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Effect of Formal Toileting Programs on Urinary Tract Infection Rates in Long Term Care

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This is to certify that the doctoral dissertation by

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has been found to be complete and satisfactory in all respects,
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Abstract

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MSN, Walden University, 2014

BSN, Troy State University, 1985

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Urinary tract infection (UTI) accounts for up to 31% of sepsis diagnoses and is the fourth leading cause of infections in long-term care (LTC) facilities. Timed and prompted toileting programs are used by LTCs to reduce incontinence episodes, but there is a lack of information regarding the effectiveness of timed and prompted voiding incontinence management programs on the rate of UTIs. The purpose of this study, guided by Donabedian's conceptual model of quality improvement, was to determine if there is a difference in the rate of UTIs in Georgia LTC facilities that have a timed and prompted voiding program and Georgia LTC facilities that do not having a timed and prompted voiding program. There were 26 directors of nursing in Georgia CMS-regulated LTC facilities. Of the respondents, 69% answered yes to having policies and procedures for timed and prompted voiding, and 31% answered no. The data were analyzed with an independent *t*-test, which revealed there was a significantly lower UTI rate in LTCs that had timed and prompted voiding programs than LTCs that did not (p=.002). The effect size to determine my study was large; Cohen's d= 3.20072, Hedges's correction =3.20072, and Glass's delta =3.64887. Applying evidence-based incontinence management programs for older adults in LTC facilities can reduce UTI rates, which effects positive social change.

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Dedication

I dedicate this dissertation to the memory of my loving parents, Reuben and Vera Conner, and my great-grandmother, Lela Powel. My parents played a pivotal role in guiding me into the path of nursing and were instrumental in my nursing school choice. My mother cared for my infant son while I attended classes over 40 years ago. My dad proudly honored me by pinning me at my pinning ceremony. My great-grandmother was born in the 1890s and spoke to me of enslaved family members; she was the first family member I saw at my graduation ceremony. I love and miss you all.

Acknowledgments

I want to acknowledge the professors who guided me through this dissertation journey. This journey has been arduous and rewarding. Thank you, Dr. Leslie Hussey, for being my professor from the beginning of my coursework through serving as a committee member on my dissertation. You stressed the importance of completing the doctoral program and obtaining the Ph.D. credentials. I also want to thank Dr. Catherine Garner for serving as my first chair. Finally, thank you, Dr. Martin, for serving as my final chair and helping me finish. I am grateful to each of you for your scholarly guidance.

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Chapter 1: Introduction to the Study

Introduction

Approximately three million nursing home or long-term facility (LTC) admissions occur annually in the United States (Centers for Disease Control and Prevention, (CDC, 2020). Over 380,000 LTC residents are hospitalized or succumb to death due to infections each year (CDC, 2020). Urinary tract infections (UTIs) are the fourth leading type of infection in LTC facility residents and affect approximately 20% of residents (CDC, 2021). Additionally, UTIs account for up to 31% of sepsis diagnoses and are the leading cause of death for noncardiac intensive care patients (Dreger et al., 2015). Infections are a significant health factor for long-term care residents that affect their quality of life.

Risk factors for UTIs include advancing age, fecal incontinence, and urinary incontinence. Researchers have shown an association between urinary/fecal incontinence and morbidity/mortality rates. Incontinence is common among older adults, with the prevalence increasing to approximately 20% in adults 85 years and older (Thirugnanasothy, 2010). John et al. (2016) conducted a systematic review and found that 43%-83% of nursing home residents have urinary incontinence, and 20% sustain infections with a mortality rate of 0.3%. In a cross-sectional study, Jerez-Roig et al. (2015) concluded that fecal incontinence is often underreported but affects 2.5% to 20% of older adults and is more prevalent in LTC residents.

Approximately 33,489 residents live in 360 Medicare/Medicaid LTC facilities in Georgia. Georgia had the highest rates of nursing homes, receiving a quality rating letter

grade of F in 2019. Georgia's nursing home ranking declined from the previous scale of 43 to 48, making it the second-worst state in which to receive nursing home care, according to Families for Better Care (2020), a long-term care advocacy group. Chronic understaffing is a significant factor affecting Georgia's ranking. The Center for Medicare & Medicaid Services (CMS) assigns LTC facilities ratings ranging from one to five stars based on health inspections, staffing, and quality measures. A five-star rating is the highest rating, and Georgia has an overall rating of 2.7 (Senior Care.com, 2021).

Approximately 75% of hospital-acquired UTIs are related to indwelling urinary catheters (CDC, 2015). The research on catheter-associated UTIs (CAUTI) has led to CDC guidelines and prevention strategies. However, limited studies measure the association between incontinence management and UTI rates in long-term care settings. Evidence-based toileting programs effectively reduce incontinence episodes (Ostaszkiewicz et al.,2016). In this study, I examined whether there is an association between having a formal incontinence management program that included timed and prompted voiding, and the incidence of non-catheter-associated urinary tract infections.

Gerontological nurses promote wellness and quality of care for older adults by using evidence-based nursing practice (American Nurses Association, 2018). Reducing the risk of UTIs can positively impact improving the quality of care for LTC residents. In this chapter, I present the background and purpose of the study and examine the problems associated with urinary incontinence and UTIs. I briefly discuss the theoretical framework used to guide the study; a more in-depth explanation of the framework

appears in Chapter 2. I also explain the rationale for using a quantitative approach and present the variables for this study.

Background

Simmering et al. (2017) found that UTIs accounted for approximately 400,000 hospitalizations in 2011 in the United States, with a financial cost of 2.8 billion dollars. A study conducted by Simmering et al. showed an upward trend of hospitalizations due to UTIs by 52%. The authors also concluded that UTIs are approximately 50% more prevalent in women compared to men. In addition, age accelerates UTIs: 23.1 % per year for women aged 80-89 compared to 7.9% for women aged 18-29 and 19.2% for women aged 50-59 (Simmering et al., 2017). The authors used a computed time series method to assess UTI incidence in an outpatient setting between 1998 and 2011. The authors found the rate for hospitalizations due to a UTIs doubled for older men compared to younger men, and hospital admissions were three times more prevalent for older women when compared to younger women.

Minimizing the risk of incontinence episodes through timed and prompted voiding programs may reduce mortality rates. Damian et al. (2017) conducted a cohort study of 675 nursing home residents in Spain and identified urinary incontinence as a mortality marker in 24% of participants' deaths. A common misperception is urinary incontinence is part of the aging process. Ostaszkiewicz et al. (2016) concluded that although chronic incontinence occurs in many nursing home residents (78% of female nursing home residents and 72% of male nursing home residents), reversible measures are possible but, not often employed.

The most common microorganisms isolated in the urinary tract contributing to UTIs are Escherichia coli (E. coli) and Staphylococcus saprophyticus (Huether & McCance, 2012). E. coli is a bacterium that usually lives in the intestines but can become pathogenic outside of the intestines (CDC, 2018). E. coli represents 52% of the enterobacteria pathogens associated with UTIs (Dreger et al., 2105). A study conducted by Jerez Roig et al. (2015) found that 66% of study participants used adult diapers to treat fecal incontinence, whereas only 9.7% received some bowel training.

Little research exists linking continence management and non-CAUTI. CAUTI infections account for 75% of hospital-acquired urinary tract infections (CDC, 2019). While there are guidelines for hospitals on preventing CAUTIs, procedures for preventing non-CAUTI UTIs are not readily available.

Problem Statement

Urinary incontinence affects 43% to 77% of nursing home residents (Franken et al., 2018). A cross-sectional study conducted by Jerez-Roig et al. (2015) found that fecal incontinence affects 42.68% of long-term care residents, a factor in UTIs. The Centers for Medicare and Medicaid Services (CMS, 2019) uses quality measures to statistically measure physical and clinical nursing home care data that reflect the population of residents. Long-stay nursing home quality measures are care indicators that quantify the care of residents who stay in the facility for more than 100 days; they include the percentage of residents with bladder and bowel incontinence, UTIs, and indwelling urinary catheters (CMS, 2019).

Urinary incontinence and infection can lead to poor patient outcomes and lengthy hospital admissions (Franken, 2018). Research indicates an association between urinary and fecal incontinence and mortality. Jamieson et al. (2017) conducted a retrospective analysis that found that 11%-17% of older community-dwelling adults have fecal incontinence and 14.5% have both urinary incontinence and fecal incontinence. They also found that frequent episodes of FI increased the probability of death.

There is a gap in the literature supporting the relationship between incontinence management and the rates of non-CAUTI in nursing home residents. Aloush et al. (2019) conducted research focused on risk factors associated with non-CAUTI after finding limited research on the subject and found an association in which comorbidities were a significant component. Eikelenboom-Boskamp et al. (2019) added incontinence to their prevalence study from 2012-2017 of Dutch nursing homes and healthcare-associated UTIs. They concluded that incontinence management reduced the risk of UTIs. The implication of incontinence and non-CAUTIs in the long-term care setting warrants further research.

Purpose of Study

The purpose of this cross-sectional self-administered survey study was to examine the difference in the rate of UTIs in Georgia LTC facilities which have a timed and prompted voiding program and Georgia LTC facilities which do not having a timed and prompted voiding programs. The independent variable used for the analysis is having a timed and prompted incontinence management program. The dependent variable is the

percentage of the long-stay non-CAUTI and urinary and fecal incontinence rates. I used a two-tailed independent t-test to test the null hypothesis.

Research Questions and Hypotheses

RQ1: What is the difference in the rate of UTIs in Georgia LTC facilities that have a timed and prompted voiding program and Georgia LTC facilities that do not have a timed and prompted voiding program?

$H_0$1: There is no difference in the rate of UTIs in Georgia LTC facilities that have a timed and prompted voiding program and Georgia LTC facilities that do not have a timed and prompted voiding program?

$H_1$1: There is a difference in the rate of UTIs in Georgia LTC facilities that have a timed and prompted voiding program and Georgia LTC facilities that do not have a timed and prompted voiding program.

Theoretical Framework

The conceptual framework was Donabedian's 1966 theoretical model of quality improvement addressing the components of structure, process, and outcomes. Donabedian developed this model to assess the quality of medical care provided from physician to patient, emphasizing the methodology used in evaluating care. Ayanian (2016) concluded that health care clinicians often use Donabedian's conceptual model and remain the framework for quality assessments. Donabedian defined structure as the health care setting, provider qualifications, and health care system policies and procedures, the process as to how care is delivered, and outcomes overall health status, morbidity (infection), and mortality (sepsis). Ameh et al. (2017) used Donabedian's

model to conduct a cross-sectional study on the quality of treatments of pressure ulcers. Furthermore, in research of patients' perception of care, the components of structure, process, and outcomes have been used (Kobayashi et al., 2011) and research of nurses' knowledge of quality care (Voyce et al., 2016). I will provide more detail on Donabedian's theoretical model in Chapter 2.

Nature of Study

I conducted a cross-sectional self-administered survey, and an independent-sample t-test analysis to examine the relationship between timed and prompted voiding, incontinence, and non-CAUTI rates for residents in Georgia LTC facilities. I analyzed secondary data from the Center for Medicare and Medicaid (CMS) Care Compare website. The website collects data on long-term care residents' quality of care, such as incontinence and urinary tract infection rates.

The survey questioned directors of nurses (DONs) regarding policies and protocols on formal toileting programs for at least one year, including prompted and timed toileting. I sent a self-administered questionnaire to the DONs of Georgia CMS-regulated LTC facilities to inquire whether they used a formal toileting program that included prompted and timed toileting. I used a comparative analysis design to analyze an association between prompted and timed toileting and Georgia state survey incontinence and non-CAUTIs rates. CMS tracks long-stay quality measures, including the percentages of bladder and bowel incontinence and UTIs.

My target population was Medicare/Medicaid nursing home facilities in Georgia. The independent variable was use of timed and prompted voiding. The dependent variable was Georgia LTC facility non-CAUTI rates.

Definitions

Antibiotics: Medication used to fight bacteria, fungi, and other microorganisms (Huether & McCance, 2012). Antibiotics are bactericidal (destroys or kills) or bacteriostatic (inhibits the growth) of the microorganism).

Clinical practice guidelines: Recommended healthcare statements issued by third-party organizations to address diagnosis and treatment modalities due to rigorous systemic reviews (National Center for and Integrated Complementary Health, 2017).

Fecal incontinence: Involuntary loss of feces or the inability to control bowel movements. Age (65 years and older) is also a risk factor (Mayo Clinic, 2018).

Indwelling catheters: Indwelling catheters are inserted into the bladder through the urethra and are exclusive of suprapubic and straight catheters (CDC, 2019). Indwelling catheter rates: CMS measures the percentage of long-stay nursing home residents (> 100 days) who have had an indwelling catheter for over 7 days (MDS, 2019). Covariates include fecal incontinence and Stage 2, 3, and 4 pressure ulcers.

CMS exclusions include:

- target assessment indicating a diagnosis of neurogenic bladder or obstructive uropathy.
- target assessment indicating no mention of an indwelling catheter.
- target assessment is an admission or readmission.

Non-catheter associated urinary tract infection: Asymptomatic or symptomatic UTIs caused in the absence of a urinary catheter (Aloush et al., 2017).

Nursing homes: Nursing homes are also known as skilled nursing facilities (SNF) and LTC facilities that provide medical and personal care for individuals who cannot function in a community setting (CDC, 2017).

Older adults: The World Health Organization (2018) cites that most developed countries use the term older adults to describe the chronological age of 60 to 65 years or older adults or the age of retirement. Medicare benefits start at the age of 65. This study describes older adults as individuals 65 years and older.

Quality measures: Quality measures are standards used to collect data on clinical performances of patient care (CMS, 2021).

Timed and prompted voiding: Minimum Data Set (MDS) defines prompted voiding as assessing and promoting continence, timed and prompted voiding, and providing positive feedback. (CMS, 2019).

Toileting programs: Continence management interventions used to minimize bladder and bowel incontinence.

Urinary incontinence: Involuntary loss of urine due to a pathological, anatomical, psychological, or physical component, resulting in obstruction, irritable bladder, or impeding neurological functioning (Dains et al., 2012). Types of incontinence include urge, stress, mixed, and functional (Huence & McCance, 2012).

Urinary tract infections: UTIs occur when bacteria enter the urinary system (CDC, 2015).

Assumptions

For my study, I assumed that nursing home residents desire to be continent and that nursing home administrators desire to provide services that will assist nursing home residents in maintaining continence. A further assumption of this study was that nursing home residents and nursing home clinicians were willing to reduce the risk of non-CAUTI UTIs. I assumed the secondary data obtained from the CMS website was accurate and that DONs of LTC facilities answered the survey honestly.

Scope and Delimitations

The scope of this study included LTC facility DONs in Georgia nursing homes and data obtained from the CMS website. For this study, I assessed the correlation between incontinence management programs and CMS nursing quality measures in LTC facilities. The participants recruited for this study included DONs from CMS-approved Georgia nursing homes.

I initially considered limiting my research method to only using secondary data analysis. The ease of availability and reduction of time in collecting data contributed to my consideration. I decided to combine a survey and a secondary approach to my method. I included the survey method to gain insight into incontinence management interventions and UTIs.

I used Donabedian's (1966) theoretical framework to guide my study. The components of the theory include structure, process, and outcome. I chose this theory to assess results or the percentage of non-catheter urinary quality indicators when nursing homes or structures apply the process of incontinence management protocols. I did not

consider another theoretical framework for my study. For this study, I extrapolated the percentage of non-CAUTI using a non-randomized cross-sectional and secondary analysis approach. Groves et al. (2013) concluded that non-randomized designs could pose a threat to generalization.

Limitations

A limitation of the survey research design was that DONs may be biased in answering the questionnaires. The invitation letter addressed the purpose of the study. Surveys for long-term care facilities included quality measures that review the percentages of bladder and bowel incontinence and UTIs. Participating in a study that quantifies the relationship between incontinence and UTIs may guide evidence-based incontinence management, reducing bias in answering the questions. The participation rate could have effected the statistical analysis. Another limitation of the study was that the quality measures only focused on Georgia's state, affecting generalizability. Comorbidities may have impacted findings and limited the potential for generalization to a larger population.

Significance

Over four million Americans reside in LTC facilities, and infections occur in up to three million residents (CDC, 2015). Urinary and fecal incontinence is a global phenomenon that affects the quality of life and mortality rates of older adults. Urinary tract infections accounted for approximately 400,000 hospitalizations in 2011 in the United States, with a financial cost of 2.8 billion dollars (Simmering et al., 2017). While studies show increased mortality associated with incontinence, there is a gap in the

literature regarding the association between timed and prompted toileting and urinary tract infections. Damian et al. (2016) conducted a cohort study and concluded that there is a "consistent mortality marker" associated between incontinence and nursing home residents (long-term care). Limited research is available regarding infections in long-term care facilities. The CDC website provides guidelines on CAUTIs, but few guidelines exist on non-CAUTI in LTC facilities. A review of the literature yielded limited results on continence/toileting programs and non-CAUTIs.

Urological comorbidities increase with age (Dreger et al., 2015). The risk of mortality increases with recurrent UTIs (Huether & McCance, 2012). Formal toileting programs may decrease incontinence episodes and lower the rate of non-CAUTIs in nursing home residents and contribute to best practices. My study results provide additional information on the effect of evidence-based incontinence management programs, which can improve nursing home residents' outcomes and quality of life which affects positive social change.

Summary

Advances in medicine have extended life expectancy in the United States but living longer does not equate to quality of life. Adults above 65 will increase from 12% to 20% of the U.S. population by 2030. Those above the age of 85 will increase from 9.6 million in 2030 to 20.9 million by 2050 (Nauert & Johnson, 2011). Incontinence and UTIs affect the quality of life for older nursing home residents. Substantial research addresses the relationship between catheter-associated urinary catheters and UTIs, but research addressing non-CAUTI is minimal.

In Chapter 1, I addressed the background and purpose of conducting a study on urinary incontinence and the relationship between urinary infections. In Chapter 2, I present a review on existing studies conducted on incontinence, urinary tract infections, and older adults residing in nursing homes. I will also provide an in-depth explanation of the theoretical foundation and review the literature.

Chapter 2: Literature Review

Introduction

Individuals admitted to nursing homes are referred to as residents, and the facilities are known as SNFs, long-term care facilities, or community living centers. I used the term long-term care facilities for this study. The CDC (2018) cited that UTIs are the fourth leading type of infection found in long term care facilities. Current literature provides considerable information regarding CAUTIs but limited scholarly articles on non-CAUTIs in long-term settings. Most LTC residents do not have indwelling catheters, yet UTIs are prominent in this population. Urinary incontinence affects 43% to 77% of nursing home residents (Franken et al., 2018). This study examined the relationship between using a timed and prompted voiding incontinence management program, incontinence rates, and non-CAUTI rates in LTC residents. I investigated the clinical practice guidelines used in managing incontinence.

There is an association between urinary/fecal incontinence, nursing home placements, and morbidity/mortality rates. Urinary incontinence affects up to 60% of older adults, and the rate increases to 77% with age, comorbidities, and functional decline (Bettez et al., 2014). Evidence-based incontinence management programs can reduce morbidity and mortality rates in older long-term care residents. Damien et al. (2017) acknowledged a high incidence of urinary incontinence in long-term care residents. Qaseem et al. (2016) found that urinary incontinence is present in 75% of women 75 years and older but often underreported. Fecal incontinence occurs in 69% of older nursing home residents (Blekken et al., 2015). Older adults have increased episodes of

incontinence that can impact dignity, independence, and overall health. Evidence-based interventions can minimize episodes of incontinence in older nursing home residents and promote positive health outcomes. The social impact of reducing incontinence can improve or maintain continence, improve quality of life, and reduce morbidity/mortality rates.

In this chapter, I review current scholarly literature and focused on non-CAUTIs, fecal/urinary incontinence, and sepsis. I also concentrate on nonsurgical and nonpharmacological evidence-based incontinence management guidelines. I present strategies, databases, search engines, and keywords used to collect data. I conclude Chapter 2 with a discussion of the theoretical foundation used to guide the dissertation and a chapter summation.

Literature Search Strategy

My literature search strategy included primary and secondary studies, systemic reviews, scholarly journals, and practice standards. The databases used for my search included CINAHL & Medline Simultaneous Search, Cochran Systemic Reviews, ProQuest, Scientific Direct, Joanna Briggs Institute, and prior dissertations. I retrieved documents from governmental agencies such as the Center for Disease Control and Prevention and the Centers for Medicare/Medicaid, including the Nursing Home Compare website. The years covered focused on peer-reviewed literature from 2015 through 2021. I used the following keywords: *urinary tract infections, urinary and fecal incontinence, sepsis, older adults, nursing homes, continence management, and toileting programs,* and *timed and prompted voiding*.

While the initial literature review showed that research is growing on the topic of urine and fecal incontinence and CAUTIs, my search produced minimum studies on non-CAUTIs (1966). In my search engine, I used the following keywords*: non-CAUTIs from within the past five years yielded limited scholarly articles on non-CAUTIs and the older nursing home population*. Current literature suggested a gap in studies that address non-catheter-associated urinary tract infections in LTC residents. I exhausted scholarly literature such as primary and secondary studies, dissertations, systemic reviews, clinical guidelines, and study conferences.

Theoretical Foundation

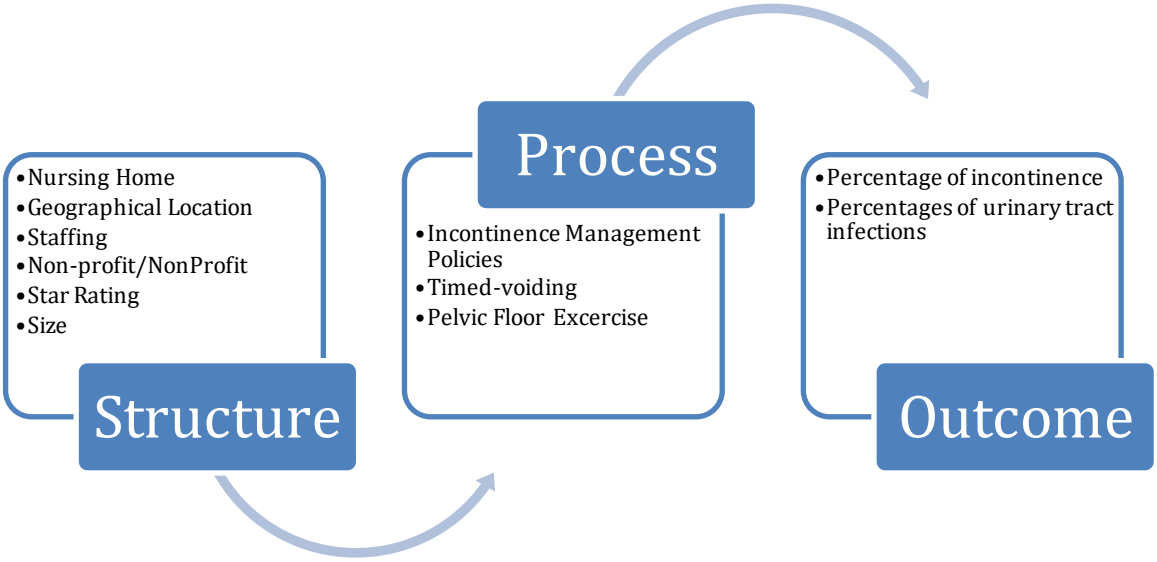
The foundation of the quality improvement movement started with Donabedian's (1966) groundbreaking work on evaluating medical care deliverance (Ayanian & Markel, 2016). The Health Service Research Section of the U.S. Public Health Service was initiated soon after the passage of Medicare and Medicaid (Ayanian & Markel, 2016). Donabedian, a leader in investigating medical care, was entrusted with reviewing research that focused on improving quality assessment (Ayanian & Markel, 2016). Donabedian was concerned with the methodology used in assessing outcomes rather than just the results of care.

The trinity of Donabedian's (1966) framework of quality improvement is structures, processes, and outcomes (Berwick & Fox, 2016). I applied Donabedian's framework to assess structure (long-term care facilities), process (incontinence management programs), and outcome (lower non-CAUTI rates). Figure 1 provides an

example of applying the conceptual model of structure-process-outcome to guide my study.

Figure 1

Donabedian's Theoretical Model of Quality Improvement



Structure

Donabedian defined structure as the health care setting, clinical and administrative staff qualification, and health care equipment and instruments (Donabedian, 1966). In my study, I assessed Georgia's LTC facility environment by reviewing its quality-of-care measures, star ratings, and CMS regulations. Hakkarainen et al. (2015) concluded that nursing home structure could include size, staffing, business model, and specialty care. Sund et al. (2015) found that structure is not limited to the healthcare setting but also indicates material and human resources.

Process

Donabedian (1966) defined a process as to how care is delivered (Ayanian & Markel, 2016). Donabedian concluded that emphasis should include the validity and reliability of recommendations from studies and consider prevention and care coordination components. My study examined the process or interventions used in incontinence care management. I analyzed active nursing interventions that include timed and prompted voiding incontinence management programs.

Outcomes

Donabedian (1966) defined outcomes as the restoral of functional abilities, rehabilitation, and survival (Ayanian & Markel, 2016). Donabedian's concept is that "good" structures and processes are related to favorable results (Ameh et al., 2017). Donabedian concluded that measuring the effectiveness of the structure and process yields better validation of outcomes. Reducing the risk of non-catheter-associated urinary tract infections is the desired outcome. I examined the character of long-term care organizations, incontinence management programs, and the percentage of non-catheter urinary tract infections.

Donabedian's Theory and Previous Studies

Donabedian's (1966) framework is used widely in healthcare research and quality improvement management. Ameh et al. (2017) conducted a cross-sectional study on chronic disease management using the conceptual model of structure- process-outcome. Dreyer et al. (2017) used Donabedian's framework to do qualitative research on the nurse practitioner's model in caring for older adults. Sales et al. (2018) conducted quantitative

research using Donabedian's framework to address their standard operational protocols (SOPs). Furthermore, Shield et al. (2014) applied Donabedian's framework in a mixed-methods study on nursing home involvement of medical staff. Hakkarainen (2015) used Donabedian's framework for post-acute care for surgical patients in long-term care facilities. Additionally, Martinez et al. (2018) used the framework at Johns Hopkins Medical Center to monitor the effectiveness of patient flow using an electronic dashboard. Rai and Wood (2018) incorporated Donabedian's model to analyze the effectiveness of their flu vaccination campaign. The authors used the structure to assess the facility's plan in setting up how they will administer the vaccine. Mahdavi et al. (2018) conducted a cross-sectional survey. They used Donabedian's theory to investigate the quality of life, diabetes coverage, and customer service in Finland, Spain, Greece, Germany, Netherlands, and the United Kingdom. Sund et al. (2015) applied Donabedian's framework to guide their quantitative study on assistive devices in rehab. Nowak et al. (2017) used the framework to assess value stream mapping and quality in care facilities.

Donabedian (1996) conceptualized that the process and setting of care deliverance play a factor in the outcome. For example, inserting an indwelling catheter will keep an older incontinent nursing home resident dry of urine. Still, the risk of a CAUTI increases with age, and indwelling catheters are not the recommended treatment management for urinary incontinence (CDC, 2015). Nurses are the primary health discipline who provide incontinence care in the nursing home setting and are obligated to implement evidence-based incontinence management interventions. CMS (2019) identifies nursing home

staffing as one of three components in rating nursing home performance and includes the hours of RN care per resident day and the staff mix of RNs, LPNs, and NAs per residents' day (CMS, 2019).

Literature Review Related to Key Variables and Concepts

A literature review from 2014 to 2019 yielded limited scholarly articles on non-CAUTI studies in LTC facilities. Research suggests that continence management programs may reduce incontinence and minimize adverse effects such as non-CAUTI. Sublett (2017) acknowledged that implementing educational training for staff regarding toileting programs can reduce the risk for non-CAUTIs. The author conducted a scholarly review based on an existing study. Northwood and Skelly (2014) reviewed healthcare data based on client recall. They found that 4.2% of clients had emergency room visits before continence care compared to 0.7% who participated in the continence care program.

Previous studies have shown that urinary and fecal incontinence are mortality markers that increase with advanced age. Damian et al. (2016) conducted a cohort study of n=675 nursing homes in Spain. The authors concluded that urinary incontinence was a mortality marker for nursing home residents and was apparent in frail and healthier nursing home residents. Jamison et al.'s (2017) cohort study of 41,932 community-dwelling older adults in New Zealand concluded that frequent episodes of fecal incontinence increased the prevalence of death.

I focused the literature review on scholarly articles that address the association between urine/fecal incontinence, morbidity/mortality rates, and non-CAUTIs. Current

research has focused on CAUTIs as the primary source of UTIs, but approximately 94% of nursing home residents do not have an indwelling catheter (Castle et al., 2015). A gap exists in studies examining the adverse effects of non-CAUTI in the LTC setting.

Incontinence and Adverse Outcomes

Urinary incontinence occurs because of pathological, anatomical, psychological, or physical components, resulting in obstruction, irritable bladder, or neurological functioning impairment (Dains et al., 2012). Incontinence occurs as an involuntary loss of bladder control (Bettez et al., 2012). Urinary incontinence includes:

- Stress incontinence (urethral sphincter failure).
- Urgency (sudden desire to urinate).
- A mixture of both (Qaseem et al. 2014).

Symptomatic issues such as coughing, sneezing, and laughing potentiate stress incontinence in 50% of Canadian patients, while urgency accounts for 14% (Bettez, 2012).

Research has indicated a relationship between urinary/fecal incontinence related to nursing home placements, morbidity/mortality rates, and healthcare-associated infections. Damian et al. (2017) conducted a cohort study that showed an association between urinary incontinence, morbidity, mortality, and quality of life. A strength of the study was that it covered longitudinal data of public and private long-term care facilities. A meta-analysis found increased mortality with urinary incontinence and advanced age (John et al., 2016). Jameson et al. (2017) conducted a retrospective analysis (n= 41,932) and concluded that urinary incontinence and fecal incontinence are associated with

mortality ($P<0.001$). The sample size was a significant strength of the study. While there is clear evidence that urinary incontinence correlates with increased morbidity and mortality, ambiguity exists if it is the consequence of a disease process (Damian et al., 2017).

The parallel between urinary incontinence and UTIs is approximately 25% (John et al., 2016). Rönneikkö et al. (2018) found that 21% of older nursing home residents had emergency room visits and admissions due to infections related to urinary incontinence, pressure ulcers, and impaired physical functioning. Castle et al. (2015) found a correlation between age and non-CAUTIs in long-term care residents. The authors analyzed MDS and Online Survey, Certification, and Reporting (OSCAR) data of U.S. long-term care facilities for a year, strengthening the study's methodology. Long-term care residents without UTIs (n = 1,138,418) were analyzed for 1 year, 9.5% contracted a UTI. The risk factors associated with non-CAUTIs include gender and age (women ≥ 65 years old), antipsychotic or anti-anxiety medications, falls and bladder and bowel incontinence, and staffing levels (Castle et al., 2015).

The pathophysiology of UTI is related to the microorganism entering the urinary system. Urinary tract infection occurs due to inflammation in the urinary system in response to a pathogenic organism entering the urothelium (Dielubanza et al., 2014). Asymptomatic bacteriuria affects 25%-50% of female nursing home residents and 15%-35% of male residents (Ajayi & Radhakrishnan, 2016). Asymptomatic pyuria affects 90% of nursing home residents (Ajayi & Radhakrishnan, 2016). Nursing home residents are more prone to the colonization of at least one multiple drug resistance organism, such

as methicillin-resistant staphylococcus aureus and vancomycin-resistant enterococcus (Giarratano et al., 2018). Reducing the risk of obtaining a non-CAUTI can improve healthcare outcomes and quality of life for older nursing home residents. Chronic conditions such as cerebral vascular accident, diabetes mellitus, Alzheimer's disease, and Parkinson's disease are risk factors for bacteriuria (Samara de Melo et al., 2017).

Adverse consequences occur because of overprescribed antimicrobials. The University of Rhode Island School of Pharmacology (2017) produced antimicrobial stewardship guidelines. They found antibiotics are ineffective in reducing UTIs for individuals with asymptomatic bacteriuria. Ajayi and Radhakrishnan (2016) found that antimicrobial prescriptions began when at least two of the following clinical symptoms were present which include: pyuria, bacteriuria >100, 000 colonized units, temperature > 38°C, acute dysuria, urgency and frequency, and costovertebral angle tenderness.

Urinary Incontinence Management Guidelines

Urinary incontinence is an unfortunate global phenomenon that often affects older nursing home residents. Urinary incontinence affects up to 60% of older adults, and the rate increases to 77% with increased age, comorbidities, and functional decline (Bettez et al., .2014). Damien et al. (2017) acknowledged a high incidence of urinary incontinence in nursing home residents in Spain. Qaseem et al. (2016) found that urinary incontinence is present in 75% of women 75 years and older due. The author also reported that women are not always forthcoming regarding sharing information about incontinence with providers. Urinary incontinence is prevalent in 50% to 70% of Korean nursing home residents (Park et al., 2015). Nyman et al. (2016) qualitative study concluded that nursing

staff often preferred using catheters and adult briefs in caring for older orthopedic patients. The authors found that staff was aware of the association between catheters, adult briefs, and UTIs, but they also focused on reducing staff workload. Urinary incontinence can range from nuisance to health adversity, impacting health outcomes and financial consequences (Qaseem et al., 2014). Damián et al. (2017) concluded that urinary incontinence is a mortality marker and recommends further studies addressing nurses' roles in managing urinary incontinence.

Gerontological nurses are the primary care clinicians in the nursing home setting and develop evidence-based policies and protocols to reduce incontinence episodes. Nursing home staff often treat urinary incontinence using interventions such as adult incontinence products rather than addressing the disorder. Gray (2017) asserts that nursing home clinicians often employ 'dependent' measures to treat urinary incontinence due to cognitive and physical function decline and comorbidities. Eikelenboom-Boskamp et al. (2019) concluded that 73. 5 % of Danish nursing home staff use adult protective products to manage incontinence. Park et al. (2015) cross-sectional study found that staff often display undeferential attitudes when treating urinary incontinence. Ostaszkiewicz et al. (2016) acknowledged that adult protective products might be preferential when staffing ratios are low, there is a lack of lift devices, and residents are immobile. Nursing home clinicians often opt for dependent measures to manage incontinence (e.g., adult briefs, diapers, and pads).

Timed and prompted voiding may be a beneficial continence management intervention. Newman (2019) advocated using prompted voiding, which can be helpful

with cognitively impaired residents and involves caregiver support in monitoring, inspiring, and praising residents. The author's scholarly article was a summation of a prompted voiding guideline from the University of Iowa College of Nursing Barbara and Richard Cosmay Center for Gerontological Excellence. Park et al. (2015) suggested that prompted toileting decreases incontinence episodes. Suzuki et al. (2016) conducted a non-randomized single-interventional study and found positive results with ultrasound-assisted prompted voiding as an intervention. A randomized control study showed a 9.1% decrease in incontinence rate in the prompted voiding interventional group (Lai, 2016). Damian et al. cited the positive patient outcomes from "successful" continence interventions. Utilizing evidence-based continence management interventions can reduce incontinence episodes.

Evidence-based continence management interventions can minimize incontinence episodes. Noninvasive treatment measures are effective in managing incontinence. Qaseem et al. (2014) conducted a systemic review for The American College of Physicians (ACP) to formulate evidence-based guidelines for women's nonsurgical management of urinary incontinence. These guidelines include:

- Pelvic floor exercise
- Bladder training
- Combined pelvic muscle training and bladder training
- Recommends against pharmacological therapy for stress incontinence
- Recommends pharmacological treatment for urgency urinary incontinence
- Weight loss and exercise for obese women

A standard urinary incontinence treatment plan found in the literature included pelvic muscle training and scheduled toileting programs. Similarly, the Canadian Urological Association (2012) suggested using behavioral methods such as avoiding caffeine, appropriate fluid reduction, and smoking cessation.

Similarly, Northwood and Skelly (2014) asserted that implementing a standardized incontinence assessment provides education on pelvic floor exercise, using portions of the chronic care model to promote client confidence in managing incontinence. The authors used a program evaluation for their scholarly paper.

Management of Fecal Incontinence

Fecal incontinence affects the quality of life and can be a predisposing factor in LTC facility admissions. Fecal incontinence occurs due to the relationship between the rectal sphincter, pelvic muscles, stool characteristics, and neurological components (Paquette et al., 2015). LTC staff often surmise that fecal incontinence is a regular aspect of aging, although research suggests that fecal incontinence can be reduced or cured in some cases (Blekken et al., 2015). Although the predisposition for fecal incontinence is 69%, the actual reporting is between 40% and 55%. Multifaceted bowel management education improves care delivery in long-term care. Damien et al. (2017) found an association between fecal and urinary incontinence and mortality. Gerontological clinicians must include interventions that are grounded in evidence to promote bowel continence.

Long-term care facilities predominately manage fecal incontinence using adult incontinence products. Jerez-Roig et al. (2015) found that 66% of Brazilian nursing home

residents wore adult diapers. Castle et al. (2015) reported that bowel control results in lower non-catheterized urinary catheter infections. Minimizing incontinence episodes improves health care outcomes. Management of fecal incontinence in long-term care includes assessment and intervention. The American College of Society of Colon and Rectal Surgeons conducted a systemic review of studies. They used the GRADE system to recommend clinical practice guidelines for caring for fecal incontinence individuals (Paquette et al., 2015).

Although there is emerging research on incontinence, morbidity, and mortality, there is difficulty finding research on the relationship between timed and prompted toileting programs and UTIs in the nursing home. Staffing and the consistency of changing diapers contributed to bacteriuria. There is a misconception that incontinence is associated with aging, physical functioning limitations are also a contributing factor (Samara de Melo et al. (, 2017). Nyman et al. (2016) qualitative study focused on incontinence management in older adults in the orthopedic setting and found that staff thought incontinence was part of the aging process. Staff interventions focused on an indwelling catheter or incontinence pads or diapers. Timed and prompted voiding is a CMS evidence-based recommendation for managing bladder and bowel elimination in Georgia LTC facilities and a factor of the quality-of-care measures used in factoring LTC facility ratings.

Summary and Conclusions

Incontinence is an unfortunate phenomenon that often accompanies older adults. Nurses are the primary health care discipline providing incontinence care in the LTC

setting and are obligated to implement evidence-based continence management interventions. Using evidence-based continence management interventions can reduce incontinence episodes and reduce morbidity and mortality rates. Incontinence is erroneously associated with aging and geriatric syndrome (Ostaszkiewicz et al.,2016). Older adults have increased episodes of incontinence that can impact dignity, independence, and overall health. Nursing home staff often use adult incontinence products rather than addressing the disorder. Nonsurgical and nonpharmacological evidence-based nursing can minimize the adverse outcomes associated with incontinence. Qaseem et al. (2014) concluded that nonpharmacological interventions such as pelvic floor muscle exercise combined with bladder training and weight loss for obese patients are effective evidence-based interventions. Furthermore, Damian et al. (2017) cited the positive patient outcomes from successful continence interventions. There is an association between urinary/fecal incontinence, nursing home placements, and morbidity/mortality rates. Minimizing incontinence episodes can significantly improve health care outcomes. The social impact of incontinence management programs can improve or maintain bladder and bowel control, promote healthy outcomes, and improve the quality of life.

I present the method of my study in Chapter 3. I also detail how I will analyze data, the ethical considerations, and the threats to validity.

Chapter 3: Research Method

Introduction

The purpose of my study was to determine if there was a relationship between prompted and timed voiding incontinence management programs, incontinence rates, and the prevalence of non CAUTI rates in Georgia nursing home residents. In this chapter, I address the research design and rationale. I discuss the relationship between the variables. The methodology section described the population, sampling procedures, recruitment procedures, data collection, instrumentation, archival data usage, and data analysis. The chapter concludes with information regarding threats to validity and a summation.

Research Design and Rationale

The research design for this study was a quantitative comparative analysis using primary survey data and secondary patient health outcome data obtained from the CMS Nursing Home Compare website. I used a two-question survey instrument and secondary data analysis. I compared questionnaire results against data from state nursing home surveys.

The independent variable for my study was incontinent management programs that include timed and prompted voiding. CMS conducts assessments of nursing home residents using the Resident Assessments Instrument (RAI) and reports the data through the MDS, and prompted, timed, are examples cited for toileting programs (CMS, 2019). The dependent variable was the percentage of long-stay low-risk SNF residents with incontinence and urinary tract infections. My study examined the relationship between timed and prompted voiding and non-CAUTs.

CMS (2019) uses quality measures to rate nursing homes based on MDS and Medicare claims. I administered a questionnaire asking DONs across LTC facilities in Georgia if they have policies and protocols on formal toileting programs that include timed and prompted toileting. There are 360 SNFs in Georgia; 45 have five-star ratings, 77 have four-star ratings, and 94 facilities are one-star (Nursing Home Report, 2018). I used a web-based format and administered the survey to 280 LTC facilities in Georgia. I extrapolated the percentage of long-stay LTC facilities with non-CAUTI rates by subtracting the percentage of indwelling catheters from the portion of UTIs.

The survey and design choices for my study are consistent with designs used in nursing research. Polit and Beck (2012) discussed that surveys offer researchers flexibility and reach a more significant population sample. I anticipated some time restraints with the responses of having the studies returned. I did not expect any time constraints in conducting the secondary analysis since the data were part of the public domain.

Methodology

Population

The target population chosen for this study were the DONs in LTC facilities in Georgia. The duties of the DON in a LTC setting include developing and administering policies/protocols that adhere to CMS quality measure guidelines. I obtained a listing of Georgia SNFs from the CMS Care Compare website. The methodology used to query participants is a survey distributed in a web-based manner. I extracted the dependent

variables (non-CAUTI and incontinence rates) from annual state survey reports found on the Georgia Care Compare website.

A single-stage sampling design was employed to connect to nursing homes and quality measure data. The target population for my study is the 360 CMS-approved nursing homes in the state of Georgia. I obtained the names of the DONs from Georgia by reviewing the Georgia Health Care Association membership directory.

Sampling and Sampling Procedures

I conducted a convenience sampling method to reach Georgia nursing home directors willing to participate. I sent out weekly follow-up reminders after one month into the survey. The independent variable is formal toileting programs that include prompted and timed toileting. The dependent variables are incontinence and non-CAUTI rates from individual Georgia LTC facilities.

I emailed the DONs of Georgia CMS-approved nursing homes and invited them to participate. A single-stage sampling design was employed to connect to nursing homes and quality measure data. I started with a Microsoft Excel table and compiled and analyzed data from two groups: LTC facilities with and without voiding programs. I calculated the percentage of non-CAUTI based on the responses. I calculated the mean infection rate of those with a prompted and timed voiding program. I also measured the mean infection rate of those with and without voiding programs.

I used an independent two-tailed *t*-test statistical analysis using IBM SPSS 27 software. I used two independent variables or predictors to evaluate LTC facilities that use prompted voiding programs and facilities that do not to analyze incontinence and

non-CAUTI rates. I calculated the sample size by conducting a G-power 3.1.9.7 analysis using an independent t-test with a median effect size and a power of 0.80 and a level of significance of 0.05, which yields a sample size of 128 with 64 in each group.

Procedures for Recruitment Participation and Data

The sample participants for the survey are DONs who oversee nursing care and ensure the care is aligned with CMS guidelines and are directly involved in annual state surveys. The CMS guidelines are used to rate nursing homes staffing, health inspections, and quality measures that include nurse-centered actions. UTIs and bladder and bowel loss percentages are clinical quality measures for CMS-certified nursing homes. The Skilled Nursing Home Value-Based Program (SNF VB) provides Medicare payment incentives based on care deliverance.

Recruitment for study participants started with an introductory advance letter (Appendix). The letter informed potential participants that the study is a dissertation conducted by a doctoral nursing candidate. The letter addressed the study's purpose, the significance of the study, the instrument used with a link, and an introduction to the researcher. The introductory letter informed participants that completing the survey constituted informed consent.

I asked the following two survey questions to DONs that consent to participate:

1. Does your facility have a formal bladder and bowel incontinence management program that includes routine timed and prompted voiding? (Y/N)
2. If you have a program, has this program been in place for a year or longer?

If the DON answered no, the data were analyzed to correlate the relationship between incontinence rates and the prevalence of non-catheter-associated urinary tract infections without a prompted and timed voiding program. If the DON answered yes, they proceeded to the second question.

I sent an email invite to potential survey participants and followed up with the survey through SurveyMonkey. I assigned a numerical code to each responding LTC facility. I compared the facility's survey response against the annual quality of care data obtained from the CMS Care Compare website. I locked the survey data in a computer file, and the hard copy is locked away. I used the results of Georgia state nursing home surveys to analyze the relationship between the independent and dependent variables. Secondary data analysis came from archival state survey data. CMS provides these data to the public to show the quality of care based on the star rating system. The state survey results are on the CMS Care Compare website.

Instrumentation and Operationalization of Constructs

The survey instrument included two items to answer questions whether the nursing homes have policies and procedures that include prompted and timed voiding incontinence management programs. Current studies suggest positive outcomes with incontinence management protocols. I developed the following questionnaire to survey Georgia nursing home DONs:

1. Does your facility have a formal bladder and bowel incontinence management program that includes timed and prompted voiding? (Y/N)

If the answer is yes, then the DON receives the next question, which was:

2. If you have a program, has this program been in place for a year or longer?

The independent variable was formal toileting programs that include prompted and timed voiding. The dependent variable was non-CAUTI rates. The inclusion criteria to participate in the survey was CMS-approved nursing homes in the state of Georgia. Exclusion criteria were non-CMS-approved nursing homes.

Operationalization

The conceptual definition in my study was Donabedian's (1966) framework: structure, process, and outcome. The structural variable was the nursing home setting. The press variable or the independent variable in this study was prompted and timed toileting.. The dependent/outcome variable was incontinence rates and urinary tract infections.

Data Analysis Plan

I conducted data analysis using IBM SPPS 27 software. I used an independent *t*-procedure to analyze the relationship between formal toileting programs that included timed and prompted voiding programs, incontinence rates, and non-CAUTIs.. Data cleansing consisted of printing data and conducting random checks for errors. The research question and hypotheses are as follows:

RQ1: What is the difference in the rate of UTIs in Georgia LTC facilities that have a timed and prompted voiding program and Georgia LTC facilities that do not have a timed and prompted voiding program?

$H_0$1: There is no difference in the rate of UTIs in Georgia LTC facilities that have a timed and prompted voiding program and Georgia LTC facilities that do not have a timed and prompted voiding program?

$H_1$1: There is a difference in the rate of UTIs in Georgia LTC facilities that have a timed and prompted voiding program and Georgia LTC facilities that do not have a timed and prompted voiding program.

Threats to Validity

The types of threats to validity to consider when conducting research are internal and external. This study identified potential risks that may question research outcomes and reviewed actions that minimize validity threats. Grove et al. (2013) acknowledged that validity is a tool that can ascertain the extent of the concept examination. The following sections describe internal and external validity threats.

Internal Validity

There are several types of internal threats to consider when conducting research. Creswell (2009) cited internal threats are related to experimental procedures, interventions, and participant experiences. Furthermore, components of internal validity can include selection, testing, and instrumentation. I conducted a self-administered web-based survey.

Internal validity recognizes the relationship between the independent and dependent variables, and managing extraneous variations is essential before forming outcome conclusions (Polit & Beck, 2012). The targeted population for this study is nursing home DONs within Georgia who share similar characteristics, which may

threaten selection validity. There are 360 nursing homes in Georgia. Using a random selection process is an action that can increase the probability of equal selection; however, this might limit the sample size for statistical analysis. Groves et al. (2013) acknowledged that online participation yields a response rate of 15% to 25% more than mailed questionnaires and that respondents often fail to answer lengthy inquiries.

External Validity

There was a question of whether Georgia LTC facility DONs would respond to the survey and thereby pose a threat to external validity. The response rate was low, which raises questions about generalization. I received 20% of the sample size, which lowered the statistical power for the study. Another external threat to validity involved the equivalencies between the groups; LTC facilities answered yes to timed and prompted voiding programs (n=18) and facilities that responded no (n=8).

This study considered the characteristics of Georgia nursing homes, such as overall ratings and registered nurse staffing levels compared to national standards. Georgia has an overall star rating of 2.7% (Senior Care.com, 2021). Georgia's nursing home ranking is 48 for nursing home care, according to Families for Better Care (2020). There is a concern that the results of my study will not generalize to other states where the overall star ratings are higher than in Georgia.

Ethical Procedures

I submitted an IRB application to review the ethical process of my proposal, reference number 01-07-21-0417665. I recruited DONs from Georgia nursing homes as study participants. I gathered data on policies and protocols on formal toileting programs

that included timed and prompted voiding. I did not use human participants to perform the study. I collected secondary data from the CMS website to view Nursing Home Compare, which publicly lists state survey results on quality-of-care indicators.

I addressed the ethical concerns related to recruitment by providing an introductory letter to inform potential participants that this is a dissertation study conducted by a Walden University doctoral candidate. I notified participants that completing the survey constitutes informed consent. I provided the title of my research, which is "The Impact of Formal Toileting Programs in Long-Term Care." I disclosed the purpose of the study, which was to examine whether a relationship exists between using timed and prompted voiding incontinence management programs, incontinence rates, and non-CAUTI rates in Georgia nursing home residents. I informed the DONs that the population chosen to participate in the study is Georgia's Medicare/Medicaid approved nursing home facilities.

I addressed the ethical concerns related to the process by describing the data collection process. I informed the DONs of the significance of the study and the instrument used for data collection. I notified participants that a comparative analysis design would analyze the relationship between timed and prompted voiding programs and Georgia incontinence and non-CAUTI rates. I informed the participants to consider the benefit of participating in research, which may reduce incontinence and non-CAUTI rates and contribute to a possible value-based initiative.

The primary survey data addressed LTC facilities that had policies and procedures that included time and prompted voiding management programs. I used a convenience

sample to identify participants but maintained the anonymity of the names of the long-term care facilities that participated in the study. I kept the confidentiality by reporting data collectively absent of personal LTC facility attributes. Data were de-identifying and published in the aggregate and held in a limited data set. Secondary data analysis came from archival state survey data.

Summary

The research design for this study included a combination of a cross-sectional survey approach and a secondary analysis. There are limited quantitative studies that address the association between incontinence and non-catheter-associated urinary tract infection. This chapter described the kind of research design used to conduct the study. Showing statistical data that has the potential for generalization can contribute to further research on this topic. I present the results of my research in Chapter 4.

Chapter 4: Results

Introduction

The purpose of this cross-sectional self-administered survey study was to examine the difference in the rate of UTIs in Georgia LTC facilities that have a timed and prompted voiding program and Georgia LTC facilities that do not have a timed and prompted voiding programs.

RQ1: What is the difference in the rate of UTIs in Georgia LTC facilities that have a timed and prompted voiding program and Georgia LTC facilities that do not have a timed and prompted voiding program?

In this chapter, I present the data collection process, including the time frame and any discrepancies. I address the characteristics and representation of the sample. In addition, I report the descriptive statistics used to characterize the sample. I describe the research questions and hypothesis in the statistical analysis, including associated probability values, confidence intervals, and effect sizes, and if the hypothesis requires additional statistical tests. I explain how I analyzed the statistical assumptions and the results of the *t*- test s.

Data Collection

I received IRB approval on January 7, 2021, and started the secondary analysis portion of my study on January 8, 2021. There are 360 CMS-approved nursing homes in Georgia (Nursing Home Compare, 2022). I collected data on clinical measures such as the percentages of UTIs, incontinence, and catheters come from MDS assessments conducted by nursing home staff. I reviewed incontinence rates, UTI rates, and catheter

rates from data collected by Georgia state surveyors, covering October 1, 2020, to September 30, 2021.

The target population was DONs from Georgia CMS-regulated long-term care facilities. I obtained the list of Georgia LTC facilities from the CMS Care Compare website. I accessed the Georgia Health Care Association website and reviewed the membership directory to attain the names of Georgia nursing home DONs. The Georgia Health Care Association represents long-term care professionals and is the "state's largest association for long-term care and post-acute care providers" (Georgia Health Care Association, 2021). A single-stage sampling design was employed to connect to nursing homes and quality measure data. I distributed a questionnaire to Georgia DONs. Study participants were recruited via email and surveyed if they had policies and protocols on bladder and bowel management programs for at least 1 year, including prompted and timed toileting.

I recruited participants by sending emails invitations informing potential participants that a doctoral candidate was conducting the survey. The email discussed the study's purpose, the significance of the study, and a copy of the IRB consent form. I followed the emails with a cross-sectional self-administered web-based survey using SurveyMonkey. The survey questions are as follows:

1. Does your facility have a formal bladder and bowel incontinence management program that includes timed and prompted voiding? (Y/N)
2. If you have a program, has this program been in place for a year or longer? (Y/N)

I used convenience sampling, initially sampling every fourth and then every third CMS-approved nursing home. The data collection time frame for this study was 3 months. I started telephoning nursing homes in March and April 2021 to obtain the names and email addresses of DONs, which yielded minimum results. An internet search generated the membership directory from the Georgia Health Care website. The Georgia Health Care Association membership directory provided the following:

- The list of Georgia nursing homes.
- The names of Georgia DONs.
- The email addresses of their administrators.

I replaced the names of the DONs with the email addresses of the nursing home administrators, sent out 221 emails starting at the beginning of May 5, 2021, and received four responses by 5/16/21. I sent out weekly follow-up reminders, and I sent the last reminder on 8/3/21. The survey yielded a total of 26 respondents.

Data Collection Discrepancies

There were some data collection discrepancies between my plan presented in Chapter 3 and my final data collection plan. I planned to submit questionnaires to 360 CMS-approved Georgia nursing homes; I submitted 221 surveys. In Chapter 3, I stated that I would obtain the names of DONs from Nursing Home Compare. While the website listed the names, addresses, and phone numbers of CMS-approved LTC facilities, it did not list the names of their DONs. I used the Georgia Health Care Association website to obtain the listing of Georgia DONs. The Georgia Health Care Association represents long-term care professionals and is the “state’s largest association for long-term care and

post-acute care providers" (Georgia Health Care Association, 2021). Another discrepancy was in the time to submit follow-up reminders. I planned to send reminders over 4 weeks; I sent the first reminder in 2 weeks followed by weekly reminders.

Because there were LTCs with timed and prompted voiding programs and LTCs that did not have timed and prompted voiding programs, I revised my research question to: What is the difference in the rate of UTIs in Georgia LTC facilities that have a timed and prompted voiding program and Georgia LTC facilities that do not have a timed and prompted voiding program?

The hypotheses are:

H_0: There is no difference in the rate of UTIs in Georgia LTC facilities that have a timed and prompted voiding program and Georgia LTC facilities that do not have a timed and prompted voiding program.

H_A: There is a difference in the rate of UTIs in Georgia LTC facilities that have a timed and prompted voiding program and Georgia LTC facilities that do not have a timed and prompted voiding program.

Descriptive and Sample Demographics

CMS uses state surveys to show the percentage of UTIs, but there is no distinction between CAUTIs and non-CAUTIs. I extrapolated the percentage of long-stay nursing home residents with non-CAUTIs by subtracting the percentage of indwelling catheters from the rate of UTIs.

Federal regulators use star ratings based on the quality of care to assist health care consumers in choosing long-term care facilities. Long-term facilities receive ratings from

one to five stars based on health inspections, quality measures, and staffing. Quality measures are clinical indicators that use short-and-long stay resident data to calculate the quality of resident care (CMS, 2021). Long-stay quality of care measures consists of indicators such as incontinence, indwelling catheters, and UTI rates for nursing home residents who remain in the facility longer than 100 days and who are often older and sicker (CMS, 2021).

There are 360 CMS-approved LTC facilities in Georgia. All LTC facilities are rated on one to five stars. There are 45 facilities with a five-star rating, 77 facilities with a four-star rating, and 94 facilities with a one-star rating (Nursing Home Report Card, 2022). As shown in Table 1, I received 26 respondents (N=26). Fifty-eight percent of the survey respondents came from facilities with star ratings of three and above.

Table 1

Star Ratings

Star ratings	Number of LTC facilities	Percentages
One star (*)	7	27%
Two stars (**)	4	15%
Three stars (***)	7	27%
Four stars (****)	6	23%
Five stars (*****)	2	8%

Descriptive Sample Characteristics

I compared Georgia's overall quality of care long-stay measures (UTIs, catheters, and incontinence) against the national averages. I reviewed data collected between the dates of 10/1/20 and 9/30/21. The national average for UTIs is 2.4%, Georgia ranks higher at 3.4% for data collected (CMS, 2021). The national average for residents with indwelling catheters is 1.6%; Georgia ranks lower at 1.5% (CMS, 2021). The national average for incontinent episodes is 47.1%, Georgia ranks lower at 43.4% (CMS, 2021). Table 2 shows the survey results of the Timed and Prompted Voiding Survey and the quality-of-care measures.

Table 2

LTC Data on UTIs, Incontinence, Cath's, W/O Cath's, Timed & Prompted Voiding

SNFs	UTIs	Incontinence	Cath's	W/O Cath's	T&P
# 1	3.51%	77.5%	1.6%	98%	Yes
# 2	2.3%	47.2%	0.00%	100%	Yes
# 3	7.6%	61.1%	3.9%	96.9%	Yes
# 4	2.6%	71.1%	0.00	100%	Yes
# 5	1.4%	35.3%	0.6%	99.4%	Yes
# 6	4.2%	33.3%	0.2%	99.8%	Yes
# 7	11%	54.4	0.00%	100%	Yes
# 8	4.8%	52.2%	3.1%	96.9%	Yes
# 9	2.1%	23%	0.00%	100%	Yes
# 10	0.3%	83.3%	0.5%	99.5%	Yes
# 11	8.9%	31.8%	1.5%	98.5%	No

# 12	6.3%	40%	1.5%	98.5%	No
# 13	11.8%	No data	0.00%	100%	No
# 14	12%	0.00%	0.7%	99.3%	No
# 15	8.7%	56.6%	2.1%	97.9%	No
# 16	4.6%	10%	3.6%	96.4%	Yes
# 17	0.8%	51.8%	0.2%	99.2%	Yes
# 18	**1.4%**	**51%**	**2.8%**	**97.2**	**Yes**
# 19	**0.00%**	**24.6%**	**0.00%**	**100%**	**Yes**
# 20	5%	87.5%	0.00%	100%	Yes
# 21	7.5%	40.6%	0.00%	100%	No
# 22	6.2%	46.1%	2.3%	97.7%	Yes
# 23	0.5%	52.8%	1.6%	98.4%	No
# 24	6%	37.3%	1.4%	98.6%	Yes
# 25	2.1%	38.9%	0.00%	100%	Yes
# 26	0.5%	56.3%	1.3%	98.7%	No
N=26					

I used Survey Monkey as the online survey tool to collect data from Georgia LTC DONs. As shown in Table 3, a higher percentage of participants answered yes to having policies and procedures for timed and prompted voiding than those who answered no.

percentage of participants answered yes to having policies and procedures for timed and prompted voiding than those who answered no.

Table 3

Responses as calculated per Survey-Monkey

Answer choices	Responses	Totals (n)
Yes	69.23%	18
No	30.77%	8

Data Analysis

Assumptions

My revised research question was: What is the difference in the rate of UTIs in Georgia LTC facilities that have a timed and prompted voiding program and Georgia LTC facilities that do not have a timed and prompted voiding program? I conducted a two tailed independent *t*-test to examine the association between a dichotomous categorical variable and a continuous dependent variable (Bannon, 2013). I tested the statistical assumptions on a continuous dependent variables (UTI rates) to assess if my data met the assumptions to perform an independent -sample *t*-test.

Assumptions are tests to assure there is validity and reliability of research and are measured by reviewing the data and performing the appropriate statistical tests (Verma & Abdel-Salam, 2019). I examined the relationship between a prompted and timed voiding incontinence management program and non-CAUTI rates for residents in Georgia LTC facilities. The assumptions of an independent *t* test are (a) the sample is normally

distributed, (b) data are measured at least at the interval level, (c) the variances of the sample are about equal which is homogeneity of variances, and (d) the groups are independent (Field, 2015). I surveyed the DONs of the Georgia LTCs to determine whether their facility had a timed and prompted voiding program.

I tested the first assumption by using the Shapiro-Wilk test to evaluate if the data were normally distributed. The Shapiro-Wilk test showed no significance p=.191 for LTC facilities with a timed and prompted voiding program and p=.203 for LTC facilities that do not have a timed and prompted voiding program (Table 4).

Table 3

Shapiro-Wilk Test Dependent Variable UTIs

T&P voiding	Stats	df	Sig	Stats	df	Sig
Yes	.185	8	,200	.881	8	.191
No	.146	18	.200	.931	18	.203

I measured data at an interval level by obtaining data from the CMS website and reviewed the percentages of UTIs, incontinence, and LTC residents with and without indwelling urinary catheters. Furthermore, I used the *t*-test to analyze the difference between LTC facilities that had timed and prompted voiding programs and those that did not. A *t*-test is a parametric test used to test a hypothesis at an interval level (Bhandari, 2023).

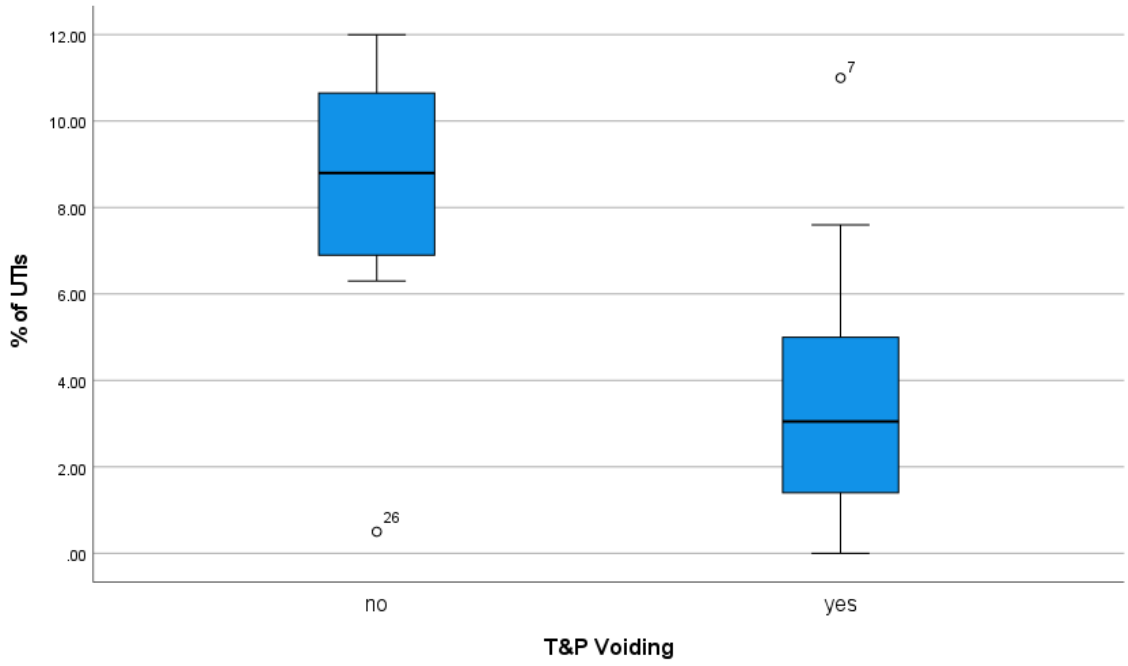
The second assumption is that data is measured at an interval level. Sample participants answered a yes/no to a survey questioning whether their facility had a timed and prompted voiding program. I reviewed the independent variable and found no relationship between the two groups.

Outliers

I used a boxplot graph to test the data for outliers; the test produced two outliers, as shown in Figure 2. Case number 26 indicates a potential outlier for an SNF who answered no to having a timed and prompted voiding program and a 0.50 % UTI rate. Case number 7 showed an 11% UTI rate for an SNF that answered yes to having a timed and prompted voiding program. I did have outliers and did keep them in my data, which is acceptable (Laird, 2015).

Figure 2

Bloxplot Graph for UTIs



I tested to determine if the variances of the sample were about equal which is homogeneity of variances. There were no differences between the groups as assessed by Levene's test for equality of variances (*p*=.728) for UTIs (see Table 5). Therefore, the assumption of homogeneity of variances was met.

Table 4

Levene's Test

UTIs	F	Sig.	T	df	Sig(2tailed)
Equal Variances assumed	.124	.728	-3.40	24	.002
Equal Variances not assumed			-3.08	10.957	..010

The fourth assumption was that the independent variable should consist of two categorical, independent groups. Each LTC was in either the group which had a timed and prompted voiding program or did not have a timed and prompted voiding program. Therefore, the fourth assumption was met.

Results

I conducted an independent *t*-test to evaluate the relationship between timed and prompted voiding, and UTI rates. Table 6 displays a descriptive analysis of the categorical variables timed and prompted voiding programs and the continuous variable, Georgia's LTC facilities UTI rates. A higher percentage of participants answered yes to having a timed and prompted voiding programs, 69.23% (n =18), while 30.77% (n= 8) replied no to having the program. UTI rates were lower for survey participants who had timed and prompted voiding programs M=3.6667% and M= 8.1500% for participants who did not.

I found a significant difference between participants that had a timed and prompted voiding program (p=.002) as shown in Table 6. I determined the sample size by calculating the standardized effect size using Cohen's d, Hedge's correction, and Glass's delta. As shown in Table 7, Cohen's d=3.09946 shows a large effect size and the mean differences between the study groups. I had a small sample size of N=26. More participants, n=18, answered yes to having a timed and prompted voiding program than those who did not, n=8. I used Hedges's correction =3.20072 to analyze my data.

Table 5

Independent t test

UTIs	F	Sig.	t	df	Sig(2tailed)	Mean Difference	Std. Error Difference	95% Conf. Low	95% Conf. High
Equal Variances assumed	.124	.728	3.404	24	.002	4.4833	1.317	1.76514	7.2014
Equal Variances not assumed			-3.08	10.957	.010	4.4833	1.45368	1.28228	7.6843

Table 6

Independent Samples Effect Sizes

	Standardizer[a]	Point Estimate	95% Confidence Interval	
% of UTIs			Lower	Upper
Cohen's d	3.09946	-1.446	-2.361	-.507
Hedges' correction	3.20072	-1.401	-2.287	-.491
Glass's delta	3.64887	-1.229	-2.247	-.157

Summary

I discussed the data collection process and provided a statistical analysis of the study's findings. I computed feedback from a self-administered survey questionnaire and analyzed the sample demographics. I addressed the sample characteristics of survey participants and their correlation between CMS quality of care measures of mean infection and incontinence rates. I used IBM SPSS 27 statistical software to run an independent-sample t-test.

In Chapter 5, I discuss the interpretation of my findings and discuss if it will extend knowledge in the scope and practice of gerontology nursing. I present the limitations, recommendations for the study, and implications for a positive social change in caring for gerontological residents in long-term care facilities.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of my study was to determine if there was a difference in the rate of UTIs in Georgia LTC facilities that have a timed and prompted voiding program and Georgia LTC facilities that do not have a timed and prompted voiding program. The mean infection rate for UTIs was statistically lower for facilities that had timed and prompted voiding programs. Results showed that initiating a formal incontinence management with timed and prompted voiding interventions were statistically significant (p=.002) for timed and prompted voiding and UTI rates.

Interpretation of the Findings

The national average percentage for UTIs is 2.4%, and the ratio in Georgia is 3.4% (Medicare, 2021). I found that facilities with timed and prompted voiding had a mean UTI rate of M=3.667%, and facilities that did not have timed and prompted voiding had a mean UTI rate of M =8.150%. In addition, the effect size to determine my study was "substantively significant"; Cohen's d= 3.20072, Hedges's correction =3.20072, and Glass's delta =3.64887. Sullivan and Feinn (2012) reported that although the p-value shows a study's statistical significance, the effect size or substantive significance is essential when reporting quantitative research findings.

John et al. (2016) found the parallel between incontinence and UTIs is approximately 25%. Similarly, continence management programs may reduce incontinence episodes and minimize non-CAUTI rates (Sublett, 2017). Damien et al. (2017) found that having continence management intervention can minimize

incontinence incidents**.** My findings support that having a timed and prompted toileting program reduced the risk for non-CAUTI in LTC facilities.

Research is expanding on incontinence and CAUTIs, but limited studies exist on non-CAUTIs in long-term care facilities. Damian et al. (2017) found that rates of urinary incontinence correlate with in increased morbidity and mortality. Newman (2019) found that every 2-hour prompted voiding minimized pressure injuries and UTIs. Eikelenboom-Boskamp et al. (2019) conducted a prevalence study from 2012 to 2017 and concluded that incontinence management programs reduced the risk of UTIs. My study supported these results as I showed a statistical significance (p = .002) for participants using timed and prompted voiding programs.

Theoretical Framework

Donabedian's (1966) theoretical quality improvement model supported this my study. Donabedian argued that factors besides medical care could affect healthcare outcomes and asserted that methodology influenced patient outcomes and advocated examining research studies for validity and reliability. The essential components of Donabedian's framework include (a) structure, (b) process, and (c) outcomes. Structure and process are crucial factors of healthcare outcomes. I analyzed and interpreted the study's findings using this model to evaluate timed and prompted voiding toileting programs (process) in Georgia LTC facilities (structure) and the facility's UTI rates (outcome). The results of my study supported Donabedian's theory that applying interventions that are driven by quantitative data can improve patient outcomes.

Limitations

I calculated the sample size by performing a G-power analysis using a two-tailed independent *t*-test, a median effect size, a power of 0.80, and a significance level of 0.05. There were challenges with survey response rates. I administered the survey from May 10, 2021 through August 11, 2021. In June 2021, I started sending weekly reminders and averaged two responses after each reminder email. I did not receive any survey responses to the last email reminder. More participants answered yes to having policies and procedures for timed and prompted voiding than those who answered no. A limitation is possible DON bias due to the survey questions. I administered a two-question survey asking participants if they had timed and prompted voiding programs, but this did not indicate compliance with the program. More participants answered yes to having policies and procedures for timed and prompted voiding than those who answered no.

This study focused on participants from Georgia, and the survey response was low, which may affect generalizability. Presenting the survey to Georgia Health Care Association nursing members may influence buy-in for participation and increase future study response rates. Another limitation of the study was using a single researcher. Munn (2020) found that having a study coordinator who worked with participants was crucial in influencing response rates.

Recommendations

I recommend further studies on timed and prompted voiding and non-CAUTIs in LTC facilities. While literature is available on incontinence management and morbidity/mortality, ambiguity exists if it is the consequence of a disease process or due

to incontinence. Furthermore, limited research exists on timed and prompted voiding toileting programs and UTIs in the long-term care setting.

The sample size for my study was N =26. I recommend a larger sample size for future studies to increase power and generalizability. The Georgia Health Care Association represents members of the long-term care community requesting their participation in future studies may influence response rates. Expanding study participants to include LTC facilities outside of Georgia (e.g., the southeast region) can be beneficial in increasing the sample size. In addition, increasing the time frame for survey data collection from three months to 6 months may yield a higher response rate.

Implications

I analyzed the difference in the rate of UTIs in Georgia LTC facilities that have a timed and prompted voiding program and Georgia LTC facilities that do not have a timed and prompted voiding program. UTIs can diminish the quality of life for LTC residents. Approximately 20% of residents have UTIs, and over 380,000 are hospitalized or succumb to death (CDC, 2021). About 70% of LTC residents receive one or more courses of antibiotics, and 40% to 75% are prescribed inappropriately (CDC, 2021). Older adults in LTC facilities are at risk for side effects such as antibiotic resistance infections or C-diff. Reducing the risk of UTIs can improve the quality of care for LTC residents. Timed and prompted voiding is a non-invasive intervention that may minimize non-CAUTIs.

I used Donabedian's (1966) theoretical framework to guide my study. Donabedian's paper on "Evaluating the Quality of Medical Care" set the groundwork for

quality assurance and is used widely in healthcare research. The framework effectively organized my data collection and analysis process. The findings from my study indicated that LTC facilities that did not have a timed and prompted voiding program had a mean average rate of 8.150%, which is significantly higher.

Conclusion

Minimizing incontinence episodes can improve the quality of life for LTC residents by promoting dignity and minimizing the risk of urinary tract infections. Infections are a significant health risk for long-term care residents and affect their quality of life. Long-term care providers often overprescribe antibiotics to LTC residents, putting them at risk for antibiotic resistance infections and Clostridium difficile. Approximately 30% to 40% of the population succumb to urosepsis (Porat et al., 2021). Eikelenboom-Boskamp et al. (2019) conducted a prevalence study from 2012 to 2017 and concluded that incontinence management programs reduced the risk of UTIs.

The social impact of this study is providing gerontology nursing interventions grounded in science, reducing morbidity/mortality rates, and improving the quality of life for LTC residents. Nurses are the primary caregivers for incontinence care in the long-term care setting. Timed and prompted voiding is a non-invasive intervention that may reduce the risk for UTIs. Further quantitative analysis on timed and prompted voiding and UTIs may contribute to evidence-based incontinence management programs.

While there is significant research on CAUTIs, minimal research exists on timed and prompted voiding programs and UTIs. This study revealed that 96.4% to 100% of LTC residents did not have indwelling catheters. Further studies on non-CAUTI rates and

timed and prompted voiding management programs can improve healthcare outcomes for older adults residing in LTC facilities.

References

Ajayi, T., & Radhakrishnan, R. (2016). Urinary tract infection in older adults in long-term care facilities. *CMAJ: Canadian Medical Association Journal Journal De L'association Medicale Canadienne*, *188*(12), 899. https://doi.org/10.1503/cmaj.150708

Aloush, S. M., Al Qadire, M., Assmairan, K., Al Sheikh, H., Mosbah, A., Hussien, H., & Al Bzoor, B. (2019). Risk factors for hospital-acquired non-catheter-associated urinary tract infection. *Journal of The American Association of Nurse, 31*(12), 747–751. https://doi.org/10.1097/JXX.0000000000000175

Aloush, S. M., Al Qadire, M., Assmairan, K., Al Sheikh, H., Mosbah, A., Hussien, H., & Al Bzoor, B. (2019). Risk factors for hospital-acquired non-catheter-associated urinary tract infection. *Journal of The American Association of Nurse, 31*(12), 747–751. https://doi.org/10.1097/JXX.0000000000000175

Ameh, S., Gómez-Olivé, F. X., Kahn, K., Tollman, S. M., & Klipstein- Amir, Y., Tan, F. E. S., Halfens, R., Lohrmann, C., & Schols, J. (2017). Pressure ulcer prevalence and care in Indonesian hospitals: A multicenter, cross-sectional evaluation using an extended Donabedian model. *Ostomy Wound Management, 63*(2), 8–23.

Ayanian, J. Z., & Markel, H. (2016). Donabedian's lasting framework for health care quality. *The New England Journal of Medicine, 375*(3), 205-207. https://doi.org/10.1056/NEJMp1605101

Bannon, W. (2013). *The 7 Steps of Data Analysis:* (1st ed.) Stats Whisper Press.

Berwick, D., & Fox, D. M. (2016). Evaluating the quality of medical care": Donabedian's classic article 50 years later. *Milbank Quarterly*, *94*(2), 237–241.

Bettez, M., Tu, l., Carlson, K., Corcos, J., Gajewski, J., Jolivet, M., & Bailly, G. (2012). Guidelines for adult urinary incontinence collaborative consensus document for the Canadian Urological Association. *Canadian Urological Association journal = Journal de l'Association des urologues du Canada*, *6*(5), 354–63.

Bhandari, P. (2023, June 21). *Interval Data and How to Analyze It | Definitions & Examples.* Scribbr. https://www.scribbr.com/statistics/interval-data/.

Blekken, L. E., Vinsnes, A. G., Gjeilo, K. H., Mørkved, S., Salvesen, Ø., Norton, C., & Nakrem, S. (2015). Effect of a multifaceted educational program for care staff concerning fecal incontinence in nursing home patients: Study protocol of a cluster randomized controlled trial. *Trials*, *16*(1), 1–9. https://doi.org/10.1186/s13063-015-0595-3

Burkholder, G. J., Cox, K., & Crawford, L. (2016). *The Scholar-Practitioner's Guide to Research Design*. ScholarWorks.

Castle, N., Engberg, J. B., Wagner, L. M., & Handler, S. (2017). Resident and facility factors associated with the incidence of urinary tract infections identified in the nursing home minimum data set. *Journal of Applied Gerontology: The Official Journal of The Southern Gerontological Society*, *36*(2), 173–194.

Centers for Disease Control. (2017). Antibiotic use in the United States, 2017: Progress and opportunity. https://www.cdc.gov/antibiotic-use/stewardship-report/pdf/stewardship-report.pdf

Centers for Disease Control. (2018). E Coli. https://www.cdc.gov/ecoli/index.html

Centers for Disease Control. (2021). Healthcare-associated Infection Surveillance Protocol for Urinary Tract Infection (UTI) Events for Long-term Care Facilities https://www.cdc. /nhsn/pdfs/ltc/ltcf-uti-protocol-current.pdf

Centers for Disease Control. (2019). Nursing home and assisted living (Long term Care facilities). www.cdc.gov/longtermcare/resources/index.htm

Centers for Disease Control (2018). Urinary tract infections (catheter-associated urinary tract infections (CAUTI) and non-catheter-associated urinary tract infections and other urinary system infections. www.cdc.gov/nhsn/pdfs/pscmanual/7psccauticurrent.pdf

Centers for Medicare and Medicaid Services. (2019a). Design for nursing home compare five-star quality rating system. www.cms.gov/Medicare/Provider-Enrollment-and-Certification/CertificationandComplianc/Downloads/usersguide.

Centers for Medicare and Medicaid Services. (2019b). Minimum Data Sets 3.0 Public Records. www.cms.gov/Research-Statistics-Data-and-Systems/Computer-Data-and-Systems/Minimum-Data-Set-3-0-Public-Reports/inde

Dain, J., Baumann, L., & Scheibel, P. (2012). *Advanced Health Assessment and Clinical Diagnosis in Primary Care*. (4th ed.*)* Mosby.

Damián, J., Pastor, B. R., García López, F. J., & Pedro, C. J. (2017). Urinary incontinence and mortality among older adults residing in care homes. *Journal of Advanced Nursing (John Wiley & Sons, Inc.)*, *73*(3), 688–699.

Dielubanza E, Mazur, D, Schaeffer, A. (2014). Management of Non-catheter associated Complicated Urinary Tract Infection *Infectious Disease Clinics of North America* 121-134 https://doi.org/10.1016/j.idc.2013.10.005

Donabedian, A. (1966). *Evaluating the quality of care.* The Milbank Memorial Fund Quarterly (3) (166–203).

Dwyer, T., Craswell, A., Rossi, D., & Holzberger, D. (2017). Evaluation of an aged care nurse practitioner service: Quality of care within a residential aged care facility hospital avoidance service. *BMC Health Services Research*, *17*(U1), 33.

Edemekong PF, Bomgaars DL, Sukumaran S. (2021). Activities of Daily Living https://www.ncbi.nlm.nih.gov/books/NBK470404/

Eikelenboom-Boskamp, A., Saris, K., van Loosbroek, M., Drabbe, M. I. J., de Jongh, F., de Jong, J. W. D., Voss, A. (2019). Prevalence of healthcare-associated infections in Dutch nursing homes: Follow-up 2010-2017. *The Journal of Hospital Infection*, *101*(1), 49–52. https://doi: 10.1016/j.jhin.2018.08.011.

European Centre for Disease Prevention and Control. (2017). Healthcare-associated infections. https://www.europa.eu/en/healthcare-associated infections (europa.eu)

Families for Better Care. (2019). Nursing home report cards. https://familiesforbettercare.com/index.php/about

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*, 1149-1160.

Franken, M. G., Corro Ramos, I., Los, J., & Al, M. J. (2018). The increasing importance of a continence nurse specialist to improve outcomes and save costs of urinary incontinence care: an analysis of future policy scenarios. *BMC Family Practice*, *19*(1), 31. https:// DOI: 10.1186/s12875-018-0714-9

Gray, M. (2017). Case Studies in Geriatric Urology: Focus on continence in the older Adult. *Urologic Nursing*, *37*(3), 143–170. https:// DOI:10.7257/1053816X.2017.37.3.143

Grove, S., Burns, N., & Gray, J. (2013). *The Practice of Nursing Research. Appraisal, Synthesis, and Generation of Evidence* (7th ed.) St. Louis MO: Elsevier Saunder

Hakkarainen, T. W., Ayoung-Chee, P., Alfonso, R., Arbabi, S., & Flum, D. R. (2015). Structure, process, and outcomes in skilled nursing facilities: understanding what happens to surgical patients when they cannot go home. A systematic review. *The Journal of surgical research*, *193*(2), 772–780. https:// doi: 10.1016/j.jss.2014.06.002

Huether, S. E., & McCance, K. L. (2012). *Understanding pathophysiology* (Laureate custom ed.). Mosby.

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: 10.1111/j.1471-6712.2010.00836. x.

Jamieson, H. A., Schluter, P. J., Pyun, J., Arnold, T., Scrase, R., Nisbet-Abey, R., … Gray, L. (2017). Fecal incontinence is associated with mortality among older adults with complex needs: An observational cohort study. *The American Journal of Gastroenterology*, *112*(9), 1431–1437.

Jerez-Roig, J., Souza, D. B., Amaral, F. S., & Lima, K. C. (2015). Prevalence of fecal incontinence (FI) and associated factors in institutionalized older adults. *Archives of Gerontology and Geriatrics*, *60*(3), 425-430. doi:10.1016

John, G., Bardini, C., Combescure, C., & Dällenbach, P. (2016). Urinary incontinence as a predictor of death: A systematic review and meta-analysis. *PloS one*, *11*(7),

Lai, C. K. Y., & Wan, X. (2017). Using prompted voiding to manage urinary incontinence in nursing homes: Can it be sustained? *Journal of The American Medical Directors Association*, *18*(6), 509–514.

Laerd Statistics (2015) *Statistical tutorials and software guides*. https://statistics.com/

Lund Research Ltd (2020). Laerd Statistics

Mahdavi, M., Vissers, J., Elkhuizen, S., van Dijk, M., Vanhala, A., Karampli, E., van de Klundert, J. (2018). The relationship between context, structure, and processes with outcomes of 6 regional diabetes networks in Europe. *Plos One*, *13*(2), 1–17.

Martinez, D. A., Kane, E. M., Jalalpour, M., Scheulen, J., Rupani, H., Toteja, R., Levin, S. R. (2018). An electronic dashboard to monitor patient flow at Johns Hopkins Hospital: Communication of key performance indicators using the Donabedian

Model. *Journal of Medical Systems*, 42(8).

Mayo Clinic. (2018). Fecal incontinence. https://www.mayoclinic.org/diseases-conditions/fecal-incontinence/symptoms-causes/syc-20351397

Munn, L. T., & Jones, C. B. (2020). Conducting Research in Hospitals: Methods to Maximize Survey Response Rates Among Nurses. *JONA: The Journal of Nursing Administration*, *50*(4), 187–189.

Nauert, R., & Johnson, P. (2011). Novel Activity Reduces Nursing Home Depression. *Texas Public Health Journal, 63*(3), 11–14.

Ness, W. (2018). Managing faecal incontinence. *British Journal of Nursing*, *27*(7), 378–381

Newman, D. K. (2019). Prompted voiding for individuals with urinary incontinence. *Journal of Gerontological Nursing, 45*(2), 14-26.

Northwood, M., & Skelly, J. (2014). Improving continence care for older adults in the community: Chronic care model mobilized. *Perspectives: The Journal of the Gerontological Nursing Association*, *37*(1), 15–23.

Nowak, M., Pfaff, H., & Karbach, U. (2017). Does value stream mapping affect the structure, process, and outcome quality in care facilities? A systematic review. *Systematic Reviews*, *6*(1), 170.

Nursing Home Report. (2019). Retrieved from nursinghomereport.org/state GA

Nyman, M., Forsman, H., Ostaszkiewicz, J., Hommel, A. (2016). Urinary incontinence and its management in patients aged 65 and older in orthopedic

care – what nursing and rehabilitation staff know and do. *Journal of Clinical l Nursing (John Wiley & Sons, Inc.)*, *26*(21–22), 3345–3353.

Ostaszkiewicz, J., Hutchinson, A., & Cull, E. (2016). Cleaning, containing and concealing incontinence in residential aged care facilities: staff members' constructions of quality continence care...25th National Conference on Incontinence in association with the Urogynecology Society of Australasia 9-12 November 2016 Adelaide Convention Centre, Adelaide, South Australia. *Australian & New Zealand Continence Journal*, *22*(4), 102–103.

Ostaszkiewicz, J., O'Connell, B., & Dunning, T. (2016). Fear and overprotection in Australian residential aged-care facilities: The inadvertent impact of regulation on quality continence care. *Australasian Journal on Ageing*, *35*(2), 119-126. doi:10.1111/ajag.12218

Park, S., De Gagne, J. C., Aeyoung So, & Palmer, M. H. (2015). Knowledge, attitudes, and practices in registered nurses and care aids about urinary incontinence in Korean nursing homes. *Journal of Wound, Ostomy & Continence Nursing*, *42*(2), 183–189.

Paquette I, Varma M, Kaiser A, Scott R. Steele S, Rafferty J. (2015). The American Society of Colon and Rectal Surgeons' Clinical Practice Guideline for the Treatment of Fecal Incontinence. *The American Society of Colon & Rectal Surgeons* Retrieved from https://fascrs.org doi10.1097/DCR.0000000000000397

Polit, D., & Beck, C. (2012). *Nursing Research Generating and Assessing Evidence for Nursing Practice* (9th ed.) Lippincott Williams and Wilkins

Porat A, Bhutta BS, Kesler S. Urosepsis. (2021). https://www.ncbi.nlm.nih.gov/books/NBK482344/

Qaseem A., Dallas P., Forciea M., Starkey M., Denberg T., & Shekelle P. (2014). Nonsurgical management of urinary incontinence in women: A clinical practice guideline from the American College of Physicians. *Ann Intern Med*.; 161:429–

Rai, G. K., & Wood, A. (2018). Effectiveness of community pharmacies in improving seasonal influenza uptake-an evaluation using the Donabedian framework. *Journal of Public Health*, *40*(2), 359–365.

Rönneikkö, J. K., Jämsen, E. R., Mäkelä, M., Finne-Soveri, H., & Valvanne, J. N. (2018). Reasons for home care clients' unplanned Hospital admissions and their associations with patient characteristics. *Archives of Gerontology & Geriatrics*, *78*, 114–126. https://www.sciencedirect.com/science/article/pii/S016749431830122

Sales, C. B., Bernardes, A., Gabriel, C. S., Brito, M. de F. P., Moura, A. A. de, & Zanetti, A. C. B. (2018). Standard operational protocols in professional nursing practice: use, weaknesses and potentialities. *Revista Brasileira De Enfermagem*, *71*(1), 126–134.

Samara de Melo, L., Falci Ercole, F., de Oliveira, D. U., Saraiva Pinto, T., Avendanha Victoriano, M., & Goulart Constant Alcoforado, C. L. (2017). Urinary tract infection: a cohort of older people with urinary incontinence. *Revista Brasileira de Enfermagem*, *70*(4), 838–844

Senior Care. (2021). Georgia Skilled Nursing Home Facilities http://seniorcare.com

Simmering, J. E., Tang, F., Cavanaugh, J. E., Polgreen, L. A., & Polgreen, P. M. (2017). The increase in hospitalizations for urinary tract infections and the associated costs in the United States, 1998-2011. *Open Forum Infectious Diseases*, *4*(1), ofw281. https//doi.org/:10.1093/ofid/ofw281

Shield, R., Rosenthal, M., Wetle, T., Tyler, D., Clark, M., & Intrator, O. (2014). Medical staff involvement in nursing homes: development of a conceptual model and research agenda. *Journal of Applied Gerontology: The Official Journal Of The Southern Gerontological Society*, *33*(1), 75–96.doi: 10.3928/01484834-20171020-02

Smith, S. N., Greene, M. T., Mody, L., Banaszak-Holl, J., Petersen, L. D., & Meddings, J. (2018). Evaluation of the association between nursing home survey on patient safety culture (NHSOPS) measures and catheter-associated urinary tract infections: results of a national collaborative. *BMJ Quality & Safety*, *27*(6), 464–doi: 10.3928/01484834-20171020-02

Sublett, C. M. (2016). Translating evidence into clinical practice. Application to the evidence Base: Effect of an education intervention on urinary tract infection knowledge. *Urologic Nursing*, *36*(2), 72–73. www.prolibraries

Sullivan, G. M., & Feinn, R. (2012). Using Effect Size—Or Why the P Value Is Not Enough. *Journal of Graduate Medical Education*, *4*(3), 279-282. https://doi.org/10.4300/JGME-D-12-00156.1

Sund, T., Iwarsson, S., & Brandt, Å. (2015). The relationship between the key elements of Donabedian's conceptual model within the field of assistive technology. *Studies In Health Technology And Informatics, 217*, 485–490.

Thirugnanasothy, S. (2010). Managing urinary incontinence in older people. *BMJ British Medical Journal* https://www.bmj.com/content/bmj/341/7768/Clinical_Review.full.pdf,

United States Department of Health & Human Services, National Institute of Health. (2017). National Center for Complimentary and Integrated Health. https://nccih.nih.govhealth/providers/clinical practice

University of Rhode Island. (2017) College of Pharmacology Antimicrobial Stewardship Guidebook https://web.uri.edu/antimicrobial-stewardship/files/Non-Catheter-Associated-Urinary-Tract-Infection-Prostatitis.pdf

Verma, J. P., & Abdel-Salam, A.-S. G. (2019). *Testing statistical assumptions in research*. Wiley.

Voyce, J., Gouveia, M. J. B., Medinas, M. A., Santos, A. S., & Ferreira, R. F. (2015). A Donabedian Model of the Quality of Nursing Care From Nurses' Perspectives in a Portuguese Hospital: A Pilot Study *J Nurs Meas.,23*(3):474-84. DOI: 10.1891/1061-3749.23.3.474

Appendix: Recruitment Letter

This letter serves as an invitation to participate in a research survey. This research is for a dissertation conducted by a doctoral nursing candidate. The purpose of this subject is to examine whether a relationship exists between the use of incontinence protocols/programs and the prevalence of non-catheter associated urinary tract infections, overall incontinence rates, and the use of indwelling catheters in Georgia nursing home residents.

The questionnaire will be distributed online with a website link. Each site will have an assigned number to replace the name of the facility and allow matching to CMS publicly available data. Your confidentiality will be maintained by reporting summary data absent personal nursing home attributes. Participation in this study constitutes informed consent. The survey questions are:

1. Does your facility have a formal bladder and bowel incontinence management program that includes routine toileting and prompted voiding? (Y/N)
2. How long has this program been in place? (< 1 year, > 1 year).

Your participation in this study will contribute to the knowledge base regarding the potential for formal incontinence management programs to reduce incontinence rates and non-catheter associated infections, in long-term care facilities.

Thank you in advance for your contribution.

Deborah Jeanmarie PhD Candidate