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This doctoral project, directed and approved by the candidate's committee, has been accepted by the College of Graduate and Professional Studies of Abilene Christian University in partial fulfillment of the requirements for the degree.

Doctor of Nursing Practice

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College of Graduate and Professional
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Date: 11/02/2023

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School of Nursing

Assessment of Self-Efficacy and Practice Change Following Pressure Injury Education
in a Long-Term Care Facility

A doctoral project submitted in partial satisfaction
of the requirements for the degree of
Doctor of Nursing Practice

by

Charity L. Booker

November 2023

Dedication

I dedicate this project to granddaughters Harper Elizabeth, Chole Camille, and to my late father. My father is not here to witness this achievement, but he would have been extremely proud. He did not complete a formal education; however, he worked hard all of his adult life. He followed the biblical instructions to give to the poor and to leave an inheritance to his children's children (Proverbs 13:22 & 19:17). I admire him for this legacy and am striving to do just that. My desire is to leave a legacy of educational pursuits and excellence for my grandchildren and to instill that there are no barriers that God cannot help you overcome, and there is no shelf life on your potential.

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Abstract

The purpose of this scholarly project was to evaluate if pressure injury education improved nursing knowledge and self-efficacy in the prevention and management of pressure injuries with the intent to improve practice. A literature review was conducted to evaluate educational interventions for adult learners and nursing roles in the care process. Existing studies indicated that patient outcomes are improved when nurses have adequate knowledge in pressure injury prevention. This quality improvement project was implemented in a long-term care facility with 28 nursing staff. The Agency for Healthcare Research and Quality pressure injury best practices presentation was the basis for the educational intervention with both didactic and interactive identification of best practice. Validated instruments included a pre- and posttest questionnaire applying Beeckman's Pressure Ulcer Knowledge Assessment Tool Version 2.0, posttest assessment of self-efficacy and levels of learning prior to and after pressure injury education, and the Pressure Ulcer Management Self-Efficacy Scale for Nurses. The pre- and posteducation scoring demonstrated improved knowledge of pressure injury intervention and management. The statistical analysis employed the Wilcoxon signed-rank test, which revealed compelling results. With a test statistic of 21.0 and a p value lower than the predetermined alpha level (.0018), the null hypothesis was confidently rejected in favor of the alternative, which suggests pressure injury education had a positive effect on the performance of the surveyed individuals. These findings underscore the importance of ongoing education in health care settings. The data strongly suggest that continuous learning can enhance the knowledge and self-efficacy of nurses and certified nursing assistants, ultimately contributing to improved patient care and outcomes.

Keywords: pressure ulcers, pressure injuries, long-term care, nursing education, pressure ulcer prevention, control, nursing knowledge

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Chapter 1: Introduction

Pressure injuries (formerly known as pressure ulcers, pressure sores, decubitus sores, decubitus ulcers, decubiti, or bedsores) have been on the spectrum as a concern of nurses before Florence Nightingale associated the responsibility of wound care to the nursing process (Ayello et al., 2017). Pressure injuries may cause pain, immobility, or associated complications that impact the individual's quality of life (Lavallée et al., 2018). The European Pressure Ulcer Advisory Panel (EPUAP et al., 2019) and the National Pressure Ulcer Advisory Panel (NPUAP et al., 2014) defined a pressure injury as localized damage to the skin and underlying soft tissue, usually over a bony prominence or related to a medical device. Pressure injuries develop from prolonged pressure coupled with shear and friction, forces from the body's weight, or medical devices (Mondragon & Zito, 2022; NPUAP et al., 2014). Pressure-related tissue injury may occur in patients with sensory deficits such as debility, paralysis, or circulatory issues, as they lack the necessary pressure feedback response, which may result in sustained pressure for prolonged periods (Mondragon & Zito, 2022). Additional contributing etiologies for pressure injury development include shearing forces, friction, moisture, poor nutritional status, and increased arteriole pressure (Mervis & Phillips, 2019; Mondragon & Zito 2022).

Pressure injuries impose significant burdens and are one of the most important management issues for health care organizations, requiring extra care cost for the individual and increased health care cost for medical institutions (Hajhosseini et al., 2020; Kim et al., 2020). Pressure injuries may result in hospital readmissions, with poor outcomes for the individual. The Centers for Medicare and Medicaid Services (CMS) also may assess penalties to health care organizations where pressure injuries are an issue (NPUAP et al., 2014; Wassel et al., 2020). In the United States, the prevalence of pressure injuries continues to increase, with estimated

treatment costs up to \$17.8 billion (Hajhosseini et al., 2020). Additionally, the cost of treatment for a pressure injury may range from \$75,000 to \$150,000 per patient, with the average cost for a Stage 3 or 4 pressure injury being \$250,000 with a fivefold increase in hospital length of stay (Padula & Delarmente, 2019). Patients with hospital-acquired pressure injuries have a median excess length of stay of 4.31 days (EPUAP et al., 2019).

Pressure injuries are indicators of the care quality provided by a facility; therefore, inadequate steps in prevention or treatment may lead to financial penalties or litigation (Mondragon & Zito, 2022). Pressure injuries are also associated with 17,000 lawsuits annually, with judgements as high as \$312 million (Agency for Healthcare Research and Quality [AHRQ], 2014; NPUAP et al., 2014). Additionally, pressure injuries are the second-most common claim after wrongful death, with 60,000 pressure injury related deaths per year (EPUAP et al., 2019). Most hospital-acquired pressure injuries can be prevented; however, approximately 2.5 million individuals in the United States will develop a pressure injury (EPUAP et al., 2019; Padula & Delarmente, 2019). Individuals who are seriously ill, elderly, have impaired mobility, and/or have poor nutrition are most at risk of developing a pressure injury; therefore, many nursing home residents are at risk (Lavallée et al., 2018).

In nursing home settings, pressure injuries are a serious concern despite regulatory and market approaches to facilitate prevention and treatment (AHRQ, 2016). As of 2007, CMS no longer reimbursed health care facilities for additional costs associated with many preventable errors, including those considered to be “never events,” which are publicly reported with the goal of increasing accountability and improving the quality of care (Patient Safety Network, 2019a). Hospital-acquired Stages 3 and 4 pressure injuries are included on the CMS list of *never events*, which halts reimbursement on nurse-sensitive indicators of quality. Therefore, health

organizations are under scrutiny to eliminate never events (Patient Safety Network, 2019a). Nurse-sensitive indicators measure the conditions for changes in a patient's health status that nursing care can directly impact. These indicators are the basis for monitoring care quality (Afaneh et al., 2021). Additionally, nurse-sensitive indicators establish common standards for benchmarking and provide evidence of the cost-effectiveness of nursing care (Afaneh et al., 2021).

The facility where this project took place takes pressure injury prevention very seriously. In 2019, the Veterans Health Administration (VHA) prioritized objectives in a health policy directive that outlined best practices for pressure injury prevention and management in addition to development of new technologies to mitigate pressure injury development (Hedt, 2020). The VHA created a pressure injury resource via a downloadable mobile application that provides nonhospitalized patients with educational tools necessary to prevent, understand, and track pressure injuries (U.S. Department of Veterans Affairs, n.d.). Staff may also utilize the mobile application to educate their patients in pressure injury prevention. To improve care quality and achieve pressure injury preventative goals, nurses require knowledge of pressure injuries pathogenesis, assessment prevention, and management. The NPUAP recommends providing guidelines on pressure injury assessment and intervention, which is imperative to assess the nurses' and other health care professionals' knowledge level of pressure injury prevention combined with ongoing continuing education in this vital area of patient care (Aydin et al., 2019). Nursing knowledge of pressure injuries enables the nurse to properly identify pressure injuries and accurately document all elements such as etiology, size, exudate, tissue type, periwounds, treatment used, pain addressed, off-loading devices, and direction of healing of the pressure injury to track the wound progression (Lyder & Ayello, 2009).

Nursing knowledge of etiologies that contribute to the pathogenesis of pressure injuries enables identification of patients at risk so that measures may be implemented to prevent pressure injury occurrence (Mondragon & Zito, 2022). Today's nurses must keep up with the ever-changing demands of their profession and be lifelong learners, continuing to increase their knowledge and skill acquisition including regular pressure injury educational sessions with competency documentation (Ayello et al., 2017). Evidence suggests that nursing knowledge regarding prevention and treatment of pressure injuries is less than optimal (Aydin et al., 2019; Kim et al., 2020). There is an enhanced awareness for health care organizations to recognize the importance of increasing nursing knowledge to improve pressure injury prevention strategies and reduce pressure injury–related complications.

Statement of the Problem

Pressure injuries result in pain, disfigurement, amputations, and increased infection risk and are associated with longer hospital stays and increased morbidity and mortality (AHRQ, 2016). No other preventable event occurs as frequently as pressure injuries (EPUAP et al., 2019). Pressure injuries remain a significant problem within hospitals and long-term care (LTC) facilities and result in decreased quality of life and high costs for both the patient, the health organization, and the health care system (Mondragon & Zito, 2022). Pressure injuries are a substantial burden for over 1 in 10 adult patients admitted to hospitals; moreover, superficial Stage 1 and 2 pressure injuries are identified as the most common stages where further wound deterioration is preventable (Li et al., 2020). Additionally, Hajhosseini et al. (2020) asserted that the increase in the incidence of pressure injuries may be attributed to the growing number of elderly requiring nursing home care, nurses' poor understanding of pressure injury management, and a deficiency of research in this area.

Nursing knowledge and clinical judgement of pressure injury recognition and visual acuity ability are important assessment skills that are crucial to preventing and treating pressure injuries in LTC. Although these professional skills are vital in the management of pressure injuries and should be a required competency for all LTC nursing staff, previous research has shown that nurses' overall level of knowledge in this area is low (Kim et al., 2020). Evidence demonstrates that pressure injury education results in a decreased incidence of pressure injuries and increased ability to manage them (Aydin et al., 2019). According to Kim et al. (2020), in acute-care hospitals, pressure injury–related education is aimed at nurses and advance practice registered nurses (APRNs), which is in contrast to nurses in subacute hospitals and LTC settings who do not receive the same level of pressure injury training. Subsequently, nurses in subacute and LTC settings are more likely to be providers of care to older and debilitated patients who are at risk for pressure injury development. Furthermore, only a few researchers have examined how staff education increases nursing knowledge of pressure injuries (Kim et al., 2020). In this pressure injury scholarly project, I evaluated how pressure injury education improves gaps in nursing knowledge of pressure injury prevention, management, and treatment.

Background

In most parts of the world, adults over age 80 are the fastest-growing population and are living longer due to advances in health care. Many may require care assistance in LTC facilities because of their disabilities and impairments (Hovey et al., 2017). According to the U.S. Census Bureau (2018), older adults are expected to outnumber children under the age of 18 by the year 2034, and nearly 1 in 4 Americans will be at least 65 years old by 2060. These statistics alone indicate the future demands for health care and caregiver assistance. Persons who are 65 or older have a 68% probability to have multiple comorbid conditions, including cognitive impairment

and disability (U.S. Census Bureau, 2018). Chronic conditions that may accompany aging, including dementia, heart disease, diabetes, arthritis, and cancer, are the nation's leading drivers of illness, disability, death, and health care costs (National Center for Chronic Disease Prevention and Health Promotion, 2022). Additionally, aging adults are a specialty group with unique care and medical necessity requirements (Schapmire et al., 2018).

Preventing pressure injuries in LTC facilities has become a crucial concern in the United States due to the increase in multiple chronic diseases among older adults. Elderly patients suffering from end-stage disease, coupled with immobility, debility, poor nutrition, and incontinence, are at higher risk of developing pressure injuries (Lavallée et al., 2018; Mäki-Turja-Rostedt et al., 2020). The prevalence of pressure injuries in LTC facilities ranges from 8.2% to 32.3%, with incidence rates as high as 59% and with treatment cost estimated at nearly \$11.6 billion (Yap et al., 2019). Furthermore, pressure injuries that occur in LTC facilities remain a significant problem due to negative impact on the patient's quality of life and significant burden attributed to the high risk of pressure injury-related complications (Ibrahim & Qalawa, 2020; Siotos et al., 2022). It is also noteworthy that the U.S. Senate prioritized pressure injury prevention research in 2018 and a bill was approved by the U.S. House of Representatives to recognize pressure injury as a national emergency in the U.S. health care system (Hedt, 2020).

Entry-level nurses are the workforce that must safeguard older adults receiving optimum nursing care (American Association of Colleges of Nursing [AACN], 2010). Entry-level nurses demonstrate deficiencies in the degree of competency in skill sets and confidence in providing care for geriatric patients in the LTC setting. A greater portion of practicing nurses care for geriatric adults without having specialized training in caring for this population. This lack of training has created gaps in knowledge about pressure injuries. Pressure injury occurrence in

nursing facilities may be linked to deficiencies in nursing and skill sets required to prevent the onset or deterioration of pressure injuries (Lee et al., 2022). Furthermore, knowledge gaps restrict the capability for the nurse to mitigate pressure injury risks or develop holistic and patient-centered plans specific to older adults. Another significant reason that contributes to pressure injury occurrence in LTC settings is the lack of standardized prevention protocols and knowledge deficits of the negative impacts of pressure injuries on patient outcomes (Mondragon & Zito, 2022).

Registered nurses (RNs) are the highest-credentialed staff in nursing homes and are accountable for the daily oversight of direct care provided by licensed practical nurses (LPNs), and certified nursing assistants (CNAs; Reform Requirements, 2016). Nursing competency skill sets are required of all nurses regardless of the clinical setting. There is an evolving expectation that nurses should retain the ability to apply various sources of information into clinical decision-making and practice (Fukada, 2018). Additionally, federal nursing home regulations mandate that nurses demonstrate distinctive competencies and skill sets that are essential to provide care for specific patient needs that align with competency requirements of the LTC facility's patient population diagnosis and acuity levels (Reform Requirements, 2016). CMS requires nursing homes to foster educational opportunities for nursing staff by developing educational tools and maintaining effective training programs to cultivate the provision of quality care, improved resident safety, and clinical outcomes.

Educating nurses to create person-centered environments facilitates a reduction in adverse events and other resident complications (Reform of Requirements, 2016). Additionally, educating nurses on effective evidence-based pressure injury risk assessment and prevention should be fundamental in LTC settings as it improves quality of life while delivering efficient

quality care in the health care organization (Mäki-Turja-Rostedt et al., 2020). Moreover, gaps in nursing knowledge about pressure injuries, wound assessment, and identification were highlighted during the COVID-19 SARS pandemic. Patients with COVID-19 demonstrated atypical pressure injury skin manifestations that were not related to friction or shearing force such as vesical eruptions, lesions, areas of livedo, and necrosis of peripheral body parts and toes (Pontieri-Lewis et al., 2021).

Siotos et al. (2022) asserted that the incidence and burden of pressure injuries in the United States have been relatively stable since 1990, without significant improvement and with incident rates being higher in comparison to comparable sociodemographic index countries. It is notable that not all pressure-related skin damage can be avoided such as in terminal pressure injuries related to end-stage malignancy complications (Vickery et al., 2020). However, the majority of pressure injuries are avoidable through interventions of a comprehensive pressure injury prevention plan (AHRQ, 2016). There are opportunities to improve the national performance levels of pressure injury, and recognizing and confronting challenges to safe practice are paramount in LTC. Pressure injury prevention education and management strategies were incorporated in this project and addressed the facility's quality improvement deficiency for pressure injury rate (U.S. Government Accountability Office [GAO], 2022).

Purpose of the Project

The purpose of this scholarly project was to evaluate if pressure injury education improves gaps in nursing knowledge of pressure injury prevention, management, and treatment in an LTC facility. The project was implemented in an LTC state veterans home located in the southeastern part of the United States over 12 weeks. A standardized pressure injury educational program equips nursing staff with tools to improve their knowledge and critical thinking in

pressure injury prevention and reduction of related complications. Training nurses in pressure injury prevention improves nursing interventions and knowledge of actual practice of pressure injury prevention (Seo & Roh, 2020). Educational strategies to increase nursing knowledge of pressure injury prevention and measures of skin repair and healing demonstrate a consensus that nursing knowledge and critical thinking in relation to preventive measures of pressure injuries are essential in health care organizations (Kim et al., 2020; Seo & Roh, 2020).

The project was guided by the following problem of interest question: In the LTC setting, does education of pressure injury prevention improve nurses' knowledge of pressure injuries and improve their self-efficacy with intent to change practice over a 12-week period? Improving nursing knowledge of early detection and reporting of wounds or signs of skin damage and prevention strategies enables patients to experience rapid recovery and avoid deterioration into a full pressure injury, and it may reduce or prevent hospitalizations (Kim et al., 2020; Price et al., 2017). The DNP project was aimed to assess nursing knowledge, including adherence to the facility's protocol for pressure injury prevention strategies including early intervention, pressure relief, nutrition, skin inspection, appropriate documentation of staging including management, and treatment of pressure injuries. I evaluated the effect of improved nursing knowledge in pressure injury prevention strategies, which resulted in improved self-efficacy with intent to change practice.

Significance

Nurses perform vital roles in the fulfilment of a successful patient experience by ensuring positive clinical outcomes; however, a broad preparation-to-practice gap impedes the nurse's ability to consistently provide safe, quality care (Kavanagh & Szveda, 2017). According to Kavey (2009), although there have been improvements in educating and training in LTC settings,

these efforts have failed to ensure all clinicians who treat older adults have the necessary knowledge and skills to provide competent care. Kavey (2009) further asserted that nursing professionals caring for older adults will be required to assume expanded nursing roles. Additionally, the Quality and Safety Education for Nursing initiative emphasized the importance of empowering nurses with essential knowledge, skills, and attitudes necessary to improve the quality and safety throughout health care (Aleamar et al., 2021).

Media outlets' coverage of the COVID-19 pandemic highlighted the LTC workforce crisis and lack of trained professionals to care for the aging population. Additionally, the pandemic altered the delivery of nursing education and required modifications of clinical experiences and instructional methods. Nursing students were restricted from on-site training in geriatric facilities (Resnick, 2021; Smith et al., 2021). They were forced to continue nursing studies virtually with instruction deficient of the critical direct, evidence-based practice bedside practicums. According to Resnick (2021), a nursing student's skill development and exposure to working in LTC are critical at this time, as without the exposure, graduate nurses will not be knowledgeable in caring for older adults.

In one project, researchers found that of 295 graduate nurses in transition to practice during the pandemic, more than half (67%) verbalized fear of missing important details or doing something wrong when providing patient care. Furthermore, graduate nurses identified the necessity of preceptor support, guidance, teaching, and continued practice of skills (Smith et al., 2021). As stated by the AACN (2010), entry-level nurses are often the workforce responsible for the care of older adults. Therefore, entry-level graduate nurses who transitioned to practice during the COVID-19 pandemic will benefit from structured pressure injury training due to gaps

in education and limited or no prior clinical experiences in caring for elderly patients with pressure injuries and other chronic multi-comorbid conditions.

Nature of Project

The goal of this quality improvement initiative was to evaluate nursing knowledge before and after an education intervention. In addition to pre- and posttest knowledge evaluation, self-efficacy because of nursing knowledge gain was measured via a posteducation survey. The facility for project completion was a 150-bed residential state veterans home located in the southeastern part of the United States. The facility provides skilled nursing and a physician on call 24 hours a day as well as memory care, wound services, and physical, occupational, and speech therapy. The population at the center consists of disabled veterans with multiple chronic diseases, many with residual stroke defects, impaired mobility, or bed-bound status. This project aimed to ascertain if education on pressure injury prevention improves nurses' knowledge and self-efficacy with the intent to change practice over a 12-week period.

A project timeline of 12 weeks was selected to allow adequate time for administration and return of preeducation surveys, staff education, and posteducation surveys to evaluate knowledge and self-efficacy. The inclusion criteria were all full-time, part-time, or per diem RNs, LPNs, and CNAs who provide care at the LTC facility. Evidence-based pressure injury prevention programs for CNAs improve skill performance and reduce the occurrence of pressure injuries in health care facilities (Kwong et al., 2020). CNAs are the first caregivers who commonly identify the first signs of a pressure injury in the LTC setting (Wogamon, 2016). Therefore, it is crucial for nursing home clinicians to possess their own knowledge of pressure injury prevention, skin assessment practices, and relevant evidence-based guidelines (Lavallée et al., 2018).

During this project, nursing staff were introduced to the educational mobile application provided by the VHA, which educates patients and their families about pressure injury prevention and helps them track any existing pressure injuries (U.S. Department of Veterans Affairs, n.d.). The administration at the state veterans home gave approval for this DNP quality improvement project. The institutional review board (IRB) of Abilene Christian University (ACU) approved this quality improvement DNP project (see Appendix A). This quality improvement project was exempt from patient consent, as the patient was the recipient of the pressure injury prevention strategies only. The project focused on presenting evidence-based pressure injury tools incorporating learning modules from the AHRQ Pressure Ulcer Best Practice Tool Kit and the NPUAP pressure injury prevention points.

Educational interventions for practice change consisted of diverse methods for pressure injury prevention strategies including off-loading, appropriate support surfaces, recognizing changing skin integrity, nutrition, skin protection against moisture, and preventing device and shearing injury. Pressure injury management education included pressure injury staging, use of appropriate wound dressings, prevention of deterioration, signs of infection, and methods to enhance pressure injury healing. Pressure injury staging training tools consisted of handouts utilizing NPUAP guidelines. Additionally, the educational presentation was in the form of PowerPoint slides, handouts, pre- and postquestionnaires to determine learning effectiveness, and knowledge attainment and impact of pressure injury practice interventions. According to Ayello et al. (2017), pressure injury education is more impactful when linked with existing knowledge and direct patient care and reinforcement by a wound nurse or other clinician.

The wound care RN completed a baseline facility assessment of the pressure injury policy and an assessment of screening for pressure injury risk. The facility assessments

established a baseline of nursing compliance with appropriate pressure injury risk assessment documentation utilizing the Braden Scale and the existing pressure injury policy. Data collection consisted of pre- and posteducation surveys and a posteducation self-efficacy survey.

Confidentiality of data was maintained by ensuring anonymity of the subjects; also, no patient identifiers were utilized in data collection. As the owner of the project, the DNP project manager collected and secured all data via protected password on a USB device, as all survey responses were completed electronically.

The DNP project utilized appropriate validated instruments with the author's permission (see Appendix B) to include pre- and posttest questionnaires applying Beeckman's Pressure Ulcer Knowledge Assessment Tool Version 2.0 (PUKAT; see Appendix C) to capture a baseline pressure injury competency to be utilized as comparison data (De Meyer et al., 2019). The same PUKAT was administered as a posttest to assess competency and levels of learning and understanding of clinical application. Additionally, permission (see Appendix D) was obtained to utilize the Pressure Ulcer Management Self-Efficacy Scale for Nurses (PUM-SES; Dellafiore et al., 2019; see Appendix E), which measured the nursing staff's level of self-efficacy posteducation.

The PUKAT that was given as a pre- and posttest assessed nursing competency and knowledge retainment with intent to practice. The PUKAT questionnaire addresses categorical pressure injury prevention and management objectives, including the following: (a) etiology and development, (b) classification and observation, (c) risk assessment, (d) nutrition, (e) reduction in amount of pressure/shear, and (f) reduction in the duration of pressure/shear (Manderlier et al., 2017).

Research Question

The project was guided by the following problem of interest question: In the LTC setting, does education of pressure injury prevention improve nurses' knowledge of pressure injuries and improve their self-efficacy with intent to change practice over a 12-week period?

Problem: The problem was the gap in nursing knowledge of pressure injury prevention and management.

Intervention: The intervention included a combination of pre- and posttest pressure injury education utilizing didactic instructional methods and evidence-based pressure injury educational tools.

Comparison: Nursing knowledge base of pressure injury prevention strategies and management was compared before and after education. Postevaluation was completed to assess nursing knowledge and self-efficacy as a measure of intent to change practice.

Outcome: The expected outcome was improvement in nursing knowledge and self-efficacy in pressure injury prevention and management, with improved evidence-based practice.

Timeline: The project timeline was over a course of 12 weeks.

Definition of Key Terms

This project had key terms that were necessary to define. Each of the terms are listed below along with a definition derived from the source or sources cited.

COVID-19. This is the acronym for the coronavirus disease of 2019 (Resnick, 2021; Smith et al., 2021).

Never events. These are conditions that involve shocking medical errors that should never occur to anyone hospitalized for care (Patient Safety Network, 2019a).

Reform of requirements. Federal final rule requirements that LTC facilities must meet to participate in Medicare and Medicaid programs (Reform Requirements, 2016).

Scope of Project

The scope was limited to examining the knowledge levels of pressure injury prevention and management before and after an educational intervention in a sample of nursing staff and CNAs. The purposeful sample included nurses and CNAs from all three shifts who provided direct care at the state veterans home. Data were gathered according to the participants' schedule and availability. Lack of control of the environment in which data were collected was an identified limitation. The DNP project incurred additional resources to analyze data and experiences. Challenges collecting posteducation data were due to staff schedule and availability, which was another limitation to the project. Exclusion criteria were contract staff and nurses and CNAs on medical leave and not currently providing direct care.

Chapter Summary

Chapter 1 introduced the DNP project, which addressed gaps in nursing knowledge of pressure injury prevention strategies and management in the LTC setting. Several national organizations, including the AHRQ, CMS, and Office of Disease Prevention and Health Promotion (ODPHP), are concerned with pressure injury prevention due to the impact of quality of life for the individual and long-term cost for the individual and the health care facility. The ODPHP (n.d.) listed pressure injury prevention and reduction among older adults as one of its primary objectives. The DNP project intervention included providing diverse methods of pressure injury education with the goal of increasing nursing knowledge, which will translate into clinical application. The project was guided by the following research question: In the LTC

setting, does education of pressure injury prevention improve nurses' knowledge of pressure injuries and improve their self-efficacy with intent to change practice over a 12-week period?

The sample population considered for this project were staff nurses including RNs, LPNs, and CNAs who provided direct care in an LTC facility. The LTC facility was located in the southeastern region of Alabama, and was selected from the GAO (2022) report on VA nursing home care. In this DNP project, interventions following NPUAP guidelines for pressure injury prevention were utilized to assess nursing knowledge, documentation, and management of pressure injuries via pre- and posttest, didactic teaching methods, and AHRQ pressure injury prevention education, PowerPoint slides, and handouts. Beeckman's PUKAT (see Appendix C) was utilized to assess nursing knowledge pre- and posteducation. Data collection was conducted via a facility assessment that was completed by the wound care nurse and the staff development nurse to determine existing pressure injury policies, pressure injury education practices, and pressure injury risk assessment documentation.

The DNP project manager's goal was to ascertain the effectiveness of the educational interventions and to demonstrate the necessity of the education implementation in improving nursing knowledge and thereby improving patient outcomes. The anticipated collective outcome of benefit was a reduction in pressure injuries as expected by the nursing staff applying learned methods of pressure injury prevention strategies, accurate use of Braden risk assessment, and adequate management of pressure injuries to prevent further deterioration. The timeline for the project and data collection took place in August through September 2023, with the final evaluation by end of September.

Chapter 2: Literature Review

The purpose of the literature review was to identify gaps at the project facility and determine successful interventions for pressure injury education. The emphasis of the literature review was on educational interventions that provided results and were simplistic in understanding and implementation. The literature review guided the DNP project and answered the problem of interest: In the LTC setting, does education of pressure injury prevention improve nurses' knowledge of pressure injuries and improve their self-efficacy with intent to change practice over a 12-week period?

Search Strategies

The following key words were used in title searching of the PICOT terms for current (2016–2021) peer-reviewed articles: *pressure ulcers, pressure injuries, long-term care, nursing education, pressure ulcer prevention, and nursing knowledge*. Searches were conducted for full-text articles via search engines in the ACU online library databases, including OneSearch, EBSCOhost, Health Source: Nursing/Academic Edition, ERIC, PubMed, MEDLINE, CINAHL, and ScienceDirect, with full-text articles. The review included studies conducted both in the United States and internationally. Multiple articles were reviewed and evaluated to ascertain superlative evidence to support the problem of interest. Articles selected included systematic reviews, meta-analyses of multiple controlled studies, cohort studies, exploratory studies, qualitative/descriptive articles, correlational studies, and systematic reviews. Articles excluded were prior to 2016, nonpeer-reviewed articles, expert opinion articles, and nonnursing articles.

Conceptual Framework

The conceptual framework for this project includes Hall's three Cs, Knowles's adult learning theory of andragogy, and the Kirkpatrick model of evaluation. The three Cs (Core, Care,

and Cure) theory was developed by Hall (1964; Sumarno, 2019; Wayne, 2023). Hall's theory defines nursing as the "participation in care, core and cure aspects of patient care, *where CARE is the sole function of nurses, whereas the CORE and CURE are shared with other members of the health team*" (Hall, 1964). In Hall's theory, these three functions are independent but interconnected circles (Hall, 1964). The essential purpose of care, which is the nurse's primary role, is to achieve an interpersonal relationship with the patient which facilitates the development of the core (Sumarno, 2019; Wayne, 2023). Applying Hall's theory to the management of pressure injuries enabled the translation of research into clinical practice (Sumarno, 2019). The care circle focuses on the nurse's role as a nurturer who delivers comfort measures and patient instruction while providing for the patient's daily needs. Additionally, the nurse's role is integrated into the dimensions of the core through effective communication, in which the nurse assesses and problem-solves the patient's social and emotional concerns (Sumarno, 2019). Hall's theory emphasizes caring for the total patient; furthermore, the theory mandates that all three components of the interconnected circle work together.

Knowles's adult learning theory of andragogy was the foundation for the DNP project. Andragogy, also known as the adult learning theory, was proposed by Knowles in 1968 and recognized that adults have unique learning styles and strengths and benefit from self-directed practical learning drawn from personal experiences (Knowles et al., 2005). The adult learning theory underpins all educational practices including the individual's attainment of knowledge (Mukhalalati & Taylor, 2019). The six learning pillars of the individual's attainment of knowledge are based on the learning pillars of andragogy. These pillars are as follows: (a) need to know, (b) self-concept, (c) the adult learning experience, (d) readiness to learn, (e) orientation to learning, and (f) motivation to learn (Knowles et al., 2005). The project manager permitted the

adult learners (nurses and CNAs) to take part in their own learning through an initial assessment of learning needs to determine baseline knowledge drawn from their past learning experiences. The DNP project established the learner's readiness to learn through preeducation scores, which underscored any knowledge deficits of pressure injury prevention measures and their internal motivation for continuing education. Adult learners must see the value of the education and have a practical and problem-centered reason to learn (Knowles et al., 2005).

The Kirkpatrick model of evaluation was applied to assess the staff's learning and development. This model utilizes four levels of learning evaluation to determine effectiveness of the education or intervention given. These levels are as follows: (a) reaction, (b) learning, (c) behavior, and (d) results (Kirkpatrick, 2007). In Level 1, I measured the staff engagement and success of the ongoing pressure injury education and training. The DNP project assessed if the staff were satisfied with the educational delivery and whether the training met the intended educational goals. In Level 2, I analyzed if the staff understood, retained, and applied knowledge of pressure injury prevention measures by administering the same PUKAT via a posttest. Additionally, I evaluated knowledge transfer and self-efficacy with intent to practice at the conclusion of the training via the PUM-SES posttest.

Prevalence of Pressure Injuries

The incidence of pressure injuries is on the rise because of the increase in the elderly population requiring LTC, nurses' poor understanding of pressure injuries, and a deficiency of research in this area (Hajhosseini et al., 2020). Additionally, the burden of pressure injuries is higher in the United States than in other sociodemographic index countries and has not changed significantly since 1990 (Siotos et al., 2022). The Healthy People 2030 report lists pressure injury reduction as one of the continued health concerns for the future (ODPHP, n.d.).

The National Pressure Ulcer Advisory Panel (now known as the National Pressure Injury Advisory Panel [NPIAP]) publishes evidence-based guidelines on the prevention and treatment of pressure injuries as well as the International Pressure Injury Classification System. A pressure injury is defined as localized damage to the skin and underlying soft tissue, usually over a bony prominence, that may be related to pressure due to immobility or prolonged pressure or due to device-related pressure and shear (NPUAP et al., 2014). A pressure injury may appear as intact skin or an open ulcer that causes pain. The AHRQ (2014) defined pressure injury prevalence as the number of people within a population with a pressure injury divided by the number of people in the total population at a given point in time. Advances in health care are allowing older adults to live longer, creating an increased need for long-term care (Hovey et al., 2017). These older adults are more likely to have higher rates of chronic disease and be dependent on others for their care needs, which places them at higher risk for pressure injuries and chronic wound development (Pagan & Harvey, 2019; Stone, 2020). These patients have end-stage disease states, coupled with immobility, debility, poor nutrition, and incontinence, which places them at higher risk for pressure injuries (Mäki-Turja-Rostedt et al., 2020).

Patients in LTC settings are vulnerable to safety problems during their care due to being chronically ill and requiring continued care after an acute hospitalization. These patients are frail and in declining health and nutritional status, which contributes to increased susceptibility to pressure injuries. Additionally, factors of incontinence, impaired mobility, sensory perception, and skin fragility result in decreased resistance to shear injuries (Lavallée et al., 2018; Mondragon & Zito, 2022; Patient Safety Network, 2019b).

Pressure injuries affect an estimated 1 to 3 million people in the United States each year, with higher numbers reported based on the clinical setting (Mondragon & Zito, 2022). Incidence

of pressure injuries ranges from 0.4% to 38% in acute care, 2.2% to 23.9% in skilled nursing facilities and nursing homes, and 0% to 17% in home health (Borojeny et al., 2020; Mondragon & Zito, 2022). According to Borojeny et al. (2020), the incidence rate of pressure injuries ranges from 4% to 38% in acute-care hospitals, with pressure injury complications and mortality rates in elderly patients being approximately 68%. This reflects a mortality rate 2 to 6 times higher than that of other diseases, with 60,000 pressure injury–related deaths annually (Borojeny et al., 2020). Most hospital-acquired pressure injuries are preventable; however, approximately 2.5 million individuals in the United States will develop a pressure injury in a health care facility (Padula & Delarmente, 2019).

In a report prepared by RTI International (2017) for CMS, it was reported that patients with acute-care hospitalizations related to pressure injuries were more likely to be discharged to LTC facilities than patients with hospitalization for all other conditions. Additionally, hospital-acquired pressure injuries have poor outcomes for the patient, which can result in hospital readmission, subsequent CMS quality penalties for the health care organization, and lower nursing-sensitive indicator scores, which is the foundation for monitoring the quality of nursing care (Afaneh et al., 2021; NPUAP et al., 2014; Wassel et al., 2020). The impact on the patient's quality of life and significant burden is attributed to the high risk of pressure injury-related complications (Ibrahim & Qalawa, 2020; Siotos et al., 2022).

Pressure injuries are a challenging concern in health care organizations and may have negative impact on reimbursement. For example, Stages 3 and 4 pressure injuries are considered never events when they are documented as occurring during the patient's hospital stay (Blenman & Marks-Maran, 2017; Kim et al., 2020). Unstageable pressure injuries, including deep tissue injuries, are similar to Stages 2, 3, and 4 pressure injuries in that they represent poor outcomes,

are a serious medical condition that can result in death and disability, are debilitating and painful, and are often an avoidable outcome of medical care (RTI International, 2017). However, not all pressure damage can be avoided. Often these pressure injuries are related to end-stage malignancy complications (Vickery et al., 2020). Pressure injuries are a serious clinical complication known to impact the patient's morbidity, quality of life, length of stay, and cost of care (Barakat-Johnson et al., 2018). Yap et al. (2019) cited the prevalence of pressure injuries in LTC facilities ranged from 8.2% to 32.3%, with incidence rates as high as 59%, and the treatment cost was estimated at nearly \$11.6 billion. Because pressure injuries are considered as indicators of the quality of care of a facility, inadequate steps in prevention or treatment can lead to litigation (Mondragon & Zito, 2022).

According to the NPUAP, individuals who remain immobile or have a body part immobile for an extended period will develop pressure injuries; however, pressure injuries are preventable, and serious complications can occur if pressure injuries are not prevented or healed. Pressure injuries, including deep tissue injuries, may be healed in acute, postacute, or LTC settings with appropriate pressure injury intervention without progressing to deterioration (RTI International, 2017). The U.S. health care system spends approximately \$11 billion annually for the prevention and treatment of pressure injuries and subsequent hospitalizations; additionally, pressure injuries contribute to a 50% increase in nurses' workloads (Borojeny et al., 2020). Pressure injuries continue to be a significant concern and have been a responsibility of nurses since well before Florence Nightingale linked these wounds to the nursing process (Ayello et al., 2017). With the necessity for expansion of integrated nursing care, the nursing role and responsibilities in pressure injury prevention and management should not be minimized; rather, they should be emphasized (Kim et al., 2020).

Definitions

Stage 1 Pressure Injury: Nonblanchable Erythema

The skin is intact, with localized redness that fails to blanch when touched. The color may appear differently in darker-pigmented skin. The presence of blanchable redness or changes in sensation, temperature, or firmness may precede visual changes (NPUAP et al., 2014).

Stage 2 Pressure Injury: Partial-Thickness Skin Loss

The skin has exposed dermis, partial-thickness loss of skin, and adipose fat in which the deeper tissues are not visible. The wound bed is viable and may appear pink, red, or moist and may resemble an intact or ruptured serum-filled blister. Granulation tissue, slough, and eschar are not present, as these pressure injuries are commonly caused by shear injuries (NPUAP et al., 2014).

Stage 3 Pressure Injury: Full-Thickness Skin Loss

There is full-thickness loss of skin, with appearance of exposed adipose fat, granulation tissue, and epibole (rolled wound edges). Slough, eschar, and undermining are often present in the wound bed. The depth of the tissue damage is dependent upon the body part that is affected; however, fascia, muscle, tendon, ligament, cartilage, and/or bone are not exposed. Areas with more adipose tissue may have deeper skin ulcerations (NPUAP et al., 2014).

Stage 4 Pressure Injury: Full-Thickness Skin and Tissue Loss

There is full-thickness tissue loss with exposure of fascia, muscle, tendon, ligament, cartilage, or bone. Slough and/or eschar may be visible with undermining and tunneling in the wound bed and epibole of the wound edges. The ulcer is deeper than the nerve endings, with depth of the ulcer varying according to the body part affected (NPUAP et al., 2014).

Unstageable Pressure Injury

The skin is obscured due to slough or eschar. Full-thickness skin and tissue loss are present, in which the extent of tissue damage within the ulcer cannot be confirmed due to slough or eschar covering the wound bed. When slough or eschar is removed, a Stage 3 or 4 pressure injury is exposed (NPUAP et al., 2014).

Deep Tissue Pressure Injury

Skin is intact or nonintact with localized persistent, nonblanchable deep red, maroon, or purple discoloration. There is epidermal separation revealing a dark wound bed or blood-filled blister. Pain and temperature change often precede skin color changes, and the wound evolves rapidly, revealing the extent of the tissue damage. Discoloration may appear differently in darkly pigmented skin. Deep tissue injuries result from intense and/or prolonged pressure and shear forces at the bone-muscle interface. If necrotic tissue, subcutaneous tissue, granulation tissue, fascia, muscle, or other underlying structures are visible, the pressure injury is evaluated and staged as unstageable, Stage 3, or Stage 4 (NPUAP et al., 2014).

Nursing Knowledge Gaps of Pressure Injuries

Preventive measures, early detection, and proper management and treatment of pressure injuries are important issues for patients, nurses, and health care organizations. Smith et al. (2021) found that 67% of nursing graduates who transitioned into practice during the COVID-19 pandemic verbalized fear of missing important details or doing something wrong when providing patient care. New graduate nurses also identified the need for preceptor support, guidance, teaching, and continued practice of skills. Nursing knowledge of pressure injury prevention varies among nurses. Although nurses are required to have professional knowledge and skill sets to manage pressure injuries, the research indicates nurses' overall level of knowledge about

pressure injury care and prevention is low (Barakat-Johnson et al., 2018). Due to time constraints, nurses do not consistently practice preventive care measures. Pressure injuries are a clinical problem that is underestimated despite advances in health care. The first step to prevention of pressure injury incidence or increase is the proper identification of its risk factors, although there is currently no consensus on its risk factors (Kim et al., 2020; NPUAP et al., 2014). Knowledge about identifying the causative agents and preventive measures can lead to implementation of more effective interventions to prevent pressure injuries (Borojeny et al., 2020). It is, however, essential for nurses to demonstrate thorough understanding of the stages of pressure injuries, clinical decision-making, and visual acuity when caring for patients with pressure injuries due to difficulty in distinguishing various stages of tissue damage.

Patients with COVID-19 demonstrated atypical pressure injury skin manifestations that were not related to friction or shearing force with necrosis of peripheral body parts and toes (Pontieri-Lewis et al., 2021). Prior evidence indicates that there are few studies that examine the effectiveness of pressure injury training on nurses' skill sets and self-efficiency in caring for patients with pressure injuries (Aydin et al., 2019; Kim et al., 2020). Additionally, a greater portion of practicing nurses care for geriatric adults, but they have not had specialized training in caring for this population (AACN, 2010). Knowledge of early detection of pressure injuries enables patients to experience rapid recovery and may reduce or prevent hospitalization (Kim et al., 2020).

Knowledge and attitudes related to pressure injuries among nurses and health care staff are not adequate. Nursing knowledge about pressure injuries is poor, which is reflected in their practice. Additionally, research has shown that LTC nurses' overall level of knowledge of pressure injury prevention is too low to accurately implement pressure injury prevention

guidelines (Kim et al., 2020; Nuru et al., 2015). Pressure injuries in nursing homes remain a serious concern despite the regulatory and market approaches to facilitate prevention and treatment (AHRQ, 2016). In a study of 479 nurses and CNAs, testing using the PUKAT showed that the mean total score was 50.7%, with lowest scoring in areas of pressure injury prevention (42.7%), etiology (45.6%), and prevention for specific patient groups (46.6%). Nurses with higher educational levels ($H = 40.43, p < 0.001$) and prior pressure injury or wound care ($t = 2.93, p = 0.004$) had significantly higher total knowledge scores (De Meyer et al., 2019). According to Wogamon (2016), CNAs who participated in pressure injury education and interventions did not significantly improve PUKAT knowledge scores, but the rate of pressure injury development decreased at the facility due to increased documentation of skin assessments and pressure injury interventions by CNAs.

There is a notable correlation between nurses with a positive attitude in pressure injury prevention and good nursing practices resulting in prevention of acquired pressure injuries (Barakat-Johnson et al., 2018). The NPUAP recommended that in addition to evidence-based practice tools and guidelines for pressure injury assessment and intervention, it is imperative to assess nurses' and other health care professionals' knowledge level combined with ongoing continuing education in this vital area of patient care (Aydin et al., 2019).

Through use of the PUKAT and Attitudes towards Pressure Ulcer questionnaire, Hultin et al. (2017) observed that some staff members had no formal nursing training in elder care. Both instruments demonstrated adequate table psychometric properties—Cronbach's α of 0.77 and 0.79, respectively—with the questionnaire consisting of 26 knowledge-based questions and 13 attitude-based questions utilizing a 4-point Likert scale (1 = *strongly agree* to 4 = *strongly disagree*). Another Likert questionnaire consisted of demographic questions to ascertain the

nursing staff's gender, age, education, and working experience with specific questions to evaluate the nursing staff's experience of using the continuous bedside pressure mapping system as a preventive tool (Hultin et al., 2017; Nuru et al., 2015). It was noted that the pressure injury mapping system, which facilitates real-time feedback, was an effective learning tool in educating staff in care of the elderly, which increased their commitment to pressure injury intervention (Hultin et al., 2017).

Pressure Injury Prevention Tools

According to the AHRQ (2014), pressure injury prevention requires an interdisciplinary approach to care, as care must be customized to the needs of each patient. Blenman and Marks-Marano (2017) implemented the pressure ulcer prevention (PUPS) program as an incentive to facilitate nursing awareness of skin care to help prevent development of pressure injuries. Nursing awareness of factors that contribute to the development of pressure injuries enables identification of patients at risk for pressure injury development, and preventive measures may be implemented to prevent pressure injury occurrence (Mondragon & Zito, 2022). The PUPS program was launched in 2014 as a collaborative effort with the health and social care community and LTC support team within the facility, consisting of patients and caregivers. The program was designed to inspire the nursing staff to be engaged and demonstrate positive attitudes about pressure injury preventive care and management. The PUPS program targets patients at risk of developing pressure injuries and patients with preexisting pressure injuries. Handouts of the PUPS program and pressure injury prevention were issued to nursing staff, patients, and caregivers. PUPS teaching sessions were given to staff and included pressure injury prevalence and prevention of pressure injuries. Additionally, nurses were provided with assessment tools and educated on how to complete the tools correctly. Kwong et al. (2020) found

that among 10 nursing homes, an evidence-based pressure injury prevention program for CNAs reduced the development of pressure injuries in an LTC and improved their skill performance.

Strengths and Weakness

The limitations of many studies were that most included observational analysis. The pressure injury educational program discussed by Seo and Roh (2020) did not engage in training at the bedside and lacked practice sessions permitting nurses to assess and manage real-life pressure injuries. The specific participant pool for the study by Blenman and Marks-Maran (2017) appeared to include health professionals in care homes, as well as personal in-home caregivers. The authors in this study also discussed that pressure injury education led to decreased pressure injury incidence in the studied population. Pressure injury prevention training programs can improve nurses' competency, and training nurses in pressure injury prevention improves nursing interventions and knowledge of actual practice of pressure injury prevention (Kim et al., 2020; Seo & Roh, 2020). Nuru et al. (2015) noted that nurses with higher education or prior formal training have better pressure injury knowledge; however, practical knowledge gained through on-the-job education is also important in pressure injury prevention.

Additionally, either in acute care or postacute care, nursing competency is required of all nurses with the expectation of applying various sources of information into their decision-making and nursing practice (Fukada, 2018). In all articles reviewed, there was agreement among researchers that necessity and opportunities exist for pressure injury education in LTC settings and that pressure injury prevention should be incorporated into the workplace. Pressure injury prevention training, regardless of whether it utilizes team-based or lecture-based learning, is useful for enhancing nurses' pressure injury prevention knowledge, behaviors, and attitudes. Pagan and Harvey (2019) noted that wound management or prevention education alone is not enough.

It is essential for pressure injury education to incorporate an educational intervention in combination with patient engagement, clinical practice change, mentorship, and on-site facility champions such as designated wound nurses. Training nurses in pressure injury prevention improves nursing interventions and knowledge of actual practice of pressure injury prevention (Seo & Roh, 2020). Seo and Roh (2020) found nursing staff in an LTC setting to have an increase in knowledge score on the PUKAT from pretest to posttest when participating in team- or lecture-based learning. Additionally, the authors gave recommendations that further research is needed to verify the longitudinal effects of pressure injury prevention training on nurses' actual performance and the incidence of pressure injury among patients. Many of the studies were in support of improving education in long-term care settings and contained evidence-based practice elements that were incorporated into the DNP project. According to Hultin et al. (2017), more research is needed to evaluate the effect of continuous pressure mapping on the incidence of pressure injuries.

Chapter Summary

Preventing pressure injuries is the key to reducing the incidence of facility-acquired pressure injuries. Florence Nightingale spoke about the nurse's role in preventing pressure injuries; however, pressure injuries are a complex and multifactorial problem that requires a holistic team approach (AHRQ, 2014; Lyder & Ayello, 2009). Four major themes emerged in the research articles reviewed: (a) pressure injuries in nursing homes continue to be a serious quality concern; (b) knowledge gaps about pressure injury risk, skin care, early identification, off-loading measures, and pressure injury prevention measures impact the facility's pressure injury rate; (c) training in postacute settings regarding pressure injury prevention and education is not emphasized to the same degree as in acute settings; and (d) there is a perceived correlation

between nursing attitude toward pressure injury prevention and good nursing practice, resulting in prevention of acquired pressure injuries.

Most of the articles reviewed revealed that knowledge deficits of pressure injury risk factors, early detection, prevention measures, and off-loading limit the nurse's ability to put adequate prevention measures into practice (Fukada, 2018; Kim et al., 2020; Mondragon & Zito, 2022). Furthermore, Nuru et al. (2015) asserted that preventing pressure injuries should be the goal of all nurses. A nurse's lack of knowledge and the practice of nurses have their own significant contributions to higher prevalence of pressure injuries. Article findings also indicated that nursing and CNA knowledge about pressure injury prevention measures must be translated into practice to decrease incidence rates. Ayello et al. (2017) emphasized that nurses must be lifelong learners to enhance their current knowledge of evidence-based pressure injury prevention and management.

Overall, literature about nurses' knowledge of pressure injury prevention is inconsistent, with some studies revealing that nurses have appropriate knowledge levels and others demonstrating that nursing knowledge is inadequate (De Meyer et al., 2019). Additionally, providing adult learning theory in education and evaluation of evidence-based pressure injury training programs, when implemented, can improve health outcomes and an individual's quality of life (Kirkpatrick, 2015; Knowles et al., 2005; Seo & Roh, 2020). The articles reviewed, in addition to contributions from national organizations such as the AHRQ, Centers for Disease Control and Prevention, NPIAP, Patient Safety Network, National Institutes of Health, and others, support the DNP interventions and evidence-based practice guidelines that were incorporated into staff education intervention. This DNP project employed team-based learning

for pressure injury education utilizing the PUKAT pre- and posttests as discussed in the research findings by Seo and Roh (2020).

Chapter 3: Methods

The clinical practice focus for this scholarly project was to provide education to improve nursing knowledge and the facility's pressure injury protocol, including early intervention, pressure relief, nutrition, skin inspection, and appropriate documentation of staging, which includes management and treatment of pressure injuries. The target population was staff in the state veterans home. Hall's three Cs theoretical framework was applicable for the DNP project and translated pressure injury education into clinical practice. The nurse is identified in the role of caring (Care) as their sole function, with other interdisciplinary health providers such as CNAs as the Core and Cure. Knowles's adult learning theory of andragogy served as the foundation for the DNP project and Kirkpatrick's model was utilized for pressure injury education program evaluation.

Project Design

The DNP project was a quasi-experimental pretest and posttest design. Quantitative data collection was employed through pre- and posttest questionnaires to ascertain staff knowledge of pressure injury prevention measures and to evaluate an educational practice intervention to improve nursing and CNA knowledge of measures to prevent pressure injury. The posttest for self-efficacy served as a measurement of the level of comfort in changing practice. Measurement of self-efficacy was demonstrated through assessment by scoring on the (PUM-SES; see Appendix E). The DNP project manager requested and received permission to utilize the PUM-SES tool (see Appendix D).

Instruments/Measurement Tools

Appropriate validated instruments were used, with the original author's consent, to measure the outcomes of the DNP project. The pre- and posttest questionnaire applied

Beeckman's PUKAT and were utilized to capture a baseline pressure injury competency to be used as comparison data. The PUKAT is a valid and reliable assessment tool used to assess nurses' knowledge about pressure injury prevention (De Meyer et al., 2019; see Appendix C). The PUKAT content validity and face validity were determined by experts from NPIAP and EPUAP through a Delphi procedure (Manderlier et al., 2017). The PUKAT is a 25-item questionnaire utilizing multiple-choice items covering six themes, which included the following: (a) etiology and development, (b) classification and observation, (c) risk assessment, (d) nutrition, (e) reduction in amount of pressure/shear, and (f) reduction in the duration of pressure/shear (De Meyer et al., 2019; Manderlier et al., 2017). The questionnaire assessed nursing proficiency in evaluation of pressure injury risk, skin assessment and preventive skin care, activity management, nutrition management, and moisture/incontinence management.

The usage of a pre- and posttest questionnaire for quantitative data collection establishes baseline nursing knowledge of skin care needs in the elderly including measures to prevent development of pressure injuries as used in prior studies (Aydogan & Caliskan, 2019; Nuru et al., 2015). The posttest assessed nursing competency and self-efficacy after pressure injury education and intervention utilizing the PUM-SES tool, which is a 10-item scale that measured nurse's self-efficacy in pressure injury management (see Appendix E). The PUM-SES tool consists of four domains: assessment, planning, supervision, and decision-making (Dellafiore et al., 2019). The AHRQ pressure injury care plan assessment checklists that were completed by the wound care nurse and the staff development coordinator were utilized to assess the facility's process for pressure injury prevention and nursing staff adherence to the facility's pressure injury prevention measures, wound care policy, and documentation of pressure injury screening and

Braden scale assessment (AHRQ, 2016). Results from the initial care plan assessment enabled the DNP project manager to ascertain areas for improvement.

The adult learning theory of andragogy was incorporated with a multidimensional pressure injury educational intervention consisting of in-service training education, online pressure injury modules for pre- and posttesting, NPIAP pocket buddies, and skin care communication sheets. The intervention goal and dependent variable were the anticipated increase in nursing knowledge of pressure injury education and the quantitative results of improved self-efficacy in practice. According to Mondragon and Zito (2022), evidence demonstrates that the education of both the clinicians and patient care providers can improve knowledge, leading to a decrease in the incidence of pressure injuries as well as an increase in the ability to manage them.

Data Collection

Data retrieval and collection were completed in August 2023 after obtaining approval from the ACU bioethics review board. Data were collected utilizing two validated structured instruments to evaluate the nurse's knowledge of pressure injury via pre- and posttest. Each project participant was asked to select an identifier to allow their results to be collected and compared anonymously to maintain confidentiality. Participants completed the PUKAT questionnaire comprising 20 practice-based questions to assess their level of knowledge and practice of normal healthy skin and prevention of pressure injuries. Additionally, the measure utilized in the project is the Braden Scale skin assessment.

Methodology Appropriateness

The instruments were appropriate for the project, and references are given to show validity and reliability. Prior to administering the knowledge-based pretest survey instrument, the

tool was reviewed, modified, and finalized for content appropriateness by the director of nursing, nursing staff development educator, and facility wound care nurse.

Data Analysis

The questionnaires completed by the nursing staff were checked for completeness. The pre- and posttest results were analyzed via Python statistical software using descriptive statistics and the Wilcoxon signed-rank sum test. The Wilcoxon signed-rank sum test was chosen due to the sample size of less than 30 and was appropriate, as there was one outlier (Webb, 2023). The Wilcoxon signed-rank sum test is the nonparametric alternative to the dependent t test and compares the medians of two dependent distributions (StatsTest.com, 2023). Survey questions were categorized as pre- and posteducation results. The z score of 21.0 for mean nursing knowledge of pressure injury scores was concluded pre- and posteducation. The test statistic of 21.0 suggests that the performance of test scores improved posteducation. The p value was below 0.05; therefore, the null hypothesis was rejected. The data analysis suggested clinical significance, and pressure injury education was statistically significant for improving overall knowledge. The nurses' overall scoring on the PUKAT and the PUM-SES validates self-efficacy and overall competency in managing pressure injuries, which can predict the nurses' plan to change practice to improve patient outcome (Dellafiore et al., 2019).

Management of Data

Confidentiality of data was maintained by ensuring anonymity of the subjects, and no patient identifiers were used in data collection. Written voluntary consent was obtained from all participants prior to implementation of the project. Individuals must freely agree to the project and give informed consent (World Medical Association, 2022). Data protection and privacy were

maintained in the online environment via password protection and securing of all hard-copy documents.

IRB Approval and Process

IRB approval was obtained prior to data collection for the project. Ethical clearance for the project was obtained from the facility administrator and director of nursing. A formal signed affiliation agreement for project approval was received from the project facility administrator and signed off by ACU administration.

Interprofessional Collaboration

The project team comprised me, the nursing staff development coordinator, the wound care RN, quality RN, and the facility director of nursing. The project was expected to last 12 weeks, with the expected duties explained by the team. The DNP project manager performed the overall supervision of the data collection.

Practice Setting

The state veterans home selected for the project site was a 150-bed LTC facility located in the southeastern part of the United States. The facility was selected as an appropriate practice setting to assess nursing knowledge of prevention of pressure injuries with the aim of improving nursing knowledge and clinical practice. Information obtained during the education is beneficial to be continued as evidence-based practice and future training at the facility. Additionally, nurses should demonstrate increased confidence levels in caring for senior adults which overall improves quality of care and outcomes in the LTC setting.

Target Population

The project was open to all available RNs, LPNs, and CNAs at the facility. The sociodemographic characteristics and the mean project age or baseline education of the nursing

staff participants were not collected for the purpose of description of the project population and risk of identification due to small sample size.

Risks/Benefits

The risks to participants were minimal. The benefit would be improved knowledge and practice of the LTC nurse.

Chapter Summary

The objective of this project was to focus on improving nursing education and self-efficacy in pressure injury management in the LTC setting. To accomplish this objective, the project incorporated a quality improvement design using a theoretical framework that supports process change for pressure injury education in LTC settings. The methodology aligned with the PICOT (plan, intervention, comparison, outcomes, and time) development of a scholarly project with successful implementation and monitoring in an LTC facility. The project's success required continued prioritization, ongoing planning, and supportive feedback from the project chair and committee.

Chapter 4: Results

Pressure injuries result in pain, disfigurement, amputations, and increased infection risk and are associated with longer hospital stays and increased morbidity and mortality (AHRQ, 2016). Evidence demonstrates that pressure injury education results in a decreased incidence of pressure injuries and increased ability to manage them (Aydin et al., 2019). The project was conducted at a 150-bed LTC state veterans home located in the southeastern part of the United States. The facility provides services for skilled nursing and a physician on call 24 hours a day, as well as memory care, wound services, and physical, occupational, and speech therapy. The resident population at the center consist of disabled veterans with multiple chronic diseases, many with residual stroke defects, impaired mobility, or bed-bound status. The inclusion criteria were nurses and CNAs who provided direct care and consented to participate in the quality improvement project and complete the pre- and postsurveys. Nursing staff on medical leave or who worked as contractors were excluded. Solicitation flyers with information about the project were hand delivered to the staff development coordinator to be placed around the facility. Participants were recruited from all three nursing shifts to obtain a sufficient sample. In total, 28 nursing staff of full-time RNs, LPNs, and CNAs consented to participate in the project.

The aim of this quality improvement project was to evaluate if education on pressure injury prevention and management improves gaps in nursing knowledge and self-efficacy in bedside practice. This chapter presents the statistical analysis results to address the PICOT question: In the LTC setting, does education of pressure injury prevention improve nurses' knowledge of pressure injuries and improve their self-efficacy with intent to change practice over a 12-week period? In this chapter, the data analysis plan is summarized, and the results are

presented in tables and narrative format. The conclusion discusses the statistical and clinical significance of the results.

Data Collection

The initial components of the education intervention included gathering data from the wound care RN and the staff development coordinator. Checklists from the AHRQ pressure injury prevention program were utilized to assess prior education on pressure injury prevention and nursing compliance in the Braden Scale assessment. Findings from the AHRQ checklist highlighted areas for improvement and dictated the necessary pressure injury education learning opportunity. The educational intervention was created utilizing the AHRQ best practice pressure ulcer prevention guideline for hospitals. The AHRQ permits the guideline to be modified for educational purposes in long-term care settings.

Data were collected utilizing two validated structured instruments that were self-administered to evaluate the nurses' knowledge of pressure injury via pre- and posttest. The Beeckman's Pressure Ulcer Knowledge Assessment Tool Version 2.0 (PUKAT) was applied before education to capture baseline pressure injury competency as comparison data. The PUKAT is a standardized, validated instrument with 25 practice-based questions that measures staff's level of knowledge and practice of preventive measures for pressure injury development (Manderlier et al., 2017). The posttest utilized the same PUKAT questionnaire to evaluate posteducation knowledge. Additionally, the Pressure Ulcer Management Self-Efficacy Scale for Nurses (PUM-SES) was administered after education to evaluate self-efficacy and overall nursing competency. The PUM-SES developed by Dellafiore et al. (2019) addresses four dimensions of self-efficacy including evaluation, planning, supervision, and decision-making.

Both stated instruments were appropriate for the project, and references are given to show validity and reliability. Prior to administering the PUKAT survey instrument, the tool was reviewed, modified, and finalized for content appropriateness, with 20 being the final question count. This enabled the questions to be completed within the designated time frame. The nurses' knowledge of pressure injury prevention was evaluated after the scoring of the PUKAT.

The implementation of the project education was on-site at the state veterans home in three separate sessions to accommodate nursing staff schedules and availability. Staff attendance was tracked by the staff development coordinator with an attendance sheet that was signed by the nursing staff. The participants were given a printed copy of the Qualtrics QR code, which was linked to the questionnaire. The QR code was also displayed on the PowerPoint presentation. When participants scanned the QR code utilizing their smart phones, the informed consent form appeared, which prefaced the questionnaire. Personal data about the participants were encrypted. Participants were given the option to participate or to decline participation in the project. When participants selected "I will consent to the project," the PUKAT questionnaire opened. If a participant opted not to participate in the project, the imbedded skip function took them to the end of the survey. Participants were asked to complete the multiple-choice questionnaire individually without any resources.

This project manager provided a PowerPoint education from AHRQ's Pressure Ulcer Best Practice Tool Kit, which covered pressure injury prevention strategies including off-loading, appropriate support surfaces, recognizing changing skin integrity, nutrition, skin protection against moisture, and preventing device and shearing injury. Additional teaching included NPIAP pressure injury stages and methods to recognize and prevent deterioration and enhance healing. A pressure injury staging tool in the form of a badge buddy was provided to

nursing staff. CNA staff were issued pressure injury identification notepads from the AHRQ tool kit, which is a communication tool to be utilized during skin inspections. Through using this tool, early identification of new skin issues can be communicated to the wound care RN. This project manager provided the wound care RN with samples of the pressure injury identification notepads a week prior to education presentation to trial on the units. The wound care RN verbalized that the tools were helpful and would be considered for widespread dissemination in the facility after further training with the staff.

The participants were advised to complete the PUKAT posttest and the PUM-SES 10-item Likert scale after 1 week of education under the same conditions with a QR code provided. However, the 1-week mark fell on a major holiday, which affected response compliance. Some participants completed the posttest before 1 week, while others completed the posttest at later dates after reminders from the staff development coordinator. The objective of utilizing both the PUKAT and the PUM-SES posteducation was to evaluate the effectiveness of educational delivery and improvement of knowledge and self-efficacy in bedside practice. This project manager retained the security of all data related to this project on a password-secured USB device. Additionally, participant test scores were maintained and password protected in Qualtrics.

Data Analysis

Python programming language was utilized in the data analysis. Due to the small sample size, deidentification was vital. Therefore, nurse demographic and professional characteristics were not obtained for this project. The survey results were downloaded from Qualtrics as Excel workbooks. Survey questions featured 20 multiple-choice questions, and responses were recorded as text. These were imported into a Pandas DataFrame, as it facilitated the advanced

manipulation and wrangling required to extract the test results. The responses were loaded into two DataFrames, one for each survey response category: preeducation and posteducation. For each set of reactions, data-cleaning techniques were employed. Missing or not-applicable responses were converted to “I do not know the answer,” which mirrored the methodology utilized in a project by Manderlier et al. (2017). This was done as the limited number of responses meant dropping rows was not feasible. A total of 28 participants attended the education session and completed the pre- and postsurveys. There were 28 recorded responses.

The final step of the loading and preprocessing process consisted of binary encoding for each sample, with 1 signifying a correct answer and 0 signifying an incorrect one. The survey questions followed a controlled multiple-choice options format, and responses had a finite set of text values. These responses were first encoded alphabetically. This was performed dynamically in Python by getting a list of the unique possible answers chosen by respondents for each question. Responses were then sorted alphabetically and mapped to the letters of the English alphabet starting from the letter A and continuing until the unique values were exhausted. This was stored as a dictionary with the text string as the key and the corresponding alphabet as its value. This method was utilized as it is easily reproducible.

Next, based on this mapping, a list of the alphabetical value of the correct answer for each column was created to convert the alphabetical responses to binary. Responses matching the alphabetical value of the correct response were given a value of 1 and incorrect responses a value of 0, which allowed binary encoding of the responses to be achieved. For each set of responses, the sum of the columns for each question was taken and is displayed below.

Table 1 demonstrates the sum of the results of respondents for each question before and after participating in the AHRQ pressure injury best practices presentation. In comparison,

higher test scores were recorded on the posteducation survey than on the pre-education survey. Scores indicate a positive impact of posteducation knowledge retainment. Figure 1 is a line plot showing the test scores per question.

Table 1

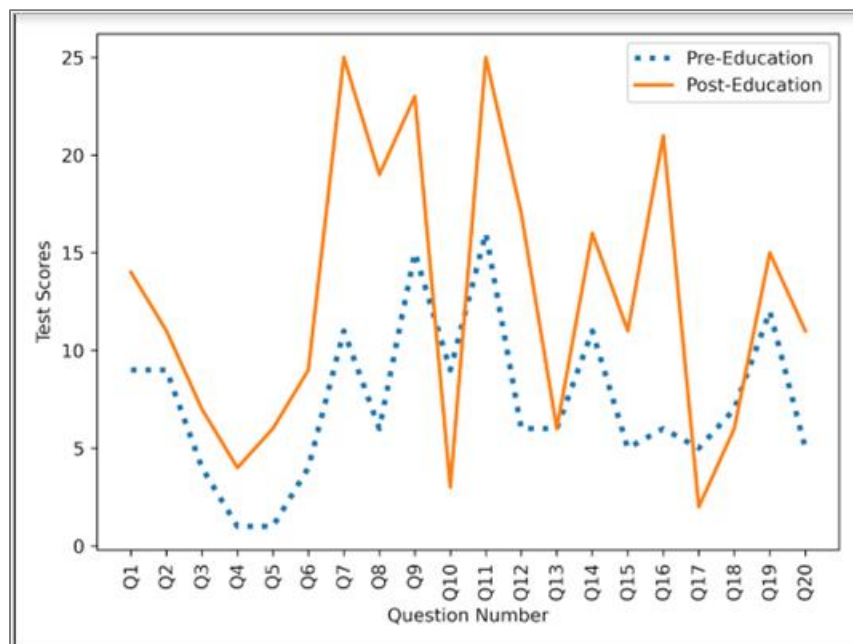
Anonymized Test Results per Question

Question	Preeducation results	Posteducation results
Q1	9	14
Q2	9	11
Q3	4	7
Q4	1	4
Q5	1	6
Q6	4	9
Q7	11	25
Q8	6	19
Q9	15	23
Q10	9	3
Q11	16	25
Q12	6	17
Q13	6	6
Q14	11	16
Q15	5	11
Q16	6	21
Q17	5	2
Q18	7	6
Q19	12	15
Q20	5	11

Figure 1 demonstrates test scores before and after the AHRQ pressure injury best practices presentation. Scores for each question were plotted side by side in a line plot to observe differences in performance. On 17 questions, there was a significant improvement in performance posteducation. Two questions (10 and 17) recorded worse performance, while one response saw no change. The overall improvement in scores reflects knowledge obtainment and clinical application posteducation.

Figure 1

Test Scores Before and After AHRQ Pressure Injury Best Practices Education



Statistical Test

The hypothesis for this analysis is as stated below.

Null hypothesis: There is no significant change in knowledge before and after the AHRQ pressure injury best practices presentation.

Alternate hypothesis: The AHRQ pressure injury best practices presentation led to improved knowledge and self-efficacy with intent to practice.

To evaluate the hypothesis, the Wilcoxon signed-ranked test was employed. This test is available on the SciPy Stats module. The Wilcoxon signed-rank sum test is the nonparametric alternative to the dependent t test and compares the medians of two dependent distributions (StatsTest.com, 2023). This test was utilized as it is appropriate for sample sizes under 30; also paired samples were in use, in which two “groups” consisting of data from the same group are observed at multiple points in time (StatsTest.com, 2023). For this test, the z method, alternative

hypothesis, and correction parameters were specified. The z method specifies how to manage pairs of observations with equal values, also known as “zero differences” or “zeros.” For this test, it was set to z split, which included the zeros and split the zero rank between positives and negatives. The Wilcoxon signed-rank sum test was chosen due to the small size of the data set, as zeros would be dropped by default.

The alternative hypothesis was set to two-sided. This evaluates whether the median difference is not equal to zero with the correction argument set to true. Continuity correction is a technique used in the Wilcoxon signed-rank test to adjust the test statistic for the discreteness of the data and involves adding or subtracting 0.5 from each difference between the paired observations before ranking them (StatsTest.com, 2023). This has the effect of shifting the distribution of the differences slightly to the left or right, depending on whether the researcher adds or subtracts 0.5. This technique is applied when the sample size is small and the data are discreet, and it improves the accuracy of the test statistic and p value. These conditions are suited to the data being analyzed, as the overall score for each question is the subject of comparison.

Table 2 demonstrates the test statistic and p value obtained from the Wilcoxon signed-rank test. The table displays the test statistic as 21, which is large and indicates that the median of the test scores is not zero, suggesting that the performance of test scores improved after education. The p value is below 0.05; hence, the null hypothesis has been rejected and the alternate hypothesis as stated, “The AHRQ pressure injury best practices presentation led to improved knowledge and self-efficacy with intent to practice” may be accepted.

Table 2

Wilcoxon Signed-Rank Test Results

Test statistic	p value
21.0	.0017852

After completing the PUKAT posteducation survey, participants completed the PUM-SES 10-question self-efficacy survey. Responses were plotted in a bar chart to determine the overall confidence levels of respondents to each question. The charts below summarize the self-rating by the respondents across the questions.

Figures 2–11 demonstrate optimistic response in self-efficacy, with no recorded instances of negative feedback. This positive trend signifies a notable degree of confidence among the participants regarding their capabilities to implement pressure injury learning at the bedside.

Figure 2

Question 1 Responses

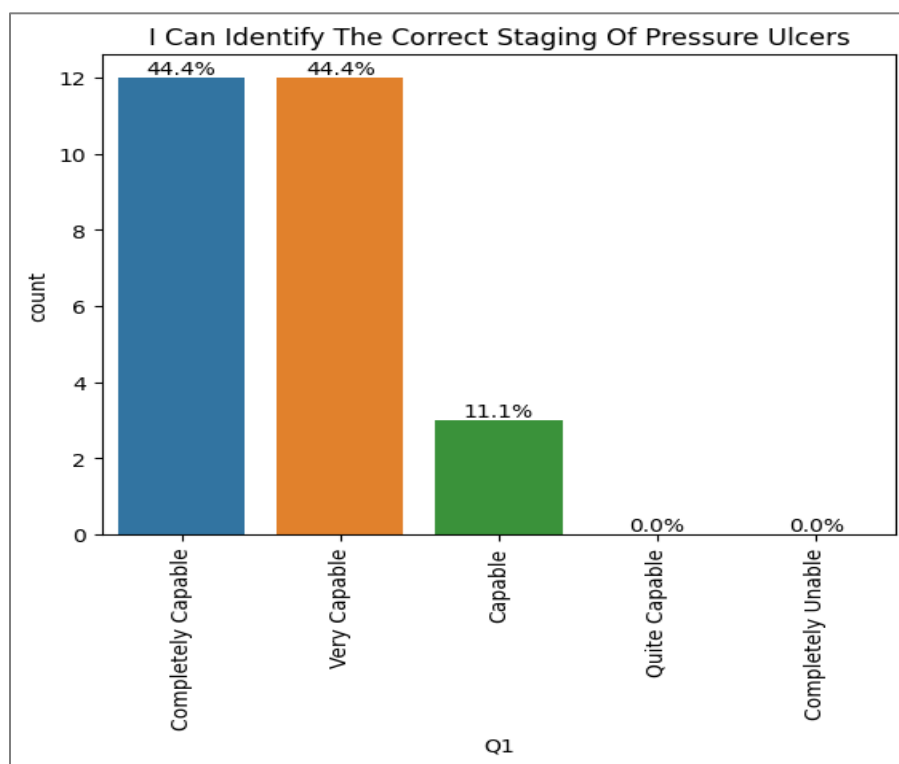


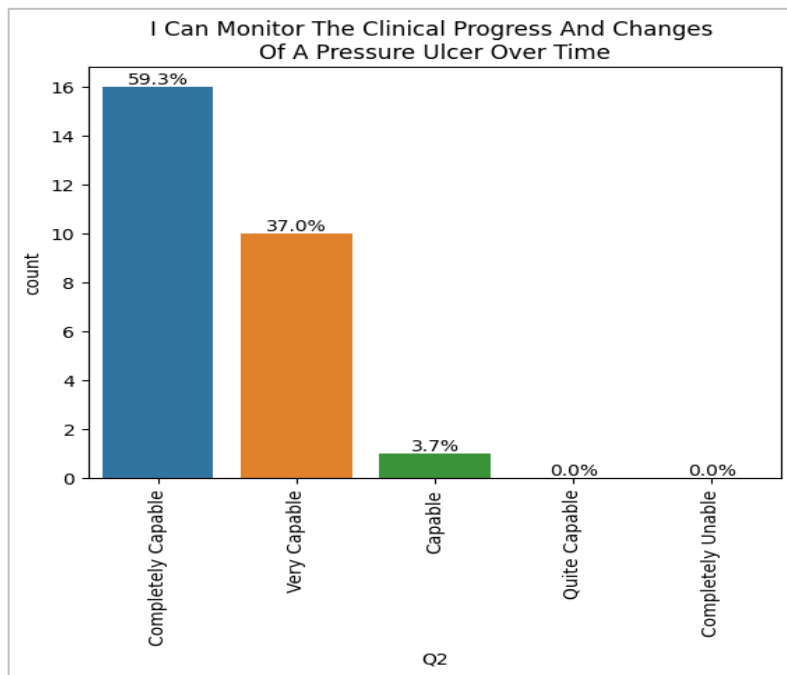
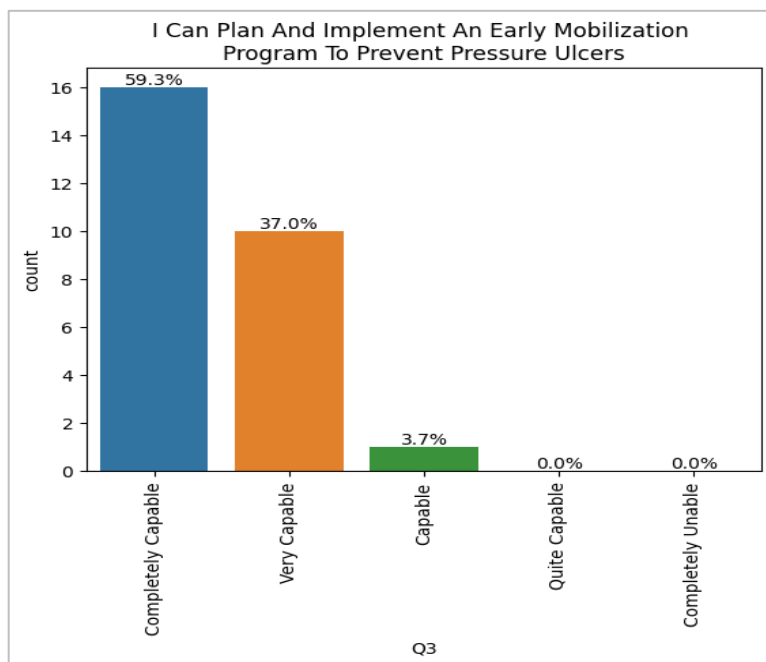
Figure 3*Question 2 Responses***Figure 4***Question 3 Responses*

Figure 5

Question 4 Responses

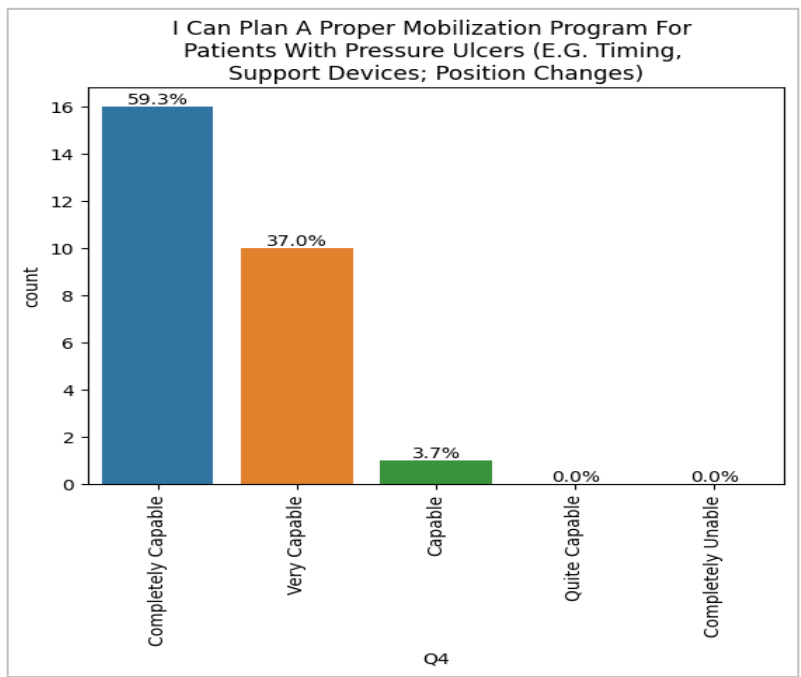


Figure 6

Question 5 Responses

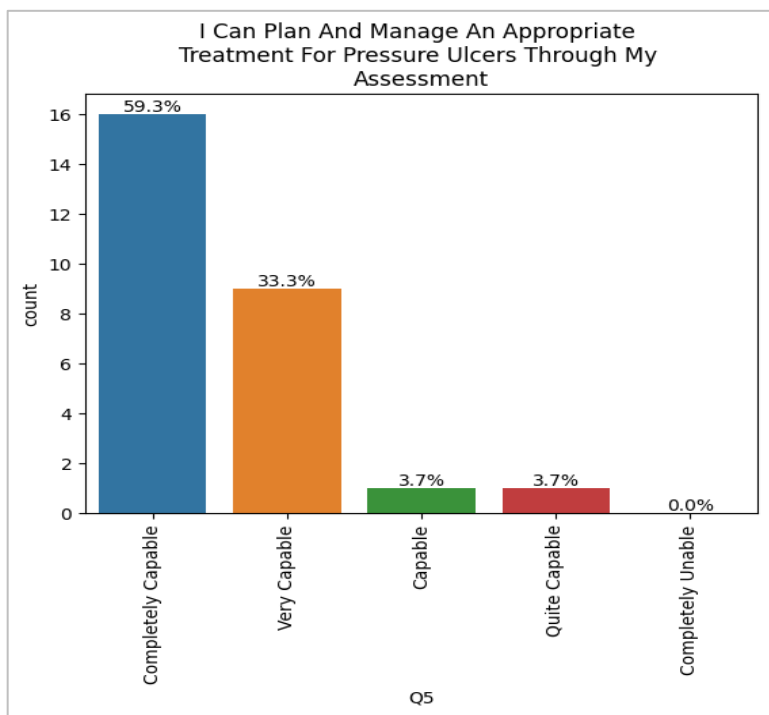


Figure 7

Question 6 Responses

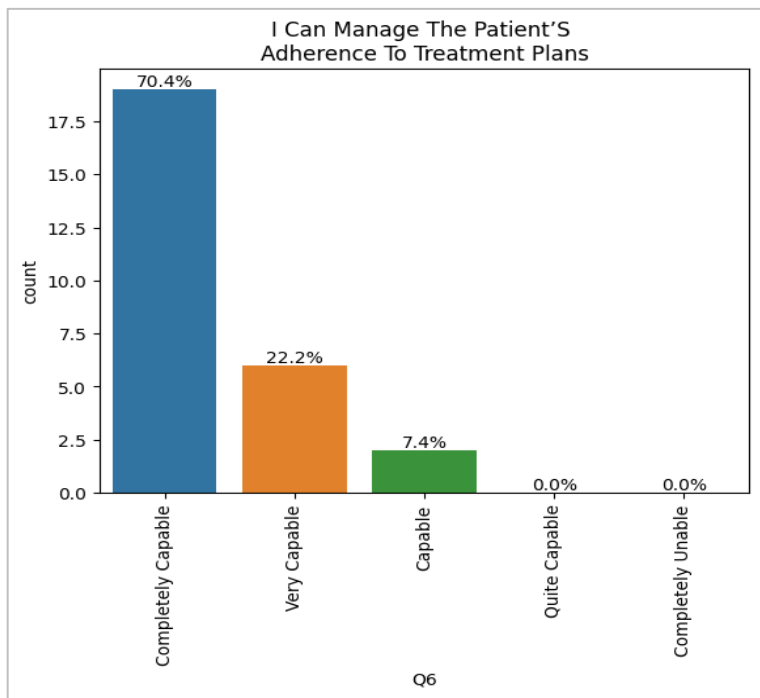


Figure 8

Question 7 Responses

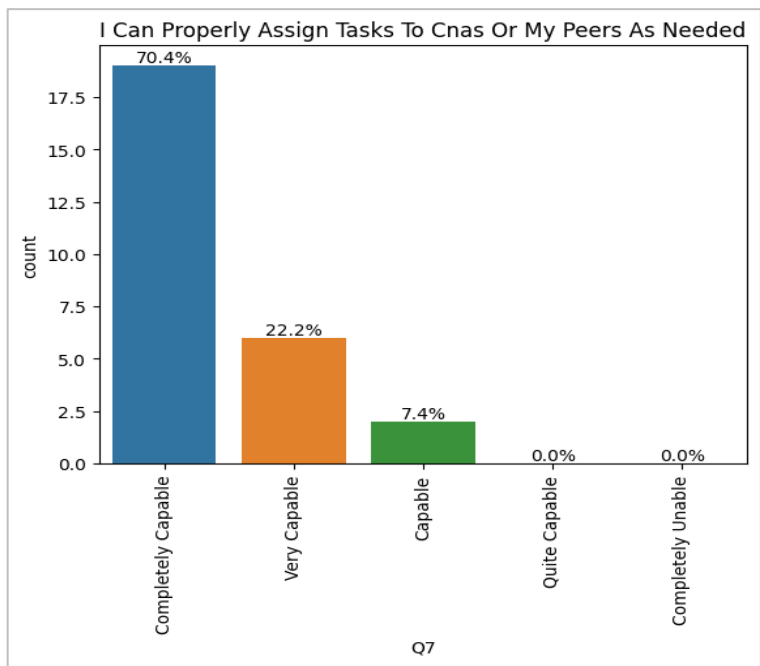


Figure 9

Question 8 Responses

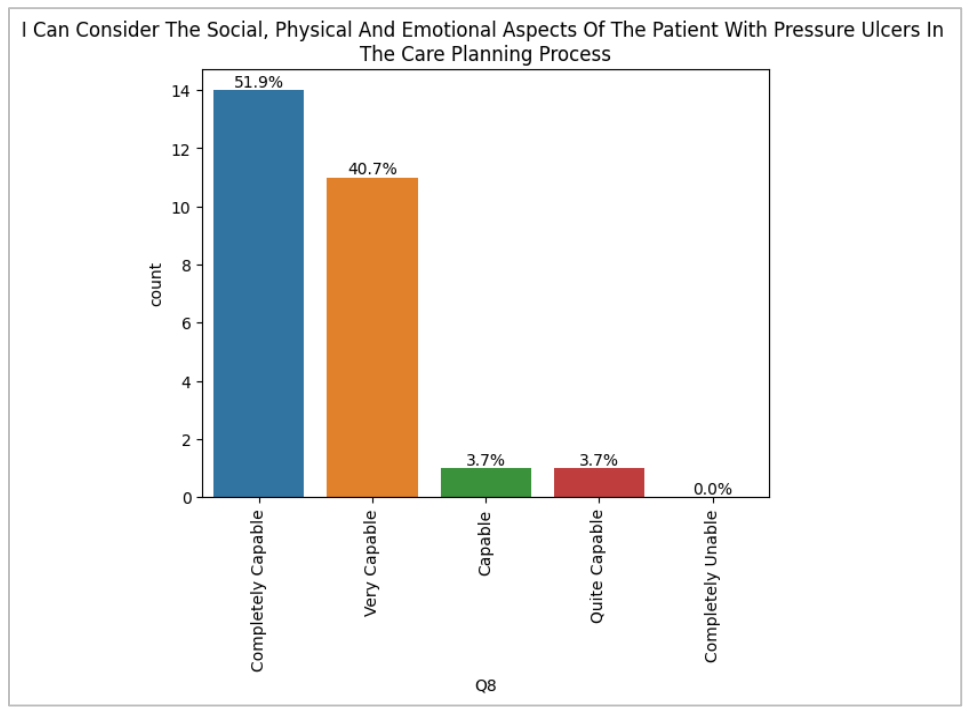


Figure 10

Question 9 Responses

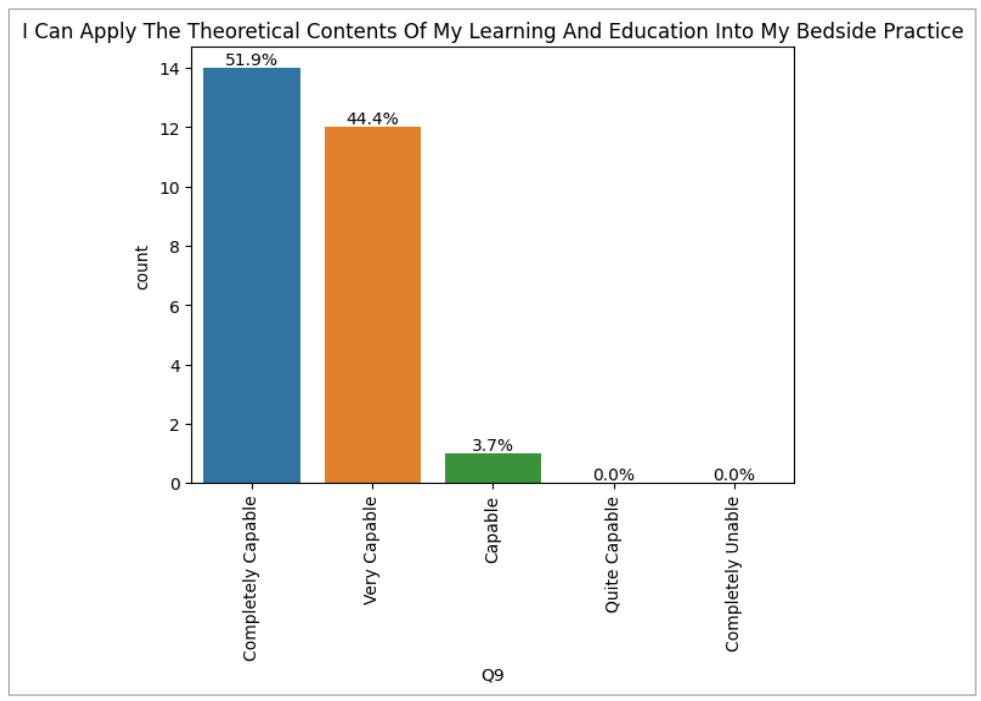
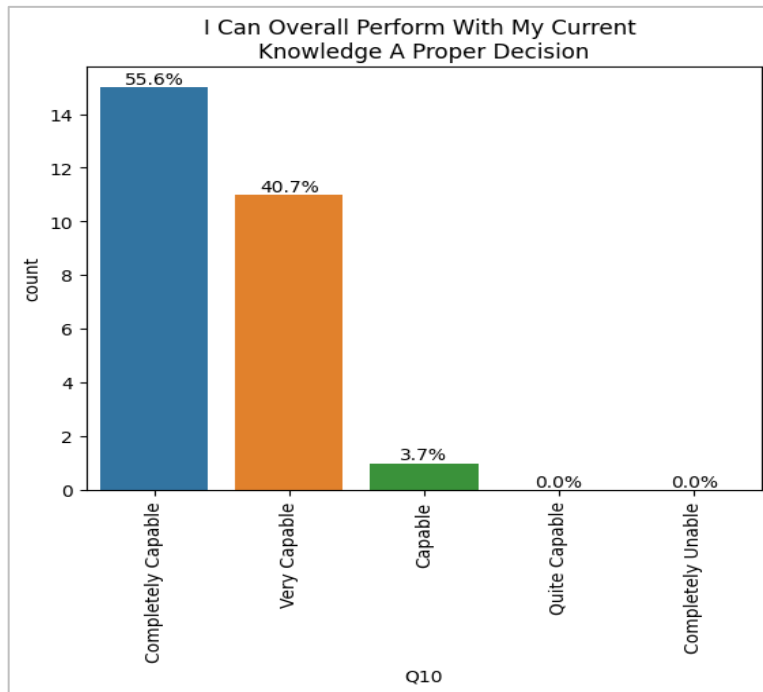


Figure 11*Question 10 Responses***Limitations**

The most notable limitation was the relatively small sample size. This limitation introduced the potential for sampling bias, as certain demographic groups may have been underrepresented in the collected data. To ensure the broader applicability of the findings, further analysis with a larger, more diverse data set is advisable. Another limitation was the short time frame for collecting data and the method of survey collection. The survey was conducted electronically, which may have introduced bias. Only individuals with access to a mobile phone or PC were able to participate. Participants with older-model Android devices had challenges accessing the QR code and required assistance. Hard-copy tests were made available to the participants. This limitation should be kept in mind when considering the broader implications of the results.

Lastly, a main limitation of the project might be the instrument used. Some of the PUKAT questions were complex and required revising of the verbiage to accommodate nondegreed staff or were difficult to interpret. Some questions related to nutrition specifics and body positions utilizing explicit degree angles were challenging for the staff to answer with full confidence of accuracy. During the pretest, respondents stated they were literally guessing at some of the questions. Another limitation could be on the part of the project manager, who was a novice at creating surveys in Qualtrics. I experienced challenges in attempting to section out the questions into thematic categories as specified in the project.

Chapter Summary

The AHRQ pressure injury best practices presentation played a pivotal role in further enriching the participants' knowledge and enhancing their overall performance. This, in turn, contributed to a remarkable boost in self-confidence, as evident in the results of the rank test. The data strongly suggested that the educational intervention had a significant and positive impact on the respondents' self-efficacy. The combination of prior knowledge of adult learners and the acquisition of additional resources fortified their existing understanding and bolstered their belief in their capabilities in clinical practice. Improvement in self-confidence is a testament to the effectiveness of the educational approach and its potential to empower clinical staff in long-term care settings.

Although there were limitations expressed during the project, it does not diminish the significance of the data analysis. Instead, they serve as reminders to for educators to exercise caution when applying findings to real-world decision-making in writing educational interventions. Additionally, the outcomes depicted in Figures 2–11 underscore the transformative potential of tailored education in nursing education (Tsimane & Downing, 2020) and emphasize

the value of ongoing learning and the pivotal role it plays in boosting confidence and competence both in health care and generally. Future research efforts should aim to address these limitations to provide a more comprehensive understanding of the relationship between education and health care performance.

Chapter 5: Discussion of Findings

Pressure injuries in nursing homes continue to be a serious quality concern, with persistent knowledge gaps in pressure injury risk, skin care, early identification, off-loading measures, and pressure injury prevention measures (Lyder & Ayello, 2009). Improving nursing awareness of factors that may contribute to the pathogenesis of pressure injuries enables identification of patients at risk for pressure injury development so that measures can be implemented to prevent pressure injury occurrence (Mondragon & Zito, 2022). The aim of this quality improvement project was to evaluate if education on pressure injury prevention and management improved gaps in nursing knowledge and self-efficacy in bedside practice.

The implementation of the project education was on-site at the state veterans home in three separate sessions. A total of 28 nurses and CNAs participated. The staff development coordinator, wound care RN, and quality RN were also present. Pre- and posteducation data were collected utilizing two validated, structured instruments—PUKAT and PUM-SES—which were self-administered to evaluate the nurses' knowledge and self-efficacy. Prior to the education presentation, the participants were given a Qualtrics QR for the PUKAT pretest questionnaire to scan with their smartphone. Informed consent was obtained with a skip function to opt out of the project. To accomplish the learning objective, the project manager presented an evidence-based pressure injury learning module from the AHRQ pressure injury tool kit that was designed for hospitals and nursing homes. The content included combined AHRQ and NPIAP best practice guidelines. Learning topics presented included pressure injury prevention, off-loading, support surfaces, healthy skin integrity, nutrition, skin protection, symptoms of wound deterioration, and measures to enhance healing and pressure injury staging. Education delivery included PowerPoint, handouts, and a pressure injury educational pocket buddy, which served as a source

of quick reference for the nursing staff to improve overall self-efficacy in pressure injury identification and staging. CNAs received pressure injury communication tools that served as early identification of skin issues during daily skin assessment.

The statistical findings of the PUKAT pre- and postquestionnaires demonstrated that the performance of the nurses improved after the AHRQ pressure injury best practices presentation. The Wilcoxon signed-rank test resulted in a test statistic of 21.0 and a *p* value lower than the predetermined alpha level (0.0018). The null hypothesis was confidently rejected in favor of the alternative and reflected that the AHRQ pressure injury best practices presentation led to improved performance by respondents. Statistical findings also demonstrated the positive impact of education on knowledge retention of nurses and CNAs, which further validated the impact of adult learning according to Knowles's adult learning theory. The adult learners, consisting of nursing staff who participated in this quality improvement project, demonstrated applying prior knowledge and personal experiences with the ability to immediately apply the pressure injury education at the bedside and improve their overall skills sets and self-efficacy. As adult learners, the participants demonstrated enhanced readiness to learn and engaged in an atmosphere that allowed them to assume ownership of their learning experience (Knowles et al., 2005). The evaluation of knowledge transfer and self-efficacy was performed at the conclusion of the educational intervention utilizing Kirkpatrick's model of evaluation and was reflected in posttest scores on the PUKAT and the PUM-SES self-efficacy survey.

Discussion of Findings

Pressure injury education can improve nurses' competency, knowledge, visual discrimination ability in pressure injury prevention and management, according to Kim et al. (2020). However, knowledge gaps remain. During the education presentation, it was notable the

most questions and comments were made when this project manager discussed the importance of nutrition and hydration in pressure injury prevention and when discussing prevention of device-related pressure injuries. In a systematic review and meta-analysis of 23 studies on pressure injury education, Kim et al. (2020) observed that nursing staff demonstrated a significant increase in knowledge in pressure injury prevention and management with higher scores on pressure injury knowledge assessment questionnaires immediately after the intervention. However, this effect no longer existed 1 to 6 months after the intervention. In relation to clinical judgement, scores improved posteducation; however, this knowledge no longer existed 1–3 months after intervention. Visual discrimination and ability to identify and differentiate skin issues improved posteducation (Kim et al., 2020). The findings of this quality improvement project demonstrated that staff had immediate improvement in knowledge posteducation.

The implication of this project was that although staff demonstrated improved knowledge and self-efficacy after education, gaps in knowledge still existed. Limitations encountered included small sample size, short turnaround time, restrictions of utilizing computer-based testing, and complexities of some test questions. In retrospect, the PUKAT questionnaire appears to be more suitable for licensed professionals, as evaluated in the project by Manderlier et al. (2017), the creators of the instrument. Additionally, in a project by De Meyer et al. (2019), the PUKAT questionnaire was administered to nurses and CNAs with findings of higher scores among nursing staff, and all participants struggled with questions relating to specific groups and pressure injury etiology. However, like these project findings, all staff scored higher on the posteducation PUKAT questionnaire.

Furthermore, the literature reviews used in this project concluded that training programs on pressure injury prevention, visual discrimination, and clinical judgement and decision-making

should be ongoing in health care facilities to improve outcomes. This project explored the implementation of education intervention and evaluation of knowledge obtainment and improvement of self-efficacy with utilization of pre- and postsurveys. Based on the evidence of this project, the PICOT objectives were met.

Evidence-Based Practice Findings and Relationship to DNP Essentials

Advanced nursing practice is grounded in the Essentials of Doctoral Education. An advanced practice nurse is responsible for preparing nurses to lead in excellence through scientific inquiry, leadership, and clinical practice (AACN, 2006). Nursing experts in clinical care and nurse scientists expand the body of evidence-based knowledge required for quality patient care. A DNP degree is specifically designed to prepare individuals for specialized nursing practice (AACN, 2006). The DNP Essentials and specialty organizations describe this specialized nursing component's core content. This project connected to DNP Essentials I, II, III, IV, V, and VII.

Essential I: Scientific Underpinnings for Practice

The DNP-prepared nurse can apply science-based theories and concepts to determine the nature and significance of health and health care delivery phenomena. This includes advancing health care delivery and developing and evaluating new practice approaches based on nursing theories as a framework (AACN, 2006). Through applying nursing theories as a framework for implementing nursing knowledge, this further supports evidence and translation of those skills into best practices (AACN, 2006). The Knowles learning theory of adult learning provided the theoretical basis for the project and guided interventions. Knowles's adult learning theory of andragogy recognized that adults have unique learning styles and strengths and benefit from self-directed practical learning drawn from personal experiences (Knowles et al., 2005).

The adult learning theory underpins all educational practices including the individual's attainment of knowledge (Mukhalalati & Taylor, 2019). This nursing theory was utilized in combination with Kirkpatrick's model of evaluation to evaluate the staff's learning and development through the posteducation survey. The Kirkpatrick model utilizes four levels of learning evaluation to determine effectiveness of the education or intervention given, which include (a) reaction, (b) learning, (c) behavior, and (d) results (Kirkpatrick, 2007). Therefore, as the project manager, I reviewed recent literature regarding pressure injury incidence and nursing education in LTC settings to learn about the updates regarding the pathophysiology and epidemiology of pressure injuries in nursing homes, and I developed an approach to address nursing education deficits. Recent research discussed increasing concern for the pressure injury incidence and how nursing home staff do not receive the same degree of education as staff in acute care settings. Therefore, this project addressed this nursing education deficit and evaluated the outcome of the education intervention.

Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking

DNP-prepared nurses should be prepared to build and lead organizations at the policy level for quality improvement (AACN, 2006). For this project, I applied for and received approval from the ACU IRB, which ensured that this project was adherent to ethical guidelines as outlined by the IRB. This project manager developed strategies to strengthen the standard of care nursing at the LTC facility through leadership and empowering the nursing staff to improve knowledge of pressure injury education. The project utilized the AHRQ quality improvement models to promote and advocate for change and improvement in health care delivery and patient safety. Additionally, this project enhanced the quality of care in older adult patients with

mobility issues and pressure injuries by improving patient safety and possibly preventing pressure injury–related health complications.

Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice

DNP-prepared nurses are capable of the translation of research into practice and the dissemination and integration of new knowledge (AACN, 2006). As the project manager, I engaged in literature reviews and synthesis of pressure injury education in LTC settings and developed the PICOT to analyze the current evidence-based practice. The PICOT guided the problem of interest used to complete a comprehensive literature search and review, followed by a synthesis of the information. Evidence-based new knowledge was obtained and disseminated, which is a role of the DNP prepared nurse. In this project, I developed, implemented, and utilized an appropriate data analysis plan, which is described in the methods and results section.

Essential IV: Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care

DNP-prepared nurses are prepared to design, select, use, and evaluate programs that evaluate and monitor outcomes of care, care systems, and quality improvement, including consumer use of health care information systems (AACN, 2006). This project manager provided leadership in the evaluation of any potential ethical and legal issues relating to the use of information, information technology, communication networks, and patient care technology. All data collection efforts were maintained securely, and no patient identification data were breached. This project demonstrated conceptual ability and technical skills to develop and execute an evaluation plan involving data extraction in utilizing Qualtrics for pre- and posttest knowledge evaluations. Technology usage for data collection reduces errors associated with data entry, allows collection of data from large samples with minimal cost, increases response rate,

reduces enumerator errors, permits instant feedback, and increases monitoring of data collection and ability to get more confidential data (Boateng et al., 2018). In addition to Qualtrics for pre- and posttesting, this project manager utilized a PowerPoint presentation and pressure injury pocket buddies and introduced the veterans application, which was accessible on a smartphone, showing it is an effective use of technology. Staff were encouraged to utilize this mobile application and share with patients who had smartphones at the facility.

Essential V: Health Care Policy for Advocacy in Health Care

DNP-prepared nurses can advocate for their profession in developing health care policy and in educating others, including health policy leaders (AACN, 2006). The primary aim of this DNP project was to improve nursing knowledge and self-efficacy in management and prevention of pressure injuries. In the project education intervention, this project manager educated others, including nursing leaders at the facility, regarding measures to improve patient care outcomes. Additionally, this project manager adhered to all certification procedures to obtain necessary approval to conduct the project, including receiving documentation of approval from senior leadership. This process revealed the systems for navigating health care policy and advocacy at health care organizations, which will benefit future quality improvement projects and sustain this project as a standard clinical practice.

Essential VI: Clinical Prevention and Population Health for Improving the Nation's Health

The project addressed the pressure injury incidence in elderly patients in LTC settings and how clinical staff can improve their bedside practice in preventing pressure injuries. Pressure injuries lead to pressure-related complications, poor quality of life, poor health outcomes, and mortality (Ibrahim & Qalawa, 2020; Siotos et al., 2022). The state veterans home provides around-the-clock care for many disabled veterans in the region. The care includes skilled nursing

and a physician on call 24 hours a day, LTC, memory care, wound services, and physical, occupational, and speech therapy. The facility also focuses on improving the quality of life for veterans with multiple chronic diseases, residual stroke defects, impaired mobility, bed-bound status, or pressure injuries. Pressure injury education and preventive measures are an effective method for improving the life of disabled and bed-bound veterans. As demonstrated in this project, educating staff on measures to prevent pressure injuries utilizing evidence-based practice guidelines from AHRQ and NPIAP improves staff knowledge and self-efficacy. This, in turn, may improve pressure injury incidence and prevent hospital readmissions, which significantly impacts community health.

Recommendations for Future Research and Clinical Practice

The findings of this DNP project highlight and inform the positive impact of education on the performance, knowledge obtainment, and self-efficacy for nursing and CNAs. To effectively implement these findings and leverage them for the benefit of health care organizations and patient care, some recommendations should be considered:

1. Continuous education programs (CEPs): Health care institutions should prioritize the establishment of lifelong learning CEPs for nursing staff (Mlambo et al., 2021). CEPs should cover the evolving nature of evidence-based practice. The literature suggests that nurses are motivated to take part in CEPs to enhance their knowledge, improve skills, and keep up-to-date with recent evidence.
2. Tailored educational content: Develop educational content that is specifically tailored to the needs and challenges faced by nurses and CNAs in their daily roles. Tailored educational strategies increase nursing knowledge and self-efficacy (van

Houwelingen et al., 2021). Additionally, addressing the staff's unique requirements can enhance the relevance and effectiveness of the education.

3. **Diverse learning modalities:** Recognizing that individuals have different learning styles, a variety of learning modalities such as in-person training, online courses, and hands-on bedside training should be offered to cater to diverse learning needs.
4. **Regular knowledge assessments:** Staff development coordinators and wound care nurses in LTC settings can implement regular knowledge assessment posttests to evaluate the impact of education. This practice facilitates monitoring of knowledge retention and identifying areas that may require further training.
5. **Larger-scale studies:** Future researchers should conduct larger-scale studies with a more diverse participant pool to validate and extend the generalizability of the findings (Boateng et al., 2018). Larger-scale studies with diverse participant pools ensure that the positive effects of education are applicable across different health care settings and populations.
6. **Feedback mechanisms:** Establish feedback mechanisms where clinical staff can provide input on the effectiveness of educational programs. This feedback can inform continuous improvement efforts. In retrospect, an evaluation form should have been given to the participants to evaluate the education content and delivery.
7. **Collaboration with educational institutions:** Collaborate with educational institutions and organizations specializing in health care education to develop and deliver high-quality educational content—for example, by partnering with local colleges that can assist in training nurses and CNAs on simulation equipment to enhance skills. This method of collaboration through simulation-based learning experiences may provide

an opportunity for institutions to collaborate and provide additional engagement with health care professions that may not be represented within a single institution (Cunningham et al., 2018).

8. Long-term impact assessment: Future studies can consider extending the assessment period beyond a week to evaluate the long-term impact of education on performance and knowledge retention. This can help gauge the sustainability of the educational benefits.

Chapter Summary

The findings and outcomes of this project have evidence-based practice, health policy, research, and social change implications. According to the literature reviews related to educating nursing staff in long-term facilities, patients benefit directly when staff are knowledgeable of evidence-based practice guidelines for pressure injury prevention and management. However, the evidence suggests that nursing knowledge regarding prevention and treatment of pressure injuries is less than optimal; therefore, the necessity for pressure injury education will remain a future concern in LTC settings (Kim et al., 2020). Literature reviews also highlighted limited education in LTC settings in comparison to pressure injury prevention education that is disseminated in acute care settings. Incidence rates of pressure injuries were as high as 59% in 2019, with treatment cost at nearly \$11.6 billion (Yap et al., 2019), which poses a significant burden on individuals' quality of life and the associated cost accrued by the health care organization.

Leaders in health care organizations and health policy makers can benefit from the project outcomes, which demonstrate that nursing education of pressure injury prevention will decrease pressure injury incidence rates in LTC facilities. This project contributed to the body of

knowledge related to adult learners in LTC settings in implementation of a pressure injury education program to improve the nursing staff's self-efficacy at the bedside. By implementing the recommendations above, health care organizations can harness the benefits of education to empower their nursing staff, enhance patient care quality, and contribute to improved health care outcomes for elderly patients in LTC facilities. The continuous pursuit of knowledge and required skill sets to remain current in evidence-based practice will remain a cornerstone of excellence in health care delivery. Future research is needed to address two crucial areas including (a) if the nurse's self-efficacy of pressure injury management impacts their bedside practice and patient outcomes and (b) if pressure injury education in LTC settings reduces hospital readmissions and cost reduction for pressure injury management. This project demonstrated the importance of continued education with clinical staff on pressure injury management and prevention. Several staff expressed that they learned something that they did not know, which is testament that the education was effective and informative.

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Appendix A: Institutional Review Board Approval

Date: May 3, 2023,

PI: Charity Booker

Department: ONL-Online Student, 17260-Doctor of Nursing

Re: Initial - IRB-2023-96

Assessment of Self-efficacy and Practice change Following Pressure Ulcer Education in a Long-Term Care Facility

The Abilene Christian University Institutional Review Board has rendered the decision below for Assessment of Self-efficacy and Practice change Following Pressure Ulcer Education in a Long-Term Care Facility. The approval is effective starting May 3, 2023.

Admin Check-in Date: --

Expiration Date: --

Decision: Approved

Category: 7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Research Notes:

Additional Approvals/Instructions:

Upon completion of this study, please submit the Inactivation Form within 30 days of study completion. If you wish to make any changes to this study, including but not limited to changes in study personnel, number of participants recruited, changes to the consent form or process, and/or changes in overall methodology, please complete the Modification Form. If any problems develop with the study, including any unanticipated events that may change the risk profile of your study or if there were any unapproved changes in your protocol, please inform the Office of Research and Sponsored Programs and the IRB promptly using the Incident Report Form. All approval letters and study documents are located within the Study Details in Cayuse IRB.

The following are all responsibilities of the Primary Investigator (PI). Violation of these responsibilities may result in suspension or termination of research by the Institutional Review Board. If the Primary Investigator is a student and fails to fulfil any of these responsibilities, the Faculty Advisor then becomes responsible for completing or upholding any and all of the following:

- If there are any changes in the research (including but not limited to change in location, members of the research team, research procedures, number of participants, target population of participants, compensation, or risk), these changes must be approved by the IRB prior to implementation.
- Report any protocol deviations or unanticipated problems to the IRB promptly according to IRB policy.
- Should the research continue past the expiration date, submit a Continuing Review Form approximately 30 days before the expiration date.
- When the research is completed, inform the Office of Research and Sponsored Programs. If your study is Expedited or Full Board, submit an Inactivation Form.
- According to ACU policy, research data must be stored on ACU campus (or electronically) for 3 years from inactivation of the study, in a manner that is secure but accessible should the IRB request access.
- It is the Investigator's responsibility to maintain a general environment of safety for all research participants and all members of the research team. All risks to physical, mental, and emotional well-being as well as any risks to confidentiality should be minimized.

For additional information on the policies and procedures above, please visit the IRB website <http://www.acu.edu/community/offices/academic/orsp...> or email orsp@acu.edu with your questions.

Sincerely,

Abilene Christian University Institutional Review Board

Appendix B: Permission for Pressure Ulcer Knowledge Assessment Tool Version 2.0

 FACULTY OF MEDICINE AND HEALTH SCIENCES	<u>DEPARTMENT OF PUBLIC HEALTH AND PRIMARY CARE</u> UNIVERSITY CENTRE FOR NURSING AND MIDWIFERY
	Dimitri Beeckman, RN, BSc, MSc, PhD Professor
	E [REDACTED] T [REDACTED] M [REDACTED]
	[REDACTED]
	www.ugent.be

DATE 15 March 2023	PAGE 1/1	OUR REFERENCE 20230315/PUKAT
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Dear Charity L. Booker and Dr. Catherine Garner,

Professor dr. Dimitri Beeckman grants permission to use the Knowledge Assessment Tool (PUKAT) 2.0 for your dissertation titled *Assessment of Self-efficacy and Practice change Following Pressure Ulcer Education in a Long-Term Care Facility* under the conditions in this agreement:

- (1) To use and print the tool
- (2) The tool will be used only within the research project and will not be sold or used with any other purposes
- (3) The copyright statement will be included on all copies of the survey tool

Ablene Christian University may not use the PUKAT 2.0 for any other purpose. The right to use the tool is not exclusive. We will also give others permission to use the PUKAT 2.0.

If I can be of any further assistance or provide you with any additional information, please do not hesitate to contact me.

With kind regards

Prof. dr. Dimitri Beeckman
Ghent University, Belgium




**GHENT
UNIVERSITY**

Appendix C: Beeckman's Pressure Ulcer Knowledge Assessment Tool Version 2.0**PUKAT 2-0****THEME: AETIOLOGY**

1. There are several causal factors in the development of pressure ulcers. Which of the following factors is one of them?

- a. Diabetes.
- b. Incontinence.
- c. Fever.
- d. Reduced level of activity.

2. A patient sits with the head of bed elevated to 60°. What happens when his skin sticks to the underlying surface when he slides down in bed?

- a. The pressure increases.
- b. Problems with the microclimate occur (temperature and relative humidity).
- c. Shear increases.
- d. Friction/rubbing increases.

3. What is the average percentage of patients with pressure ulcers in European hospitals?

- a. Between 1% and 5%.
- b. Between 5% and 10%.
- c. Between 10% and 15%.

Appendix D: Permission for Pressure Ulcer Management Self-Efficacy Scale for Nurses

**I.R.C.C.S. Policlinico
San Donato**
Gruppo San Donato

April 19th, 2023

Object: Pressure Ulcer Management Self-Efficacy Scale for Nurses (PUM-SES)

To: Charity L. Booker, DNP student at Abilene Christian University

Thank you for your interest to Pressure Ulcer Management Self-Efficacy Scale for Nurses (PUM-SES), published as follows: Dellafiore, Arrigoni, Ghizzardi, Baroni, Conte, Turrini, Castiello, Magon, Pittella, Caruso. (2019). Development and validation of the pressure ulcer management self-efficacy scale for nurses. *J Clin Nurs* 2019; 28:3177–3188. **You have permission to use the PUM-SES scale for your research project, and the original paper must be cited in your future thesis, abstract, or presentations.**

Sincerely

Dr. Rosario Caruso

Appendix E: Pressure Ulcer Management Self-Efficacy Scale for Nurses (Partial)

Pressure Ulcer Management Self-Efficacy Scale for Nurses (PUM-SES)

Dellafiore, Arrigoni, Ghizzardi, Baroni, Conte, Turrini, Castiello, Magon, Pittella, Caruso. (2019). *Development and validation of the pressure ulcer management self-efficacy scale for nurses*. J Clin Nurs 2019; 28:3177–3188. doi.org/10.1111/jocn.14875

Please, consider your working experience regarding to patients with Pressure Ulcer, “how much do you feel able to face the following situation [...]?”

completely
unable
1

Quite capable
2

capable
3

Very capable
4

Completely
capable
5

A - Assessment					
1. I can identify the correct stage of pressure ulcers	1	2	3	4	5
2. I can monitor the clinical trajectory and changes of pressure ulcers over time	1	2	3	4	5
B - Planning					
3. I can plan and implement an early mobilization program to prevent pressure ulcers	1	2	3	4	5
4. I can plan a proper mobilization program for patients with pressure ulcers (e.g. timing, support devices; position changes)	1	2	3	4	5