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Nursing Knowledge on Pressure Injury Prevention in the Intensive Care Unit

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
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Walden University
2019

Abstract

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MS, Walden University, 2019

BS, Long Island University College, 1985

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

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Abstract

Over 60,000 hospital patients die each year from complications associated with hospital-acquired pressure injuries (HAPIs). Pressure-injury rates have increased by 2% within the past decade as life expectancy has also increased due to high cost in Medicare. Evidence shows that the incidence of pressure injuries (PIs) in healthcare facilities is increasing, with high rates of occurrence in intensive care units (ICUs). At the clinical site for which this project was developed, multiple in-services had been provided to staff regarding PIs, but uncertainty persisted about how knowledgeable the nurses were. This project, using the Academic Center for Evidence Star Model of Knowledge Transformation improved the nurses' knowledge and their practice related to PI prevention in the ICU, as well as to translate evidence into nursing practice. A literature review was conducted on PI prevention to inform the project. The project provided an educational program for intensive care nurses on PI prevention and determined, based on participants' pre- and posttest responses, that nurses' knowledge improved as a result of participation. This project, involving 55 nurses, includes information on the Pieper-Zulkowski Pressure Ulcer Knowledge Test (PZ-PUKT) measuring pressure knowledge which resulted in an 85% improvement on injury prevention, 76% in wound description, as well as, 62% in the Braden Scale. Improvements in knowledge and practice resulting from nurses' participation in an evidence-based education session on PI prevention may bring positive social change to the organization at which this project was conducted.

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Dedication

I would like to dedicate my Doctor of Nursing Practice (DNP) final project to God, who gave me the strength to pursue my dreams. To my family, especially Claudel, my husband, who was always there for me, staying up me while I was working on my project. Without his help, this dream could not have been a success. I wanted to thank my kids, Vanessa and Tamara, for understanding and cooperating with me. Many times, I wanted to quit, but they kept me going and said they believed in me. To all family members (with special thanks to my sister Gladys), friends, and coworkers, who have helped and supported me along this process, this is for you.

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Section 1: Nature of the Project

Introduction

The quality of care provided by acute-care facilities is being scrutinized by many government agencies, such as the Centers for Medicare and Medicaid Services (CMS). The Institute of Medicine and the Institute of Healthcare Improvement have voluntarily joined organizations such as the Leapfrog Group and Hospital Quality Initiative (HQI) to ensure healthcare quality for the public by identifying when nursing may influence negative outcomes in hospitals (Leapfrog Group, 2011). Quality indicators include hospital-related conditions such as catheter-associated urinary tract infections (CAUTIs) and hospital-acquired pressure injuries (HAPIs). Pressure injuries (PIs), formerly known as *pressure ulcers*, continue to be a problem in the hospital setting. As defined by the National Pressure Ulcer Advisory Panel (NPUAP, 2016), a PI is "a localized injury to the skin and/or underlying tissue over a bony prominence, as a result of pressure, or pressure in combination of shear."

In the United States, it is estimated that 2.5 million patients per year are affected with PIs (Agency for Healthcare Research and Quality [AHRQ], 2014). In the intensive care unit (ICU), pressure injuries are associated with an increased risk of death, longer length of stay, and discomfort (Apostolopoulou et al., 2014). In addition, the development of PIs has been used as a measure of the quality of care that is provided to patients (Meddings et al., 2015).

The goal of this project was to provide education to critical-care nurses on PI prevention and to assess participants' knowledge and practice improvement after

completion of the education. A staff education project was developed to meet the need for an evidence-based educational program to support nursing knowledge about PI prevention and assessment. The target population consisted of critical-care registered nurses in a medical ICU. In this 30-bed ICU in a tertiary-care facility in the southeastern United States, PIs remain at 0.3% to 1% per month, as compared to the national incidence rate of 2.5% (Padula, 2017).

Problem Statement

The practice problem for this DNP project was the high occurrence of PIs developing in the ICU. Patients in the ICU are critically ill, with many experiencing multiorgan failure, so prevention of PI is essential. PI affects the comfort of the patient and extends the patient's duration of stay in the hospital. On average, the organization admits several patients with life-threatening disease, infection, and PIs. The facility provides numerous opportunities for nurses to learn about PIs, including skills fair and a routine in-service on PI prevention, but PI has always seemed to be an issue. The facility also has new staff members whose knowledge base on prevention is unknown. The problem is significant because nurses frequently do not use the preventive measures available to them. To help nurses gain a better understanding of how best to prevent PIs, this project was developed to provide evidence-based information to the nurses in the ICU. I sought to assess nurses' knowledge and practice related to PI prevention in order to identify any supports that might be needed for an improvement or change in practice. Currently, HAPIs represent a national concern due to increased patient morbidity, the high cost of treatment, and medical expenses (Zaratkiewicz et al., 2011). The

development of pressure injuries is linked to poor patient outcomes, but most HAPIs can be prevented if hospitals improve the quality of their care. However, since July 2015, due to higher incidents of HAPIs, PI has increased by 2% as life expectancy has also increased (Cano, Anglade, Stamp, & Young, 2015).

Currently, there is evidence that the incidence of PIs in healthcare facilities is increasing. Over 60,000 hospital patients die each year from complications associated with HAPIs. HAPI rates vary depending on the clinical setting, ranging from 2.2% to 23.9% in long-term care to 0% to 17% in home care (Health Research & Educational Trust, 2017). According to NPUAP (2015), PI care in the United States costs around $11 billion annually. Costs for an individual PI can vary from $500 to $70,000. According to the Wound, Ostomy, and Continence Nurses Society (WOCN, 2017), PI is a complex problem due to multiorgan failure and comorbidities. Recognizing that PIs cannot be completely eliminated, the WOCN (2017) issued a position statement on avoidable versus unavoidable PIs. Policies and campaigns have been implemented to encourage hospitals to improve the quality of care in an effort to reduce unnecessary and preventable costs. Medical devices related to PI have come to be more than 30% of the overall hospital-acquired pressure ulcer injury (HAPU/I) rate therefore to treat PIs quickly, to reduce the cost and improve quality interventions must be implemented (Health Research & Educational Trust, 2017).

Purpose

The purpose of this staff education project was to provide an educational program to intensive care nurses on PI prevention and to determine whether nursing knowledge

improved when measured by pre- and posttest responses. Nurses perform and inspect all pressure points on admission, on transfers, at the beginning of each shift, for each end-of-shift report, and at discharge, but PI remains a concern in the project agency.

Addressing the Gap in Practice

A better understanding of the gap between theory and practice may encourage healthcare providers to pay more attention to evidence-based practice (EBP) recommendations in order to reduce PI incidence in healthcare settings. In this case, there is a gap in nursing education and application of knowledge regarding PI prevention.

The staff education project was developed to address the gap in practice regarding EBP for PI prevention by improving nurses' knowledge of PIs. In order to ensure superior prevention of PIs, it is necessary to assess nurses' knowledge and practice (Joint Commission Resources, 2012). The Pieper-Zulkowski Pressure Ulcer Knowledge Test (PZ-PUKT) was used to measure PI knowledge in addition to factors attributed to development of pressure injuries (Pieper & Zulkowski, 2014). It has been reported that many nurses have inadequate knowledge concerning PIs and the staging of wounds (Delmore et al., 2018) and need to be educated on PI prevention.

Waugh (2014) conducted a systematic review using seven studies to examine nursing knowledge and PI prevention and found that there was no relation to the application of adequate PI prevention. Furthermore, nurses with higher levels of education have scored higher in knowledge in some studies, whereas other studies have shown no difference in knowledge associated with nurses' education (Waugh, 2014).

The WOCN (2017) recommended further research to identify the development of risk factors for PI and interventions for clinical practice. The WOCN has noted the need for a fuller understanding of the conditions and risk factors associated with avoidable and unavoidable PIs.

Practice-Focused Question

The practice-focused question for this project helped to identify the clinical problem relating to PI prevention (Fineout-Overholt, Melynk, Stillwell, & Williamson, 2010). The question was as follows: To what extent will the nurses' knowledge on pressure injuries improve after attending a structural education program?

Due to a lack of documentation on PI prevention, it appeared that the nursing staff did not understand the importance of adequate preventative measures for PIs. For example, the Braden Scale is highly predictive of PI development, although it is utilized inefficiently. In 2014, wound experts with NPUAP affirmed that not all PIs can be prevented in the ICU, suggesting that the development of PI may be unavoidable in critically ill patients (Cox, Roche, & Murphy, 2018). In the facility, the Braden Scale is used as an assessment tool for patients at risk of PI. Understanding the scale and its scoring assist in determining the level of risk. A score of 15-18 identifies a patient at risk, a score of 13-14 identifies moderate risk, a score of 10-12 indicates high risk, and a score below 9 identifies greater risk (Cox et al., 2018). However, Bergstrom and Braden (2002) recommended that low subscale scores are to be used for prevention protocols, as these are now required by CMS (Cox et al., 2018). In addition, there may be a lack of research

evidence on the effectiveness of some interventions that are available (Gray, Grove & Sutherland, 2017).

Nature of the Doctoral Project

The evidence that was used to meet the purpose of this doctoral project included information obtained from various literatures. In identifying the research problem, I used research from Cumulative Index of Nursing and Allied Health (CINAHL), Medline, Joanna Briggs Institute, and Cochrane. The population involved in this project included wound care nurses, the wound care champion RN of the unit, dieticians, and a physical therapist. A questionnaire tool was provided to all nurses in the critical care units in the medical ICU to measure knowledge and practice on PIs. The doctoral project was conducted to assess nursing knowledge of an EBP for PI prevention in intensive care nurses after providing an educational program. I used a validated questionnaire tool to assess nurses' knowledge of PI prevention and practice. The staff education project involved pretest-posttest administration of a questionnaire to determine the effect of education on nursing knowledge on PI. ICU nurses involved in delivering regular care to any patient at risk of PI were included.

Approach Used

The approach that was used for this doctoral project included a comprehensive literature review on PI prevention and practice in the ICU. The project was directed by the Academic Center for Evidence (ACE) Star Model of Knowledge Transformation to translate evidence into nursing practice, which has been used as a guide to increase understanding of the use of EBP in nursing practice and its relevance in clinical decision

making (Stevens, 2013). The development of nursing knowledge is relevant. Furthermore, it will be evaluated to appropriately answer the research question. The ACE model was used to assist in nursing education, PI prevention, practice, skin assessment, and the Braden Scale.

Significance of the DNP Doctoral Project

The NPUAP has developed many educational materials regarding PI. The persistence of PIs as a problem in the hospital setting can be attributed to the inadequacy of efforts to disseminate the knowledge required to prevent these injuries (NPUAP, European Pressure Ulcer Advisory Panel, & Pan Pacific Pressure Injury Alliance, 2014). I discussed the need for this project with the nurse manager and how it might be beneficial to assess nursing knowledge and practice. In 2011, the Center for Medical Surveillance began reporting HAPI rates for hospitals on its Hospital Compare website, and in 2014, the Affordable Care Act began reducing reimbursement to hospitals that were in the highest quartile for incidence of hospital-acquired conditions (HAC) for Medicare patients (Meddings et al., 2015). PI is considered as a localized injury to the skin or underlying body tissue that occurs over bony prominences (NPUAP, 2016). Working in ICU exposes staff to the rigors of PI prevention in immobile patients, and despite the many protocols that are available to deal with the issue, it keeps occurring.

Efforts to assess nursing knowledge and practice can be useful if problems can be identified and improvements in the quality of patient care can be achieved. Such efforts to support PI prevention are important because the incidence of HAPIs has increased nationally in medical ICUs (Institute for Clinical Systems Improvement, 2012).

Stakeholder Analysis

Stakeholders in this project were the hospital administrators, the nurse manager for the unit, and the wound care specialists. These experts were informed of the project and were asked to offer guidance. The stakeholders may be impacted by the results of the pretest/posttest questionnaires, and could further impact the rate of PI incidence in the facility.

Contributions to Nursing Practice

PIs can contribute to increased length of hospital stay, increased chance of death, missed employment days, social isolation, pain, suffering, and financial burden (Strazzieri-Pulido, Gonazalez, Nogueria, Padilha, & Santos, 2019). Hospital mortality rates have increased to 11.2% with patients who developed HAPIs and the rate of mortality with readmission within 30 days after discharge was 15.3% (Lyder et al., 2012). This project assessed nurses' knowledge of PI prevention and practice with the implementation of an evidence-based education program. Nursing knowledge of prevention and assessment of PIs is essential to lowering PI rates.

Transferability of Knowledge

Through this DNP project, critical-care nurses gained knowledge and experience on PI prevention in nursing practice. An additional goal of this project is to support positive change by sharing the findings with others in similar practice areas with similar issues such as PIs. Dealing with PI is a major concern in hospitals because CMS will no longer reimburse for PIs caused while patients are hospitalized (Cooper, 2013).

Implications for Positive Social Change

There have been a number of suggestions to increase nursing knowledge over the years. Some of the most effective involve providing standard operating protocols in the practice setting, providing summaries of information at conferences and workshops, and recognizing continuous educational achievements through certifications and honors. Assessing critical-care nurses' knowledge and practice through an evidence-based educational program on PI prevention may bring positive social change to the organization at which this project was conducted. Educational program can bring knowledge closer to nurses, alleviate the strain of nurses' workload, and give nurses motivation to receive continuing education. In efforts to transfer knowledge, professional bodies require that all nurses complete a required continuing education regimen over a period of time. Several resolutions in assisting continuing education have been proposed, such as making required reading material available in summary form as well as having the material available for staff through electronic means. However, these methods have not been taken up effectively (Clark et al., 2015; Coventry, Maslin-Prothero, & Smith, 2015).

Summary

In the field of acute care, critically ill patients are at a high risk for developing PIs. Preventing PIs is a healthcare concern in the hospital where I implemented this DNP project, and this project was an effort to mitigate PIs by determining the level of nurses' knowledge of PI prevention and practice in the ICU through an educational program. In Section 2, I present the background and context of project, which are supported by a

comprehensive literature review on PI prevention and practice.

Section 2: Background and Context

Introduction

In the hospital- and home-care settings, there are an increasing number of patients who are immobilized by illness. This situation has led to an increase in the incidence of PIs. PIs represent a significant concern in the hospital-care setting. The focus question for this project was the following: To what extent will the nurses' knowledge on pressure injuries improve after attending a structural education program? This project assessed the impact of an evidence-based education program on nurses' knowledge of PI prevention and assessment.

The DNP project focused on assessing the information that was possessed by nurses and disseminating information in regard to PI prevention. It encompassed a literature review on the prevention of PIs. Using a pre- and posttest questionnaire as the chief study design, I obtained information from nurses on their knowledge of current practice guidelines. In this section, I present the theoretical models for the project, a literature review, and the project's relevance to nursing practice.

Concepts, Models, and Theories

Theoretical frameworks create a reference for interpretation or generalization of the literature. The theoretical framework suggested that evidence-based practice (EBP) is valid; therefore, confirming the need to understand research findings. Furthermore, evidence-based nursing practice is the identification of theories on human health and human experiences to direct modalities of care. Using EBP to make changes in current practices have proven effective and demonstrate positive outcomes. Failure to apply EBP

to guide nursing care increases the risk of poor effects (Chrisman, Jordan, Davis, & Williams, 2014). With this in mind, I used the evaluation criteria proposed Chrisman, et, al, 2014) to guide the direction of this project.

Nurses have developed numerous EBP models to help in understanding evidence in the context of nursing practice. The ACE model assists in examining and applying EBP in a manner that is useful for nursing. (Academic Center for Evidence-Based Practices [ACEBP], 2012).

Using the ACE Star Model of Knowledge Transformation, one can discover barriers when moving evidence into practice and implementing solutions grounded in EBP. The ACE model includes competencies for essential skills of knowledge management, accountability for the scientific basis of nursing practice, organizational and policy changes, and the development of scientific foundations for EBP. This model was developed for clinical and educational use to assess nurses' willingness to practice evidence-based care and to measure the impact of related professional development. The model, represented by a five-pointed star, defines knowledge and integrates best research evidence with clinical expertise to achieve EBP. Point 1 of the star represents primary research studies; Point 2 represents evidence summary; Point 3 refers to evidence-based clinical practice guidelines; Point 4 represents evidence in action; and Point 5 represents evaluation of the impact of the EBP on satisfaction, efficacy, patient health outcomes, and health policy (Correa-de-Araujo, 2015).

Another model that can be considered is the health benefit model (HBM), which was developed as a way to understand the perceived benefits and consequences of

decision-making behaviors (Roden, 2004). Garrett-Wright (2011) applied the HBM to perceived behavioral control and behavioral intention from the theory of planned behavior.

Literature Review

Bradshaw (2010) acknowledged that an important feature that distinguishes the nursing profession is taking accountability for practice and examining the best way to deliver care; this statement fully reflects the essence of EBP related to PI treatment. However, the main problem in PI treatment lies in the fact that there is a gap between theory and practice. To prove the validity of this assumption, PI treatment should be considered in terms of risk assessment strategies. Consistency in nursing assessment, documentation, and relevance to the interventions planned will improve PI prevention and decrease the risk of PI development. Identification of extrinsic and intrinsic risk factors for PI development is necessary.

However, a retrospective observational study conducted using the U.S. Premier Healthcare Database (PHD) showed the importance of identifying risk factors for HAPIs and improving best practice for PI prevention (Dreyfus, Gayle, Trueman, Delhougne, & Siddiqui, 2018). Patients who may receive a mixture of treatments for other pathologies may not be receiving proper nutrition as income constraints may dictate diet. In addition, literature indicates that unmodifiable factors associated with patients with disease processes and comorbidities have a great effect on PI development and patients' ability to adhere to preventive measures (NPUAP, 2017; WOCN Society, 2017).

PIs are responsible for over 60,000 annual cases of hospital death in the United States due to complications (ICSI, 2012). Meanwhile, difficulty in obtaining reimbursement for ulcer treatment raises operating costs in healthcare institutions. The cost of treatment has been set at a figure of around $11 billion every year, which underscores the need to reduce the incidence of PI at a local and national scale (Bauer, Rock, Nazzal, Jones, & Qu, 2016).

Several comprehensive reviews addressing PI prevention and nursing knowledge were identified. The NPUAP provides information on identifying and staging PI along with current treatment and served as a resource for project. Waugh (2014) discovered that there was no significant nursing knowledge with PI prevention when nursing knowledge was effectively identified. However, the lack of knowledge to nursing practice scored higher with higher application of PI prevention. Furthermore, although nurses who scored high were highly educated, there was no major difference in knowledge scores for nurses with higher levels of education (Waugh, 2014).

Moore and Cowman (2014) compared PI incidence between patients assessed with the Braden risk assessment tool (n = 74) and patients examined through unstructured risk evaluation (n = 76), concluding that there was no statistical difference between the groups. They further compared PI assessment using the Waterlow risk assessment tool (N = 420), the Ramstadius risk screening tool (N = 420), and no formal risk assessment (N = 420). The findings they obtained gave Moore and Cowman reason to assert that there was no statistical difference in PI incidence across the three patient groups.

In the facility studied, wound care prevention is essential, and the Braden Scale has been used as the most complete process for validation (Garcia-Fernandez, Pancorbo-Hildago, & Agreda, 2014). Depending on the score, the nurse assessing the patient may initiate preventive measures. The Braden score system consists of six subscales—sensory perception, moisture, activity, mobility, nutrition, and friction/shear—for identifying patients at risk for pressure injury (AHRQ, 2016).

Search Strategy

A comprehensive literature review was conducted using CINAHL, Medline, Cochrane, and the Walden library database. Boolean operators were used for key words such as *pressure injury, knowledge, prevention, critical care, skin assessment, education, staging*, and *Braden Scale*. With high occurrence of PI's in mind, there have been broad attempts to develop methods for reducing the incidence of PI in high-risk patients. To this end, there have been several proposed methods that have taken into account the type of care setting and the patient group. Some of the methods proposed are inspecting the skin frequently, relieving pressure on risk areas, reducing moisture by applying creams, preventing friction and forces of shear when moving the patient, making sure that the patient receives proper nutrition, and paying special attention to patients at risk during rounding (Tayyib, Coyer, & Lewis, 2015).

The knowledge and skills required for preventing PIs consist of patient-risk assessment, practice protocols for prevention of ulceration, assessment of ulcers, and management of PIs. The accumulation of such knowledge is the essence of this DNP project. I sought to implement an evidence-based PI prevention program that was

dedicated to increasing the knowledge of nurses. The logical premise underlying the project was that with sufficient knowledge, a nurse should be able to handle and prevent PIs.

Local Background and Context

The clinical site where this staff education project was piloted was a 30-bed medical ICU in a tertiary-care facility in a hospital in the southeastern United States. Patients in a ICU setting such as the project site may be unconscious and immunocompromised. They may also be receiving medications that increase the risk of developing PI. Hospitalized patients being treated for a variety of illnesses require constant monitoring by nurses to ensure that the risk of PI is minimal. Many of these patients have multiorgan failure. It is essential to note that immobilization is one of the chief contributors to the PI problem (Cox et al., 2018).

Under new CMS guidelines, Stage 2-4 or unstageable PIs that were not present on admission were considered injuries. Suspected deep-tissue injury was replaced by deep-tissue injury (CMS, 2018). Evidence-based guidelines provide essential vision to clinicians and stakeholders related to patients who received interventions and offered to support HAPI that was unavoidable due to critically ill patients. With the implementation of a quality-improvement initiative 67% reduction in HAPIs were reflected avoidable (Jacobson, Thompson, Halvorson, & Zeitler, 2016).

The implementation of continuing education programs in PI prevention seems to be eliminating the incidences of the injury. It is a reference point from which the need to

develop other novel solutions or to intensify the use of the existing ones can be supported.

DNP-prepared nurses must take roles of leadership and advocate for changes that better serve the patient. They are also required to take part in the generation of nursing wisdom and the dissemination of information to others. This role of dissemination was integral to this project. The aim was to ensure that the delivery methods were effective.

Being in the ICU makes one realize that despite the bulletin boards and booklets available in the area and the nurses' lounge advocating PI prevention, a large part of the nurses' day is spent tending to already-developed PIs. With an increasing number of geriatric ICU patients, there is need to consider all approaches that could prevent this susceptible group of patients from developing PIs. This calls into question the validity of the methodologies suggested for prevention. However, scrutiny of these methods yields evidence that the recommendations are valid in practice (Mallah, Nassar, & Badr, 2015). The question of how much of the available knowledge is actually disseminated and internalized successfully therefore arises. This seems to be the logical progression to finding a solution to the practice problem.

Relevance to Nursing Practice

PI continues to represent a financial problem for the healthcare system and a challenge to patients' quality of life (Parnham, 2015). Although the NPUAP has provided many protocols, guidelines, and educational materials related to PIs to all organizations, PIs remain a problem in the hospital setting, which can be attributed to the inadequacy of efforts to disseminate the knowledge required to prevent these injuries (NPUAP et al.,

2014). Nuru, Zewdu, Amsalu, and Mehretie (2015) found PI knowledge to be good in over half of the nurses in an institutional study, but they found practice essentials to be good in less than half of the nurses. In the study, many reasons were given for the development of this problem, including inadequate resources and equipment and a staff shortage, which may have affected work performance and caused fatigue (Nuru et al., 2015).

In another study by Gunningberg et al. (2015), the thematic description of this PI knowledge was found to be weak. Using a PI knowledge tool, the researchers were able to test for the themes of nutrition, classification and observation, risk assessment, and etiology and causes. From their findings, they recommended an extensive educational campaign. This is why the knowledge base of nurses was an important factor to consider in the current project.

Role of the DNP Student

My role as the DNP student in this project was to assess nurses' knowledge and practice related to PI prevention in the ICU. To achieve this, I used pre- and posttest questionnaires.

My primary objectives as a DNP-prepared nurse are to serve as a role model and to engage in EBP research, identifying gaps that exist and undertaking to structure and implement projects to fill those gaps. The DNP-prepared nurse should provide incentive for nurses to undertake interventions and research. My role in this project also involved evaluating the success of the project in terms of the set of objectives, which involved

determining whether nurses' knowledge of PI prevention and practice improved after an educational session.

Professional Role in the Project

The professional obligation of registered nurses is to ensure that all of the knowledge that their colleagues acquire through education and experience is passed on. In order for information to be raised the levels of knowledge and wisdom, it must be tested in the crucible of evidence. The interventions have already been tested. Therefore, I sought in this DNP project to establish whether the dissemination of this knowledge was complete and the effect it had on the incidence and management of PIs.

Motivation for Completing the Project

I was a key figure in an interprofessional practice team, serving as a conduit for information, a conflict arbitrator, a leader, and a project director. While working in the ICU and seeing many protocols for PI prevention, documentation, and skin assessment, I noted that PIs continued to occur. During past practicum experiences, I had noticed that there seemed to be a gap concerning PI prevention related to knowledge. My role was to educate the nursing staff on the importance of skin assessment for patients in the ICU and to assess nurses' knowledge on PI prevention before and after education was provided.

My motivation for this doctoral project derived from my interest in determining what research was currently available that would support and identify the need to implement a PI prevention program and its impact on nurse knowledge. I had no bias for this project.

Potential Biases

During the project, one potential challenge that I identified was staff cooperation, which could have affected the accuracy of questionnaire results. Although EBP is used for guiding advanced nursing practice, there are some barriers involved when implementing interventions. The educational intervention in this project was based on quality improvement models that can be applied in the healthcare setting.

Expert Panel

I conducted a staff education project using the staff education plan. A PowerPoint (PPT) presentation was presented to the participants (Appendix A). I explained the pretest, which was a 47-item questionnaire administered to the nursing staff prior to staff education in order to determine participants' current knowledge and understanding of PI prevention (Appendix B), as well as the posttest, which was a 47-item questionnaire that was administered to the nursing staff after the completion of the education program to determine new knowledge and understanding of PI prevention (Appendix C).

I will present the education packet (Appendix D) which I will have reviewed with the expert panel of: nurse manager, two clinical managers, and RNs on that unit. The education packet will include current evidence on Pressure Injury Prevention from the NPAUP including: wound description and staging information and risks factors. I will also include a Best Practice check list, which will provide information on Pressure Injury Prevention and what should be applied for each patient (Appendix E), and finally, I include the Braden Scale, concerning risk assessment on pressure injury and level of intervention to follow (Appendix F). I will explain the conduction of the pre-

test, develop the intervention with feedback from your expert panel, revise the education packet present the information then conduct the post-test and evaluate it then work with the expert panel and make recommendations.

The overall goal is to educate staff on Pressure Injury prevention as studies have shown that educating staff will lead to improvement in clinical outcomes (Kavanagh et al., 2012). The DNP project is an integral part of developing the skills to research and develop evidence-based nursing knowledge. The DNP project proposed seeks to mitigate this by first assessing the degree of knowledge the nurses have on Pressure Injury prevention and then charting a course for their continuous education.

The DNP prepared nurse must take the role of leadership and advocate for changes that better serve the patient. They are also required to take part in the generation of nursing wisdom and in disseminating this knowledge to others. This role of dissemination is the key part of this project. The aim is to ensure that the delivery methods are effective.

Summary

The role of the DNP nurse as a leader and advocate is best exemplified by the DNP project. In the same breath, the DNP nurse is able to sharpen their research skills while contributing to the body of nursing wisdom. A practicum stint in the ICU revealed that despite the large amount of information available on PIs, there are still many cases of ICU-related pressure injuries. In light of this, a new strategy must be adopted.

The project proposes to couple an evaluation of the degree of knowledge with a subsequent educational initiative for nurses in the ICU. The results of this project are

aimed at improving the patient outcome, quality care, and the management of hospital and patient resources as well as adding to the body of nursing knowledge. Through evidence-based practice research modalities, we are able to understand the problem and generate the most viable solutions for the good of the entire healthcare system. Section 3 details the collection and analysis of evidence on nursing knowledge on pressure injury prevention and practice.

Section 3: Collection and Analysis of Evidence

Introduction

HAPIs remain a national concern due to patient morbidity, the high cost of treatment, and reimbursement cases (Zaratkiewicz et al., 2011). The aim of this staff education project was to provide education to critical-care nurses on PI prevention and to assess staff knowledge after completion of the education. In this section, I describe the collection and analysis of evidence, addressing the following topics: (a) practice-focused question, (b) setting/population sample, (c) participants, (d) procedures, (e) instrumentation materials, (f) data analysis, (g) protection of participants, and (h) project ethics and Institutional Review Board (IRB), concluding with a summary. The project plan was to obtain data and analyze evidence through the use of a questionnaire on PI prevention. The questionnaires were distributed, collected, and analyzed to ensure that the research questions had been answered as predicted.

Practice-Focused Question

According to Stillwell, Fineout-Overholt et al. (2010), a practice-focused question identifies a clinical problem for staff to recognize and understand. The focus question for this staff education project was the following: To what extent will the nurses' knowledge of PIs improve after attending a structural education program?

Sources of Evidence

The sources of evidence that were used for this doctoral project were obtained from numerous articles in the literature. All articles were reviewed and organized into sections related to PIs, prevention, skin bundle, knowledge, staging, wounds, and best

practice. Sources of evidence were gathered from CINAHL, Joanna Briggs Institute, Medline, and Cochrane. Recommendations and further research related to knowledge and practice of PI prevention were considered in order to address the practice-focused question. My aim was for the staff education project to address a gap in the knowledge of critical-care nurses and provide the necessary evidence to improve nurses' practice and maintain PI prevention. The staff education project site was an acute-care tertiary Level 1 trauma unit consisting of 763 beds.

Setting and Sample Population

The selected setting was a 30-bed ICU in a medical ICU located in the southeastern region of the United States Working in the ICU exposes staff to the rigors of PI due to patient immobility and hemodynamic instability. The sample population consisted of 20 RNs working in the ICU. As the DNP student directing this project, I had the stakeholders assist in the selection of the healthcare individuals. The stakeholders who assisted in the process were the wound care nurse, the wound care RN of the unit, and the clinical specialist of the unit. In this organization, nurses are expected to formulate and communicate changes to practice and management in the healthcare setting.

Participants

All participants for this staff education project were registered nurses working in intensive care with direct patient care responsibilities. The age range for participants was 23-65 years. Participants were informed of this staff educational project and informed

that all data, questionnaires, and surveys would be kept confidential and anonymous in a locked cabinet in the ICU charge office.

Procedures

The staff education project took 2 weeks. A PPT presentation was shown to the participants and took approximately 60 minutes (Appendix A). I explained the pretest, which was a 47-item questionnaire administered to the nursing staff prior to the staff education in order to determine their current knowledge and understanding of PI prevention (Appendix B), as well as the posttest, a 47-item questionnaire administered to the nursing staff after the completion of the education program to determine new knowledge and understanding of PI prevention (Appendix C). I presented the education packet (Appendix D), which I had reviewed with an expert panel consisting of the nurse manager, two clinical managers, and RNs on that unit. The education packet included current evidence on PI prevention from the NPAUP, including wound description, staging information, and risk factors. I also included a best practice checklist, which provided information on PI prevention and what should be applied for each patient (Appendix E). Finally, I included the Braden Scale concerning risk assessment for PIs and levels of intervention to follow (Appendix F). The duration of each test was approximately 20-30 minutes. The posttest questionnaire consisted of 47 questions used by Pieper and Zulkowski (2014) utilizing a Likert scale. The Likert scale was used to evaluate the self-reported knowledge before the pre-test and after the posttest. A nonparametric *t* -test result was used to identify the trends between ordered groups and to examine the frequency and knowledge with respect to PI prevention test completion

(Terry, 2015). The findings from the pre- and posttest were analyzed to determine change in practice.

Instrumentation and Materials

Due to its high reliability, the Pressure Ulcer Knowledge Test (the Pieper test) was used to assess nurses' knowledge of PI prevention, referring to the research question. This test has a Cronbach's alpha of 0.8 and shows good validity for PI prevention and skin assessment and staging (Pieper & Zulkowski, 2014).

Through this staff educational project, I sought to address the PI concern by getting an overall perspective on information dynamics as they related to PI prevention. The quantity and quality of information that is available to the nursing staff were assessed. The data collection method consisted of performing a skin assessment on all patients who met the inclusion criteria, at the beginning of the shift and at the end-of-shift report. Skin assessment was the driver for a nursing intervention to identify early skin damage and to prevent skin damage (Tume, Siner, Scott, & Lane, 2014). Other data collection involved documenting the Braden Scale for each patient. The Braden score system consists of six subscales: sensory perception, moisture, activity, mobility, nutrition, and friction/shear (Tayyib et al., 2015). The first subscale uses a scale of 1 to 3, and the remaining five subscales use a scale of 1 to 4. The lower the score, the higher the patient's risk of developing sores or injuries is. Depending on the score, the nurse assessing the patient then initiates preventive measures.

Protection of Participants

All participants for this project were registered nurses working in intensive care with direct patient care. Upon conducting a project, it is crucial to ensure the protection of human subjects in terms of autonomy, confidentiality, nonmaleficence, and beneficence (Gray et al., 2017). All participants were protected, as all data, questionnaires, and surveys were kept confidential in a locked cabinet in the ICU charge office.

Project Ethics and Institutional Review Board (IRB)

As per protocol regarding rules and ethical and federal regulations, I submitted the DNP project to the Walden University IRB for approval.

Data Analysis and Synthesis

The need to evaluate the incidence of PIs in critically ill patients in the ICU was closely related to the clinical question. The pre- and posttest questionnaire helped to closely represent the clinical question when exploring the outcomes of nurse-driven behaviors to decrease PIs. After the education session, posttest questionnaires were given to the participating nurses in anonymously labeled packets. Responses from these questionnaires were evaluated and analyzed. DNP projects are crucial in evaluating practice guidelines and settings to ensure that the quality of care continuously increases. This particular staff education project was conducted to ensure that the body of knowledge that was available to the nurses reached its target audience efficiently and therefore enabled them to meet the needs of their immobilized and sometimes unconscious patients.

Summary

In summary, the need to assess nurses' knowledge and practice related to PI prevention in the ICU continues to be a concern. Although PIs may remain an issue, having ongoing education, training, assessment, and a guidelines tool on PI prevention to improve nurses' knowledge and practice related to PI is essential to preventing further injuries. In order to raise information to the levels of knowledge and wisdom, it must be tested in the crucible of evidence. In Section 4, I present the findings and recommendations.

Section 4: Findings and Recommendations

The local problem serving as inspiration for this DNP project was the high occurrence of PIs developing in the ICU. In Section 3, I addressed the gap in practice concerning PI and explored how to mitigate risks by assessing nurses' knowledge. In the following section, I evaluate current practice pertaining to PIs and conduct pre- and posttest evaluations. The findings from this PI study may support the need for improvement or change in practice. Better understanding of the gap between theory and practice may encourage healthcare providers to pay more attention to EBP recommendations in order to reduce PI incidence in healthcare settings. As a reminder, the guiding practice-focused question for this project was the following: To what extent will the nurses' knowledge on pressure injuries improve after attending a structural education program? The purpose of this educational project was to provide further education on PI prevention and to identify whether nurses' knowledge improved based on the training. The focus of the training was assessment and understanding of better methods of PI prevention.

The aim of this educational project was to identify whether nurses' knowledge improved after an educational session. PIs in the ICU are inevitable; however, assessing and analyzing new evidence and strategies for PI prevention could reduce the incidence of PIs in the hospital. This study was based on multiple sources of evidence to support the conclusion. The sources of evidence used for the staff education included literature obtained from CINAHL Plus with Full-Text, Joanna Briggs Institute, Medline, Cochrane, and ProQuest. Development of the process included a pretest and posttest on nursing

knowledge of PI prevention that were administered to the nursing staff. Results of the pretest and posttest were compared to identify outcomes. The comparison between the pretest and posttest responses determined that nurses' understanding had increased after the intervention. Section 4 contains a discussion of the findings, implications, strengths, and limitations of the study, as well as my analysis of myself.

Findings and Implications

The project objective was to assess nurses' knowledge of PI prevention in the ICU after attending a structured educational program. The aim of conducting this study of a staff education project was achieved by using the Pieper Knowledge Test. The Pieper Knowledge Test was used to measure five categories: (a) PI prevention, (b) staging, (c) wound description, (d) the Braden Scale and (e) program education. Permission to conduct the project was pursued, reviewed, and obtained from the project agency's Institutional Review Board (IRB), which issued project approval on June 21, 2019, (Reference # 005544). A PPT was presented to the participants (Appendix A). This project required the distribution of a pretest questionnaire on current knowledge and understanding of PI prevention (Appendix B) and was administered to the nurses. In order to understand the change in nurse's knowledge to determine the presence of new knowledge and understanding of PI prevention, a posttest questionnaire was administered to the nursing staff by the expert panel after the completion of the educational program (Appendix C). An educational packet on PI prevention was presented to the nurses (Appendix D). Using the NPAUP guidelines, the education packet included current evidence on PI prevention, including wound description and staging information and risk

factors. The packet included a best practice checklist, which provided information on PI prevention (Appendix E), and the Braden Scale: risk assessment on PI and interventions Appendix F). The results from the pre- and posttest assessment of the participants' practice and knowledge of PI prevention were analyzed. Among the 47 questionnaires from the Pieper Knowledge Test, I selected 14 of the questions related to prevention, staging, knowledge, the Braden Scale, and education to determine knowledge deficits and any needs for improvements in knowledge.

There were 75 nurses in the ICU. Seventy-five (100%) nurses were administered the pretest and provided with the education packet on PI prevention in the ICU. Seventy-five participants completed a color-coded pretest. Following the completion of the pretest, 75 participants were administered the education presentation and packet. Participants were allowed to ask questions throughout presentation, which lasted 30 minutes. After the education presentation, the participants were given the color-coded posttests, which they were allowed 2 weeks to complete. Upon return, each participant's pretest and posttest were matched. Of the 75 initial participants, only 55 (73%) nurses completed both the pretest and the posttest. Therefore, 55 total participants were included in the complete data set to determine any change in knowledge.

The following results reflect responses to two general questions on nurses' knowledge on PI prevention and show strong improvement in nurses' knowledge on PI prevention (see Table 1). Prior to education, only 30 nurses (54%) demonstrated knowledge concerning patient assessment for PI development on admission to the hospital, compared to 45 nurses (81%) on the posttest; thus, there was an increase of

27%. The second question concerning care given to prevent or to treat PI and to treat PI documentation demonstrated that 34 (61%) of participants indicated that this idea was important on the pretest, compared to 43 (78%) of participants on the posttest, demonstrating 16% improvement in understanding. In both cases, participants' knowledge increased.

Table 1

Comparison of Nurses' Knowledge on Pressure Injury Prevention

Question item	Pre-test *Strongly agree* *N* = 55 (%)	Posttest *Strongly agree* *N* = 55 (%)	Percent change
All individuals should be assessed on admission to a hospital for risk of pressure injury development	30 (54%)	45 (81%)	27%
All care given to prevent or treat pressure injuries must be documented	34 (61%)	43 (78%)	17%

The next four questions focused on the staging of wounds, differentiating Stage I and Stage II (see Table 2). The first question asked participants about the definition of Stage I and the description of a lightly pigmented person. Prior to education, 33 (60%) of the nurses were able to define Stage I in a lightly pigmented person. Post education, there was an increase so that 42 (76%) nurses were able to define Stage I in a lightly pigmented person. The results indicated that after education, there was increased knowledge for Question 1. The second question asked participants about the description of Stage II and how to identify full thickness skin loss. On the pretest, 22 (40%) participants indicated that full thickness of the skin loss is described as Stage II. On the posteducation

assessment, 20 (36%) participants demonstrated knowledge on full thickness skin loss in Stage II. As noted below, there was a decrease by 4% on the posttest for Question 2. Although there was a decrease of 4% on the Stage II description, results demonstrated improvement of knowledge on staging. Question 3 asked participants to identify whether Eschar is healthy. The results for the third question indicated that prior to education, 25 (45%) of the participants described healthy tissue as Eschar. After education, 7 (13%) of the nurses indicated that Eschar is not considered healthy tissue. The fourth question asked each participant to describe slough; 32 (58%) participants identified slough as "yellow cream necrotic tissue" on the pretest, and 40 (73%) did so education. The results for Question 4 on slough indicate that there was an increase in knowledge.

Table 2

Comparison of Nurses' Knowledge on Staging

Question item	Pre-test *Strongly agree* *N* = 55 (%)	Posttest *Strongly agree* *N* = 55 (%)	Percent change
Stage I pressure injuries are defined as intact with non-blanche erythema in lightly pigmented persons	33 (60%)	42 (76%)	16%
Stage II pressure injuries are full thickness skin loss	22 (40%)	20 (36%)	4%
Eschar is healthy tissue	25 (45%)	7 (13%)	32%
Slough is yellow or cream necrotic tissue on a wound bed	32 (58%)	40 (73%)	15%

The next two questions related to the nurses' knowledge on the Braden Scale (see Table 3). The first question showed that 24 (44%) of the participants indicated an

understanding about risk factors for the development of PIs such as immobility, incontinence, impaired nutrition, and altered level of consciousness. On the posttest, 43 (78%) of the participants were able to identify the risk factors for patients concerning PIs. This result indicates that the overall knowledge of risk factors improved significantly for the participants. For the second question, 22 (40%) participants agreed that a low Braden score is associated with a higher risk of PI. In the posttest results, 28 (50%) of the nurses agreed that the increase of PI is contributed to a low Braden score. Results for Question 2 showed a 10% change in knowledge after education.

Table 3

Comparison of Nurses' Knowledge on Braden Scale

Question item	Pre-test *Strongly agree* *N* = 55 (%)	Posttest *Strongly agree* *N* = 55 (%)	Percent change
Risk factors for development of pressure injuries are immobility, incontinence, impaired nutrition, and altered level of consciousness	24(44%)	43(78%)	34%
A low Braden score is associated with increased pressure injury risk	22(40%)	28 (50%)	10%

In the next two questions, participants were asked about the values of education as a direct impact on nurses' knowledge (see Table 4). The first question involved the issue of whether the incidence of PIs can be decreased after an education session; 34 (62%) of the participants agreed on the pretest, and 50 (90%) of the participants agreed on the posttest, indicating 28% improvement. Question 2 asks about participants knowledge of

government intervention regarding risk, prevention, and treatment, 32 (58%) of the nurses agreed. Following education, 42 (76%) of the participants acknowledged that PIs were increasing tremendously. Results showed 18% improvement. After education, in responding to both questions, participants showed improved knowledge.

Table 4

Comparison of Nurses' Knowledge on Education Program

Question item	Pre-test *Strongly agree* *N* = 55 (%)	Posttest *Strongly agree* *N* = 55 (%)	Percent change
Educational programs may reduce the incidence of pressure injuries	34 (62%)	50 (90%)	28%
The incidence of pressure injury is so high that the government has appointed a panel to study risk, prevention, and treatment	32 (58%)	42 (76%)	18%

The implications noted show an improvement in nursing knowledge and a decrease in nurses' knowledge on staging. The improvements seen were in nurses' knowledge on PI prevention, wound description, the Braden Scale, and the education program. The results indicate that with education, nurses' scope of knowledge can be expanded. As a result, from a practical standpoint, patient care can be improved. If nurses can successfully understand PI, can correctly identify wound description, can understand the metric of the Braden Scale, and can see the value in an education program, patients can continue to reap the benefit of more informed nurses. From a reverse viewpoint, being able to understand where nurses have fallen short in understanding can yield better

opportunities for implementing education during follow-up. The need to understand the implication on decreased staging knowledge could provide an opportunity to develop better programs that can help nurses understand the implications of full thickness skin loss. As a result, future nurses may be able to identify staging better and make adjustments in practice more quickly.

Recommendations

This doctoral project was conducted to assess nurses' knowledge on PI prevention and to understand whether nurses' knowledge decreased or increased following an educational program in the ICU. There are significant issues facing nurses in relation to their knowledge on PIs. The findings from the posttest strongly indicate that the educational program may decrease the incidence of PI, resulting in better patient care. The overall goal is to educate staff on PI prevention, as studies have shown that educating staff leads to improvement in clinical outcomes. According to Henry and Foronda (2017), improving nurses' knowledge of PI prevention results in preventing HAPI incidents. The results from this project indicated positive outcomes in two areas:

1. *Increased education on PI prevention*: When nursing staff are given education about a topic, they can apply that knowledge for better outcomes. This project clearly demonstrated that when the nursing staff was educated, their knowledge about PIs increased. The results may translate into better patient care and earlier identification of the start of PI. Henry and Foronda (2017) reviewed and discussed the nurse education programs for the prevention and identification of HAPI and concluded that education programs increased nurses' knowledge of

HAPIs. In addition, creating a culture of success education can promote high-quality care and safety for patients (Henry & Foronda, 2017).

a. *Development of useable tools pertaining to PI and skin condition and placement of these tools in accessible areas:* This educational program demonstrated different models of what is considered healthy skin and what is considered a PI. Hospitals and institutions might consider adding visual guidelines for nurses to reference (see Appendix E) provided by WOCN (2017). They also might consider placing guidelines in high-traffic or high-visibility areas as a reminder for nurses between educational programs. Henry and Foronda (2017) suggested including a number of PI and wound pictures for each stage to help solidify nurses' education. Furthermore, Ebi, Hirko, and Mijena (2019) did a cross-sectional study design on nurses' knowledge of pressure ulcers and certified the use of an educational program on PIs to keep nurses well-informed regarding current knowledge. In addition, reviewing PI prevention guidelines on a regular basis is useful in increasing nurses' knowledge on PI prevention (Ebi et al., 2019).

Strengths and Limitations

The strengths of the doctoral project are the use of a reliable and valid tool to assess the nurses' knowledge on pressure injury prevention and documentation. This has not been previously attempted in this ICU. The results were startling, with far fewer nurses than expected having a robust knowledge of pressure injury prevention and documentation. The positive post-test results clearly demonstrate the impact of an

educational program on increasing knowledge of pressure injury prevention. In the future, such programs should be presented regularly to all existing and new staff to ensure that all staff is competent and knowledgeable regarding pressure injury prevention and documentation.

Study limitations include the fairly large attrition number in participation. There are 75 nurses on the Intensive Care Unit but only 55 (73%) nurses participate in the educational periods. Although participants were informed of the anonymity of their participation, only 55 (73%) participated in the complete pre-test and post-test. The significance of this attrition is not known, but it may be concluded that there is a lack of commitment to pressure injury prevention. Other interpretations of this limitation might be because of the demanding nature of the profession and other education programs occurring simultaneously. Lastly, part of the limitation on the study may have been the design in that completing questionnaires may not be desirable to participants may affect results (Ebi et al., 2019). Other limitations of this project were the limited participant pool-specifically one facility, one ICU and to distribute only to nurses. Also, the small sample size of this group prevents generalizability to a larger audience. Although, new evidence-based practice suggested that the Pieper Pressure Ulcer knowledge test has proven to be a safe practice for adult learners to self-identify, self -learn and self-correct knowledge (Delmore, et al., 2018).

The Pieper Knowledge Test has been tested before to determine the strengths and limitation in clinical practice to measure the staff knowledge. Negativity on PI prevention can lead to lack of knowledge on preventive measures and may influence the nurses'

performance. Research suggests pressure injury prevention can result from a lack of knowledge on pressure injury prevention, and may contribute to lack of adequate validation therefore the results cannot be generalized (Dalvand, Ebadi & Geshiagh, 2018).

Future Directions

The future directions for researchers interested in pressure injury prevention could include routine educational programs on pressure injury prevention, and assessing nurses' knowledge on staging, on wound description and Braden Scale. Having accurate, up–to-date and ongoing knowledge regarding pressure injury, prevention, risk, staging, and treatment is one way to prevent pressure injuries (Pieper & Zulkowski, 2014). Providing a structured staff educational project is important to closing the gap and can be effective in changing the culture in the intensive care unit with the development of guidelines and protocols.

Section 5: Dissemination Plan

The purpose of this project was to determine whether nursing knowledge improved when comparing intensive-care nurses' responses to a pre- and posttest questionnaire after an educational program on PI prevention. My plan is to disseminate the project's findings and share the results with clinicians within the organization. Nurses are the primary audience with which I intend to share the project's outcomes. The following paragraphs outline the plan for dissemination and describe the rationale for the audience of nurses as the primary recipients.

Plan for Dissemination

The dissemination of a project is a crucial procedure to transfer findings to stakeholders. Presenting the findings to the organization's leadership provided a valuable opportunity for the organization leader to stimulate change. The promotion of new strategies to develop advanced levels of clinical judgment, systems thinking, delivering, and evaluating evidence-based care practices will be undertaken with the intention of improving patient outcomes (Association of Critical Care Nurses [AACN], 2015). The most tremendous impact has been to provide the findings. I plan to disseminate the findings in three tiers: internally within the organization, externally as a publication, and in an ongoing fashion at a selection of local and national conferences. The rationale for choosing these stakeholders stems from the idea that the results generated from the DNP project can be contributed in multiple outlets. First, from the perspective of internal dissemination, I plan to share the results in my facility through ongoing education in the ICU. The project demonstrated the effectiveness of staff response to an educational

program. Therefore, an ongoing PI prevention and documentation program will be developed to be presented at the mandatory quarterly critical care skills fair in the facility for improving the knowledge of the bedside nurses. This process will translate evidence into practice by creating a culture change. Keyton (2017) suggested that culture results from shared patterns of values and artifacts (in this case, knowledge and training) that are passed through member interactions. Ideally, the internal culture can reflect better practices.

From an external perspective, I plan to publish this project to serve as a resource guide at clinical sites such as critical-care nursing seminars or symposia regarding nursing knowledge on PI prevention. The publications that I may consider submitting to are the *American Journal of Nursing* and *Nursing 2019 Critical Care*. I chose these two magazines for publication because these magazines are the most informative, reliable sources for EBP for critical-care nurses.

Lastly, I will submit my project to organizations holding relevant local or national conferences, specifically, the Broward County Chapter of the American Association of Critical Care Nurses (BCCAACN) and the National Nurses Teaching Institute of the American Association of Critical Care Nurses (NTIAACN). BCCAACN is a local chapter for critical-care nurses whose members meet monthly and that provides lectures, continuing educational programs on health, school fairs, and other programs on topics related on current issues pertinent to critical care. NTIAACN is the world's largest specialty nursing organization and provides current literature, lectures, and education on current EBP to critical-care nurses.

Analysis of Self

This project has given me the opportunity to expand myself in numerous ways. The DNP program prepares nurses to be scholars, practitioners, and project developers. The AACN (2006) defined a DNP-prepared nurse as one who is challenged by rapidly changing practices and dynamic work environments. My experience in this project indicates that I am capable of focusing on one area of medical concern, developing a project accordingly, conducting research accurately and with validity, and producing interpretable results. As a result, in the future, I will have the skill set needed to develop new policies and procedures focusing on new clinical practice. As a practitioner, my role is to be committed as a patient advocate and to promote positive patient outcomes. My project indicates that I am capable not only of interpreting results by analyzing numerical outcomes from a pretest and posttest, but also of transferring data into tangible recommendations for better practice. The DNP program is designed to train nurses to demonstrate the highest levels of knowledge, leadership, communication skills, and ability to translate evidence into practice (AACN, 2015). The completion of this project indicates that I will be able to conduct future projects as a capable and competent project manager.

As Scholar

As a scholar, I will continue to translate evidence into practice and assist with health care functions and conferences. This project initiative has improved my nursing skills, as well as my presentation and writing skills. This DNP project has increased my nursing knowledge to achieve better outcomes for patients and higher levels of safety.

Additionally, as a scholar, my goal is that a publication of this project may contribute to the greater body of knowledge available to other scholars learning about PI prevention. Lastly, from the perspective of evaluation evidence, and implementing the evidence into practice, the results from this study may contribute to better training materials. This project, which focused on PI prevention, contributes knowledge based on actual nurses engaging in patient care. These kinds of projects contribute outcomes that can be used in the development of training materials that can be transferable across many similar settings and are not unique to the participant pool used (Almaki, 2016). As a bonus, quantitative data similar to the data gathered during this DNP project can be used to inform future studies that collect interview data from participants (Murphy, Staffileno, & Carlson, 2015).

Project Manager

Completing this project has improved my skills and critical thinking. For a DNP-prepared nurse, understanding project development is important. In the future, I hope to engage in continued professional collaboration with the organization. This project has allowed me to develop a start-to-finish opportunity to create knowledge from the findings of pre- and posttest comparisons. From this work, I have learned that the effort of coordinating a project can yield a better understanding of how to assess knowledge and build on that knowledge toward the end goal of successful patient care. The leadership role of the DNP-prepared nurse involves developing EBP into a plan that improves outcomes for a target population. This project has allowed me to increase my confidence in translating theory into EBP.

Summary

The practice problem of PI continues to be a challenge in the acute-care setting. Specifically, the need to assess knowledge and practice of PI prevention in the ICU will continue to be a concern. Providing ongoing education, training, assessment, guideline tools, and best practice for PI prevention can have a positive impact on nurses' knowledge and practice. For a PI to be prevented there must be a well-documented plan for interventions to be delivered to the patient (Jacobson et al., 2016; Pittman et al., 2016). Furthermore, the development of this doctoral project has enabled me to apply my expertise to problem solving within the facility to promote improved patient outcomes.

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Appendix A: Power Point Presentation for Expert Panel

Best Practice for Pressure Injury Prevention

- Pressure injuries still a problem in the hospital setting.
- Increase in the incidence of pressure injuries

History

- In the United States, it is estimated that 2.5 million patients per year are affected with pressure injuries (Agency for Healthcare Research and Quality, [AHRQ], 2016).

Best Practice for Pressure Injury Prevention: Overview

- 47 questions test tool used by Pieper and Zulkowski (2014) on Nursing Knowledge
- Administration of an anonymous pre-test /post-test
- Assessment of pre-test / post-test
- Present feedback to wound expert

Best Practice for Pressure Injury Prevention

Education Packet

- Current evidence on PI prevention
- Identify the definitions of terms; wound description/ staging
- Risks factors
- Braden scale /sensory perceptions –
  - Braden subscale interventions
- Pressure injury prevention bundle –
- Wound screening

Best Practice for Pressure Injury Prevention: Post-test

Presentation of Post-test

- 47 questions test tool used by Pieper and Zulkowski (2014) on Nursing Knowledge
- Administration of an anonymous post-test
- Use of answer key to evaluate responses

Best Practice for Pressure Injury Prevention: Analysis

Analysis

- Randomly-generated using color coding
- Identification codes on each envelope

Best Practice for Pressure Injury Prevention: Evaluation/Follow -up

Evaluation

- Determine the gaps in nursing knowledge
- Review feedback with expert panel
- Revise education program based on feedback
- Staff observation
- Debrief

*Click on the slide to view entire presentation

Appendix B: Pieper Pressure Ulcer Knowledge Pretest

Select options to respond: 1) True, 2) False or 3) Do not know using a check mark

1Stage pressure ulcers are defined as intact skin with nonblanche erythema in lightly pigmented persons	1	2	3
2. Risk factors for development of pressure ulcers are immobility, incontinence, impaired nutrition, and altered level of consciousness.			
3. All hospitalized individuals t risk for pressure ulcers should have a systematic skin inspection at least daily and those in long term care at a once a week.			
4. Hot water and soap may dry the skin and increase the risk for pressure ulcers.			
5. It is important to massage bony prominences.			
6. A stage III pressure ulcer is a partial thickness skin loss involving the epidermis and/ or dermis.			
7. All individuals should be assessed on admission to a hospital for risk of pressure ulcer development.			
8. Cornstarch, creams, transparent dressings (e.g., tegaderm, opsite), and hydrocolloid dressings (e.g., Duoderm, Restore) do not protect against the effects of friction.			
9. A stage IV pressure ulcer is a full thickness skin loss with extensive destruction, tissue necrosis, damage to muscle, bone, or supporting structure.			
10. An adequate dietary intake of protein and calories should be maintained during illness			
11. Persons confined to bed should be repositioned every 3 hours.			
12. A turning schedule should be written and placed at the bedside.			
13. Heel protectors relieve pressure on the heels.			
14. Donut devices/ring cushions help to prevent pressure ulcers.			
15. In a side lying position, a person should be at a 30-degree angle with the bed unless inconsistent with the patient's condition and other care needs that take priority.			
16. The head of the bed should be maintained at the lowest degree of elevation (hopefully, no higher than a 30-degree angle) consistent with medical conditions.			
17 A person who cannot move him or herself should be repositioned every 2 hours while sitting in a chair.			
18. Persons who can be taught should shift their every 30 minutes while sitting in a chair.			
19. Chair –bound persons should be fitted for a chair cushion.			
20. Stage II pressure ulcers are full thickness skin loss.			
21 The epidermis should remain clean and dry.			
22. The incidence of press ulcers is so high that the government has appointed a panel to study risk, prevention, and treatment.			

23. A low-humidity environment may predispose a person to pressure ulcers.			
24. To minimize the skin's exposure to moisture on incontinence, underpads should be used to absorb moisture.			
25. Rehabilitation should be instituted if consistent with the patient's overall goals of therapy.			
26. Slough is yellow or cream necrotic tissue on a wound bed.			
27. Eschar is good for wound healing.			
28. Bony prominences should not have direct contact with one another.			
29. Every person assessed to be at risk for developing pressure ulcers should be placed on a pressure-redistribution bed surface.			
30. Undermining is the destruction that occurs under the skin.			
31. Eschar is healthy tissue.			
32. Blanching refers to whiteness when pressure is applied to a reddened area.			
33. A pressure redistribution surface reduces tissue interface pressure below capillary closing pressure.			
34. Skin macerated from moisture tears more easily.			
35. Pressure ulcers are sterile wounds.			
36. A pressure ulcer scar will break down faster than unwounded skin.			
37. A blister on the heel is nothing to worry about.			
38. A good way to decrease pressure on the heels is to elevate them of the bed.			
39. All care given to prevent or treat pressure ulcers must be documented.			
40. Devices that suspend the heels protect the heels from pressure.			
41.Shear is the force that occurs when the skin sticks to a surface and the body slides.			
42. Friction may occur when moving a person up in bed.			
43. A low Braden score is associated with increased pressure ulcer risk.			
44. The skin is the largest organ of the body.			
45. Stage II pressure ulcers may be extremely painful due to exposure of nerve endings.			
46. For persons who have incontinence, skin cleaning should occur at the time of soiling and at routine intervals.			
47 Educational programs may reduce the incidence of pressure ulcers.			

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Appendix C: Pieper Pressure Ulcer Knowledge Posttest

Select options to respond: 1) True, 2) False or 3) Do not know using a check mark

1Stage pressure ulcers are defined as intact skin with nonblanche erythema in lightly pigmented persons	1	2	3
2. Risk factors for development of pressure ulcers are immobility, incontinence, impaired nutrition, and altered level of consciousness.			
3. All hospitalized individuals t risk for pressure ulcers should have a systematic skin inspection at least daily and those in long term care at a once a week.			
4. Hot water and soap may dry the skin and increase the risk for pressure ulcers.			
5. It is important to massage bony prominences.			
6. A stage III pressure ulcer is a partial thickness skin loss involving the epidermis and/ or dermis.			
7. All individuals should be assessed on admission to a hospital for risk of pressure ulcer development.			
8. Cornstarch, creams, transparent dressings (e.g., tegaderm, opsite), and hydrocolloid dressings (e.g., Duoderm, Restore) do not protect against the effects of friction.			
9. A stage IV pressure ulcer is a full thickness skin loss with extensive destruction, tissue necrosis, damage to muscle, bone, or supporting structure.			
10. An adequate dietary intake of protein and calories should be maintained during illness			
11. Persons confined to bed should be repositioned every 3 hours.			
12. A turning schedule should be written and placed at the bedside.			
13. Heel protectors relieve pressure on the heels.			
14. Donut devices/ring cushions help to prevent pressure ulcers.			
15. In a side lying position, a person should be at a 30-degree angle with the bed unless inconsistent with the patient's condition and other care needs that take priority.			
16. The head of the bed should be maintained at the lowest degree of elevation (hopefully, no higher than a 30-degree angle) consistent with medical conditions.			
17 A person who cannot move him or herself should be repositioned every 2 hours while sitting in a chair.			
18. Persons who can be taught should shift their every 30 minutes while sitting in a chair.			
19. Chair –bound persons should be fitted for a chair cushion.			
20. Stage II pressure ulcers are full thickness skin loss.			
21 The epidermis should remain clean and dry.			
22. The incidence of press ulcers is so high that the government has appointed a panel to study risk, prevention, and treatment.			

23. A low-humidity environment may predispose a person to pressure ulcers.			
24. To minimize the skin's exposure to moisture on incontinence, underpads should be used to absorb moisture.			
25. Rehabilitation should be instituted if consistent with the patient's overall goals of therapy.			
26. Slough is yellow or cream necrotic tissue on a wound bed.			
27. Eschar is good for wound healing.			
28. Bony prominences should not have direct contact with one another.			
29. Every person assessed to be at risk for developing pressure ulcers should be placed on a pressure-redistribution bed surface.			
30. Undermining is the destruction that occurs under the skin.			
31. Eschar is healthy tissue.			
32. Blanching refers to whiteness when pressure is applied to a reddened area.			
33. A pressure redistribution surface reduces tissue interface pressure below capillary closing pressure.			
34. Skin macerated from moisture tears more easily.			
35. Pressure ulcers are sterile wounds.			
36. A pressure ulcer scar will break down faster than unwounded skin.			
37. A blister on the heel is nothing to worry about.			
38. A good way to decrease pressure on the heels is to elevate them of the bed.			
39. All care given to prevent or treat pressure ulcers must be documented.			
40. Devices that suspend the heels protect the heels from pressure.			
41.Shear is the force that occurs when the skin sticks to a surface and the body slides.			
42. Friction may occur when moving a person up in bed.			
43. A low Braden score is associated with increased pressure ulcer risk.			
44. The skin is the largest organ of the body.			
45. Stage II pressure ulcers may be extremely painful due to exposure of nerve endings.			
46. For persons who have incontinence, skin cleaning should occur at the time of soiling and at routine intervals.			
47 Educational programs may reduce the incidence of pressure ulcers.			

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Appendix D: Education Packet

Pressure Injury Prevention Points

RISK ASSESSMENT

1. Consider bedfast and chairfast individuals to be at risk for development of pressure injury.
2. Use a structured risk assessment, such as the Braden Scale, to identify individuals at risk for pressure injury as soon as possible (but within 8 hours after admission).
3. Refine the assessment by including these additional risk factors:
   - A. Fragile skin
   - B. Existing pressure injury of any stage, including those ulcers that have healed or are closed
   - C. Impairments in blood flow to the extremities from vascular disease, diabetes or tobacco use
   - D. Pain in areas of the body exposed to pressure
4. Repeat the risk assessment at regular intervals and with any change in condition. Base the frequency of regular assessments on acuity levels:
   - A. Acute care . . . . . Every shift
   - B. Long term care . . . Weekly for 4 weeks, then quarterly
   - C. Home care. . . . . At every nurse visit
5. Develop a plan of care based on the areas of risk, rather than on the total risk assessment score. For example, if the risk stems from immobility, address turning, repositioning, and the support surface. If the risk is from malnutrition, address those problems.

SKIN CARE

1. Inspect all of the skin upon admission as soon as possible (but within 8 hours).
2. Inspect the skin at least daily for signs of pressure injury, especially nonblanchable erythema.
3. Assess pressure points, such as the sacrum, coccyx, buttocks, heels, ischium, trochanters, elbows and beneath medical devices.
4. When inspecting darkly pigmented skin, look for changes in skin tone, skin temperature and tissue consistency compared to adjacent skin. Moistening the skin assists in identifying changes in color.
5. Cleanse the skin promptly after episodes of incontinence.
6. Use skin cleansers that are pH balanced for the skin.
7. Use skin moisturizers daily on dry skin.
8. Avoid positioning an individual on an area of erythema or pressure injury.

NUTRITION

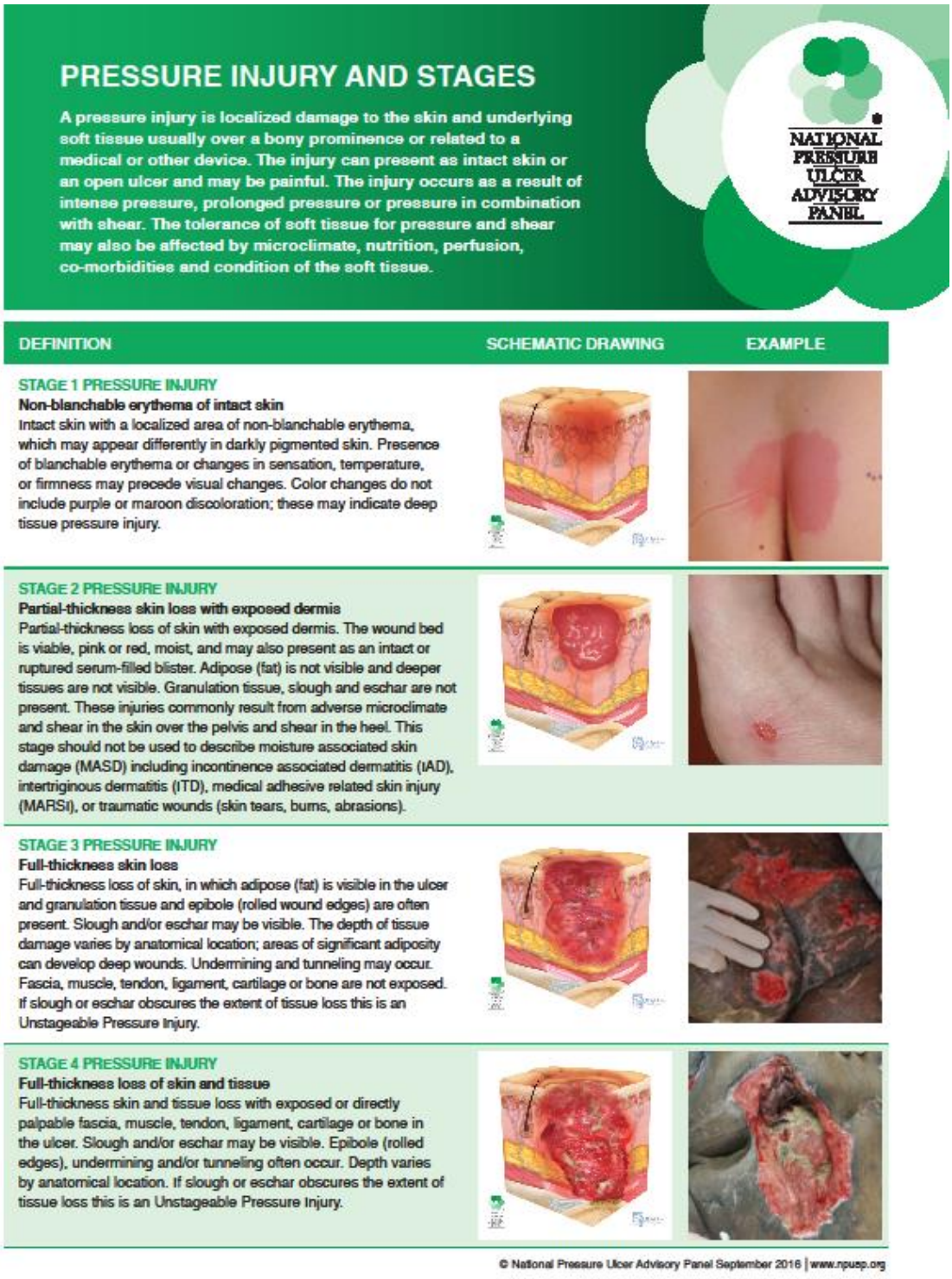
1. Consider hospitalized individuals to be at risk for under nutrition and malnutrition from their illness or being NPO for diagnostic testing.
2. Use a valid and reliable screening tool to determine risk of malnutrition, such as the Mini Nutritional Assessment.
3. Refer all individuals at risk for pressure injury from malnutrition to a registered dietitian/nutritionist.
4. Assist the individual at mealtimes to increase oral intake.
5. Encourage all individuals at risk for pressure injury to consume adequate fluids and a balanced diet.
6. Assess weight changes over time.
7. Assess the adequacy of oral, enteral and parenteral intake.
8. Provide nutritional supplements between meals and with oral medications, unless contraindicated.

REPOSITIONING AND MOBILIZATION

1. Turn and reposition all individuals at risk for pressure injury, unless contraindicated due to medical condition or medical treatments.
2. Choose a frequency for turning based on the support surface in use, the tolerance of skin for pressure and the individual's preferences.
3. Consider lengthening the turning schedule during the night to allow for uninterrupted sleep.
4. Turn the individual into a 30-degree side lying position, and use your hand to determine if the sacrum is off the bed
5. Avoid positioning the individual on body areas with pressure injury.
6. Ensure that the heels are free from the bed.
7. Consider the level of immobility, exposure to shear, skin moisture, perfusion, body size and weight of the individual when choosing a support surface.
8. Continue to reposition an individual when placed on any support surface.
9. Use a breathable incontinence pad when using microclimate management surfaces.
10. Use a pressure redistributing chair cushion for individuals sitting in chairs or wheelchairs.
11. Reposition weak or immobile individuals in chairs hourly.
12. If the individual cannot be moved or is positioned with the head of the bed elevated over 30°, place a polyurethane foam dressing on the sacrum.
13. Use heel offloading devices or polyurethane foam dressings on individuals at high-risk for heel ulcers
14. Place thin foam or breathable dressings under medical devices.

EDUCATION

1. Teach the individual and family about risk for pressure injury
2. Engage individual and family in risk reduction interventions



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Appendix E: Best Practice Checklist/Pressure Injury Prevention Bundle

Identify a bundle of best practices	
• A clinical pathway has been created • Key elements of a comprehensive skin assessment have been identified • Approaches to document and report results of skin assessment have been explored • A tool for assessing risk has been chosen • An appropriate bundle of best practices has been identified for our organization	___ ___ ___ ___ ___
Develop pressure ulcer care plan based on identified risk	
• Approaches to document and communicate care plan have been identified • A system linking care planning to assessment has been developed • All levels of staff are aware of care plan	___ ___ ___
Customize the bundle for specific work units	

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Appendix F: Braden Scale Risk Assessment Tool

BRADEN SCALE – For Predicting Pressure Sore Risk

SEVERE RISK: Total score ≤ 9 **HIGH RISK**: Total score 10-12
MODERATE RISK: Total score 13-14 **MILD RISK**: Total score 15-18

RISK FACTOR	SCORE/DESCRIPTION				DATE OF ASSESS ➡			
					1	2	3	4
SENSORY PERCEPTION Ability to respond meaningfully to pressure-related discomfort	**1. COMPLETELY LIMITED** – Unresponsive (does not moan, flinch, or grasp) to painful stimuli, due to diminished level of consciousness or sedation, OR limited ability to feel pain over most of body surface.	**2. VERY LIMITED** – Responds only to painful stimuli. Cannot communicate discomfort except by moaning or restlessness, OR has a sensory impairment which limits the ability to feel pain or discomfort over ½ of body.	**3. SLIGHTLY LIMITED** – Responds to verbal commands but cannot always communicate discomfort or need to be turned, OR has some sensory impairment which limits ability to feel pain or discomfort in 1 or 2 extremities.	**4. NO IMPAIRMENT** – Responds to verbal commands. Has no sensory deficit which would limit ability to feel or voice pain or discomfort.				
MOISTURE Degree to which skin is exposed to moisture	**1. CONSTANTLY MOIST**– Skin is kept moist almost constantly by perspiration, urine, etc. Dampness is detected every time patient is moved or turned.	**2. OFTEN MOIST** – Skin is often but not always moist. Linen must be changed at least once a shift.	**3. OCCASIONALLY MOIST** – Skin is occasionally moist, requiring an extra linen change approximately once a day.	**4. RARELY MOIST** – Skin is usually dry; linen only requires changing at routine intervals.				
ACTIVITY Degree of physical activity	**1. BEDFAST** – Confined to bed.	**2. CHAIRFAST** – Ability to walk severely limited or nonexistent. Cannot bear own weight and/or must be assisted into chair or wheelchair.	**3. WALKS OCCASIONALLY** – Walks occasionally during day, but for very short distances, with or without assistance. Spends majority of each shift in bed or chair.	**4. WALKS FREQUENTLY**– Walks outside the room at least twice a day and inside room at least once every 2 hours during waking hours.				
MOBILITY Ability to change and control body position	**1. COMPLETELY IMMOBILE** – Does not make even slight changes in body or extremity position without assistance.	**2. VERY LIMITED** – Makes occasional slight changes in body or extremity position but unable to make frequent or significant changes independently.	**3. SLIGHTLY LIMITED** – Makes frequent though slight changes in body or extremity position independently.	**4. NO LIMITATIONS** – Makes major and frequent changes in position without assistance.				
NUTRITION Usual food intake pattern [1]NPO: Nothing by mouth. [2]IV: Intravenously. [3]TPN: Total parenteral nutrition.	**1. VERY POOR** – Never eats a complete meal. Rarely eats more than 1/3 of any food offered. Eats 2 servings or less of protein (meat or dairy products) per day. Takes fluids poorly. Does not take a liquid dietary supplement, OR is NPO[1] and/or maintained on clear liquids or IV[2] for more than 5 days.	**2. PROBABLY INADEQUATE** – Rarely eats a complete meal and generally eats only about ½ of any food offered. Protein intake includes only 3 servings of meat or dairy products per day. Occasionally will take a dietary supplement OR receives less than optimum amount of liquid diet or tube feeding.	**3. ADEQUATE** – Eats over half of most meals. Eats a total of 4 servings of protein (meat, dairy products) each day. Occasionally refuses a meal, but will usually take a supplement if offered, OR is on a tube feeding or TPN[3] regimen, which probably meets most of nutritional needs.	**4. EXCELLENT** – Eats most of every meal. Never refuses a meal. Usually eats a total of 4 or more servings of meat and dairy products. Occasionally eats between meals. Does not require supplementation.				
FRICTION AND SHEAR	**1. PROBLEM**– Requires moderate to maximum assistance in moving. Complete lifting without sliding against sheets is impossible. Frequently slides down in bed or chair, requiring frequent repositioning with maximum assistance. Spasticity, contractures, or agitation leads to almost constant friction.	**2. POTENTIAL PROBLEM**– Moves feebly or requires minimum assistance. During a move, skin probably slides to some extent against sheets, chair, restraints, or other devices. Maintains relatively good position in chair or bed most of the time but occasionally slides down.	**3. NO APPARENT PROBLEM** – Moves in bed and in chair independently and has sufficient muscle strength to lift up completely during move. Maintains good position in bed or chair at all times.					
TOTAL SCORE	**Total score of 12 or less represents HIGH RISK**							

ASSESS	DATE	EVALUATOR SIGNATURE/TITLE	ASSESS.	DATE	EVALUATOR SIGNATURE/TITLE
1	/ /		3	/ /	
2	/ /		4	/ /	

NAME-Last First Middle	Attending Physician	Record No.	Room/Bed

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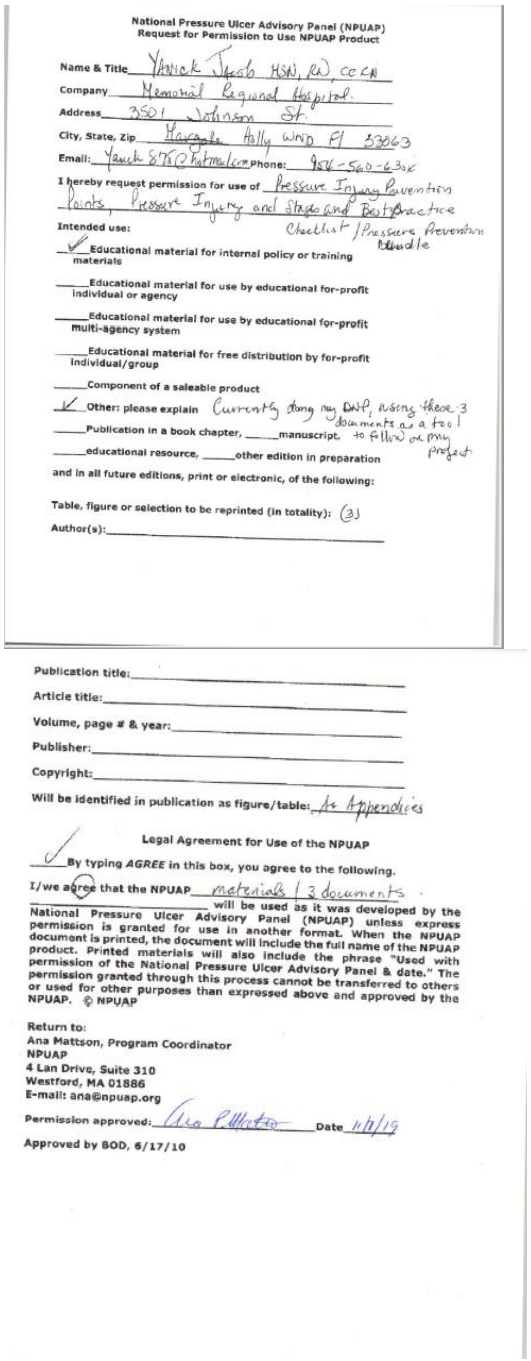

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2. The full name of the tool, Pieper Zulkowski Pressure Ulcer Knowledge Test, or PUKT will be used on any reproduction of the tool.

3. Results of the testing and citations using PUKT will be emailed to Drs Pieper and Zulkowski at drkarenz@aol.com in a form that will be sent to you