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Reducing Infection Rates Through Handwashing Education

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Walden University

College of Nursing

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Maureen Osegbe

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
2021

Abstract

Reducing Infection Rates Through Handwashing Education

by

Maureen Osegbe

MS, Walden University, 2018

BS, Stevenson University, 2015

Project Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Nursing Practice

Walden University

May 2021

Abstract

Health care-associated infections (HCAIs) affect millions of people worldwide, causing morbidity and mortality among hospitalized patients. Hand hygiene is the single most effective way to prevent HCAIs. This project addressed a gap in practice regarding nurses' knowledge on the effective use of hand hygiene in a medical/surgical unit in a hospital located in northeastern Maryland. This project addressed the question of whether an educational program on handwashing for nurses reduced HCAI rates. A literature review was conducted to support the development of the educational program; relevant sources included peer-reviewed journal articles, systematic reviews, and guidelines that supported the practice-focused question, with search dates ranging from 2015 to 2020. After receiving approval from the facility and from Walden's institutional Review Board, using analysis, design, development, implementation, and evaluation model as a guide, an educational program was designed with input from content experts. A 60 minute in person presentation was provided to registered nurses on the medical/surgical unit following social distancing guidelines. The Hand Hygiene Knowledge Questionnaire for Healthcare Workers was administered to 52 registered nurses as a pretest and posttest. Data analysis using a paired t test indicated, that after the training session, nurses' knowledge about hand hygiene improve in all areas measured. This project has the potential to promote positive social change, in that nurses who receive education through the project may disseminate the information to other nurses and the nursing students whom they precept.

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Dedication

I dedicate this work to my late parents, Bruno and Angelina Osegbe, whose love for education encouraged my success in achieving my goals in education. I would also like to dedicate this work to my lovely husband, Mr. Maurice Chinemezi Owuamanam, and my son, Maurice Chukwuebuka Owuamanam, Jnr. You all are the joy of my life.

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Section 1: Nature of the Project

Introduction

Hospital-acquired infections (HAIs) are a problem for health care facilities worldwide. HAIs affect some patients admitted to the hospital, adversely impacting their quality of life. Each year in the United States, HAIs affect nearly 2 million patients admitted to hospitals, and roughly 100,000 individuals die due to HAIs (Mynaříková et al., 2020). In Europe, HAIs infect one out of 18 hospital-admitted patients (Mynaříková et al., 2020). According to Mynaříková et al. (2020), the growth of HAIs has been caused by health care providers' lack of hand hygiene during patient care, as seen throughout hospitals. Studies on the association between lack of hand hygiene and patient outcomes have confirmed the former's negative impact on a range of clinical outcomes, including patient dissatisfaction and, eventually, increased mortality (Mynaříková et al., 2020). Health care guidelines have been established to reduce HAIs and subsequent morbidity and mortality rates. For example, a central line bundle of care is being used as a method to reduce central-line-associated bloodstream infections (CLABSI), which includes hand hygiene education programs for personnel, hand hygiene, and daily review of the need for a catheter (Lewis et al., 2016).

Hand hygiene remains an effective strategy to reduce HAIs when combined with other intervention measures. To minimize HAIs' likelihood, patient care equipment that is shared, such as blood pressure cuffs, stethoscopes, and similar instruments, must be adequately disinfected between patients (Rebmann, 2005). The diaphragm of a stethoscope, for example, has been shown to harbor bacteria that can easily be spread

from patient to patient if the stethoscope is not cleaned between patients. Likewise, thermometers should have disposable probe covers that should be discarded after each use.

The aim of this project was to assess staff knowledge through handwashing education on a medical/surgical unit in a hospital located in northeastern Maryland. The medical/surgical unit was comprised of 52 full-time and part-time registered nurses. The nurses' education was expected to improve their knowledge of and strategies for HAI prevention. This project may promote positive social change, in that nurses who receive education through the project may disseminate the information to other nurses and the nursing students whom they assist by precepting daily. Such dissemination may lead to improved patient outcomes during hospitalization.

Problem Statement

Direct and indirect observation of activities of health care providers regarding hand hygiene was conducted in a hospital located in northeastern Maryland to ensure successful compliance. This project was developed in an effort to answer the following question: Does an educational program on handwashing for nurses reduce HAI rates?

The infection rate in a health care environment is a significant concern that requires nurses' intervention. HAIs contribute considerably to mortality and morbidity of patients in the health care environment. Poor hand hygiene among health care workers (HCWs) caring for patients has been acknowledged to be among the most significant causes of HAIs. According to Doherty (2020), "Keeping the healthcare environment clean is an essential attitude of Infection Prevention and Control (IPC), and every patient

deserves to be treated and cared for in a clean and safe environment” (p. 8). HAIs represent a serious patient safety issue that is very costly in the health care setting and is linked to significantly increased morbidity and mortality rates (Doherty, 2020). As stated by Gwarzo (2018), guidelines from the Centers for Disease Control and Prevention (CDC, 2018) indicate that all health care workers are required to institute standard handwashing procedures before attending to each patient.

Handwashing is a necessary procedure in the inhibition of HAIs, and yet it remains the most violated of all infection control processes (Conly et al., 1989). An intensive care unit intervention training for infection control indicated that poor handwashing practices were related to a high HAI rate (Conly et al., 1989). A nursing staff education program that is designed to improve handwashing techniques holds significance for nursing practice because proper handwashing can considerably decrease the overall HAI rate (Conly et al., 1989). As an educational intervention, handwashing education is necessary because it can support the eradication of HAIs (Conly et al., 1989).

The literature indicates that control of HAIs in the health care environment continues to be a gap in nursing practice. This Doctor of Nursing Practice (DNP) project focused on hand hygiene strategies to reduce HAIs in the hospital environment. This project involved the creation of an environment where practice and academic leaders collaborate with the strategic goal of reducing HAIs. Nurses need to be educated and more knowledgeable in order to lower HAI rates in the health care environment.

Purpose/Gap in Nursing Practice

The purpose of this project was to address the gap in practice regarding nurses' knowledge concerning the effective use of hand hygiene in a medical/surgical unit in a hospital located in northeastern Maryland. This project was developed to answer the following question: Does an educational program on handwashing for nurses reduce HAI rates? This project focused on educating nurses who have direct contact with patient care on eliminating HAIs. Staff compliance with handwashing may result in patients not contracting infections during their stay in the hospital. This project's overall goal was to decrease the length of patient hospitalizations and hospital costs while promoting safer and higher quality health care practices in society as a whole.

Nature of the Doctoral Project

An extensive literature review was conducted to prepare the educational program for this project. I reviewed contemporary evidence-based literature related to reducing HAIs by searching the Walden University online databases, including MEDLINE, CINAHL Plus, ProQuest Nursing & Allied Health Source, Joanna Briggs Institute EBP, and PubMed. The keywords that I used included but were not limited to *handwashing*, *hand hygiene*, *education*, and *nursing staff education*.

This project used peer-reviewed journal articles, systematic reviews, and guidelines that supported the practice-focused question, with publication dates ranging from 2015 to 2020. Giving nursing staff education on reducing infections would help in tackling the HAI gap with the goal of making the health care environment free of infection.

Significance of Problem Statement

Regardless of all of the efforts made to reduce infection rates in the hospital setting in northeastern Maryland, nursing staff continue to care for patients without following proper handwashing hygiene. The decreased level of compliance with hand hygiene among HCWs resulted in the facility that was the focus of this study implementing a strategy to enforce handwashing compliance. Direct and indirect observation of health care providers' activities toward hand hygiene was conducted to ensure that compliance was successful. Questionnaires were implemented to assess the nursing staff's level of hand hygiene compliance.

This project may advance positive social change by promoting hand hygiene, with the potential to reduce HAI rates in hospital facilities located in northeastern Maryland. Lowering patient HAI rates may lead to (a) decreased hospital costs, (b) decreased lengths of stay in the hospital, and (c) reduced readmissions (Mah et al., 2006). More broadly, infection control programs promote safer and higher quality health care practices in society.

By developing this project, I sought to support Walden University's mission to stimulate positive social change by using infection prevention and control (IPC) practice improvement to reduce the infection rate in a health care institution located in northeastern Maryland. Walden University's mission is to provide a diverse community of career professionals with the opportunity to convert themselves into scholar-practitioners so that they can have an impact toward positive social change (Walden University, 2020, Vision, Mission, and Goals section). An increase in infection control

knowledge may lead to adherence behaviors such as hand hygiene performance that will benefit the population's health.

Patients who have no infection before hospital admission may benefit from this project, which has proven successful. The project offers nurses a unique opportunity to reduce the potential for HAIs. Using nursing practice knowledge, nurses can facilitate patient recovery while minimizing complications related to infections (Benson & Powers, 2011). This project may contribute positively to practice by nurses who provide patient care at the bedside; in this way, it may lead to reduced infection rates, resulting in positive patient outcomes. This project may transfer to other areas of practice within the institution and other institutions on a larger scale, affecting basic nursing strategies such as the following:

- the practice and promotion of hand hygiene
- consistent use of an aseptic technique
- cleaning and disinfection practices
- use of standard precautions
- patient assessment and additional precautions
- patient education
- use of safety devices
- removal of unnecessary invasive devices
- use of bundle strategies for infection prevention (Benson & Powers, 2011)

Nursing-sensitive patient outcomes represent the effects of nursing interventions that result in changes in patients' symptom experience, safety, functional status, psychological distress, or costs (Benson & Powers, 2011).

Summary

Hand hygiene is the simplest and most cost-effective means to reduce the spread of HAIs. However, it would be impossible to solve problems of patient safety without understanding the significance of proper hand hygiene compliance and promoting its implementation in the health care system at all financial, administrative, and social levels (Klymenko & Kampf, 2015).

In this section, I presented the importance of hand hygiene education to reduce infection. Section 1 addressed the project's problem statement, purpose, nature, and significance to nursing practice. After establishing a gap in nursing practice, I identified the need for a staff education program and supported this need through evidence. This project may impact patient care and promote positive social change by increasing nurses' knowledge of hand hygiene, which may result in improved hand hygiene compliance and reduced HAI rates.

Section 2 provides background and context related to this project, including theories relevant to a hand hygiene education project. Additionally, I describe the project's relevance to nursing practice and DNP students' role in promoting positive social change.

Section 2: Background and Context

Introduction

HAIs are a significant concern for the health care industry worldwide (Chiguer et al., 2018). In the United States, one out of every 136 hospitalized patients falls seriously ill due to HAIs, which equates to 2 million cases and nearly 80,000 deaths each year (Chiguer et al., 2018). The CDC (as cited in Chiguer et al., 2018) defined an HAI as a localized or systemic condition resulting from a contrary reaction due to an infectious agent or its toxin, with no evidence of infection upon hospital admission. The risk factors for HAIs are longer duration of hospital stay, exposure to an intravascular catheter, recent surgery, and urinary catheter (Chiguer et al., 2018).

The incidence of infection within a hospital is an essential indicator of assessing quality care, patient safety, and infection-free during patient admission. An action plan for infection control and hygiene improvement is recommended with the participation of all stakeholders' including doctors, pharmacists, the hygiene team, nurses, and administrators (Chiguer et al., 2018). Infections acquired in the hospital are a major health-care-related problem, as they contribute to hospital length of stay (LOS) prolongation, high costs of care, and increased morbidity and mortality (Pettemerides et al., 2018).

The practice-focused question for this DNP project concerned whether an education program for nurses working in a hospital facility can enhance their knowledge of strategies for reducing HAI rates, including handwashing hygiene. I addressed the practice gap related to nurses' understanding of infection prevention strategy by

providing education on reducing infection rates through handwashing. In this section, I describe concepts, models, and theories relevant to the DNP project; discuss the project's relevance to nursing practice; provide local background and context for the practice problem; and consider my role in this project as a DNP student and my role in the project's team.

Concepts, Models, and Theories

Concepts

The following concepts were important to this project.

Handwashing With Soap

Handwashing with soap is an effective way to prevent the spread of infectious diseases such as respiratory and diarrheal illnesses (Zhang et al., 2020). However, handwashing compliance is lacking, particularly among nurses in a hospital located in northeastern Maryland. In the hospital, observing nurses perform handwashing helps to evaluate nurses' compliance in preventing infection and their awareness from maintaining adequate handwashing at all times. Education and promotional materials about handwashing may change individuals' awareness concerning handwashing (Zhang et al., 2020). Infectious disease outbreaks may also affect individuals' attention to handwashing hygiene.

Health Care Workers' Knowledge Regarding Hand Scrub

HCWs' knowledge regarding hand scrub should be assessed because the hand hygiene practices of HCWs have been useful in preventing HAIs. This concept has been aptly used to improve understanding, training, monitoring, and reporting related to hand

hygiene among HCWs (Rahul et al., 2016). Despite the emphasis on the importance of effective handwashing in preventing nosocomial infection, not all HCWs are compliant with handwashing protocols (Rahul et al., 2016). HCWs may either fail to wash their hands properly or fail to follow the correct steps in effective handwashing, which may ultimately lead to HAIs.

Nurses constitute the largest percentage of HCWs, and they are the nucleus of the health care system. Because they spend more time with patients than any other HCWs, their compliance with handwashing guidelines seems to be more vital in preventing disease transmission among patients.

Infection Control Policies on Hand Hygiene

There is a need for multiple intervention approaches to make hand hygiene a sustainable practice within health care. Hand hygiene is not the responsibility of the infection control department alone; it involves a multidisciplinary approach (Rahul et al., 2016). Hospital administrators, other key leaders, and nursing leaders are the key to success for hand hygiene compliance within a hospital. HCWs should regard the infection control department as a resource and partner rather than as an enforcer. Thus, infection control staff can play a vital role in hand hygiene compliance by encouraging patients' monitoring of hand hygiene by observation. Hand hygiene adherence goes beyond education and training, as it involves continuous motivation toward change and how that change can be sustained (Rahul et al., 2016).

Models

I used the analysis, design, development, implementation, and evaluation (ADDIE) model (Hui-Chin & Sheng-Shiang, 2019) to guide the design of an education program. The model provided a framework for designing educational material to foster an infection-free environment. ADDIE is commonly used for the design of educational programs by instructors, university administrators, and software developers (Hui-Chin & Sheng-Shiang, 2019). The use of the ADDIE model makes educational programs more efficient, effective, and relevant to survey development. The ADDIE model has become the most prominent model for the design of educational programs over the last 10 years (Hui-Chin & Sheng-Shiang, 2019).

The ADDIE phases may be described as follows:

1. The *analysis* phase is the foundation for all other phases of the ADDIE model. This phase requires educators to process the need, task, and goal of a program (Hui-Chin & Sheng-Shiang, 2019). Educators identify the problem, analyze the cause and impact of the problem, and determine the subjects' needs and learning characteristics.
2. The *design* phase involves planning and selecting instructional activities, materials, or assessment methods to ensure that the subjects learn the intended information and that instructional objectives can be accomplished (Hui-Chin & Sheng-Shiang, 2019).
3. In the *development* phase, educators create the content for the lesson generated in the design phase (Hui-Chin & Sheng-Shiang, 2019). All of the

components of the lesson are formulated with detailed information for educators to use during implementation.

4. In the *implementation* phase, strategies are implemented over a period of time in an attempt to close the identified gap.
5. Finally, in the *evaluation* phase, the strategy that was implemented is evaluated to assess the quality of the intervention.

Theories

I grounded this DNP project on Kolb's theory of experiential learning (Long & Gummelt, 2020). Kolb's theory of experiential learning is among the most commonly accepted and applied learning theories that emphasizes the critical role that real-world knowledge plays in the learning process (Long & Gummelt, 2020). By concentrating on the all-inclusive process of learning, experiential learning theory accommodates various learners and individual growth and development throughout the learning process (Long & Gummelt, 2020).

Reducing infection rates in the hospital requires implementing a learned strategy for handwashing that involves nurses and other HCWs. Kolb's model is one of the learning style based on experiential learning theory to understand effective learning. For Kolb, learning is a process through which experience is converted into knowledge (Sanjabi & Montazer, 2020). Kolb's theory identifies four stages within the learning process:

- concrete experience (CE; feeling)
- abstract conceptualization (AC; thinking)

- reflective observation (RO; observing)
- active experimentation (AE; doing; Sanjabi & Montazer, 2020).

Implementing an educational program for nurses will help to enhance their knowledge of handwashing to provide adequate patient care. The aim of reducing HAI rates will result in the organization's introduction of educational programs and follow-up with staff to ensure compliance, leading to positive patient outcomes.

Evidence-based practice (EBP) has become acknowledged as an important part of quality patient care. Nurses are encouraged to provide patient care by a culture that supports EBP (Melnik & Fineout-Overholt, 2018, p. 364). Leaders and health professionals face the challenge of transforming research evidence into practice and implementing revised practices, which imposes pressure on organizational development and change, learning, and quality of care (Erichsen et al., 2018). Nurses at the point of care are essential to implementing EBP; therefore, it is vital to ascertain factors that may hinder EBP adoption.

Definition of Terms

The following words and phrases were defined for this DNP project:

Iatrogenic: An illness that is caused by a medication or drugs prescribed by a physician or after a medical or surgical procedure (Darchy et al., 1999).

Analysis, design, development, implementation, and evaluation (ADDIE) model: Allows the planning and development of a pedagogical mediation that leads to meaningful learning (Hui-Chin & Sheng-Shiang, 2019).

Evidence-based practice (EBP): A problem-solving method for providing health care that incorporates the best evidence from revisions and patient care data with clinician expertise and patient preferences and values (Ramos et al., 2020). EBP offers logical means to address fundamental problems in modern society to tackle unsatisfactory events and the research-to-practice gap (Ramos et al., 2020).

Kolb model: Experiential learning is learning by experience. By participating in real-life activities, students can efficiently transform the knowledge that they have learned from the classroom and textbooks into their understanding (Sanjabi & Montazer, 2020).

Hospital-acquired infection (HAI): An infection that occurs 48–72 hours after hospital admission due to a patient's stay in the hospital (Effatpanah et al., 2020). HAIs are not present or incubating at the time of admission but may include infections that appear after hospital discharge, as well as occupational infections that occur among staff (Boyce et al., 2017). They comprise almost all clinically apparent infections that do not initiate from a patient's original admitting diagnosis (Mynaříková et al., 2020).

Hand hygiene: By the mid-1980s, handwashing was a central focus of CDC guidelines on preventing health care-associated infections (Boyce et al., 2017). Handwashing with water and soap was the recommended method. HCWs were instructed to undertake vigorous rubbing together of all surfaces of lathered hands for at least 10 seconds, followed by thorough rinsing under a stream of water (Boyce et al., 2017).

Relevance to Nursing Practice

HAIs have become a concern for health care systems globally. HAIs are infections that can happen to any individuals who come into contact with the health care environment. Patients and health care professionals can become infected with a health care-associated infection. HAIs have been described since ancient times, as have measures for preventing infection (Georgios et al., 2011).

Recent research has shown that lack of appropriate hand hygiene poses a severe risk for patients due to cross-contamination, the spread of microorganisms, and postoperative infections (Erichsen et al., 2018). A common mode of transmitting HAIs is via contaminated hands. As such, hand hygiene is the best method of preventing the spread of disease. Nurses' compliance with hand hygiene is important. Cross-contamination of infection, shows the correlation among the environment, patients, and staff. A majority of hospitals' efforts to prevent infection are focused on the practices of staff members. Nurses focus on reducing contamination by implementing hand hygiene that results in reducing patient LOS in the hospital, reducing health-care-related costs, and supporting positive patient outcomes. The most common hand hygiene interventions typically consist of education, feedback, reminders, and access to alcohol-based hand rub.

CDC (2020) guidelines include recommendations for reducing infection that address hand hygiene; cleaning and disinfecting environmental surfaces, air, and water; environmental culturing; managing regulated medical waste; construction and renovation; use of carpeting, laundry, and bedding; pest control; and animals in health care facilities. Multimodal clean care is a safer care strategy that involves five moments when hand

hygiene should be performed: (a) before touching a patient, (b) before aseptic procedures, (c) after the risk of body fluid exposure, (d) after touching a patient, and (e) after touching patients' surroundings (Fouad & Eltaher, 2020).

Local Background and Context for the Doctoral Project

HAIs are common adverse incidents that happen to patients admitted to the hospital. HAIs can result in patient discomfort, increased length of hospital stay, permanent disability, and even patient death. HAI control measures involve the continuous use of handwashing by health care professionals before and after contact with patients to avert infection.

This doctoral project took place in a medical/surgical unit in a hospital located in northeastern Maryland. This medical/surgical unit had 52 full-time and part-time registered nurses and was an ideal site for the provision of a 1-hour educational program on handwashing education. The HAI rate in the hospital has grown more significant over the past few decades, despite increasing attention to the problem and the implementation of numerous infection control methods (Hassan et al., 2010).

Numbers from the National Audit Office show that HAIs are becoming increasingly prevalent and are responsible for approximately 5,000 deaths per year (Scott, 2004). The CDC has estimated that about one out of every 20 individuals admitted in the hospital will become infected with an HAI, noting that such infections incur \$4.4 billion in additional hospital care costs yearly (Scott, 2004). Studies have indicated that the cumulative costs of infections in the United States may increase from \$5 billion to \$29 billion, based on the infection's nature (Hassan et al., 2010). Hospitals do not receive

reimbursement from Medicare for costs incurred as a result of infections that their staff could have averted through infection control compliance.

Infection control is every staff member's responsibility. Implementation of nursing, cleaning, and disinfecting practices reduces the burden of contamination in the hospital setting. Proper hand hygiene among staff is extremely important to this effort (Feighery, 2019).

I sought and received approval for this DNP project from the Walden Institutional Review Board (IRB approval number # 01-14-21-0582046). Walden University provides career professionals in various communities with the opportunity to transform into scholar-practitioners who create positive social change (Walden University, 2020). The School of Nursing provides relevant educational programs based on the scholar-practitioner model. Nursing professionals in these programs achieve improvement in their critical-thinking skills and gain specialized nursing knowledge that prepares them to transform the health care system by selecting and implementing EBP (Walden University, 2020). The Walden institutional mission supported this project, which was developed to enable ongoing review of events and feedback on individual reports, thereby supporting ongoing improvement in the quality of patient care.

Role of the DNP Student

The DNP degree marks the highest and last level of nursing education that concentrates on clinical practice (Laureate Education, 2011). A DNP helps a nurse advance to a higher level of clinical practice; DNP programs produce leaders in nursing who can contribute to decisions that positively impact patients' health (Laureate

Education, 2011). As a DNP student, I sought to influence health care outcomes by educating nursing staff on hand hygiene. I aimed to contribute positively to transforming the future of nursing in the health care environment. I will disseminate what I have learned about hand hygiene strategies to other nurses. As a change agent, I will collaborate with other departments to enhance handwashing practices among providers.

Due to the high morbidity and mortality rate related to HAI, I decided to embark on this project to apply hand hygiene education learned to help reduce HAI. I will establish methods to (a) decrease infection rates in the health care system; (b) improve the outcome of the hospitalized patient, thereby reducing their length of stay. Compliance is the issue in reducing infection in the hospital. Still, I will place a handwashing poster on each handwashing sink and the hospital hallways to remind other staff and me of the need for handwashing.

Role of the Project Team

The DNP project team included the mentor, nursing staff, staff educator, and the education department. The mentor offered direction and advice on how to complete the project. The mentor checked the work and make corrections for improvement. The mentor was kind, knowledgeable, and give enough time for the completion of the project. The mentor always check on the student to make sure that the work is done well. The mentor served as a content expert for the planning and implementation of the curriculum.

The nursing staff served as the voluntary participants for this project. Nursing staff signed a form allowing participation, completed the pretest, attended the educational session, completed the posttest and evaluated the educational session.

The Staff Educator (SE) served as a content expert in the planning and implementing of the curriculum. This individual assisted the DNP student in curriculum content validity. The SE assisted in scheduling the educational sessions and maintained confidentiality related in pre and post-test.

The Education Department (ED) at the facility located in northeast Maryland approved the project proposal. The ED and the DNP student are charged with the responsibility of protecting the nursing staff's rights and welfare. The education department has an enormous impact on the timeliness, efficiency, cost, and scope of this project. The education department ensured confidentiality by not identifying the nursing staff.

Summary

Despite the various strategies used to reduce HAI, infection is still increasing in the hospital located in northeast Maryland, thus having an adverse impact on the affected patients. Hospitals with a high rate of infection due to their error in care incur cost on themselves not covered by insurance. The increased rate of HAI is a concern in the health care environment that requires immediate attention. As a DNP student, I am obligated to address HAIs at this facility through an educational program on hand hygiene.

Section 2 introduced Kolb's adult education theory as the theoretical framework for this project. For the nursing staff educational program, the model chosen will include ADDIE. Next, this section addressed the relevance to nursing practice. Finally, the section addressed the background and context for the project, the DNP student's role in implementing the project, and the project team's role. Section 3 will address the process

and procedural approach for collecting data, the sources of evidence and the methodology for data collection related to this nursing staff education project, and how the data will be analyzed to answer the practice-focused question.

Section 3: Collection and Analysis of Evidence

Introduction

HAIs are among the causes of adverse events, mortality, and reduced quality of life in hospitalized individuals, leading to increased hospital LOS (Izadi et al., 2020). The aim of this project was to introduce an educational program on handwashing strategies that nurses should use in the hospital setting to reduce infection. This project followed the DNP staff Walden educational manual. This project also supported World Health Organization (WHO) recommendations to reduce HAIs.

Section 3 reintroduces the practice-focused question that guided this project. Additionally, the process for gathering sources of evidence is addressed. Finally, the methodology for data collection is described.

Practice-Focused Question

Through this project, I attempted to answer the following practice-focused question: Does an educational program on handwashing for nurses reduce HAI rates? This doctoral project was conducted to address a gap in nursing practice related to HAIs in the health care environment. HAIs occur when patients acquire infections at a health care facility that were not present at the time of their admission. HAIs may become clinically evident 48 hours after admission; alternatively, an infection may appear after a patient is sent home from a facility.

The number of HAIs is significant. It is estimated that 7.1 million HAI cases occur every year, with 1 out of every 20 people suffering due to poor practices, with an

estimated cost of \$32 million per year (Sharif et al., 2019). HAIs create misery for patients and impose a burden on the economy (Sharif et al., 2019).

The aim of this project was to reduce infection rates by educating nurses on handwashing strategies in a medical/surgical unit located in northeastern Maryland. I sought to answer the following practice-focused question: Does an educational program on handwashing for nurses reduce HAI rates? Educating nurses on eliminating HAIs among hospitalized patients may help to reduce HAIs and associated costs. This project involved the use of a survey to monitor nurses' handwashing compliance and the impact of HAIs on patient outcomes post hospital discharge. This project's overall goals were to decrease the length of patient hospitalizations, reduce hospital costs, and promote safer and higher quality health care practices in society as a whole.

Hand hygiene compliance is the root of infection control programs. In health care facilities, education on how to improve hand hygiene compliance to reduce health-care-acquired infections is needed. This project was aimed to reduce infection rates by providing handwashing education in a medical/surgical unit located in northeastern Maryland. Through the project, I attempted to answer the following question: Does an educational program on handwashing for nurses reduce HAI rates? This project focused on educating nurses on hand hygiene strategies to reduce HAIs. Staff compliance with proper hand hygiene helps to keep hospitalized patients free from infection upon discharge.

Thorough knowledge of hand hygiene among staff can reduce nosocomial HAIs and reduce extraneous costs that health care facilities incur (Cobb & Lazar, 2020). All

staff nurses received a 1-hour training on handwashing for infection control. Strict hand hygiene protocols were introduced and monitored among staff members, along with protocols for the cleaning and disinfection of hospital equipment throughout the organization. All staff nurses received a 1-hour training on infection control, personal protective equipment, signage at handwashing sinks demonstrating the correct handwashing method, and the correct concentrations of disinfectant to be used (Feighery, 2019).

Sources of Evidence

I used evidence-based literature to prepare the education program for this project. I reviewed the current evidence-based literature related to reducing HAIs using Walden University online databases including MEDLINE, WHO implementation toolkit, CINAHL Plus, ProQuest Nursing & Allied Health Source, Joanna Briggs Institute EBP, and PubMed. Keywords included, but were not limited to, *nosocomial infection control*, *hand hygiene practice among HCWs*, *hospital-acquired infections*, and *handwashing*. I used peer-reviewed journal articles, systematic reviews, and guidelines that supported the practice-focused question, with publication dates ranging from 2015 to 2020.

Approach or Procedural Steps

The project was evaluated by the IRB at Walden University. Because the intervention pertained to the development of an EBP education program that included human subjects, it was reviewed by the IRB to ensure that it did not breach human rights or negatively impact participants' welfare. This project received Walden University IRB approval on January 14, 2021 (approval number # 01-14-21-0582046). The health care

facility located in northeastern Maryland did not require approval from its IRB. A pretest known as the Hand Hygiene Knowledge Questionnaire for Healthcare Workers (HHKQHW) was administered to 52 registered nurses. The HHKQHW was created by the WHO and had known reliability and validity.

The HHKQHW is a questionnaire that assesses HCWs' hand hygiene knowledge (Abdallah et al., 2018). There are 10 questions, excluding the first seven questions that assess demographic variables (i.e., hospital name, ward, age, gender, profession, and previous hand hygiene training; Abdallah et al., 2018). The questions assess different aspects of knowledge about hand hygiene (Abdallah et al., 2018).

This doctoral project's participants were from a medical/surgical unit in a northeastern Maryland hospital. The medical/surgical unit was comprised of 52 full-time and part-time registered nurses. This unit was an ideal setting to provide 1 hour of handwashing education because the nurses provided direct patient care constantly. The hospital administration encouraged all nurses to attend the educational program because the HAI rate was high. The expectation was that participants who attended the educational program would improve their knowledge of implementing handwashing hygiene.

I received input into the curriculum for this project from content experts, including my mentor, personnel in the facility's staff education department, and staff on the facility's infection control team. I delivered a 1-hour in-person education program. This project used the ADDIE phases by means of an iterative process. The components of the ADDIE model are as follows (Budoya et al., 2019):

- *analysis phase*: target audience analysis focusing on the nurses and the patient
- *design phase*: specifying learning activities and teaching strategy
- *development phase*: constructing teaching and learning program structure and making the program available to the population
- *implementation phase*: providing support to users and using evaluation devices to investigate the teaching material and the program's values
- *evaluation phase*: evaluating the effectiveness of the teaching materials, tools, and activities; scrutinizing the impact of the teaching and learning process; and finding changes and adjustments for future delivery

The content of the educational program was focused on published evidence and the WHO toolkit. The educational program covered topics such as the causes and effects of infection in the hospital and how to prevent HAIs. The education focused on reducing infection rates through handwashing. After the educational session, the participants were able to do the following:

1. State the potential effects/consequences of HAIs for the hospital.
2. State the potential effects/consequences of HAIs for the patient.
3. Identify the internal and external factors that place patients at risk for infection.
4. Identify interventions to prevent infection among inpatients.

Following the development of the educational program, nurses were scheduled to attend the teaching session. A posttest was administered to 52 participants.

The data collection process involved the use of a questionnaire, as recommended by the WHO, that focused on hand hygiene knowledge for health care workers (see Appendix A). Data were fed into SPSS software v. 22, which was used for statistical analysis. McNemar's test was used to compare participants' knowledge before and after the educational workshop (Abdalrahman et al., 2018). Descriptive statistics were used to analyze the data.

Ethical Considerations

Potential ethical issues were considered in the planning and implementation of this project. This project involved educating nurses on infection prevention and control (IPC) programs to prevent the spread of pathogens from health care providers to patients and vice versa. The IRB of Walden University approved this research study on reducing infection rates through handwashing education after an ethics review. The Walden IRB approved this project before participant recruitment, data collection, or dataset access occurred. Based on the questionnaire distributed in this project, individual participants' confidentiality was maintained due to IRB approval.

I have presented the project in such a way that the reader cannot identify individual people based on information anywhere in the project. The IRB was responsible for ensuring that all Walden University participation occurred on a voluntary basis and that participants could withdraw at any time.

Alignment

This project presented a practical skill performance through education and practice to close a gap pertaining to HAIs in the health care environment. The outcome of

the practice-focused question (Does an educational program on handwashing for nurses reduce HAI rates?) was presented.

Data Analysis and Synthesis

In this project, I analyzed and synthesized nurses' pre- and posteducational knowledge regarding risk factors for HAIs and infection prevention strategy using the HHKQHW, which contained 20 questions that assessed proper hand hygiene knowledge. The collected data were entered, cleaned, and checked by assessing frequencies for all variables. Data entry was done using SPSS to ensure that there were no entry errors and to detect missing data and outliers. Statistical significance reported *p*-value of < 0.05 levels indicated if there were significant differences. Descriptive statistics were used to determine the differences between groups at baseline. Additionally, a comparison of infection rates on the unit was analyzed.

Summary

Lack of hand hygiene knowledge among HCWs contributes to increased HAI rates. Section 3 addressed obtaining sources of evidence, the procedural steps for the staff education project, and the collection of data related to a nursing staff educational program on hand hygiene. Included in this section are the procedural steps involved in collecting the data, including the instrument that was used. The ethical implications and alignment were described. Finally, I addressed the use of SPSS for statistical analysis. Data from the 52 participants were collected using the HHKQHW (see Appendix A).

This project addressed how nurses should reduce infection through an educational program. This section described the procedure for searching for current evidence to

complete this project. The project questionnaire outcome was discussed, using descriptive statistical information.

In Section 4, I describe findings that resulted from the analysis and synthesis of the evidence. I provide recommendations that address the gap in practice. Infection is a significant concern in a health care setting. Strategies should be implemented and maintained to prevent infection.

Section 4: Findings and Recommendations

Introduction

HAIs are common and potentially severe complications that occur in inpatient care. Common HAIs include pneumonia, surgical site infections, gastrointestinal and urinary tract infections, and bloodstream infections (Kaier et al., 2020). HAIs have been found to be responsible for increased LOS and resource use, as well as additional morbidity and mortality. Hand hygiene is an effective strategy to reduce HAIs in a medical/surgical unit when combined with other intervention measures.

The infection rate in a health care environment is still an important concern that requires nurses' intervention to eradicate. In collaboration with the facility management, I identified a need for enforcement to reduce infection rates through handwashing education delivered to nurses. Nurses do not have proper knowledge of infection control. The practice and promotion of hand hygiene prevention strategies such as handwashing and the use of other cleaning and disinfection practices help to reduce HAI rates.

I decided to develop a health care staff education project to address this practice gap. With this study, I aimed to address the following practice-focused question: Does an educational program on handwashing for nurses reduce HAI rates? The DNP project's purpose was to assess staff knowledge through handwashing education on a medical/surgical unit in a hospital located in northeastern Maryland.

The medical/surgical team at the study facility had 52 full-time and part-time registered nurses. In developing the educational content of the module, I used five

research articles published between 2015 and 2020. The content of the educational module (see Appendix B) included the following:

- the practice and promotion of hand hygiene
- consistent use of an aseptic technique
- cleaning and disinfection practices
- use of standard precautions
- patient assessment and additional precautions
- patient education
- use of safety devices
- removal of unnecessary invasive devices
- use of bundle strategies for infection prevention (Benson, & Powers, 2011)

Nursing-sensitive patient outcomes represent the effects of nursing interventions that result in changes in patients' symptom experience, functional status, safety, psychological distress, or costs (Benson & Powers, 2011).

To evaluate the efficacy of the educational program, I used the HHKQHW (see Appendix A), consisting of 10 questions, to evaluate the participants' knowledge of HAI risk factors and control strategies. A pretest and a posttest were administered before and after the educational sessions. The results from each evaluation were used as the basis to determine whether the educational program was effective in improving nurses' knowledge of EBP in preventing HAIs. A paired-samples *t* test was conducted to determine whether the differences between the pretest and posttest scores were statistically significant.

This section contains the results of the data analysis that was performed. The responses obtained from both tests were used to determine the effect of the educational program. Handwashing education is essential because it provides educational interventions for health care providers that assist in eradicating HAIs (Conly et al., 1989). The HHKQHW is an evidence-based test that can be used to quickly assess knowledge on infection prevention and control processes among staff (Kaur et al., 2017).

Findings and Implications

Fifty-two nurses participated in an educational program within the hospital setting located in northeastern Maryland from January 25 to February 10, 2021. The program consisted of a total number of 10 educational sessions, each lasting 30 to 40 minutes. All participants agreed to take part in the study, respond to the survey, and complete a pre- and posttest utilizing the infection control staff survey. To maintain participants' privacy, no identifiable information was requested. After the posttest was completed, the tests were analyzed. A statistician provided a calculation of percentages for the answers for each question. There were no unanticipated limitations to this project.

Demographic Characteristics of the Respondents

This study was about reducing infection rates through handwashing knowledge. Thus, respondents' age, gender, and professional level were considered essential demographic characteristics in the findings and are presented under Tables 1 to 3. The survey targeted 52 potential participants, all of whom responded within the defined time frame.

Table 1 shows data on respondents to the questionnaires. Out of the 52 respondents, 29 (56%) were female, and 23 were male (44%). This analysis implies that the majority of HCWs are female.

Table 1

Gender Value

	Frequency	Percent	Valid percent	Cumulative percent
Male	23	44.2	44.2	44.2
Female	29	55.8	55.8	100.0
Total	52	100.0	100.0	

Table 2 presents the age of the respondents to the questionnaires. Table 2 indicates that out of 52 respondents, 14 (27%) were 25 to 29 years of age, 18 (35%) were 30 to 39 years of age, and 20 (39%) were 40+ years of age.

Table 2

Age Group

	Frequency	Percent	Valid percent	Cumulative percent
25-29	14	26.9	26.9	26.9
30-39	18	34.6	34.6	61.5
40+	20	38.5	38.5	100.0
Total	52	100.0	100.0	

This analysis suggests that the majority who were in the age range of 40+ years understood that infection rates can be reduced through handwashing educational training.

Table 3 presents data on the professional levels of respondents to the questionnaire. Out of 52 respondents, 52 (100%) were nurses, 0 (0%) were auxiliary nurses, 0 (0%) were medical doctors, 0 (0%) were technicians, 0 (0%) were therapists, 0 (0%) were nurse students, and 0 (0%) were medical students. The analysis suggests that the majority of the respondents who responded to the questionnaire were nurses.

Table 3

Profession

	Frequency	Percent	Valid percent	Cumulative percent
Nurse	52	100	100	100
Auxiliary nurse	0	0	0	0
Med. doctor	0	0	0	0
Technician	0	0	0	0
Therapist	0	0	0	0
Nurse student	0	0	0	0
Medical student	0	0	0	100.0
Total	52	100.0	100.0	

Results

The HHKQHW staff survey results (see Table 1) describe the level of HCWs' knowledge of hand hygiene for infection prevention practices before and after the educational sessions.

Table 4*Paired-Sample Statistics*

Pair 1	Mean	N	Std. deviation	Std. error mean
Pretest	10.96	52	2.009	.279
Posttest	13.71	52	2.444	.339

Table 5*Paired-Sample Test (Paired Difference)*

Pair 1	Mean	Std. deviation	Std error mean	95% confidence interval of the difference Lower	95% confidence interval of the difference Upper	t	df	Sig. (2-tailed)
Pretest Posttest	- 2.750	3.223	.447	-3.647	-1.853	- 6.153	51	.000

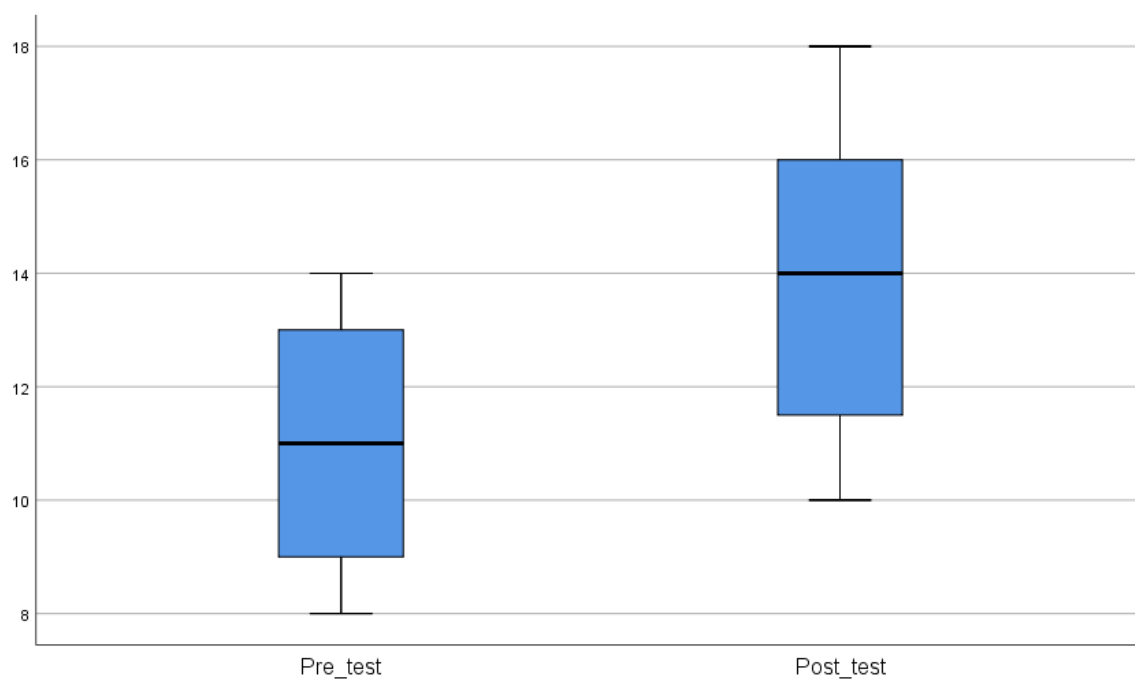
The paired *t* test between pretest score and posttest score shows a significant increase in test score. The pretest score mean is 10.96, while the posttest score mean for the sample group is 13.71. The paired *t* test [$t(-6.153, 51)$] has a *p*-value [$p = 0.000$] less than 0.05, indicating a significant difference between pre-test score and post-test score. The training has a significant impact on increasing participants' knowledge about the importance of hand hygiene in health care and medical facilities.

One of the questions was intended to elicit information from respondents regarding whether they had received previous training on handwashing related to reducing infection rates. Prior to the educational program, the question response represented 16 (30.8%); after participants had received the education, the responses represented 36 (69.2%). After participants had received the education, the percentage of respondents increased.

Another question focused on establishing whether the respondents routinely used an alcohol-based hand rub as a way to reduce infection. Before receiving education, 12 (23%) respondents said that they did not use an alcohol-based hand rub for hand hygiene, whereas after receiving education, 40 (76.9%) respondents said that they used an alcohol-based hand rub for hand hygiene.

Figure 1

Pre- and Posttest Findings



Recommendations

This DNP project's outcome increased knowledge among nursing staff on a medical/surgical unit in a northeastern Maryland hospital. Through this project, I demonstrated that an educational intervention on staff knowledge through handwashing for nurses working in a medical/surgical unit in a hospital located in northeastern Maryland

resulted in a significant increase in knowledge among participants. I would recommend increasing hand hygiene awareness at other hospitals within the neighborhood and applying it as part of annual competency training programs.

To ensure the sustainability of the program, it will be important to identify a champion who will ensure that the program's elements are carried on in the future. Change champions are crucial in the successful implementation and sustainability of EBP (Miech et al., 2018). Because there is no instrument available to specifically measure the knowledge of hand hygiene risk among nurses working in the hospital, I recommend the use of a hand hygiene staff survey.

Recommendations for Future Projects

I recommend that further evaluation of this project occur in the future by examining its effect on infection reduction in the hospital. In this way, it may be clear whether the knowledge assimilated through the training is being put into practice and influences a low patient infection rate. Similarly, infection reduction rate data should be collected and reported using the National Database of Nursing Quality Indicators (NDNQI) monthly for 12 months before and after the educational program. With such data, it may be possible to ascertain whether there has been a change in infection trends since I completed the project.

Contribution of the Doctoral Project Team

The DNP project team included the staff educator, nurse supervisor, assistant director of nursing, and nursing director. The nurse educator aided with problem identification and with the establishment of a necessary intervention for patient infection

reduction. The nurse educator/infection control nurse was responsible for teaching the nursing staff about the key components and processes of reducing HAI and the various infection prevention strategies. As the project manager, I played the role of guiding the staff education and collaborated with the rest of the team members to ensure that the project was running smoothly. I evaluated the evidence, developed the educational materials, and analyzed the data; I also set up regular meetings with the project team, at least twice every week, to share vital information, project milestones, and evidence. Based on the urgency and importance of issues identified, the scheduled meeting created opportunities for each team member to share ideas, opinions, and expertise relative to the DNP project.

Strengths and Limitations of the Project

Strengths

The strengths of this project derived from the use of evidence-based research to develop the educational program. EBP is one of the crucial competencies for all health care professionals because it offers providers an opportunity to improve practice and add value to the patient experience (Dang & Dearholt, 2017). The project involved a team of clinically experienced and knowledgeable nurses who could contribute their professional opinions to the development of a comprehensive educational program. The nurse educator and nurse supervisor were consistently involved and accessible to offer guidance, and they exhibited interest in the project's progress. As a result, the education program has a likelihood of being incorporated into the annual educational program in the future.

Limitations

Obtaining evidence-based research sources and analyzing them to come up with the best evidence was one of the limitations of this DNP project. The volume of the articles published on the topic in recent years made it difficult for the project team to review every research article published on the topic. An exhaustive review would have been prohibitive to the completion of this project. Thus, the project team selected those articles that were most relevant to the patient population and project setting.

A second limitation of this DNP project was that it was carried out in one hospital; consequently, its findings may not be generalized to other hospitals within the area. Another limitation was that there were no valid and reliable instruments to measure nurses' knowledge of infection prevention strategies among hospital employees; the handwashing staff survey may have been insufficient to measure their complete understanding of the topic.

Section 5: Dissemination Plan

As drawn from the DNP's essentials 111, dissemination of results and findings from EBP and research is vital to improving health outcomes (Turkson et al., 2020). Dissemination is defined as a planned and systematic process that involves recognizing target audiences and the environments in which a project's findings will be received (Wilson et al., 2010). Dissemination can involve corresponding and communicating with the broader community of health care providers and policy audiences to promote the adoption of research findings into practice.

It is crucial for health care professionals and the public to recognize the immediate need for handwashing to reduce the rate of HAIs. I will present this DNP project's results to the hospital nurses to convey the education program's impact in increasing awareness and knowledge of handwashing. My aim in developing this project was to introduce an educational program on handwashing strategies that nurses should use in the hospital setting to reduce infection. This project followed Walden's DNP Nursing Staff Education Manual and was consistent with WHO recommendations for the reduction of HAIs. I developed the project to address a gap in practice regarding nurses' knowledge about the effective use of hand hygiene in a medical/surgical unit in a hospital. Utilizing nursing practice knowledge, nurses can facilitate patient recovery while minimizing complications related to infections (Benson & Powers, 2011). The project may contribute to nursing practice by providing nurses, who deliver direct patient care at the bedside, with knowledge that they need to reduce infection rates, thereby

resulting in positive patient outcomes. As this project proves successful, it may transfer to other areas of practice within the institution and other institutions.

Self-Analysis

This DNP project provided an excellent opportunity for me to learn and grow while exploring ways to improve the care of diverse populations. Working on my project with experienced and professional expertise helped me to develop substantive, high-level knowledge as a practitioner, scholar and project manager, and nursing leader.

As Practitioner

My concern for health care workers' and patients' health status prompted me to choose the aim of reducing infection rates through handwashing education for my DNP project. One of my practice objectives as an advanced nurse practitioner is to improve knowledge among nurses. As the developer of this project, I found that leadership and direction were major challenges that I encountered. Effective and positive leadership is essential in promoting staff development and ensuring high-quality patient care.

The DNP program has increased my experience and knowledge significantly. I am confident that completing this DNP program will help me to become an active leader and a good nurse practitioner.

As Scholar

As a scholar, I have learned about the proper use of evidence-based research findings and strengthened my leadership orientation. In this way, the DNP program has prepared me to participate in the growth of nursing profession and improve patient care. In completing the DNP project with perseverance and determination, I have acquired and

fortified my leadership and research skills, as well as my ability to participate in and contribute to the growing nursing field. One of the professional skills that needed my attention is the expectation that I can evaluate the quality and basic published research studies through participating with the committee in charge of protocol development in my facility.

As Project Manager

My experiences as a project manager exposed me to many challenges in developing and completing this project. First, I had a difficult time managing the time required to complete the various project activities. However, I successfully came up with a written time plan that helped to resolve my time management concerns. The project team members were very helpful, and their advice was important. The nurse educator and supervisor provided much help in planning the project. My experience as a leader and practitioner enabled me to be involved and assist in making effective decisions when I encountered challenges, especially at the beginning of the project.

Summary

Hand hygiene is the simplest and most cost-effective means to reduce the spread of HAIs. It is impossible to solve patient safety problems without understanding the significance of proper hand hygiene compliance and without promoting its implementation in the health care system at all financial, administrative, and social levels (Klymenko & Kampf, 2015). For this DNP project, I developed a hand hygiene education program to reduce infection rates.

In Section 1 of this document, I presented the project's problem statement, purpose, nature, and significance to nursing practice. I described the gap in nursing practice that this project was developed to address, and I identified and supported the need for a staff education program by citing evidence. I explained that despite various strategies that had been used to reduce HAIs, infection rates were increasing in a hospital located in northeastern Maryland, having an adverse impact on affected patients. Hospitals that have high rates of infection because of errors in care incur costs that are not covered by insurance. For these reasons, increased HAI rates are a concern in the health care environment that requires immediate attention. As such, I sought to address HAIs at the facility through the development of an educational program on hand hygiene. The significance of the project in impacting patient care and promoting positive social change was evident in the increase in nurses' knowledge, resulting in the potential to increase hand hygiene compliance and reduce hospital infection rates.

In Section 2, I provided information on the background and context for this project, including theories relevant to a hand hygiene education project, the project's relevance to nursing practice, and a DNP student's role in promoting change. This project effectively improved nurses' knowledge of handwashing to reduce infections through hand hygiene education. The main challenge faced during this project was time management, which I successfully resolved through the use of an activity timeline.

Stakeholders within the organization, including the nurse educator and administrators, were instrumental in accomplishing the project objectives. With pertinent stakeholders' support, I expect that the implementation of the project in neighboring

facilities would be successful. It will be essential for nurse educators and supervisors to hold ongoing educational sessions to promote this project's sustainability. I also recommend that this project be extended to investigate the impact of the program in reducing infections within the hospital over a period of time.

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Appendix A: Hand Hygiene Knowledge Questionnaire for Health-Care Workers

I used Abdalrahman et al., (2018) Hand Hygiene Knowledge Questionnaire for Health-Care Workers. The questionnaire is as follows:

Period Number*

The knowledge required for this test is specifically transmitted through the WHO hand hygiene training material and you may find the questions more difficult if you did not participate in this training.

Tick **only one answer** to each question.

Please read the questions carefully before answering. Your answers will be kept confidential.

Short Glossary:

Alcohol-based handrub formulation: an alcohol-containing preparation (liquid, gel or foam) designed for application to the hands to kill germs.

Facility: health-care setting where the survey is being carried out (e.g., hospital, ambulatory, long-term facility, etc).

Handrubbing: treatment of hands with an antiseptic handrub (alcohol-based formulation).

Handwashing: washing hands with plain or antimicrobial soap and water.

Service: a branch of a hospital staff that provides specified patient care.

Ward: a division, floor, or room of a hospital for a particular category or group of patients (it corresponds to the smallest segmentation of the health-care facility; one service can include multiple wards).

Personal ID**:

Date:

Facility:

Service**:

Ward**:

City**:

Country**:

- Gender:** Female Male
- Age:** years
- Profession***:** Nurse Auxiliary nurse Midwife
 Medical doctor Resident
 Technician Therapist Nurse student
 Medical student Other

* To be completed by the data manager.

** **Optional**, to be used if appropriate, according to the local needs and regulations.

*****Technicians**: radiologist, cardiology technician, operating room technician, laboratory technician

Therapist: physiotherapist, occupational therapist, audiologist, speech therapist

Others: dietician, dentist, social worker, etc.

Department (please select the department which best represents yours):

- Internal medicine Surgery Intensive care unit Mixed medical/surgical
 Emergency unit Obstetrics Paediatrics Long-term/rehabilitation
 Outpatient clinic Other

Did you receive formal training in hand hygiene in the last three years? Yes No

Do you routinely use an alcohol-based handrub for hand hygiene? Yes No

Which of the following is the main route of cross-transmission of potentially harmful germs between patients in a health-care facility? (*tick one answer only*)

- Health-care workers' hands when not clean
 Air circulating in the hospital
 Patients' exposure to colonised surfaces (i.e., beds, chairs, tables, floors)
 Sharing non-invasive objects (i.e., stethoscopes, pressure cuffs, etc.) between patients

What is the most frequent source of germs responsible for health care-associated infections?

(tick one answer only)

- The hospital's water system
- The hospital air
- Germs already present on or within the patient
- The hospital environment (surfaces)

Which of the following hand hygiene actions prevents transmission of germs to the patient?

- a. Before touching a patient Yes No
- b. Immediately after a risk of body fluid exposure Yes No
- c. After exposure to the immediate surroundings of a patient Yes No
- d. Immediately before a clean/aseptic procedure Yes No

Which of the following hand hygiene actions prevents transmission of germs to the health-care worker?

- e. After touching a patient Yes No
- f. Immediately after a risk of body fluid exposure Yes No
- g. Immediately before a clean/aseptic procedure Yes No
- h. After exposure to the immediate surroundings of a patient Yes No

Which of the following statements on alcohol-based handrub and handwashing with soap and water are true?

- i. Handrubbing is more rapid for hand cleansing than handwashing True False
- j. Handrubbing causes skin dryness more than handwashing True False
- k. Handrubbing is more effective against germs than handwashing True False
- l. Handwashing and handrubbing are recommended to be performed in sequence True False

What is the minimal time needed for alcohol-based handrub to kill most germs on your hands?

(tick one answer only)

20 seconds

3 seconds

1 minute

10 seconds

What is the minimal time needed for alcohol-based handrub to kill most germs on your hands?

(tick one answer only)

m. Before palpation of the abdomen Rubbing Washing None

n. Before giving an injection Rubbing Washing None

o. After emptying a bedpan Rubbing Washing None

p. After removing examination gloves Rubbing Washing None

q. After making a patient's bed Rubbing Washing None

r. After visible exposure to blood Rubbing Washing None

Which of the following should be avoided, as associated with increased likelihood of colonisation of hands with harmful germs?

s. Wearing jewellery Yes No

Damaged skin Yes No

Artificial fingernails Yes No

Regular use of a hand cream Yes No

Thank you very much for your time!

Appendix B: Hand Hygiene Flyer



Reducing Infection Rate through Hand Wash Education

WHAT'S NEW?




Hand hygiene is the simplest and most cost-effective means to reduce the spread of HAI.

The practice and promotion of hand hygiene

- *Consistent use of an aseptic technique.*
- *Cleaning and disinfection practices.*
- *Use of standard precautions.*
- *Patient assessment and additional precautions.*
- *Patient education.*
- *Use of safety devices.*
- *Removal of unnecessary invasive devices.*
- *Use of bundle strategies for infection prevention.*

