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Hospital-Acquired Infections Evidence-Based Standards of Hand Hygiene

Terry Hosch
Walden University

Walden University

College of Management and Human Potential

This is to certify that the doctoral study by

Terry Lynn Hosch

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. Kim Sanders, Committee Chairperson, Health Sciences Faculty
Dr. Cynthia Newell, Committee Member, Health Sciences Faculty

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

Walden University
2025

Abstract

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Terry Lynn Hosch

MBA/MHA, Pfeiffer College 2003

BSN, Queens College 1992

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Healthcare Administration

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Abstract

Hospital-acquired infections (HAIs) remain a challenge for healthcare organizations despite being preventable. Implementing and monitoring evidence-based hand-washing standards can help reduce the spread of germs and HAIs. The cost of HAIs continues to rise, affecting finances, patient length of stay, and outcomes. HAIs add $28 billion to $45 billion annually to U.S. healthcare costs. The purpose of this quantitative correlational study was to examine and evaluate HAIs (dependent variable) and hand hygiene compliance (independent variable), as well as the impact on healthcare organizations' financial performance, patient length of stay, and outcomes. The study employed Donabedian's theoretical framework, which comprises structure, process, and outcomes as its theoretical foundation. The population for this study consisted of patients admitted as inpatients between January 2019 and December 2019 who acquired HAIs. Pearson's correlation and multiple regression analysis were used as the statistical tests for examining and evaluating independent and dependent variables. The analysis of the data showed that there was no statistically significant correlation between HAIs and adherence to established evidence-based handwashing standards. Findings indicated no statistically significant correlation between HAIs and hand hygiene compliance. The results of multivariate regression revealed that CLABSI (B = -83154.962, p = .008) and SSI (B = -47197.724, p = .029) were significant predictors of reimbursement (financial performance). This research contributes to positive social change by validating the need for continued research to identify standards and adherence measures that improve hand hygiene compliance and reduce HAIs.

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Dedication

I want to sincerely thank my immediate family, friends, and colleagues for their unwavering support, encouragement, and prayers throughout this journey. I especially want to acknowledge my brother, Larry, and my son, Alonzo, both of whom passed away before I finished this work. I also appreciate Gregory for his consistent reminders and motivation, which helped me stay focused and driven towards achieving this important milestone. Finally, I am grateful to my community of spiritual believers for their ministering and steadfast dedication to helping me reach this personal life goal. I am forever grateful with the utmost commitment to God and everyone who has shared this journey with me.

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Table of Contents

List of Tables

List of Figures

Section 1: Foundation of the Study and Literature Review

Introduction

The prevention of hospital-acquired infections (HAIs) starts with appropriate hand hygiene, also known as hand washing. Hand hygiene prevents health care providers from spreading germs and is a defensive mechanism to decrease infections in health service organizations. According to the Centers for Disease Control and Prevention (CDC, 2023a), the spread of germs occurs by inadequate hand washing. In addition, the CDC (2023a) noted that hand washing with soap and water can help prevent the spread of germs, around 30% of diarrhea-related illnesses, and 20% of respiratory infections.

Health service organizations must ensure they have processes such as hand hygiene and evidence-based standards of care in place to prevent HAIs. According to Forrester et al. (2022), healthcare-associated infection costs continue to escalate, thus requiring ongoing research to determine the impact on health service organizations' finances, patient length of stay, and outcomes. The national estimation of HAIs needs to be updated but continues to impact health service organizations' finances (Forrester et al., 2022).

In their research, McFarland et al. (2020) noted that healthcare organizations' challenges are specific to increased patient length of stay, adverse outcomes, and death resulting from increased surgical site infections (SSIs). Implementing strategies to prevent and reduce HAIs can positively affect organizational finances. However, the impact remains uncertain (McFarland et al., 2020). As McFarland et al. identified, research to determine the financial benefit of reducing HIAs validates the need for

continued research. In addition, their research identified the necessity of examining and evaluating preventive strategies to minimize SSIs as they affect cost and patient outcomes. Based on the results of this study, health service organizations might implement evidence-based organizational strategies to promote positive social change by increasing knowledge within the patient population related to HAIs and preventative measures to enhance informed decision-making while decreasing the number of infections and healthcare costs and improving patient outcomes.

Further implications for potential positive social change from this study's findings could impact local and national policymakers and regulatory agencies to develop policies to prevent HAIs by appropriate evidence-based hand washing standards. Policies focused on initiatives to improve the health and well-being of the community might enhance the quality of care and patient outcomes while reducing the occurrences of HAIs. Reducing HAIs requires healthcare organizations to collaborate with key stakeholders in the organization and community and incorporate decision-making and policy development focused on shared knowledge of HAIs and understanding to meet the needs of the community and those seeking healthcare services (Reupert, 2023).

Section 1 includes a discussion of the background, problem statement, purpose of the study, research questions, hypothesis, theoretical framework, and nature of the study. In addition, this section includes a discussion of the literature search strategy, a literature review related to key variables and or concepts, definitions, and assumptions, the scope of delimitations, limitations, significance, summary, and conclusion.

Background

The actual impact of HAIs remains challenging due to the lack of universal surveillance systems to monitor occurrences. However, the CDC continues to be at the forefront of establishing evidence-based standards and guidelines to enhance health outcomes prevention and develop infection prevention surveillance systems (Carande-Kulis, 2022). Guidelines established by the CDC address specific questions based on an extensive literature review, evidence, and quality. Examining and evaluating current practices and how they enhance or promote standards of healthcare services and patient outcomes help support decision-making and appropriate implementation of evidence-based care standards (Carande-Kulis, 2022). Although the CDC substantiates the significance of proper hand washing to prevent unwarranted pathogens and diseases, research indicates simple hand washing compliance remains substandard among healthcare professionals. Researchers have continued investigating the importance of appropriate handwashing to reduce HAIs (Toney-Butler et al., 2023). Additional research is required and could help examine and evaluate if adherence to hand hygiene evidence-based standards impacts patient length of stay by increasing hospitalization time and health care financial performance and negatively affecting patient outcomes. Health service organizations must remain proactive in examining and evaluating evidence-based standards to reduce infections and the associated benefits of cost reduction (McFarland et al., 2020).

This research study is essential to help provide additional research that may determine the importance of handwashing and how compliance with evidence-based hand

hygiene standards may impact patient length of stay, health organization financial performance, and patient outcomes. The study may also provide insightful knowledge and examine and evaluate opportunities for evidence-based standards for hand hygiene compliance to reduce HAIs while enhancing healthcare organizations' financial performance, reducing patient length of stay, and improving outcomes.

Problem Statement

HAIs encompass $28 to $45 billion of annual healthcare organization costs that, with standard handwashing, are preventable and can help decrease costs (Fish et al., 2021). Research dating back to the 1800s discussed the importance of hand hygiene as a preventative mechanism to reduce the spread of disease and infection in healthcare (Fish et al., 2021). The problem is that, based on research findings, healthcare organizations lack standardization and adherence to improving hand hygiene compliance and appropriate evidence-based mechanisms to reduce HAIs. The lack of evidence-based care standards for hand hygiene increases the HAIs, which impacts patients' length of stay by increasing hospitalization time and healthcare financial performance and hurts patient outcomes (McFarland et al., 2020). The lack of compliance and the existence of appropriate handwashing standards remain challenging. In their research study, Fish et al. (2021) identified that compliance with hand hygiene standards improved by monitoring adherence and sharing results with frontline staff and coworkers in an open forum and that variation in compliance existed between nurses and physicians. Providing awareness of compliance standards and the importance of hand hygiene could help decrease HAIs.

As Fish et al. (2021) noted in their study that hand hygiene compliance remains a challenge. However, electronic measurement tools could enhance healthcare organizations' ability to examine and evaluate improvement opportunities, promote positive change with compliance, and decrease unwarranted HAIs. The need for ongoing research specific to patient outcomes and quality care supports this research problem based on previous research that shows that developing and implementing surveillance programs to monitor HAIs decreases the length of stay and cost.

Sikora and Zahra (2022) noted that HAIs affect 3.2% of patients hospitalized in the United States and 6.5% in the European Union/European Economic Area, and an even higher worldwide prevalence. HAIs are patient safety issues that lead to increased morbidity, mortality, and negative occurrences for patients, families, and health service organizations (Sikora & Zahra, 2022). The lack of knowledge and research specific to the actual impact HAIs have on health service organizations justifies the need for continued research.

Chakraborty (2020) utilized a multilevel health quality framework incorporating Donabedians' theory of structure, process, and outcome (SPO) to support healthcare organizations' quality of outcome metrics. The research discussed elements specific to improving patient outcomes, including collaboration and communication among all caregivers. In addition, Chakraborty highlighted the importance of focusing on the model of patient care quality (PCQ) and Donabedian's theory of quality for all admitted patients. PCQ focuses on interpersonal, technical, environmental, and administrative quality aspects, while SPO focuses on variables throughout the healthcare organization. The

structure is cohesion, effectiveness, medical treatment expenses, PCQ as the process, patient satisfaction, hospital reputation, and financial performance as the outcomes. Findings from this research reiterated the importance of collaboration and effective communication across the healthcare organization and the importance of providing high-quality care, which could improve the organization's financial performance, enhance relationships with key stakeholders, and ensure patients receive appropriate care to improve outcomes.

Purpose of the Study

This quantitative study examined the correlation between HAIs (dependent variable) and evidence-based standards of hand hygiene compliance (independent variable). In addition, the study evaluated HAIs' impact on the healthcare organization's financial performance, the patient's length of stay in the hospital, and the patient's outcome. HAIs continue to affect patient outcomes, leading to increased length of stay, morbidity, and mortality, which increases health service organization costs (McFarland et al., 2020). Research conducted by Shepard et al. (2020) suggested that health service organizations can maintain probability by eliminating each HAI, which would increase costs by $25,008 and $1,518,682 in revenue by admitting additional patients.

Research Questions and Hypotheses

Research question (RQ)1: What, if any, is the statistical correlation between HAIs and adherence to established evidence-based handwashing standards and the impact on financial performance, patients' length of stay, and patient outcomes?

$H_0$1: There is no statistically significant correlation between HAIs and adherence to established evidence-based handwashing standards on healthcare organizations' financial performance, patient's length of stay, and outcomes.

$H_1$1: There is a statistically significant correlation between HAIs and adherence to established evidence-based handwashing standards on healthcare organizations' financial performance, patients' length of stay, and patient outcomes.

RQ2: What, if any, is the statistical correlation between the implementation of a hand hygiene compliance program and HAIs?

$H_0$2: There is no statistically significant correlation between HAIs and implementing a hand hygiene compliance program.

$H_1$2 There is a statistically significant correlation between HAIs and the implementation of a hand hygiene compliance program.

The measurement of variables included secondary datasets obtained from the healthcare organization’s hospital-acquired infection and hand-hygiene compliance database set. Data analysis examined and evaluated adult patients admitted to the hospital experiencing a hospital-acquired infection during their stay. The study also examined and evaluated the statistical correlation between the compliance of evidence-based hand hygiene standards, organizational financial performance, patient length of stay, and outcomes.

Theoretical Framework

Donabedian's conceptual model, developed by Avedis Donabedian in 1966, provides a framework that supports the examination of and quality of health care. The

model was the theoretical framework that grounds this study, and it incorporated three specific aspects: structure, process, outcome (SPO). The model referenced environmental factors, necessary resources, finances, and infrastructure to provide quality care. The process aspect of the model involved specific standards and procedures that outlined the care provided, and outcomes are the results of those receiving care (LoPorto, 2020). Applying the Donabedian model to this research study provided insight and supports the examination of the potential correlation between HAIs, the adherence to evidence-based standards of hand hygiene compliance, and the effect on healthcare organization's financial performance, patient length of stay, and outcomes.

The structure in this study was a community adult acute care healthcare facility's staff, equipment, and resources necessary to provide care for patients with HAIs, and staff adherence to handwashing standards. The process involved communication and interactions between patients, nurses, medical providers, and staff, and adherence to evidence-based handwashing protocols, care bundles, policies, and procedures. The outcome was collaboration between patients, nurses, and medical providers and adherence to evidence-based protocols, care bundles, policies, and processes focused on improving patient care and reducing HAIs. The logical connection of Donabedian's model was essential for this study because it established a framework that supports the examination of the health service organizations' quality of care through their SPO, which impacts quality (Donabedian, 2005).

Healthcare organizations can utilize this framework to assess their internal SPO related to HAIs and their impact on the organization. Once the evaluation is complete, the

organization can implement strategies to enhance the quality of care, decrease patient length of stay, and improve financial performance (McCullough et al., 2023). The central hypothesis for this study was that the implementation of evidence-based standards of handwashing decreases HAIs.

Nature of the Study

The study design was quantitative descriptive correlational using secondary data from the organization's HAI and hand hygiene compliance databases. The key variables in this study included the dependent variable of HAIs and the independent variable, evidence-based standards of hand hygiene compliance. According to the U.S. Department of Health and Human Services (2021), HAIs are infections obtained during hospitalization and are unrelated to the initial reason for hospitalization. In addition, the study aimed to evaluate the length of time patients remain in the hospital (LOS), HAIs' financial effect on the healthcare organization, and the outcome of patients experiencing HAIs during admission.

The study examined patients admitted to the organization experiencing HAIs during admission. Data included the number of patients with HAIs, type of infections, patient length of stay, staff adherence to infection prevention standards of care of handwashing, and the financial impact HAIs had on the organization. The study further examined and evaluated any potential correlation between the dependent variable of HAIs and the independent variable of adherence to hand hygiene standards. The study also examined and evaluated HAIs' impact on organizational financial performance, patient length of stay, and outcomes (i.e., morbidity and mortality rates) of patients with

HAIs and adherence to established evidence-based handwashing standards. The selection of a descriptive correlational design was appropriate for this study to provide the opportunity to describe the independent and dependent variables and the relationships between and among them (Frankfort-Nachmias et al., 2021).

Literature Search Strategy

Research articles to support this study included the following databases and search engines: MEDLINE with full text, Cumulative Index for Nursing and Allied Health Literature (CINAHL) with full text, Google Scholar, ProQuest Dissertations & Theses Global, and the Walden Library. The peer-reviewed literature search focused on scholarly journals published between 2020 and 2023 and seminal research articles published before 2020 to support selecting the appropriate theoretical framework. Keywords and the search terms included *hospital-acquired infections, HAIs, hospital length of stay, quality of care, hand hygiene,* and *financial performance*. In addition, the literature search reviewed reference lists of related articles specific to HAIs, healthcare finances, patient length of stay, and outcomes to support and validate research gaps and the need for continued research.

Literature Review Related to Key Variables and Concepts

HAIs, infections obtained during hospital admission, occur from invasive procedures, surgeries, and medical devices placed during hospital stays and are identified as the most common event impacting patient safety. HAIs affect over 3.2% of hospitalized patients in the United States and 6.5% Europeans with a questionable even higher percentage worldwide (Sikora et al., 2022). HAIs include central-line associated

bloodstream infections (CLABSI), catheter-associated urinary tract infections (CAUTI), surgical site infections (SSI), and ventilator-associated pneumonia (VAP). The cost of these five significant types of HAIs accounts for $9.8 billion for the United States adult inpatient population. According to the CDC, HAI costs the U.S. health system an alarming $28 billion to $45 billion annually. Although other HAIs occur, the most common HAIs in the healthcare system include pneumonia, gastrointestinal infections, surgical site infections, bloodstream infections, and urinary tract infections (Sikora et al., 2022).

Sikora et al. (2022) further shared that the lack of surveillance systems to monitor HAIs impacts knowledge of the effect on healthcare organizations, indicating a need for appropriate preventive mechanisms and monitoring. A surveillance model analysis of German hospitals revealed an increased LOS specific to infection location and type. The increase in LOS culmination of all HAIs was 12 days facility-wide and varied from CAUTI (3.3 days), SSI (12.9 days), and primary bloodstream infections (12.5 days). Patients experiencing several infections during their hospital stay experienced LOS to 25.6 days.

HAIs impact health service organizations and increase the cost of care, but the financial implications remain unclear without continued research and data. Data on quality outcomes specific to HAIs can provide health service organizations with valuable information to examine and evaluate opportunities to decrease cost and patient length of stay, improve outcomes, and implement strategies focused on reducing HAIs (Shepard et al., 2020). Shepard et al.’s (2020) retrospective analysis focused on patients with HAIs

daily cost, length of stay, and length of stay for patients admitted to the Intensive Care Unit (ICU).

The study incorporated performing chart reviews and analysis to determine if patients discharged from Stanford Hospital with HAIs daily cost and length of stay differed from those discharged without HAIs. Research conducted by Shepard et al. (2020) determined that between October 1, 2015, and September 30, 2018, 78,551 inpatient discharges incorporated 1,541 HAIs. Patients discharged with HAIs, daily hospital cost was $6, 433 ($6,251, $6,615) (*P = .073*) versus $6,604 ($6,557, $6,651) with length of stay of 26.30 (24.89, 27.71) days versus 5.69 (5.64, 5.74) (*P < .001)* days respectively. Prior research by Shepard et al. (2020) also revealed that HAIs increase overall hospital costs and patient length of stay. Still, patients with an SSI had a higher hospital cost but a lower daily hospital cost compared to similar patients without an SSI.

In addition, Shepherd et al. (2020) concluded that eliminating HAIs provides an opportunity for additional admissions; however, it increases hospital total costs, but hospital profits increase more. Eliminating HAIs indicated hospital costs and revenue increases of $25,008 and $1,518.682. The focus on HAIs research showed how reducing HAIs benefits hospital profits and positions the healthcare organization to support funding for initiatives to reduce HAIs (Shepard et al., 2020). Healthcare organizations must continue conducting self-assessments and examining and evaluating mechanisms to enhance financial performance, decrease patient length of stay, and improve outcomes.

Osme et al. (2020) conducted a matched-pairs-case-control study at a referral tertiary-care teaching hospital in Brazil in January 2018. The study consisted of 83

patients with HAIs and 83 without HAIs. The cost analysis of hospitalization reimbursement from the Brazilian government determined that for patients with HAIs, it was higher, 75% (US$27271), compared to patients without HAIs (US$1553) (Osme et al., 2020). Patients with HAIs had longer LOS (15 days), and the hospital received an additional reimbursement cost of US$996. The cost for HAI patients admitted to the ICU was eight times higher (US$11,776) than for patients without a HAI (US$1,329). The direct cost for a patient admitted to the ICU was 56.5% less than the reimbursement and 111.5% above the reimbursement for patients in the ICU with a HAI (Osme et al., 2020). The study suggests that implementing HAI's initiatives to reduce HAI can impact LOS and direct costs.

A study by Stewart et al. (2021) involved a 1-year prospective incidence study of HAI in NHS Scotland as part of the Evaluation of Cost of Nosocomial Infection (ECONI) study. The research aim was to estimate how reducing hospital length of stay impacts HAIs, thus providing additional capacity to meet the needs to deliver quality patients. The study performed observation at one academic and one general hospital of adult inpatients with 24-hour stays with HAI diagnosis.

Stewart et al. (2021) found that excess LOS of 7.8 days (95% confidence interval (CI): 5.7-9.9) was specific to HAI. Patients hospitalized for 30 days had median LOS, and those patients without HAI had three days of LOS. The comparison of HAI patients and those without an infection overall LOS exceeded the estimated LOS by 3.5 times (27 days compared to 7.8 days). HAI contributing to the most prolonged LOS was pneumonia (16.3 days; 95% CI: 7.5-25.2), bloodstream infections (11.4 days; 58.-17.0),

and SSI (9.8 days: 4.5-15.0). Based on the research findings, reducing HAI by 10% would equate to an additional 5800 available hospital bed-days in Scotland and the ability to treat 1706 elective patients (Stewart et al., 2021).

McFarland et al. (2020) completed an evaluation of the methods used to estimate the cost-effectiveness of prevention strategies for all SSI. The evaluation included a systemic review registered with PROSPERO, the International Prospective Register of Systematic Reviews, which included 32 studies of 24,043 participants and SSI prevention in orthopedic surgeries. Databases to search for studies included PubMed, Medline via EBSO host, CINAHL via EBSCO host, and NHS Economic Evaluation Database published in English, meeting the PICO criteria.

Studies evaluated methods used for SSI prevention, including antibiotic prophylaxis, screening, treating, or decolonization of methicillin-resistant Staphylococcus aureus, and surgical wound closure. Evaluation methods included cost-analysis to cost-effectiveness and cost-utility analyses. All studies revealed economic benefits in preventing SSI. However, inconsistency existed, and the overall quality was low to moderate. The results supporting the idea that SSI prevention improves the quality of life remain questionable. McFarland et al. (2020) noted the need for additional research to determine the financial benefit of preventing SSIs. Healthcare organizations can evaluate their approach to enhancing quality care by adopting a systematic perspective to measuring quality and organizational financial performance.

Chakraborty et al. (2020) proposed using the conceptual framework based on Donabedian's (1996, 1968, 1988) SPO classification to improve the dimensions of patient

care quality (PCQ) and help healthcare organizations remain competitive. Structure refers to the healthcare organization's facility, staff, finances, and equipment. The process is the interactions between providers and medical treatment, and outcomes equate to interventions of care provided and patient status (Chakraborty, 2020). The approach used to measure PCQ was multilevel and defined by the healthcare team members' role, collaboration, and the effect on patient-centered variables, PCQ, cost of treatment, and patient satisfaction, which equate to organizational outcome, financial performance, and reputation. The alignment of Donabedian's SPO with the PCQ framework provided the ability to evaluate the cause, effects, and dimensions of PCQ in the United States healthcare system. According to CMS (2016), as cited by Chakraborty et al. (2020), quality metrics specific to patients' length of stay, readmission, and mortality rates are standard publicly reported metrics. Therefore, healthcare organizations must incorporate initiatives to measure quality while ensuring quality patient care delivery and cost reduction.

Ni et al. (2020) evaluated the effectiveness of implementing a hand hygiene improvement project at a 2,500-bed general teaching hospital in Zhejiang, China. The 2017 year longitudinal single-center hand hygiene improvement project adhered to China's National Measures for Ethical Review of Biomedical Research Involving Humans. The project included evaluating and analyzing data about the hand hygiene compliance rate of all hospital staff with over 5,000 participants. The project implementation occurred over three phases: phase I (December 2017 to August 2018) required ensuring facility readiness and baseline data collection. Phase 2 (September

2018 to April 2019) and Phase 3 (May 2019 to December 2019) provide the appropriate implementation of measures and outcome evaluation.

Utilizing the World Health Organization hand-hygiene survey record sheet as a tool to measure compliance, the research noted compliance rates for Phases I, II, and III were 76.61%, 79.95%, and 83.34%, indicating that hand hygiene compliance improved due to continuous intervention ($p < 0.001$; Ni et al., 2020). In addition, the research suggests that implementing hand hygiene programs requires education, training, continuous monitoring, feedback, and collaboration of key stakeholders to improve the healthcare organization's hand hygiene compliance rates (Ni et al., 2020).

According to Toney-Butler et al. (2023), appropriate hand hygiene remains a significant precursor in reducing HAIs. Implementing proper hand hygiene standards decreases the transmission of microorganisms, healthcare costs, and length of stay, enhancing the organization's financial viability. The presence of HAIs increases mortality and morbidity. Healthcare organizations must ensure the implementation of evidence-based standards and education of staff and patients as a mechanism to help decrease the transmission of HAIs (Toney-Betler et al., 2023).

Definitions

Calendar year: A period of 365 days starting on January 1st and ending on December 31st.

Catheter-associated urinary tract infection (CAUTI): The most common type of infection includes the urinary system and evolves from inserting a tube into the bladder to

drain urine. Prolonged use increases the potential of acquiring an infection (CDC, 2023b).

Central line-associated bloodstream infection (CLABSI): A bacterial or viral infection that enters the bloodstream by placing a central line (CDC, 2023b).

Clostridium difficile Infection (C. Diff): Diarrhea induced by the bacteria Clostridium difficile related to the use of antibiotics. **(**CDC, 2024).

Compliance with evidence-based hand hygiene standards- the compliance with hospital policy IP-02-01, which utilizes the CDC and World Health Organization as a resource to establish Hand Hygiene Guidelines for adherence to hand washing, and hand sanitizer processes (CDC, 2002).

Evidence-based standards: The purposeful use of research and best practices to support decision-making about the care of patients (Dotson, n.d.).

Fiscal year: A period of 365 days beginning with July 1st and ending with June 30th.

Hand hygiene: A process of cleaning the hands with soap and water, alcohol-based hand sanitizers, foams, or gels to remove and reduce the spread of microorganisms (Toney-Butler et al., 2023).

Hospital-acquired infection(s) (HAIs): HAIs, also referred to as healthcare-associated infections, are defined as infections obtained while receiving healthcare for another condition (U.S. Department of Health and Human Services, 2021). The CDC categorizes HAIs as bloodstream infections, catheter-associated urinary tract infections (CAUTIs), and ventilator-associated pneumonia (VAP) (CDC, 2023b).

Hospital financial performance: Mechanisms that indicate the hospital's ability to manage its financial resources to remain profitable while providing quality care. Economic indicators might include return on assets and net profit margin, liquidity, working capital, days cash on hand, efficiency, financial ratios, utilization trends, length of stay, and net patient revenue (Guerra et al., 2022).

Length of stay (LOS): The average number of days a patient remains hospitalized at a healthcare facility. The American Hospital Association determines the average length of stay by dividing the number of inpatient days by the number of admissions (U.S. Department of Health and Human Services, 2023).

National Health and Safety Network (NHSN): A division of the CDC that monitors and trends HAIs of hospitals at the local, state, and national levels (CDC, 2023b).

Quality of care: Providing healthcare services that adhere to current knowledge and research to individuals and populations that enhance their health outcomes. The Institute of Medicine (IOM) indicates that quality incorporates effectiveness, efficiency, equity, patient-centeredness, safety, and timeliness (Agency for Healthcare Research and Quality [AHRQ], 2020).

Standardized infection ratio (SIR): A statistical method used to monitor and track HAIs at the local, state, and national levels. The SIR compares the actual number of hospital HAIs to the predicted number of infections. A SIR greater than 1.0 indicates more HAIs observed than were expected (CDC, 2022).

Surgical site infection (SSI): An infection occurring at the surgery site after a surgical procedure (CDC, 2023b).

Ventilator-associated event (VAE): The combination of objective criteria to define events involving respiratory status improvements or deterioration related to mechanically ventilated patients (CDC, 2025).

Assumptions

The healthcare organization's Quality Department collects data on patients admitted to the facility who acquired HAI during their stay. The assumption is that the data collected adheres to the definition of the standardized infection ratio (SIR). According to the CDC (2022), SIR tracks HAIs over time at the national, state, and local levels. This assumption was necessary for the study because the healthcare organization receives payments from CMS. Failure to meet the standards for HAI reporting through NHSN, as outlined by CMS, could impact reimbursement payments (CDC, 2023b). In addition, the assumption of increased HAIs relates to decreased compliance with evidence-based hand hygiene standards. According to Sikora et al. (2022), implementing infection prevention initiatives can reduce LOS and cost.

Scope and Delimitations

According to Ni et al. (2020), healthcare team members' hand hygiene compliance rates remain low, increasing the incidence of HAIs. The research problem this study attempted to address was HAIs in healthcare organizations and evidence-based hand hygiene compliance, as well as how both could impact the organization's financial performance and patient length of stay and negatively affect patient outcomes. The scope

of this study was limited to acute care hospital patients admitted to the organization who obtained HAI during their hospitalization or one that existed at discharge. The study used secondary data from the hospital Quality Department and thus limited the population scope to a specific geographical location, which further restricted the ability to get the validity of HAIs in hospitals overall. Based on the study sample size and the use of secondary data limited to only adult patients admitted to the organization, the study has poor generalizability. The study only applies to a specific population of inpatients admitted to the organization from calendar year January 2019 through December 2019. As mentioned, this study population focused on adult patients admitted to an acute care hospital who developed HAI.

Limitations

A potential limitation of this study was the manual data collection process for inpatient hand hygiene compliance of staff across all shifts providing care to the study population. Identified staff referred to as data collectors on each inpatient care unit require education and competency validation before observing staff performing hand hygiene. After the completion of observations, staff enter data electronically. The manual process could affect data collection based on the knowledge level and training of individuals collecting data. In addition, the facility's infection preventionists' and data abstractors' interpretation of the NHSN and SIR definitions on reporting HAIs posed potential for internal and external validity. Data submitted to NHSN at the national and state levels use the information to examine and evaluate initiatives for HAI prevention

(CDC, 2023c). Inaccurate data reported could impact appropriate initiatives for HAI reduction.

Additional limitations included variable treatments for HAIs across healthcare organizations. In addition, the researcher used caution to ensure unbiasedness and separation of roles as an employee and those of the researcher. Ongoing consultation with the organization's Institutional Review Board (IRB) and Walden University's Center for Research Quality (CRQ) occurred to ensure adherence to research standards and data protection.

Significance

The healthcare arena must continue to promote research to examine and evaluate evidence-based standards to enhance the population's knowledge, health, and well-being, specific to HAIs. The CDC (2022) noted that improving healthcare delivery's safety, quality, and value and preventing and reducing HAIs remain a top priority. This study was significant and aligned because it may add to the growing body of knowledge on HAIs and their impact on healthcare organizations' financial strength, patient length of stay, quality of care, and patient outcomes. Based on the results of this study, hospital administrators can implement evidence-based organizational strategies to promote positive social change by increasing knowledge within the patient population related to HAIs and preventative measures to enhance informed decision-making while decreasing the number of infections and healthcare costs and improving patient outcomes.

Summary and Conclusions

The literature review related to key variables and concepts specific to HAIs and evidence-based hand hygiene compliance supported the need for continued research. Although reducing and preventing HAIs remains attainable, healthcare organizations experience adverse patient outcomes. HAIs increases patient mortality and costs for the U.S. healthcare system (Fish et al., 2021). Healthcare organizations face challenges with adherence to hand hygiene improvement and appropriate evidence-based mechanisms to reduce HAIs, impacting financial performance, patient length of stay, and outcomes. According to Forrester et al. (2022), the economic impact of HAIs on healthcare organizations remains monumental, and the estimated direct cost ranges between 28-45 billion U.S. dollars. Although research has indicated the need to reduce HAIs, healthcare organizations must collaborate with key stakeholders on preventative measures and enhance knowledge of the importance.

HAI prevention begins with hand hygiene and implementing evidence-based initiatives to reduce HAIs. Programs focused on prevention can benefit healthcare organizations by reducing 12,000 to 223,000 HAIs, equating to $142 million to $4.25 billion in savings annually (Sikora et al., 2022). According to reviews of U.S. healthcare epidemiology, avoiding 100% prevention of HAIs seems impossible. However, data indicated that 65-70% of CLABSI and CAUTI and 55% of VAP and SSI reduction can occur by implementing infection prevention programs (Sikora et al., 2022). Additional research could help examine and evaluate if adherence to evidence-based standards for

hand hygiene impacts the patient's length of stay by increasing hospitalization time and healthcare organizations' financial performance and adverse patient outcomes.

The findings from this study provided valuable information, insight, and knowledge into the benefits of adherence to evidence-based hand hygiene compliance for the prevention of HAIs. The study further enlightens healthcare organizations about the benefits of reducing HAIs in improving financial performance, decreasing patient length of stay, and improving outcomes. According to the CDC (2023c), each day, one in 31 U.S. patients obtains HAIs specific to receiving healthcare services. The reduction of HAIs begins with appropriate hand hygiene and enhancing the knowledge of patients and healthcare providers. Findings from this study could also promote adherence to evidence-based hand hygiene compliance, leading to improved patient safety, quality of care, and decreased patient mortality and morbidity. This study examined any statistical correlation between HAIs and evidence-based standards of hand hygiene compliance and the impact on healthcare organizations' financial performance, patients' length of stay in the hospital, and patient outcomes.

Section 2: Research Design and Data Collection

Introduction

During the extensive literature review to support this study, it was discovered that healthcare organizations face challenges in reducing HAIs. A simple preventative measure to reduce the spread of infections is hand washing. Although simple compliance with hand washing and implementing evidence-based standards, policies, and procedures to reduce HAIs is necessary, continued research remains essential. As discussed in Section 1, in this quantitative correlational study, the examination and evaluation of the correlation between the independent variable of evidence-based standards of hand hygiene compliance, the dependent variable of HAIs, and the impact on the healthcare organization's financial performance, the patient's LOS, and outcome occurred.

Healthcare organizations must remain vigilant in aligning with key stakeholders and policymakers to examine and evaluate opportunities that enhance the health and well-being of the population. The reduction of HAIs remains a significant opportunity for healthcare organizations. The organization must recognize the importance of ongoing research to support decision-making and develop policies and procedures to decrease HAIs, enhance financial performance, reduce patient length of stay, and improve outcomes. Examining and evaluating evidence-based handwashing standards through continued research can enhance consumer knowledge, bringing it into line with the standard of care for preventing HAIs. Reducing HAIs could decrease healthcare costs, reduce patient length of stay, and improve outcomes (McFarland et al., 2020).

Section 2 includes research design and rationale, methodology, sampling, instrumentation, operationalization of constructs and variables, data analysis, threats to external and internal validity, ethical procedures, and a summary.

Research Design and Rationale

This study incorporated secondary data from the organization's HAI and the hand hygiene compliance database. The organization's Quality Department collected and reported data on patients admitted to the facility who obtained HAI during their stay. The dependent variable in this study was HAIs. The independent variable was adherence to established hand hygiene standards and the effect on the healthcare organization's financial performance, patients' LOS, and patient outcomes.

The research study design was a quantitative descriptive correlational design. The designated design supported evaluating stated RQs, describing the independent and dependent variables, and examining and evaluating potential relationships. According to Frankfort-Nachmias et al. (2021), a descriptive correlational design contributes to the ability to organize and describe data. In addition, the design used correlational statistics to measure the association of relationships and strength between variables. The selection of a descriptive correlational design for this study presented no time and resource constraints consistent with the design choice. The research design choice helped provide insight and increase knowledge about the significance of the benefits of reducing HAIs. Descriptive statistics provided the ability to summarize data from selected population samples and determine accuracy, appropriateness, and validity (Burkholder et al., 2020).

Methodology

The data included for this quantitative correlational study were secondary data of patients admitted to an adult acute care facility. The data included those patients admitted between January 1, 2019, and December 31, 2019, who obtained HAIs during their hospitalization. The healthcare organization's Quality Department provided the secondary data sets. Hand hygiene compliance was assessed by direct observation of staff hand hygiene practices. All observations were recorded electronically using the healthcare organization's hand hygiene collection audit tool (see Appendix).

Population

The target population for this study was all adult inpatients admitted to the healthcare organization from January 1, 2019, to December 31, 2019. The target population consisted of 8,337 patients admitted to the organization who experienced an HAI during their admission. The secondary data included the total number of patients with HAIs. The data also consisted of the type of infections and how long the patient remained hospitalized. The organization reports all HAIs in adherence to SIR, which monitors HAIs at the national, state, and local levels.

Sampling and Sampling Procedures Used to Collect Data

As recipients of payments from CMS, healthcare organizations must report qualifying HAIs through the CDC's NHSN reporting system (CDC, 2023c). The classification of HAIs adheres to stringent data collection and reporting guidelines to ensure reporting accuracy. The organization monitors and reports CAUTIs, CLABSIs, Clostridium difficile (C. Diff), Methicillin-Resistant Staphylococcus Aureus (MRSA),

and SSIs to NHSN. The organization also monitors Ventilator-Associated Events (VAE); however, the organization does not report the information to CMS.

The sampling strategy used for this study was random sampling. The quality department collected data on all patients admitted who obtained HAIs during their admission. The data was for the calendar year January 2019 through December 2019. The quality department identified patients meeting the definition of HAI as outlined by NHSN. Before submitting the information to NHSN, the quality department completed an electronic medical record (EMR) analysis to ensure that the HAI met the criteria for submission.

The department submitted questionable HAIs to an external abstractor for additional review. All secondary data were blinded and publicly reported. This quantitative study examined the correlation between HAIs and adherence to evidence-based standards of hand hygiene compliance, which may impact patients' LOS, organizational financial performance, and patient outcomes.

Instrumentation and Operationalization of Constructs

The CDC (2023c) utilizes NHSN as a tracking system to collect HAI data. NHSN supports local, state, regional, and national healthcare organizations with collected comparative and benchmark data to examine and evaluate areas of opportunity and preventative measures to eliminate HAIs. As a premier tracking system, NHSN shares and posts data to the CMS website in stringent adherence to state and federal reporting mandates. Data security, integrity, and confidentiality allow healthcare organizations to examine and evaluate potential infection prevention issues and implement performance

improvement initiatives. (CDC, 2023c). Acute care hospitals reporting HAIs include CLABSI, CAUTI, MRSA, C. Diff, and SSIs to meet the requirements of CMS's Hospital Inpatient Quality Reporting (IQR) and Promoting Interoperability (PI) Program requirements (CDC, 2023c).

Operationalization and Data Analysis Plan

The analysis for this research study incorporated using IBM SPSS statistics (V 29.0.2.0) software to answer the RQs and hypotheses. According to Wagner (2020), IBM SPSS statistics software supports different kinds of computer files containing the information for analysis. The output files obtained from the analysis display data in tables, graphs, or charts. As mentioned in Section 1, the RQs and hypotheses for this research study included the following:

RQ1: What, if any, is the statistical correlation between HAIs and adherence to established evidence-based handwashing compliance and the impact on financial performance, patients' length of stay, and patient outcomes?

$H_0$1: There is no statistically significant correlation between HAIs and adherence to established evidence-based handwashing standards on healthcare organizations' financial performance, patient's length of stay, and outcomes.

$H_1$1: There is a statistically significant correlation between HAIs and adherence to established evidence-based handwashing standards on healthcare organizations' financial performance, patients' length of stay, and outcomes.

RQ2: What, if any, is the statistical correlation between the implementation of a hand hygiene compliance program and HAIs?

$H_0$2: There is no statistically significant correlation between HAIs and implementing a hand hygiene compliance program.

$H_1$2: There is a statistically significant correlation between HAIs and the implementation of a hand hygiene compliance program.

Pearson's correlation was used as the statistical test for examining and evaluating the independent and dependent variables. The test for interval-ratio variables incorporates measuring any relationship or association between independent and dependent variables. Test ranges from 0.01 to $\pm$1.0, and 0.00 indicates no variable association. +1.0 indicates a positive variable association, and -1.0 indicates a perfect negative association (Frankfort-Nachmias et al., 2021). In addition, multivariate regression allowed the opportunity to determine the effect of two or more variables, including the dependent variable HAIs and independent variable evidence-based hand hygiene standards, and the impact on the organization's financial performance, patient LOS and outcomes (Frankfort-Nachmias et al., 2021).

Threats to Validity

Validity refers to the measurement method's accuracy and intentions. Internal and external threats can impact research results (Frankfort-Nachmias et al., 2021). An internal threat can be the training individuals receive. Individuals may lack sufficient training on data collection and adherence to the standards and stipulations outlined by NHSN for collection methods and data entry. External threats to validity included data collection and entry by various individuals. Inconsistencies may exist in how the data were collected and entered into the NHSN system. NHSN provides multiple learning

opportunities in different formats to ensure end-user knowledge and understanding. The NHSN surveillance system is vital as a quality tool and resource for participating healthcare organizations to improve patient outcomes and enhance healthcare safety (CDC, 2023c). However, the potential internal threat specific to data collectors' training was found to be invalid. All individuals responsible for data collection received appropriate training and complied with NHSN data collection standards.

Ethical Procedures

Completing a doctoral-level research project required adherence to written guidelines and ethical considerations outlined by Walden University. Access to the Walden University Office of Research Ethics and Compliance guides ensured compliance with doctoral-level research standards. Before beginning any data collection, approval was received from the Walden Institutional Review Board (IRB) and IRB approval number 11-08-24-1060096 was assigned. Once received, the IRB approved the research proposal, and data collection, analysis, and report of findings occurred (Walden University, 2021).

Secondary data were obtained from the organization’s Department of Quality for this research study. All data were confidential, had no identifiable patient information, and involved no human subjects. As an employee of the organization, caution was vital to ensure unbiasedness and separation of roles as an employee and those of the researcher. Adherence to all ethical standards outlined by Walden University and the organization was maintained. In addition, the organization reports all HAIs through the CDC's NHSN surveillance system in compliance with CMS infection reporting requirements.

Summary

Reporting HAIs as mandated by the CDC NHSN allows healthcare organizations to use analyzed data to examine and evaluate trends and problems related to HAIs. As mentioned in Section 2, this study's quantitative correlational descriptive design offered the capability to measure the independent and dependent variables to determine if relationships exist. The design further provided the opportunity to evaluate stated RQs, describe the dependent and independent variables, and examine and evaluate any relationships or impacts.

HAI data obtained from the Department of Quality were confidential and followed strict CDC NHSN reporting guidelines. NHSN reports submitted data to CMS as part of participating healthcare organizations' CMS quality measurement reporting requirements (CDC, 2023c). The healthcare organization can use the findings to implement preventative measures to decrease and eliminate HAIs. Section 3 further discusses the data collection of secondary data sets and the research findings and answers and summarizes RQs.

Section 3: Presentation of Results and Findings Section

Introduction

Section 3 incorporates data collection, analysis, and results of secondary data, as well as a summary. This quantitative study examined the correlation between HAIs (dependent variable) and evidence-based hand standards of hand hygiene compliance (independent variable). In addition, the study evaluated HAIs' impact on the healthcare organization's financial performance, the patient's length of stay in the hospital, and the patient's outcome.

This research study consisted of two questions. The first RQ for this study focused on the relationship between HAIs and evidence-based hand hygiene standards and the financial impact on healthcare organizations, the LOS for patients, and outcomes. The corresponding hypotheses were as follows:

$H_0$1: There is no statistically significant correlation between HAIs and adherence to established evidence-based hand washing compliance on healthcare organizations' financial performance, patients' length of stay, and outcomes.

$H_1$1: There is a statistically significant correlation between HAIs and adherence to established evidence-based hand washing standards on healthcare organizations' financial performance, patients' length of stay, and outcomes.

The second RQ was to identify if there were any significant statistical correlations between the implementation of a hand hygiene compliance program and HAIs. The corresponding hypotheses were as follows:

$H_0$2: There is no statistically significant correlation between HAIs and implementing a hand hygiene compliance program.

$H_1$2: There is a statistically significant correlation between HAIs and the implementation of a hand hygiene compliance program.

Data Collection of Secondary Data Set

Secondary data for this research were obtained from the healthcare organization's Quality Department. The Quality Department collected data on patients admitted to the facility who acquired HAIs during their stay and functioned as the primary source for HAI data. The random data samples included all male and female adult patients admitted to the facility in calendar year 2019. Using secondary data did not require interaction with human subjects and contained no identifiable patient information. The choice of random sampling aimed at including all patients who met the standard NHSN definition of HAI.

Results

SPSS Statistics 29.0.2.0 was utilized to investigate and examine two RQs and their corresponding hypotheses. Pearson correlations and multivariate regression analysis were conducted to address these RQs. Pearson correlation measures the strength and direction of the linear relationship between two continuous variables, ranging from -1 (perfect negative correlation) to +1 (perfect positive correlation), with 0 indicating no linear correlation (Field, 2024). Multivariate regression is a statistical technique used to assess the relationship between one or more predictor variables and multiple outcome

variables simultaneously, within a single model (Field, 2024). The specific RQs and hypotheses are outlined below.

RQ1: What, if any, is the statistical correlation between HAIs and adherence to established evidence-based hand washing compliance and the impact on financial performance, patients' length of stay, and patient outcomes?

$H_0$1: There is no statistically significant correlation between HAIs and adherence to established evidence-based hand washing standards on healthcare organizations' financial performance, patient's length of stay, and outcomes.

$H_1$1: There is a statistically significant correlation between HAIs and adherence to established evidence-based hand washing standards on healthcare organizations' financial performance, patients' length of stay, and outcomes.

RQ2: What, if any, is the statistical correlation between the implementation of a hand hygiene compliance program and HAIs?

$H_0$2: There is no statistically significant correlation between HAIs and implementing a hand hygiene compliance program.

$H_1$2: There is a statistically significant correlation between HAIs and implementing a hand hygiene compliance program.

The variables for the first RQ included HAIs (MRSA, C. Diff, SSIs, CLABSIs, CAUTIs, and VAE), compliance with established evidence-based hand washing, financial performance, and patient's length of stay. MRSA, C. Diff, SSIs, CLABSIs, CAUTIs, and VAE were coded as 0 for no or 1 for yes. Compliance with established evidence-based hand washing was coded as 0 for no and 1 for yes. Financial performance

and patients' length of stay were measured at the interval level of measurement. As seen in Table 1, out of a total of $N = 116$ inpatients (62 males and 51 females), there were 44 (37.9%) cases of MRSA and 72 (62.1%) participants who did not have MRSA. There were 39 (33.6%) cases of C. Diff and 77 (66.4%) participants who did not have C. Diff. There were 4 (3.4%) cases of CLABIs and 112 (96.6%) participants who did not have CLABIs. There were 5 (4.3%) cases of CAUTIs and 111 (96.7%) participants who did not have CAUTIs. There were 18 (15.5%) cases of SSIs and 98 (84.5%) participants who did not have SSIs. There were 17 (14.7%) cases of VAEs and 99 (85.3%) participants that did not have VAEs. Regarding hand hygiene compliance, 87 (75.0%) participants complied, and 29 (25.0%) did not comply. The percentages were not utilized in the statistical analysis. Instead, the presence or absence of the infection was dichotomized as either 0 for no or 1 for yes. This study did not aim to determine if the difference between the number of actual infections and the number of predicted infections was due to chance alone. The purpose of this study was to determine if there is a correlation between hand washing compliance and infection; therefore, the SIR does not pertain to this current analysis.

Table 1

Percentages and Frequencies for the Variables

Variable	Category	*N*	*%*
MRSAyesno	no	72	62.1%
	yes	44	37.9%
CDIFFyesno	no	77	66.4%
	yes	39	33.6%
CLABSIs	no	112	96.6%
	yes	4	3.4%
CAUTIs	no	111	95.7%
	yes	5	4.3%
SSI	no	98	84.5%
	yes	18	15.5%
VAE	no	99	85.3%
	yes	17	14.7%
HandHygCompliance	no	29	25.0%
	yes	87	75.0%

Length of stay (LOS) ranged from two days to 316 days. The average LOS was 12.90 days (*SD* = 29.06). Reimbursement ranged from $4,414.40 to $37,351.25. The average reimbursement was $10,128.78 (*SD* = $6078.50). Table 2 shows the descriptive statistics for the LOS and reimbursement.

Table 2

Descriptive Statistics for Length of Stay and Reimbursement

Variable	Minimum	Maximum	*M*	*SD*
LOS	2	316	12.90	29.06
Reimbursement	4414.00	37351.25	10128.78	6078.50

Parametric Assumptions

Before conducting the analysis, some parametric assumptions needed to be verified. Regarding Pearson correlations, these assumptions included normality, linearity, and absence of outliers (Field, 2024). Skewness and kurtosis values were also computed to assess normality. Acceptable ranges are between -3 to +3 (Field, 2024). Table 3 shows there was a violation of this assumption as Skewness ranged from 2.070 to 10.047, and kurtosis ranged from 5.343 to 105.42. As a consequence, the nonparametric Spearman's correlations were conducted, which do not have a normality assumption.

Table 3

Skewness and Kurtosis Statistics for Length of Stay and Reimbursement

Variable	Skewness	Kurtosis
Length of stay (Days)	10.047	105.417
Reimbursement	2.070	5.343

Regarding the parametric assumption of normality of regression residuals for multivariate regression was assessed. Visual inspection of histograms for length of stay and reimbursement revealed that the data were positively skewed (see Figures 1 and 2). However, multivariate regression is robust to deviations from normality (Field, 2024).

Figure 1

Histogram of Regression Residuals (DV Reimbursement)

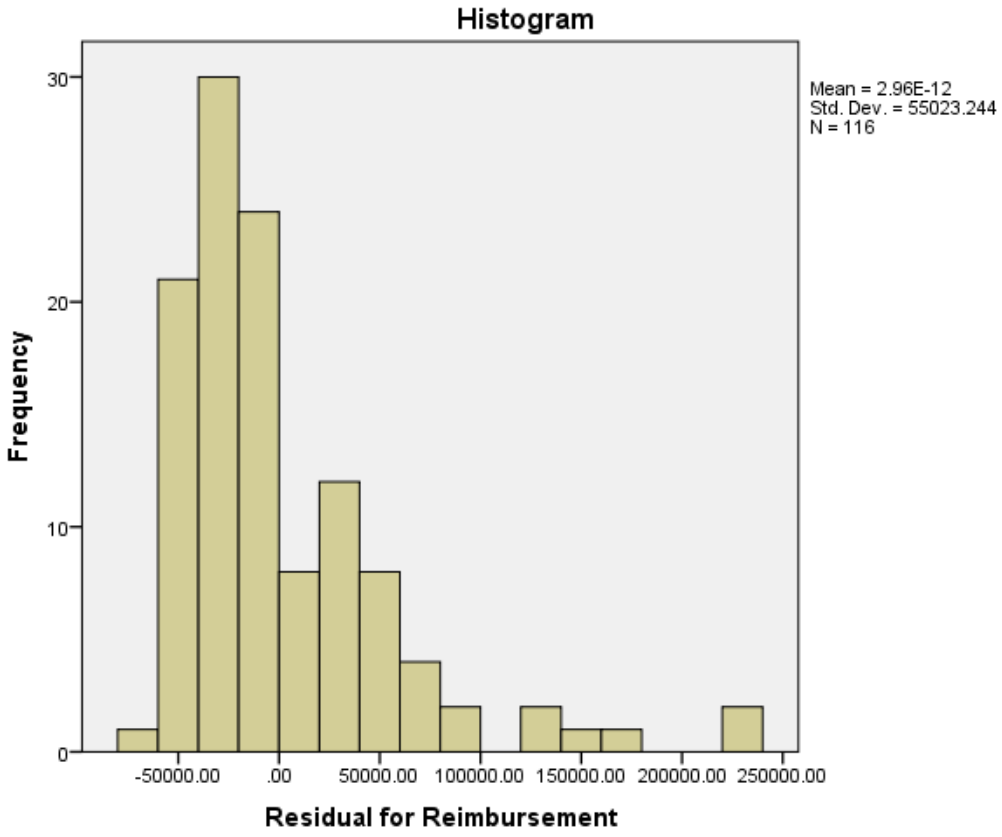
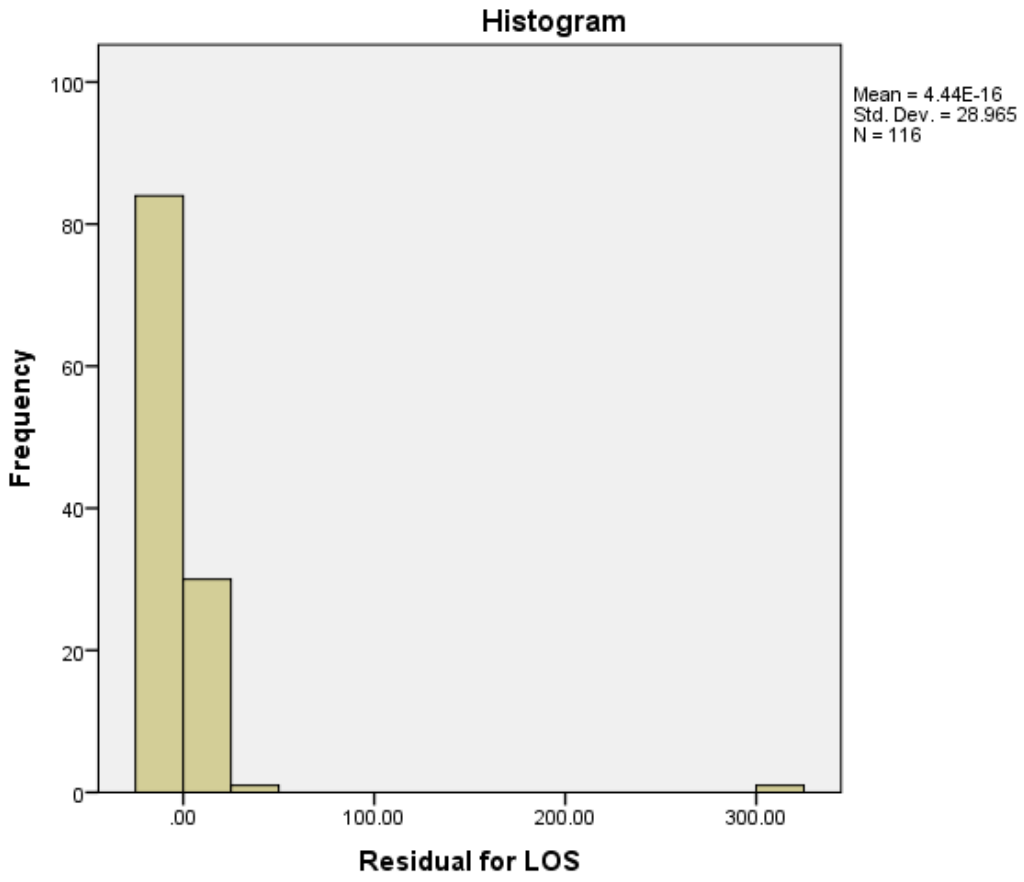


Figure 2

Histogram of Regression Residuals (DV Length of Stay)



Summary

RQ1 was as follows: What, if any, is the statistical correlation between HAIs and adherence to established evidence-based hand washing standards and the impact on financial performance, patients' length of stay, and patient outcomes? The corresponding hypotheses were as follows:

$H_0$1: There is no statistically significant correlation between HAIs and adherence to established evidence-based hand washing standards on healthcare organizations' financial performance, patient's length of stay, and outcomes.

$H_1$1: There is a statistically significant correlation between HAIs and adherence to established evidence-based hand washing standards on healthcare organizations' financial performance, patients' length of stay, and outcomes.

Spearman Correlations

Due to the violation of normality, Spearman correlations were conducted. The results of Spearman correlations revealed no statistically significant correlations ($p >$ .05). Although hand hygiene compliance corresponded to a *decrease* in MRSA *(Rho = -.040, p = .662),* and CDIFF *(Rho = .911),*and an increase in length of stay (*Rho* = .113, *p* = .226), reimbursement (*Rho* = .136, *p* = .144), CLABIs (*Rho* = .000, *p* = 1.00), CAUTIs (*Rho* = .123, *p* = .082), SSI (*Rho* = .082, *p* = .379), and *VAE* (*Rho* = .070, *p* = .453), the correlations were not statistically significant ($p > .05$; see Table 4).

Table 4

Spearman Correlations for Hand Hygiene Compliance, MRSA, C-Diff, Reimbursement, and LOS

Variables		1	2	3	4	5	6	7	8	9
Hand hygiene Compliance	*Rho*	1.000								
	p	.								
Length of stay (Days)	*Rho*	.113	1.000							
	p	.226	.							
Reimbursement	*Rho*	.136	.532	1.000						
	p	.144	.000	.						
MRSA	*Rho*	-.041	-.227	-.296	1.000					
	p	.662	.014	.001	.					
CDIFF	*Rho*	-.011	-.141	-.243	-.067	1.000				
	p	.911	.130	.009	.472	.				
CLABSIs	*Rho*	.000	.060	.198	-.148	-.134	1.000			
	p	1.000	.521	.034	.114	.150	.			
CAUTIs	*Rho*	.123	-.018	.059	-.166	-.151	-.040	1.000		
	p	.190	.850	.530	.075	.106	.669	.		
SSI	*Rho*	.082	.333	.405	-.335	-.305	-.081	-.091	1.000	
	p	.379	.000	.000	.000	.001	.387	.332	.	
VAE	*Rho*	.070	.143	.040	-.324	-.295	-.078	-.088	-.178	1.000
	p	.453	.125	.667	.000	.001	.403	.348	.056	.

Results of Multivariate Regression

A multivariate regression was conducted to determine if hand hygiene compliance, MRSA, C. diff, SSIs, CLABSIs, CAUTIs, and VAE predicted reimbursement and length of stay. The two dependent variables of length of stay and reimbursement were entered into SPSS's multivariate regression procedure. The predictor variables of hand hygiene compliance, MRSA, C. diff, SSIs, CLABSIs, CAUTIs, and VAE were included. The results of multivariate regression revealed that none of the predictor variables were significant in predicting length of stay. However, CLABSI (*B* = -

83154.962, $p = .008$) and SSI ($B = -47197.724$, $p = .029$) were significant predictors of reimbursement. Nonoccurrences of CLABSI and SSI results in a decrease in reimbursement (see Table 5).

Table 5

Results of Multivariate Regression for Hand Hygiene Compliance, MRSA, C-diff, SSIs, CLABSI, CAUTIs, and VAE Predicting Reimbursement and Length of Stay

Dependent variable	Predictor	*B*	*t*	*p*	95% Confidence Interval	
					Lower Bound	Upper Bound
Length of stay (Days)	Intercept	44.193	.871	.386	-56.35	144.74
	[HandHygCompliance=.00]	-3.483	-.540	.590	-16.26	9.29
	[HandHygCompliance=1.00]	0[a]	.	.	.	.
	[MRSA=0]	-.572	-.063	.950	-18.51	17.37
	[MRSA=1]	0[a]	.	.	.	.
	[CDIFF=0]	-1.149	-.130	.897	-18.74	16.44
	[CDIFF=1]	0[a]	.	.	.	.
	[CLABSIs=0]	-5.837	-.332	.741	-40.72	29.04
	[CLABSIs=1]	0[a]	.	.	.	.
	[CAUTIs=0]	-.826	-.050	.961	-33.85	32.20
	[CAUTIs=1]	0[a]	.	.	.	.
	[SSI=0]	-21.463	-1.755	.082	-45.70	2.78
	[SSI=1]	0[a]	.	.	.	.
	[VAE=0]	-5.562	-.451	.653	-30.00	18.87
	[VAE=1]	0[a]	.	.	.	.
Reimbursement	Intercept	238085.677	2.695	.008	62974.17	413197.18
	[HandHygCompliance=.00]	-10658.115	-.950	.344	-32907.90	11591.68
	[HandHygCompliance=1.00]	0[a]	.	.	.	.
	[MRSAyesno=0]	9221.009	.585	.560	-22021.81	40463.83
	[MRSAyesno=1]	0[a]	.	.	.	.
	[CDIFFyesno=0]	4706.431	.305	.761	-25922.90	35335.76
	[CDIFFyesno=1]	0[a]	.	.	.	.
	[CLABSIs=0]	-83154.962	-2.713	.008	-143899.05	-22410.87
	[CLABSIs=1]	0[a]	.	.	.	.
	[CAUTIs=0]	-39022.586	-1.345	.181	-96534.66	18489.49
	[CAUTIs=1]	0[a]	.	.	.	.
	[SSI=0]	-47197.724	-2.216	.029	-89414.78	-4980.67
	[SSI=1]	0[a]	.	.	.	.
	[VAE=0]	-10534.721	-.491	.625	-53087.74	32018.30
	[VAE=1]	0[a]	.	.	.	.

RQ2 was as follows: What, if any, is the statistical correlation between the implementation of a hand hygiene compliance program and HAIs? The corresponding hypotheses were as follows:

$H_0$2: There is no statistically significant correlation between HAIs and implementing a hand hygiene compliance program.

$H_1$2: There is a statistically significant correlation between HAIs and the implementation of a hand hygiene compliance program.

Spearman correlations were conducted in order to address this RQ. None of the correlations were significant ($p > .05$). Although there were decreases in MRSA (*Rho* = -.041, $p = .662$) and CDIFF (*Rho* = -.011, $p = .911$), the association was not significant (see Table 6).

Table 6

Spearman Correlations

Variable		1	2	3	4	6	7	8
Compliance	*Rho*	1.000						
	p	.						
MRSA	*Rho*	-.041	1.000					
	p	.662	.					
CDIFF	*Rho*	-.011	-.067	1.000				
	p	.911	.472	.				
CLABSIs	*Rho*	.000	-.148	-.134	1.000			
	p	1.000	.114	.150	.			
CAUTIs	*Rho*	.123	-.166	-.151	-.040	1.000		
	p	.190	.075	.106	.669	.		
SSI	*Rho*	.082	-.335	-.305	-.081	-.091	1.000	
	p	.379	.000	.001	.387	.332	.	
VAE	*Rho*	.070	-.324	-.295	-.078	-.088	-.178	1.000
	p	.453	.000	.001	.403	.348	.056	.

The results from RQ1, which was conducted using both Spearman correlations and multivariate regression, indicated that the first null hypothesis was rejected. Although the results of Spearman correlations revealed no significant findings, the results of multivariate regression revealed that CLABSI (B = -83154.962, p = .008) and SSI (B = -47197.724, p = .029) were significant predictors of reimbursement (financial performance). Therefore, it was concluded that there is a statistically significant correlation between HAIs and adherence to established evidence-based handwashing standards on healthcare organizations' financial performance, patient length of stay, and outcomes. Secondary HAI data sets obtained from the healthcare organization from January 1, 2019, through December 31, 2019, included MRSA, C. Diff, SSIs, CLABSIs, CAUTIs, and VAE. Although the organization does not report VAE data to CMS, it was included in the HAI overall data analysis.

Section 3 included collecting secondary data, statistical analysis findings, and a synopsis of each RQ and hypothesis. The incorporation of answers and interpretations of each RQ and hypothesis using tables and graphs are included. Answers to RQ1 revealed no statistically significant findings and no rejection of the null hypothesis. RQ2 also showed no statistically significant correlation between HAIs and adherence to established evidence-based handwashing standards on healthcare organizations' financial performance, patient length of stay, and outcomes.

Section 4 includes the interpretation of the findings and potential impact on healthcare. The analysis of findings and interpretation also includes the context and the

application of the Donabedian conceptual model, study limitations, recommendations for further research, implications for professional practice and social change, and the conclusion.

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

Introduction

HAIs represent a persistent challenge for healthcare organizations, contributing $28 to $45 billion annually to U.S. healthcare costs despite being largely preventable through proper hand hygiene practices (Fish et al., 2021). The lack of standardized adherence to evidence-based hand washing protocols increases HAI occurrence, negatively impacting patient length of stay, healthcare financial performance, and patient outcomes. This quantitative correlational study examined the relationship between HAIs (dependent variable) and evidence-based hand hygiene compliance (independent variable), while evaluating their impact on healthcare organizations' financial performance, patient length of stay, and outcomes. Two RQs were investigated: (a) the statistical correlation between HAIs and adherence to established evidence-based hand washing standards and their impact on financial performance, length of stay, and patient outcomes, and (b) the correlation between implementing a hand hygiene compliance program and HAIs. The study employed a descriptive correlational design using secondary data from 116 adult inpatients admitted to the healthcare organization during calendar year 2019. The data were analyzed through IBM SPSS Statistics software using Pearson correlations and multivariate regression analysis.

The statistical analysis revealed predominantly null findings across both RQs. Using IBM SPSS Statistics 29.0.2.0, Spearman correlations showed no statistically significant relationships between hand hygiene compliance and any measured HAI types (MRSA, C. diff, CLABSIs, CAUTIs, SSIs, or VAEs), with *p*-values exceeding .05 for all

correlations. Hand hygiene compliance was 75% among the 116 participants, yet this did not translate into significant infection prevention outcomes. Multivariate regression analysis similarly found no significant predictors for length of stay among the infection variables. However, two notable exceptions emerged in financial performance outcomes: CLABSIs (B = -83154.962, p = .008) and SSIs (B = -47197.724, p = .029) were significant predictors of reimbursement, with nonoccurrence of these infections associated with decreased reimbursement costs. The study's null hypothesis could not be rejected for either RQ, indicating no statistically significant correlation between HAIs and hand hygiene compliance program implementation. The unexpected findings contradict established literature supporting hand hygiene effectiveness in infection prevention.

Interpretation of the Findings

The study employed two RQs that generated four corresponding hypotheses to examine the relationships between HAIs and hand hygiene compliance. The interpretation section will systematically analyze and discuss the findings for each hypothesis, examining both the statistical outcomes and their implications within the broader context of infection prevention literature. All the hypotheses will be tested in relation to the empirical evidence collected, and the possible explanations of the observed results and their correspondence to the current standards of healthcare practice will be considered.

RQ1: What, if any, is the statistical correlation between HAIs and adherence to established evidence-based handwashing standards and the impact on financial performance, patients' length of stay, and patient outcomes?

The first RQ involved the statistical relationship between HAIs and compliance with set evidence-based hand washing, and how it affects the financial performance, patient length of stay, and patient outcomes of healthcare organizations. The question posed a central issue in healthcare delivery since the comprehension of such relationships is essential to the establishment of effective infection prevention measures and resource allocation decisions. The RQ included two hypotheses, the null hypothesis that there is no statistically significant relationship between these variables, and the alternative hypothesis that there exists a statistically significant relationship between HAIs, hand hygiene adherence, and organizational outcomes.

$H_0$1: There is no statistically significant correlation between HAIs and adherence to established evidence-based hand washing standards on healthcare organizations' financial performance, patients' length of stay, and outcomes.

The statistical analysis supported the null hypothesis ($H_0$1), demonstrating no statistically significant correlation between HAIs and adherence to established evidence-based hand washing standards on healthcare organizations' financial performance, patient length of stay, and outcomes. Spearman correlations revealed nonsignificant relationships across all measured variables, with hand hygiene compliance showing weak correlations with infection types: MRSA (Rho = -.040, p = .662), C. diff (Rho = -.011, p = .911), CLABSIs (Rho = .000, p = 1.00), CAUTIs (Rho = .123, p = .190), SSIs (Rho = .082, p =

.379), and VAEs (Rho = .070, p = .453). Despite 75% hand hygiene compliance among healthcare staff, this did not translate into measurable reductions in infection rates or improvements in organizational outcomes. The multivariate regression analysis similarly found no significant predictors for length of stay among the infection prevention variables. The findings suggest that, within this study's methodology and timeframe, hand hygiene compliance as measured did not demonstrate the expected statistical relationship with reduced HAIs or improved financial and clinical outcomes.

The null findings present a significant contradiction to the robust literature base, which consistently demonstrates hand hygiene's critical role in infection prevention. The CDC's emphasis on hand washing effectiveness, supported by Toney-Butler et al. (2023), indicated that proper hand hygiene can reduce respiratory infections by 20% and diarrhea-related illnesses by 30%. Similarly, Fish et al. (2021) demonstrated that hand hygiene compliance improvements correlate with reduced HAI transmission when combined with monitoring and feedback mechanisms. Within Donabedian's theoretical framework, this study's findings challenge the expected structure-process-outcome relationship (Donabedian, 2005). The structure component (healthcare facility with 75% compliance rates) and process component (evidence-based handwashing protocols) should theoretically yield improved outcomes in reduced infections and better organizational performance. \However, the absence of these expected correlations may indicate measurement limitations, a temporal disconnect between compliance observation and infection development, or insufficient sample size rather than actual ineffectiveness of hand hygiene practices.

$H_1$1: There is a statistically significant correlation between HAIs and adherence to established evidence-based hand washing standards on healthcare organizations' financial performance, patients' length of stay, and outcomes.

The alternative hypothesis ($H_1$1) was not supported by the statistical analysis, as the data failed to demonstrate a statistically significant correlation between HAIs and adherence to established evidence-based hand washing standards on healthcare organizations' financial performance, patient length of stay, and outcomes. Despite theoretical expectations that improved hand hygiene compliance would correlate with reduced infection rates and better organizational metrics, the empirical evidence showed non-significant relationships across all measured variables. Multivariate regression analysis similarly failed to identify hand hygiene compliance as a significant predictor of length of stay or financial performance indicators. The results indicate that the measurement approach was not adequate to identify the actual relationship and that there are possibly other unmeasured variables that were mediating the anticipated association between hand hygiene practices and infection prevention outcomes.

The rejection of the alternative hypothesis is opposed to significant evidence that highly supports the effectiveness of hand hygiene as a tool to reduce HAIs and enhance healthcare outcomes. Studies by McFarland et al. (2020) and Shepard et al. (2020) indicated that there is clear financial gain when hospitals prevent HAI, showing possible savings of up to $25,000 per prevented infection and gains of up to $1,518,682. The inability to identify these relationships in the current research is opposite to the previous findings of Sikora et al. (2022), who reported that 65-70% of CLABSIs and CAUTIs

could be reduced by implementing infection prevention programs. Within Donabedian's theoretical framework, the expected pathway from structure through process to outcomes was not empirically validated. The disconnect may reflect limitations in the study's temporal design, as the framework assumes that process improvements require sufficient time to manifest in measurable outcomes. The literature's emphasis on continuous monitoring and multifaceted interventions, as demonstrated by Ni et al. (2020), suggested that isolated compliance measurements may be insufficient to capture the complex dynamics of infection prevention effectiveness within healthcare systems.

RQ2: What, if any, is the statistical correlation between the implementation of a hand hygiene compliance program and HAIs?

The second RQ specifically examined the statistical correlation between the implementation of a hand hygiene compliance program and HAIs, focusing on the direct relationship between program implementation and infection outcomes. The question represents a more targeted investigation into program effectiveness, addressing whether structured compliance initiatives can measurably impact HAI rates within healthcare organizations. RQ2 generated two hypotheses: the null hypothesis ($H_0 2$) stating no statistically significant correlation exists between HAI occurrence and hand hygiene compliance program implementation, and the alternative hypothesis ($H_1 2$) proposing a statistically significant correlation between these variables.

$H_0 2$: There is no statistically significant correlation between HAIs and implementing a hand hygiene compliance program.

The statistical test was in favor of the null hypothesis, indicating that there was no statistically significant association between HAIs and the implementation of a hand hygiene compliance program. The Spearman correlations were all found to be nonsignificant in all types of infections measured during the study. Despite the implementation of a structured hand hygiene compliance program with 75% adherence rates among healthcare staff, no measurable reduction in infection rates was detected. The findings suggest that the compliance program, as implemented and measured in this study, did not achieve statistically detectable improvements in infection prevention outcomes within the specified timeframe and methodology.

The failure to reject the null hypothesis is contrary to evidence from the literature supporting the effectiveness of hand hygiene programs. Ni et al. (2020) showed significant improvement in hand hygiene compliance in their longitudinal intervention project, with hand hygiene compliance rates rising from 76.61% to 83.34% with respective infection reductions. Similarly, Fish et al. (2021) demonstrated that compliance programs with monitoring and feedback mechanisms resulted in successful reduction of HAI transmission rates. The findings of the study contest the expectations of Donabedian's theoretical framework, where the structured programs based on the implementation of evidence-based protocols should produce measurable infection reductions (Donabedian, 2005). The lack of significant correlations in this study may not necessarily reflect ineffective programs, but may rather be because of insufficient program duration, insufficient feedback mechanisms, or limitations in the measurement. Toney-Butler et al. (2023) emphasized that hand hygiene programs need to be sustained

and complete to show meaningful results, so it may be that the cross-sectional approach used in this study was not comprehensive enough to illustrate the tempo dynamics needed for program success.

$H_1$2: There is a statistically significant correlation between HAIs and implementing a hand hygiene compliance program.

The alternative hypothesis was not supported by the empirical evidence, as the data did not support a statistically significant association between HAIs and the implementation of a hand hygiene compliance program. Despite the expected correlation that a structured compliance program would lower infection rates, the statistical analysis showed consistently non-significant correlations for all types of measured infections. The program's implementation, including direct observation methods and electronic data collection, resulted in 75% compliance rates but failed to result in detectable reductions. The multivariate regression analysis also failed to find the compliance program to be a significant predictor of infection reduction. The findings suggest that the program's implementation period was insufficient to demonstrate measurable effects, the measurement methodology was inadequate to capture true relationships, or confounding variables may have masked the expected correlation between program implementation and infection prevention outcomes.

The rejection of the alternative hypothesis ($H_1$2) presents a significant contradiction to the robust evidence base established in the literature. Research by Chakraborty et al. (2020) emphasized that quality improvement programs incorporating systematic measurement and feedback mechanisms significantly enhance patient care

quality and organizational outcomes. The CDC's guidelines, supported by extensive research, establish clear evidence that properly implemented hand hygiene programs can reduce healthcare-associated infections by substantial margins (Carande-Kulis, 2022). Within Donabedian's theoretical framework, the expected progression from program structure through systematic processes to improved outcomes was not empirically validated in this study (Donabedian, 2005). However, the literature emphasized critical implementation factors that may explain these null findings. Ni et al. (2020) demonstrated that successful programs require sustained intervention periods, continuous education, and multifaceted approaches combining training, monitoring, and stakeholder engagement. The study's findings may reflect insufficient program maturation time or inadequate integration of evidence-based implementation strategies rather than inherent program ineffectiveness.

Limitations of the Study

The study encountered several significant limitations that impacted the validity and generalizability of findings. The sample size of 116 participants from a single healthcare facility during 2019 severely restricted external validity and the ability to generalize findings to other healthcare organizations or time periods. The reliance on secondary data from one institution's quality department further limited the scope and applicability of results to broader healthcare settings, particularly those not utilizing the CDC's NHSN reporting systems.

The manual data collection process for hand hygiene compliance presented substantial methodological challenges. Multiple staff members across different

departments and shifts were responsible for observing and recording hand hygiene practices, introducing significant inter-observer variability and potential bias. Despite education and competency validation requirements, the subjective nature of observational data collection created inconsistencies that may have affected the accuracy of compliance measurements. The time lag between the observation of compliance and the development of infection was also difficult, since hand hygiene practices at a single point may not be a good indication of such practices during the most crucial times of infectious transmission.

The inconsistency in data interpretation between infection preventionists and abstractors on the definition of NHSN and SIR raised further validity issues. The lack of agreement on the interpretation of HAI criteria resulted in the inability to provide consistent infection classification and reporting, which obscured real associations between variables. The cross-sectional study design hindered the possibility of establishing causation and the dynamics of time required to show that the infection prevention programs are effective. In addition, the dual status of the researcher, being the investigator and organizational employee, made it susceptible to potential unconscious bias, although variable HAI treatment protocols across the facility confounded the research, potentially affecting outcomes regardless of hand hygiene compliance measures.

Recommendations

Standardized hand hygiene observation practices should be adopted in healthcare organizations with strict data collector training programs. Facilities should also seek to invest in electronic monitoring systems that offer real-time feedback and objective

measurement of compliance rates as opposed to using manual observation alone. Such technological solutions may reduce inter-observer variation and provide continuous data gathering for all shifts and departments. To ensure a high level of consistency in the way the NHSN definitions are interpreted, and the criteria of HAI classification are met, organizations should establish clear standards of competency for infection preventionists and data abstractors.

Multi-modal hand hygiene programs need long-term commitment and sufficient resources. According to the focus on continuous intervention as highlighted in the literature, organizations ought to come up with all-inclusive programs that include education, training, monitoring, feedback systems, and leadership participation. Such programs should have behavioral change plans and organizational culture change programs that are in line with the financial advantages as shown by Shepard et al. (2020). Healthcare administrators should implement strong data governance systems that guarantee the quality and integrity of data during the collection and reporting process. Organizations should also invest in sufficient staffing of infection prevention programs to facilitate the consistency of implementation and monitoring programs and understand that effective infection prevention programs have the potential to save organizational costs and provide better patient outcomes.

Subsequent research should utilize multi-site designs that include larger sample sizes to increase generalizability and power, reflecting on the single-site weakness that is present in the current research. In addition, secondary data are not adequate to collect primary data, and a larger population size would be necessary to study and assess more

variables that influence HAIs and standards of care handwashing. Longitudinal study designs spanning multiple years would better capture the temporal relationships between hand hygiene interventions and infection outcomes, addressing this study's cross-sectional limitations.

Research should investigate the optimal timing and frequency of hand hygiene observations to establish meaningful correlations with infection prevention outcomes. Studies examining the lag time between compliance improvements and measurable infection reduction would provide valuable insights for program evaluation timelines. Future research should also explore the effectiveness of different hand hygiene monitoring technologies, comparing electronic systems with traditional observation methods. Comparative effectiveness research examining various hand hygiene program components would help identify the most impactful intervention strategies, building on Sikora et al.'s (2022) findings regarding infection prevention program effectiveness. Studies should investigate the relationship between program intensity, duration, and effectiveness, providing evidence-based guidance for resource allocation decisions. Research incorporating economic evaluation methods would strengthen the business case for hand hygiene program investments, particularly given the demonstrated financial benefits of HAI reduction.

Mixed-methods research approaches combining quantitative infection data with qualitative assessments of organizational culture and staff behavior would provide a comprehensive understanding of hand hygiene program effectiveness within this theoretical framework. Future research should address confounding variables more

rigorously, controlling factors such as patient acuity, comorbidities, length of stay variations, and seasonal infection patterns. Multilevel modeling approaches could better account for the hierarchical nature of healthcare data and organizational factors influencing outcomes. Finally, researchers should explore innovative measurement approaches, including the use of artificial intelligence and machine learning algorithms to analyze hand hygiene compliance patterns and predict infection risk, advancing both scientific understanding and practical implementation of evidence-based infection prevention programs.

Implications for Professional Practice and Social Change

Professional Practice

The research has significant implications for healthcare administrators and organizations seeking to enhance infection prevention strategies and optimize patient safety outcomes. Despite the study's null findings, the established literature confirmed that appropriate hand washing remains an integral component of reducing HAIs, patient mortality, and morbidity, with hand hygiene standards helping reduce the spread of organisms, associated costs, and patient length of stay (Toney-Butler et al., 2023). The estimated annual cost of preventable HAIs to healthcare organizations through standard handwashing approaches $28 to $45 billion, emphasizing the critical need for effective implementation strategies.

Healthcare leaders must recognize that the absence of significant correlations in this study does not diminish the established evidence supporting hand hygiene effectiveness. Research indicates that monitoring adherence and sharing results with

frontline staff could help improve hand hygiene compliance (Fish et al., 2021). Organizations should have formal hand hygiene programs that are not limited to simple compliance metrics but also actual feedback systems, employee education, and cultural change programs. The results underscore the importance of thorough data collection procedures and agreed observation guidelines. Healthcare organizations should invest in electronic monitoring systems, which provide objective and continuous monitoring of compliance rates across all shifts and departments. McFarland et al. (2020) stated that the increase in HAIs continues to affect patient length of stay, adverse outcomes, and death; therefore, efficient measurement and intervention strategies are important to the success of an organization.

Positive Social Change

Hand washing regularly can reduce HAIs and create positive social change. Sikora et al. (2022) noted that the lack of surveillance systems for direct monitoring of HAIs has a direct impact on the knowledge and importance of preventative measures and monitoring, suggesting that improved infection prevention interventions may have a positive impact on community health literacy and awareness. The potential for positive social change lies in the role of healthcare organizations as leaders in community health and educators. In a longitudinal single-center hygiene improvement project, Ni et al. (2020) found that the hand hygiene compliance rate had improved because of the continuous intervention, and the research suggested that better hand hygiene compliance should be achieved through education, training, monitoring, and collaboration between the key stakeholders.

The social change implications are broader, pertaining to health equity and access to good care. HAIs, which could be reduced through good hand hygiene programs, would reduce the costs of care, allowing access to underserved populations. The CDC noted that one in every 31 U.S. patients acquires HAIs specifically while they receive healthcare services, suggesting that successful infection prevention programs would have a substantial effect on population health outcomes and reduce healthcare disparities (CDC, 2023c). Collaborating with leaders within the organization and community can promote a unified approach to decision-making, policy development, and positive social change to meet the community's needs (Reupert, 2023). Furthermore, policies focused on initiatives to improve community health and well-being might enhance the quality of care and patient outcomes while reducing HAI occurrences. The reduction of HAIs begins with appropriate hand hygiene and enhancing the knowledge of patients and healthcare providers, creating ripple effects that extend beyond hospital walls to influence community health practices and awareness of infection prevention strategies.

Conclusion

HAIs represent a persistent challenge for healthcare organizations, contributing $28 to $45 billion annually to U.S. healthcare costs despite being largely preventable through proper hand hygiene practices. This quantitative correlational study examined relationships between HAIs and evidence-based hand hygiene compliance, along with their impact on healthcare organizations' financial performance, patient length of stay, and outcomes. Using secondary data from 116 adult inpatients admitted during calendar year 2019, the study employed Spearman correlations and multivariate regression

analysis through IBM SPSS Statistics software. The statistical analysis showed no significant associations between hand hygiene compliance and infection reduction in all variables measured, with both null hypotheses being rejected despite 75% hand hygiene compliance among healthcare staff.

Although these findings are inconsistent with the existing literature advocating for the effectiveness of hand hygiene, they raise important methodological issues for future studies in infection prevention. The study validates the need for ongoing research using improved methodologies to examine and evaluate opportunities to enhance patient safety and well-being through evidence-based hand hygiene standards, ensuring that healthcare organizations continue pursuing effective strategies to reduce HAIs and improve patient outcomes.

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Appendix: Hand Hygiene Observation Collection Tool