2022

Comparison Between Hospital Ownerships in the Prevention of Surgical Site Infections

Kameha Johnson
Walden University

Walden University

College of Management and Human Potential

This is to certify that the doctoral study by

Kameha Johnson

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Rabeh Hijazi, Committee Chairperson, Health Sciences Faculty
Dr. Kristin Wiginton, Committee Member, Health Sciences Faculty
Dr. Suzanne Richins, University Reviewer, Health Sciences Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2022

Abstract

Comparison Between Hospital Ownerships in the Prevention of Surgical Site Infections

by

Kameha Johnson

MHA, Walden University, 2017

BBA, Strayer University, 2015

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Healthcare Administration

Walden University

November 2022

Abstract

Millions of Americans seek health care for surgical interventions throughout the United States. Despite the 2010 Affordable Health Reform Act, hospital-acquired infections (HAIs) are still rising. Specifically, surgical site infections (SSIs) are a national problem in both non-profit and for-profit hospitals. SSIs are the third most commonly reported HAIs and account for 14%-16% of HAIs among U.S. patients. The purpose of this quantitative study was to determine an association between the independent variable of the type of hospital ownership (i.e., non-profit and for-profit), and SSI rates, health care utilization cost (i.e., readmission rates and LOS), and patient outcome measures (i.e., mortality and morbidity rates) as the dependent variables with National Surgical Quality Improvement Program among post-operative patients. Guided by the Bertalanffy's general systems theory, a sample size of 548 was analyzed using an independent sample t-test, MANOVA and ANOVA as the statistical tests. Based on analysis findings, the relationship between variables was not statistically significant. This research contributes to positive social change by providing awareness to healthcare administrators and health providers to demonstrate the compliance of infection control practices. It also helps healthcare administrators, and clinicians to create policies that optimize "The Triple Aim" of the Affordable Care Act to improve patient care for both preoperative and post-operative patient populations.

Comparison Between Hospital Ownership in the Prevention of Surgical Site Infections

by

Kameha Johnson

MHA, Walden University, 2017

BBA, Strayer University, 2022

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Healthcare Administration

Walden University

November 2022

Dedication

This dissertation is dedicated to my immediate family and all the little brown girls who have struggled to strive while feeling undervalued in society. A special thank you to my husband Kevin, my children Deion & Brianna, my siblings Devonte & Andre, and my mother Cynthia. There were moments where I've had self-doubt and you've all believed in me more than I believed in myself. Having a strong support system is pivotal.

Mommy, as a single mother you've always put your children first. Your hard work, strong work ethic and sacrifices never went unnoticed. To my lovely grandmother Ivy who is no longer with us, I did it! Mama, I'm the first doctoral graduate in the family. My only wish is that you were here to witness. I love you all!

Acknowledgments

I would like to thank God first and foremost. Throughout this journey you've carried me. Without you none of this would be possible. To Overseer Jackie your weekly prayer calls helped me through many challenging moments during this process. To Dr. Robert Hijazi, Dr. Kristin Wiginton, and Dr. Suzanne Richins without your leadership and guidance I would not have been able to complete this process. There are not enough words to express my gratitude. Thanks a million!

Table of Contents

List of Tables

Section 1: Foundation of Study and Literature Review

Each year millions of Americans seek health care for surgical interventions throughout the United States. Patients are recipients of care in both non-profit and for-profit health systems. Despite the passage of the 2010 Affordable Health Reform Act, hospital-acquired infections (HAI) are still on the rise (Centers for Disease Control and Prevention [CDC], n.d.). This study addressed the relationship between hospital ownership type, surgical site infection (SSI) rates, health care utilization cost (i.e., readmission rate, length of stay (LOS), and patient outcome measures (i.e., mortality and morbidity rates). Section 1 will present the problem statement, purpose and nature of the study, research questions and hypotheses, theoretical framework, assumptions, delimitations, scope, limitations, strategies, and overall significance of the study. In Section 2, data collection, research design, and the analyses of variables will be described.

Problem Statement

SSIs are a national problem that plagues the health care sector, including non-profit and for-profit hospitals (CDC, n.d.). In 2019, the CDC estimated that there were 157,500 SSIs out of 14.2 million surgical procedures. SSIs are the third most commonly reported HAIs and account for 14%–16% of HAIs among the U.S. patients (Badia, Casey, Crosby, Hudson & Mitchell, 2017). SSI is the costliest HAI, with an estimated annual cost of $3.3 billion associated with roughly 1 million in-patient days (CDC, 2019). Hospitals incur costs of $29,000 per patient who suffers from SSI complications (Anderson, 2016). The increased health care utilization cost associated with SSIs is

reflected in increased readmission rates, increased LOS, and patient outcomes, including mortality and morbidity rates (Badia et al., 2017). For instance, up to 25% of post-operative patients experience complications that lengthen hospital stay (Woodfield et al., 2019).

An estimated 40%–60% of SSIs are preventable but remain a substantial cause of morbidity despite advances in infection control practices such as improved operating room ventilation, hand hygiene practices, and antimicrobial availability prophylaxis (CDC, 2016; McDermott et al., 2017). Further, despite several studies on improving patient experiences, including infection control in non-profit and for-profit health systems (Joynt et al., 2019; Meyers et al., 2019), no research comparing non-profit and for-profit hospitals with quality performance initiatives in the prevention of SSIs among the post-operative patient population. Non-profit and for-profit hospitals have a financial incentive to reduce SSI rates due to a government mandate for accountability and improved patient care (Sohn & Timmermans, 2017). There are nearly three times as many non-profit hospitals as for-profit hospitals in the United States (American Hospital Association, 2018). Though non-profit hospitals are tax-exempt and service-driven, and for-profit hospitals focus on stakeholders with services tha are business-driven, both health systems share the same legal regulations. In non-profit versus for-profit hospitals, it is critical to understand if there is a difference in SSI rates between non-profit and for-profit hospitals with quality performance initiatives like the National Surgical Quality Improvement Program (NSQIP), which was cultivated enhanced surgical patient care (American College of Surgeons, n.d.).

Results from this study may provide programmatic implications in the implementation of quality initiative programs, especially among non-profit hospitals with medical students and resident doctors in training. For example, making sure that medical students and residents train in the hospital's infection and quality performance initiatives. This study compared SSI rates, health care utilization cost (measured as readmission rates and LOS per admission), and patient outcome measures (i.e., morbidity and mortality rates) between non-profit and for-profit hospitals with quality performance initiatives (i.e., NSQIP) in the prevention of surgical site infections among the post-operative patient population. The study may also provide a recommendation to critical stakeholders for policies that optimize "The Triple Aim" of the Affordable Care Act that highlights social change through delivering better care, healthy people, and communities (Sohn et al., 2017). Improving the quality of health services requires the shared responsibility of administrators, practitioners, and communities.

Purpose of the Study

The purpose of this quantitative retrospective review study was to determine the relationship between the type of hospital ownership (i.e., non-profit versus for-profit) with the NSQIP program and the prevention of surgical site infections among post-operative patients. First, this study determined the difference in SSIs' overall rate between non-profit and for-profit hospitals with the NSQIP program. Next, this study determined differences in health care utilization costs measured as readmission rates and LOS among post-operative patients with an SSI between non-profit and for-profit hospitals with NSQIP. Finally, this study determined the difference in patient outcome

measures (i.e., mortality and morbidity rates) among post-operative patients with SSI between non-profit and for-profit hospitals with NSQIP.

Research Questions and Hypotheses

RQ 1: Is there a difference between non-profit and for-profit hospitals with NSQIP in SSI rates among post-operative patients?

$H_0$1: There is no significant difference between non-profit and for-profit hospitals with NSQIP program in SSI rates among post-operative patients.

H_a1: There is a significant difference between non-profit and for-profit hospitals with NSQIP program in SSI rates among post-operative patients.

RQ 2: Is there a difference between non-profit and for-profit hospitals with NSQIP in health care utilization cost (i.e., readmission rates and LOS) among post-operative patients with surgical site hospital-acquired infection?

$H_0$2: There is no significant difference between non-profit and for-profit hospitals with NSQIP in health care utilization cost (i.e., readmission rates and LOS) among post-operative patients with surgical site hospital-acquired infection.

H_a2: There is a significant difference between non-profit and for-profit hospitals with NSQIP in health care utilization cost (i.e., readmission rates and LOS) among post-operative patients with surgical site hospital-acquired infection.

RQ 3: Is there a difference between non-profit and for-profit hospitals with NSQIP ownership type patient outcome measures (i.e., mortality and morbidity rates) among post-operative patients with surgical site hospital-acquired infection?

$H_0$3: There is no a significant difference between non-profit and for-

profit hospitals with NSQIP in ownership type patient outcome measures (i.e., mortality and morbidity rates) among post-operative patients with surgical site hospital-acquired infection.

H_a3: There is a significant difference between non-profit and for-profit hospitals with NSQIP in ownership type patient outcome measures (i.e., mortality and morbidity rates) among post-operative patients with surgical site hospital-acquired infection.

Theoretical Foundation for the Study

In quantitative studies, theories or conceptual frameworks comprise interrelated sets of constructs that describe the relationships among variables (Creswell, 2017). This quantitative study's theoretical framework was Bertalanffy's (1968) general systems theory (GST) principles. The GST was defined as a set of elements standing in interrelation among themselves and with the environments. Bertalanffy (1969) noted that a consequence of the existence of general system properties is the appearance of structural similarities in different fields.

Systems theory's underlying principle may be intuitive primarily to health care professionals (Anderson, 2016). Health systems have four individual levels: (a) the patient; (b) the team and practitioners; (c) the organization (i.e., hospital) that supports the training and education of teams by providing infrastructure and resources; and (d) the political and economic environment (e.g., regulatory, and markets), the conditions under which organizations, care teams, individual patients, and individual care providers operate (Shortell et al., 2016). Hospital correspondences in the principles govern intrinsically widely different (Bertalanffy, 1969). The GST theory has essential value in

helping administrators detect problems that a program (i.e., NSQIP) is attempting to solve and its many facets (Anderson, 2016). GST is a tool that goes beyond innovation and adoption. GST allows leaders to detect patterns and system failures through a linear process (Anderson, 2016).

The GST theory was appropriate for this doctoral study when comparing hospital ownership types (i.e., non-profit and for-profit). Bertalanffy's theory is a method for examining complex organizational change by improving the quality and safety of health care served by a deeper understanding of how innovations spread throughout systems and subsystems (Agency for Healthcare and Research Quality, 2018). The application of Bertalanffy's (1968) GST theory may detect patterns and gaps that create system failures, which may include identifying conditions like staffing shortages, increased surgical volumes, room turnover time, improper cleaning of rooms, and instrumentation, impacting individual patient outcomes and care efficiency (Anderson, 2016). The GST theory also provides a health care framework that can reduce adverse events (i.e., surgical complications), improve quality performance, and individualized accountability of control practices in operating room settings. The theory's framework aligns with the problem statement because this study's results can provide programmatic information and implications relevant to healthcare leadership and administration and infection control.

Nature of Study

The nature of this study is a quantitative retrospective review of an archival dataset. When conducting research, a retrospective review requires the use of secondary data. This study determined the relationship between the type of hospital ownership (i.e.,

non-profit and for-profit) as the independent variable and dependent variables. The dependent variables included SSI rates, health care utilization cost (i.e., readmission rates and LOS), and patient outcome measures (i.e., morbidity and mortality rates). The results of this study can provide helpful information that can benefit quality improvement initiatives in health systems, specifically in the surgical service department.

Literature Search Strategy

Classifying literature relevant to the study required research using various databases and articles. I used the Walden University online library to search a variation of key phrases (i.e., *SSI rates in healthcare, non-profit, for-profit sectors, and Bertalanffy's General Systems Theory*). Surveys from the CDC Database defined the prevalence and statistical analysis of SSI rates (CDC, n.d.). The CDC data also provided detailed information on Medicaid, Medicare, quality measures, and hospital ownership type. The NSQIP dataset was used to examine the reduction of SSIs by evaluating the NSQIP program implementation through the assessment of healthcare utilization costs that translate into readmission rates, LOS, and outcomes of both morbidity and mortality rates (American College of Surgeons, n.d.).

The literature search includes a review of articles published within the past 5 years. Studies reviewed included a timeline of (2016 to 2020). Sources for peer-reviewed article retrieval include the Agency for Research Quality, American Hospital Association, The National Institute of Health, Google Scholar, Research Gate, PubMed, ProQuest, Sage Journal, and Medline. Articles on various research designs (i.e., quasi-experimental, pilot studies, Meta-analyses, randomized, controlled, and non-randomized) were sources

to establish the groundwork for this retrospective study. Critical phrases used in the literature search linked the significance of themes described in each doctoral study section.

Hospital Ownership Types

The health care sector in the United States consists of clinicians, hospitals, and other health care facilities as well as insurance plans; these can be privately or publicly owned (Institute of Medicine, n.d.). There are nearly three times as many non-profit hospitals as for-profit hospitals in the United States (American Hospital Association, 2018). Organizational theories on both types of hospital ownership vary. Miller (2017) conducted an empirical study on hospital ownership and concluded that stakeholders in structural environments have a difference in behavior in health systems throughout the United States. Their study also suggests that government and regulatory agencies and businesses within communities influence non-profit versus for-profit behaviors. The government may be more vested due to non-profit hospitals' transparency and stewardship of community wellness (Lu, 2017). Despite several studies on improving patient experiences, including infection control in non-profit and for-profit health systems (Myers et al., 2019; Joynt et al., 2019), no research compared non-profit and for-profit hospitals with quality performance initiatives in the prevention of SSIs among the post-operative patient population.

Characteristics of Non-Profit and For-Profit Hospitals

Quality care and health outcomes vary among hospitals in the public and private sectors (Carmona et al., 2017). For-profit systems maximize value through

efficiency for stakeholders, whereas non-profits are interested in meeting the demands of patients regardless of surplus or inefficiencies (Min et al., 2019). Non-profit ownership is community-based tax-exempt entities. Section 501(c) of the Internal Revenue Code of 1986 exempts corporations, community chests, foundations, charitable, religiously exclusive operated, research-based, and educational institutions (Internal Revenue Services [IRS], n.d.). Additionally, no net earnings can benefit shareholders. The IRS (n.d.) highlighted several characteristics that non-profit hospitals must meet as criteria to maintain exempt status: (a) operate emergency services to all community members despite their ability to pay; (b) controlled by a board of trustees composed of civic leaders; (c) have hospitals available to all qualified practitioners; (d) utilize net revenue to expand organization, research, and medical training; and (e) in-patient services for all patients within the community regardless of their ability to pay (IRS, n.d.). In contrast, for-profit hospital ownership types are business-driven entities that generate income for their shareholders. Profits made by products and services measure the level of success. This ownership type is taxed based on net revenue (IRS, n.d.).

Despite differences between the hospital types, non-profit and for-profit health systems share the same legal regulations. In non-profit versus for-profit hospitals, it is critical to understand if there is a difference in SSI rates between non-profit and for-profit hospitals with quality performance initiatives (i.e., NSQIP). Residents in training and medical students may not be vigilant of policies and procedures. The NSQIP provides participating hospital administrative databases with tolls, analyses, and reports to make informed decisions about improving quality healthcare (Ellis, 2018; Uthayasanka et al.,

2017).

System Trends and Challenges by Type of Hospital Ownership

By implementing quality initiative solutions such as the NSQIP, hospitals may find solutions to remedy or gain perspectives on reducing SSIs. Researchers who have examined the relationship between quality initiatives in reducing SSIs have reached different conclusions. Edelsburgh et al. (2018) concluded that guidelines for reducing SSI rates do not address "grey areas" on the care continuum, i.e., the post-operative nature of patient care. Patients may live in unclean environments. According to the World Health Organization (WHO), SSIs are mostly avoidable than any other HAI.

SSI prevention requires the successful implementation of infection control practice guidelines such as a surgical safety checklist, including timely administration of preoperative antibiotic prophylaxis and ensuring sterility in the operating room (2018). The process of reducing SSI complications requires an in-depth analysis of both mortality and morbidity rates and processes such as surgical volume and outcomes (Clifford, 2017). System trends can be utilized as an investment for improvement internationally in healthcare organizations. For example, (Carmona et al. , 2017) used the International Quality Improvement Collaborative framework in their study to assess the impact of IQIC on post-operative outcomes. IQIC created a tailored Quality Improvement (QI) strategy to reduce mortality and major complications.

A comparison of hospital ownership types may add more credibility to improving outcomes. In addition to IQIC, the NSQIP, built by surgeons for surgeons, provides participating hospitals' administrative databases with tolls, analyses, and reports to make

informed decisions about improving quality healthcare (Ellis, 2018; Uthayasankar et al., 2017). The NSQIP database identifies risks associated with post-operative complications. Ellis, Liu, and Clifford (2018) analyzed proxies using the NSQIP program within their study on Veteran Affairs health systems. Researchers identified that administrative data were limited in their ability to provide clinical detail for risk adjustment; therefore, they could not fully account for changes in risk profile.

Challenges associated with QI initiatives. Becker's hospital highlights data and measurement issues, stakeholder buy-in, staff engagement, and QI sustainability. Data is not accurately measured when it is not collected or entered appropriately. Additionally, it is impossible to change a culture and improve system process gaps without stakeholder buy-in and staff engagement. Sustainability will not be achieved without the components listed above (Becker's Hospital, n.d.).

Structural measures cover a broad group of variables that reflect the setting in the delivery of surgical care, such as procedure volume, subspecialty training, nurse-to-bed ratios, or the presence of specific amenities. Structural measures are frequently used because they are often quickly, easily, and inexpensively obtained from administrative databases. For instance, the volume-outcome relationship can be used as a proxy for quality and as the basis for surgical quality initiatives (Clifford, 2017). There are still important evidence gaps in the literature that need to be covered, including comparing hospital ownership. For-profit may have limited resources to spend on healthcare. Stakeholders' primary goal is profit; this may harm patient outcomes (Myers et al., 2019). The research will also examine the characteristics and background of SSIs.

SSIs

The literature gap and the problem statement support the significance of examining the relationship between SSI rates, healthcare utilization cost, patient outcomes, and type of hospital ownership (non-profit versus for-profit). SSIs are the third most reported HAI and account for 14%-16% of HAIs among the United States patients in 2017 (Badia et al., 2017). Advances made in infection control practices include improved operating room ventilation, sterilization methods, preoperative showers, hand hygiene practices, and availability of antimicrobial prophylaxis; SSIs remain a substantial cause of morbidity (CDC, 2016). Patients with SSIs are twice as likely to die, 60% more likely to be admitted to the intensive care unit, and more than five times more likely to be readmitted to the hospital after discharge (Scott, Walsh, & Al-Qurayshi, 2019). In 2019, the CDC estimated that there were 157,500 SSIs out of 14.2 million surgical procedures. SSIs are a national problem that plagues the healthcare sector, including non-profit and for-profit hospitals (CDC, n.d.).

Characteristics of SSIs

SSIs are defined as infections related to post-operative procedures within 30 days at the surgery's incision site (CDC, n.d.). The CDC classifies SSIs as the following: (a). *Superficial Incisional* – infection must occur within 30 days of operative procedures and only the incision's skin and subcutaneous tissue. The patient must have one of the following: (1) Drainage from the incision; (2) Bacterial organisms of tissue and or; (3) Localized swelling, pain, redness, and heat; *(b). Deep Incisional* – infection must occur within 30 to 90 days of operative procedures and involve the incision's deep soft tissue

(i.e., fascia and muscle layers).

The patient must have one of the following: (a) Drainage from the incision ;(b) Dehiscence (separation) of tissue; (c) a bacterial organism of tissue ;(d) Fever; (e) Abscess and or ;(f) Localized swelling, pain, and heat. *(g). Organ space* infection must occur within 30 to 90 days of operative procedures and involves any part of the body deeper than fascia and muscle layers open or manipulated during operative procedures. The patient must have one of the following: (a) Drainage from a drain placed in the organ space, (b) A bacterial organism of tissue or body fluid, and or ;(c) An abscess (Center for Disease Control, n.d.).

Impact of SSIs

Non-profit and for-profit hospitals have a financial incentive to reduce SSI rates due to a government mandate for accountability and improved patient care (Sohn et al., 2017). Woodfield et al. (2019) noted that up to 25% of post-operative patients experience complications that lengthen a patient's hospital stay. Badia et al. (2017) highlighted within their study that despite previous research on HAIs, SSIs are the third most reported HAI and account for 14% - 16% of HAIs among patients. As the third commonly reported HAI, there is a clear gap in processes and initiatives used to reduce SSIs. When SSIs occur, healthcare utilization costs measured as readmission rates, LOS, and patient outcome measures (i.e., morbidity and mortality rates) increase. The CDC also reports that SSI is the costliest HAI type with an estimated annual cost of $3.3 billion and is associated with nearly one million additional in-patient days annually. An estimated 40% - 60 % of these infections are preventable (McDermott et al., 2017).

Anderson et al. (2016) highlighted that out of 100 reported HAIs annually, there is an estimated cost of $985,000 to $2.7 million. Seventy-three percent of HAIs reported were SSIs. Within North Carolina alone, costs related to the total daily charges, mean LOS, and 30-day readmission rate for patients with an SSI compared with patients without an SSI may be $7493 versus $7924 (Gantz, Owen, Zagadailov, and Merchant, 2019).

Anderson et al. (2016) highlighted that hospitals incur $29,000 per patient who suffers from SSI complications. Gantz et al. (2019) noted that hospitals have a financial incentive to reduce HAIs. Hospitals will gain an increase in both cost and revenue when SSIs reduce. When post-operative patients develop SSIs, daily impacts go beyond financial. Badia et al.'s (2017) study highlighted the impact of patients' mental status and daily active living of post-operative patients impacted by SSI. Moitra, Guerra, Linde-Zwirble, & Wunsch (2016) mentioned the impact of LOS being more extensive on patients over 65. The older post-operative Population is predisposed to comorbidities. The duration of hospital stays can increase beyond 15 days, with a mean of $43,970 additional expense (Moitra et al., 2016). Gellhorn et al. (2017) also describe patient burdens associated with developing this HAI. Gellhorn conducted a series of interview questions for a qualitative study with a focus group that individually suffered from SSIs. This study outlined the severity of the post-operative population's burdens with SSI complications. Out of (n=30), 33% of post-operative patients underwent a second surgical procedure to treat HAI.

Many of the burdens and impacts were interrelated. Most patients reported a

significant impact of the infection on their financial status, physical mobility, and pain. The monetary impact included financial hardship, such as the inability to pay their medical bills or meet other financial obligations resulting from additional surgery. Some patients complained of the inability to complete simple daily activities such as walking and standing. The mental impact, such as isolation and depression, was also reported (Badia, 2017). Backonja, Kendall, Miller, Pollack & Pratt (2016) discussed another type of experienced and seldom addressed impact. A few challenges occur after discharge.

Patients within the study felt they lacked knowledge and experience associated with wound complications. Much like (Gellhorn et al.'s , 2017) research outcome, patients suffered anxiety due to the lack of communication from the health care provider. Other impacts will require future research.

Risk-Adjusted Outcome Measures

The process of reducing SSI complications requires an in-depth analysis of outcome measures (i.e., morbidity and mortality rates). In relationship to SSI rates. SSIs contribute to patient morbidity and mortality (Clifford, 2017). Patient outcome measures (i.e., morbidity and mortality rates) are translated into 30 -day post-operative outcomes. Risk-adjusted ratios allow NSQIP to compare data through hierarchal modeling that compares surgical results. Built by surgeons for surgeons, NSQIP provides participating hospital administrative databases with tolls, analyses, and reports to make informed decisions about improving quality healthcare (Ellis, 2018; Uthayasankar et al, 2017).

Throughout the United States healthcare systems, more than ten million patients undergoing surgical procedures annually. Authors Albu, Moldovan, Toth, & Voidazan

(2020) asserts that SSIs contribute significantly to health care utilization cost (i.e., readmission rates and LOS) and patient outcome measures (i.e., morbidity and mortality rates). Though no recent studies can be found specific to how outcome measures (i.e., morbidity and mortality rates) relate to this study. It is essential to define each variable clearly. As mentioned above, outcome measures translate into 30-day post-operative outcomes. An odds ratio is used and adjusted as a composite score. The ratio allows NSQIP to compare data through hierarchical modeling that compares surgical results (American College of Surgeons, 2017). John Hopkins Health System (n.d.) defines surgical volume as the quantity in which hospitals do specific surgical procedures within a certain period. Morbidity is the amount of disease within a population and disease or disease symptom defined by the National Institute of Health (n.d.). Morbidity also refers to medical problems caused by treatment. In contrast, mortality is the number of deaths in a specific group of people in a certain period (National Institute of Health, n.d.). Each year millions of Americans seek healthcare for surgical interventions throughout the United States. Patients are recipients of care in both not- for- profit and for-profit hospitals. Despite the passage of the 2010 Affordable Health Reform Act, HAIs are still on the rise (CDC, n.d.). SSIs are a national problem that plagues the healthcare sector including non-profit and for-profit hospitals (CDC, n.d.).

"While advances have been made in infection control practices, including improved operating room ventilation, sterilization methods, preoperative showers, hand hygiene practices, and availability of antimicrobial prophylaxis, SSIs remain a substantial cause of morbidity" (CDC, 2019). Patients with SSIs are twice as likely to die, 60% more

likely to be admitted to the intensive care unit, and more than five times more likely to be readmitted to the hospital after discharge (Scott, Walsh, & Al-Qurayshi, 2019). In 2019, the CDC estimated that there were 157,500 SSIs out of 14.2 million surgical procedures. Cooper (2016) highlighted that an estimated that 40–60% of SSIs are preventable and that effective control of SSIs relies on many interventions that include surveillance, antimicrobial prophylaxis, and eradication of carrier status, infection control programs, and education.

The Cochrane Review (n.d.) indicated that there are six principles central to surgical practices. Principles include :(a) Preoperative skin antiseptics for preventing SSIs after surgery ;(b) Antimicrobial drugs ;(c) Preoperative hair removal to reduce SSI ;(d) Surgical hand antisepsis to reduce SSIs; (e) Preoperative bathing or showering with skin antiseptics to prevent SSI; and (f) Dressings and topical agents for surgical wound healing by secondary intention (Cooper, 2016). Despite an estimation of 40%-60% of SSIs being preventable, it remains a substantial cause of morbidity despite advances made in infection control practices- i.e., improved operating room ventilation, hand hygiene practices, and the availability of antimicrobial prophylaxis (Abubakar, 2020; CDC, 2016 & McDermott et al., 2017).

There are nearly three times as many non-profit hospitals as for-profit hospitals in the US (American Hospital Association, 2018). Organizational theories on types of hospital ownership vary. Kotter and Schlesinger conducted an empirical study on hospital ownership. Their study concluded that structural environments' stakeholders have differences in behavior in health systems throughout the United States (Miller, 2017).

Both non-profit and for-profit hospital ownership types have the same regulations. Throughout the United States, health systems face hospital-acquired infections, specifically SSIs (American Hospital Association, 2018). According to the Institute of Medicine (n.d.), the health care sector in the United States consists of an array of clinicians, hospitals, and other healthcare facilities, insurance plans, and purchasers of healthcare services, all operating in various configurations of groups, networks, and independent practices. Some are based in the public sector; others operate in the private sector as either for-profit or not-for-profit hospital ownership types (Institute of Medicine, n.d.).

Structural measures cover a broad group of variables that reflect the setting in the delivery of surgical care, such as surgical procedure volume, subspecialty training, and nurse-to-bed ratios, or the presence of specific amenities. Structural measures are frequently used because they are often quickly, easily, and inexpensively obtained from administrative databases. For instance, the volume-outcome relationship can be used as a proxy for quality and as the basis for surgical quality initiatives (Clifford, 2017).

Because two-thirds of non-profit hospitals are teaching and community-based systems in large inner cities, it is vital to examine demand, differences in SSI rates, health care utilization cost (i.e., readmission rates and LOS), and patient outcome measures (i.e., morbidity and mortality rates). The ratio of resident doctors in training and quality performance policies in non-profit versus for-profit hospitals (Joynt et al., 2019). As highlighted above, The Failure Theory analyzes organizations' efficiency, demand, and surplus. Hansmann's comparison of non-profit and for-profit

suggests that for-profit systems maximize value through efficiency for stakeholders. Simultaneously, non-profit health systems are interested in meeting patients' demands regardless of the surplus or inefficiencies (Min et al., 2019). The gap in the literature and the problem statement, as mentioned above, supports the significance of examining the relationship between SSI rates, healthcare utilization cost (i.e., readmission rates and LOS), patient outcome measures (i.e., morbidity and mortality rates), and type of hospital ownership types (non-profit versus for-profit). SSIs are the third most reported HAI and account for 14%-16% of HAIs among the United States patients in 2017 (Badia, Casey, Crosby, Hudson, & Mitchell, 2017). This study will analyze if hospital ownership types, both non-profit and for-profit, are predictive of SSI rates, health care utilization cost (i.e., readmission rates and LOS), and patient outcome measures (i.e., morbidity and mortality rates) and determine a difference in performance if any.

Definitions and Key Terms

Affordable Healthcare Reform Act: health reform law enacted in 2010. Affordable Healthcare Reform Act: health reform law enacted in 2010. The law aims to provide affordable health insurance for uninsured citizens and improve the quality of care by holding health systems accountable (National Conference of State Legislatures, 2010).

Centers for Medicare and Medicaid Services (CMS): CMS is a federal agency that operates under the umbrella of the United States Department of Health and Human Services that administers both Medicaid and Medicare health benefits (CMS, 2017).

Comorbidity: The condition of having two or more diseases simultaneously. Conditions such as obesity, diabetes, cardiovascular disease, and respiratory illnesses that

can create complications during surgery. Complications may include developing SSIs as an outcome (Joint Commission, 2018).

For-profit hospital ownership: any hospital operates as an investor-owned or independent proprietorship controlled by stockholders and receives partial funding from CMS (CMS, 2017).

Hospital-acquired infection (HAI): HAIs are infections are also known as nosocomial infections. Nosocomial infections are acquired by patients while receiving treatment for medical or surgical conditions within a hospital setting. HAIs include different pathogens, viruses, bacteria, and fungi (Office of Disease Prevention and Health Promotion, 2018).

Hospital Ownership Type: designated proprietary as a for-profit, private, non-profit, and Government (CMS, 2017).

Morbidity: Disease or a symptom of disease or the amount of disease within a population. Morbidity also refers to medical problems caused by treatment (National Institute of Health, n.d.).

Mortality: the number of deaths in a specific group of people in a certain period (National Institute of Health, n.d.).

National Surgical Improvement Program (NSQIP): The NSQIP is an outcomes-based program to measure and improve the quality of surgical care (American College of Surgeons, 2017).

Non-profit hospital ownership: includes any hospital controlled by a board of trustees and operates as a tax-exempt organization under the 501(c) (3) US tax that

receives funding through CMS based on the quality of services rendered. Examples of non-profit hospitals include but are not limited to academic-based (teaching hospitals), religious-based, charity-based, and government-based health systems (American Hospital Association, n.d.).

Quality: CMS defines quality as measures utilized as a tool to quantify healthcare processes, outcomes, patient perceptions, and organizational health systems that provide effective, efficient, safe, patient-centered, equitable, and timely care (CMS, 2017).

Risk-adjusted outcome: performance measures that include three basic measurements used to access the quality of healthcare: structure, process, and outcome. It is a statistical process used to identify and adjust for variation in patient outcomes that stems from differences in patient characteristics or risk factors across healthcare organizations (Joint Commission, 2018.).

Standard of Care: in legal terms, the standard of care is the level at which the average, prudent provider in each community would practice. It is how similarly qualified practitioners would have managed the patient's care under the same or similar circumstances (CDC, 2016).

Surgical Site Infection (SSI): CDC defines SSI as an infection that occurs after surgery in the part of the body where the surgery took place. Various SSIs include superficial (skin only) and under the skin involving organs or implanted material (CDC, n.d.).

Teaching Hospital: The American Hospital Association defines teaching hospitals as "academic medical centers that fulfill critical social missions, including educating and

training future medical professionals; conducting state-of-the-art research; caring for the poor and uninsured, and optimizing services to provide highly specialized clinical care to the most severely ill and injured patients'' (American Hospital Association, n.d.).

The Triple Aim: is defined by the Institute of Healthcare Improvement to optimize health system performance. Dimensions of the "Triple Aim" are improving the patient experience of care (including quality and satisfaction); improving the health populations; and reducing the per capita cost of health care (Institute of Healthcare Improvement, 2019).

Assumptions

There were some assumptions made before conducting this proposed study. It was assumed that all health systems employed appropriate measures for collecting data. Measures used to collect information are assumed to be valid and reliable, and appropriate to the data that is being collected. It is assumed that hospitals collected a valid measure of LOS, readmission rates, SSI rates, morbidity and mortality rates. This study will assume that all health systems included in the data employed the national surgical quality initiative process or program. Another assumption was that there is no missing information from data collected that could introduce bias in the data.

Limitations

Rahman (2016) noted that there are disadvantages associated with retrospective studies. The use of secondary data is the most notable limitation in this proposed study. Since SSI rates, health care utilization cost (i.e., readmission rates and LOS), and patient outcome measures (i.e., morbidity and mortality rates) derive from hospitals utilizing the

NSQIP initiative is a known limitation. This study will only include hospitals with NSQIP. Therefore, this study cannot be generalized to hospitals that do not utilize the NSQIP. Furthermore, not all NSQIP participating hospitals may accurately collect and report data.

The NSQIP report for some private hospitals is not always transparent to the public. The analysis of this study will only include selected organizations with adequate data, i.e., no significant missing information from selected organizations' data. The variables and methods used to collect data are also a limitation. The study is limited to the variables already included in the data and the method it was collected. For this reason, the validity and reliability of the data cannot be verified.

Additionally, data were both collected and dispersed individually by organizations. There is no way of determining the standardization of data collected. Finally, a mixture of for-profit and non-profit hospitals was located throughout the United States. Access to care, electronic medical records, and retention of quality talent pool (staff/practitioners) may vary among locations. Hospitals not registered with the NSQIP will not gain access to surveys and outcomes. The results of this research may not be accurate for hospitals that are not participants in the same quality initiative.

Scope and Delimitations

This proposed study's scope is limited to comparing two types of hospital ownership (i.e., for-profit and non-profit) hospitals. Both organizational types utilize the NSQIP initiative. Datasets from selected hospitals are publicly available without manipulation and interpretation. This proposed study's scope has a timeline of (2016 to

2020) on archival data. The survey data for this study was obtained from the NSQIP website. Specific details about each hospital ownership type (i.e., non-profit and for-profit) and additional data regarding variables were obtained from the CMS. The NSQIP database website identifies risks associated with post-operative complications. The CMS data will also provide information on Medicaid, Medicare, quality measures, and hospital ownership type.

Rahman (2016) noted that delimitations are crucial to narrowing the scope of research design. This proposed study is delimited to the investigation of differences, if any, between hospital ownership type (i.e., non-profit and for-profit), SSI rates, healthcare utilization cost (i.e., readmission rates and LOS), and patient outcome measures (i.e., mortality and morbidity rates) with NSQIP. There are still important evidence gaps in the literature that need to be covered, including comparing healthcare delivery between hospital ownership (Myers et al., 2019). This study's results may help Healthcare Administrators identify any challenges or differences in both types of health systems' operations.

Significance, Summary, and Conclusions

This doctoral study's healthcare implication is collecting and analyzing data from actual clinical events to promote education to leaders and practitioners about patient safety. This retrospective study examines practices, processes, and SSI-reported incidents between non-profit and for-profit hospitals with NSQIP. This research aims to compare non-profit and for-profit hospitals with quality performance initiatives (NSQIP) to prevent SSIs among the post-operative Population. This study examines the relationship

between the type of hospital ownership (i.e., non-profit and for-profit) as the independent variable and dependent variables that include SSI rates, health care utilization cost (i.e., readmission rates and LOS), and patient outcome measures (i.e., morbidity and mortality rates).

Both non-profit and for-profit hospitals have unique distinctions that create a foundation for a philosophical analysis of each ownership type's governance and code of conduct. There are notable variations in these types of hospitals (Kales, 2018). Non-profit health systems are community-based tax-exempt institutions that are funded by charity, research, and educational training. In contrast, for-profit health systems ran by shareholders financial incentives and may not have a similar interest in community wellness. Differences in characteristics may influence the LOS, readmission rates, morbidity and mortality rates.

Significance to Practice

Hospital administrators and health providers are tasked to demonstrate compliance with infection control practices. Reducing complications requires an in-depth analysis of mortality and morbidity rates and processes such as surgical procedure volumes and outcomes. SSIs contribute to patient morbidity and mortality (Clifford, 2017). Patient outcome measures (i.e., morbidity and mortality rates) translate into 30-day post-operative outcomes. Risk-adjusted ratios (e.g., patient outcome measures) allow NSQIP to compare data through hierarchal modeling that compares surgical results.

Built by surgeons for surgeons, NSQIP provides participating hospital administrative databases with tolls, analyses, and reports to make informed decisions

about improving quality healthcare (Ellis, 2018; Uthayasankar et al., 2017). Additionally, the Institute of Health notes that the first attempts to measure surgical care quality require a multifaceted view of outcomes. Processes and structural balance measures let administrators know whether changes lead to improvement, helping to achieve the overall aim of reducing SSIs (n.d.). An example includes the rate of occurrence of readmission rates per 1,000 patient population and percent of SSIs, which is higher than perioperative patients who did not have complications from SSIs (CDC, 2019). Due to resident doctors' ratio in training new to systems and processes, including quality performance policies. In non-profit versus for-profit hospitals, it is critical to understand if there is a difference in SSI rates between non-profit and for-profit hospitals with quality performance initiatives (i.e., NSQIP).

Significance to Social Change

The problem statement, as mentioned above, supports the significance of examining the relationship between SSI rates, healthcare utilization cost (i.e., readmission rates and LOS) of non-profit versus for-profit (hospital ownership type) status and how these variables impact the patient outcome measures (i.e., mortality and morbidity rates). Results from this study may provide programmatic implications in the implementation of quality initiative programs, especially among non-profit hospitals with medical students and resident doctors in training. Residents in training and medical students may not be vigilant of policies and procedures.

This study will compare SSI rates, healthcare utilization cost (i.e., readmission

rates and LOS), and patient outcome measures (i.e., mortality and morbidity rates) between non-profit and for-profit hospital types with quality performance initiatives (i.e., NSQIP) in the prevention of SSIs among the post-operative population. This proposed doctoral review may identify improvement opportunities in the underlying system and processes. The study may also provide a future recommendation to key stakeholders for policies that optimize "The Triple Aim" of the Affordable Care Act that highlights social change through delivering better care, healthy people, and communities (Sohn et al., 2017)). Improving the quality of health services requires the shared responsibility of administrators, practitioners, and communities.

Summary and Conclusions

As highlighted by the Institute of Medicine (n.d.), the healthcare sector in the United States consists of an array of clinicians, hospitals, and other healthcare facilities, insurance plans, and purchasers of health care services. All sectors operate in various configurations of groups, networks, and independent practices. Some are based in the public sector; others operate in the private sector as either for-profit or not-for-profit hospital ownerships (Institute of Medicine, n.d.). Throughout the United States, health systems and providers hold a standard of accountability and transparency. Seshamani et al. (2018) note that "given the lack of any "gold standard" health care delivery model as well as the variation in populations, markets, and geographies across the country, delivery system reform continues to be an evolving process of innovation and evaluation" (p.4). As healthcare administrators, this leaves much groundwork for quality initiatives and improvements. Even though implementing policies, processes, and procedures, safety

remains a number one concern.

Specifically, HAIs such as SSIs create a substantial financial impact on the readmission of patients. Patient impacts occur on a personal level due to developing SSIs. Utilization of the NSQIP Creates extensive data that both practitioners and administrators to improve post-operative outcomes. This proposed study will be conducted to determine if there is a relationship between SSI rates, healthcare utilization cost (i.e., readmission rates and LOS), and patient outcome measures (i.e., mortality and morbidity rates) and hospital ownership type (i.e., non-profit and for-profit).

Section 2: Research Design and Data Collection

This study was conducted to determine the relationship between the dependent variables (SSI rates, health care utilization cost [i.e., readmission rates and LOS] and patient outcome measures [i.e., mortality and morbidity rates]) and the independent variable of the type of hospital ownership (i.e., non-profit and for-profit). Using the GST theory, each health system was viewed as four individual levels (a) the patient; (b) the team and practitioners; (c) the organization (i.e., hospitals) that supports the training and education of teams by providing infrastructure and resources; and (d) the political and economic environment (e.g., regulatory, and markets), the conditions under which organizations, care teams, individual patients, and individual care providers operate (Short ell, 2016). Section 2 will include discussions on the study's purpose, data collection, research design, analyses of variables, and threats to the study's internal and external validity.

Research Design and Rationale

The first research question addressed the difference in SSI-rates between hospital ownership types (non-profit and for-profit). The second research question addressed the difference in health care utilization cost (measured as readmission rate and LOS) among post-operative patients with SSIs between hospital ownership types (i.e., non-profit and for-profit). Finally, the third research question assessed the difference between hospital ownership type (i.e., non-profit and for-profit) and patient outcome measures among post-operative patients with SSI. Patient outcome measures were a composite score of measures of mortality and morbidity rates). The selection of multiple research questions

was established by assessing Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) surveys and determining variables that can provide information to address the gap in the literature. The independent variable is hospital ownership type (i.e., non-profit and for-profit). Dependent variables are SSI rates, health care utilization cost (i.e., readmission rate and LOS), and patient outcome measures (i.e., mortality and morbidity rates). A comparative quantitative non-experimental design was appropriate for this retrospective study because it can determine statistically significant relationships between variables, which is the intent of this study, though this design does not infer causation. This approach was taken to examine whether differences exist between the independent variable and dependent variables.

Historical data has increased in popularity in health care research (Cole et al., 2018). However, limitations do exist when conducting retrospective studies using secondary data. Researchers analyzing the data are not usually the same individuals as those involved in the data collection process (Uthayasankar et al., 2017). Specific nuances in the data collection process are unknown, which may be important to the interpretation of variables in the dataset.

Methodology

Population

The target population consisted of greater than or equal to 30-days post-operative patients from non-profit and for-profit hospitals with NSQIP. Data included a sample of 548 selected surveyed hospitals out of a total of 772 hospitals surveyed from the secondary data collected last 2018. Of these 548 hospitals, there were 525 non-profits and

23 for-profits.

Sampling and Sampling Procedures Used to Collect Data

The survey data for this study were obtained from the NSQIP website. The data included roughly 1 million surgical procedural cases submitted by 772 surveyed hospitals with NSQIP. But the target population consisted of greater than or equal to 30- days post-operative patients from non-profit and for-profit hospitals across the United States. Any hospital that did not provide information on the variables of interest were not included. Data collected contains information reported from the year 2018. The dataset included information on health care utilization cost (i.e., readmission rate and LOS) and patient outcome measures (i.e., mortality and morbidity rates) for in-patient and outpatient greater than or equal to 30-day and total occurrences that are hospital site-specific (American College of Surgeons, n.d.).

To determine the study's sample size, a power analysis was performed using G* Power, version 3.1.9.4. Based on the power analysis, the sample size of 548 non-profit and for-profit hospitals with NSQIP provided 100% power to address the research questions. Using the alpha level of $\alpha = 0.05$ for a small effect size of 0.2, the minimum number of hospitals with NSQIP across the United States ($n = 548$) were included in the study. The p value was a guide in developing an equation that includes independent variables that may have significant relationships with dependent variables. One example could be patients having higher SSI rates of occurrence in a specific hospital ownership type (i.e., non-profit or for-profit). Statistical significance was set at less than $p = 0.05$ and was used as a basis to accept or reject the null hypothesis. Anything less than 0.05

was considered statistically significant, whereas anything above 0.05 was not statistically significant (Creswell, 2017). Classification for hospital ownership type (i.e., non-profit and for-profit) was obtained from the CMS database, and this information was used to create the variable of the type of hospital ownership (independent variable).

Instrumentation and Operationalization of Constructs

The NSQIP is a web-based data system created by the American College of Surgeons. The information that is warehoused is a Participant Use Data File (PUF). PUF contains patient-level aggregate data but does not identify hospital ownership type (American College of Surgeons, n.d.). Hence, the reason CMS data will be utilized to determine the type of health system. The data contains roughly one million surgical procedural cases submitted by 772 surveyed hospitals with NSQIP across the United States. The NSQIP survey consists of both inclusion and exclusion criteria.

The inclusion of data in the study is determined by procedural codes used for insurance reimbursement and types of surgery. For example, major head and neck surgical procedures are coded as a diagnostic related group (DRG). DRGs are the code that hospitals use when submitting billing to health insurance companies. Reimbursement amounts are based on DRG codes. The target population of greater than or equal to 30-days post-operative patients from both non-profit and for-profit hospitals with NSQIP will also be used as an inclusion criterion.

This study is bound to the targeted population in the NSQIP dataset. Exclusion from this study is any hospital that is not for-profit, non-profit, and registered with the American College of Surgeons NSQIP program. Post-operative patients with less than

30-days of having surgery will not be included. To maintain ethical standards, appropriate utilization of data transfer is necessary. Because patient names and other identifying information are not included within data, a breach of privacy cannot occur. In the NSQIP dataset, there are 273 variables that are representative of each surgical case. Most variables will not be used in this study except for the identified study variables.

Variables that will be used explicitly in this research include the type of hospital ownership, healthcare utilization cost (i.e., readmission rate and LOS), and patient outcome measures is a composite score (measured as mortality and morbidity rates) and SSI rates. The intent was to analyze the dependent variable patient outcome measures (i.e., morbidity and mortality rates) as a composite score using univariable analysis of variable (ANOVA). However, this study utilized a multivariate analysis of variance (MANOVA) model also to analyze RQ3.Morbidity was a composite variable that indicated whether a patient experienced any of the following post-operative complications. Complications include acute renal failure, bleeding transfusions, *C. difficile* colitis, cardiac arrest requiring CPR, CVA/stroke with neurologic deficit, DVT/thrombophlebitis, myocardial infarction, pneumonia, progressive renal insufficiency, pulmonary embolism, sepsis, septic shock, unplanned intubation, urinary tract infection, or ventilation for more than 48 hours. Mortality was measured using the variable related to discharge destination (i.e., expired). Morbidity and mortality rates for each hospital ownership type (i.e., non-profit and for-profit hospitals) were then calculated and reported as a proportion ranging from 0 to 1. This study also intended to measure SSI rates as a percentage of 0 – 100%. However, SSI rates will be recoded as a

binary variable dichotomized as 1 = yes and 0= no). As mentioned above, hospital ownership types (i.e., non-profit and for-profit) will be retrieved from CMS. The 2018 NSQIP data collected by the American College of Surgeons asks a series of questions. Variables for this proposed quantitative study can be described as nominal ratio, and interval. Nominal or categorical variables are categorical or naming. The variable ratio contains a true zero value. Interval variables have no absolute zero value. For example, 0 degrees in temperature simply means that it is cold (Walden University, 2020).

The independent variable is categorical hospital ownership type (i.e., non-profit and for-profit). Hospital ownership will be coded as 1= non-profit and 2= for-profit. The dependent variable healthcare utilization costs are measured as readmission rates and LOS, both ratio scales. Readmission rates will be measured as a percentage from 0% to 100%. LOS will be measured as the number of days.

Data Analysis Plan

This study will compare hospital ownership types (i.e., non-profit and for-profit) with NSQIP quality performance initiatives in the rate of SSI, healthcare utilization cost that will be measured as readmission rates, LOS, and patient outcome measures (i.e., mortality and morbidity rates) among post-operative patients. The proposed retrospective quantitative study is designed to determine the relationship between hospital ownership (i.e., non-profit versus for-profit) and the NSQIP to the dependent variables.

A power analysis was performed to determine the sampling required of (n = 548) for the study. A binary logistic regression analysis will be used to determine whether there are a statistically significant difference in individual surgical cases, the independent

variable hospital ownership type (i.e., non-profit and for-profit) and the dependent variable SSI rates. This study intended to measure SSI rates as a percentage of 0 – 100%. However, SSI rates will be recoded as a binary variable dichotomized as 1 = yes and 0= no). An independent sample t-test and a MANOVA and ANOVA parametric tests will also be used to evaluate the means of the dependent variables SSI rates, healthcare utilization cost (i.e., readmission rates and LOS), and patient outcome measures (i.e., mortality and morbidity rates). The intent was to analyze the dependent variable patient outcome measures (i.e., morbidity and mortality rates) as a composite score using ANOVA. However, this study utilized a MANOVA model also to analyze RQ3. Morbidity was a composite variable that indicated whether a patient experienced any of the following post-operative complications. The SPSS Application version 27 will also be utilized in analyzing the selected secondary dataset.

Analysis Plan for Research Questions

RQ 1- Quantitative: Is there a difference between non-profit and for-profit hospitals with NSQIP in SSI rates among post-operative patients?

H*o1*- There is no significant difference between non-profit and for-profit hospitals with NSQIP program in SSI rates among post-operative patients.

H*a1*- There is a significant difference between non-profit and for-profit hospitals with NSQIP program in SSI rates among post-operative patients.

RQ 2- Quantitative: Is there a difference between non-profit and for-profit hospitals with NSQIP in healthcare utilization cost (i.e., readmission rates and LOS) among post-operative patients with surgical site hospital-acquired infection?

H*o2*- There is no significant difference between non-profit and for-profit hospitals with NSQIP in healthcare utilization cost (i.e., readmission rates and LOS) among post-operative patients with surgical site hospital-acquired infection.

H*a2*- There is a significant difference between non-profit and for-profit hospitals with NSQIP in healthcare utilization cost (i.e., readmission rates and LOS) among post-operative patients with surgical site hospital-acquired infection.

RQ 3- Quantitative: Is there a difference between non-profit and for-profit hospitals with NSQIP ownership type patient outcome measures (i.e., mortality and morbidity rates) among post-operative patients with surgical site hospital-acquired infection?

H*o3*- There is no significant difference between non-profit and for-profit hospitals with NSQIP ownership type patient outcome measure (i.e., mortality and morbidity rates) among post-operative patients with surgical site hospital-acquired infection.

H*a3*- There is a significant difference between non-profit and for-profit hospitals with NSQIP ownership type patient outcome measures (i.e., mortality and morbidity rates) among post-operative patients with surgical site hospital-acquired infection.

The SPSS software version 27 will be utilized for analyzing data specific to this study. For data analyses, the nominal independent variable hospital ownership type (i.e., non-profit and for-profit) will be coded as 1= non-profit and 2= for-profit. Using a binary logistic regression model, the first research question will address whether there were any statistically significant differences in the likelihood, or odds, of an SSI (dependent variable) among hospital ownership types (i.e., non-profit and for-profit (independent

variable). The dependent variable SSI rate was defined as 1 = yes and 0 = no. In addition, there will be a selection of greater than or equal to 30- days post-operative patients from both non-profit and for-profit hospitals.

For the second research question, MANOVA will be used. A MANOVA test will be used because there are two dependent variables. The MANOVA test will be utilized to examine healthcare utilization cost measured as, i.e., readmission rates and LOS (dependent variables) between the grouping independent variable hospital ownership type, i.e., non-profit and for-profit among post-operative patients with SSIs. Readmission rates will be measured as a percentage. LOS will be measured as the number of days in the hospital ranging from 0 to 100. Hospital ownership types will be coded as 1= non-profit and 2= for-profit. For RQ2 analysis, a sample will include only post-operative patients with SSI, which will be filtered from the selected (n = 548) NSQIP surveyed hospitals. Creswell (2009) highlights that MANOVA testing is utilized when more than one dependent variable is in the ratio or interval scale.

Finally, the third research question examines the relationship between the independent grouping variable hospital ownership type (i.e., non-profit and for-profit) and dependent variable patient outcome measures, which is a composite score of mortality and morbidity rates among post-operative patients with SSIs. An ANOVA will be utilized to compare the differences, if any, between the nominal grouping independent variable hospital ownership type (i.e., non-profit and for-profit) and patient outcomes among post-operative patients with SSIs. Hospital ownership will be coded as 1= non-profit and 2= for-profit. Patient outcome measures, i.e., mortality and morbidity rates

dependent variables, will be measured on an interval scale ranging from 0to10.There will be a selection of only post-operative patients with SSI filtered from the selected (n = 548) hospitals with NSQIP. The ANOVA test will compare averages between the nominal grouping independent variable hospital ownership type (i.e., non-profit and for-profit) and patient outcome measures. The intent was to analyze the dependent variable patient outcome measures (i.e., morbidity and mortality rates) as a composite score using ANOVA. However, this study utilized a MANOVA model also to analyze RQ3.

Morbidity was a composite variable that indicated whether a patient experienced any of the following post-operative complications. Mortality was measured using the variable related to discharge destination (i.e., expired).Using the alpha level of α =0.05 at 0.95 predictive power, the minimum number of (n = 548) selected hospitals with NSQIP across the United States will be included in the study. The ANOVA is a parametric test used to determine whether a statistically significant difference in groups' means. A MANOVA test will be used because there are two dependent variables.Statistical significance will be set at less than p 0.05 and will be used as a basis to accept or reject the null hypothesis. Anything less than 0.05 is statistically significant. Whereas anything above 0.05 is not statistically significant.

Threats to Validity

Threats to validity are both internal and external. Internal factors that impact validity are anything within the study that may affect results. Accuracy and methodology are prime examples. Hospitals registered to the American College of Surgeons NSQIP program submit data retrieved from their site. There is no way to ensure that information

supplied is valid, reliable, and accurate. It can only be assumed that the method used was accurate and not biased in past research. As discussed in section one, retrospective research designs threaten validity due to the data's secondary nature. Because data from this proposed study is secondary, methods of data collection could not be controlled. There were also limitations to the variables used in the study. The study is limited to the way the variables were measured. Finally, external threat to validity factors that may impact the study is only including a few variables. Other characteristics may affect SSI rates between non-profit and for-profit hospital ownership types. This study is also limited to NSQIP registered hospitals across the United States. The selection of specific hospitals with NSQIP may influence outcomes.

Ethical Considerations

Some ethical considerations that were applied to this study were adhering to Walden University's guidelines. When conducting retrospective studies, only secondary data can be utilized as a rule. Walden also requires students that conduct doctoral-level research to obtain Institutional Review Board (IRB) approval. The IRB process ensures that students adhere to the university's ethical standards. Secondary data was used, and no personal or identifying information will be used for the target population of this study. Overall, research will be conducted with integrity.

Summary

This section provided details on the research design and the rationale for the study. Section two was divided into areas that examined the data collection process along with the analysis of variables. Ethical considerations and threats to validity were also

discussed. Though retrospective studies have natural challenges, it is important that all information obtained was collected with integrity.

Section 3: Presentation of the Results and Findings

Using Bertalanffy's GST theory, this study aimed to examine the relationship between hospital ownership type, SSI rates, health care utilization cost (i.e., readmission rate, LOS), and patient outcome measures (i.e., mortality and morbidity rates). Using the GST theory, each health system was viewed as four individual levels: (a) the patient; (b) the team and practitioners; (c) the organization (i.e., hospitals) that supports the training and education of teams by providing infrastructure and resources; and (d) the political and economic environment (e.g., regulatory, and markets), the conditions under which organizations, care teams, individual patients, and individual care providers operate (Short ell, 2016). The first research question examined whether there was any difference in the SSI rates between hospital ownership types (non-profit and for-profit). The second research question examined the difference in health care utilization cost (measured as readmission rate and LOS) among post-operative patients with SSIs between hospital ownership types (i.e., non-profit and for-profit). Finally, the third research question assessed the difference between hospital ownership types (i.e., non-profit and for-profit) and patient outcome measures among post-operative patients with SSI.

The survey data for this study was obtained from the NSQIP website with a timeline of 2016 to 2020. The NSQIP database website identifies risks associated with post-operative complications. The intent was to analyze patient outcome measures (i.e., morbidity and mortality rates) as a composite score using ANOVA. However, this study utilized a MANOVA model to analyze RQ 3. Morbidity was a composite variable that indicated whether a patient experienced any of the following post-operative

complications: acute renal failure, bleeding transfusions, *C. difficile* colitis, cardiac arrest requiring CPR, CVA/stroke with neurologic deficit, DVT/thrombophlebitis, myocardial infarction, pneumonia, progressive renal insufficiency, pulmonary embolism, sepsis, septic shock, unplanned intubation, urinary tract infection, or ventilation for more than 48 hours. Mortality was measured using the variable related to discharge destination (i.e., expired). Morbidity and mortality rates for each hospital ownership type (i.e., non-profit and for-profit) were then calculated and reported as a proportion ranging from 0-to 1.

In this section, the research design, rationale, data collection, and data results are all described. This section also addresses the data collection used to conduct a binary logistic regression and MANOVA analyses to answer research questions.

Data Collection of Secondary Data Set

The procedures for secondary data collection include survey data obtained from the NSQIP website. The NSQIP database website was developed by surgeons to identify risks associated with post-operative complications. The dataset included information on health care utilization cost (i.e., readmission rate and LOS) and patient outcome measures (i.e., mortality and morbidity rates) for in-patient and outpatient greater than or equal to 30-day and total occurrences that are hospital site-specific (American College of Surgeons, n.d.).

For this study, the sampling and procedures used in the data included roughly 1 million surgical procedural cases submitted by 772 surveyed hospitals with NSQIP. The target population consisted of greater than or equal to 30-days post-operative patients from non-profit and for-profit hospitals across the United States. Any hospital that did not

provide information on the variables of interest was not included. Data collected contained information reported from the year 2018. Exclusion from this study is any hospital that was not for-profit, non-profit, and registered with the American College of Surgeons NSQIP program. Post-operative patients with less than 30-days of having surgery were omitted.

A review of the hospitals currently participating in NSQIP showed that 68% were non-profit, 29% were government (primarily military hospitals or international hospitals), and 3% were for-profit hospitals. The 29% of government-owned hospitals were excluded from the analysis. There was a discrepancy with unequal sample sizes for both non-profit and for-profit hospitals. Due to the nature of secondary data, researchers do not get to choose if there is an equal proportion. It was estimated that 68% of NSQIP hospitals were considered non-profit (n = 525) and 3% (n = 23) were for-profit. Data analysis was run using a smaller sample size (n = 30 non-profit hospitals and n = 23 for-profit hospitals), which did not impact any changes in statistically significant outcomes. This data were not utilized due to a possible publication bias. Publication bias occurs with over manipulation of data, such as removing observations that contradict the hypotheses (Adamkovic et al., 2021). To maintain ethical standards, appropriate utilization of data transfer was necessary. Because patient names and other identifying information were not included within the data, a breach of privacy cannot occur.

In the NSQIP dataset, 273 variables are representative of each surgical case; most variables were not used in this study except for the identified study variables. This study compared hospital ownership type (i.e., non-profit and for-profit) with NSQIP quality

performance initiatives in the occurrence of SSI, health care utilization cost that was measured as readmission rates, LOS, and patient outcome measures (i.e., mortality and morbidity rates) among post-operative patients. A binary logistic regression analysis was used to analyze individual surgical cases, hospital ownership type (i.e., non-profit and for-profit), and SSI rates. Logistic regression was beneficial in addressing whether there were any statistically significant differences in the likelihood, or odds, of occurrence of SSIs among hospital ownership types (i.e., non-profit and for-profit. A multivariate analysis of variance (MANOVA) model was used to evaluate the means of the dependent variables health care utilization cost (i.e., readmission rates and LOS) and patient outcome measures (i.e., mortality and morbidity rates) and SSI rates. Readmission rates were measured as a proportion between 0 and 1, and LOS was measured as the number of days in the hospital ranging from 0–105.The intent was to analyze the dependent variable patient outcome measures (i.e., morbidity and mortality rates) as a composite score using ANOVA. However, this study utilized a MANOVA model also to analyze RQ3. Morbidity was a composite variable that indicated whether a patient experienced post-operative complications, and mortality was measured using the variable related to discharge destination (i.e., expired).

Results

Statistical Analysis

Data for 1,020,511 surgeries performed in 2018 by 772 hospitals participating in NSQIP were obtained. The majority of these hospitals were non-profit hospitals. Using 2021 data, it was estimated that 68% of NSQIP hospitals were considered non-profit (*n* =

525), and 3% (*n* = 23) were for-profit. The remaining 29% of cases represented government-owned hospital types and were excluded from analysis, giving a final tally of 724,944 cases (*n* = 694,606 non-profit and *n* = 30,338 for-profit) from 548 hospitals. Limitations of using this approach will be further described in Section 4. The following section details research questions and outcomes.

RQ 1

RQ 1 sought to determine if there was a difference in the dependent variable SSI rates and the independent predictor variable hospital ownership type (i.e., non-profit and for-profit). Among surgeries, a total of 22,031 (3.0%) SSIs were documented. Organ space infections were the most common type of SSI (*n* = 10,621, 1.5%), followed by superficial incisional SSIs (*n* = 9,428, 1.3%) and deep incisional SSIs (*n* = 2,671, 0.4%). A small number of cases (*n* = 688, 3.0%) experienced two or more types of SSIs.

When comparing the occurrence of SSI rates between non-profit and for-profit hospitals, no significant differences were observed (Table 1). For example, the odds of an SSI in for-profit hospitals as compared to non-profit hospitals was 0.98 with a 95% confidence interval of 0.92–1.05. Because the point estimate approaches 1 and the 95% CI includes the value of 1.0, the odds of SSI are the same in both types of hospitals. Therefore, there is no significant difference between non-profit and for-profit hospitals with an NSQIP program in the likelihood of SSI among post-operative patients.

Table 1

Odds Ratio of Surgical Site Infections by Type of Infection

Type of surgical site infection (SSI)	Odds Ratio	95% CI	Std. Err	*P*

Any SSI	0.98	0.92 – 1.05	0.34	.61
Superficial incisional	1.01	0.91 – 1.12	0.05	.86
Deep incisional	1.02	0.84 – 1.23	0.10	.83
Organ space	0.93	0.85 – 1.03	0.47	.18

RQ 2

RQ 2 sought to examine differences between the independent variable hospital type (i.e., non-profit and for-profit) with dependent variables healthcare utilization cost (i.e., readmission rates and LOS) among post-operative patients with SSI rates. This study intended to measure SSI rates as a percentage of 0 – 100%. However, for this study, SSI rates will be recoded as a binary variable dichotomized as 1 = yes and 0= no). "Based on the data reviewed by the NSQIP, readmission rates were significantly higher among cases who developed SSIs than those who did not" (NSQIP, 2018). "Over one-third of cases who developed SSI were readmitted (n = 8,415, 38.2%) compared to only 4.0% (n = 27,862) of those who did not develop an SSI" (NSQIP, 2018). In fact, cases with SSI were almost 15 times more likely to be readmitted than those without (OR = 14.97, 95% CI: 14.53 – 15.42, p = .000). Though not realistic, an OR and unadjusted OR simply means that no additional factors were tested that influenced outcomes. Other factors may be associated with the dependent variables healthcare utilization cost (i.e., readmission rates and LOS). Adjusted odds ratio examines effects that each variable may or may not have when other variables are included in statistical analysis.

The risk of readmission was most significant among cases with organ space infections (OR = 20.34, 95% CI: 19.55 – 21.16, p = .000) followed by deep incisional infections (OR = 18.66, 95% CI: 17.28 – 20.15 p = .000). While the risk of readmission

after a superficial incisional infection was still greater than among cases with no SSI, it was much lower than the other types of SSI (*OR* = 6.61, 95% *CI*: 6.30 – 6.94, *p* =.000). Likewise, cases experiencing an SSI had a significantly longer length of stay (LOS) than cases without SSI (*M* = 7.04 v. *M* = 2.16, *t* = -190, *p* = .000). This pattern was observed in all three types of SSI, most notably among cases with organ space infections where the length of stay more than quadrupled (*M* = 9.17 v. 2.21, *t* = -190, *p* = .000).

However, when exploring whether any significant differences in healthcare utilization costs (readmission rates and mean LOS) occurred between cases who experienced an SSI in non-profit hospitals as compared to those who experienced an SSI in a for-profit hospital, both the MANOVA model (*W* = 0.99, *F* (2, 545) = 2.13, *p* = 0.12) there were no significant differences between groups see Table 2. Both groups demonstrated a readmission rate of approximately 38% and a length of stay of 7 days post-operation. Therefore, we fail to reject the null hypothesis that there is no significant difference between non-profit and for-profit hospitals with NSQIP in healthcare utilization cost (i.e., readmission rates and LOS) among post-operative patients with surgical site hospital-acquired infection (Ho2).

Table 2

Health Care Costs and Patient Outcome Measures Associated with Surgical Site Infections by Hospital Ownership Type

	Non-profit Hospitals	For-profit Hospitals	All Hospitals	p
Healthcare utilization costs:				
Readmission rate	0.38 (0.37 – 0.39)	0.40 (0.35 – 0.45)	0.38 (0.37 – 0.45)	0.24
Length of stay (days)	7.06 (6.95 – 7.17)	6.54 (5.99 – 7.10)	7.04 (6.93 – 7.15)	0.06

Outcome measures:				
Morbidity rate	0.38 (0.38 – 0.39)	0.39 (0.36 – 0.43)	0.38 (0.38 – 0.39)	0.50
Mortality rate	0.02 (0.02 – 0.02)	0.01 (0.00 – 0.02)	0.02 (0.02 – 0.02)	0.35

RQ 3

RQ3 examined where differences existed, if any, between independent variable hospital ownership types (i.e. non-profit and for-profit) and dependent variables patient outcome measures (i.e., mortality and morbidity rates) among post-operative patients with SSIs. Overall, less than 10% *(n* = 63,436, 8.7%) of patients experienced a post-operative morbidity. The most commonly reported morbidities were bleeding transfusions (*n* = 30,471, 4.2%), sepsis (*n* = 11,577, 1.6%), urinary tract infection (n = 8,798, 1.2%), and pneumonia (*n* = 7,520, 1.0%). All other morbidities were experienced by less than 1% of cases per Table 3.

Cases who experienced an SSI were seven times more likely to have any type of post-operative morbidity (*OR* = 7.38, 95% *CI*: 7.17 – 7.60, *p* = .000), and each specific type of morbidity also showed significance. Odds ratios ranged from a two-fold increase in CVA/stroke with neurologic deficit among cases with SSI as compared to those without (*OR* = 2.44, 95% *CI*: 1.98 – 3.01) to a nearly twenty-fold increase in sepsis among cases with SSI as compared to those without (*OR* = 19.28, 95%*CI*: 18.50 – 20.09). When considering mortality, <1% of all cases were recorded as having died (*n* = 4,298, 0.6%). Cases with SSI were over three times more likely to die than cases without SSI (*OR* = 3.62, 95% *CI*: 3.27 – 4.00).

Table 3

Comparison of Post-Operative Morbidity and Mortality Rates Among Cases with and without Surgical Site Infections by Hospital Ownership Type

	Cases with SSI	Cases without SSI	All cases	Odds Ratio (95% CI)
Any morbidity	8,483 (38.5%)	54,953 (7.8%)	63,436 (8.7%)	7.38 (7.17 – 7.60)
Acute renal fail	332 (1.5%)	1,410 (0.2%)	1,742 (0.2%)	7.61 (6.75 – 8.59)
Bleeding transfusions	2,942 (13.3%)	27,529 (3.9%)	30,471 (4.2%)	3.78 (3.63 – 3.94)
C. difficile colitis	360 (1.6%)	1,945 (0.3%)	2,305 (0.3%)	5.99 (5.34 – 6.70)
Cardiac arrest requiring CPR	180 (0.82%)	1,847 (0.3%)	2,027 (0.3%)	3.13 (2.68 – 3.64)
CVA/stroke with neurologic deficit	95 (0.4%)	1,244 (0.2%)	1,339 (0.2%)	2.44 (1.98 – 3.01)
DVT/thrombophlebitis	550 (2.5%)	3,142 (0.4%)	3,692 (0.5%)	5.70 (5.20 – 6.25)
Myocardial infarction	266 (1.2%)	2,297 (0.3%)	2,563 (0.3%)	3.73 (3.28 – 4.23)
Pneumonia	1,103 (5.0%)	6,417 (0.9%)	7,520 (1.0%)	5.72 (5.36 – 6.11)
Progressive renal insufficiency	299 (1.4%)	1,352 (0.2%)	1,651 (0.2%)	7.14 (6.29 – 8.10)
Pulmonary embolism	273 (1.2%)	1,970 (0.3%)	2,243 (0.3%)	4.46 (3.93 – 5.07)
Sepsis	3,877 (17.6%)	7,700 (1.1%)	11,577 (1.6%)	19.28 (18.50 – 20.09)
Septic shock	1,576 (7.1%)	3,813 (0.5%)	5,389 (0.7%)	14.13 (13.30 – 15.00)
Unplanned intubation	774 (3.5%)	3,803 (0.5%)	4,577 (0.6%)	6.69 (6.19 – 7.24)
Urinary tract infection	789 (3.6%)	8,009 (1.1%)	8,798 (1.2%)	3.22 (2.99 – 3.47)
Ventilation for >48 hours	1,187 (5.4%)	4,425 (0.6%)	5,612 (0.8%)	8.99 (8.42 – 9.60)
Mortality (all-cause)	432 (2.0%)	3,866 (0.5%)	4,298 (0.6%)	3.62 (3.27 – 4.00)

A comparison of morbidity and mortality rates between cases who experienced an SSI in non-profit hospitals as compared to those who experienced an SSI in a for-profit hospital, using the MANOVA model ($W = 1.00$, $F(2, 545) = 0.72$, $p = 0.48$) showed no significant differences between groups found in Table 2. In both types of hospital ownership, approximately 38% of cases with SSI experienced post-operative morbidity, and 2% died. Therefore, we fail to reject the null hypothesis that there is no significant difference between non-profit and for-profit hospitals with NSQIP in patient outcome measures (i.e., morbidity and mortality rates) among post-operative patients with surgical site hospital-acquired infection (Ho3).

For RQ 1, logistic regression determined with a 95% confidence level that the independent variable hospital ownership types (i.e., non-profit and for-profit) was not significant in predicting the dependent variable SSI rates. The relationship between the variables was not statistically significant per Table 1 (p-value= 0.61), as the p-value was well above the conventional threshold of 0.05. Therefore, an association does not exist between variable SSI rates and the independent predictor variable hospital ownership type (i.e., non-profit and for-profit).

For RQ 2, MANOVA determined with a 95% confidence level that the independent variable hospital ownership types (i.e., non-profit and for-profit) was not significant in predicting the dependent variable healthcare utilization costs (i.e., LOS and readmission rate). The relationship between the variables was not statistically significant per Table 2 (p-value(s) = 0.25 and 0.06), as the p-value was well above the conventional threshold of 0.05. Therefore, an association does not exist between the independent

variable hospital type (i.e., non-profit and for-profit) with dependent variables healthcare utilization cost (i.e., readmission rates and LOS) among post-operative patients with SSIs.

For RQ 3, MANOVA determined with a 95% confidence level that the independent variable hospital ownership types (i.e., non-profit and for-profit) was not significant in predicting the dependent variable patient outcome measures (i.e., morbidity and mortality rates). The relationship between the variables was not statistically significant per Table 3 (p-value (s) = 0.50 and 0.35), as the p-value was well above the conventional threshold of 0.05. Therefore, an association does not exist between independent variable hospital ownership types (i.e. non-profit and for-profit) and dependent variables patient outcome measures (i.e., mortality and morbidity rates) among post-operative patients with SSIs.

Summary

Section 3 contained a detailed breakdown of research questions, data analyses, sampling procedures, and statistical results. There were also limitations to the study that will be further explored in Section 4.

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

The overall purpose of this quantitative retrospective study was to address the research gap by determining whether there was a relationship between hospital ownership type (i.e., non-profit and for-profit) with the NSQIP program and prevention of SSIs among the post-operative patients. Specific variables included SSI rates, health care utilization cost (i.e., readmission rate and LOS) and patient outcome measures (i.e., morbidity and mortality rates). This study intended to measure SSI rates as a percentage of 0–100%. However, SSI rates was recoded as a binary variable dichotomized as 1 = yes and 0= no).

Based on analysis findings, the relationship between variables was not statistically significant. An association does not exist between dependent variables SSI rates, health care utilization costs (i.e., LOS and readmission rate), patient outcome measures (i.e., mortality and morbidity rates), and the independent predictor variable hospital ownership type (i.e., non-profit and for-profit). Section 4 contains a details on interpretation and findings, limitations, recommendations and implications for social change.

Interpretation and Findings

The literature gap and the problem statement support the significance of examining the relationship between SSI rates, health care utilization cost, patient outcomes, and type of hospital ownership (non-profit versus for-profit). Despite several studies on improving patient experiences, including infection control in non-profit and for-profit health systems (Joynt et al., 2019; Meyers et al., 2019), no research compared non-profit and for-profit hospitals with quality performance initiatives in the prevention

of SSIs among the post-operative patient population.

When examining RQ 1, it was critical to understand whether there is a difference in SSI rates between non-profit and for-profit hospitals with quality performance initiatives (i.e., NSQIP). It was assumed that examining this relationship may provide programmatic implications in implementing quality initiative programs. However, when comparing SSI occurrence between non-profit and for-profit hospitals, no significant differences were observed. Because an association does not exist between variable SSI rates and the independent predictor variable hospital ownership type (i.e., non-profit and for-profit), perhaps NSQIP is a robust quality improvement program.

When exploring RQ 2 on whether any significant differences in health care utilization costs (readmission rates and LOS) occurred between non-profit and for-profit hospitals, there was no significant difference. The independent variable hospital ownership types (i.e., non-profit and for-profit) were not significant in predicting the dependent variable healthcare utilization costs (i.e., LOS and readmission rate). Because an association does not exist between the independent variable hospital type (i.e., non-profit and for-profit) with dependent variables healthcare utilization cost (i.e., readmission rates and LOS) among post-operative patients with SSIs, perhaps analyzing other variables such as surgical case volumes, socioeconomic status, gender, race, and or comorbidities would have been beneficial. Based on the results, this may be a gap and should be explored further.

For RQ 3, an association also does not exist between independent variable hospital ownership types (i.e., non-profit and for-profit) and dependent variables patient

outcome measures (i.e., mortality and morbidity rates) among post-operative patients with SSIs. Other researchers reported similar outcomes. In their Veteran Affairs health systems study, Ellis et al. (2018) analyzed proxies using the NSQIP program and identified that administrative data were limited in their ability to provide clinical detail for patient outcome measures. Perhaps additional research will be helpful in determining the gap. Pairing variables with demographics may also be beneficial in future research.

Relation of Findings to Theoretical Foundation

For this study, the GST theory was incorporated to understand health systems based on four individual levels (a) the patient; (b) the team and practitioners; (c) the organization (i.e., hospital) that supports the training and education of teams by providing infrastructure and resources; and (d) the political and economic environment (e.g., regulatory, and markets), the conditions under which organizations, care teams, individual patients, and individual care providers operate (Shortell et al., 2016). Specifically, Bertalanffy's GST theory was utilized to examine the relationship between hospital ownership type (i.e., non-profit and for-profit), the reduction of SSI rates, healthcare utilization costs measured as readmission rates and LOS, and patient outcome measures (i.e., mortality and morbidity rates).

Limitations of the Study

The NSQIP was the dataset most appropriate for this study. Built by surgeons for surgeons, NSQIP provides participating hospital administrative databases with tolls, analyses, and reports to make informed decisions about improving quality healthcare

(Ellis, 2018; Uthayasankar et al., 2017). Though appropriate, there were limitations. The use of secondary data is the most notable limitation in this study. Because data is secondary, researchers are limited in the manipulation of data. Since SSI rates, health care utilization cost (i.e., readmission rates and LOS), and patient outcome measures (i.e., morbidity and mortality rates) derive from hospitals utilizing the NSQIP initiative. It is a known limitation. There was also some discrepancy with unequal sample sizes for non-profit and for-profit hospitals. It was estimated that 68% of NSQIP hospitals were considered non-profit (n = 525) and 3% (n = 23) were for-profit. Data analysis was ran using a smaller sample size (n= 30 non-profit hospitals and n=23 for-profit hospitals) which did not impact any changes in statistically significant outcomes. This data was not utilized due to a possible publication bias. Publication bias occurs with over manipulation of data.

Unfortunately, due to the nature of secondary data, researchers do not get to choose if there is an equal proportion. Adamkovic, Greger, and Ropovik (2021) highlight that direct evidence for publication bias was found by numerous cohort studies examining the publication status of projects that received ethics approval, grant funding, or by tracking study registrations, reports to licensing authorities, and conference abstracts. This occurs where a researcher striving to corroborate a theory arbitrarily removes observations contradicting the predictions (Adamkovic et al., 2021).

Additionally, this study only includes hospitals that participate with NSQIP. Therefore, this study cannot be generalized to hospitals that do not utilize the NSQIP. The results of this research may not be accurate for hospitals that are not participants in

the same quality initiative. This study is also limited to the variables already included in the data and the method by which it was collected. For this reason, the validity and reliability of the data cannot be verified.

Recommendations

Based on the limitations of this study, mainly data being secondary, primary research may be necessary. Primary research will allow future researchers to explore factors or variables that may have significance in influencing SSI rates. One example is pairing and examining a ratio of surgical volume in comparable hospital sizes, similar demographic, populations, races, patients with and without comorbidities, socioeconomic status, and patient outcomes. This may increase the statistical outcome significantly.

Implications for Professional Practice and Social Change

Professional Practice

This research has implications for healthcare administrators and health providers to demonstrate the compliance of infection control practices. It is also crucial for healthcare administrators, and clinicians to create policies that optimize "The Triple Aim" of the Affordable Care Act to improve patient care for both preoperative and post-operative patient populations. Utilizing the GST theory framework also has essential value in helping administrators detect problems that a program is attempting to solve and its many facets. GST allows leaders to detect patterns and system failures (Anderson, 2016). System failure may include identifying conditions such as staffing shortages, increased or decreased surgical volumes of procedures, room turnover times, and improper cleaning of rooms and instrumentation, which may impact individual patient

outcomes and efficiency of care provided. (Anderson, 2016). Understanding gaps such as system failures allows healthcare administrators to make necessary changes in processes. Changes in processes can ultimately lead to positive social change.

Positive Social Change

This study's implication was to collect and analyze data from actual clinical events to promote education to leaders and practitioners about patient safety. Specifically, this study compared SSI rates, healthcare utilization cost (i.e., readmission rates and LOS), and patient outcome measures (i.e., mortality and morbidity rates) between non-profit and for-profit hospital types with quality performance initiatives (i.e., NSQIP) in the prevention of SSIs among the post-operative population. In 2019, the CDC estimated that there were 157,500 SSIs out of 14.2 million surgical procedures. SSIs are the third most commonly reported hospital-acquired infections (HAIs) and account for 14%-16% of HAIs among the United States patients (Badia, Casey, Crosby, Hudson, & Mitchell, 2017). Despite the passage of the 2010 Affordable Health Reform Act, hospital-acquired infections (HAI) are still on the rise (Center for Disease Control and Prevention [CDC], n.d.). Therefore the implication for social change is ensuring that the individual patient is treated holistically. Holistic care requires treating the whole patient. Care of the whole patient include but is not limited to cultural, physiological, health literacy, spiritual and psychological. Additionally, because an association does not exist between variable SSI rates and the independent predictor variable hospital ownership type (i.e., non-profit and for-profit), perhaps NSQIP is a robust quality improvement program quality improvement program that may be vital in remedying SSIs, the national problem that

plagues the healthcare sector (CDC, n.d.).

My study added depth in understanding how the prevention of SSIs require an overview of the four individual levels (a) the patient; (b) the team and practitioners; (c) the organization (i.e., hospitals) that supports the training and education of teams by providing infrastructure and resources; and (d) the political and economic environment (e.g., regulatory, and markets), the conditions under which organizations, care teams, individual patients, and individual care providers operate (Short ell, 2016). It is crucial for stakeholders to implement policies that optimize "The Triple Aim" of the Affordable Care Act that highlights social change through delivering better care, healthy people, and communities (Sohn et al., 2017). Improving the quality of health services requires the shared responsibility of administrators, practitioners, and communities. Though SSIs remain the third most commonly reported HAI, the first attempts to measure quality of surgical care require a multifaceted view of outcomes. Processes and structural balance measures let administrators know whether changes lead to improvement. This helps to achieve the overall aim of reducing SSIs (Institute of Health, n.d.).

Conclusion

There were no association identified between independent and dependent variables. Due to the limitations of the study mainly data being secondary, I recommend primary research. Primary research will allow future researchers to explore factors or variables that may have significance in influencing SSI rates. One example is pairing and examining a ratio of surgical volume in comparable hospital sizes, similar demographic, populations, races, patients with and without comorbidities, socioeconomic status, and

patient outcomes. This may increase the statistical outcome significantly.

In summary, this study sought to address the gap in literature regarding the relationship of non-profit and for-profit hospitals with quality performance initiatives in the prevention of SSIs among the post-operative patient population. This study concluded that hospital ownership types with does not predict SSIs, readmission, length of stay, mortality or morbidity. These relationships indicate perhaps NSQIP is a robust quality improvement program quality improvement program that may be vital in remedying SSIs. The battle against SSIs is a priority for both healthcare administrators and clinicians alike. It is crucial for stakeholders to implement policies that optimize "The Triple Aim" of the Affordable Care Act that highlights social change through delivering better care, healthy people, and communities (Sohn et al., 2017). Improving the quality of health services requires the shared responsibility of administrators, practitioners, and communities. Though SSIs remain the third most commonly reported HAI, the first attempts to measure surgical care quality require a multifaceted view of outcomes. Healthcare Administrators can use results of this study to implement effective policies and quality initiative programs. Processes and structural balance measures let administrators know whether changes lead to improvement, helping to achieve the overall aim of reducing SSIs (Institute of Health, n.d.). Understanding gaps, treating the whole patient and possible system failures is key to reducing and or reducing SSIs. This still leaves much groundwork for quality initiatives and improvements as healthcare administrators.

References

Adamkovič, M., Greger, D., & Ropovik, I. (2021). Neglect of publication bias compromises meta-analyses of educational research. *PLOS ONE,16*. https://doi.org/10.1371/journal.pone.0252415

Abubakar, U. (2020) Point-prevalence survey of hospital acquired infections in three acute care hospitals in Northern Nigeria. *Antimicrob Resist Infect Control,* 9(63). https://doi.org/10.1186/s13756-020-00722-9

American College of Surgeons. (2017). The National Surgical Quality Improvement Program. https://www.facs.org

American Hospital Association. (2018). Hospital ownership types. https://www.aha.org/aha-search?search_api_fulltext=

Anderson, B. R. (2016). Improving healthcare by embracing systems theory. *National Institute of Health, 152*(2), 593–594. https://doi.org/10.1016/j.jtcvs.2016.03.029

Anderson, D. J., Pyatt, D. G., Weber, D. J., & Rutala, W. A. (2013). Statewide costs of healthcare-associated infections: estimates for acute care hospitals in North Carolina. *American Journal of Infection Control, 41*(9), 764–768. http://doi.org/10.1016/j.ajic.2012.11.022

Anderson, D., & Perl, T. (2018). Basics of surgical site infection: Surveillance and prevention. In P. Lautenbach, K. Malani, J. Woeltje, E. Han, J. Shuman, & J. Marschall (Eds.), *Practical healthcare epidemiology* (pp. 147–161). Cambridge University Press. https://doi.org/10.1017/9781107153165.015

Balachandran, R., Kappanayil, M., Sen, A. C., Raj, B., & Kumar, R. K. (2015). Impact of

the international quality improvement collaborative on outcomes after congenital heart surgery: A single center experience in a developing economy. *Annals of Cardiac Anesthesiology, 18*(1), 52–57.

Baker, A. W., Salem, J., Ergai, A. O., Sexton, D. J., & Anderson, D. J. (2017). Performance of statistical process control methods for regional surgical site infection surveillance: A 10-year multicentre pilot study. *BMJ Journal, 27*(8). https://doi.org/10.1136/bmjqs-2017-006474

Badia, J. M., Casey, A. L., Hudson, P. M., Mitchell, S. A., & Crosby, C. (2017). Impact of surgical site infection on healthcare costs and patient outcomes: a systematic review in six European countries. *Journal of Hospital Infection, 96*(1), 1–15. https://doi.org/10.1016/j.jhin. 2017.03.004

Bertalanffy, V. L. (1969). *General system theory; foundations, development, applications*. G. Braziller.

Carmona, F. M., Ferreira M. N., Amato, L., & Caneo, L. F. (2017). Collaborative quality improvement in the congenital heart defects: Development of the ASSIST consortium and a preliminary surgical outcomes report. *Brazilian Journal of Cardiovascular Surgery, 32*(4), 260–269. https://doi.org/10.21470/1678-9741-2016-0074

Centers for Disease Control and Prevention. (n.d.). Healthcare associated infections (HAIs). https://www.cdc.gov/hai/index.html

Centers for Disease Control and Prevention. (2010). Surgical site infection (SSI). https://www.cdc.gov/hai/ssi/ssi.html#:~:text=A%20surgical%20site%20infection

%20is,infections%20involving%20the%20skin%20only

Centers for Disease Control and Prevention. (2016). Standard precautions for all patient care. https://www.cdc.gov/infectioncontrol/basics/standard-precautions.html

Centers for Disease Control and Prevention. (2019). National healthcare safety network surgical site infection Surveillance. https://www.cdc.gov/nhsn/PDFs/pscManual/9pscSSIcurrent.pdf

Center for Medicare and Medicaid Services. (2017). Quality measurement and quality improvement. https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/MMS/Quality-Measure-and-Quality-Improvement-

Center for Medicare and Medicaid Services. (2018). https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/HAC-Reduction-Program#:~:text=The%20Hospital%2DAcquired%20Condition%20(HAC,in%20the%20inpatient%20hospital%20setting.

Clifford, Y. K., Skube, S. J., Zhen, H., Melton, G. B., & Arsoniad, E. G. (2017). Characterizing surgical site infection signals in clinical notes. *National Institute of Health, 245*(1). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6197986/

Cooper, R. A. (2016). Surgical site infections: Epidemiology and microbiological aspects in trauma and orthopedic surgery. *International Wound Journal, 10*(1), 3–8. https://doi.org/10.1111/iwj.12179

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Sage Publications.

Ellis, R. J. (2018). Database research for surgical health services research: American College of Surgeons National Surgical Quality Improvement Program. *Elsevier Journal, 164*(1), 173–175.

Gantz, O., Zagadailov, P., & Merchant, A. (2019). The cost of surgical site infections after colorectal surgery in the United States from 2001 to 2012: A longitudinal analysis. *The American Surgeon, 85*, 142–149. https://doi.org/10.1177/000313481908500219

Herrera, C. A., Rada, G., Kuhn, B. L., & Barrios, X. (2014). Does Ownership Matter? An Overview of Systematic Reviews of the Performance of Private for-profit and Private Non-profit, and Public healthcare providers. PLOS ONE. Retrieved from https://doi.org/10.1371/journal.pone.0093456

Institute of Health Improvement. (2019). Measures to preventing hospital-acquired infection. http://www.ihi.org/resources/Pages/Measures/MeasurestoPreventHAIs.aspx

Institute of Medicine. (n.d.). Defining Quality. The National Academies of Science.

Johnson, K (2022). A Comparison between Non-profit and For-profit Hospitals with Quality Performance Initiatives in the Prevention of Surgical Site Infections among the Post-operative Population [Unpublished manuscript.] College of Health Science, Walden University.

Joint Commission. (2018). Specifications for Joint Commission Quality Measures. https://manual.jointcommission.org/releases/TJC2018A/DataElem0170.html

Joynt, K. E., Orav, J., & Jha, A. K. (2014). Association between Hospital Conversions to

For-profit Status and Clinical and Economic Outcomes. JAMA. 312(16), 1644-1652. https://Doi: 10.1001/jama.2014.13336

Joynt, M., Peacock, K., Luke, A. A., Barker, A., Olsen, M.A. (2019). Associations between Social Risk Factors and Surgical Site Infections after Colectomy and Abdominal Hysterectomy. JAMA. 2(10). https://doi:10.1001/jamanetworkopen.2019.12339

Kales, C. (2018). Profit Versus Non- Profit in Hospital Administration.

Ko, C. Y. (2009). Measuring and improving surgical quality. https://www.psqh.com/analysis/measuring-and-improving-surgical-quality/

Krein, S.L., Damschroder, L.J., Kowalski, C. P., Forman, J, & Saint, S. (2010). The influence of organizational context on quality improvement and patient safety efforts in infection prevention: a multi-center qualitative study". Social Science and Medicine. 71 (1), 1692-1701.

Laureate Education (Producer). (2010f). Research design and methods—Part 4 [Video file]. Baltimore, MD: Author.

Lautenbach, P. Malani, K. Woeltje, J. Han, E. Shuman, & J. Marschall (Eds.), *Practical Healthcare Epidemiology* (pp. 147-161). Cambridge: Cambridge University Press. https://doi:10.1017/9781107153165.015

Lu, J. (2017). Does Population Heterogeneity Really Matter to Nonprofit Sector Size? Revisiting Weisbrod's Demand Heterogeneity Hypothesis. VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations. 31. 10.1007/s11266-017-9915-4.

McDermott, K.W., Elixhauser, A., & Ruirui, S. (2017). Trends in Hospital Inpatient Stays in The United, States, 2005-2014. Healthcare Cost and Utilization. Agency for Healthcare Research and Quality. https://www.hcup-us.ahrq.gov/reports/statbriefs/sb225-Inpatient-US-Stays-Trends.pdf

Miller, S. (2017). Strategies Hospital Leaders use in Implementing Electronic Medical Record Systems. https://scholarworks.waldenu.edu/cgi/viewcontent.cgi?referer=https://scholar.google.com/&httpsredir=1&article=4414&context=dissertations

Min, N., Shen, R., Berlan, & Hyung Lee, K. (2019). How Organization Identity Affects Hospital Performance: Predictive Power of Mission Statements. Retrieved from https://doi.org/10.1080/15309576.2019.1684958

Moitra, V. K., Guerra, C., Linde-Zwirble, W. T., & Wunsch, H. (2016). Relationship Between ICU Length of Stay and Long-Term Mortality for Elderly ICU Survivors. *Critical care medicine*, *44*(4), 655–662. https://doi.org/10.1097/CCM.0000000000001480

Morrow B. (2010). An overview of cohort study designs and their advantages and disadvantages. International Journal of Therapy & Rehabilitation, 17(10), 518–523. https://ezp.waldenulibrary.org/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=104928870&site=eds-live&scope=site.

Meyers, D.J., Trivedi, A.N, Mor, V., & Rahman, M. (2019). Comparison of the Quality of Hospitals That Admit Medicare Advantage Patients Vs Traditional Medicare

Patients. *JAMA* 3(1): e1919310. https://doi:10.1001/jamanetworkopen.2019.19310

National Conference of State Legislatures. (2010).The Affordable Care Act Brief Summary. https://www.ncsl.org/research/health/the-affordable-care-act-brief-summary.aspx

Pollack, A. H., Backonja, U., Miller, A. D., Mishra, S. R., Khelifi, M., Kendall, L., & Pratt, W. (2016). Closing the Gap: Supporting Patients' Transition to Self-Management after Hospitalization. *Proceedings of the SIGCHI conference on human factors in computing systems. CHI Conference*, *2016*, 5324–5336. https://doi.org/10.1145/2858036.2858240

Rahman, M. (2016). The Advantages and Disadvantages of Using Qualitative and Quantitative Approaches and Methods in Language "Testing and Assessment" Research: A Literature Review. Journal of Education and Learning. \https://www.researchgate.net/publication/309889936_The_Advantages_and_Disadvantages_of_Using_Qualitative_and_Quantitative_Approaches_and_Methods_iN_Language_Testing_and_Assessment_Research_A_Literature_Review/citation/download

Rosenberger, L. H., Sawyer, R.G., & Politano, A.D. (2011). The surgical careimprovement project and prevention of post-operative infection, including surgical site infection. National Institute of Health, 12(3), 163-8. https://Doi: 10.1089/sur.2010.083.

Schaffer, V. O., Srinivasan, J. K., & Sullivan, P. S. (2014). Improving Quality of Surgical

Care and Outcomes: Factors Impacting Surgical Site Infection after Colorectal Resection.

Scott, O., Walsh, J., & Al-Qurayshi, Z. (2019). Surgical Site Infection: A National Perspective. https://journals.sagepub.com/doi/10.1177/0194599819832858

Shepard, J., Ward, W., Milstone, A., Carlson, T., Fredrick, J., & Perl, T. (2013). Financial Impact of surgical site infections on hospitals: the hospital management perspective. JAMA Surgery, 148(10), 907-914. doi:10.1001/jamasurg.2013.2246.

Sohn, H. and Timmermans, S. (2017). Social Effects of Healthcare Reform: Medicaid Expansion under the Affordable Care Act and Changes. Sage Publications 3(1). Doi: 10.117/2378023117700903

Shortell, T. M., Walden, D.D.; Roedler, G.J.; Forsberg, K.J.; & Hamelin, R.D. (2016).*Systems Engineering Handbook*, 4th ed.; Wiley

Spruce, L. (2014). Back to basics: Preventing surgical site infections. AORN Journal, 99 (5), 601-608. doi://10.1016/j.aorn.2014.02.002

Tevis, S. E., Kohlnhofer, B. M., Weber, S. M., & Kennedy, G. D. (2014). Post-discharge complications are an important predictor of post-operative readmissions. American Journal of Surgery, 208(4), 505–510. Retrieved from http://doi.org/10.1016/j.amjsurg.2014.05.013

Tofthagen, C. (2012). Threats to Validity in Retrospective Studies. The National Institute of Health, 3(3), 181-183.

Uthayasankar, S., Muhammad, M. K., Zahir, I. & Vishanth, W. (2017). Critical analysis of Big Data challenges and analytical methods. Journal of Business Research 70

(1) 263-286. https://doi.org/10.1016/j.jbusres.2016.08.001.

Vagnani, G. & Volope, L. (2017). Innovation attributes and managers' decisions about the of innovations in organizations: A meta-analytical review. International Journal of Innovation Studies 1(2)107-133.

Voidazan, S., Albu, S., Toth, R., Rachita, A., & Moldovan, I. (2020). Healthcare Associated Infections – A New Pathology in Medical Practice? National Institute of Health 17(3) p.760.doi: 10.3390/ijerph17030760

Wacker, J. (2017). Perioperative Patient Safety and Quality: How Much Do We Want to Know? Swiss Review of Military and Disaster Medicine. 2(17), 36-41. http://www.medof.ch/gemeinsame-publikationen.html

Walden University. (n.d.). Doctoral Study Prospectus Guide. Retrieved July 15, 2018, https://academicguides.waldenu.edu/researchcenter/osra/DHA

World Health Organization. (2018). Preventing surgical site infections. Retrieved from https://www.worldhealthorganizationpreventingsurgicalsiteinfections.html

Woodfield, J., Deo, P., Davidson, A., Chen, T. Y., & van Rij, A. (2019). Patient reporting of complications after surgery: what impact does documenting postoperative problems from the perspective of the patient using telephone interview and postal questionnaires have on the identification of complications after surgery. *BMJ open*, *9*(7), e028561. https://doi.org/10.1136/bmjopen-2018-028561