Reducing HA-UTIs and HA-CAUTIs in a Long-Term Care Facility (LTCF) By Utilizing a Nurse-Led Protocol

Chinomso Ezenwata

Touro University, Nevada

In partial fulfillment of the requirements for the Doctor of Nursing Practice

DNP Project Chair: Dr. Samantha Peckham

DNP Project Member(s): Dr. Theresa Tarrant

Date of Submission: January 27, 2021

Table of Contents

Abstract …… 3

Introduction and Background …… 4

Problem Statement …… 6

Purpose Statement …… 6

Review of Literature …… 8

Theoretical Model …… 15

Project and Study Design…… 21

Implementation …… 23

Evaluation…… 28

Conclusion…… 40

References …… 41

Appendix…… 49

Abstract

Patients in long-term care facilities (LTCF) are vulnerable to acquiring Healthcare-associated urinary tract infection (HA-UTI) and healthcare catheter-associated urinary tract infection (HA-CAUTI). HA-UTIs are the second most common infection among residents of LTCFs. HA-UTIs and HA-CAUTIs present an unnecessary discomfort, complications, extended hospital stay, and puts the facility at risk for non-reimbursement. HA-UTIs and HA-CAUTIs can be prevented or treated without consequence when recognized early. This project aims to prevent HA-UTIs, and HA-CAUTIs, improve staff knowledges, reduce risk of complications, establish culture of safety and maximize facility reimbursements.

An evidence-based UTIs and CAUTIs protocol was developed and implemented in the LTCF. The CNAs, LPs, and RNs were trained on the new nurse-led protocol. During the evaluation period, one patient was diagnosed with HA-UTI and no HA-CAUTI, compared to the eight patients diagnosed with HA-UTI pre-implementation. the result showed 3.3% post-implementation compared to 26.7% pre-implementation. The nurse-led protocol effectively decreased the incidence of HA-UTIs in LTCF within four-week time frame of the DNP project. The project findings demonstrated a statistically significant increase in staff knowledge on HA-UTIs and HA-CAUTIs and a decrease in HA-UTI rates in LTFC.

Introduction

Reducing HA-UTIs and HA-CAUTIs in a Long-Term Care Facility Utilizing a Nurse-Led Protocol

Healthcare associated urinary tract infection (HA-UTI) is the second most common infection among residents of long-term care facilities (Viner, 2020). The urinary system is one of most common sites of healthcare-associated infections (HAI), accounting for 20% of HAI among residents of long-term care facilities (LTCFs) (Centers for Disease Control and Prevention [CDC], 2020). HAIs are infections acquired by patients while receiving health care for another condition (US Department of Health and Human Services [HHS], 2020) and represent a substantial cause of morbidity and mortality for the 2.5 million Americans residing in LTCFs (Cohen, 2016). It is estimated that 1.7 million patients suffer HAIs in the US, with 99,000 of those resulting in death; healthcare associated catheter associated urinary tract infections (HA-CAUTIs) are one of the most common infection types (McNeil, 2017). HA-CAUTIs are caused by bacteria originating from within the perineum that are transferred from the hands of a caregiver to the patient during indwelling catheter insertion or after care, whereas HA-UTI is an infection of the lower and/or upper genitourinary tract system (Lajiness & Lajiness, 2019).

LTCFs provide care to a vulnerable population who are unable to independently manage their care in the community. These individuals are considered vulnerable with weak immune systems. It is estimated between one to three million serious infections occur in these facilities, which includes HA-UTIs, diarrhea and antibiotic-resistant infections (CDC, 2019). HA-UTIs is one of the HAIs affecting the older population in LTCFs. HA-UTIs is the most

common bacterial infections in older adults, accounting for more than 50% of all infections treated in LTCFs (Avelluto & Bryman, 2018).

HA-UTIs and HA-CAUTIs can be prevented or treated without consequence when recognized early. However, if left untreated, they can lead to serious complications such as kidney damage, altered mental status, or sepsis. Some conditions such as chronic genitourinary symptoms, dementia, communication barriers, incontinence and other comorbidities of the LTCF population makes it a challenge to identify HA-UTIs (Viner, 2020). One of the common approaches to treat HA-UTI, and HA-CAUTIs in LTFCs is the use of antibiotics. However, repetitive use of antibiotics may lead to increased cost, development of multidrug resistance, and disturbances in the normal flora in the body (Tambunan, & Rahardjo, 2019). Therefore, focusing on a nonantibiotic approach could help prevent and save costs associated to HA-UTIs and HA-CAUTIs. This can be achieved by implementing an evidence-based prevention protocol. Therefore, early recognition of symptoms, diagnosis, and treatment are imperative (McMullen et al., 2007).

The Center for Medicare and Medicaid (CMS) requires facilities to report data about HAIs to the CDCs National Healthcare Safety Network (NHSN) in order to receive reimbursement. CMS does not reimburse the cost to treat HAIs, which includes HA-UTIs, and may also fine the LTCF if the healthcare acquired infection (HAI) rate is too high (McNeil, 2017). The NHSN provides facilities with forms and the facilities are required to collect HA-UTI data (numerator), monthly summary data (denominator), and all required data elements (CDC, 2020). Therefore, this Doctor of Nursing Practice (DNP) project will utilize a standardize assessment and provide evidence-based tools to reduce HA-UTI and HA-CAUTI within the practice site.

Background

It is estimated there are 1.6 to 3.8 million HAIs that occur annually in the US, costing $38 to $137 million for antimicrobial therapy and $673 million to $2 billion for hospitalizations due to the impact of these infections (Cohen, 2016). The estimated total annual cost of treating HA-UTIs is significant, costing the US $2.47 billion (Sanyal et al., 2019). Healthcare professionals employed by LTCFs are mandated to prevent, identify, and manage HAIs such as HA-UTIs. Therefore, it is imperative that health professionals identify patients with HA-UTIs and HA-CAUTIs symptoms in LTCFs, and treat patients in a cost effective and timely manner. It is important to note that state regulators consider infection control as one of four quality measures they assess on annual review surveys in LTCFs (McMullen et al., 2007).

Risk factors of HA-UTIs include vagina atrophy, prostate enlargement, urinary retention, incontinence, incomplete emptying of the bladder, dementia, and prolong presence of an indwelling catheter (Perry, 2011). McNeil (2017) mentions that organizations, such as the CDC, created some of the earliest HA-UTI prevention guidelines in 2009. However, many of these evidence-based guidelines and implementation of protocols have not been successful and consistent (McNeil, 2017).

Problem Statement

HA-UTIs and HA-CAUTI are among the most prevalent bacterial infections, representing a major health problem within LTCFs. CMS does not reimburse LTCFs for costs associated with treating HA-UTIs and can cite the facility for poor quality care if the HAI rate is too high. Therefore, LTCFs are experiencing a loss of revenue due to the reduction in CMS reimbursement as well as the treatment cost. It is estimated that a single treatment for a patient with HA-UTI is $758 with an annual cost to patients of over $340 billion in the US (Ferguson,

2018). HA-CAUTIs occurs in patients who have an indwelling urinary catheter. The infection can be transmitted during the catheter insertion procedure or during catheter care stemming from poor technique leading to increased morbidity, hospital cost, length of stay, and mortality. The results of HA-CAUTIs are an estimated 13,000 deaths annually in the US, with an estimated cost of $450 million per year (McNeil, 2017). Given the burden on patients, as well as the financial liability caused by HA-UTIs and HA-CAUTIs, prevention is the most significant and beneficial resolution.

At the project site, the prevalence of HA-UTIs and HA-CAUTIs are as follows; between June 2019 to September 2020 there were 297 HAIs. There were 49 HA-UTIs and 14 HA-CAUTIs accounted for 63 cases which amounts to 21% of HAIs in the facility in a 27-month period. There are no prevention protocols currently in place or any screening tools to determine potential HA-UTIs present on admission. Therefore, part of this project is to develop a nursing protocol that will include: (a) monitoring signs and symptoms of patients in LTCFs for HA-UTIs, and HA-CAUTIs, (b) encouraging fluid intake to reduce HA-UTIs and HA-CAUTIs, (c) monitoring urinary input and out of patients, (d) proper perineal care and indwelling catheter care and (e) staff education. NHSN allows facilities to customize the UTI event forms keeping in mind that only HA-UTIs meeting NHSN HA-UTIs criteria should be submitted (CDC, 2020).

Purpose Statement

The poor management of HA-UTIs, HA-CAUTIs, the financial burden, and potential complications are well noted. Therefore, this project will implement an evidence-based prevention protocol by using NHSN surveillance forms for HA-UTIs events for LTCFs through CDC site. The aim is to reduce HA-UTIs and HA-CAUTIs from occurring in the

LTCFs and improve compliance with the state's regulatory quality measure. The purpose of this DNP project is to improve the revenue of the facility by reducing HAIs and HA-CAUTIs to reduce the facility's reimbursement penalties, improve the knowledge and skills of the nursing staff, and improve the facility reputation in the community.

Project Question

Will the incidence of HA-UTIs and HA-CAUTIs decrease in a LTCF with the initiation of a nurse-led prevention protocol compared to no prevention protocol used within the timeframe of the DNP project?

P: Increased HA-UTIs and HA-CAUTIs

I: Nurse-led Prevention Protocol

C: No prevention protocol

O: Reduced HA-UTIs and HA-CAUTIs

T: Within the time frame of the DNP project (4 weeks)

Project Objectives

All DNP project objectives will be completed within the timeframe of the DNP program.

- Develop a nurse-led protocol to prevent HA-UTIs and HA-CAUTIs.
- Improve nursing knowledge and skills protocol through education training.
- Reduce HA-UTIs and HA-UTIs.

Review Method, Coverage and Justification

In order to identify evidence to guide the development of HA-UTIs, HA-CAUTIs and nurse protocol, a literature search was conducted using the Jay Sexter Library database, Cumulative Index of Nursing, Allied Health Literature (CINAHL) Plus, PubMed, Medline, and EBSCO host. Publication review was limited from 2010 to 2020 and available in English.

Method

The literature reviewed included interventional trials, mixed methods, systemic review and quantitative studies. The articles chosen are effective and applicable to the project, as most of the studies have implemented guidelines for HA-UTIs and HA-CAUTIs prevention and have decreased their number of HA-UTIs and HA-CAUTIs post implementation.

A broad systematic literature search was conducted to retrieve literature on reducing HA-UTIs and HA-CAUTIs in a long-term care facility. Using the phrase "reducing urinary tract infections, urinary tract infection, prevention, long term care" there were 36 results, but some of the result were not related to older population. Therefore, the following keywords were incorporated in order to broaden the search:

- "Infection control, long-term care facilities" – 81
- "Catheter associated infection long-term care facilities" – 10
- "Healthcare associated infection, long-term care facilities" -38
- "Urinary tract infection long-term care facilities" – 43
- "UTI Guideline" – 2
- Urinary tract infection prevention" - 772

Inclusion and exclusion criteria were used to streamline articles that are pertinent to the topic. The inclusion articles are those published in a peer review, scientific journal, related to: (a) LTCF setting, older adult population (b) research focus was the prevention of HA-UTIs and HA-CAUTIs and(c) subjects were healthcare staff. The exclusion articles were the articles not associated to adult population in LTCFs. A total of 10 papers were reviewed including literature review and studies.

Keywords: infection control, urinary tract infection, healthcare associated infection, catheter associated urinary tract, HA-UTIs, HA-CAUTIs, and guidelines for HA-UTIs

Review Synthesis

The articles used show that HA-UTIs and HA-CAUTIs in long term care is a problem and not all LTCF's have a nursing protocol in place to prevent HA-UTIs. Viner (2020) notes that HA-UTIs prevention and treatment is unclear due to the lack of universally accepted criteria and inconsistencies for treatment. A lack of accepted criteria is present, with practitioners treating patients with antibiotics with no signs of symptoms of HA-UTIs (Avelluto & Bryman, 2018). Although treatment and diagnosis protocol are not conclusive for HA-UTIs management, improved awareness of HA-UTIs and HA-CAUTIs have great importance to outcomes. The studies reviewed show that staff knowledge has an impact on HA-UTI prevention. Improved knowledge on HA-UTIs and diagnosing HA-UTIs early resulted in HA-UTI prevention for patients (Freeman-Jobson et al., 2016).

Education in a multi-dimensional interactive educational program builds knowledge and in turn decreases the rate of HA-CAUTIs in patients (Ferguson, 2018). Use of pre-test and post-test to manage awareness of UTIs and increase education resulted in early awareness results in staff effectively recognizing HA-UTIs (Viner, 2020). Successful diminishing incidence of HA-UTIs with education has provided suggestions for expanding tailored education to other staff such as physical therapists (PT) and CNAs (Viner, 2020). Such efforts can further decrease the HA-UTI rates by using a multi-disciplinary team for early diagnosis of HA-UTIs (Viner, 2020). Online modules with implementation of catheter protocols have also been supported to significantly reduce HA-CAUTI rates (Zurmehly, 2018).

Including staff and nurses in the development of facility protocols allows staff to feel included in decisions (Quinn, 2015). This empowers the nurses to question if the catheter is used appropriately and allows for staff to work together with practitioners to manage care. A daily monitoring for the need of catheters uses and targeting education were factors resulting improved HA-UTIs outcomes (Quinn, 2015). Patients want to become more empowered with their care and nurses' support in improving their knowledge, skills and confidence is needed to reduce the risk of HA-CAUTIs and effective catheter management (Waskiewicz et al., 2019). These findings support that improving patients' knowledge about their condition enhances the ability to self-care (Waskiewicz et al., 2019). Quality improvement in HA-UTIs scores consists of recognizing the cost of implementation and maintenance. Recommendations for new policy changes to HA-UTIs prevention and cost has not been well documented and involves educators evaluating economics for curriculum continuation of change (Cohen, et al., 2016).

Impact of Problem

According to the CDC (2019) there are approximately one to three million serious infections that occur annually in LTCFs. HA-UTIs are the most common bacterial infections in older adults, accounting for more than 50% of all infections treated in LTCFs (Avelluto & Bryman, 2018). HA-UTIs account for 40% of HAI and 80% of those HA-UTIs are related to use of a catheter (Quinn, 2015).

HA-UTIs and HA-CAUTIs present a financial burden on the facility. The estimate in nursing homes are 1.6 to 3.8 million HAIs occur annually, which costs $38-$137 million for antimicrobial therapy and $673 million to $2 billion for hospitalizations in the US (Cohen, 2016). Impacts of HA-UTIs and HA-CAUTIs to patients include increased mortality and complication leading to hospitalization while the impacts to LTFCs including increased health

care costs (Ferguson, 2018). HA-UTIs and HA-CAUTIs are preventable, prevalent, and costly (Freeman-Jobson, 2016).

LTCFs have a regulatory problem that further impacts quality of care and reimbursement with CMS. Quality measures are driven by minimum data set (MDS) 3.0 which is a data-packed tool that drives care, reimbursement, and quality outcomes (Holhbein, 2015). MDS, along with patient expectations, and LTCFs Five-Star quality ratings have placed great importance on the MDS assessment (Holbein, 2015). As a result of this, LTCFs are being examined more closely and are implementing ways to improve quality of care, increase reimbursement and improve facilities reputation.

Prevention of HA-UTI and HA-CAUTI

Most HAIs can be prevented through proper infection prevention and control practice (Cohen, 2016); therefore, to identify, reduce and prevent HA-UTIs and HA-CAUTIs, it is important that nurses should have the ability and appropriate education to assess and identify the presence of HA-UTIs. Possessing education and knowledge can reduce or prevent the incidence of infections in LTCFs (Viner, 2020). Nursing staff should be assessing both new patients upon admission and existing residents, including those with indwelling catheters for HA-UTIs symptoms. Performing these assessments accurately will identify the presence of HA-UTIs and HA-CAUTIs infection, confirming which ones were present on admission or acquired in the facility (Quinn, 2015). Early recognition of HA-UTIs and HA-CAUTIs are essential in reducing and treating the infection before it leads to complications. Catheter insertion is performed by nurses utilizing a sterile technique but if this procedure is not performed correctly HA-CAUTIs can occur (McNeill, 2017). Therefore, use of a nursing

guideline for catheter insertion, competencies, education, and random audits of catheter insertion maybe helpful in promoting correct placement and technique (McNeill, 2017).

Preventive measures. Early intervention stabilizes the condition and establishes approaches to care to initiate best management (Viner, 2020). Furthermore, it is also important to invest in infection prevention activities to reduce morbidity and mortality, as well as reduce costs to LTCFs (Cohen, 2016). Most published guidelines are similar in preventive measures. There have been guidelines written for prevention, diagnosis and treatment of HA-UTIs (references here for guidelines). The most commonly used HA-CAUTIs guidelines are those developed by the CDC (CDC, 2019). The CDC guidelines consist of urinary catheter use (indications), proper techniques for urinary catheter insertion, proper technique for urinary catheter maintenance, quality improvement (QI) programs and strategies to enhance appropriate use of catheters, surveillance, and administration infrastructure (CDC, 2019). The CDC guidelines are in-depth and broad in that they cover the aforementioned multifaceted approach and factors that may hinder prevention of HA-CAUTIs.

Prevention barriers. One problem faced by the staff is the inability to identify HA-UTIs in patients due to communication barriers, memory impairment (dementia), comorbidities, or chronic genitourinary symptoms (Genao & Buhr, 2012). It is difficult to obtain an accurate history in the elderly when these communication barriers exist. The presence of other comorbidities, multiple medicines and the normal signs of aging often make it more difficult (Perry, 2011).

Current Management

A diagnosis of HA-UTI is reliant upon the growth of bacteria in a urine, yet in the absence of clinical symptoms, treatment may be unnecessary (Viner, 2020). There is no

recommendation to treat asymptomatic bacteria because treatment of asymptomatic bacteria is associated with antibiotic overuse and an increase antibiotic resistance (Viner, 2020). In this case, preventive measure such as good hygiene or increase fluid intake may serve as a good approach. Adults over 65 years of age often do not present with the typical symptoms of a HA-UTIs, such as fever, urinary burning, or urinary frequency. HA-UTIs among this population may present with nonspecific symptoms, such as decreased appetite, poor oral intake, decreased physical activity, and/or increased agitation (Jump et al., 2012). Nonspecific symptoms, such as mental status changes and behavioral changes, are often attributable to HA-UTIs in this population. This presents a unique challenge when diagnosing HA-UTIs in patients age 65 years and older, which is considered the most common bacterial infection (Avelluto & Bryman, 2018). Often times, patients without symptoms go unchecked until they become symptomatic. Despite these aforementioned guidelines, implementation of protocols in the LTFCs have been slow, and consistent adherence to the guidelines has not occurred (McNeill, 2017).

Current Recommendations

Often times, HA-UTI is not diagnosed because of its asymptomatic nature in some adult populations, which can delay identification, diagnosis, and treatment, resulting in unnecessary hospitalization and mortality (Viner, 2020). Thus, early recognition, preventative measures and initiation of appropriate treatment is paramount. Implementation of an educational program for nursing staff on early recognition and treatment of HA-UTI can promote quality of care and reduce hospital readmission (Viner, 2020). The prevention, diagnosis and management of HA-UTIs should be based on local and national guidelines, as well as current best practices (Armstrong, 2015). Recommendations for prevention of HA-UTI

and HA-CAUTI consists of continuously educating nurses to update their knowledge of HA-UTI and HA-CAUTI problems, in-service training programs for catheter care, and reviewal of guidelines for infection control of catheters (Shehab, 2017).

HA-UTI and HA-CAUTI is an infection that affects patients directly but can also indirectly affect everyone involved in patient care. Therefore, it is important for the facility and health care staff to provide quality care. This can be accomplished by educating nursing staff on HA-UTI and HA-CAUTI prevention protocol that includes; early identification, prevention measures, and management of this condition based on best practices.

Significance to the Nursing Profession

Prevention of HA-UTI and HA-CAUTI is significant to the nursing profession because it promotes quality care and reduces infection prevalence and associated mortality rate. Quality care is provided by nurses and staff who can directly control urinary infections (Zurmehly, 2018). It also decreases hospital admissions and facility cost of treating HA-UTI. Nurses can deliver quality care to facilities (Zurmehly, 2018) and have the opportunity to reduce the number of HA-UTIs and HA-CAUTIs in long term care settings.

Theoretical Framework

The Donabedian model explores how care is delivered and how it impacts both patients and society (Moran et. al, 2014). The framework consists of three main components; structure, process, and outcomes (see Appendix A). Donabedian (1966) introduced these concepts in his seminal work on evaluating the quality of medical care. Structures of health care are physical and organizational characteristics of care settings, such as facilities, equipment, and personnel (Shojania et. al, 2007). The processes of patient care depend on the structures to deliver resources and mechanisms for contributors to implement patient care activities (Shojania et. al,

2007). These processes are performed in order to improve patient health outcomes by promoting recovery, restoration, and patient satisfaction (Shojania et. al, 2007). The Donabedian model is chosen to guide this scholarly project through implementation.

Historical Development

Avedis Donabedian was a physician who developed the Donabedian Model in 1966 to assess how the quality of care was delivered; this model can be applied to a variety of situations and settings (Shojania et. al, 2007). Donabedian was both an educator and scholar. He taught at the University of Michigan and won many awards, including the Baxter American Foundation Health Services research prize in 1986 (Best & Neuhauser, 2004). Donabedian was interested in studying the American healthcare system and write 11 books and hundreds of articles about healthcare and the healthcare system (Best & Neuhauser, 2004). In the 1980s, Donabedian noticed that quality of medical care generally reflects the values and goals of the medical system, as well as those of the larger society. His model for classified the different ways that one might measure the quality of care in a given setting. He began by differentiating three aspects of care, known as structure-process-outcome (Donabedian, 1988). Donabedian started his work and framework on quality improvement. One of his books, *Explorations in Quality Assessment and Monitoring*, contributed immensely to healthcare quality (Donabedian, 1980). Donabedian wrote that healthcare quality consisted of seven pillars: efficacy, optimality, efficiency, acceptability, legitimacy, equity, and cost. The concepts of structures, processes, and outcomes are related. Donabedian recognized that effective structures lead to effective processes, while effective processes lead to effective patient outcomes. The Donabedian model is relevant to the nursing profession because the model focuses on quality improvement through the use of structure-process-outcome approach. Quality is a key

component in nursing practice and a critical element for access of health care services and patient outcome.

Applicability of Theory to Current Practice

The Donabedian theory was developed in order to improve quality outcomes. This theoretical model has been significant in the healthcare quality movement (Berwick & Fox, 2016). Donabedian believed that change cannot occur without identifying the structure of the problem and understanding the process for the desired outcome. This makes the Donabedian model applicable to many practices because his first method ("structure") takes into consideration the system it stems from.

Kajonius and Kazemi (2016) utilized Donabedian`s model to determine structure and process quality as predictors of satisfaction with elderly care. The study tested the Donabedian model's structure-process-outcome by analyzing data from a Swedish nationwide survey on elderly care that included all municipals in Sweden. Data were retrieved from the Swedish annual national elderly survey (National Board of Health and Welfare, 2012). The survey was administered by Statistics Sweden (SCB) on behalf of the National Board of Health and Welfare (in collaboration with the Swedish Association of Local Authorities and Regions) and was sent by mail to people who were 65 years and older that were using elderly care services in 324 Swedish municipals. The survey included 35 indicators covering a wide range of quality issues pertaining to elderly care services. Statistics Sweden added the structural data (e.g., budget per elderly, budget per capita) to the questionnaire data and compiled the information into publicly available data files. The data, analyzed at the municipality level, showed that process-related factors were more strongly associated with older persons' satisfaction in both

home and nursing home care. The study concluded that Donabedian framework is useful for predicting client satisfaction in elderly.

Kuribayashi el al. (2011) utilized Donabedian`s structure-process-outcome model to determine patient perception of nursing service quality. The purpose was to categorize and confirm patients' specific experiences with regard to nursing for improving the quality of nursing care. They initially created an item pool based on patient experience with nursing service and quality, and compiled items from an existing scale related to patient perceptions of hospitalization, patient satisfaction, and assigned to structure, process or outcomes through discussion among expert nurses and pilot data collection. They classified surroundings as structure (e.g., accessibility to nurses), patient–practitioner interaction, patient participation as a process (e.g., knowledge and clinical skill, patient decision-making), and changes in patients, satisfaction as an outcome (e.g., information support, overall satisfaction). The reliability and validity of the conceptual model and questionnaire was confirmed for use among patients across multiple wards. Findings suggest that patient experiences with regard to nursing service may represent quality under a structure-process-outcome approach, by which practitioners, managers and policy makers can more easily identify a series of causes and effects of nursing practice to effect quality improvement.

Major Tenets

Donabedian's model has three components: 1) structure 2) process and 3) outcomes. Donabedian's model was used to provide a comprehensive structure to move from contributions through the process of care delivery, and conclude with the outcomes (McKay & Wieck, 2014).

Structure

Structure elements tend to be relatively permanent in nature and are often thought of as key determinants to quality (McKay & Wieck, 2014). Structure includes facilities, environment, equipment, staffing, and finances (Hursh et al., 2013). LTCFs need a building to provide patients care, a work environment that ensures adequate resources for healthcare staff to practice, proper equipment staffing, and finances to enable LTCFs to function. Proper staff education training is also considered structure and is needed to introduce the tools necessary to prevent HA-UTI and to manage CAUTI in the LTCFs.

Process

Process involves the interactions between healthcare providers and the patients in order to deliver care (Hursh et al., 2013). The process component of the framework is more flexible and readily changeable and encompasses the things healthcare staff do or fail to do, which shapes patient outcomes (McKay & Wieck, 2014).

Outcome

Outcome is the changes attributed to the patient healthcare intervention, whether positive or negative, and are concrete and precisely measured **(**Hursh et al., 2013**).** The effectiveness in decision-making skills is dependent on the nurse's ability to critically think in order to make a decision resulting in the best patient outcome (Huddleston, 2014).

Theory Application to DNP Project Structure

The structural component of Donabedian's theoretical framework refers to healthcare staff involved and organization. Structure is part of the work environment and has an effect on staff satisfaction, nurse retention, and patient care. If staff have access to information, resources, and support, they will have a stronger sense of meaning (Huddleston, 2014).

Structure suggests all aspects affecting the conditions of providing care, such as budget resources, staff training, reward systems, payment methods, facilities and equipment (Kajonius, & Kazemi, 2016). Donabedian (1988) defined structure as the attributes in which care occurs. Staff needs organizational involvement, support and resources in order to care for patients with HA-UTI and CAUTI, or to prevent HA-UTI and CAUTI.

Process

Process refers to cooperation between all staff members involved in improving patient care. This process requires collaboration of healthcare staff to communicate effectively to provide a multidisciplinary care delivery. For example, a CNA might witness a urine odor and notify the nurse, or witness a patient that reports a burning sensation with urine. A nurse can notice changes in mental status in an elderly patient that is different from the baseline. This information will lead to the process of diagnosis and treatment of HA-UTI. A nurse who is determined to prevent HA-UTI and HA-CAUTI should understand preventive measures and adequate care through proper education. The caring process is identified as the care provided to the hospitalized patient and the nursing skill required to provide the patient with quality care. The care of the hospitalized patient is defined as the processes required by healthcare staff to adequately care for the patient (Donabedian, 2005). The nursing skills required for caring process include effective communication, effective decision-making, effective collaboration, and clinical skills.

Outcome

Patient outcome with regards to the healthcare system is connected to changes in health status and satisfaction. A patient with HA-UTI and HA-CAUTI who is treated with an

effective antibiotic will be more satisfied compared to a patient whose antibiotic is ineffective. Outcomes validate the effectiveness of quality patient care (Donabedian, 1988).

The goal for this project is to reduce and prevent HA-UTI and HA-CAUTI in LTCFs. Donabedian's framework is applicable to this DNP project because changes in structures and processes of care are required to optimize patient outcomes (McKay & Wieck, 2014). Nurses will play an important role by adequately implementing measures that will prevent or reduce HA-UTI and HA-CAUTI in the LTFC`s through a nurse-led protocol and evidence-based practice. Donabedian`s model provides nurses with an opportunity to collaborate with patients to attain optimum health and quality care. Nurses are tasked with providing quality patient care by recognizing early symptoms that may lead to complications if not treated in time. The success of the DNP project depends on a positive outcome.

Setting

The project will take place in a LTCF in East Las Vegas, Nevada. The facility is one of seven that belongs to a corporation that is headquartered in California; this is the only facility operated in Nevada. The project site consists of full continuum of care, from short term care to long-term skilled nursing, as well as hospice services (C. Lee, personal communication, August 15, 2020). The facility has a total of 100 beds, and serves patients requiring skilled nursing care and rehabilitation. The patients ages range from 40 – 95 years old. The length of stay for long-term patients can range from one day to the rest of their lives depending on their medical condition and their insurance (C. Lee, personal communication, August 15, 2020). The facility employs a medical director; however, the patients are seen by independent practitioners who are contracted and not directly hired by the facility. These independent practitioners have been credentialled and receive privileges to see patients at the facility. The project site has

incorporated electronic health records (EHR) through Point Click software. The EHR software includes the patient chart, which contains medications, demographics, allergies, medical diagnoses, practitioner orders, progress notes, history, physical assessment, medication administration record (MAR), laboratory results, radiology report, input, output, fall report, vital signs, weight, message center, and identification and password for every staff member who has authority to view the medical record.

The facility contracts with a laboratory and nurses are responsible for entering the orders into the laboratory system. The laboratory service operates daily, except on Tuesdays. The laboratory services include drawing blood, picking up specimen samples (urinalysis, wound culture, stool), sending lab results via fax or uploading it to the system, and calling the nurses for any critical lab value. The facility contracts with a pharmacy whose responsibilities include titrating compound medications, checking for medication contraindications, dosage, dispensing and delivery of medication two to five times daily, and destroying unused medication. The pharmacy consultant comes to the facility once a month to audit charts, collect the unused medications, and check to ensure that medications are dispensed, administered, and stored in compliance with the state pharmacy regulations. The pharmacy consultant sends medication dose adjustment recommendations, lab recommendations based on the medication, and medication insurance coverage or whether it is uncovered to the facility.

Population of Interest

The direct population of interest will include three registered nurse (RNs), five licensed practical nurses (LPNs), 10 certified nursing assistants (CNAs) and two skilled RN admission nurses. The two skilled RNs specifically chosen to participate in this project have the position of admission nurses. The indirect population of interest will include the contract practitioners

and the patients who reside in the LTCF unit of the project site. The project lead will collaborate with contract practitioner and nursing staff in order to implement the protocol. The project lead has chosen these participants because they provide direct patient care, and they are in a position to report, identify, and prevent HA-UTIs within the LTCF. The nursing educator and the infectious disease nurse will also be included to participate due to their vital position in tracking and providing data and materials that will help the population of interest in seeking guidance after the protocol has been implemented. This project will exclude direct patient care staff and patients in the skilled unit, kitchen and janitorial staff, therapists, office staff, and social service staff.

Stakeholders

It is important for the project lead to find key stakeholders to elicit their support for a possible intervention (Bemker & Schreiner, 2016). The key stakeholders at this project site include the facility administrator, corporate administration, Director of Nursing (DON), participating nursing staff, and the participating CNAs. Other stakeholders consist of the nursing educator, infection disease nurse, nurse managers, and case managers. Permission to complete the project has been granted and affiliation agreement is not necessary per the DON (see Appendix B). The key stakeholders, nurses and CNA's will implement the protocol intervention. Stakeholders have reviewed and agreed to the project implementation at this facility. The indirect stakeholders are the patients, families, and contract practitioners.

Intervention and Timeline

The project will utilize quality improvement (QI) approach to implement HA-UTI and CAUTI reduction and prevention strategies, which will improve LTCF staff knowledge and

patient outcomes. An essential part of the QI approach involves encouraging staff to change their practice by highlighting potential patient benefits (Mavin & Mills, 2015). Implementing care plans is efficient when the team works toward a common goal. HA-UTI and HA-CAUTI are considered to be preventable and there are many guidelines that details similar HA-HA, and HA-CAUTI prevention strategies (Mavin & Mills, 2015).

The timeline for project implementation is five weeks and will start at the beginning of November 2020. The project timeline will include implementation of the project intervention and data collection.

Week 1

During the first week, the project lead will send out a reminder to the staff of the dates, times, and location of the educational sessions. Project lead will perform patient chart review to determine how many HA-UTI and HA-CAUTI were diagnosed in the pre-implementation timeframe of four weeks. Prequestionnaires (see Appendix C) will be given to the staff to determine their knowledge before educational training is conducted. The prequestionnaire will consist of 10 questions derived from CDC guidelines in the educational training. The purpose of the prequestionnaire is to test the staff knowledge about HA-UTI and HA-CAUTI before the educational training. The educational training will be presented in PowerPoint form and handout (See Appendix E).

Week 2

During this period, a postquestionnaire (see Appendix F) will be administered after the educational training to determine the effect of the training when compared to the prequestionnaire. Project lead will initiate evidence-based nurse-led protocol to reduce, and

prevent HA-UTI and HA-CAUTI. The project lead will monitor interaction with nursing staff to determine if the training provided is being practiced.

Week 3 - 4

The project lead will continue to monitor implementation progress and support staff by rounding and answering questions or concerns related to the protocol. Data collection will be in progress throughout the implementation of this project.

Week 5

The final week of implementation will complete the data collection process and permit the evaluation of project efficacy after the protocol has been implemented. The data will be analyzed and interpreted. Plans for dissemination will be arranged with the project site.

Tools

The project lead will utilize the following tools: a nurse-led protocol for HA-UTI and HA-CAUTI (see Appendix G, and H), a prevention graphic for the CNAs (see Appendix I), a chart audit tool for HA-CAUTI and HA-UTI (see Appendix J and K), and pre- and postquestionnaire. The protocol includes criteria for defining HA-UTI and HA-CAUTI. Symptomatic UTI (SUTI) is use for residents without an indwelling urinary device and Catheter-Associated Symptomatic UTI (CA-SUTI) is for residents with an indwelling urinary device (CDC, 2015). Also, educational material will be utilized in promoting HA-UTIs and HA-CAUTIs prevention (see Appendix E).

Nurse-Led Protocols

There is evidence that supports the prevention and reduction of HA-UTI and HA-CAUTI by using best practice guidelines through a nurse-led protocol (Zurmehly, 2018).

Nursing plays a key role to reducing inappropriate use of urinary catheters, which has been proven to be effective in reducing and preventing HA-CAUTIs (CDC, 2020). This nurse-led protocol will utilize CDC prevention guidelines for HA-UTI and HA-CAUTI events for LTCFs (2020) and the protocol will apply to every patient who resides in the long-term unit. The protocol provides a criterion that nursing staff will be mandated to follow in order to prevent HA-UTI and HA-CAUTI. There are three components to the nurse-led protocol. The first component is used for the non-catheterized patient, the second is for patient with an indwelling catheter, and the third component is mandated bedside prevention for the CNAs. The protocol displays steps that need to be followed if the patient meets the criteria for HA-UTI and HA-CAUTI.

Chart Audit Tools

The chart audit tool will be used to audit LTCF patient charts four weeks prior to implementation and during implementation to determine the facility's history of HA-UTI and HA-CAUTI. HA-UTI and HA-CAUTI history will be obtained from the infectious disease nurse. Chart audit is designed to improve patient care by identifying gaps in care through systematic collection and analysis of data and aims assess quality improvement, while improving patient care by reviewing outcomes compared to facility standard (Thompson et al., 2018). The chart audit will be used to check patients with HA-UTI and HA-CAUTI and if both the nurses and CNAs are compliant with the protocol (see Appendix J and K).

Educational Presentation

The educational training will be conducted in the conference room. The training will start by explaining the introduction, and background of HA-UTI and HA-CAUTI as one of the most common sites of HAI, accounting for up to 20% of infections reported by LTCFs (CDC,

2020). The training will include the problems and risk factors associated with HA-UTI and HA-CAUTI such as age-related changes, urinary retention, obstruction, catheter use, dehydration, comorbid conditions, manage bladder voiding, and longtime catheter use. Lastly, project lead will utilize guidelines for prevention. The training will be conducted in the morning on two separate days in order to accommodate day shift and night shift participants and their schedules. Training will be conducted using PowerPoint presentation, and handouts and will last approximately one hour to one hour and thirty minutes (See Appendix E).

Prequestionnaire and Postquestionnaire

The prequestionnaire and postquestionnaire are the same questionnaire and will be administered to test participant knowledge before and after the educational training (see Appendix H and I). The questionnaire consists of 10 questions that require the participant to choose a number from one to five base on the participant confidence to the question. The responses range from strongly disagree to-neutral to strongly agree. The questionnaire was generated from the CDC guideline for HA-UTI and HA-CAUTI educational training, and should take approximately 10 to 15 minutes and will be completed by each participant.

Data Collection

The project lead will conduct pre-implementation, retroactive chart review of all patients in long-term unit to determine those who are at risk or meet the criteria for HA-UTI and HA-CAUTI. The chart audit will be used to determine the rate of HA-UTI and HA-CAUTI in the facility. Data will be collected before and after the implementation and will be evaluated by the key stakeholders and the project led to determine if the HA-UTI and HA-CAUTI rates have met the DNP project objective. Both CNAs and nursing prevention data will be collected from the designated area in the EHR and CNA ADL sheet. The International Statistical

Classification of Diseases and Related Health Problems (ICD-10) codes relate to urinary tract infections such as HA-UTI, pyuria, urethritis, diabetes, kidney stones, and cystitis and will be used to further identify at risk patients. The pre- post-questionnaire will be use to evaluate participant knowledge before and after completing the educational training so as to determine if the training was successful.

Ethics/Human Subjects Protection

The project will be conducted at a LTCF and will not involve direct patient care or the use of human subjects; therefore, an Institutional Review Board (IRB) submission will not be required. Although participants have willingly committed, and will volunteer to participate in project implementation, participation is not mandated and will not be a consideration as part of employment. Participants understand there is no financial gain associated with participating in this educational training and implementation. No monetary compensation will be provided to staff participants. However, participants will be served snacks and drinks during the educational training session. All information collected, including patient charts and staff participants' information, will be kept confidential and prequestionnaire and postquestionnaire will not contain participant identifiers.; Participant responses will be tracked with an assigned identification number that correlates with the prequestionnaire and postquestionnaire. Data will be store in a locked drawer in an office where only the project lead will have access. Staff who participate in the training will benefit by learning ways to help prevent or reduce HA-UTI and HA-CAUTI and how to promote patient safety. There is no risk associated with participating.

Measures/Plan for Analysis

The data analysis will be conducted using SSPS program. The data analysis will compare the prequestionnaire and postquestionnaire with the use of a paired-sample t-test, and

a McNemars test will be used for pre-implementation and post-implementation chart audit comparison. Paired samples are used to test the same population at two points in time (Pallant, 2016). Statistical analysis will be used to determine whether the responses in the prequestionnaire and postquestionnaire a resulted in an increase in participants' understanding of HA-UTI and HA-CAUTI prevention.

Analysis of Results

This project was focused on reducing HA-UTIs and HA-CAUTIs. The project utilized a quality improvement (QI) approach to implement HA-CAUTI and HA-UTI reduction as well as prevention strategies to increase staff knowledge to improve patient outcomes. The project was initiated by an educational training session that staff attended and the training included pre- and post-education questionnaires. Weekly meetings were held with stakeholders to discuss the implementation process and timeline. Thirty chart audits were performed pre-implementation and post-implementation to determine the effectiveness of the nurse-led protocol. The total number of participants in the project included eighteen staff: three registered nurses (RNs), five licensed practical nurses (LPNs), and 10 certified nursing assistants (CNAs).

A statistical data analysis was performed using Statistical Package for the Social Sciences (SPSS) to evaluate participants' responses to the pre-questionnaire and post-questionnaire data and the pre-implementation and post-implementation chart audit. An ANOVA test will be used to check for assumptions and violations.

A pre-questionnaire was administered before educational training and a post-questionnaire was administered post-educational training. The pre-questionnaires and post-questionnaires consisted of ten questions with five response options (1= not knowledgeable, 2=

disagree, 3= neutral, 4= knowledge, 5 = very knowledgeable). A codebook was created using Excel to record each participant's response scores. The codebook data was imported into SPSS and a paired sample t-test was used to evaluate if the "Reducing HA-UTI and HA-CAUTI Educational Training" had a significant impact on the staff's knowledge.

A paired-sample t-test was conducted to evaluate the impact of educational intervention on reducing HA-UTI and HA-CAUTI. Participant scores were compared before and after the training. There was statistical significance observed in the scores from the mean pre-questionnaire T1 (mean =38.89, SD=4.90) compared to mean post-questionnaire T2 (mean = 46.06, SD=4.99). The t-test results showed significance $t(17) = -6.86$, $p < 0.001$. P-values less than 0.05 were deemed significant. The mean increase in the educational training scores was -6.61 with a 95% confidence interval ranging from -8.65 to -4.58. This shows that the educational training was effective in increasing post-questionnaire scores (Table 1).

Table 1. Paired t-test result for pre- and post-educational training.

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	pre	38.89	18	4.90	1.15
	post	45.50	18	3.90	0.92

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	pre & post	18	0.59	0.010

Paired Differences	t	df

				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			Sig. (2-tailed)
Pair 1 pre - post	-6.61	4.09	0.96	-8.65	-4.58	-6.86	17	0.000

An ANOVA test was used to check for assumptions and violations of the paired sample test. Participants were divided into three groups according to their job title (Group 1: CNAs; Group 2: LPNs; Group 3: RNs). The test shows a p value of <0.135 which is greater than 0.01, showing non-significance, so equal variances are assumed, and not violated (Table 2). See table 2.

Table 2. ANOVAs to check for assumption and violation for pre- and post- educational training.

ANOVA

TS

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	95.411	2	47.706	2.291	0.135
Within Groups	312.367	15	20.824		
Total	407.778	17			

A total of thirty charts were audited pre- and post-implementation to determine the effectiveness of the nurse-led protocol in reducing HA-UTIs and HA-CAUTIs. Before implementation of the nurse-led protocol, the HA-UTI infection rate was eight patients and the HA-CAUTI rate was zero. The post-implementation chart audit showed one HA-UTI and zero HA-CAUTI. The chart audit showed that four weeks prior to implementation, 26.7% of patients were diagnosed with HA-UTI compared to 3.3% post-implementation. Due to small sample size, a McNemars test was used to measure pre- and post-implementation with the first recorded at Time 1 (pre-implementation) and the second recorded at Time 2 (post-implementation). Both of these variables are categorical with only two response options (0 = absent; 1 = present) for HA-UTI and HA-CAUTI. The null hypothesis was rejected due to the difference before and after the chart audits. The p-value was 0.016 and shows a statistical significance in the proportion of HA-UTI diagnosis following the nurse-led protocol implementation when compared to pre-implementation (See Table 3).

Table 3. McNemar`s test result for pre- and post-implementation chart audits

Related-Samples McNemar Change Test Summary

Total N	30
Test Statistic	5.143[a]
Degree of Freedom	1
Asymptotic Sig. (2-sided test)	0.023
Exact Sig. (2-sided test)	0.016

a. The exact p-value is computed based on the binomial distribution because there are 25 or fewer records.

An ANOVA test was used to check for assumption and violation for the McNemar`s test. Charts audited were divided into three age groups (Group 1: 45-55; Group 2: 56-65; Group 3: 66+). The test showed a p <0.121 which is greater than 0.01, indicating non-significance, so equal variances were assumed and not violated (Table 4).

Table 4. ANOVA test result to check for assumption and violation for pre- and post-implementation chart audits

ANOVA

TT

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.649	1	0.649	3.484	0.072
Within Groups	5.217	28	0.186		
Total	5.867	29			

Discussion

The project question was to determine if the incidence of HA-UTIs and HA-CAUTIs would decrease in a LTCF with the initiation of a nurse-led prevention protocol compared to no prevention protocol. Before the nurse-led protocol was implemented, eight patients were

diagnosed with HA-UTI and no patients with HA-CAUTI. After implementing a nurse-led protocol, one patient was diagnosed with HA-UTI and the HA-CAUTI remained at zero. This showed that 26.7% of patients were diagnosed with HA-UTIs pre-implementation compared to 3.3% post-implementation. The difference in the number of patients diagnosed with HA-UTIs clearly showed a decrease in HA-UTIs after the nurse-led prevention protocol was initiated. The nurse-led protocol effectively decreased the incidence of HA-UTIs in LTCF within the four-week time frame of the DNP project.

The objectives of this DNP project were to develop a nurse-led protocol, improve nursing knowledge and skills protocol through education training and reduce HA-UTIs and HA-UTIs in the LTCF.

Developing a nurse-led protocol was the first objective goal in reducing HA-UTIs and HA-CAUTIs in the LTCF. The project objective was met by developing a nurse-led protocol as a guideline for the staff to use in identifying patients who were at risk for HA-UTIs and HA-CAUTIs in order to prevent infection development.

In order to improve nursing knowledge and skills with regards to HA-UTIs and HA-CAUTIs, an educational training was conducted. Before conducting educational training, staff were given a pre-questionnaire to determine their knowledge and skills. The pre-questionnaire mean was 38.89% compared to post-questionnaire mean 46.06%, showing a knowledge increase of 7.17%. A 7.17% post-questionnaire increase implied that the educational training was effective in improving nursing knowledge, and skills.

The impact of the “Reducing HA-UTIs and HA-CAUTIs in LTCF” project was significant in the facility as evidenced by the increase in post-educational training knowledge related to reducing HA-UTI and HA-CAUTI, and chart audits which showed a decrease in HA-

UTIs from 26.7% to 3.3% post-implementation. The project's results were compared with other literature review studies designed to reduce HA-UTIs and HA-CAUTIs. The studies used a pre- and post-test design to determine the effectiveness of educational intervention among the nursing staff.

Viner (2020) conducted a study to understand the effect of UTI educational intervention in LTCF nursing staff. Two LTCFs were used in the study with a total of 21 participants, including 18 RNs and 3 LPNs, with an average work experience of six years. A paired sample t-test was used to evaluate data and found no statistically significant UTI knowledge difference from pre- to post-intervention, possibly because the project participants were experienced nurses. However, the study emphasizes the importance of an educational training, improve awareness in early recognition of UTIs, and decrease the necessity hospitalization and mortality from UTI.

A second study by Hernandez et al. (2019) used a quantitative research study to investigate the impact of a CAUTI education packages on nurses' knowledge and indwelling catheter management practice. The participants in the study were educated on how to use the checklist pre-intervention. The post-intervention evaluation show CAUTI education package had a significant impact.

A third study by Sublett (2016) examined the effect of an education intervention on UTI knowledge among healthcare staff. There were 27 participants in the study. A pre- and post-intervention survey demonstrated an increase in learning by those who participated in the educational training. The paired sample t-test showed statistical significance in prevention of a non-CAUTI in the same group of participants. UTIs are the most common infectious problem

among older adults in LTCF, which suggests the need for training to prevent and manage HA-UTIs and HA-CAUTIs (Means, 2016).

The findings in this DNP project were similar to those of Viner (2020), Hernandez et al. (2019) and Sublett (2016). These authors reviewed and examined the effect of education intervention in preventing UTIs and CAUTIs. Overall, the studies concluded there were significance benefit from educational intervention training in reducing and preventing HA-UTIs and HA-CAUTIs in facilitates.

Significance

The significance of this project's results centered on implementing a nurse-led protocol to reduce HA-UTIs and HA-CAUTIs in the LTCF by providing nursing staff with the skills and knowledge needed to promote patient safety, reduce facility financial burden related to HA-UTIs and HA-CAUTIs, and provide quality care. CCMS apply reimbursement penalties to LTCFs for HAIs such as HA-UTIs and HA-CAUTIs (CMS, 2020). The penalty shows the seriousness and importance for facilities to engage in preventing HA-UTIs and HA-CAUTIs in order to avoid losing reimbursement as a result of HAIs.

This DNP project implemented an evidence-based guideline through the nurse-led protocol. A nurse-led protocol can be helpful in policy development as it relates to nursing scope of practice. DNP Essential V discussed the importance of health care policy that creates a framework through institutional decision making or organizational standards that can facilitate the ability to engage in practice to address health care needs (AACN, 2006). The implementation of a nurse-led protocol provides a relevant information to develop a policy within the facilities to improve care delivery consistent with evidence-based guidelines advocated by organizations such as CDC and ANA. Nurses are in a position to identify signs

that could pose harm to their patients and are valuable asset in keeping patient safe. Therefore, investing in infection prevention activities such as HA-UTI and HA-CAUTI nurse-led protocol is important towards reducing morbidity, mortality and cost to LTCFs (Cohen, 2016). This nurse-led protocol can be used to facility compliance with CDC and state guidelines, encourage collaboration between the nurse and the practitioners, and promote patient safety.

Limitations

This project started while the world was facing a health-related pandemic known as COVID-19. This pandemic affected data collection because of the low patient census and, as a direct result, decreased medical staffing. CDC guideline indicate people with COVID-19 have had a wide range of symptoms ranging from mild symptoms to severe illness (CDC, 2021). Patients who tested positive for COVID-19 were either placed on isolation, or sent to the hospital to recover. Staff who contracted the virus, took time off from work to recover, some took off to care for someone with COVID-19.

Project Design

The project site did not have HA-UTIs and HA-CAUTIs protocol prior to this project. Because of this, the project was designed to address LTCF patients with HA-UTIs and HA-CAUTIs. Between January to June 2020, there were thirteen HA-UTIs cases and three HA-CAUTIs cases, which amounts to 14% of HA-UTIs in the facility in a six-month period. During the pre-and post-implementation, patients' chart was reviewed and there were no patients diagnosed with HA-CAUTIs. The purpose of the project was to reduce HA-UTIs and HA-CAUTIs, unfortunately since there were no HA-CAUTI case, it is considered a limitation in the project was unable to measure the CAUTIs part of the protocol. The timeframe of four weeks to implement the project was not enough time to study the project's effectiveness

compared to a study that was done over a longer timeframe. The project implementation occurred in only one location because the project lead did not include other sites at the time.

Recruitment

Data recruitment was limited due to the pandemic. At the beginning of the project, over 30 staff declared interest in participating in the nurse-led protocol. Some staff who showed interest initially were unable to sign up for the project because of CDC COVID-19 guideline and they do not want to be gather in a room per staff statement. According to CDC, COVID-19 symptoms may appear 2-14 days after exposure to the virus, and even if one does not feel sick, one can spread COVID-19 to others (CDC, 2021). In addition, some of staff could not participate during the project because they had to work less hour. The facility focused on taking precautions such as limiting activities, limiting movements by requiring patient to stay in their room, and isolating patient with fever, cough, to avoid COVID-19 infection. There were staff shortages because of the safety precautions in place such as staying home if a staff come in contact with someone with positive case, or if a staff have symptoms.

Data Collection

Data were collected through EHR using chart audit. Some of the checklists were not completely filled out by the staff, making it difficult to determine if patients' symptoms were ignored or not recognized. Some of the checklist omitted acute pain, change in mental status, new case of incontinent, urgency, or if criteria were met or not. The sample size (30) was not enough to test the confidence interval in a large-scale sample.

Dissemination

The project findings will be shared with the practice site and disseminated to three other skilled facilities owned by the company. The population of interest was focused on

medical staff in LTCFs. A PowerPoint slide presentation will be conducted during the quarterly company meetings. The project will be shared with the company that were hired by the facility to provides annual continuing education (CE) for their staff. By sharing the project protocol, the hired company may choose to share or incorporate the project to their CE services which will be shared to other facilities that source for their service. As an APRN working in other post-acute facilities, the project's results will be introduced to twelve facilities with SNFs and LTCFs in the Clark County area to help reduce HA-UTIs and HA-CAUTIs. The project's results will be shared with providers who specialized in post-acute care and care for the geriatric population. The nurse practitioner can use this project to support HA-UTIs and HA-CAUTIs program in the facilities they see patients, educate nursing staff, and encourage nursing staffs to participate in UTIs, and CAUTIs prevention. The project's results will also be shared with twenty-three facilities within the NP group during staff meeting with the hope that those facilities will implement the project. The project will be submitted and disseminated through the Doctor of Nursing Practice repository as a resource for DNP students seeking to write a UTIs or CAUTIs prevention project.

Project Sustainability

A new approach often presents challenges and takes time. Therefore, implementing a nurse-led protocol to prevent HA-UTIs and HA-CAUTIs in LCTFs will require continuous reinforcement until staff are familiar with the process. The staff members will utilize the project to prevent HA-UTIs and HA-CAUTIs on LTCF patients and new patient admissions. This project will be incorporated in new hire training for registered nurses (RNs), license vocation nurses (LPNs) and certified nursing assists (CNAs), and the annual facility training. Preventing infection and maintaining patient safety is a core policy in the LFTCs. There is a

need to implement regular in-service nursing education regarding evidence-based practice guidelines for HA-UTI and HA-CAUTI prevention and accurate documentation using the nurse-led protocol checklist (Hernandez et al., 2019). The infection disease nurse should randomly audit protocol checklists to ensure staff members are compliant with the protocol. HA-UTIs and HA-CAUTIs can be prevented if evidence-based practice guidelines and nurse-led protocols are followed.

Conclusion

Long-term care facilities provide care to patient populations who are unable to manage their care in the community independently. These individuals are considered vulnerable with weakened immune systems. The impact of HA-UTIs and HA-CAUTIs on patients and the LTCFs includes increase mortality and higher healthcare costs. Fortunately, most HA-UTIs and HA-CAUTIs can be prevented if evidence-based practice guidelines are followed. The project was implemented at one LTCF with a vulnerable population at risk for HA-UTIs and HA-CAUTIs. The project focused on reducing and preventing HA-UTIs and HA-CAUTIs by educating the nursing staff on evidence-based practices. Project findings demonstrated a statistically significant increase in staff knowledge of HA-UTIs and HA-CAUTIs and a decrease in HA-UTI rates in LTFC. Consistent quality care requires a collaborative approach in providing evidence-based practice to patients, and continuous improvement is needed to sustain quality patient outcomes and reduce LTFC costs. A nurse-led protocol can help policy development as it relates to expanding the nursing scope of practice.

References

American Association of Colleges of Nursing (AACN). (2006) Essentials of doctoral education for advanced nursing practice. Retrieved from https://www.aacnnursing.org/Education-Resources/AACN-Essentials

Anguinine, T. H., Contrin, L. M., Beccaria, L. M., Frutuoso, I. S., da Silveira Rodrigues, A. M., & Wernek, A. L. (2018). Adherence to the protocol for the prevention of urinary tract infection. *Journal of Nursing UFPE / Revista de Enfermagem UFPE*, *12*(10), 2675–2682. https://doi.org/10.5205/1981-8963-v12i10a234874p2675-2682-2018

Armstrong, K. (2015). Diagnosing and treating urinary tract infections in older people. *British Journal of Community Nursing*, *20*(5), 226–230. https://doi.org/10.12968/bjcn.2015.20.5.226

Atkins, L., Sallis, A., Chadborn, T., Shaw, K., Schneider, A., Hopkins, S., Bunten, A., Michie, S., & Lorencatto, F. (2020). Reducing catheter-associated urinary tract infections: a systematic review of barriers and facilitators and strategic behavioural analysis of interventions. *Implementation Science*, *15*(1), 1–22. https://doi.org/10.1186/s13012-020-01001-2

Avelluto, G. D. & Bryman, P. N. (2018). Asymptomatic bacteriuria vs. symptomatic urinary tract infection: Identification and treatment challenges in geriatric care. *Urologic Nursing*, *38*(3), 129–143. https://doi.org/10.7257/1053-816X.2018.38.3.129

Bemker, M. & Schreiner, B. (2016). The DNP degree & capstone project: A practical guide. Destech Publications. Lancaster, Pennsylvania.

Berwick, D. & Fox, D. (2016). Evaluating the quality of medical care: Donabedian's classic article 50 years later. *Milbank Quarterly, 94*(2), 237-241. https://doi.org/10.1111/1468-0009.12189

Best, M. & Neuhauser, D. (2014). Avedis Donabedian: Father of quality and poet. Retrieved from http://dx.doi.org/10.1136/qshc.2004.012591

Castle, N., Engberg, J. B., Wagner, L., & Handler S. (2015). Resident and facility factors associated with the incidence of urinary tract infections identified in the nursing home minimum data set. https://journals.sagepub.com/doi/full/10.1177/0733464815584666?utm_source=summon&utm_medium=discovery-provider

Center for Disease Control and Prevention [CDC] (2021). COVID-19. Retrieved from https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html

Centers for Disease Control and Prevention [CDC] (2019). Use of Agency Materials. Retrieved from https://www.cdc.gov/other/agencymaterials.html

Centers for Disease Control and Prevention [CDC] (2020). Healthcare-associated infection surveillance protocol for urinary tract infection (UTI) events for long-term care facilities. Retrieved from https://www.cdc.gov/nhsn/pdfs/ltc/ltcf-uti-protocol-current.pdf

Centers for Disease Control and Prevention [CDC] (2019). Nursing homes and assisted living (long-term care facilities). Retrieved from https://www.cdc.gov/longtermcare/index.html

Centers for Disease Control and Prevention [CDC]. (2020). Healthcare-associated Infection surveillance protocol for urinary Tract infection (UTI) events for long-term care

facilities. Retrieved from https://www.cdc.gov/nhsn/pdfs/ltc/ltcf-uti-protocol-current.pdf

Centers for Medicare and Medicaid Services. (2020). Hospital-acquired condition reduction program (HACRP). Retrieved from https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/HAC-Reduction-Program

Cohen, C. C. (2016). Costs of infection prevention practices in long-term care settings: A systematic review. *Nursing Economic$*, *34*(1), 16–45.

Collins, L. (2019). Diagnosis and management of a urinary tract infection. *British Journal of Nursing*, *28*(2), 84–88. https://doi.org/10.12968/bjon.2019.28.2.84

Donabedian, A. (2005). Evaluating the quality of medical care. *The Milbank Memorial Fund Quarterly*, 44, 166-203. doi: 10.1111/j.1468- 0009.2005.00397.x

Donabedian, A. (1996). The effectiveness of quality assurance. *International Journal for Quality in Healthcare, 8*, 401-407. Retrieved from http://fkilp. iimb.ernet.in

Donabedian, A. (1988). The quality of care: How can it be assessed*? Journal of the American Medical Association, 260,* 1743-1748. doi:10.1001/ jama.1988.03410120089033

Donabedian, A. (1966). Evaluating the quality of medical care. *Milbank Quarterly*, 44, 166-203.

Ferguson, A. (2018). Implementing a CAUTI prevention program in an acute care hospital setting. *Urologic Nursing*, *38*(6), 273–302. https://doi.org/10.7257/1053-816X.2018.38.6.273

Freeman-Jobson, J. H. (2016). Quality/Performance Improvement. Effect of an education presentation on the knowledge and awareness of urinary tract infection among non-

licensed and licensed health care workers in long-term care facilities. *Urologic Nursing*, *36*(2), 67–71. https://doi.org/10.7257/1053-816X.2016.36.2.

Genao, L., & Buhr, G. T. (2012). Urinary tract infections in older adults residing in long-term care facilities. *The annals of long-term care: the official journal of the American Medical Directors Association*, *20*(4), 33–38.

Healthcare-associated infection surveillance protocol for urinary tract infection events for long-term care facilities. Retrieved from https://www.cdc.gov/nhsn/PDFs/LTC/LTCF-UTI-protocol-current.pdf

Hernandez, M., King, A., & Stewart, L. (2019). Catheter-associated urinary tract infection (CAUTI) prevention and nurses' checklist documentation of their indwelling catheter management practices. *Nursing Praxis in New Zealand*, *35*(1), 29–42. https://doi.org/10.36951/ngpxnz.2019.004

Hohlbein, L. (2015). MDS Monitor. MDS assessment accuracy and quality outcome success. *Long-Term Living: For the Continuing Care Professional*, *64*(5), 10–11.

Huddleston, P. (2014). Healthy work environment framework within an acute care setting. *Journal of Theory Construction & Testing*, *18*(2), 50–54.

Hursh, A., Salsbury, S., Lenhart, B., Doran, S., & Zadvinskis, I. M. (2013). Using Personalized Care Boards for Communicating Safe Patient Handling and Mobility Status in Acute Care: Lessons Learned Using the Donabedian Model. *American Journal of Safe Patient Handling & Movement*, *3*(4), 124–131.

Kajonius, P. J., & Kazemi, A. (2016). Structure and process quality as predictors of satisfaction with elderly care. *Health & Social Care in the Community*, *24*(6), 699–707. https://doi.org/10.1111/hsc.12230

Kannankeril, A. J., Lam, H. T., Reyes, E. B., & McCartney, J. (2011). Urinary tract infection rates associated with re-use of catheters in clean intermittent catheterization of male veterans. *Urologic Nursing, 31*(1), 41–48.

Kobayashi, H., Takemura, Y., & Kanda, K. (2011). Patient perception of nursing service quality; an applied model of Donabedian's structure-process-outcome approach theory. *Scandinavian Journal of Caring Sciences, 25*(3), 419–425. https://doi.org/10.1111/j.1471-6712.2010.00836.x

Lajiness, B., & Lajiness, M. J. (2019). 50 years of urinary tract infections and treatments - has much changed? *Urologic Nursing, 39*(5), 235–239. https://doi.org/10.7257/1053-816X.2019.39.5.235

Mavin, C., & Mills, G. (2015). Using quality improvement methods to prevent catheter-associated UTI. *British Journal of Nursing, 24*, S22–S28. https://doi.org/10.12968/bjon.2015.24.Sup18.S22

Masters, K. (2011). Models and theories focused on nursing goals and functions. In *Philosophies and theories for advanced nursing practice* (pp. 383- 412).

McKay, C., & Wieck, K. L. (2014). Evaluation of a collaborative care model for hospitalized patients. *Nursing Economic$, 32*(5), 248–267.

McMullen, D., Bartlett, J. M., & Rosario, J. G. (2007). A long-term care facility attacks UTI prevalence: implementing a team approach to increase staff knowledge of and compliance with good infection control practices. *Nursing Homes: Long Term Care Management, 56*(5), 34–36.

McNeill, L. (2017). Back to basics: How evidence-based nursing practice can prevent catheter-associated urinary tract infections. *Urologic Nursing, 37*(4), 204–206.

Means, T. (2016). Improving quality of care and reducing unnecessary hospital admissions: a literature review. *British Journal of Community Nursing*, *21*(6), 284–291. https://doi.org/10.12968/bjcn.2016.21.6.284

Moran, K.J., Burson, R., & Conrad, Dianne. (Eds.) (2014) *The doctor of nursing practice scholarly project: a framework for success.* Burlington, Mass.: Jones & Bartlett Learning. https://doi.org/10.7257/1053-816X.2017.37.4.204

Pallant, J. (2016). *SPSS Survival Manual: A Step-by-Step Guide to Data Analysis Using IBM SPSS Program* (6th ed.). New York, NY: McGraw-Hill.

Palms, D. L., Mungai, E., Eure, T., Anttila, A., Thompson, N. D., Dudeck, M. A., Edwards, J. R., Bell, J. M., & Stone, N. D. (2018). The National Healthcare Safety Network Long-term Care Facility Component early reporting experience: January 2013-December 2015. *American Journal of Infection Control*, *46*(6), 637–642. https://doi.org/10.1016/j.ajic.2018.01.003

Parker, V., Giles, M., Graham, L., Suthers, B., Watts, W., O'Brien, T., & Searles, A. (2017). Avoiding inappropriate urinary catheter use and catheter-associated urinary tract infection (CAUTI): a pre-post control intervention study. *BMC Health Services Research*, *17*, 1–9. https://doi.org/10.1186/s12913-017-2268-2

Perry M. (2011). Treating symptomatic UTIs in older people. *Practice Nursing*, *22*(1), 21–23.

Quinn, P. (2015). Chasing Zero: A nurse-driven process for catheter-associated urinary tract infection reduction in a community hospital. *Nursing Economic$*, *33*(6), 320–325.

Sadler C, Huff M, & Harrigan A. (2000). Faculty practice and health promotion in a community correctional facility. *Holistic Nursing Practice*, *14*(2), 38–47.

Sanyal, C., Husereau, D. R., Beahm, N. P., Smyth, D., & Tsuyuki, R. T. (2019). Cost-effectiveness and budget impact of the management of uncomplicated urinary tract infection by community pharmacists. *BMC Health Services Research*, *19*(1), N.PAG.

Shehab, M. S. (2017). Impact of protocol of care of patients undergoing urinary catheterization on nurses' knowledge. *International Journal of Caring Sciences, 10*(2), 1013–1020.https://doi.org/10.1186/s12913-019-4303-y

Shojania, K.G., McDonald, K.M., Wachter, R.M., & Owens, D.K. (2007). Closing the quality gab: A critical analysis of quality improvement strategies. Retrieved from https://www.ahrq.gov/downloads/pub/evidence/pdf/caregap/caregap.pdf

Tambunan, M. P., & Rahardjo, H. E. (2019). Cranberries for women with recurrent urinary tract infection: a meta-analysis. *Medical Journal of Indonesia*, *28*(3), 268–275. https://doi.org/10.13181/mji.v28i3.3299

Thompson, G. N., McClement, S. E., Labun, N., & Klaasen, K. (2018). Developing and testing a nursing home end-of-life care chart audit tool. *BMC Palliative Care*, *17*, 1. https://doi.org/10.1186/s12904-018-0301-9

United State Department of Health and Human Services (2020). Health Care-Associated Infections. Retrieved from https://health.gov/our-work/health-care-quality/health-care-associated-infections

Viner, S. (2020). Urinary tract infection knowledge of long-term care nursing staff: The effect of an educational intervention. *Urologic Nursing*, *40*(1), 7–21. https://doi.org/10.7257/1053-816X.2020.40.1.7

Waskiewicz, A., Alexis, O., & Cross, D. (2019). Supporting patients with long-term catheterization to reduce risk of catheter-associated urinary tract infection. *British Journal of Nursing, 28*(9), S4–S17. https://doi.org/10.12968/bjon.2019.28.9.S4

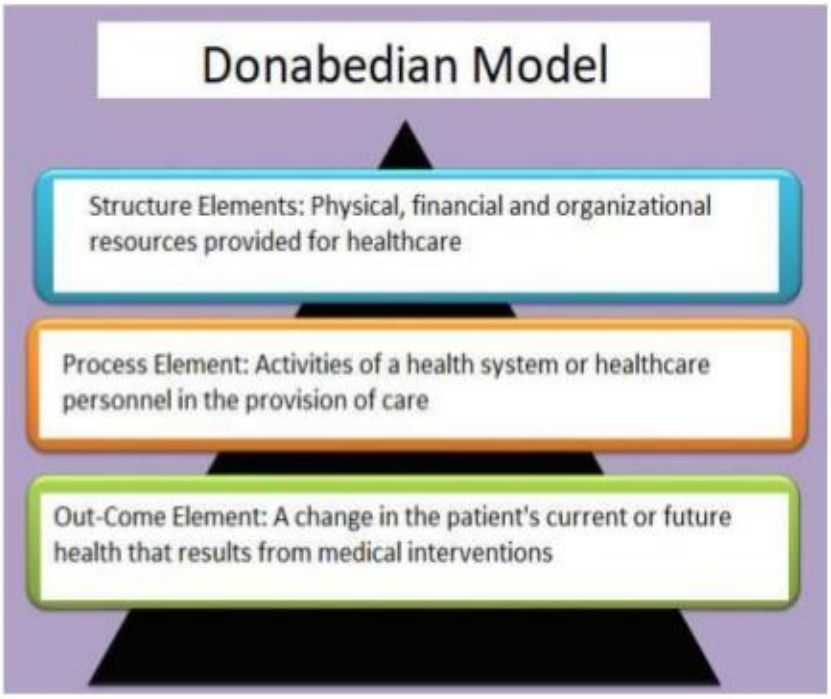
Zurmehly, J. (2018). Implementing a nurse-driven protocol to reduce catheter-associated urinary tract infections in a long-term acute care hospital. *Journal of Continuing Education in Nursing, 49*(8), 372–377. https://doi.org/10.3928/00220124-20180718-08

Appendix A

Donabedian Theoretical Framework

Models of QA

Donabedian's model to analyse quality includes three factors: structure, process, and outcome. Structure refers to prerequisites, such as hospital buildings, staff and equipment. Process describes how structure is put into practice, such as specific therapies. Outcome refers to results of processes, for instance, results of therapy.



Appendix B

Permission Letter

Appendix C

Prequestionnaire for HA-UTI and HA-CAUTI

Please answer the following questions on a 5-point scale: 1 = Strongly Disagree; 2 = Disagree; 3 = Neither; 4 = Agree; 5 = Strongly Agree

How familiar are you with steps to prevent a UTI?	1 2 3 4 5	1
Women are four times as likely as men to get a UTI?	1 2 3 4 5	2
keeping genital area clean and dry will prevent UTI?	1 2 3 4 5	3
Drinking enough water each day prevent will UTI?	1 2 3 4 5	4
Urinary catheters used for management of incontinence	1 2 3 4 5	5
Keep the collecting bag below the level of the bladder at all times. Do not rest the bag on the floor?	1 2 3 4 5	6
The control and prevention of CAUTI is a priority at my facility?	1 2 3 4 5	7
I provide catheter care to all patients with indwelling urinary catheters in my care every shift	1 2 3 4 5	8
Nurses are key players in the reduction of indwelling urinary catheter use in LTCF	1 2 3 4 5	9
Share the steps to prevent a UTI with each person you support and make sure they know what to do and why it is important.	1 2 3 4 5	10

Appendix D

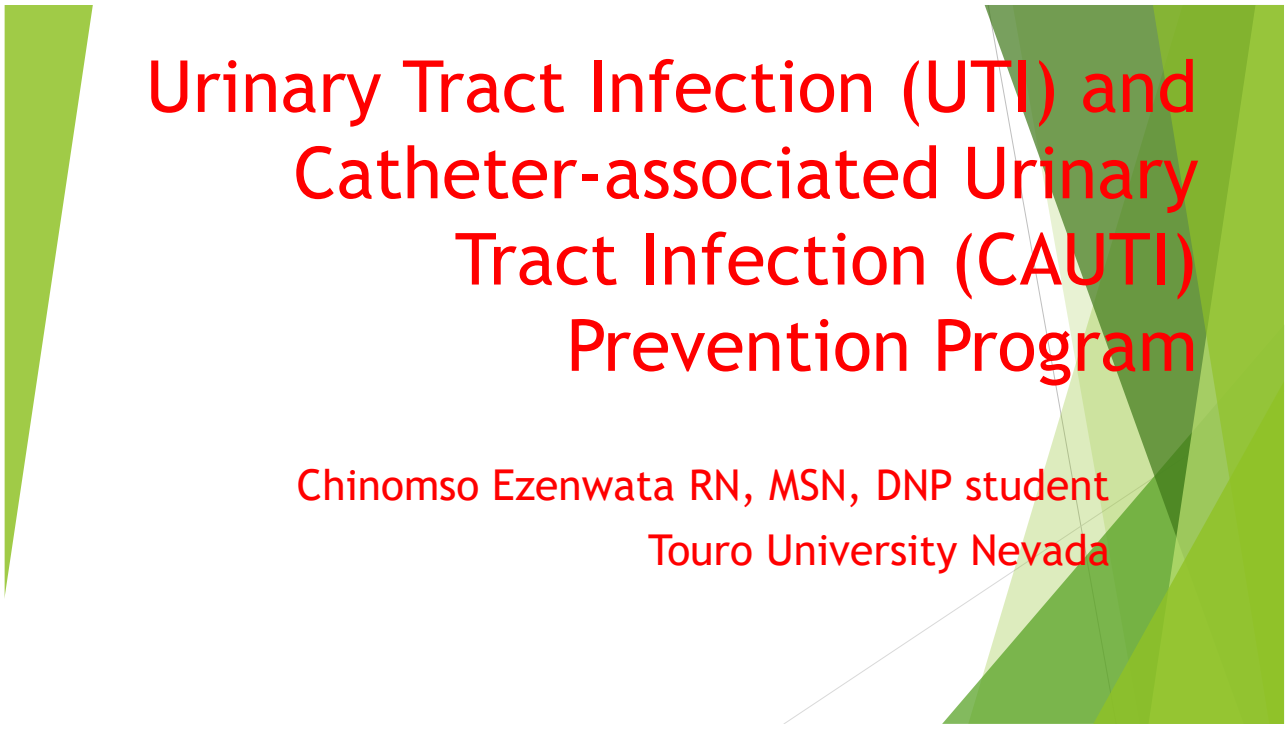
Permission to use Material

Use of Agency Materials

Most of the information on the CDC and ATSDR websites is not subject to copyright, is in the public domain, and may be freely used or reproduced without obtaining copyright permission.

Appendix E

Educational Training PowerPoint embedded



Appendix F

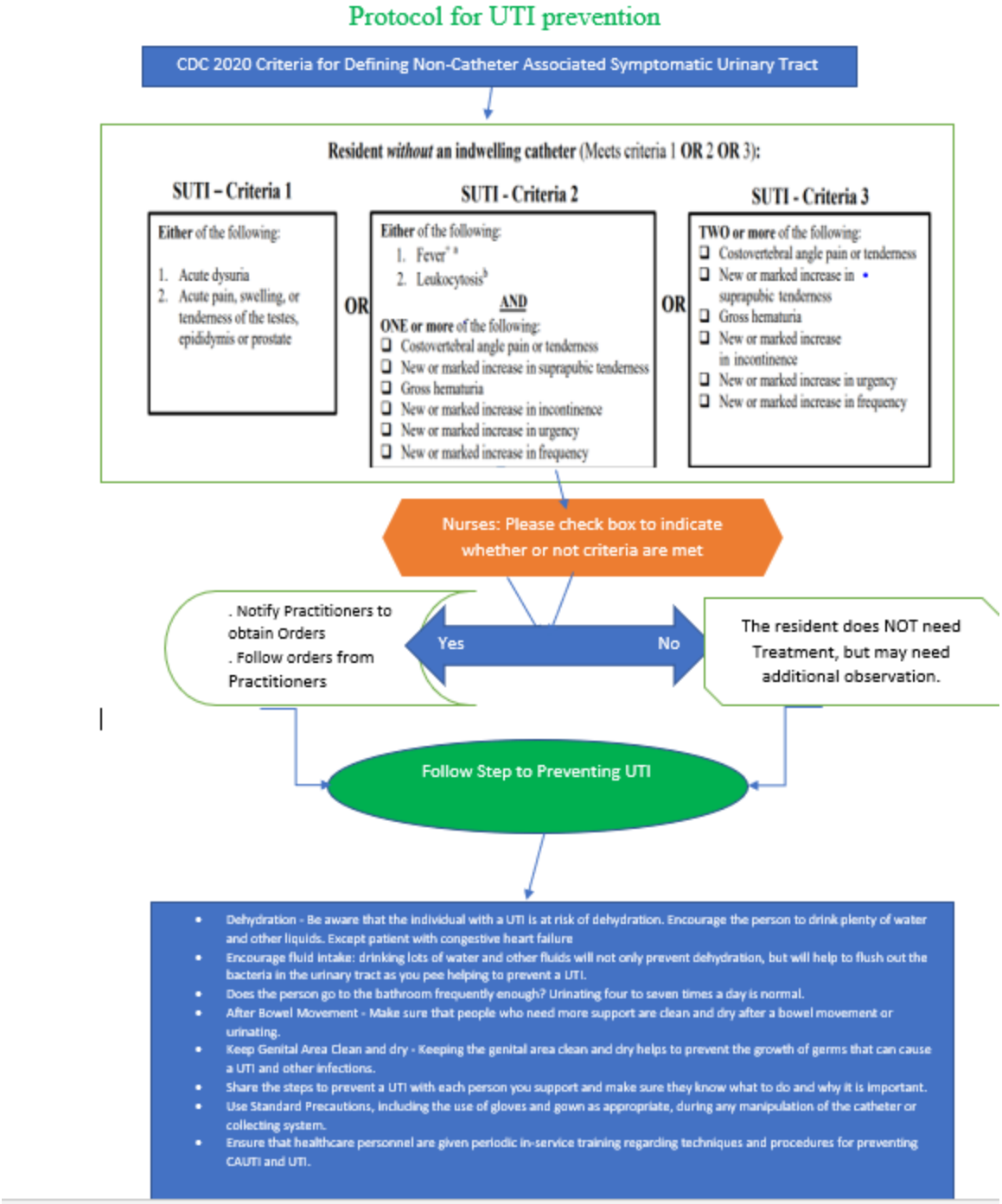
Postquestionnaire

Please answer the following questions on a 5-point scale: 1 = Strongly Disagree; 2 = Disagree; 3 = Neither; 4 = Agree; 5 = Strongly Agree

How familiar are you with steps to prevent a UTI?	1 2 3 4 5	1
Women are four times as likely as men to get a UTI?	1 2 3 4 5	2
keeping genital area clean and dry will prevent UTI?	1 2 3 4 5	3
Drinking enough water each day prevent will UTI?	1 2 3 4 5	4
Urinary catheters used for management of incontinence	1 2 3 4 5	5
Keep the collecting bag below the level of the bladder at all times. Do not rest the bag on the floor?	1 2 3 4 5	6
The control and prevention of CAUTI is a priority at my facility?	1 2 3 4 5	7
I provide catheter care to all patients with indwelling urinary catheters in my care every shift	1 2 3 4 5	8
Nurses are key players in the reduction of indwelling urinary catheter use in LTCF	1 2 3 4 5	9
Share the steps to prevent a UTI with each person you support and make sure they know what to do and why it is important.	1 2 3 4 5	10

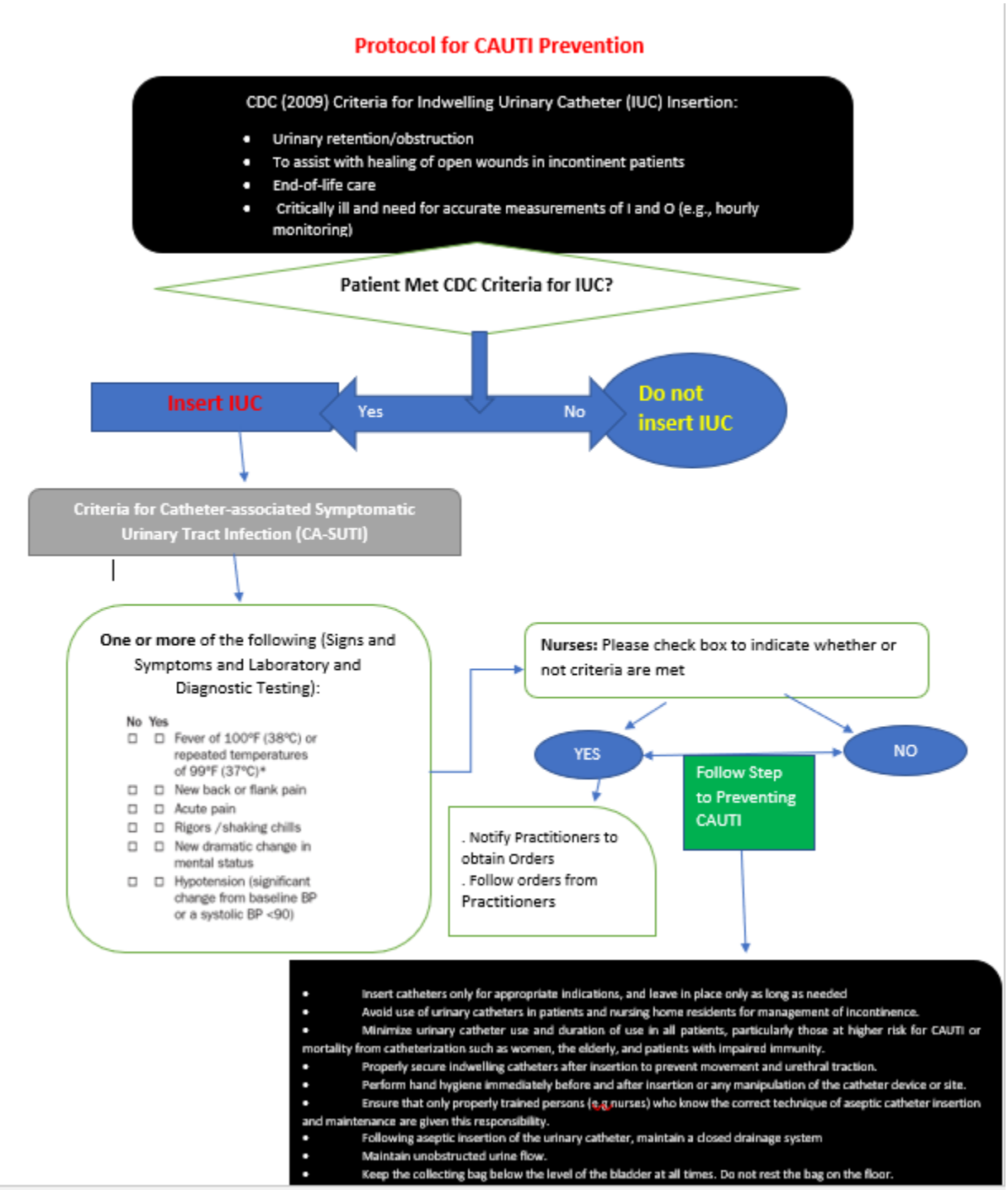
Appendix G

Nurse-led Protocol for HA-UTI


Protocol for UTI prevention
CDC 2020 Criteria for Defining Non-Catheter Associated Symptomatic Urinary Tract
Resident without an indwelling catheter (Meets criteria 1 OR 2 OR 3):
SUTI – Criteria 1
Either of the following:
1. Acute dysuria
2. Acute pain, swelling, or tenderness of the testes, epididymis or prostate
OR
SUTI - Criteria 2
Either of the following:
1. Fever[a]
2. Leukocytosis[b]
AND
ONE or more of the following:
Costovertebral angle pain or tenderness
New or marked increase in suprapubic tenderness
Gross hematuria
New or marked increase in incontinence
New or marked increase in urgency
New or marked increase in frequency
OR
SUTI - Criteria 3
TWO or more of the following:
Costovertebral angle pain or tenderness
New or marked increase in suprapubic tenderness
Gross hematuria
New or marked increase in incontinence
New or marked increase in urgency
New or marked increase in frequency
Nurses: Please check box to indicate whether or not criteria are met
. Notify Practitioners to obtain Orders
. Follow orders from Practitioners
Yes
No
The resident does NOT need Treatment, but may need additional observation.
Follow Step to Preventing UTI
Dehydration - Be aware that the individual with a UTI is at risk of dehydration. Encourage the person to drink plenty of water and other liquids. Except patient with congestive heart failure
Encourage fluid intake: drinking lots of water and other fluids will not only prevent dehydration, but will help to flush out the bacteria in the urinary tract as you pee helping to prevent a UTI.
Does the person go to the bathroom frequently enough? Urinating four to seven times a day is normal.
After Bowel Movement - Make sure that people who need more support are clean and dry after a bowel movement or urinating.
Keep Genital Area Clean and dry - Keeping the genital area clean and dry helps to prevent the growth of germs that can cause a UTI and other infections.
Share the steps to prevent a UTI with each person you support and make sure they know what to do and why it is important.
Use Standard Precautions, including the use of gloves and gown as appropriate, during any manipulation of the catheter or collecting system.
Ensure that healthcare personnel are given periodic in-service training regarding techniques and procedures for preventing CAUTI and UTI.

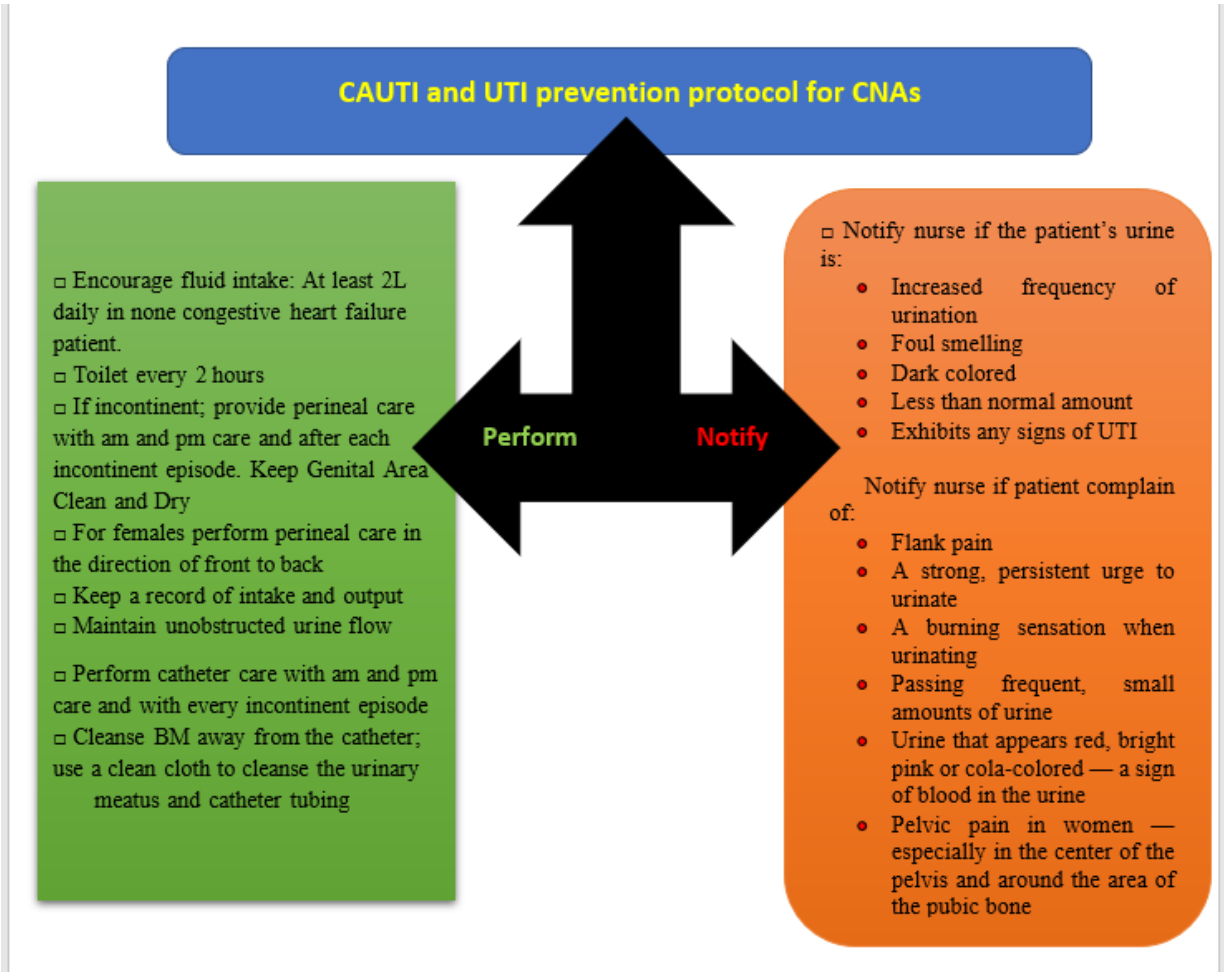
Appendix H

Nurse-led Protocol



Appendix I

Protocol for CNAs



Appendix J

Chart Audit For HA-CAUTI

Chart Audit For CAUTI

Date of Insertion Place of Insertion	Documentation Under Tubes & Drains	Foley Care Documentation Completed
Date of Insertion: _____ ○ Place of Insertion: ○ ER ○ Outside Facility ○ Other Unit: _____ ○ OR ○ 7S	○ Urine Color ○ Odor ○ Daily Assessment Need ○ Catheter Assessed ○ Collection Device ○ Site Assessment ○ Date of Insertion ○Charting Not Done	○ No ○ Yes

Appendix K

Chart Audit For HA-UTI

Chart Audit For UTI

Please check Yes or NO	Yes	NO
Nurse documented UTI assessment		
Nurse Document incontinent status		
Patient Demented		
Assess vital sign		
CNAs perform perineal care on bedbound patient		
CNA report input and output to the nurse		
Urinary frequency reported		
CNAs compliance with prevention measure		