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Strategies for Clinical Managers to Reduce Nosocomial Infections

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Walden University

College of Management and Human Potential

This is to certify that the doctoral study by

Samisha Davis

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.

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Walden University

2023

Abstract

Strategies for Clinical Managers to Reduce Nosocomial Infections

by

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MBA, University of Texas at Tyler, 2017

BAS, Texas Woman's University, 2011

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

August 2023

Abstract

Increasing nosocomial infection rates threaten patient safety when approximately 100 million patients annually acquire at least one nosocomial infection during their hospital stay. Some clinical managers lack strategies to reduce the incidence and costs of nosocomial infections. Clinical managers need training in proactive infection control guidelines that may reduce infection rates and increase profitability. Grounded in adaptive leadership theory, the purpose of this qualitative multiple case study was to explore successful strategies that clinical managers used to reduce incidence and costs associated with nosocomial infections. The participants were four clinical managers employed by health care organizations in the Southeast Texas region of the United States. Data were collected using semistructured interviews as well as Leap Frog Hospital Safety Grade, Texas Department of Health and Human Services, and The Joint Commission websites. Through thematic analysis, three themes emerged: education and training, hand hygiene and equipment cleaning, and accountability. A key recommendation is for clinical managers to use a multidisciplinary approach and a combination of infection control strategies to reduce the incidence of nosocomial infections. The implications for positive social change include the potential to influence future infection control programs and improve dignity and quality of life for patients.

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Dedication

I dedicate my doctoral work to my husband, Kenneth Sr., and my children, Kenneth Jr., Karson, and Kenadee. Thank you for the support and inspiration throughout this journey. A special feeling of gratitude to my loving parents, Sammie and Paulette Robinson whose words of encouragement and reassurance ring in my ears.

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Section 1: Foundation of the Study

Nosocomial infections, or hospital-acquired infections, continue to be a source of calamity for patients and health care facility employees. Approximately, 100 million patients will acquire at least one nosocomial infection (Taye et al., 2023). The effect on patients includes extended length of stay in the hospital and an increased financial burden because of an unexpected infection (Stewart et al., 2021). The infections also have a financial ramifications for health care facilities, resulting in an annual direct and indirect cost burden of \$96 to \$147 billion (Mylonakis & Ziakas, 2021). Health care professionals can act as vectors in the transmission process by disseminating infections to patients, and approximately 55% to 70% of nosocomial infections are potentially preventable (Bearman et al., 2019). Strict adherence to infection control guidelines may reduce infection rates and increase profitability for hospitals. The objective of this qualitative multiple case study was to explore successful strategies used by clinical managers to reduce nosocomial infection costs and incidence rates.

Background of the Problem

Health care is a business, and the goal of hospital executives, stakeholders, policymakers, and clinicians is to maximize profits and minimize loss while providing quality health care to patients. Externally, hospital executives acquired private equity investments, such as dialysis centers, home health services, and private physician practices. Through private equity deals, hospital executives can increase revenue by 20% to 30% (Gondi & Song, 2019). Internally, clinical physicians implemented telehealth as an alternative to face-to-face visits. The use of telemedicine allowed physicians to screen

more patients, provide rural communities with health care access, and connect physicians with international patients (Kichloo et al., 2020). The use of telemedicine increased cost savings by \$19 to \$121 per visit (Nord et al., 2019).

Reducing nosocomial infections is another approach to maximize profits and minimize loss. Nosocomial infections were a common cause of morbidity and mortality rates across the world affecting approximately 3.2% of hospitalized patients (Magill et al, 2018). These preventable infections pose a significant threat to patient safety as well as a financial burden and cause patients to experience additional health complications, extended length of stays in hospitals, and a diminished quality of life (Nguemeleu et al, 2020). In addition, the cost burden to treat patients with nosocomially acquired infections in the United States is between \$96 to \$147 billion annually (Mylonakis & Ziakas, 2021). Hospital leaders can continue to grow their health care business by using successful strategies to reduce nosocomial infection rates and increase profits, which is the purpose of the current study.

Problem and Purpose

The specific business problem was that some clinical managers lack strategies to reduce the incidence and costs of nosocomial infections. The purpose of this qualitative multiple case study was to explore strategies clinical managers used to reduce the incidence and costs associated with nosocomial infections.

Population and Sampling

The targeted population was clinical managers in health care organizations in the Southeast Texas region of the United States who demonstrated success in the reduction of incidence and costs of nosocomial infections. For strategy implementation to be considered successful, the clinical managers had confirmed successful knowledge and experience in addressing hospital-acquired infections. Data were collected from semistructured interviews with seven interview questions.

Qualitative researchers do not randomly select participants for their sample, but instead, purposely choose their participants because of the small sample sizes of qualitative studies (Subedi, 2021). After I received approval from the Walden University Institutional Review Board (IRB) to conduct this study, I began recruiting eligible participants by screening the professional social media site, Linked In, for clinical managers who work for hospitals rated “A” in infection control by Leap Frog Hospital Safety Grade, the Texas Department of Health and Human Services, and The Joint Commission websites. The purposeful selection of at least three clinical managers for my sample was based on their knowledge and experience on the topic of the study (see Cleary et al., 2014).

To meet the eligibility requirements for this study, participants had to have at least 3 years of management experience in the health care field and have implemented strategies to reduce the incidence and costs of nosocomial infections. The data sources for this study consisted of participants’ interview

responses and data extracted from their companies' public websites regarding their success in dealing with nosocomial infections.

Nature of the Study

The three research methods are qualitative, quantitative, and mixed (Yin, 2018). I chose the qualitative methodology for the current study. Qualitative researchers explore participants' experiences, thoughts, and feelings to understand participant behaviors (Tomaszewski et al., 2020). The qualitative methodology was appropriate for the current study because my goal was to understand the successful strategies that clinical managers used to reduce the incidence and costs of nosocomial infections. The quantitative methodology involves the utilization and interpretation of numerical data to evaluate variables' characteristics or relationships (Apuke, 2017). The quantitative methodology was not appropriate for this study because I did not statistically analyze variable relationships to address my research question. Mixed-method researchers combine qualitative and quantitative methods to explore and examine various facets of a single research question (Noyes et al., 2019). Since variable relationships and differences were not measured, the mixed-method approach was not appropriate for this study.

I considered four qualitative research designs for use in this study: narrative, case study, phenomenology, and ethnography. Narrative researchers elicit data from human experiences and inquiry (Nasheeda et al, 2019). In this study, I did not explore the stories of human experiences, so the narrative design was not suitable. Phenomenological researchers explore the personal meaning of participants' lived experiences from the first-person point of view without further explanation (Neubauer et al., 2019). I did not

observe phenomena as they unfolded because data from successful strategies would not have been available. Ethnography refers to learning about people from their experiences in historical and cultural contexts by immersion in the population and actively engaging with the participants (Webster & Rice, 2019), which was not the intent of the current study. Case study researchers observe different aspects of phenomena within their real-life context and explore their relationship from more than one type of data and multiple sources (Rashid et al., 2019). I chose a multiple case study design instead of a single case study design so that I could gain a broader perspective of the strategies clinical managers used to reduce the incidence and costs of nosocomial infections.

Research Question

What strategies do clinical managers use to reduce the incidence and costs associated with nosocomial infections?

Interview Questions

1. What strategies are you using to reduce the incidence and costs associated with nosocomial infections in your organization?
2. When you developed your infection-control strategies, what events or key issues shaped your new policies?
3. How do you measure the effectiveness of the strategies?
4. What were the barriers to policy implementation?
5. How did you address any barriers to policy implementation?
6. How are new employees trained to implement infection-control strategies?

7. What else can you share with me about the strategies you developed and implemented to reduce the incidence and costs associated with nosocomial infections in your organization?

Conceptual Framework

I used a composite conceptual framework of adaptive leadership theory and Six Sigma to explore the strategies clinical managers employ to reduce the incidence and costs associated with nosocomial infections. Heifetz and Linsky (1994) introduced the adaptive leadership theory to address conflict, which required a change in values, beliefs, and behaviors. Adaptive leaders identify problems and find solutions based on research to best fit the organization. Adaptive leaders also prepare and encourage followers to handle change (Khan, 2017). Followers must re-evaluate their existing beliefs to adopt new priorities and habits. In the current study, I used the adaptive leadership theory to identify and understand the strategies the participating managers used to address the lack of or ineffective infection control strategies that affect profitability and infection control levels.

Six Sigma is a systematic management methodology used to improve processes in health care delivery systems to enhance quality (Schweikhart & Dembe, 2009). Six Sigma methodologies are used to raise productivity and improve the customer experience. The use of adaptive leadership theory augmented by Six Sigma enabled me to assess strategies, tools, and techniques to reduce the incidence and costs associated with nosocomial infections while emphasizing the importance of adaptation in the health care environment.

Operational Definitions

Clinical managers: Nurses, imaging technologists, and laboratory technicians who retain a role in clinical work but also engage in management and administrative activities (Imran et al, 2021).

Nosocomial infections: Infections that are acquired from a health care facility; also known as hospital- acquired infections or health care- associated infections (Wang et al., 2019).

Telehealth: The delivery of health-related services by health care professionals from a distance through the use of digital communication and information technologies; also known as telemedicine (Monaghesh & Hajizadeh, 2020).

Medical errors: Actions that result in an error of execution or errors that result due to planning, which may be intentional or unintentional (Ahsani-Estahbanati et al., 2022).

Assumptions, Limitations, and Delimitations

Assumptions

Assumptions are foundational principles that researchers presume are true but cannot be verified (Saultz, 2020). I assumed that clinical managers took ownership in reducing incidences and costs associated with nosocomial infections and wanted to develop successful strategies for patients. Another assumption was that study participants were willing participants and answered the interview questions with veracity and authenticity. The anonymity and confidentiality of participants were maintained to preserve the integrity of the study.

Limitations

Study limitations represent weaknesses that may determine conclusions and may influence areas of further research for future investigation (Ross & Zaidi, 2019). One limitation was that clinical managers may have opted against face-to-face interviews to maintain social distancing guidelines during the COVID-19 pandemic. Instead, virtual interviews were offered via online platforms, such as Zoom or Skype, to preserve the efficacy of the interview. Another limitation was the small sample size. Subedi (2021) acknowledged that smaller sample sizes are not representative of a larger population but allow for in-depth understanding of infection-control strategies. Four clinical managers in the southeast Texas region of the United States were chosen as participants. I selected participants based on the successful strategies implemented to ensure data saturation.

Delimitations

Delimitations refer to the boundaries the researcher sets and may expose the shortcomings of the study (Theofanidis & Fountouki, 2019). One delimitation was that the participants were specific to clinical managers instead of all managers in health care organizations. Clinical managers lead personnel who work directly with patients and could provide data specific to the incidence and costs of nosocomial infections. Another delimitation was the location of participants and the study, which was limited to the southeast Texas region of the United States. Different strategies may be used in other geographical areas to address the incidence and costs of nosocomial infections.

Significance of the Study

Contribution to Effective Business Practice

Clinical managers must identify areas of weakness and adapt to thrive in challenging environments, and nosocomial infections significantly impact profitability (Shepard et al., 2020). The findings and conclusions of this study may be adopted or adapted by clinical managers to develop or improve their infection control strategies. The study findings may be of value to business practice through the identification of successful nosocomial infection strategies that reduce patients' length of stay and the costs of additional supplies and equipment. A derivative of nosocomial cost reduction is subsequent hospital cost reduction.

Contribution to Positive Social Change

The addition of effective infection control programs can contribute to positive social change. Leaders can improve human conditions by adopting successful strategies to reduce nosocomial infections. Clinical managers who improve infection rates may improve the quality of life for patients and improve the overall health of individuals within their families and communities.

Review of the Literature

An effective academic literature review consists of a concise central point, the analysis, and the synthesis of evidence established on the issue (Linnenluecke et al., 2020). Evaluating literature encompassing the strategies used to reduce infection rates and health care expenses might allow other managers to help mitigate health care costs effectively. In this literature review, the examination of relevant literature and use of the

conceptual framework of the adaptive leadership model allowed me to develop an understanding of the existing seminal work conducted on this topic. The review process involved searching for references comprising peer-reviewed journals, books, and reports and websites of government health agencies published within 5 years of the completion of this study completion.

Literature Review Search Strategy

To search the extant literature on the primary topic, I used the following keyword search terms and phrases: nosocomial infections, health care costs, health care infections, hospital-acquired infections, preventable medical errors, health care leadership strategies, surgical site infections, bloodstream infections, the adaptive leadership model, and Six Sigma. Additional search terms included cost of hospital- acquired infections, hand hygiene, environmental cleaning, hospital ventilation systems, reusable medical equipment, vaccinations, social distancing, and patient advocate programs. I carried out these searches in multiple databases available through the Walden University Library, such as CINAHL & MEDLINE, Academic Search Complete, ProQuest Health & Medical Collection, SAGE Knowledge, ScienceDirect, EBSCOhost, and Elsevier. Google Scholar also provided easy access to multiple articles published between 2019 and 2023. Information from the government agencies' databases was also accessed including the databases of the Agency for Healthcare Research and Quality, Centers for Medicare and Medicaid Services and Institute of Medicine. Table 1 illustrates the distribution of the literature reviewed, consisting of books, peer-reviewed, and non-peer-reviewed journals used for the study.

Table 1*Sources of Academic and Professional Literature*

Sources	# in the Review of the Literature: Published before 2019	# in the Review of the Literature: Published in or after 2019	# in other areas of the study: Published before 2019	# in other areas of the study: Published in or after 2019	Percentage of total sources in study	Total
Peer- reviewed journals	16	68	4	19	88%	107
Non-peer- reviewed journals	0	12	1	0	10%	13
Books	0	1	1	0	2%	2
Total	16	80	6	19	100%	121

Note: Frequency and percentage of resources within the literature review and proposal.

Adaptive Leadership Theory

In a constantly evolving health care environment, use of the adaptive leadership theory enables leaders to view problems differently. The leadership approach embraces the process of diagnosis, interruption, and innovation (Northouse, 2019). Adaptive leaders use trust and flexibility to motivate others as well as themselves to take creative approaches in attacking challenges (Schulze & Pinkow, 2020).

First, the diagnosis of a problem requires the identification of the cause of an undesired state. Diagnosis of the problem is the most important step for an adaptive

leader (Kuluski et al., 2021). Physicians are taught to diagnose medical conditions by synthesizing the patient's signs, symptoms, and clinical history. Patients must be completely honest with their physician for an accurate diagnosis to be drawn (Berger et al., 2020). Once the diagnosis is made, the physician can interrupt the pattern of the condition by encouraging a stop in action where the condition will cease from improving or worsening. Last, the physician suggests innovative methods of treatment to aggressively remedy the condition while preserving the patient's quality of life.

Hospital leadership should behave in the same manner, utilizing adaptive leadership theory to handle the challenges relating to nosocomial infections. Adaptive leadership intervention strategies include asking questions regarding problem definition to construct solutions, showing the reality of external threats, disorienting people from their existing roles, and challenging norms (Kuluski et al., 2021). Changes in an organization can only be made once the problem has been properly diagnosed, interrupted, and innovatively treated (Kuluski et al., 2021).

Exercising adaptive leadership is different from managing. Although the terms are often used interchangeably, there are distinct differences between leaders and managers. Managers maintain order and consistency by planning, budgeting, organizing, staffing, controlling, and problem-solving whereas leaders produce change by establishing direction, aligning people, motivating, and inspiring (Northouse, 2019). Managers must work for change within an organization, but leaders can work from the outside because they possess power and influence (Fousiani & Wisse, 2022). However, adaptive leaders understand the basis of their power and know when and how to exert that power over

their followers to affect change (Northouse, 2019). Managers also supervise and handle situations after they arise whereas leaders are forward thinkers who can recognize situations before they arise (Azad et al, 2017). In other words, managers react, whereas leaders anticipate. Leaders emerge from all levels of an organization, and clinical leaders can be just as effective in adaptive leadership as executives.

Leaders can build resilience and distribute leadership by adopting an adaptive leadership approach. Resilience is the ability of an individual to handle adversity and springboard back to the norm (Eliot, 2020). Adaptive leaders can quickly recover from crises and trauma. Health care leaders regularly face disruptive change and uncertain economic futures. Since the COVID-19 pandemic, health care leaders have been forced to be resilient to grow their organizations and make them even stronger. Health care leaders have been challenged with caring for terminally ill patients although the health care facilities were understaffed and underequipped (Elliott et al., 2021). Leaders had to shift their focus from maintenance to innovation because the former mindset of preserving the current circumstances was no longer effective. Furthermore, innovation was required to determine a new way of living within a pandemic. Leaders with resilient attitudes can increase the level of resilience in their followers, and the followers can positively adapt to change, maintain a positive outlook, and continue to perform in a manner that is favorable to the organization (Eliot, 2020).

In adapting to change, effective adaptive leaders know when to distribute leadership. Adaptive leaders understand the value of motivating, influencing, and delegating (Bagwell, 2020). In emergencies, there is limited time to develop solutions

and implement change. Leaders may have multiple tasks to complete for the success of the organization, and the delegation of tasks is time efficient and allows leaders to focus on other areas of interest. Delegation enables employees to absorb more responsibility, which promotes distributed leadership (Lyu et al., 2023).

Continuous quality improvement is an endless goal of the adaptive leader (Nelson & Squires, 2017). The main principles of continuous quality improvement include a focus on organizational processes, methodological problem-solving, and the collaboration of multi-disciplinary teams (Hill et al., 2020). Continuous quality improvement initiatives in health care include reducing in-department wait times, increasing patient satisfaction scores, increasing patient safety, reducing costs, and decreasing hospital-acquired infection rates (Haque et al., 2020). The adaptive leader identifies areas or processes in need of reform, seeks opportunities for enhancement, takes action focused on correcting the root cause of the problem, studies the results, and develops methods to upgrade the process (Fagerdal et al., 2022). Continuous quality improvement is an ongoing process. The constant need to improve services, processes, and outcomes is what makes an adaptive leader essential in the reduction of hospital-acquired infections.

Bailey et al. (2019) used the adaptive leadership theory to investigate behavior changes in patients undergoing treatment for chronic Hepatitis C and their health care providers' responses. Through analyzing the transcripts of recorded clinical encounters between patients and their providers, they found that physicians placed more emphasis on disease management and neglected the total care of the patient. As a result, patients were less adaptive to their conditions. Researchers also found that communication improved

between providers and patients once both entities addressed adaptive challenges including medication support, family and home life and employment (Bailey et al., 2019). Shifting the provider focus from strictly disease management to treating the total patient can have a positive impact on the provider-patient interaction.

Adaptive leadership became an essential skill for health care leaders in response to the COVID-19 pandemic. Poor infection prevention and control strategies as well as negligence intensified the spread of the new disease (Shbaklo et al. 2021). Pivots or shifts in strategy for attacking the disease became evident as new information emerged. Researchers focused on three pivot stages in response to the COVID-19 pandemic in health care. In Pivot 1, health care professionals targeted remote monitoring. For example, the Women's College Hospital in Ontario, Canada created a telephone line and video system to connect patients and health care providers with nurse navigation, social work, and pharmacy services (Laur et al., 2021). Remote monitoring processes were refined, and patients' clinical needs were still met. In Pivot 2, health care professionals focused on supporting complex patients. Patients who were admitted to the hospital with COVID-19 had pre-existing health conditions and social challenges including food insecurity and lack of financial support (Laur et al., 2021). As a result, there was a pivot to a more patient-centered approach to include mental health, government services, and food insecurity support, which facilitated better health outcomes. In Pivot 3 health care professionals focused on adapting, spreading and, sustaining the new program. As COVID-19 cases decreased, health care leaders shifted focus from short-term accommodations to long-term, sustainable processes (Laur et al., 2021). Health care

leaders delegated more nurses and physician assistants to manage lower-risk patients instead of physicians as well as increased the use of digital tools to manage patients (Stoller, 2020). The use of these three strategic pivots displays how adaptive leadership can be an asset to the health care community in times of uncertainty.

Bajaba et al. (2021) examined the personality traits of clinical managers in Saudi Arabia during the COVID-19 pandemic to determine the importance of adaptive personality in times of crisis. The researchers hypothesized that clinical managers who demonstrate adaptive performance are more effective during times of crisis. They randomly distributed online surveys to 116 clinical managers in the private, public, and charitable sectors and found that clinical managers with adaptive personality traits, such as being quick learners, flexible, and optimistic are more likely to have increased levels of self-efficacy to lead during times of crisis. Such managers were confident in their capabilities and determined to achieve a goal. In addition, their findings suggested that clinical managers who demonstrated adaptive performance such as engaging in creative problem solving and remaining calm in emergencies were more likely to lead in times of crisis (Bajaba et al., 2021). Adaptive personality traits and adaptive performances are more desirable for clinical managers in cases of crisis management.

Contrasting Conceptual Framework: Six Sigma

Six Sigma is a business management strategy commonly used in health care to improve processes and improve patient care, reduce waste, and eliminate defects (Rathi et al., 2022). This management strategy enables leaders to enhance the profitability of an organization by improving the quality of its operations. The five-step problem-solving

approach of define, measure, analyze, improve, and control (DMAIC) helps leaders to identify and reduce variability, which improves overall quality (Monday, 2022).

The first phase of this approach is to define the problem, which requires leaders to identify the needs and wants of patients (Monday, 2022). Patients want to enter a health care facility, be treated, and be released without any complications. For example, nosocomial infections are added complications patients do not anticipate or need. Health care organizations are also affected by increasing rates of nosocomial infections, and the economic burden sustained by health care organizations can affect the quality of health care and the success of the organization (Gidey et al., 2023).

Measure is the next phase in the Six Sigma strategy. Clinical managers must measure the current process by a collecting data on the current process to assess performance issues or deficiencies (Monday, 2022). For example, clinical managers should assess the current infection control strategies to reduce nosocomial infections and measure their performance as well as assess trends in the data. Gathering current data allows clinical managers to understand the specific strategies that need improvement.

The analysis phase requires an understanding of the root cause of the problem that led to poor performance. Current strategies could be ineffective due to poor planning, management issues, equipment failures, or miseducation. Once the cause is identified, clinical managers can then devise a process control solution that is focused on the root cause. The analyze phase is important because implementing a solution that is not focused on the root cause can waste time and resources or cause new problems.

Improve is the action phase of the Six Sigma strategy, and in this phase, clinical managers implement the solutions that were developed in the previous stage. In this stage, all stakeholders should be made aware of the changes and knowledgeable about their roles in the new process (Mittal et al., 2023). After implementation, clinical managers then recollect data to reassess and determine if the solution worked. For example, if the new infection control strategies were unsuccessful according to the data, clinical managers should return to the measurement stage to go back through the process. The improvement stage can be a lengthy process; however, it is necessary to verify the improvement took place as expected.

The final phase is control. In this stage, a monitoring system is developed and implemented to track the success of the updated process (Monday, 2022). Clinical managers can also develop a response plan of action if there is a dip in performance. The goal in the control phase is to maintain the improvements by making the new strategies a part of the organizational culture (Mittal et al., 2023). For example, the new and improved infection control strategies could be implemented in new employee training and adopted by existing employees to maintain success.

Six Sigma strategies can be used to reduce health care waste. The United States spends more money on health care than any other country and about 30% of this spending is considered waste (Shrank et al., 2019). Health care spending is growing at a substantial rate due to the aging population, technological advances, higher incomes, and higher wage growth (Stadhouders et al., 2019). To estimate levels of waste in the health care system, Gossett et al. (2019) evaluated the areas of failure of care delivery, failure of

care coordination, overtreatment, pricing failure, fraud and abuse, and administrative failures and found that administrative and pricing failures were the two most costly waste expenditures. Pricing failures including medication and laboratory pricing accounted for \$230 billion. While administrative failures, such as errors with health information technology, accounted for more than \$260 billion (Shrank et al., 2019). Nosocomial infections can be prevented and are therefore considered health care waste. The resources and money spent to counteract the effects of nosocomial infections could be used in more useful ways. The excessive costly failures in the health care system present an opportunity for leaders to reevaluate spending.

In a study using historical data, Kuwaiti & Subbarayalu (2017) employed the Sigma DMAIC approach to assess the nosocomial infection rates in inpatient units at King Fahd Hospital of the University in Saudi Arabia. The incidence of nosocomial infections was recorded at 3.92 (Kuwaiti & Subbarayalu, 2017). Various process improvement strategies were implemented using DMAIC methods to enhance areas of personnel, process, environment, and materials, and after implementation, incidence rates were reassessed showing a significant reduction to 2.73, indicating that the approach was effective. Hospital administrators and quality management personnel can use Six Sigma methodologies to identify unsuccessful processes and implement successful processes.

Rosko et al. (2020) examined the relationship between hospital profitability and efficiency in a study of 1,317 not-for-profit hospitals. Profit was evaluated by calculating the difference between revenue and expenses. The researchers found that hospital size played a significant role in profitability, where larger organizations had more skilled

workers, better technology, and more resources to generate more profits. The hospital executives that cut expenses by reducing the volume of services without compromising the quality gained financial success. Six Sigma methodologies can be used by hospital managers to improve processes that will lead to improved efficiency. According to Rosko et al. (2020), an increase in efficiency reduces costs, which increases profitability.

Although Six Sigma can be used to address health care concerns in areas of waste, spending, and defects, I used the qualitative approach in the current study. Use of Six Sigma methodology would have transformed this study into a mixed-method study. Since the goal of this study was to identify strategies used by clinical managers to reduce the costs and incidence associated with nosocomial infections, I determined the adaptive leadership theory was more aligned with the study goals.

The Effects of Nosocomial Infections

Despite the increasing efforts of health care institutions and health care providers to prevent medical errors, medical errors are still imminent. Common preventable medical errors include misdiagnosis, medication error, faulty medical devices, infections, failure to account for surgical equipment, and improper medical device placement (Karande et al., 2021). Such errors are caused by human error and can be avoided with proper education and training (Barranco et al., 2021). The focus of this study surrounded one specific preventable medical error, which was nosocomial infections.

Nosocomial infections, or hospital-acquired infections, are infections that are contracted by patients within 48 hours or 3 days after admission into a health care facility (Wang et al., 2019). Infections include catheter-associated urinary tract infections, central

line-associated bloodstream infections, surgical site infections, ventilator-associated pneumonia, hospital-acquired pneumonia, and *Clostridium difficile* infections (Monegro et al., 2021). Ventilator-associated pneumonia was the most common nosocomial infection with an incidence rate of 51% followed by central line bloodstream infections with an incidence rate of 34% (Grasseli et al., 2021). COVID-19 can be classified as a nosocomial infection if a patient was not admitted with the infection. Since the COVID-19 outbreak, nosocomial infections have risen within hospitals from approximately 3% to 12% (Wang et al, 2020).

Although nosocomial infections are common, approximately 65% to 70% are preventable (Bearman et al., 2019). Nurses, imaging technologists, physicians, and other health care employees contribute to the transmission of infections. Transmission rates increase largely due to incorrect isolation guidelines, the use of shared equipment, constant movement of infected personnel and, ineffective infection control measures (Barranco et al., 2021). Isolation guidelines were established by the Centers for Disease Control and Prevention (CDC) based on the transmission route for specific infections and diseases.

According to the CDC (2019), patients infected with Tuberculosis should be in a contained hospital room with local exhaust ventilation to control the airflow and prevent contamination of air in other areas of the hospital. If these strict isolation guidelines were not followed, the contamination of air would be widespread and the transmission rates for Tuberculosis would increase. Health care professionals who do not follow the isolation guidelines, risk spreading infections and diseases. Also, shared equipment among patients

increased the risk of contracting a nosocomial infection. Patients should have exclusive use of their medical equipment or equipment should be thoroughly sterilized between patients. Additionally, the constant movement of personnel increases the transmission rates of nosocomial infections. Health care professionals should be confined to specific zones and should not work across departments (Liu et al., 2021). The movement of personnel should be minimized to reduce patient exposure. Last, infection control standards were developed to limit transmission rates. Diseases can spread quickly and result in fatalities with ineffective infection control measures.

Nosocomial infections occur at a higher rate in lower-income countries than higher-income countries (Barker et al., 2017). Effective prevention and control practices are especially important in countries, such as India. Systems Engineering for Patient Safety is a conceptual framework that examines problems through the lens of complex interactions between people and systems (Barker et al., 2017). Researchers conducted a qualitative study based on the Systems Engineering for Patient Safety conceptual framework to examine barriers to infection control at a private tertiary care hospital in India using semi-structured interviews. Twenty nurses and physicians were interviewed to assess the hospital's infection control policies focusing on how people, physical environments, organizations, and tools are barriers to the success of interventions. The primary barriers to infection control were people, tasks, and organizational level. High turnover rates, time spent training new employees, and heavy clinical workloads were major barriers to effective infection control (Barker et al., 2017). Institutional support was essential to the implementation of infection control practices.

Since nosocomial infections were a serious concern for citizens in underdeveloped countries, researchers characterized how strategy and technology could be mobilized to improve the effectiveness of infection control practices during outbreaks of Ebola, Middle East Respiratory Syndrome and Severe Acute Respiratory Syndrome in Asia and West Africa. Researchers found that delayed response to outbreaks accounted for 50% of cases (Rajakaruna et al., 2017). Policy deficiency, poor training, lack of standard case definition, and lack of isolation accounted for the rest of the cases (Rajakaruna et al., 2017). Therefore, poor strategies and inadequate technologies and human resources were a direct cause of increased transmission of Ebola, Middle East Respiratory Syndrome and Severe Acute Respiratory Syndrome, which led to increased mortality, morbidity, and unnecessary costs.

The patient's and caregiver's perspectives on nosocomial infections were explored in a study to improve quality and communication (Mo et al., 2019). Semistructured interviews were conducted with 18 patients or caregivers affected by nosocomial infections. Although most participants had negative feelings about their infection, participants had positive feelings about their care or caregiver's response. Participants used words to describe their feelings such as sad, frustrated, powerless, and traumatized about their infection (Mo et al., 2019). Patients also experienced confusion and anxiousness due to the lack of knowledge surrounding their condition. As a result, a holistic and individualized approach to caring for patients with nosocomial infections became evident. According to Mo et al. (2019), patients with nosocomial infections could

benefit from psychological and emotional support as well as physical healing. Mortality rates can also affect health care professionals' response to nosocomial infections.

Mortality rates

Hospital-acquired infections have caused more than 2.5 million people to be ill and over 90,000 fatalities annually (Despotovic et al., 2020). Health care-associated infections are the major cause of morbidity and mortality in nursing homes, accounting for more than 2 million infections per year (Noh et al., 2021). In addition, trauma patients who were admitted to the hospital and contracted a hospital-acquired infection, such as sepsis, were 6 times more likely to die from that infection (Glance et al., 2011). Additional research about the effects of hospital-acquired infections on mortality rates further supports the importance of effective infection prevention programs.

Researchers explored the mortality rate of bedridden patients with hospital-acquired pneumonia throughout a 3-month period. The study population included 1,141 patients across 25 health care facilities who developed pneumonia at least 48 hours after hospital admission. Approximately 189 deaths occurred during the 90 days leading to a mortality rate of 16.56% (Ramirez et al., 2017). The mortality rate for community-acquired pneumonia was 6.5% during hospitalization and 13% 30 days after discharge (Ramirez et al., 2017). The mortality rate was higher for patients with hospital-acquired pneumonia versus community-acquired pneumonia, which led to advancing infection control efforts (Sogaard et al., 2021).

Mortality rates of patients with hospital-acquired infections from multi-drug resistant organisms versus mortality rates from a different source with targeted

hospitalized patients in Spain were examined. The MDROs considered were methicillin-resistant *Staphylococcus aureus*, linezolid-resistant *Staphylococcus epidermidis*, vancomycin-resistant *Enterococcus faecalis*, and *Escherichia coli* (Barrasa- Villar et al., 2017). Because these organisms are resistant to antibiotics, the likelihood of transmitting infections to hospitalized patients significantly increases. As a result, the mortality rate of patients with a hospital-acquired infection from a multi-drug resistant organism was 1.7 times higher as compared to those from a different source (Barrasa-Villar et al., 2017). In these cases, the use of isolation rooms, personal protective equipment, and proper hand hygiene is essential. The financial implications of nosocomial infections are also significant.

Financial Implications

Nosocomial infections not only threaten a patient's well-being and life but can also have a financial burden on health care facilities. Such infections are associated with increased resource consumption, such as more imaging tests, blood tests, and extended length of stay in the hospital. The longer patients require treatment in hospitals because of acquiring an additional infection, the higher the financial burden to the patients as well as the hospital. The financial implications have been quantified in previous studies to justify the need for effective infection prevention programs. The prevention of nosocomial infections can lead to substantial economic impacts of health care facilities.

Hospitals under financial pressure have decreased patient outcomes and struggle to maintain quality and safety standards. The correlation between hospital financial condition and hospital quality and safety at acute care facilities was investigated. The

study included general and surgical hospitals in New York State that participated in the Centers for Medicare and Medicaid Services. A score was developed for each hospital based on four domains: inpatient quality, patient safety, the process of care, and patient experience of care. The strongest indicator of financial performance was improved patient experience of care (Akinleye et al. 2019). Financially stable hospitals had better patient experience scores and lower readmission rates (Akinleye et al., 2019).

Glance et al (2011) explored the economic burden of nosocomial infections in trauma patients including the length of stay and hospital cost. The study population included patients admitted to hospitals under a trauma diagnosis code, admitted for more than three days in the hospital, and contracted one of four nosocomial infections including sepsis, pneumonia, Staphylococcus infections, and Clostridium-difficile associated disease (Glance et al., 2011). Total inpatient costs were 6 times higher in patients with a nosocomial infection as compared to patients without a nosocomial infection with the highest costs seen with patients who developed sepsis or pneumonia during their stay (Glance et al., 2011). In addition, patients with a nosocomial infection had a significant increase in length of stay with each infection including sepsis (17 days), pneumonia (23 days), Staphylococcus (15 days), and Clostridium difficile (14 days); (Glance et al., 2011). The economic burden was significant for trauma patients advancing the need for effective infection prevention programs.

Approaches to Reducing Nosocomial Infections

Nosocomial infections threaten the finances of health care institutions because of prolonged hospitalization, increase treatment costs, increase in the number of diagnostic

investigations, and increase medico-legal disputes. A patient who acquires an infection while in the hospital will have an extended length of stay. The excess length of stay for all nosocomial infection types is approximately 7.8 days (Stewart et al., 2021). The extended length of stay represents additional days the patient nor the facility anticipated. Patients scheduled for a cholecystectomy procedure are required to spend 3 days in the hospital after surgery for recovery. If the patient contracts a surgical-site infection immediately following surgery, the length of stay will be prolonged. The patient's length of stay will extend from 3 to 10 days. The longer a patient remains in the hospital, the higher the risk of acquiring a nosocomial infection. Patients who acquire new infections will require additional diagnostic testing, which increases the financial burden on the patient.

Medico-legal disputes increase with nosocomial infections. Approximately 12.5% of the total judgments of compensation claims in the medical professional liability field refer to health care-acquired infections (Treglia et al., 2022). The economic burden of nosocomial infections can be minimized with effective infection control strategies. Federal agencies, such as the CDC and the Center for Medicare & Medicaid Services, have implemented standards for reducing nosocomial infections in hospitals since the attributable costs are approximately \$9 billion annually (Scott et al., 2019).

Health care workers should expand their knowledge of nosocomial infection control to reduce transmission rates. A study was performed to determine the level of knowledge for future nurses. Approximately 177 nursing students and 162 nursing staff were interviewed about their knowledge of controlling nosocomial infections using a

three-part questionnaire (Majidipour et al., 2019). Most nurses had a moderate knowledge of infection control standards and practices. Infection control knowledge and practices varied between 3rd and 4th year nursing students. The 4th year nursing students had better performance measures in infection control practices indicating performance improved as knowledge increased (Majidipour et al., 2019). Extensive infection prevention education programs among health care workers can aid in the fight against nosocomial infections.

Hospital infection prevention and control programs (IPC) are designed to minimize rates of preventable nosocomial infections. Failures of IPC programs led to increased infection rates, which subsequently led to preventable deaths and social disruption (Gilbert, & Kerridge, 2019). Health care workers' strict adherence to IPC policies is fundamental to keeping transmission rates low. Researchers studied doctors' IPC to gain a better understanding of their practices. Approximately 26 doctors and nurses from a range of specialties in an Australian hospital were interviewed. Although doctors recognized the significance of hospital-acquired infections, they lacked the leadership and role modeling needed in prevention. Failure of professionals and other health care organizations to hold doctors accountable undermined efforts to reduce infection rates. Hand hygiene is another strategy used to combat the spread of nosocomial infections.

Hand Hygiene

Effective infection control measures are vital to infection prevention. Hand hygiene is the most effective action against the spread of COVID-19 and other nosocomial infections (World Health Organization, 2020). Since the main source of

infection is human-to-human transmission (Du et al., 2021), hand hygiene and the use of personal protective equipment are critical. Two methods of hand hygiene are most effective against the transmission of nosocomial infections: soap and water and alcohol-based antiseptics (Hoffmann et al., 2021). Health care professionals should vigorously rub hands together with soap and water until the hands are visibly clean. Alcohol-based antiseptic cleansers or sanitizing rinses can be used when the hands are not visibly soiled. After a few rinses, the hands should be washed with soap and water.

The incidence of hospital-acquired infection rates was investigated before and after an educational campaign on hand hygiene within a hospital in Indonesia (Murni et al., 2015). Participants and health care professionals were evaluated daily for new hospital-acquired infections as well as the frequency of hand hygiene was observed. After the launch of the educational campaign, researchers recorded the incidence of hospital-acquired infections and compliance rates. A nearly 13% reduction in hospital-acquired infections from the preintervention period to the post intervention period was recorded (Murni et al., 2015). Hand hygiene compliance increased from 18.9% to 62.9% (Murni et al., 2015). The educational campaign on hand hygiene was effective in reducing the infection.

A combination of approaches has been researched to sustain hand hygiene compliance in the health care setting. These approaches include effective role modeling, peer influence, and an emphasis on leadership (Hillier, 2020). Role modeling allows health care workers to observe hand hygiene techniques from other health care workers and emulate their behaviors. New employees can understand the importance of hand

hygiene by observing their colleagues use hand hygiene techniques with every patient. Role modeling can inspire health care professionals to commit to proper hand hygiene techniques with every patient and at every encounter. Likewise, peer influence can impact positive or negative decisions the health care providers make (Andrews et al., 2020). Health care providers should positively pressure their colleagues to comply with hand hygiene standards.

Health care leadership must embrace quality improvement, especially in the area of hand hygiene. Quality improvement refers to empowering health care teams and equipping them with the necessary tools and skills (Drew & Pandit, 2020). Quality improvement, not tradition, should guide all activities within the organization and must be a part of the organizational culture. Hand hygiene must be included in the organizational culture for employees to be compliant. Health care leadership can emphasize the importance of hand hygiene by encouraging role modeling and positive peer influence among employees. The maintenance of medical equipment also plays an important role in the reduction of nosocomial infections.

Medical Equipment

The use of personal protective equipment enables health care workers to shield themselves and minimize exposure to nosocomial infections. The barrier of personal protective equipment breaks the chain of human-to-human transmission. Personal protective equipment includes aprons, gowns, gloves, face masks, goggles, and breathing equipment (Verbeek et al., 2020). According to the CDC (2020), health care workers accounted for approximately 11% of confirmed cases of COVID-19 in the United States.

Health care workers expose themselves to nosocomial infections when personal protective equipment is not used. Health care workers transfer the infection to patients through direct contact with skin, body fluids, or the patient's environment (Reddy et al., 2019).

Choosing the appropriate personal protective equipment is just as important as the use. Researchers have discovered that the type of personal protective equipment worn is contingent upon the type of infectious disease. Face masks and face shields should be worn to protect against influenza, tuberculosis, COVID-19, and other respiratory infections (Chughtai & Khan, 2020). Gowns, gloves, and aprons should be worn when patients are under contact precautions or when health care workers encounter blood or body fluids (Jain et al., 2019).

The decontamination of medical equipment and surfaces is also essential to controlling nosocomial infection transmission. Pathogens, such as methicillin-resistant *Staphylococcus aureus* (MRSA), Vancomycin-resistant *Enterococcus*, *Burkholderia cepacia*, and *Enterococcus faecalis* are the most common life-threatening causes of nosocomial infections (Tapouk et al., 2020). These pathogens can be found in inanimate objects around health care facilities and transferred to patients through workers. Proper sanitation and disinfection in high-risk areas can break the chain of transmission (Assadian et al., 2021). Hospital-grade cleaning products that are chemical-based with chlorine, alcohol or, hydrogen peroxide are required to manage or eliminate nosocomial infections (Liu et al., 2020). Sanitation schedules must be evaluated to account for clinical risk, location, and hand-touch frequency. The appropriate usage of personal

protective equipment and proper sanitation and disinfection of medical equipment can dramatically reduce the spread of nosocomial infections in health care facilities. Patient advocacy programs have emerged as a strategy to include patients in the infection control process.

Patients as Advocates

Patient advocacy is not a new concept in health care. Patient advocacy requires hospital personnel to safeguard patients' autonomy, act in patients' best interests, and champion social justice on behalf of the patient (Nsiah et al., 2019). There is an entire hospital department dedicated to patient advocacy, where advocates work with many patients throughout the hospital. Advocates support patients by making sure their privacy, rights, and choices are respected as well as advise patients on health care needs (Baskin, 2020). Patients can participate in their health care as advocates for themselves. Because of limited resources, there are not enough patient advocates to support every patient in a clinical facility. Health care professionals encourage patients to educate and advocate for themselves.

Patient engagement is essential to advocacy. Patient engagement can help to improve health care outcomes, facilitate better patient care, and achieve lower costs (Ramdurai, 2020). Patients who are actively engaged can be advocates for themselves by asking questions and learning more about their diagnosis. The more knowledge the patient has, the more helpful the patient can be to the health care provider. Improved health care outcomes and patient care can improve because the patient can make decisions with their health care provider instead of the health care provider making

decisions for the patient (Garcia et al., 2022). A collaborative approach to health care can be beneficial because patients will have more accountability and ownership in their care.

The University of Montreal Faculty of Medicine created a “Patients as Partners” concept that allowed health care professionals to gain knowledge on how patients feel about participating in their care to achieve optimal health outcomes (Pomey et al., 2015). Professionals also gained data on whether patients understood the technical and scientific background of their chronic illnesses. According to Pomey et al (2015), three main types of engagement practices are learning practices, assessment practices, and adaptation practices. Learning practices involved patients gathering information on their medical disease or illness. This practice required research and asking questions of their health care provider. The assessment practice involved patients surveying the relevancy and appropriateness of the health care provider’s recommendations. Patients also gauged the quality of their interactions with the health care provider to determine whether they were a good fit. The adaptation practice involved the patient committing to accept and follow the recommendations. Patients also committed to the required follow-up care to actively participate in their care. Through the use of engagement practices, health care providers established a deeper trust-based relationship with the patients (Bombard et al., 2018). Health care professionals established other hospital-based programs to target nosocomial infection rates, such as the STRIVE (States Targeting Reduction in Infections via Engagement) program.

STRIVE Program

The CDC developed a program to reduce nosocomial infections entitled the STRIVE Program (Popovich et al., 2019). The objective of STRIVE was to improve infection prevention and control practices by identifying and collaborating with hospitals with increased nosocomial infection rates and pairing them with subject-matter experts to promote change (Popovich et al., 2019). Participant hospitals were identified from their high infection rates of either central-line bloodstream infections, catheter-associated urinary tract infections, or hospital-onset MRSA bloodstream infection (Popovich et al., 2019). Hospital employees received in-depth educational training on eight targeted infection prevention strategies: the business case for infection prevention, environmental cleaning, engagement, antibiotic stewardship, personal protective equipment, hand hygiene, socio-adaptive strategies, and competency-based training. Infection rates were evaluated for one year. As a result of STRIVE, hospital leadership strengthened their relationships with state health departments and was able to identify opportunities for improvement (Fowler et al., 2019).

Patient engagement is critical to the safety and management of infectious diseases. Patient engagement requires patients to collaborate with health care professionals to increase the quality of their care. According to Bombard et al. (2018), five strategies that contribute to optimal patient engagement include design, recruitment, involvement, creating a receptive context, and leadership actions. The design of a patient engagement program should be focused on making patients feel comfortable to participate. Likewise, patient involvement may require recruitment strategies such as incentives or financial compensation to encourage participation. In addition, patients

should be assured of mutual respect and equal partnership with their health care providers. Last, successful engagement programs should have the support and involvement of organizational leaders. These strategies can be used to shape patient engagement programs and improve health care outcomes.

Gaps exist between education and the implementation of intervention programs. Gray areas and positive deviances were characterized to develop creative solutions to solve problems that were not adopted by the mass community. The “gray areas” represented the areas in health care where professionals had protocols but failed to execute them (Gesser-Edelsburg et al., 2018). A qualitative study was performed to include interviews, observations, and video recordings with staff from two intensive care units in Jerusalem. Some situations, such as maintenance of a sterile field and disinfection of a patient’s room required the staff to act using their education and past experiences to decrease the spread of infections (Gesser-Edelburg et al., 2018). The recommendation was to encourage hospital personnel to create their solutions to various problems and share that information with colleagues, such as social distancing.

Social Distancing

Social distancing is another strategy used to reduce the spread of infections. Public social distancing is a lockdown strategy implemented by the government to reduce social contact across communities (Huang et al., 2021). In the wake of the COVID-19 pandemic, social distancing was used as a tool to limit physical interactions between people by closing public areas and restricting where people could go. There was also a limit on the maximum number of people who could be in a facility at one time. As a

result, businesses had to operate at a limited capacity so that customers could be physically separated. Social distancing is based on the premise that infections cannot spread from person to person if the people are physically separated and have no contact (Zhao et al., 2021). Because humans can be a transmission channel, social distancing allows the transmission to be broken, which could eradicate infections.

Social distancing has a positive effect on the fight to reduce nosocomial infections. Respiratory diseases are spread through droplets in the air that are produced by coughing, sneezing, and talking (Qian & Jiang, 2022). As a result, the World Health Organization (2021) encouraged physical distance of at least 1 meter or 3 feet away from others. Visual cues in businesses, such as markings on the floor and wall signage, were used as reminders of the social distancing measures (Wee et al., 2020). Because viruses do not survive for very long outside of the body, physical separation between people can reduce transmission rates (Riddell et al., 2020).

The use of isolation wards is also a form of social distancing and is used as a strategy to contain infectious diseases. Hospitals have shifted from multibedded cohort rooms, where more than one patient occupies the room at the same time, to single occupancy rooms. Patients with infectious diseases can be isolated in their rooms to limit transmission to other patients. Visitors are not allowed in the isolation rooms. Only essential health care personnel are allowed in the rooms, which also decreases infection rates. Health care leaders in Wuhan, China implemented the use of mobile isolation wards in their fight against COVID-19. The mobile isolation ward allowed health care professionals to isolate, observe, screen, and triage patients entering the hospital with a

fever (Cheng et al., 2021). The mobile isolation ward was a quick response to an emergent health event. Patients still received necessary treatment but were quickly isolated from other patients to reduce transmission rates. The three essential epidemiological elements that contribute to a pandemic would be broken with the use of mobile isolation rooms. If the source of the infection, route of transmission, and population are controlled, then the infection could not spread to other patients (Cheng et al., 2021).

Matrajt and Leung (2020) studied the effectiveness of social distancing interventions. The interventions reduced contact with adults over the age of 60, adults between 20-59 years of age, and children under the age of 19 for 6 weeks. As a result of the social distancing interventions, researchers were able to slow the infection rate over time. Even if the four age groups reduced contact rates by 85%, the infections rates would rebound once social distancing interventions were lifted; therefore, the practice of social distancing can delay infection rates until other interventional measures, such as the development of vaccines and clear hand hygiene programs, can be developed.

Vaccinations

Vaccinations have been used as a strategy to control the spread of infections for many years. Although the human immune system can fight off some diseases and infections, vaccinations work with the body's immune system to develop immunity to diseases (Pollard & Bijker, 2021). Vaccines work by imitating infections. The body responds by producing antibodies against the infection. Once the body encounters the actual infection, the antibodies recognize the infection and quickly destroy it before the

infection can take effect. The use of vaccinations has helped to eradicate smallpox, reduce the incidence of polio, and reduce disabilities and death from tetanus, measles, whooping cough, and influenza (Greenwood, 2014). Vaccinations can also reduce the incidence of hospital-acquired infections by limiting the pool of people who are infected.

Influenza is a respiratory illness transmitted by a highly contagious virus that attacks the respiratory system (Kalil & Thomas, 2019). The virus can mutate, which prohibits the immune system from recognizing the strain. The influenza vaccine is necessary annually for maximum protection. According to the CDC (2021), influenza vaccination reduces the risk of flu illness by 40% to 60%. Reducing the risk of influenza illness also reduces the risk of influenza-associated hospitalizations. Transmission rates in hospitals can drastically reduce using vaccinations.

The control of measles has been successful using vaccinations as well. Measles is a virus that is spread through respiration droplets and aerosolized particles with a death rate of around 30% in the 1920s (Naim, 2015). As a result of worldwide vaccinations, measles incidence rates decreased by 66% and the death rate also decreased by 73% (Gastanaduy et al., 2021). Although measles has been eradicated, a decline in vaccination coverage could cause a rebound in transmission rates (Gastanaduy et al., 2021).

The hospitalization rate following the administration of the COVID-19 vaccine in New York City was observed to assess the effectiveness of the vaccine. Senior citizens between the ages of 65- 84 were the target population because of the likelihood of preexisting health conditions. In the preimplementation period, more than 7,500 New York City residents between the ages of 65-84 were hospitalized for the COVID-19 virus

(Greene et al., 2022). Following the administration of the vaccine, only 4,780 residents were hospitalized, which was a 15% reduction in the hospitalization rate (Greene et al., 2022). The vaccine was effective in reducing hospitalization rates, which also prevents the transmission of hospital-acquired infections. Influenza, measles, and COVID-19 are just a few diseases that can be easily spread throughout health care facilities but have been controlled with vaccinations.

Ventilation Systems

Proper ventilation is important to control the spread of hospital-acquired infections. Routine activities, such as laughing, talking, breathing, and singing allow potential pathogens to float through the air (Asadi et al., 2019). Proper ventilation keeps the air recirculating to limit exposure to hospital-acquired infections. Cooling, heating, humidifying, filtering, and air redistribution are crucial functions of health care facilities' heating, ventilation, and air conditioning (HVAC) systems for environmental protection (Asim et al., 2022). Airborne diseases such as *Aspergillus* and *Staphylococcus aureus*, have been linked to poorly functioning or poorly maintained HVAC systems (Saran et al., 2020). Increased awareness of the effect of ventilation on the spread of hospital-acquired infections can shape future infection control programs.

Three typical forms of ventilation are mixing ventilation, natural and mechanical displacement ventilation, and wind-driven ventilation (Bhagat et al., 2020). The most widely used form is mixing ventilation, which mixes fresh air with contaminated air to keep pollutants distributed evenly (Qian & Zheng, 2018). Displacement ventilation minimizes the mixing of the air by forcing contaminated air to rise and be extracted

through upper-level vents, whereas fresh air can be supplied through lower-level vents (Bhagat et al., 2020). The wind-driven ventilator creates a vacuum that draws contaminated air out of the building utilizing natural forces in an energy-efficient manner (Qian et al. 2010). The contaminated air can leave the room without being circulated back in. The goal of the three ventilation forms is to increase ventilation rates. A higher ventilation rate can dilute the contaminated air faster thereby decreasing the risk of cross-infection (Qian & Zheng, 2018).

The effect of natural ventilation systems to reduce Tuberculosis transmission risk in hospitals was measured. Room ventilation was measured pre and post modification using a carbon-dioxide tracer gas technique in 4 waiting rooms and 2 consulting rooms in hospitals in Lima, Peru. The post modifications were additional windows for cross-ventilation, removing glass from unopenable windows, creating a skylight, and building an open-air waiting room (Escombe et al., 2019). As a result of the modifications, ventilation in all 6 rooms increased and the risk of Tuberculosis transmission decreased by 72% (Escombe et al., 2019). Low-cost modifications to existing infrastructure can significantly improve the transmission risk in hospital-acquired infections.

Future Directions

Multifaceted infection control programs are essential to reducing the incidence and costs associated with hospital-acquired infections. The infection control intervention was conducted at a South Korean nursing home to include five elements: system change, training and education, evaluation and feedback, reminders in the workplace, and institutional safety climate (Noh et al., 2021). Health care workers were observed by

infection control nurses. As a result of the multifaceted approach, hand hygiene compliance increased by 40% and glove misuse decreased by 20% (Noh et al., 2021). The multimodal infection control program significantly improved infection control practices.

Inadequate infection prevention and control practices have poorly affected health care facilities. Performance gaps and implementation challenges faced by hospital staff in Georgia were assessed in efforts to strengthen the infection control practices. A random sample of inpatient hospitals was chosen to ensure adequate representation. Trained infection prevention specialists interviewed hospital managers and infection prevention and control team members such as nurses, epidemiologists, and physicians. Although 90% of the facilities offered formal infection prevention and control training for employees, 54% required annual training (Deryabina et al., 2021). Approximately 17% of the facilities had a dedicated infection prevention and control monitoring/audit plan, yet none of the plans had the necessary elements outlined by the World Health Organization (Deryabina et al., 2021). The participant facilities valued infection prevention and control because training was available to employees. Routine monitoring was inadequate. A comprehensive infection prevention and control monitoring system was essential to facilitate compliance and continuous improvement.

The education and training in learning institutions for medical students regarding infection control must be assessed. The more knowledge and skills that medical students have in infection control practices will benefit future health care institutions. Instructors assessed the knowledge of 207 medical school students in Uganda. The students were

interviewed about their knowledge of infection control practices including hand hygiene, isolations precautions, respiratory hygiene, cough etiquette, and the use of personal protective equipment (Nalunkuma et al., 2021). Although the students had sufficient knowledge of infection control practices, there was a lack of knowledge on specific standards including disposal of sharps, duration of handwashing, and the use of single glove use on different body sites (Nalunkuma et al., 2021). As a result, there should be consistent infection control education and training for all medical students, even in the first semester. More emphasis should be placed on meeting specific infection control standards, essentially improving the patient safety culture.

Patient Safety Culture

Adopting a patient safety culture is important to improve the problematic practices or attitudes associated with hospital-acquired infections. The culture of an organization is established by the leadership. The more emphasis leadership places on employee involvement, stability, performance, policies, efficiency, and quality care, the more employees will embody those qualities (Padgett et al., 2017). According to the World Health Organization (2019), patient safety is a global priority and contributes significantly to unsafe care. Safety should be the priority of all health care organizations and health care leaders must instill safe practices in their employees.

Health care professionals have focused attention on programs establishing a culture of safety. Health care providers and staff with a strong patient safety culture are more likely to engage in safe practices than those with a weak safety culture. A strong patient safety culture includes teamwork within units, staffing sustainability,

organizational learning, communication openness, management support, and teamwork across units (Reis et al., 2020). All health care professionals should share the same values and goals to foster quality patient care by minimizing risks to the patient. A culture of patient safety also champions performance assessment and accountability by shifting from a blame culture to a responsibility culture (Parker & Davies, 2020). Human errors should be reported to proper authorities to maintain accountability and support health care professionals in learning from their mistakes. Leaders can assist in a responsibility culture by focusing on solutions rather than problems. Leaders can also spotlight the failure of systems or processes rather than human failure.

Adaptive leadership theory was the lens through which I performed this study to determine the best strategies used to reduce the incidence and costs associated with nosocomial infections. Leaders in health care facilities can merge effective infection strategies and develop a successful infection control program. Periodic surveillance and quality control checks should be required to measure the continued effectiveness of the program. Continuous quality improvement can increase the efficiency of processes and decrease corresponding costs. Human factors, including blame culture, poor communication, and ineffective infection control strategies can hinder progress toward patient safety and patient satisfaction goals (Padgett et al., 2017). Health care professionals want to protect their patients. Clear direction, leadership, support, and education can help to accomplish preventive objectives.

1.13 Transition

In Section 1, a justification for researching on strategies for reducing nosocomial infections was provided. Section 1 included an introduction to the study, a background of the problem, the problem statement, the purpose of the study, the significance of the study, research questions, and a review of the professional and academic literature. Section 1 includes the effects and importance of reducing nosocomial infections. The conceptual framework is adaptive leadership theory augmented by Six Sigma to help leaders adjust to change and develop strategies to combat the problem.

Section 2 includes 13 subsections. Section 2 begins with a reiteration of the purpose statement followed by a description of the role of the researcher, participants, research methods, and design. The remaining subsections include population and sampling, ethical research, data collection and analysis followed by reliability and validity. Section 3 will include the presentation of findings, application to professional practice, implications for social change, and recommendations for actions and further research.

Section 2: The Project

Purpose Statement

The purpose of this qualitative multiple case study was to explore strategies clinical managers used to reduce the incidence and costs associated with nosocomial infections. The targeted population was four clinical managers in the southeast Texas region of the United States who demonstrated success in the reduction of incidence and costs of nosocomial infections. Study outcomes may contribute to positive social change by promoting the development of effective infection prevention programs that may be adopted by other health care facilities, which may improve the overall health and physical well-being of communities' citizens.

Role of the Researcher

My role in the qualitative research process was to acquire information to further knowledge through observation and asking probing questions as well as interpret patterns and trends in the collected data (see Roger et al., 2018). Use of qualitative methodology allows the researcher to understand the meaning of participants' behaviors and experiences of a specific phenomenon without the use of statistical analysis (DeJonckheere & Vaughn, 2019). My goal as the researcher was to establish competence in the field of interest (see Jamieson & Saunders, 2020). I established competence and answered the research question in this investigative research study through conducting interviews, interpreting data, formulating findings, and presenting the findings.

As the researcher, I served as the primary data collection instrument (see Taherdoost, 2021). Qualitative research requires the researcher to understand, interpret, and make distinctions in the data by immersing themselves in the social contexts and minds of the participants (Aspers & Corte, 2019). My experience as a health care professional and educator for over 16 years shaped my perspective on the research topic. My expertise as an ultrasound technologist in various hospitals has shaped my insight into infection control strategies.

As a human being, it was impossible for me to eliminate all bias; however, researchers must avoid bias in their studies. The rigor of the qualitative study is dependent on the ability of the researcher to examine their role and influence in the formulation of research questions, data collection, and sample recruitment (Busetto et al., 2020). My cultural and experiential background was introduced in the study but my personal lens did not determine the outcome and findings. Various types of bias, including a flawed study design, selection bias, and interviewer bias, can distort the evidence, leading to depressed validity and reliability in the study (Frampton et al., 2022). I mitigated my personal lens and bias by adhering to the interview protocol, using member checking, reaching data saturation, and conducting transcript validation in which I ensured that my interpretation of the data represented the participants' comments and viewpoints. Reflexivity and introspection were other processes I used to mitigate bias by continually reflecting on the research process and how bias influenced the research (see Roger et al., 2018).

The *Belmont Report* includes the three basic ethical principles that must be followed when carrying out research involving human subjects: respect for persons, beneficence, and justice (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979). I honored the participants' autonomy and did not withhold necessary information so that they could make an informed decision on their participation. Informed consent is the process by which a researcher discusses the basic elements of the study by providing risks, benefits, inconveniences, and uncertainties to the participants to facilitate a voluntary willingness to participate (Pietrzykowski & Smilowska, 2021). Romm (2020) and Taherdoost (2021) indicated that a researcher is responsible for upholding ethical standards and practices that guide their behaviors regarding the rights of research participants or anyone that can be affected by their research. I protected participants from harm, secured their well-being, and ensured equitable treatment throughout the study.

I conducted semistructured interviews with the participants to collect data to answer the overarching research question. Interviews are a direct representation of participants' thoughts, feelings and intentions and allow the participants to speak for themselves (Hughes et al., 2020). The basic questions of "who", "what", "why", and "how" were asked to gain in-depth knowledge about the research topic. According to Lavee and Itzhakov (2023), a good interview yields quality and thick data. During the interview process, I discussed important and personal experiences with the participants, which required established trust between both parties. The interviews were conducted using the Zoom platform to fit the participants' needs. I secured all data in a protected

and confidential fashion during the research phases and will destroy the data after 5 years.

Participants

Participant recruitment is valuable to the research process because the delivery of high-quality research in a qualitative study is dependent on the experiences of participants and their involvement in the process (Matandika et al., 2021). The targeted population was four clinical managers in health care organizations in the southeast Texas region of the United States who demonstrated successful strategies in the reduction of incidence and costs of nosocomial infections. Data saturation occurred when subjects provided no additional new information and data saturation increased the validity of the study (see Guest et al., 2020).

I identified a list of health care facilities within the southeast Texas region with successful infection control rates using Leap Frog Hospital Safety Grade, Texas Department of Health and Human Services, and the Joint Commission websites. I extended an invitation to participate in the study to the prospective participants through the professional social media platform, LinkedIn. Once participants were identified and invited, I emailed them an outline of the informed consent form and set the requirements of the interview. Four clinical managers were selected based on their employer's infection ratings and the participant inclusion criteria.

I safeguarded the participants' interview data to encourage their honesty and full disclosure. According to McKibbin et al. (2021), most research participants expect some,

if not all, data collected to remain protected. Although the participants disclosed their involvement in the study, interview data and documents are stored on a password-protected laptop and will be kept in a safe environment for 5 years. After 5 years, the electronic and hard copy data will be destroyed.

Research Method

I employed the qualitative multiple case study design to answer the research question in this study. The three research methods are qualitative, quantitative, and mixed (Yin, 2018). The choice of research methods is dependent upon the nature of the research question and the knowledge the researcher is seeking (Gaglio et al, 2020). In this case, the study involved strategies that clinical managers used to reduce the incidence and costs associated with nosocomial infections. Quantitative researchers use statistical data as a tool to examine functional relationships between variables in the form of rich data and thick descriptions (Borgstede & Scholz, 2021). Although the nature of the research involves data, qualitative research includes data in the form of words, not numbers (Borgstede & Scholz, 2021). The mixed method approach interweaves quantitative and qualitative data whereby qualitative results can be triangulated with quantitative findings and vice versa (Dawadi et al., 2021). The product of qualitative research is richly descriptive and provides a resolution to specific research questions that quantitative or mixed methods research cannot (Busetto et al., 2020). Qualitative methodology was the preferred research method because my goal was to understand the successful strategies that clinical managers used to reduce the incidence and costs of nosocomial infections.

Research Design

Four possible qualitative research designs are case study, ethnography, narrative, and phenomenology. I used the case study research design in this study. The case study approach is often used for evaluation purposes and helps the researcher to develop an in-depth understanding of the context of a specific case (Tomaszewski et al., 2020). The ethnographic approach is used to describe the shared cultural practices of a group of people, and the narrative approach is used to describe the personal stories told about shared experiences (Tomaszewski et al., 2020). Likewise, the phenomenological approach is employed to describe the meaning of lived experiences by the people who experienced the same phenomena (Neubauer et al., 2019). In the current study, the participants were clinical managers who had experience with strategies to reduce hospital-acquired infections.

In this study, a multiple case study design was more appropriate than a single case study design. In a multiple case study, there is a commonality among the cases, enabling researchers to find specific differences that are replicable or comparable to similar contexts (Takahashi & Araujo, 2019). The multiple case study design allowed for a more in-depth understanding of the cases as a unit because the evidence was more reliable (Heale & Twycross, 2018). Since case studies rely on analytical data, the use of multiple cases can strengthen the results by replicating the pattern and increasing validity and credibility. The data from four clinical managers supported my interpretation of the whole phenomenon in the current study.

Population and Sampling

The population within a study is different than the sample; the population is the group of potential participants from whom the researcher will collect data (Casteel & Bridier, 2021). In this multiple case study, the population consisted of four clinical managers in health care organizations in the southeast Texas region of the United States who demonstrated success in the reduction of incidence and costs of nosocomial infections. I identified health care facilities with successful infection control strategies through Leap Frog Hospital Safety Grade, the Texas Department of Health and Human Services, and the Joint Commission websites and then recruited clinical managers as participants from those facilities.

The sample is a selected set of participants whom the researcher will collect data from and should be a representative subset of the population used to identify patterns (Casteel & Bridier, 2021). I used purposive, nonprobability sampling and population-based convenience sampling techniques in this study. Purposive, nonprobability sampling occurs when the researcher intentionally chooses participants based on their knowledge and experiences, which may add credibility to the study (Campbell et al., 2020). Clinical managers work directly with front-line health care professionals to implement strategies to reduce hospital-acquired infections, so clinical managers have direct knowledge of the impact that successful reduction strategies have on facilities and the community. The population-based convenience technique refers to studies with no sampling because the whole population is participants, and information collected from all members of the population of interest (Andrade, 2021). Information is collected from all members of the population of interest. In this case, four clinical managers were participants.

Data saturation is the most common guiding principle for determining sample size. Hennink and Kaiser (2022) described data saturation as the point in which no new codes, themes, data, or categories are found and no new data or information is forthcoming. Saunders et al. (2019) described data saturation as the point at which further data collection becomes counterproductive and unnecessary. Saturation is not based on a definitive number or calculation. Since the population and sample consisted of clinical managers with direct knowledge about the topic of interest, data saturation could be met with as little as three participants. Once saturation was met, in this study that point was after four participants, the data collection process ceased.

Ethical Research

Research ethics is a practice or action researchers take during the research process. Ethical research refers to the method in which researchers formulate a topic, design the research, gain access to participants, collect data, analyze the data, and then report the findings responsibly (Saunders et al., 2019). According to the *Belmont Report*, researchers who include respect for persons, beneficence, and justice in their methodology and data management practices also have respect for ethics (Bitter et al., 2020).

Informed consent is the cornerstone of research ethics (Xu et al., 2020). The goal of the informed consent process is to provide sufficient information to potential participants so that a voluntary decision on joining the study can be made (Hoverd et al., 2021). Informed consent offers the participants freedom of choice. A component of informed consent is advising the potential participants of all advantages and

disadvantages of their participation and allowing them to choose. I fully explained the study details, including the interview process, the intent of the study, that no incentives would be offered for participation, and confidentiality guidelines, to the participants before the signed consent form is signed. At this time, participants could decide to move forward or decline to participate. Each participant gave written consent to participate in the data collection process. The consent form can be found in the Appendix.

Participants could withdraw from the study at any time. Preserving the right to withdraw from research aligns with individual freedoms, which are supported by U.S. laws (Lynch, 2020). Participants could withdraw from the study, without consequences, by sending me an email indicating the reason for the withdrawal. Once the email was received, I would have removed all collected data from that participant from the study and properly destroyed it.

The ethical protection of participants is the responsibility of the researcher. To ensure ethical protection, I used codes or pseudonyms in place of personal identifiers to uphold the participants' confidentiality and protect the participants' information from being accessed by unauthorized persons and, thereby, protected the integrity of the study. A breach of confidentiality could harm participants' reputations and hinder the trust relationship between participants and researchers (Turcotte-Tremblay & Sween-Cadieux, 2018). I did not include the names or identifiable information of individuals or organizations in this study. Furthermore, study data will be safeguarded for 5 years to protect the rights of participants and then it will be destroyed.

I remained ethical and facilitated trust by ensuring that participants understood their roles and rights regarding participating in the study and my adherence to following ethical standards. I gained Walden University's IRB approval before collecting any data. The IRB approval number is 02-13-1027372. I showed my commitment to upholding ethical standards for human research participants by preserving their right to informed consent and upholding confidentiality. According to the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research (1979), following the Belmont Report guides researchers with the ethical principles of respect for persons, beneficence, and justice.

Data Collection- Instruments

As the researcher of this qualitative study, I was the primary data collection instrument. Secondary data collection instruments can include observations, document studies, semistructured interviews, and focus groups (Busetto et al., 2020). Document studies involve the review of written materials and observations allowing the researcher to examine the actual behavior of participants (Busetto et al., 2020). In addition, interviews allow the researcher to ask questions to explore the topic of interest in detail, whereas focus groups are used to generate information on collective views (Gill et al., 2008).

I conducted semistructured interviews of clinical managers who demonstrated successful strategies in the reduction of incidence and costs of nosocomial infections to answer the research question. Semistructured interviews consist of a flexible protocol that allows the researcher to ask follow-up questions and probe the participant for in-depth

data (DeJonckheere & Vaughn, 2019). A researcher can ask open-ended questions to explore the thoughts and beliefs of participants related to the research topic. Jimenez and Orozco (2021) encouraged researchers to use the interview questions as a series of prompts to gain richer data. Following the interview, I facilitated member checking and transcript review to enhance reliability and validity. Both processes ensured the analysis and interpretation of the data were trustworthy (Lopez-Zeron et al., 2021). The interview protocol and questions were included in the Appendix.

Data Collection Technique

Proven data collection techniques were essential to the data analysis process. Data collection techniques were used by researchers to gain insight into their research topic. Data collection is a pivotal and sometimes a challenging component of a research study (Birt et al., 2016; Taherdoost, 2021). The objective of the study was to identify the strategies that clinical managers used to reduce the incidence and costs associated with nosocomial infections. Observations, interviews, focus groups, questionnaires, and document analyses are common data collection techniques in qualitative studies (Taherdoost, 2021). Semistructured interviews were the best approach to answer the research question. Semistructured interviews are characterized as pre-determined open-ended questions the researcher asks to gain insight into the participants' behaviors (Busetto et al., 2020).

Participants were identified based on high infection control ratings documented through Leap Frog Hospital Safety Grade, Texas Department of Health and Human Services, and The Joint Commission websites. Clinical managers were recruited as

participants from those facilities. The invitation included consent forms, confidentiality rules, and a request for a convenient date and time to conduct the virtual interview through Microsoft Teams or Zoom. Incentives were not offered to participants. The data collection technique was based on virtual semistructured interviews. Although the video conferencing option was more convenient, participants must have met technological and logistical requirements to participate such as a reliable Internet connection, an additional camera, and headphones (Lobe et al., 2020). The requirements and email invitation can be found in the appendix. As outlined in the Consent Form, participant agreed to participate in the study by replying to the email invitation with the words “I Consent.”

Taherdoost (2021) indicated that using interview protocol helped researchers prepare to conduct successful, productive, ethical, and repeatable interviews for each participant. An interview protocol is appropriate for researchers to use when conducting semistructured interviews (Taherdoost, 2021). This protocol is a step-by-step strategic process to help researchers execute repeatable and successful interviews. My interview protocol included the introduction of the researcher, interview questions, and the interview closing reminders. The interview protocol can be found in the appendix. I audio recorded and transcribed each interview to ensure I captured the data as the participants intended. Otter was my primary resource for audio recording the interviewers, and I used the voice recorder on my cellular device, iPhone SE, as a backup. During the interviews, I also use field notes to record participant behaviors, facial expressions, and other nonverbal responses that may enhance the study.

Midlevel managers often do not have access to formal company documents; therefore, I reviewed and collected data from public documents available on business or social networking websites instead of requesting access to company documents. I triangulated data from the semistructured interviews with secondary data from public documents such as appointment calendars, customer reviews, location, strategic website features, and other public information. Carr et al. (2019) indicated the ability to review electronic interactions between the participants and their prospects and clients on their business or social networking website can be an advantage to capturing strategies in action. Social media can provide direct access for researchers to examine how individuals conduct their lives and businesses. At times, social media can give insight into individual behavior patterns (Carr et al., 2019).

Data Organization Technique

Data organization is a strategy for analysis. Johnson et al. (2020) indicated that data organization is important to protect the participants and the integrity of the research. I organized and tracked primary and secondary data using Microsoft Word and Excel spreadsheets. All data collection was labeled to protect the identity of the participants using alphanumeric labels P1, P2, P3, and P4. All interview transcripts and summaries have an alphanumeric file named for each mid-level manager. Files were exported from Otter to Microsoft Word for member checking, organization, and analysis.

Otter is a speech-to-text transcription application that helps users change speech to text through artificial intelligence and machine learning. I used Otter with Google Meet during interviews to record and transcribe the interviews in real time and manually

verified the transcription for accuracy. I organized the data in Microsoft Word in preparation to analyze the findings in Excel. Upon completion of the recorded interviews, the recordings were transcribed into electronic files. The interview transcripts were organized and coded into themes. Thematic analysis is a pattern of recognition whereby non-numerical data is analyzed and themes, or codes, can emerge allowing the data to be described and interpreted (Roberts et al., 2019). The electronic files were stored on a password-protected computer for easy retrieval. Hard copies of field notes were locked in a home safe. Electronic and hard copies of data will be destroyed after 5 years.

Data Analysis

In qualitative research, data analysis is comprised of preparing and organizing data, transcribing data, coding the data, transforming the codes into themes, and presenting the findings with transparency (Lester et al., 2020). The primary data source was semistructured interviews of clinical managers. Researchers often construct field notes and memos during the interview to capture the feelings and impressions of the participants (Mattimoe et al., 2021). Secondary data sources were hospital grading lists to document successful infection control strategies.

I used ATLAS.TI as a qualitative research tool for coding, mind-mapping, and identifying themes. The data was prepared and organized for thematic analysis including converting all audio and video interview files into electronic format. The data was then coded, which involved assigning a descriptive word or phrase to a reflection or experience to connect the data (Lester et al., 2020). The codes were isolated into themes.

Researchers develop themes to recognize similarities, differences, and relationships across categories (Lester et al., 2020).

Use of ATLAS.TI supports the performance of (a) keywords-in-context (KWIC) analysis, (b) constant comparison analysis, and (c) classical content analysis (Leech & Onwuegbuzie, 2007). Application of ATLAS.TI to perform KWIC, constant comparison, and classical content analyses will enable me to ensure that the exploration and analysis of collected study data are suitably robust via data analysis triangulation (Leech & Onwuegbuzie, 2007). Researchers conduct KWIC analyses to explore the use of keywords in context and to identify underlying connections within document wording or language used by the participants (Leech & Onwuegbuzie, 2007). The conduct of KWIC analyses using ATLAS.TI will support the identification of open codes within the collected study data. Deductive and inductive coding of passages of text also supported the constant comparison analyses to assist me in the identification of underlying themes within the collected data (Leech & Onwuegbuzie, 2007). I used ATLAS.TI to perform constant comparison analyses of collected documents and interview transcripts and to identify and document emerging themes.

I also used ATLAS.TI to perform classical content analyses of collected study data to determine the total count for each code used during analysis. Information regarding code counts supported the determination of the relative importance of deductive and inductive codes and the identification of key underlying themes within the data. The use of ATLAS.TI to conduct co-occurrence analyses enabled me in the exploration of relationships between codes.

I utilized information regarding the frequency of codes across all study source materials (documents and interview transcripts) to assess the importance of each code and to determine which codes to retain during the final thematic analysis. Carsten et al. (2010) indicated that researchers should establish a minimum frequency of occurrence, with codes with frequencies below this minimum removed from further analysis. Carsten et al. established a minimum code frequency of approximately 19% for their qualitative study of social constructions of followership, Guest and McLellan (2003) used a benchmark of 20%. These researchers deleted codes from further thematic analysis if fewer than 20% of study respondents provided information associated with a code since the use of a minimum code frequency of 20% supported the development of themes.

In this qualitative multiple case study, methodological triangulation was the chosen data analysis process. Triangulation could be used by researchers to enrich research by offering multiple datasets to explain different aspects of phenomena (Noble & Heale, 2019). Methodological triangulation consists of several methods of collecting information to avoid researcher bias and increase validity (Dzwigol, 2020). The convergence of multiple methods better supports a single conclusion than one method alone (Heesen et al., 2019). I collected data through interviews and field notes. The reliance of a single research method can be detrimental to the study's findings.

Reliability and Validity

Reliability, validity, credibility, confirmability, and transferability are key aspects of qualitative research. The worth and merit of qualitative research are determined by the

rigor and trustworthiness of the study to bring forth results (Peels & Bouter, 2023) .

Multiple techniques can be used in qualitative research to ensure trustworthiness.

Reliability

Reliability in this study determines its value in the business and health care fields. Reliability refers to the extent to which the experiment yields the same results if repeated (Kamper, 2019). One method to ensure reliability was to evaluate the interview protocol because the reliability of a qualitative study was dependent on the reliability of the data collection process and the steps taken by the researcher to enable other researchers to repeat this same process regardless of the results obtained. The protocol must be easily understood and answer the research question.

Validity

In qualitative research, validity refers to the appropriateness of the tools, processes, and data to answer the research question (Truijens et al., 2019). The intended purpose of the study must be represented appropriately by the methodology, data collection instrument, and sampling population. Other researchers cannot rely on the policies and results of a study that is not valid. One threat to validity was researcher bias. Qualitative research tends to be exploratory, which may allow the personal views and perspectives of the researcher to affect how research is conducted. Researchers must be aware of their perceptions and bias during the research process. Reflexivity involves actively engaging in critical self-reflection to neutralize the impact of subjectivity and examine personal judgments and assumptions (Olmos-Vega et al., 2022). Embracing

reflexivity encourages transparency about methodological decisions thereby widening the integrity of the research process.

Credibility

Credibility is an important aspect of establishing trustworthiness. Credibility is the extent to which data and interpretations are plausible, believable, and accurate (Nguyen et al., 2021). The research findings must be an accurate representation of the meaning of the study. In this case, the results of the interviews must be a truthful depiction of the lived experiences of participants to accurately answer the research question.

Triangulation is a process to promote credibility. Methodological triangulation involves the process of utilizing multiple methods to confirm or refute a phenomenon (Johnson et al., 2020). The authenticity of each source strengthens the credibility of the collective study. Member checking, or participant validation, involves sharing data, such as interview transcripts and findings, with the participants to ensure credibility (Lopez-Zeron et al., 2021). In this case, interview responses were returned to the participants for accuracy checks. The objective was to ensure that my interpretation of the responses aligned with the intention of the participants. If the interpretation did not align, the participants could clarify their responses or correct errors.

Confirmability

Researchers must ensure that the findings are shaped by the participants and not the researcher. Confirmability enhances confidence in the findings because the researcher displays objectivity and unbiased data (Nyirenda et al., 2020). Confirmability can be

established by member checking, triangulation, and prolonged engagement. Prolonged engagement requires the researcher to understand the context surrounding the phenomena that are being studied by spending extended time with the participants (Johnson et al., 2020). Reflexivity is also an important component of confirmability to ensure that researcher bias does not affect the findings.

Transferability

Transferability is the extent to which the methods can be generalized and can move from one person or place to another (Stenfors et al., 2020). Transferability is the responsibility of the reader. Providing detailed accounts of the research process is the responsibility of the researcher. Thick and rich descriptions of the participants and research process will enhance transferability by allowing readers to determine if the findings are applicable in other settings (Johnson et al., 2020). In this case, transferability enhanced trustworthiness if the methods could be applied to areas other than health care. Meticulous adherence to the outlined data collection process and analysis techniques as well as reaching data saturation can help readers determine transferability.

Data Saturation

Data saturation refers to the point at which no additional data is needed because the current data begins to repeat itself (Hennink & Kaiser, 2022). This signifies that data collection and the sample size are adequate. Once a researcher stops identifying new themes or patterns, then data saturation has been reached, which is a critical component

of qualitative research. Saturation supported the rigor of the data collection process thereby enhancing trustworthiness.

Transition and Summary

In Section 2, I provided a restatement of the purpose of the study, an overview of the role of the researcher, participants, research methods, and research design. Population and sampling, ethical research, data collection instruments as well as data collection techniques are also outlined in Section 2. Section 2 concluded with data organization techniques, data analysis, and reliability and validity.

The foundation for the study was established in Section 3. In Section 3, the findings of the study will be presented. I also summarize the application to professional practice, implications for social change, and recommendations for action.

Section 3: Application to Professional Practice and Implications for Change

Introduction

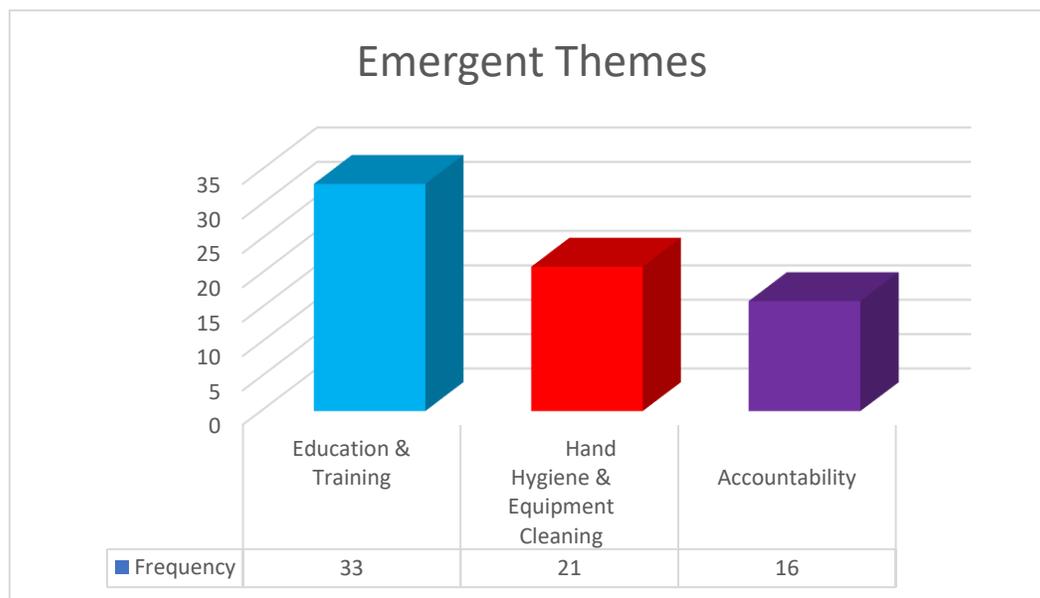
The purpose of this qualitative multiple case study was to explore the strategies that clinical managers used to reduce the incidence and costs associated with nosocomial infections. All four participants (i.e., P1-P4) were current clinical managers who work at health care facilities across the southeast Texas region of the United States. I verified that all four participants had implemented successful strategies to reduce the incidence and costs associated with nosocomial infections at their health care facilities. The participants were employed by “A” rated hospitals in the area of infection control. Data saturation was achieved after the fourth participant. Saturation refers to the point in data collection when no additional insight is added and the data becomes redundant (Hennink & Kaiser, 2022). After conducting the semistructured interviews consisting of seven, open-ended questions, I used the ATLAS.TI software for thematic coding and identified three essential themes. I used member checking to reinforce the validity of the study by verifying the accuracy of the interview transcript by emailing the interview transcript to all participants and scheduled a follow-up meeting to ensure that I captured their answers as intended. Member checking can be used to capture the voices of the participants (Candela, 2019). The findings showed methods that the managers used to motivate their technologists and nurses to reduce nosocomial infections. The implemented strategies minimized the transmission of nosocomial infections; thereby, improving overall patient safety and reducing costs.

Presentation of Findings

The intent of this qualitative multiple case study was to answer the overarching research question: What strategies do clinical managers use to reduce the incidence and costs associated with nosocomial infections? From the analysis of the semistructured interview responses of the four participants (i.e., P1-P4) who implemented successful infection control strategies in their prospective organizations, I identified three emergent themes: education and training, hand hygiene and equipment cleaning, and accountability.

Figure 1

Frequency of Major Themes



Emergent Theme 1: Education and Training

Comprehensive educational programs and thorough training are essential to reducing nosocomial infections in health care facilities. Continuing education is

necessary to competently perform and respond to advanced medical changes in patient safety (Kakkar et al., 2021). Extensive knowledge that clinical managers possess of nosocomial infections and how they are transmitted can assist in reduction of infection rates. Nurses are primarily responsible for daily patient care activities that involve more contact with patients than other health care workers (Alrubaiee et al., 2020). However, technologists, janitors, physicians, nursing assistants, and other health care staff must also be educated and trained in infection control strategies and practices.

Adequate clinical training was valuable in teaching strategies that helped enhance the knowledge, skills, and confidence of clinical staff. Yimam (2022) acknowledged that training has a significant positive relationship with employee performance. Clinical staff who are well trained in infection-control strategies can perform better because they are more confident in their skill level and abilities. Strategies such as mass communication, group huddles, and refresher courses for all clinical staff were the major strategies described by the participants in the current study.

Strategy 1: Mass Communication

P1 and P2 described the importance of global education and training for all health care staff. According to Engda (2020), strengthening the medical education system is necessary for good knowledge, attitude, and practice of infection, prevention, and control strategies for nosocomial infections. P1 and P2 used mass communication, such as email, to distribute new strategies, new policies, or reminders of existing strategies. Mass media, or mass communication, plays a major role in circulating information and influencing public behavior (Anwar et al., 2020). Mass emails were also distributed by health care

facility education officials if infection rates increased. P3 used bulletin boards with bright colors to attract the attention of pertinent staff.

Strategy 2: Huddles

Participants used routine huddles to disseminate information. Huddles are short meetings where team members can share information and highlight concerns (Galapin et al., 2019). P2 noted that daily safety huddles facilitated team communication, collaboration, and empowerment within the department. In these huddles, clinical managers offered face-to-face updates and standings on patient safety issues and immediately educated and trained staff on issues, such as hand hygiene.

Strategy 3: Refresher Courses

Periodic refresher training courses are used to update knowledge and practice regarding various health care standards, including infection control (Savul et al., 2021). P1 described the use of annual online refresher training modules, saying that each year, all clinical staff completed mandatory training modules by a specified date, and the modules included subjects such as demonstrations on the use of personal protective equipment, hand-washing techniques, and other infection control strategies. P2 noted the importance of annual competencies to refresh skills and build confidence. According to Schwid et al. (2019), increased confidence and strategy usage were the results of targeted refresher courses.

Theme 1 Alignment to the Conceptual Framework

Adaptive leaders embrace the process of diagnosis, interruption, and innovation (Northouse, 2019). The educational and training strategies implemented by the

participants align with interruption, which can also be categorized as disruption. Disruption is defined as a change that upsets current systems or upends existing paradigms (Shaw & Chisholm, 2020). Mass communication, huddles, and refresher courses disrupt existing behaviors by providing general knowledge to inspire change. General knowledge and information drive behavior (Mustika et al., 2022). Mass emails, bulletin boards, and short training meetings are examples of how adaptive leaders can use education and training to increase awareness of effective infection control strategies that could result in a desired behavioral change.

Development is one of the four principles of adaptive leadership (Kuluski et al., 2021). Development involves growing and progressing, which is an essential part of health care. Clinicians attend many years of school to acquire the knowledge and education needed to perform clinical duties. After college, clinicians take certification and registry exams to prove their competence in the field. Continual development of skills in the workplace instills confidence in clinicians for patients (Owens & Keller, 2018).

Theme 1 Alignment to the Review of the Literature

Infection control education and training are critical in laying the foundation for all clinical staff. Viinikainen et al. (2022) suggested the more education and training someone has, the less likely they are to engage in risky health behaviors. Educating clinical staff on the risks of not participating in effective infection control strategies could persuade them to shift their mindset. An important goal of health care providers is to provide patient-centered, quality health care (Hannawa et al., 2022). Educated clinical

staff will choose behaviors and routines that align with their goal. New strategies should also be shared with other clinical staff to ensure equitable care for all patients.

Emergent Theme 2: Hand Hygiene and Equipment Cleaning

Hand hygiene and equipment cleaning remain one of the major strategies used to reduce nosocomial infections. Microorganisms and pathogens can be transmitted to patients through clinicians' hands and require effective hand hygiene to break the chain of infection (Ahmadipour et al., 2022). Hand hygiene includes hand washing with soap and water or the use of alcohol hand sanitizers (Duane et al., 2022).

Equipment cleaning in health care facilities is also essential for nosocomial infection reduction. Bacteria such as *A.baumannii*, *E. faecium*, and *S. aureus*, can live on inanimate objects from 1 to 4 weeks, causing bloodstream and urinary tract infections (Katzenberger et al., 2021). Routine cleaning of critical and noncritical medical equipment significantly reduces the risk of nosocomial infections among hospitalized patients (Martel et al., 2021). All four participants described effective strategies in their organizations.

Strategy 1: Miniature Hand Sanitizers

P3 described the process of adding hand sanitizers to nurse badge clips for accessible hand hygiene. P3 and other clinical managers surveyed nurses to identify organizational barriers that compromised sufficient and proper hand hygiene. Through the survey, clinical managers determined that hand-washing stations and hand sanitizer pumps were not easily accessible during direct patient care exams. A strategy to make hand hygiene accessible was to supply all nurses and direct patient care employees with

personal, miniature, hand sanitizer bottles that could be clipped to their badges. Hand hygiene compliance nearly triples for health care providers who have reachable soap and water or hand sanitizer (Alene et al., 2022). According to P3, after the change, hand hygiene compliance improved throughout the organization.

Strategy 2: Hand-Washing Procedure

P1 and P2 noted the importance of education and training on the hand-washing procedure. P1 described the education around how to perform hand hygiene, discussing the importance of lathering the hands with soap and water causing friction. Friction removes bacteria and organic matter from the hands (Mihalache et al., 2021). P1 also emphasized that the hand-washing process should last for a minimum of 20 seconds. P2 suggested that hand hygiene should be performed before entering a patient's room and upon exiting the patient's room. Clinical staff were encouraged to wash hands with soap and water where visibly soiled instead of using hand sanitizer. According to Singh et al. (2020), sanitizers cannot remove dirt, soil, and lubricants from hands. P2 went on to say the clinical staff should inspect their hands, wrists, and lower arm thoroughly before completing the hand-washing process. If visible soil remains, the process should be repeated. Staff were also encouraged to immediately perform hand hygiene upon removing gloves. Hand hygiene is necessary upon the removal of gloves because microorganisms can contaminate hands and wrists during the glove removal process (Teasing et al., 2021).

Strategy 3: Disposable Wipes

P2 and P4 stressed the importance of routine cleaning and disinfection of medical equipment. They reported that germicidal disposable wipes were used in health care facilities to disinfect the equipment frequently touched by patients and clinical staff. The disposable wipes are towels saturated in disinfectant to remove microorganisms and bacteria from high-touch surfaces, including MRSA, *Clostridium difficile*, *vancomycin-resistant Enterococcus*, and *E.coli* (Song et al., 2019). P4 stated that the equipment is wiped down before and after every patient encounter. Disposable plastic covers were also used on equipment as a barrier between the patient and the equipment. After usage, the plastic cover was disposed of in the trash, and the equipment was wiped down with a disposable wipe. The breakage rate for nonlatex commercial covers is 0% to 5% (Basseal et al., 2019). The need for disinfection after the removal of the cover remained a successful infection control practice. P2 stated that once interventional procedures are complete, every surface in the room is disinfected with disposable wipes to prevent transmission.

Strategy 4: Disinfectant System

High-level disinfectant procedures were essential to reduce the spread of infection in interventional surgery suites. As a standard practice in their department, P2 described the use of a hydrogen peroxide mist system, cleared by the Food and Drug Administration, to disinfect equipment between procedures (see Rutala et al., 2016). Hydrogen peroxide is a highly reactive chemical that can inactivate pathogens and microorganisms that cause disease (Choi et al., 2021). According to Buescher et al.

(2016), the system had a 91.4% success rate in reducing more than 36 environmental contaminants, vaginal and skin flora, and pathogens leading to nosocomial infections.

Theme 2 Alignment to the Conceptual Framework

As previously described, adaptive leaders embrace innovation. Adaptive leadership is a collaborative effort of members of an organization to identify solutions to organizational challenges (Alhosis, 2019). The challenge presented to clinical managers in this study was the lack of hand hygiene. The use of miniature hand sanitizers clipped to badges and the detailing of the handwashing procedure were examples of mutually beneficial solutions they implemented. In this case, the strategies presented were beneficial for the organization and the patients.

Another principle of adaptive leadership is interruption or disruption. The use of disposable wipes and the disinfectant system break the chain of infection by interrupting the cycle. The chain of infection has six links: infectious agent, reservoir, portal of exit from an existing host, mode of transmission, portal of entry into the next host, and susceptible host (Penny, 2021). The use of effective equipment cleaning strategies breaks the chain between the mode of transmission and the portal of entry. For instance, a COVID-19 positive patient coughs on an ultrasound transducer during the procedure, so the technologist uses a disposable wipe and the hydrogen peroxide mist system to sanitize the transducer before scanning the next patient; consequently, COVID-19 cannot be transmitted to the next patient because the technologist interrupted the disease process and broke the chain. Adaptive leaders understand the chain of infection and developed strategies for prevention.

Theme 2 Alignment to the Review of the Literature

Hand hygiene compliance is the most effective measure of infection control in health care settings (Kraker et al., 2022). Clinical managers used existing literature to reiterate the importance and effectiveness of hand hygiene. Furthermore, outlining when and how to perform hand hygiene procedures was essential to infection containment. Critical care medical equipment was routinely sanitized by the participants in their prospective departments. Stethoscopes, thermometers, pulse oximeters, and glucometers were common non-critical medical equipment that could compromise patient safety (Birlie et al., 2021). All medical equipment must be properly sanitized between patients to break the chain of infection. *Hepatitis B*, *Ebola*, and *influenza* can live on dry surfaces for weeks (Wibmann et al., 2021). Human coronavirus can live on inanimate objects for up to 9 days (Kampf et al., 2020). Effective cleaning strategies were paramount in reducing nosocomial infection rates.

Emergent Theme 3: Accountability

All clinical staff are held accountable for infection control in health care facilities including technologists, nurses, physicians, and other clinical staff. Accountability programs improve employee execution of infection control strategies by promoting internal coordination and performance monitoring (Li et al., 2022). The three elements of accountability are a clear definition of a desired goal, the ability to measure goal achievements, and the consequences if achievements are unsatisfactory (Denis, 2014). In health care facilities, a major goal is to reduce the nosocomial infection rate. Secret

shoppers, financial incentives, and report cards are strategies that the participants reported using to monitor accountability in their organizations.

Strategy 1: Secret Shoppers

P3 and P4 described the effectiveness of secret shoppers in their organizations. Secret shoppers or mystery shoppers are commonly used in health care organizations to attain a realistic or unbiased perspective of the patient experience (Rankin et al., 2022). Secret shoppers present as patients or other clinical staff to evaluate the patient experience. Hand hygiene is one area of interest for secret shoppers. P4 described the secret shopper experience by noting that the hand hygiene of nurses and other clinical staff were observed in the department and on nursing floors. Secret shoppers observed clinical staff either hand washing or using hand sanitizer immediately upon exiting or entering a patient's room. The secret shoppers graded the clinical staff on their performance of hand hygiene activities and reported the findings back to the infection control department. The use of secret shoppers enabled clinical managers to acquire performance data on their staff and devise a plan to further accountability (Cheo et al., 2020).

Strategy 2: Financial Incentives

Incentive programs have become increasingly utilized as a strategy to promote continuous improvement of health outcomes (Wang et al., 2023). P4 explained that a financial incentive was attached to the secret shopper findings. For instance, if the department was 100% compliant, each staff member received 100% of the monthly bonus. However, if the department was only 90% compliant, each staff member received

a percentage of the monthly bonus. The compliance goal was 90% or higher. If the department was 80% compliant, no monthly bonuses were rewarded to employees.

In Japan, over \$110 million in financial incentives were distributed to clinical staff for infection control and prevention and antimicrobial stewardship teams, which helped sustain and accelerate reductions in antimicrobial use nationwide (Okubo et al., 2023). The Zuckerberg San Francisco General Hospital and Trauma Center implemented a pay-for-performance program for resident physicians to improve patient safety events. Each resident received up to \$1,200 for every target goal met. As a result, needlestick injuries decreased, provider communication improved, and length of stay decreased (Chen et al., 2021). The use of financial incentives reduced exceeding infection control rates.

Strategy 3: Report Cards

P3 noted the use of report cards to associate infection control rates with individual clinicians. The report card is a performance-based tool used to rate or grade individual efficacy and encourage engagement in the quality improvement process (Marshall, 2001). The clinical staff received monthly report cards grading their performance in specific areas. P3 described the penalty for a poor grade was reeducation for the first offense, a verbal warning for the second offense, and a written notice in the employee record for the third offense. P3 suggested that the monthly report cards assisted in holding staff members accountable for their actions.

Theme 3 Alignment to the Conceptual Framework

Clinical managers were responsible for building character traits in their staff. Character is one of the four principles of the adaptive leadership theory, which means accepting responsibility for one's actions and building trust (Kuluski et al., 2021). The strategic method of using secret shoppers, financial incentives, and report cards empowered employees to accept responsibility for their role in infection control. McKimm et al. (2023) suggested that adaptive leaders demonstrate ethical responsibility and morality by building character. Clinical staff have an ethical and moral obligation to minimize the spread of infection.

Theme 3 Alignment to the Review of the Literature

As previously stated, two elements of accountability were consequences when goals were not met and rewards when achievements were satisfactory. Clinical managers in health care organizations focus on a safety climate that centers around patients' perceptions of how much the organization values safety (Braun et al., 2020). Accountability programs, such as the use of secret shoppers and report cards, were examples of the value of safety. Clinical managers used accountability programs to address health system inefficiencies, such as increasing nosocomial infection rates, and improve basic health care performance (Boydell et al., 2019). The financial incentive program was a reward system for demonstrated accountability among clinical staff. Employees and patients who value safety feel secure when their health care organizations invest in such programs.

Application to Professional Practice

Nosocomial infection rate reduction is a primary focus in health care safety because the impact remains significant. A high prevalence of nosocomial infections in a health care facility leads to increased microbial resistance, increased medical expenses, long-term disability, and mortality for the patient (Honghui et al., 2022). The use of additional drugs, increased length of hospital stay and reputational damages are impactful considerations for facilities with increased infection rates (Su et al., 2021). The participants in my study identified specific strategies that have been prosperous in reducing the incidence and costs associated with nosocomial infections.

Infection control education of all staff, especially clinical staff, was the most mentioned theme among participants. Continuous access to educational materials or routine educational huddles were important in disseminating information throughout the organization. Hand hygiene was also emphasized as a key strategy. Immediate access to hand sanitizers or hand washing stations was essential in the reduction of infection rates. The participants described the importance of educating the clinical staff on when and how to use proper hand hygiene procedures. Training on infection control practices was standard among all clinical staff for graduates and experienced staff alike. Annual refresher courses and peer training were mandatory requirements to facilitate continuous improvement. The participants also used report cards and secret shoppers to hold clinical staff accountable for their behaviors. Financial incentives were offered to clinicians who effectively used infection control protocols. Disposable wipes and the disinfectant system

were effective in cleaning and sanitizing medical equipment to reduce the spread of nosocomial infections.

Clinical managers must be adaptive because the health care field is constantly evolving. New technological advancements, evolving disease processes, and infection control standards are transforming health care policies (Nilsen et al., 2020). New policies and standards are the results of data. Data-driven decision making is a concept to authorize clinical managers to use high-quality information from data analytics to drive decision-making (Szukits, 2022). Using data, clinical managers can identify areas of improvement with their existing strategies. Data can be in the form of surveys to staff and patients as well as infection rates. Developing a data-driven approach to infection control can improve the health care delivery system (Cascini et al., 2021).

Implications for Social Change

The findings represented in this study may add to the current literature regarding the incidence and costs associated with nosocomial infections. Nosocomial infections represent a significant safety and financial burden in developing and developed countries alike. Khan et al. (2017) suggested that nosocomial infections account for 7% in developed countries and 10% in developing countries. Leaders should reevaluate existing infection control strategies for effectiveness. Hand hygiene, equipment cleaning, as well as education and training, are inexpensive strategies that can be adopted to make a significant difference in the lives of patients leading to improved dignity and quality of life for local citizens.

Recommendations for Action

The infection control strategies identified in this study can help clinical managers and health care leaders reduce nosocomial infection incidence, thereby increasing profitability. Conducting high-quality infection prevention and control measures can reduce the occurrence of severe complications and deaths (Cui et al., 2022). Based on the study findings, I recommend a multidisciplinary approach to infection control. Although several effective strategies were identified, one strategy alone cannot reduce the incidence of nosocomial infections. A combination of strategies including education and training, hand hygiene, equipment cleaning and disinfection, isolation guidelines, room ventilation, and vaccinations are effective tools for infection control (Haque et al., 2020).

I also recommend that clinicians across multiple departments adopt all infection control strategies outlined. Clinical staff in pediatrics, labor and delivery, emergency departments, imaging, and surgery should utilize the same infection control strategies. Clinical staff does not only include nurses. All clinical staff, including nurses, technologists, nursing assistants, and physicians should be educated on infection control strategies and encouraged to participate in infection control programs. The research findings will be publicized. The study participants will receive a summary of the research to share with their peers, such as other clinical managers and health care leaders. The study will also be published and made available through the ProQuest database for review. Additionally, I will seek opportunities to present the research findings in health care administration forums and conferences.

Recommendations for Further Research

The goal of this qualitative multiple case study was to identify strategies that clinical managers used to reduce the incidence and costs associated with nosocomial infections. One of the limitations of the study was the sample size. The study consisted of four clinical managers in the southeast Texas region of the United States. More participants, from other regions around the United States, may have yielded different results. As study participants are homogeneous, the findings may not be generalizable (Clark et al., 2019). Future researchers may expand their population pool to other geographical areas. Participants from other parts of the country with different cultural and educational backgrounds may have generated more strategies that could suit various health care facilities.

Future researchers should also evaluate patient involvement in infection control. The study revealed strategies that clinicians used to reduce nosocomial infections. Patients must also adhere to infection control standards and feel empowered to address noncompliance from clinicians. Researchers should investigate patient knowledge of nosocomial infections and the strategies used to engage patients to participate in their own care. Patient engagement strengthens the relationship between the patient and the health care professional to improve health outcomes (Marzban et al., 2022). The collaboration between patients and health care professionals may have a significant positive effect on nosocomial rates and costs.

Reflections

Upon entering the DBA program, I was determined to prove, to myself and my family, that I could do anything. Since I am the first person in my family to attend and complete college, I knew that I was trail-setting for the next generation of scholars. I understood that I would have to sacrifice time and money to pursue the degree. However, I did not know that this experience would change my life forever.

During the program, I suffered challenges. My new home was infested with mold and the cost to remediate was more than I could afford. I was forced to give up my home and move to a rental property. I was hopeless and felt defeated. I decided to take a semester off from school to make my new house a home for my family. Due to the commitments of the program, I could not attend many extracurricular games and events with my family to ensure that I completed assignments by the due date. I pushed through the challenges understanding that graduation was near.

As I moved closer to completion, I was more determined than ever to graduate. The research study was eye-opening. Although some clinical managers were reluctant to share their experiences with me, the willing participants shared strategies that could influence the future of infection control programs. As a health care educator, I plan to share my research findings with other clinical managers in hopes of creating better health care outcomes for patients and communities.

Conclusion

Nosocomial infections can be reduced with effective infection control strategies. I identified three themes that clinical managers used to reduce incidence and costs. The three themes identified were education and training, hand hygiene and equipment cleaning, and accountability. Specific strategies were identified in each theme. The combination of strategies strengthened the infection control programs.

Furthermore, the identified strategies were initiated by clinical managers who surveyed their staff to determine best practices. Health care leaders and clinical managers can be important facilitators to prevention and control by engaging staff, sharing information, and coaching (McAlearney et al., 2021). Health care leaders must empower clinical managers to identify areas of weakness and develop effective solutions. Health care leaders and clinical managers have a financial and ethical duty to ensure compliance with effective infection control strategies. Nosocomial infections are worth preventing to benefit patients, health care providers, and health care institutions.

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Appendix: Interview Protocol Script

Hi! I appreciate you taking the time to meet with me today. As I stated in the email when we scheduled this meeting, my name is Samisha Davis, a doctoral student at Walden University, working on a qualitative multiple case study to answer my research question. The specific business problem is that some clinical managers lack strategies to reduce the incidence and costs of nosocomial infections. The purpose of this case study is to explore strategies clinical managers use to reduce the incidence and costs associated with nosocomial infections. We can begin if you are ready.

1. What strategies are you using to reduce the incidence and costs associated with nosocomial infections in your organization?
2. When you developed your infection-control strategies, what events or key issues shaped your new policies?
3. How do you measure the effectiveness of the strategies?
4. What were barriers to policy implementation?
5. How did you address any barriers to policy implementation?
6. How are new employees trained to implement the infection-control strategies?
7. What else can you share with me about the strategies you've developed and implemented to reduce the incidence and costs associated with nosocomial infections in your organization?

Those are all the questions I have for you. Do you have any further comments on the topic of strategies to reduce nosocomial infections?

Thank you so much for your time today. Your input has been very helpful to my study.

I would like to confirm that I have captured your responses as you intended. I want to send you a summary of your interview for your review. May I call you on _____ (insert date) to review the data I have collected with you? What time works best for you?