharged from a hospital inpatient stay receive the HCAHPS survey. This information, which includes data related to discharge instructions and willingness to recommend the hospital, is also reported to CMS. Although more than 4,000 hospitals provide data to CMS, only hospital-level data from hospitals that reported data for all the variables were included in the analyses. The IRB approval number for the study is 06-15-21-0671652.

Sampling

The CMS data sets include information for over 4,000 hospitals. However, all hospitals do not report data for all quality outcome measures, depending on the services they provide. Furthermore, hospitals that do not participate in the Medicare program can submit patient satisfaction data but are not required to provide data related to quality outcome measures. Therefore, the sample for the study only included hospitals that report information for all the independent variables (i.e., medical or surgical complication, readmission rates, discharge instruction) and the dependent variable (i.e., patient satisfaction) for the collection period of July 1, 2016 through June 30, 2018 (see Table 1). When the data were filtered to include only hospitals that report information for the independent and dependent variables, 2,742 hospitals remained, and this comprised the sample size for the study. Because the information is publicly reported on the CMS website, permission to access the data sets was not required.

Table 1

Hospitals Reporting Data to CMS for Collection Period

Performance characteristics	Number of hospitals
Medical or surgical complications	3,177
Readmission rates	4,277
Discharge instructions	4,699
Patient satisfaction	4,699
All four characteristics	2,742

Note. Data collection period was July 1, 2016 through June 30, 2018.

Power Analysis

A prior power analysis using G*Power (see Faul et al., 2007) software (3.1.9.7) was used to determine if the number of hospitals in the sample would be sufficient to detect significance in the findings. Using the logistic regression test, with an $\alpha = 0.05$, a 95% predictive power, and an odds ratio of 1.49, the minimum number of hospitals needed in the sample was 347. I used the information for 2,742 hospitals for the data analysis, exceeding the minimum number required.

Instrumentation and Operationalization of Constructs

Data for serious medical or surgical complications and readmission rates are reported directly to CMS via the claims submission process. However, data for the provision of discharge instructions and patient satisfaction are collected using the HCAHPS survey tool. In 2002, the HCAHPS survey tool was born out of a joint effort between CMS and the AHRQ. Before that time, there was no standardized tool that captured information related to the patient experience during a hospital inpatient stay. The information collected from the survey, and made available to consumers, allows for a meaningful comparison among hospitals. The tool has demonstrated good structural validity, internal consistency, and reliability (Almeida et al., 2015). Consequently, it is used by many hospitals, even those that do not participate in the Medicare program. Hospitals that participate in the Medicare program have been required to use the tool since 2006, and data collected from the survey factors into reimbursement for inpatient hospital stays.

The HCAHPS survey can be administered via four different modes (i.e., mail only, telephone only, mixed [mail with telephone follow-up], or Active Interactive Voice Response) and is available in a variety of languages, including English, Spanish, Chinese, Russian, Vietnamese, Portuguese, and German translations (HCAHPS, 2020). Hospitals are required to randomly survey patients on a monthly basis, with the expectation that a minimum of 300 surveys will be completed in a rolling 12-month period. Patients who meet the following criteria are eligible to receive the survey:

- 18 years of age
- classified as an inpatient with at least one overnight stay
- principal diagnosis must be nonpsychiatric
- alive at discharge (Medicare.gov, n.d.)

However, patients who fall into one or more of the categories below are not included in the sample:

- discharged to hospice care
- discharged to nursing homes and skilled nursing facilities
- prisoners
- identification of a foreign home address
- those who request that their identities remain private (e.g., public figures)
- those who request to be excluded from the survey (Medicare.gov, n.d.)

Hospitals are also required to disclose the types of patients that are excluded from their sample.

CMS aggregates the hospital-level data collected through the HCAHPS survey tool quarterly, with the most up-to-date information available on the Hospital Compare website. Hospitals are not allowed to change their sampling methodology or mode of survey administration within a calendar quarter. Furthermore, hospitals that use a third-party vendor to collect the HCAHPS data are not allowed to change vendors during a calendar quarter. Hospital-level data collected for the provision of discharge instructions and patient satisfaction using the HCAHPS survey tool were used for the study analyses.

Medical or Surgical Complications

Information related to hospital medical or surgical complications was obtained using the PSI-90 data set. The information for serious medical or surgical complications are extracted from Medicare enrollment and claims data transmitted to CMS. The hospital-level data are categorized into 10 different patient safety indicators (Medicare.gov, n.d.):

- (PSI 3) pressure injury (pressure ulcers)
- (PSI 6) collapsed lung that results from medical treatment (iatrogenic pneumothorax)
- (PSI 8) broken hip from a fall in the hospital (in-hospital fall with hip fracture)
- (PSI 9) bleeding or blood clots requiring a procedure after surgery (perioperative hemorrhage or hematoma)
- (PSI 10) kidney failure requiring dialysis after surgery (postoperative acute kidney injury requiring dialysis)
- (PSI 11) respiratory failure after surgery (postoperative respiratory failure)

- (PSI 12) blood clots, in the lung or a large vein, after surgery (perioperative pulmonary embolism or deep vein thrombosis)
- (PSI 13) blood stream infection after surgery (postoperative sepsis)
- (PSI 14) an abdominal or pelvic wound that splits open after surgery (postoperative wound dehiscence)
- (PSI 15) accidental cuts and tears requiring a corrective procedure after abdominal or pelvic surgery (unrecognized abdominopelvic accidental puncture or laceration)

These indicators reflect the incidence of preventable complications related to medical or surgical inpatient hospital care.

The composite score of all 10 patient safety indicators was used for the study (i.e., PSI-90 composite score). The PSI-90 composite score captures the incidence of all 10 indicators. The numerator represents qualifying discharges with a secondary diagnosis of one of the 10 patient safety indicators. The denominator includes all medical or surgical discharges. The data are risk-adjusted to account for differences in patient characteristics (i.e., demographics), the potential for less accurate reporting from smaller hospitals compared to larger hospitals, and the perceived harm to the patient. PSI-90 composite scores are reported as a rate. For example, a composite score of 2.5 would indicate the hospital reports 2.5 incidents of preventable surgical or medical complications per 1,000 discharges.

Readmission Rates

Hospital-level data for 30-day hospital-wide rate of readmissions were obtained

from the Unplanned Hospital Visit data set. The data for readmission rates are extracted from Medicare enrollment and claims data transmitted to CMS. This measure includes all patients readmitted to a hospital up to 30 days after an inpatient stay, regardless of the diagnosis. The rate is reported as a percentage (i.e., the total number of 30-day hospital-wide readmissions divided by the total number of discharges). The data are risk-adjusted to reflect patient factors (i.e., age, past medical history, and comorbidities) present at the time of admission that makes readmission more likely, as not to unfairly penalize hospitals that care for sicker patients. Hospital-level data for the collection period of July 1, 2016 through June 30, 2018 were used for the analysis.

Discharge Instructions

Information related to the provision of discharge instruction was obtained from the patient surveys (HCAHPS) data set. The HCAHPS survey tool includes two questions addressing discharge information:

- During the hospital stay, did doctors, nurses, or other hospital staff talk with you about whether you would have the help you needed when you left the hospital?
- During this hospital stay, did you get information in writing about what symptoms or health problems to look out for after you leave the hospital?

Patients can answer “yes” or “no.” The composite score for patients who indicated they were given information about what to do during their recovery at home (i.e., patients who answered “yes” to both questions divided by the total number of patients who completed the HCAHPS survey) is reported as a percentage in the hospital-

level data set. The data are risk-adjusted to account for the difference in patient mix (i.e., demographics and medical conditions) across hospitals. For the study, the composite hospital-level data for the percentage of patients answering "yes" for the collection period of July 1, 2016 through June 30, 2018 was used for the analyses.

Patient Satisfaction

The HCAHPS survey is also used to capture information about the patient's experience during their hospital stay. For the study, an item on the survey was used as a measure of patient satisfaction. This item on the survey asks the individual to identify their willingness to recommend the hospital to friends and family. The patient can answer "definitely no," "probably no," "probably yes," and "definitely yes." For the study, the hospital-level data for patients responding "definitely yes" they would be willing to recommend the hospital to friends and family, were used. The data are risk-adjusted to account for the difference in patient mix (i.e., demographics and medical conditions) to allow for objective comparisons across hospitals. Hospital-level data for the collection period of July 1, 2016 through June 30, 2018 were used for the analysis.

Data Analysis Plan

The hospital-level data were analyzed using SPSS (version 27) statistical software. The sample size was comprised of 2,742 hospitals that reported data for all four variables to CMS. Data related to the provision of discharge instructions and willingness to recommend the hospital were extracted from the patient surveys (HCAHPS) data set. Information related to medical or surgical complications was obtained via the PSI-90-

Safety data set and readmission rates from the Unplanned Hospital Visits data set. The risk-adjustments applied to the data by CMS are as follows:

- HCAHPS Survey: Adjusted to account for the difference in patient mix (i.e., demographics and medical conditions) to allow for objective comparisons across hospitals.
- Medical or surgical complications: Adjusted to account for differences in patient characteristics (i.e., demographics), the potential for less accurate reporting from smaller hospitals compared to larger hospitals, and perceived harm.
- Readmission rates: Adjusted to reflect patient factors (i.e., age, past medical history, and comorbidities) present at the time of admission that make readmission more likely. (Medicare.gov, n.d.)

Only hospitals that submitted hospital-level data for all variables were included in the analysis. Also, the data collection period of July 1, 2016 through June 30, 2018 was used for the analysis. Information for medical and surgical complications (i.e., PSI-90 Safety) is reported in 2-year increments (July 1, 2016 through June 30, 2018). However, data for the remaining variables (i.e., readmission rates, discharge instructions, and patient satisfaction) are reported in 1-year increments (July 1, 2016 through June 30, 2017 and July 1, 2017 through June 30, 2018). Therefore, the information in these data sets was combined to incorporate data collected over the 2 years, allowing for alignment between the reporting periods for all the variables.

The research questions and hypotheses for the study are as follows:

Research Question 1: What is the relationship between medical or surgical complications (i.e., how often adult patients had certain serious complications related to medical or surgical inpatient hospital care) and hospital patient satisfaction (i.e., patient's willingness to recommend the hospital to friends and family)?

H_{01}: There is no statistically significant relationship between medical or surgical complications and hospital patient satisfaction.

Ha_1: There is a statistically significant relationship between medical or surgical complications and hospital patient satisfaction.

Data for medical or surgical complications are continuous in nature. Also, data related to patient satisfaction are reported as a percentage in the dataset. Therefore, linear regression was used to analyze the relationship between medical or surgical complications and patient satisfaction. Linear regression determines the likelihood that the independent variable can predict the dependent variable. Statistical significance was established at $p \leq 0.05$.

Research Question 2: What is the relationship between the provision of discharge instructions (i.e., whether patients were given information about what to do during their recovery at home) and hospital patient satisfaction (i.e., patient's willingness to recommend the hospital to friends and family)?

H_{02}: There is no statistically significant relationship between the provision of discharge instructions and hospital patient satisfaction.

Ha_2: There is a statistically significant relationship between the provision of discharge instructions and hospital patient satisfaction.

Data for the provision of discharge instructions and patient satisfaction are continuous in nature (i.e., reported as a percentage). For the analysis, linear regression was used to analyze the relationship between the provision of discharge instructions and patient satisfaction, and determine the likelihood that the independent variable can predict the dependent variable. Statistical significance was established at $p \leq 0.05$.

Research Question 3: What is the relationship between unplanned hospital readmission rates (i.e., rate of 30-day hospital-wide unplanned readmissions after an inpatient stay, regardless of diagnosis) and hospital patient satisfaction (i.e., patient's willingness to recommend the hospital to friends and family)?

H_{03}: There is no statistically significant relationship between unplanned hospital readmission rates and hospital patient satisfaction.

Ha_3: There is a statistically significant relationship between unplanned hospital readmission rates and hospital patient satisfaction.

Similar to Research Questions 1 and 2, linear regression was used to analyze the relationship between readmission rates (i.e., continuous data) and patient satisfaction. Statistical significance was established at $p \leq 0.05$.

Threats to Validity

Researchers can assuredly state that their findings were not a result of chance, bias, or study design if a study is valid. Burkholder, Cox, and Crawford (2016) state that "in research, valid findings accurately describe or reflect the phenomena under study" (p. 102). The current study relied on the accuracy and timeliness of data submission to CMS from hospitals that participate in the Medicare program. If this does not occur, the

potential threat to internal validity impacts the ability to generalize the findings of the study. Furthermore, external validity could be compromised if data is not risk-adjusted consistently by CMS across all sites. Finally, CMS does not identify a sampling methodology to determine which patients receive the HCAHPS survey. Therefore, this could vary from site to site and poses a threat to internal validity.

Ethical Procedures

Only secondary data was used for the study. Also, the hospital-level data extracted from the CMS data sets for analyses had no patient identification information. Therefore, personal health information was not compromised.

Summary

Quantitative research design uses a structured, systematic approach to answer a research question. This approach involves the establishment of research questions and hypotheses, the identification of variables, and the collection and analysis of objective, measurable data. The healthcare administrator can use the information generated from quantitative studies to make meaningful changes in processes that improve patient satisfaction, the delivery of care, and enhance the overall patient experience during a hospital stay. The quantitative research approach has been used in past studies that have examined the relationship between hospital characteristics and patient satisfaction (Craig et al., 2015; Davidson et al., 2016; Lobo Prabhu et al., 2018; Mazurenko et al., 2017; McFarland et al., 2015; McFarland et al., 2017; Salinas et al., 2017; Schmocker et al., 2015). Craig et al. evaluated the relationship between patient satisfaction and pain management, while Lobo Prabhu et al. analyzed the relationship between patient

satisfaction and surgical outcomes. In two separate studies, McFarland et al. looked at how patient satisfaction was influenced by hospital size (i.e., number of beds). Also, the association between patient satisfaction and discharge instructions, readiness for discharge, and readmission rates were studied by Waniga et al., Schmocker et al., and Salinas et al., respectively. Furthermore, the systematic reviews conducted by Davidson et al. and Mazurenko et al., synthesized the findings from studies examining the relationship between patient satisfaction and a single hospital characteristic (e.g., nurse and provider communication, surgical volumes, size, geographic location, type, ownership, use of an electronic medical record) or patient characteristics (e.g., demographic factors, medical conditions). For the current study, this approach allowed me to identify the presence of a relationship between three hospital performance characteristics (independent variables) and patient satisfaction (dependent variable), the strength and directionality of that relationship, and the ability of the independent variable(s) to predict the dependent variable (Creswell & Creswell, 2018). The following section will present the results and findings of the data analyses examining the relationship between the variables.

Section 3: Presentation of Results and Findings

Introduction

Identifying hospital performance characteristics that can predict patient satisfaction is critical to the health care leader seeking to enhance the delivery of quality care and improve organizational financial performance. The purpose of the study was to determine if three hospital performance characteristics can predict patient satisfaction. Data from 2,732 hospitals were used to analyze the relationship between medical or surgical complications, the provision of discharge instructions, and readmission rates and patient satisfaction. In this section, I identify the data collection period and describe how the data were procured, filtered, and analyzed from secondary datasets located in the CMS data base. Next, descriptive data for the independent and dependent variables are presented. The results of the statistical data analysis (i.e., multiple regression) are presented, and the findings used to answer the three research questions. Finally, assumptions associated with linear regression (i.e., linearity, homoscedasticity, normality of errors, and collinearity) are validated.

Data Collection of Secondary Data Sets

Information for the analyses were extracted from data sets in the CMS database. CMS collects quality outcome and performance data from many sources, including claims data, beneficiary surveys, and third parties (e.g., Joint Commission surveys, state agencies). Information for over 4,000 hospitals is stored by CMS in a number of data sets. The three data sets used for the study were PSI-90-Safety, HCAHPS, and Unplanned Hospital Visits.

Data Collection Period

The hospitals in the CMS data base are assigned unique identification numbers. This unique identification number is used consistently across the data sets. The identification number was used to filter the data to determine which hospitals had submitted information for the independent and dependent variables. Therefore, if the identification number was present in the PSI-90-Safety data set, the HCAHPS data sets, and the Unplanned Hospital Visit data sets, information for that hospital was extracted for the analysis.

The PSI-90-Safety data set was used to obtain information for medical or surgical complications. This information is available in 2-year increments and data for the time period of July 1, 2016 through June 30, 2018 were used for the analysis. For this period, 3,177 hospitals reported information related to medical or surgical complications. Alternatively, the HCAHPS data set was used to extract information related to the provision of discharge instructions and patient satisfaction (i.e., willingness to recommend the hospital to friends and family). HCAHPS data are reported in 1-year increments. Therefore, data for discharge instructions and patient satisfaction from July 1, 2016 through June 30, 2017 and July 1, 2017 through June 30, 2018 were averaged for the 3,074 hospitals reporting information in both collection periods. Finally, the Unplanned Hospital Visit data set was used to obtain information for 30-day readmission rates. Similar to information in the HCAHPS data set, readmission rates are reported in 1-year increments. Accordingly, the same methodology (i.e., an average of rates for July 1,

2016 through June 30, 2017 and July 1, 2017 through June 30, 2018 reporting periods) was used for the 3,074 hospitals reporting information in both collection periods.

Once all the data for the independent and dependent variables were extracted, and where appropriate averaged to reflect a uniform collection period, the information was filtered to encompass only those hospitals that reported information for all four variables. The total number of hospitals reporting data for medical or surgical complications, the provision of discharge instructions, readmission rates, and patient satisfaction was 2,732.

Descriptive Data

From a geographic perspective, the 2,732 hospitals in the sample size are located across all 50 states (see Table 2). Additional descriptive data for information related to the independent and dependent variables are summarized in Tables 3 and 4, respectively. Finally, Figures 2 to 5 demonstrate that each variable (independent and dependent) is normally distributed around the mean.

Table 2

Geographic Location of Hospitals in the Sample

State	Number of hospitals	% of hospitals
AK	6	0.2%
AL	66	2.4%
AR	39	1.4%
AZ	43	1.6%
CA	270	9.9%
CO	38	1.4%
CT	21	0.8%
DC	6	0.2%
DE	6	0.2%
FL	156	5.7%
GA	87	3.2%
HI	12	0.4%
IA	33	1.2%
ID	11	0.4%
IL	115	4.2%
IN	80	2.9%
KS	44	1.6%
KY	57	2.1%
LA	75	2.7%
MA	53	1.9%
MD	42	1.5%
ME	15	0.5%
MI	88	3.2%
MN	44	1.6%
MO	62	2.3%
MS	48	1.8%
MT	13	0.5%
NC	72	2.6%
ND	6	0.2%
NE	18	0.7%
NH	12	0.4%
NJ	59	2.2%
NM	24	0.9%
NV	18	0.7%
NY	125	4.6%
OH	111	4.1%
OK	63	2.3%
OR	31	1.1%
PA	129	4.7%

State	Number of hospitals	% of hospitals
RI	10	0.4%
SC	46	1.7%
SD	13	0.5%
TN	72	2.6%
TX	181	6.6%
UT	27	1%
VA	69	2.5%
VT	6	0.2%
WA	42	1.5%
WI	41	1.5%
WV	27	1.0%
Total	n = 2,732	

Note. N = 2,732. Number and percent of hospitals reporting data for all variables.

Table 3

Descriptive Data for Hospital Performance Characteristics

Independent variables	*N*	Minimum	Maximum	Mean	*SD*
Medical or surgical complications	2,732	0.43	3.81	0.99	0.19
Discharge instructions	2,732	68.12%	98.48%	89.95%	3.36%
Readmission rates	2,732	10.44%	20.60%	15.31%	0.79%

Note. Independent variables: medical or surgical complications (rate per 1,000 discharges), discharge instructions (percent responding "Yes" to receiving), and readmission rates (percent of 30-day hospital wide readmissions). *SD* = standard deviation.

Table 4

Descriptive Data for Patient Satisfaction

Dependent variable	*N*	Minimum	Maximum	Mean	*SD*
Patient satisfaction	2,732	32.56%	96.00%	70.84%	9.00%

Note. Dependent variable: percent of patients willing to recommend the hospital to friends and family. *SD* = standard deviation.

Figure 2

Distribution of Data for Medical or Surgical Complications per 1,000 Discharges

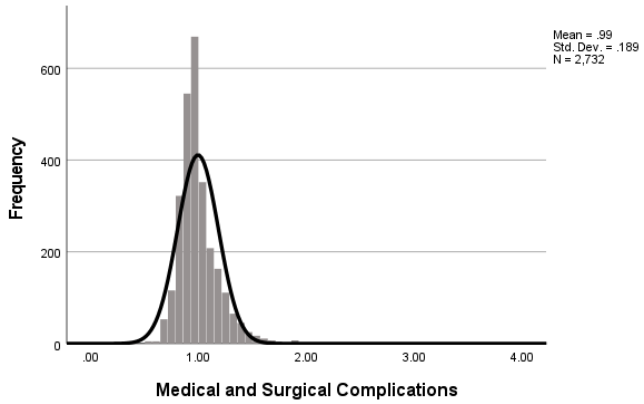


Figure 3

Distribution of Data for Percent of Patients Reporting "Yes" to Receiving Discharge Instructions

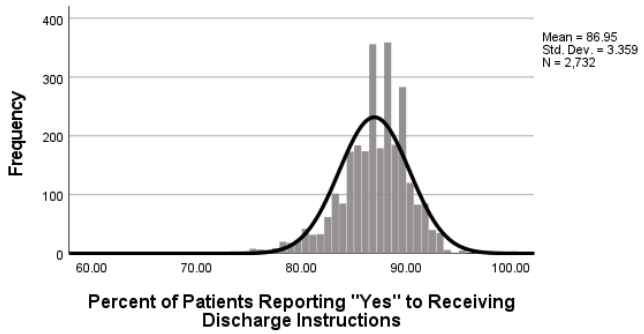


Figure 4

Distribution of Data for Percent of 30-Day Hospital-Wide Readmissions

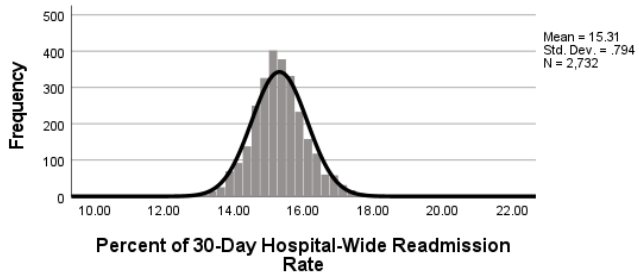
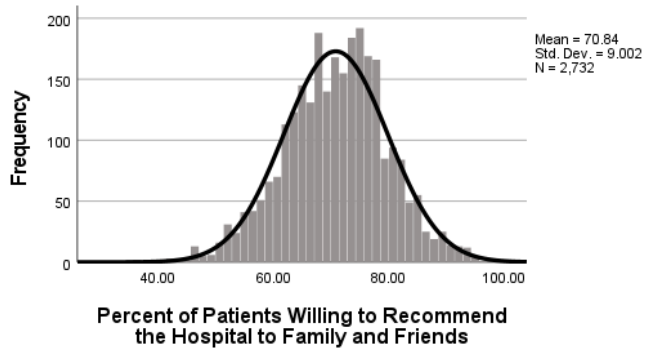


Figure 5

Distribution of Data for Percent of Patients Willing to Recommend the Hospital to Friends and Family



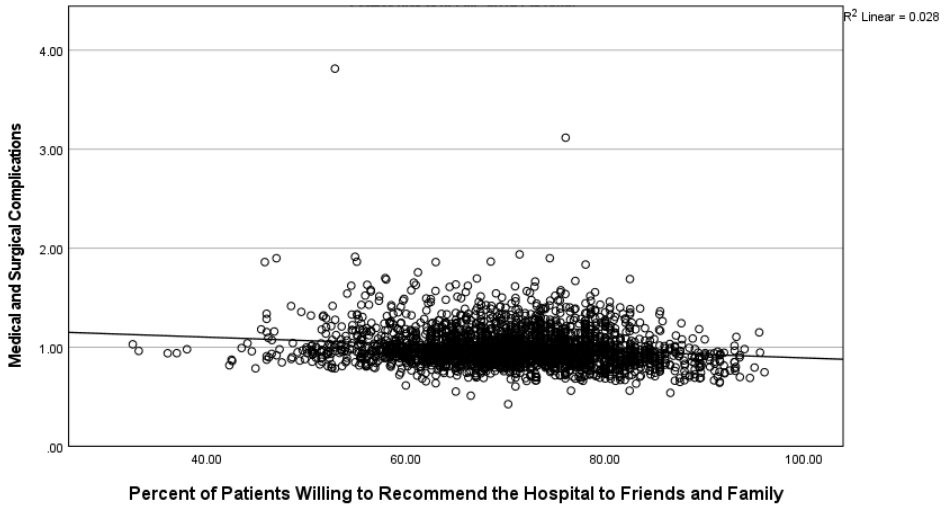
Assumptions

There are four assumptions associated with multiple regression: linearity, homoscedasticity, normality of errors, and collinearity. Figures 6 to 8 demonstrate the linear relationship between the independent variables (medical or surgical complications, discharge instructions, readmission rates) and the dependent variable (patient satisfaction). These findings are significant as they validate the linearity assumption (i.e., there is a linear relationship between the independent and dependent variables). Another assumption, homoscedasticity, assumes that the variance across the independent variables (medical or surgical complications, discharge instructions, readmission rates) are similar

and there is no pattern to their distribution. Figure 9, a scatter plot of the residual versus predicted values, demonstrates that the variances across the independent variables are equally distributed, thereby validating the assumption of homoscedasticity. Normality of errors posits that there is an assumption that the residuals are normally distributed. The normal probability plot of the of the standardized residuals (see Figure 10) demonstrates that this assumption is also met for the regression model. Likewise, the absence of multicollinearity, or correlation among the independent variables, is also an assumption of the regression analysis. Multicollinearity occurs when the independent variables are highly correlated with each other. The variance inflation factor (VIF) identifies the presence and strength of the correlation. A VIF of > 5 would signify the presence of multicollinearity, calling into question the significance of the regression model and the interpretation of the results of the analysis. The values for the VIF ranged from 1.04 to 1.13 for the independent variables (see Table 6). Because the VIF values are not > 5, multicollinearity is not present, and the assumption is validated. Finally, it should be noted that all the data were included in the analysis, including outlier values. Hence, Cook's distance was calculated to determine the influence of any outlier data points on the regression model. Cook's distance was found to be 0.024, significantly less than a value of 1, which is considered to be significant. Therefore, there is negligible influence of outlier values on the regression analysis. Based on the validation of the aforementioned assumptions, the regression analysis is deemed to be valid and reliable.

Figure 6

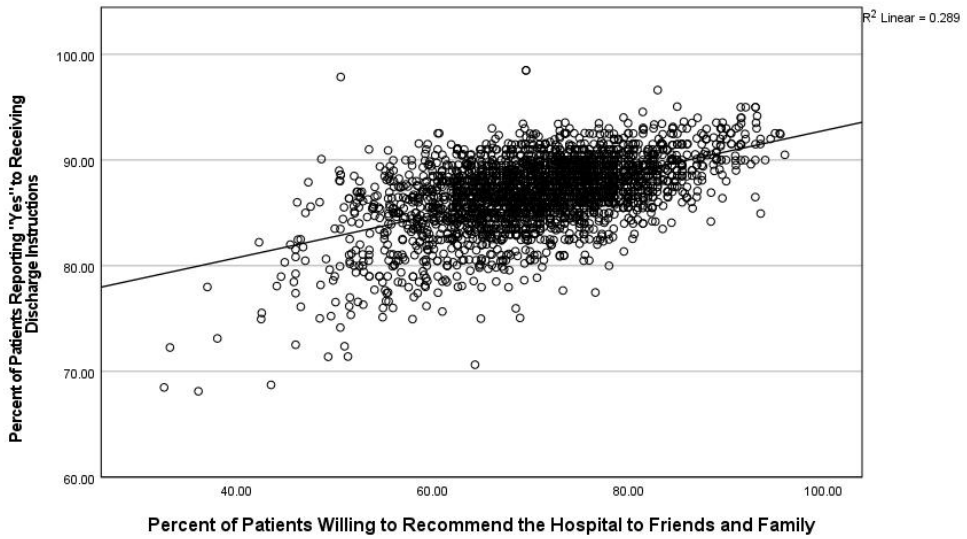
Linear Relationship Between Medical or Surgical Complications and Patient Satisfaction



Note. Each dot represents an individual hospital. Percent of patients willing to recommend the hospital to friends and family (DV) increase as the number of medical or surgical complications (IV) decrease**.**

Figure 7

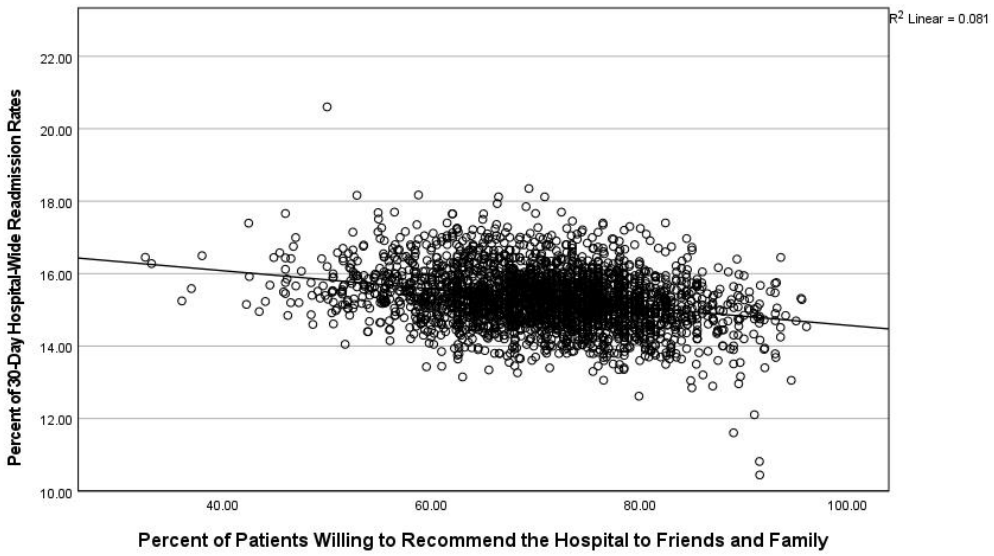
Linear Relationship Between the Provision of Discharge Instructions and Patient Satisfaction



Note. Each dot represents an individual hospital. Percent of patients willing to recommend the hospital to friends and family (DV) increase as the percentage of patients reporting “yes” to receiving discharge instructions (IV) increases.

Figure 8

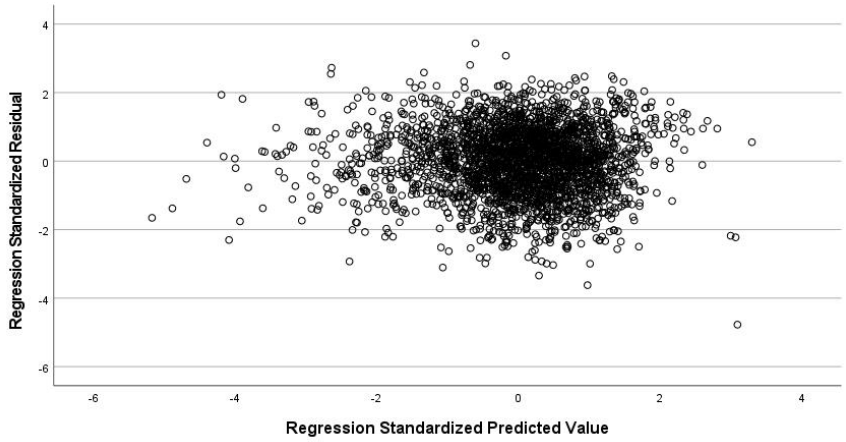
Linear Relationship Between Readmission Rates and Patient Satisfaction



Note. Each dot represents an individual hospital. Percent of patients willing to recommend the hospital to friends and family (DV) increase as the percentage of 30-day hospital-wide readmission rates (IV) decreases.

Figure 9

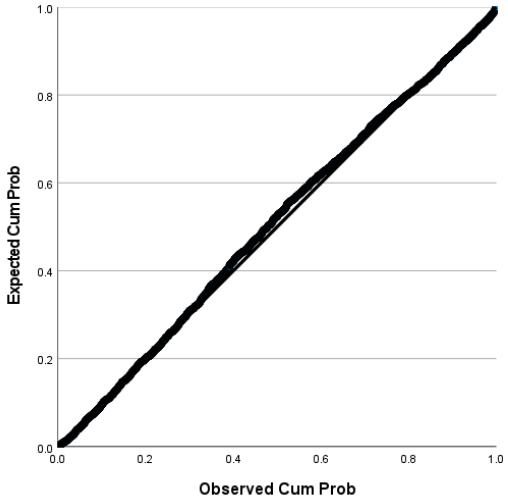
Scatter Plot



Note. Scatter plot of the residual versus predicted values demonstrating homoscedasticity.

Figure 10

Normal Probability Plot



Note. Normal probability plot of the regression standardized residual demonstrating normality of errors.

Statistical Analysis Findings

After information for medical or surgical complications, the provision of discharge instructions, and readmission rates and patient satisfaction were extracted from the CMS database, and adjusted to align with the defined reporting period, the data was entered into the IBM SPSS (Version 27) software tool. A multiple regression analysis was conducted, and the findings are summarized in Tables 5 to 7. The results show that the regression model is statistically significant, $F(3,2728) = 408.14$, $p < .001$. Furthermore, the model indicates that 31.0% ($R^2 = 0.31$) of the variance in patient satisfaction is attributed to hospital performance related to medical or surgical complications, the provision of discharge instructions, and 30-day readmission rates.

Table 5

Multiple Regression Model Summary

Model	*R*	*R* square	Adjusted *R* Square	Standard error of the estimate	Durbin-Watson
1	.58	.31	.31	7.48	1.72

Note. Multiple regression model summary addressing goodness of fit. Predictor variables: (Constant), medical or surgical complications, discharge instructions, and readmission rates.

Table 6

ANOVA Statistics for the Multiple Regression Model

Model	Sum of squares	*df*	Mean Square	*F*	*p*
Regression	68566.21	3	22855.40	408.14	<.001
Residual	152766.99	2728	56.00		
Total	221333.19	2731			

Note. *df* = degrees of freedom; *F* = F distribution.

Table 7

Multiple Regression Analysis Results

Variable	*B*	*SE*	β	*t*	*p*	95% CI	VIF
Medical or surgical complications	-3.73	0.77	-0.08	-4.84	<.001	[-5.25,-2.22]	1.04
Discharge instructions	1.32	0.05	0.49	29.17	<.001	[1.23, 1.40]	1.11
Readmission rates	-1.32	0.19	-0.12	-6.86	<.001	[-1.69,-.94]	1.13

Note. *B* = unstandardized regression coefficient; *SE* = standard error; β = standardized regression coefficient; CI = confidence intervals; VIF = variance inflation factor.

Research Question 1

What is the relationship between medical or surgical complications (i.e., how often adult patients had certain serious complications related to medical or surgical inpatient hospital care) and hospital patient satisfaction (i.e., patient's willingness to recommend the hospital to friends and family)?

Regression analysis was selected to analyze the relationship between medical or surgical complications and patient satisfaction, and the ability of the former to predict the latter. The results of the multiple regression analysis (see Table 8) indicate that when readmission rates and the provision of discharge instructions are held constant, a significant ($p < .001$) but weak ($\beta = -0.08$) inverse relationship exists between medical or surgical complications and patient satisfaction. Thus, as the rate of medical or surgical complications increased, patient satisfaction scores decreased. The regression coefficient (B = 3.73, 95% C.I. [-2.22,-5.25]) indicates that for each additional incident of a medical or surgical complication, patient satisfaction scores decreased by 3.73%. Also, the VIF was 1.04, indicating a negligible correlation between medical or surgical complications and the remaining independent variables. The regression model was statistically significant, $F(3,2728) = 408.14$, $p < .001$, indicating that medical or surgical complications can predict patient satisfaction (see Table 9).

Table 8

Multiple Regression Analysis – Patient Satisfaction and Medical or Surgical Complications

Independent Variable	*B*	*SE*	β	*t*	*p*	95% CI
Medical or surgical complications	-3.73	0.77	-0.08	-4.84	<.001	[-5.25, -2.22]

Note. Coefficients for the multiple regression analysis results for patient satisfaction and the incidence of medical or surgical complications. *B* = unstandardized regression coefficient; *SE* = standard error; β = standardized regression coefficient; CI = confidence intervals; VIF = variance inflation factor.

Table 9

ANOVA Statistics for the Regression Model

Model	Sum of squares	*df*	Mean square	*F*	*p*
Regression	68566.21	3	22855.40	408.14	<.001
Residual	152766.99	2728	56.00		
Total	221333.19	2731			

Note. *df* = degrees of freedom; *F* = Fisher's F ratio.

Research Question 2

What is the relationship between the provision of discharge instructions (i.e., whether patients were given information about what to do during their recovery at home) and hospital patient satisfaction (i.e., patient's willingness to recommend the hospital to friends and family)?

Regression analysis was selected to analyze the relationship between the provision of discharge instructions and patient satisfaction, and the ability of the former to predict the latter. The results of the multiple regression analysis (see Table 10) indicate that when medical or surgical complications and readmission rates are held constant, a significant ($p < .001$) but moderate ($\beta = 0.49$) positive relationship exists between the provision of discharge instructions and patient satisfaction (i.e., patient satisfaction scores were higher for those patients who reported receiving discharge instructions). The unstandardized coefficient (B = 1.32, 95% C.I. [1.23, 1.40]) indicates that for each additional 1% increase in the rate of respondents reporting that they were provided with discharge instructions, patient satisfaction scores increased by 1.32%. The VIF was 1.11, indicating a negligible correlation between the provision of discharge instructions and the remaining independent variables. The regression model was statistically significant, $F(3,2728) = 408.14$, $p < .001$, indicating that the provision of discharge instructions can predict patient satisfaction (see Table 11).

Table 10

Multiple Regression Analysis – Patient Satisfaction and Discharge Instructions

Independent Variable	*B*	*SE*	β	*t*	*p*	95% CI
Discharge instructions	1.32	0.05	0.49	29.17	<.001	[1.23, 1.40]

Note. Coefficients for the multiple regression analysis results for patient satisfaction and the provision of discharge instructions. *B* = unstandardized regression coefficient; *SE* = standard error; β = standardized regression coefficient; CI = confidence intervals; VIF = variance inflation factor.

Table 11

ANOVA Statistics for the Regression Model

Model	Sum of squares	*df*	Mean square	*F*	*p*
Regression	68566.21	3	22855.40	408.14	<.001
Residual	152766.99	2728	56.00		
Total	221333.19	2731			

Note. *df* = degrees of freedom; *F* = Fisher's *F* ratio.

Research Question 3

What is the relationship between unplanned hospital readmission rates (i.e., rate of 30-day hospital-wide unplanned readmissions after an inpatient stay, regardless of diagnosis) and hospital patient satisfaction (i.e., patient's willingness to recommend the hospital to friends and family)?

Regression analysis was selected to analyze the relationship between readmission rates and patient satisfaction, and the ability of the former to predict the latter. The results of the multiple regression analysis (see Table 12) indicate that when medical or surgical

complications and the provision of discharge instructions are held constant, a significant (p <. 001) but weak (β = -0.12) inverse relationship also exists between readmission rates and patient satisfaction (i.e., patient satisfaction scores were lower for patients who had a readmission). The unstandardized coefficient (B = -1.32, 95% C.I. [-1.69, -.94]) indicates that for each additional 1% increase in the readmission rate, patient satisfaction decreased by 1.32%. Lastly, the VIF was 1.13, indicating a negligible correlation between readmission rates and the remaining independent variables. The regression model was statistically significant, F(3,2728) = 408.14, p < .001, indicating that readmission rates can predict patient satisfaction (see Table 13).

Table 12

Multiple Regression Analysis - Patient Satisfaction and Readmission Rates

Independent Variable	*B*	*SE*	β	*t*	*p*	95% CI
Readmission rates	-1.32	0.19	-0.12	-6.86	<.001	[-1.69, -.94]

Note. Coefficients for the multiple regression analysis results for patient satisfaction and unplanned 30-day hospital-wide readmission rates. *B* = unstandardized regression coefficient; *SE* = standard error; β = standardized regression coefficient; CI = confidence intervals; VIF = variance inflation factor.

Table 13

ANOVA Statistics for the Regression Model

Model	Sum of squares	*df*	Mean Square	*F*	*p*
Regression	68566.21	3	22855.40	408.14	<.001
Residual	152766.99	2728	56.00		
Total	221333.19	2731			

Note. *df* = degrees of freedom; *F* = Fisher's *F* ratio.

Summary

Data for 2,732 hospitals for the collection period of July 1, 2016 through June 30, 2018, was extracted from the CMS database and analyzed. The regression analysis identified statistically significant ($p < 0.001$) relationships between patient satisfaction and the three hospital performance characteristics. This would indicate that patient satisfaction can be predicted from the incidence of medical or surgical complications, the provision of discharge instructions, and readmission rates. The provision of discharge instructions had the strongest relationship ($\beta = 0.49$) with patient satisfaction. Alternatively, medical or surgical complications and readmission rates had weak, inverse relationships ($\beta = -0.08$ and $\beta = -0.12$, respectively) with patient satisfaction. The analysis also demonstrated negligible correlations among the independent variables (i.e., multicollinearity is absent from the regression model).

The analysis indicates that the null hypotheses for the three research questions can be rejected. The findings support that there is a statistically significant relationship between hospital performance characteristics (i.e., medical or surgical complications, the provision of discharge instructions, and readmission rates) and patient satisfaction and

that the former can predict the latter. Health care leaders looking to improve patient satisfaction scores should explore improvements in processes that mitigate the risk of medical or surgical complications and hospital readmissions. Furthermore, given that the provision of discharge instruction had the best ability to predict patient satisfaction, enhancing the discharge planning process to include comprehensive instruction should be a priority for the health care leader.

The following section summarizes the key findings of the study, describes how the results contribute to the current body of literature, interprets the findings in the context of the theoretical framework, summarizes the limitations of the study and makes recommendations for future research, and identifies the implications for professional practice and social change.

Section 4: Application to Professional Practice and Implications for Social Change

Introduction

The purpose of the quantitative research study was to determine if three hospital performance characteristics (i.e., medical or surgical complications, the provision of discharge instructions, and readmission rates) could predict patient satisfaction scores. The health care leader can use this information to improve the delivery of care and improve the organization's financial performance. Furthermore, understanding which factors predict patient satisfaction can also lead to positive social change through improved quality of care, decreased health care costs, and enhanced population health.

Information extracted from the CMS database was used to conduct a regression analysis. Hospitals that reported data for the independent and dependent variables for the reporting period of July 1, 2016 through June 30, 2018 were included in the sample (N = 2,732). The findings indicated that the independent variables (i.e., the rate of medical or surgical complications, patients reporting “yes” to receiving discharge instructions, and 30-day hospital-wide readmission rates) have a significant relationship ($p < 0.001$) with the dependent variable (i.e., willingness to recommend the hospital to friends and family) and could be used to predict patient satisfaction. The provision of discharge instructions could best predict patient satisfaction ($\beta = 0.49$), while the incidence of medical or surgical complications ($\beta = -0.08$) and readmission rates ($\beta = -0.12$) had weaker predictive abilities. Moreover, the analysis indicated that the regression model was statistically significant ($p < 0.001$), and further evaluation validated the assumptions for

regression analysis (i.e., linearity, homoscedasticity, normality of errors, and collinearity).

The findings from the current study align with the conclusions from previous research studies that identified a relationship between hospital performance characteristics and patient satisfaction scores. For instance, Chen et al. (2020) identified a significant negative correlation ($p < 0.001$) between readmission rates and patient satisfaction after analyzing hospital-level HCAHPS data from over 2,700 hospitals. Similar to the current study, patient satisfaction scores were lower in hospitals with higher readmission rates. Also, studies by Kang et al. (2019), Schmocker et al. (2015), and Waniga et al. (2016) identified a relationship between providing discharge instructions and patient satisfaction scores. In these studies, patient satisfaction scores were higher when patients received comprehensive instructions prior to discharge from the hospital setting. Furthermore, the study by Lobo Prabhu et al. (2018) revealed statistically significant lower patient satisfaction scores when surgical complications were present. This finding was echoed in studies by Odom-Maryon et al. (2019) and Rochon et al. (2016). Therefore, the current study affirms the association between hospital performance characteristics and patient satisfaction identified in the literature. However, this study also demonstrated that these characteristics could predict patient satisfaction scores. In doing so, the findings further refine the relationship between hospital performance characteristics and patient satisfaction.

The theoretical framework used for the study was Andersen's model of healthcare utilization – Phase 5 (Andersen, 2008). The model postulates that contextual factors

(including hospital performance characteristics), individual characteristics, and health behaviors could explain and predict the use of healthcare services. Furthermore, Anderson's model identified consumer (patient) satisfaction as an outcome measure of health care utilization and a predictor of the use of health care services (Anderson, 2008; Anderson & Newman, 2005; Babitsch et al., 2012). The current study validated Anderson's theory in that the findings support the concept that patient satisfaction can be predicted from data for hospital performance characteristics (i.e., medical or surgical complications, readmission rates, and the provision of discharge instructions). The significant ($p < .001$) statistical findings suggest that patient satisfaction scores were higher when patients were provided discharge instructions. Conversely, satisfaction scores were lower if a patient experienced a medical or surgical complication during their hospital stay or if they were readmitted to the hospital within 30 days of discharge.

Limitations of the Study

While the findings were significant, there were limitations associated with the study. First, although the sample size was large (2,742), it only included those hospitals that reported data for all four variables (i.e., medical or surgical complications, the provision of discharge instructions, readmission rates, and patient satisfaction), thereby excluding data from nearly 2,000 hospitals. Also, only three hospital performance characteristics were analyzed for their ability to predict patient satisfaction. There are numerous hospital characteristics (e.g., ownership, number of beds, mortality rates, physician communication, etc.) that could be analyzed for their ability to predict patient satisfaction. Furthermore, the 2-year reporting period used for the study (July 1, 2016

through June 30, 2018) may have also led to the exclusion of hospitals if they did not submit data for that period. Finally, the validity of the information in the data sets are contingent upon hospitals accurately collecting and reporting information and CMS consistently applying the same methodology when risk-adjusting the data. Consequently, the ability to generalize the current study's findings is hampered by these limitations.

Recommendations

The current study analyzed three hospital performance characteristics and their ability to predict patient satisfaction. Further research examining the relationship between additional hospital performance characteristics and how structural (e.g., hospital size) and geographical factors influence patient satisfaction scores would further enhance the body of knowledge. Also, expanding the reporting period beyond 2 years may allow more hospitals to be included in the sample size, allowing the data to be more generalized.

Implications for Professional Practice and Social Change

The study findings support the notion that performance characteristics can predict patient satisfaction in the hospital setting. Patients who reported receiving discharge instructions were more willing to recommend the hospital to friends and family. In contrast, patients who experienced a medical or surgical complication or required readmission were less likely to recommend the hospital. Therefore, directing resources to enhance patient and family education prior to discharge would have the most impact on patient satisfaction scores, based on the study findings. Likewise, prioritizing quality improvement initiatives aimed at reducing the incidence of medical or surgical and hospital readmissions could also lead to higher patient satisfaction scores. The health care

leader can use this information to guide decisions related to process improvements to improve the patient experience.

Identifying which hospital performance characteristics predict patient satisfaction is valuable to the health care leader for many reasons. First, patient satisfaction has been linked to the delivery of quality care (Al-Abri & Al-Balushi, 2014; Kraska et al., 2017). Enhanced quality of care is also associated with decreased health care costs (Huerta et al., 2016; Lee et al., 2016; Porter et al., 2016; Stanowski et al., 2015; Upadhyay et al., 2019). Therefore, health care leaders must look to which factors drive higher patient satisfaction scores to improve the quality of care in the hospital setting and aid in decreasing health care costs for the consumer. Furthermore, the health care administrator must also be focused on the organization's financial performance. Data related to quality outcome measures (e.g., readmission rates) and patient satisfaction scores are increasingly being used by payers to determine reimbursement for hospital services. Additionally, patients have access to hospital performance outcome data and can use this information to decide where to receive services. Hence, the financial performance of a health care organization is dependent on the delivery of quality care and how satisfied the patients are with their hospital experience.

The implications of the study findings to positive social change can be seen at the individual, community, and population levels. As indicated, patient satisfaction scores are reflective of quality of care (Al-Abri & Al-Balushi, 2014; Kraska et al., 2017). Therefore, hospitals that achieve higher patient satisfaction scores likely deliver better care. Enhancing the quality of care in the hospital setting can also lead to decreased health care

costs (Huerta et al., 2016; Lee et al., 2016; Porter et al., 2016; Stanowski et al., 2015; Upadhyay et al., 2019). Decreasing health care costs is critical as it allows greater access to needed services for all members of the community. Improving access to care can enhance health outcomes at the individual and population levels by encouraging preventative care, and mitigating the risk of developing a chronic condition, reducing hospital admissions, decreasing mortality rates, etc. Furthermore, hospitals that provide an optimal patient experience benefit from better reimbursement rates, allowing them to remain financially viable. All these factors lead to positive social change through improved health and wellness and quality of life for individuals in the community.

Conclusion

The goal of the study was to determine if specific hospital performance characteristics could predict patient satisfaction. The findings support that medical or surgical complications, readmission rates, and the provision of discharge instructions can predict performance related to patient satisfaction scores. With this information, health care leaders can identify effective interventions that can improve patient satisfaction scores and the delivery of quality care. This outcome ensures hospital financial viability and enhances the health and well-being of individuals in the communities where hospital services are provided. Ultimately, this result can lead to positive social change through decreased health care costs, a better quality of life, and enhanced population health.

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