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The Effectiveness of an Organizational Hospital-Acquired Pressure Ulcer Prevention Workshop on Pressure Ulcer Prevalence Rates

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This is to certify that the doctoral study by

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Abstract

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MS, Hunter College, 2007

BS, Hampton University, 1997

Project Submitted in Fulfillment

of the Requirements for the Degree of

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Abstract

The goal of this project was to evaluate a hospital acquired pressure ulcer (HAPU) prevention program. The program objective was to encourage collaboration of team members to prevent HAPUs in order to reduce prevalence rates to national target benchmarks. This project evaluated that program by exploring changes in the incidence of HAPUs following implementation of the HAPU prevention program. This study was retrospective in nature and used a backdated analysis of archival data collected as a separate-sample, pretest–posttest, and quasi-experimental design to assess the relationship of the frequency of HAPUs to the implementation of a skin safety program. The data collected was between July 2012 and December 2013 from 2 medical/surgical units in a metropolitan hospital in New York City. Data were analyzed using descriptive statistics and t tests for independent samples. Incidence of HAPUs fell on both units, with t tests demonstrating statistically significant differences and large effect sizes on both units, suggesting clinical and practical significance of the findings. While this project does not establish improved HAPU incidence as a direct consequence of the skin health education program, findings of the project provide insight for hospital leaders in their efforts to reduce HAPU rates. Results of the project suggest a HAPU prevention program emphasizing development of knowledge and skills as well as the promotion of collaboration between health care team members may be effective in reducing HAPU incidence rates. This project also provides a low cost educational option to reduce healthcare disparities and promote positive social change. Further research in similar contexts is recommended for future study.

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Section 1

Introduction

Health care workers consider hospital-acquired pressure ulcers (HAPUs) serious clinical complications. A pressure ulcer (PU) can increase a patient's length of stay (LOS) in the hospital, pain, and infection, as well as contribute to mortality (Armour-Burton, 2013; Chicano, 2009). A complex health care concern, HAPUs will increase as the population ages, but the prevalence of HAPUs is already high (Gunningberg, 2011). The government increasingly holds hospitals, as a whole, accountable for such prevalence rates through programs such as the Centers for Medicare & Medicaid Services (CMS) initiative, the Hospital Quality Initiative, and government programs or private insurance, by withholding reimbursement for preventable hospital-acquired conditions (Hines, 2009). Consequently, hospital administrators have particular interest in studies such as the present one.

In order for practicing clinicians to carry out effective pressure ulcer prevention, they must have an understanding of the epidemiology of pressure ulcers, the etiology of pressure ulcer development, the key factors predisposing an individual to risk of HAPUs, and the recognized strategies necessary to combat this risk (European Pressure Ulcer Advisory Panel [EPUAP] and National Pressure Ulcer Advisory Panel [NPUAP], 2009). Various sources provide appropriate guidelines for training, including the National Institute for Health and Clinical Excellence (NICE), which launched its guidelines in 2001 and updated them in 2003 and again in 2005; the United States Department of Health's (2001) Essence of Care Benchmarks for Pressure Ulcers; the Welsh Assembly

Government's (2003) Fundamentals of Care; and the EPUAP (1999). However, evidence suggest nurses do not uniformly receive such training; for example, Gould (1992) assessed the amount of education that nurses received on pressure ulcer prevention and management at the undergraduate level, finding it inadequate to meet received benchmarks.

Probable risk factors for HAPUs include hospitalization due to impaired mobility, inadequate nutrients, or liquid intake. Other factors include a diminished circulation of extremities, (b) disposition of the body's anatomical pressure points, (c) frail skin integrity, (d) changes in bowel or bladder function, and (e) changes in cognitive ability (Ballard, 2008). Strategies to prevent HAPUs include quality skin care, turning and positioning patients at a minimum of every 2 hours, and the use of pressure-reducing mattresses and other devices (Ballard, 2008). HAPU prevention is multidimensional and is directly related to nursing practice and the improvement of clinical and operational performance (Hines, 2009). Hence, higher rates of HAPU development may signal overall poor care by the health care system (Lyder, 2012). Quality improvement projects decrease the frequency of pressure ulcers (Elliot, 2008), but that during the development of such projects organizations may see increased HAPU prevalence because of the stress on the organization. Further, few researchers have addressed which interventions effectively change routine clinical practices. While many organizations are undertaking interventions to reduce HAPU prevalence rates in acute care settings, researchers have not provided the guidance needed to deploy resources as efficiently as possible (Lyder, 2003). Ploeg (2007) described the emphasis on evidence-based practice (EBP) in health

care as spurring a growth in practice guidelines. However, measures to address HAPU rates require planning for successful implementation (Ploeg, 2007).

In 2012, stakeholders at a 726-bed acute care hospital in an urban community recognized HAPUs as a growing concern. These stakeholders decided to design and implement an educational workshop to provide a pressure prevention plan that included nursing interventions to minimize or eliminate friction and shear, minimize pressure with off-loading, manage moisture, and maintain adequate nutrition and hydration. The current national target benchmark for HAPUs used by the hospital of 3.6 per 1,000 patients was compared to the medical center's HAPU prevalence of 4.3 per 1,000 patients, which revealed that the medical center was above the targeted benchmark. Therefore, in this project, I used a retrospective analysis of archival data collected, in a modified version of a separate-sample, pretest–posttest, quasi-experimental design (Campbell & Stanley, 1963), to assess the relationship of the frequency of HAPUs to the implementation of a skin safety program.

Background

Although a majority of health care workers may receive adequate training on pressure ulcer prevention, the occurrence of HAPUs remains a concern for most health care organizations. In order to plan and target effective and sustainable strategies to reduce HAPU rates, health care facilities must understand the factors and experiences that influence guideline implementation (Ploeg, 2007).

The elements of an intervention that will significantly alter HAPU rates remain elusive; thus the success of such interventions is also difficult to predict. The fact that

Elliot (2008) identified high-quality organizational leadership as key to the success of the CMS initiative suggests that this may influence HAPU prevention programs. Armour-Burton found (2013) that a multidisciplinary approach could effectively reduce HAPUs. This project supplements such findings by providing a comprehensive and rigorous evaluation of one program.

As health care organizations continue to seek ways to prevent HAPUs, Nurses Improving Care for Health system Elders (NICHE)—a nationwide geriatric nursing program that provides clinical, scholastic, and organizational resources to various practice settings and their associates—is a key partner. A number of acute care settings have achieved good outcomes with respect to HAPUs—which disproportionately affect older patients—by incorporating the NICHE program (Wald, Richard, Vaughan, Dickson, & Capezuti, 2012). NICHE hospitals may have a higher level of commitment to and investment in nursing practice, with a large proportion achieving Magnet designation from the American Nurses Credentialing Center of the American Nursing Association (Wald, Richard, Vaughan, Dickson, & Capezuti, 2012).

Problem Statement

Decreasing HAPU rates in hospitals requires a multifaceted approach and the support of all members of the health care interdisciplinary team. However, most health care organizations ultimately hold nursing leadership accountable for the prevalence of HAPUs and for taking steps to help decrease these events (Tooher, 2003). In studies on nurses' and nursing assistants' awareness of pressure ulcer prevention and treatment, researchers have revealed that knowledge levels are related to some individual and

educational characteristics. Even with technical and scientific improvements in health and recommendations for PU prevention, HAPUs rates continue to exceed benchmarks around the world, and nursing professionals' knowledge about prevention and treatment remains a challenge. Internationally, there are various clinical practice guidelines, with guidelines training sessions for PU treatment and prevention, the use of interdisciplinary approaches, and the development of educational programs with the goal of the implementation of EBPs that will prevent HAPU development (Wound, Ostomy, & Continence Nurses Society [WOCN], 2003).

Nurses may not feel able to make suitable clinical decisions and, as such, will not be empowered to make their own nursing judgments. Loss of control over behavior has been discussed in the literature and may be influenced by factors both internal and external to a health care organization (Ajzen & Madden, 1986; Moore, 2010). Without adequate instruction, clinical staff may implement practices not supported by scientific evidence (Moore, 2010). The skin safety workshop developed to address the high prevalence rates of HAPUs was analyzed in this project.

Purpose

In this project, I investigated the effects of a program that provided education to direct care staff with the goal of preventing HAPUs. I investigated the effects of a skin safety educational program provided to direct care providers on the number of HAPUs experienced by patients. The program provided direct care staff, including registered nurses (RNs), licensed practicing nurses (LPNs) and nurses' aides (NAs), with the knowledge and tools required to prevent, correctly identify, treat, and manage HAPUs.

The medical center where I undertook my research created a culture of diligence in which care providers recognized HAPU prevention as a high priority.

Project Question

This study was retrospective in nature and used a retrospective analysis of archival data collected as a separate-sample, pretest–posttest, quasi-experimental design to assess the relationship of frequency of HAPUs to the implementation of a skin safety program. The research question for this study was the following: Is there a difference between pre-intervention and post-intervention HAPU prevalence after direct staff on two medical surgical units are provided HAPU education?

Frameworks for the Project

Titler, Kleiber, and Steelman (2001) pointed out that the commitment to EBP needs to be at multiple system levels, from the clinician to high-level management. The Iowa model of evidence-based practice (hereinafter, the Iowa model) provided a framework for the program that I evaluated. Titler (2001) created the Iowa model to outline knowledge transformation and guide the implementation of research into clinical practice. The Iowa model calls for encouraging staff to establish practice questions, prompting them either through identification of a problem or through awareness of new knowledge. Titler et al. (2001) highlighted the significance of considering the total health care system (from the health care recipient, to the health care provider, to the organizational structure) and using research within these contexts to guide best practice decisions. This model guided the evaluation, redesign, and reimplementation of the organizational-wide HAPU prevention program, if warranted.

Nature of the Project

The goal of this project was to investigate the relationship between the implementation of the skin safety program and the frequency of HAPUs experienced by the patients in two hospital units. Using the current national target HAPU benchmark, a separate-sample, pretest–posttest, and quasi-experimental design with a pre-existing dataset derived from patients' electronic medical records. Data, such as the weekly average LOS, were combined with the results of comprehensive skin assessments that occurred weekly starting at the time of admission and as needed through their date of discharge from the facility. The Care Cast Enterprise Hospital Database and SPSS for Windows (Release 11.5) were the key tools for data preparation and analysis.

The workshop participants were direct care workers from two units at a metropolitan New York City hospital. All participants were LPNs, RNs, and NAs. All participants were required to attend one of the workshops during the 6-month program implementation period. The program consisted of a 1-day workshop provided to 30 to 35 direct care workers, where the following were the foci:

- identifying specific risk factors for pressure ulcers in all patients;
- discussing unit-specific pressure ulcer risk factors;
- identifying actions that affect patient risk factors (minimizing friction/sheer and off-loading pressure, providing support surfaces, managing moisture, maintaining nutrition/hydration, collaborating by educating patients and family);

- comparing and contrasting indication for the use of skin care products to reduce the risk of pressure ulcers;
- discussing appropriate communication of patient risk factors, development of plans of care, and evaluation of actual patient outcomes between nursing staff;
- applying concepts discussed in class to develop a plan of care, including appropriate documentation and handoff; and
- demonstrating correct data collection and use of the current national target HAPU benchmark pressure ulcer collection tool.

The skin safety educational workshop was 7 hours in length and covered skin anatomy and physiology, the care of the skin, risk assessment, etiology of pressure ulcers, pressure ulcer staging, nutrition, the process of wound healing, wound assessment, equipment, dressing selection, documentation, and accountability. The program agenda is provided in Appendix A.

The PowerPoint presented during the program included the following: (a) a basic introduction to the facts of pressure ulcers and the need for the skin safety workshop initiative; (b) a short definition of a pressure ulcer; (c) the need and expectation of commitment/teamwork from the entire medical team; (d) how to identify and implement practice bundles and interventions for risk factors as instructed; and (e) the process and steps to staging pressure ulcers, including definitions and pictures of examples of all stages of pressure ulcers. After lunch, participants took part in a group activity on the principles described in the first half of the workshop. The participants then received a

presentation of skin care products by Smith & Nephew, including visual aids of the products and demonstrations. Care for pressure ulcers, the current national benchmark, and the medical center's HAPU prevalence rates were then explained and discussed. This was preceded by another activity called "Pulling It All Together," involving a case study. The workshop concluded with a game based on *Jeopardy* (see Appendix B), which presented the educational facts provided throughout the entire workshop to test the retention of the educational material. The workshop ended with a program evaluation.

Definitions

Common terms used in the skin safety workshop were as follows:

Hospital-acquired pressure ulcer (HAPU): HAPUs are pressure ulcers acquired during hospitalization (Gould, 2000).

Number of male patients (Gender): Percent of patients who were male. Provides a measure of relative percentage of male and female patients.

Number of medical patients: Percent of patients with primary reason for hospitalization coded as medical. Provides a measure of relative percentage of medical and surgical patients.

Patient age: Calculated for all patients included in the prevalence study.

Pressure ulcer (PU): An injury to the skin or underlying tissue, caused by pressure, friction, and moisture, sometimes called a bedsore—typically seen in patients with limited mobility (Ballard, 2008).

Prevalence (percentage of patients with any ulcers): The number of patients with Stage I–IV and "unable to stage" pressure ulcers, as a percent of all patients in the prevalence study.

Skin assessment: An examination in which the practitioner assesses the condition of the skin, typically performed on patients at risk of developing HAPUs (Gould, 1992).

Assumptions

The main assumption of this study was that skin assessment provided data that accurately measures and quantifies pressure ulcer risk. This means not only that nurses accurately assign numbers that reflect skin condition, skin status, or pressure ulcer stages using specified parameters, but also that they reported information correctly. The accuracy of these data is described in terms of validity and reliability. Validity is the degree to which accumulated evidence and theory support interpretations of test scores entailed by proposed uses of a test (American Educational Research Association, 1999). As Streiner and Norman (2008) noted, content, criterion, and construct validity are related concepts that characterize validity. Thus these modes of description are valid and useful.

The skin assessment used included the Braden Scale (available in Appendix C) as a means to comprise all factors relevant to pressure ulcer risk. Researchers have described several pressure ulcer risk factors, and capturing them all presents a challenge (Gottrup, 2004). Factors directly causing heightened exposure to pressure or shearing force and restricted mobility play the most important role in pressure ulcer prevalence. However, in a population where the majority of patients experience limited mobility (e.g.,

hospitalized patients who require intensive care or postsurgical care), this single aspect may not be discriminative enough to describe patients at increased HAPU risk. However, researchers have not clarified the role of factors that are intrinsic (e.g., nutrition), iatrogenic (e.g., medications or medical procedures), or behavioral (e.g., nicotine intake) in populations (Sharp & McLaws, 2006). Obtainable results provide contradictory evidence, reflecting the population under investigation and methodological concerns of relevant studies. As Papanikolaou, Lyne, and Anthony (2007) noted, weighting items that influence HAPU risk equally does not accurately reflect their relative influence. Like other tools, the Braden Scale assigns weights arbitrarily (Anthony, Parboteeah, Saleh, & Papanikolaou, 2008). The Braden Scale is an imperfect tool, but I assumed that its results have enough validity to use for this study. Pancorbo-Hidalgo, Garcia-Fernandez, Lopez-Medina, and Alvarez-Nieto (2006) concluded that the Braden Scale score is a good "pressure ulcer risk predictor" I also assumed that the skin assessments identify pressure ulcer risk when there is actually a pressure ulcer risk (sensitivity) and accurately specify when there is no risk (specificity). Attained sensitivity and specificity make it possible to consider other valuable estimates, like predictive values and probability ratios. Both sensitivity and specificity of a test must be high (nearly 100%) to be useful in clinical practice (Anthony et al., 2008).

Studies of diagnostic accuracy are usually applied to examine high prevalence of HAPUs. Scholars compare the outcomes from one or more tests under evaluation with outcomes from the reference standard; both are independently measured in subjects who are thought to have or not have the condition of interest (Papanikolaou, Lyne, &

Anthony, 2007). The reference standard is considered the best test to determine whether a pressure ulcer is present or absent. No clear and approved reference standard for pressure ulcer risk exists. Therefore, diagnostic accuracy cannot be investigated (Rutjes, Reitsma, Coomarasamy, Khan, & Bossuyt, 2007). Pressure ulcer risk scale researchers typically use the actual development of pressure ulcers as a reference standard in the absence of a clear and approved standard.

Investigations of pressure ulcer preventive measures almost uniformly find a positive effect, which suggests the research is unreliable (Halfens, 2010). While the staff who received the skin safety education interpreted pressure ulcer risk as a predictor of who will develop a pressure ulcer and who will not, it is possible to develop pressure ulcers without many risk factors. This is an impractical and undesirable parameter for a study (Halfens, 2010). Scores on such metrics as the Braden Scale are different from being at PU risk (Olshansky, 2008), given the complex nature of pressure ulcer development and the implementation of preventive interventions.

Researchers determine pressure ulcer risk by constructing validation by identified groups. For example, intensive care unit (ICU) patients are at a much greater risk for pressure ulcer development than patients of other specialties (Kottner, Wilborn, Dassen, & Lahmann, 2009). Using the identified group design thus significantly aids in constructing validation of PU risk scales. However, future research should utilize identified and unidentified groups to make significant improvements.

Pressure ulcer risk and pressure ulcer development are multifaceted, which complicates the task of creating valid risk scales. In spite of the limitations of HAPU risk

scales, research shows that they correlate with one another, which suggests they are valid. In contrast, linking HAPU risk scores to scores of different or unrelated constructs will produce unreliable results. Health problems and conditions are not associated with pressure ulcer risk. In fact, PU risk is indistinguishable from general health status (Balzer, Pohl, Dassen, & Halfens, 2007). For example, a scale measuring overall care dependency performed as well at identifying patients at PU risk as PU risk assessment scales have (Balzer et al., 2007). Thus, the possibility that the skin assessments correlated with overall care because assessments can be used as an evaluation tool to know if an intervention is effective, supports my assumption in this project that they were valid.

Scope and Delimitations

In this project, I evaluated the prevalence rates of HAPUs after administration of the program against the 2013 HAPU prevalence data and the current national target HAPU benchmark. HAPU prevalence rates referred to the sum or percentage of people with HAPUs while on a hospital unit. HAPU prevalence may reveal a solitary point in time, such as on every 15th day of each month, known as point prevalence. Conversely, HAPU prevalence rates can reveal a patient's likelihood of developing a HAPU over a lengthy period of time, such as an overall hospital admission visit, known as period prevalence. Prevalence rates take into account all pressure ulcers existent in a set of patients—those that occurred during a hospital stay as well as those that developed them in another place.

The Braden Scale (Bergstrom, Braden, Laquzza, & Holman, 1987) was used as a reference standard of predictive modeling results. Patients without documented Braden

scores were dropped from the sample. Patients who scored a total of 9 or less were categorized as severe risk; a total score of 10 to 12 were categorized as high risk; a total score of 13 or 14 were categorized as moderate risk; and a total score of 15 or more were categorized as moderate risk. See Appendix D for the Braden Scale. Patients with pressure ulcers were included even if it was unclear whether or not the pressure ulcers developed during their stay at the hospital. As a result, subjects affected with HAPUs and those free of HAPUs were included in the analysis.

Limitations

Nursing staff's decision to participate in multidisciplinary care is influenced by their educational preparation and professional socialization (World Health Organization, 2010). Formal educational programs tend to offer resources to increase participants' skills. The ability to study, examine, analyze, and treat a condition often forms the focus of formal educational endeavors. Nontechnical components, such as communication techniques, teamwork practices, and client-focused care models, receive little attention in the literature (World Health Organization, 2010). These nontechnical skills form the main fundamentals for multidisciplinary practice, and some health care practitioners have insufficient preparation to provide effective care. Equally, emphasizing nontechnical skills may inhibit practitioners such as nurses from being active members of the decision-making processes within a multidisciplinary team (World Health Organization, 2010). Thus, a study such as the current one, that measured the behavior of nurses when presented with technical procedures, does not necessarily provide an accurate measure of what nursing staff might achieve with a less technical approach.

If health care professionals are to provide multidisciplinary care, they will need opportunities within their day-to-day practice settings to develop the necessary skills. While many formal educational programs and their providers strive to achieve such experiences for their staff, time and funding constraints often limit the potential of such programs (Barr, 2005). Barriers to providing opportunities for nursing staff to participate in multidisciplinary teams include aligning scheduled classes, the willingness of staff to work with other disciplines at a perceived cost to their own studies, the diverse levels of staff preparation, and perceived costs and budgetary constraints (Barr, 2005). The design of multidisciplinary wound care teams requires time and resources to train health professionals to work within them. Role-playing, simulations, and moderated case discussions will enable health professionals to focus on the nontechnical skills in communicating technical data (Disch, 2013). The current study addressed an educational workshop that makes limited use of these tools, and thus it is not generalizable to workshops that made more extensive use role-playing, simulations, and moderated case discussions.

The objective of interprofessional skin safety educational workshops, such as the one I assessed, is to formulate and inspire team members to work toward the shared goal of accomplishing safer, more patient-centered outcomes. While the content provides advanced learning for all health professionals in attendance, experienced wound care clinicians should have the opportunity to participate in the skin safety workshop (Gottrup, 2004). All of the clinicians who provide skin care need to be competent to act as a team, which includes bringing the proper attitude and respect to the team. Many competencies

are common or overlap with more than one health profession. Therefore, enhancement of these collaborative competencies can extend the reach and effectiveness of the entire team (Barr, 2005). Since the current study addressed a workshop that does not enhance collaborative competencies, it sheds little light on what a workshop with such an element might be able to achieve.

A key to achieving multidisciplinary care is to ensure participant safety (Disch, 2013). This is accomplished when interprofessional respect and successive trust is established amongst the RN, nursing assistant, wound care specialist, and other members of the skin care team. Established hierarchical structures that lead to a perceived dominance of one profession over another (e.g., medicine over allied health or nursing) often prevent participants from expressing an alternative view for fear of being ridiculed (Disch, 2013). At the same time, team members can be punished by their professional peers for venturing beyond their discipline and potentially undermining established power bases when they participate in multidisciplinary activities (Disch, 2013). Organizers of multidisciplinary wound teams should educate members so that they know how to work as a team to prevent HAPUs. Researchers also support regular examinations of team dynamics so that professional distinctions do not inhibit participation or disrupt team members' sense of professional identity and all team members recognize themselves as part of a team (Disch, 2013). If this can be achieved, patient satisfaction as well as health professionals' job satisfaction will improve (Chang, Ma, & Chiu, 2009). As Gottrup (2004) noted, providing multidisciplinary wound care service requires more

than forming the team. Developing systems and resources that ensure the team functions effectively is essential to provide an effective educational workshop.

Significance

Reducing HAPUs has several positive health outcomes. The design of the program I studied involved the input of a number of stakeholders and representatives. The educational program influenced the development of useful and realistic implementation plans. The implemented interventions include constant revisiting of strategies in place due to organizations' internal and external changes that contribute to health and social outcomes. Involving patients and others affected by patient care improvement processes is of critical importance (Kettner, 2008). Thus, workshops such as the one studied involved healthcare providers who provided direct patient care and were worthy subjects of research.

Designing and implementing a HAPU prevention program and preventing and reducing the prevalence of HAPUs must include the alignment of research and the incorporation of the information related to the needs of patients, clinicians, payers, and policymakers. Nursing leadership can guide the achievement of such a program as evidenced through quality practices and patient satisfaction results. Improving the quality of care involves nursing practice as well as clinical and operational performance (Hines, 2009). The development and enhancement of HAPU prevention programs involve evidence-based clinical practices steered by a team of various disciplines with great skill sets. Incorporating guidelines that define exposure to HAPU risk factors and lower

HAPU prevalence rates before and after the implementation of the workshop was needed for the medical center hosting the study.

Summary

In this project, I responded to a need to analyze the skin safety program implemented within a 726-bed acute care hospital to reduce HAPU prevalence. Like many hospitals, the hospital exceeded the current national target HAPU benchmark rate of 3.6 HAPUs per 1,000 patients. In this project, I evaluated the effect on these rates of a workshop based on the Iowa model, using the Braden Scale as a standardizing tool. A one-to-one case control study provided data, including LOS and the results of comprehensive skin assessments. Given the scope, this project had limitations in relation to the task of producing a final determination on the ideal program with which to address HAPU prevalence, but the findings are applicable to any number of acute care facilities. The significance of this project is substantial; HAPUs are a problem in hospitals and are likely to become more so as the population ages.

Section 2

Introduction

Hospital acquired pressure ulcers (HAPUs) pose a public health problem, costing hospitals a good deal of money. Researchers have revealed a correlation between HAPUs and advanced mortality in a hospital as well as within 30 days of hospital discharge (Kane, 2007). Governmental agencies and professional organizations have issued clinical practice guidelines for HAPU prevention for decades. However, health care organizations continue to struggle to implement these recommendations when it comes to patient care (Kane, 2007). Many organizations are creating interventions to prevent HAPUs in acute care settings, but there is little evidence as to which of these interventions will effectively change routine clinical practices (Hulscher, 2003). Researchers have identified sustained pressure over time, shearing, and friction, as crucial PU risk factors (Exton-Smith & Sherwin, 1961; Husain, 1953; Rudd, 1962; García-Fernández, Agreda, Verdú, & Pancorbo-Hidalgo, 2014). The persistence of HAPU rates above benchmarks in spite of established knowledge as to their causes suggests barriers to prevention of sustained pressure over time, shearing, and friction.

In the following literature review, I describe the literature related to the scope of the problem of HAPU prevalence, risk factors, industry awareness of the problem, and the few studies that have been undertaken on the effectiveness of intervention. I also describe the limitations of these studies of efficacy and provide an overview of how I attempted to overcome these limitations.

Literature Search Strategy

Six electronic databases, the Academic Search Complete, PubMed, the Cochrane Central Register of Controlled Trials (CENTRAL), the Cumulative Index to Nursing and Allied Health Literature (CINAHL), the Cochrane Database of Systematic Reviews, and the Database of Abstracts and Reviews of Effect (DARE), provided articles for this literature review. The search was confined to English-language publications from January 1, 2000 to August 31, 2014. The literature review also entailed website searches of the CMS, the AHRQ, the U.S. National Library of Medicine, and the United States Small Business Administration. The search terms used were *nursing educational strategies*, *pressure sore, educational interventions*, *pressure ulcer*, *pressure ulcer prevention*, *wound care*, *pressure ulcer education*, *hospital-acquired pressure ulcer*, *pressure prevention education interventions*, *wound education*, *wound programs*, *wound treatment*, *wound intervention*, *pressure ulcer program*, *pressure nursing interventions*, *wound care nursing education*, and *nursing education programs*. Boolean words "or" and "and" were used as a part of the search process. The lists of references in the recovered articles were searched to confirm that all pertinent studies were included. I performed the literature search in March, 2014 but subsequently extended the search period to include studies up to August 31, 2014. Excluding journal articles not available in the English language limited this review. Nonetheless, the literature did not include any random control tests (RCTs) created in languages other than English within the review period that could have influenced the findings of this review.

HAPU Incidence

In the United States, complications from HAPUs cause 60,000 deaths and significant morbidity annually (Hulscher, 2003). As many as 3 million people in the United States develop HAPUs in the course of a year; HAPUs figure as major sources of morbidity, mortality, and health care costs (Smith et al., 2013). When HAPUs persist for 6 months or more, they can add to the length of hospitalization, impede a patient's return to living independently, and necessitate long-term care (Smith et al., 2013). Thus, research suggests HAPUs are an important public health problem.

Concepts, Models, and Theories

A number of researchers have studied interventions to promote HAPU prevention. However, Tooher (2003), appraising studies of the implementation of HAPU guidelines across multiple health care settings, found that active strategies are associated with better outcomes than passive strategies. The intervention approaches most commonly reported include clinical best practices or policies the researchers described as the significant fundamentals of HAPU prevention programs. The strategies employed were based on publications of government and professional organizations relevant to HAPU prevention. More creative interventions, such as refiguring roles and responsibilities and presenting performance data on graphical displays, also exist (Ballard, 2008); these approaches to intervention may inspire future programs.

Some scholars examine a variety of interventions aimed at improving patient care. While these interventions may not directly relate to HAPU prevention, they have broad relevance to this study because it addresses an intervention. Audit and feedback, for

example, effectively change provider behavior (Jamtvedt, 2006). The existence of initiatives, such as the national target HAPU benchmark, may lead to a focus on the significance of measuring and monitoring performance without necessarily leading to follow-through in the form of feedback. More researchers should explore the relationship between monitoring and feedback, with respect to HAPU prevention monitoring as well as other types of performance metrics.

Frameworks

Developed from the theoretical framework of the Iowa model, the workshop the current study investigated instructed staff on how to use the evidence-based patient risk assessment tool (the Braden Scale) as a standardizing tool (Bergstron et al., 1987). This tool was used to capture data related to patients' HAPU risk and wound evaluation, which included history and physical wound description, staging, and etiology. The workshop also included instruction on how to record and document the pressure ulcer data properly, using a consistent and uniform documentation format in the electronic medical record, to ensure that data collection is easily accessible for analysis of the effectiveness of the workshop. In the workshop, I sought to improve the documentation of HAPU prevention interventions, risk assessments, skin inspection findings, and treatment.

Literature Review Related to Methods

Many studies related to HAPU prevention lack a control group or site or multiple sampling times; most used a simple before–after study design. This lack of control means that scholars could find changes that occurred with the passage of time unrelated to the

actual intervention or that improvement identified did not persist (Jamtvedt, 2006). Most of the researchers also reviewed report patient outcome measures; few scholars reported both nursing process and patient outcome measures collectively Jamtvedt (2006) Process measures would include a description of the extent of implementation of the intervention and could help to clarify why an intervention succeeded or failed (Hulscher, 2003). Within these limitations, the collective data analysis includes a statistically noteworthy decline in total pressure ulcer prevalence due to the interventions.

The heterogeneity of quality improvement interventions in health care has led researchers and practitioners to call for more rigorous, theory-driven studies of HAPU prevention interventions aimed at improving patient care and their efficacy (Walshe, 2007). Better reporting of whether the intervention has the desired effect on processes of care or patient outcomes will improve the reader's understanding of the framework by which the interventions function and will support an understanding of the success of future interventions.

The organizational context in which interventions occur influences their efficacy. Culture, leadership, and resources are all dimensions of organizational context (Estabrooks, 2009). Organizational perspective has an influence on the success or failure of prevention interventions at the organizational level. Future studies should include an assessment of the factors that seem likely to influence the effectiveness of HAPU prevention interventions (Davidoff, 2008). Research suggests that RN staffing, for example, affects patient outcomes including HAPU prevalence and therefore is likely to affect the effectiveness of interventions (Kane, 2007). A gap exists in the literature in that

studies of HAPU-preventing interventions have been prevalent but have been small in scale and limited in their findings, due to methodological constraints.

Researchers have identified a number of risk factors for HAPUs. Lyder et al. (2012) described HAPUs as disproportionately affecting non-White patients between the ages of 75 and 84. Sources of heightened risk for these patients include cardiovascular disease, chronic obstructive pulmonary disease, congestive heart failure, diabetes mellitus, obesity, and use of corticosteroids during hospitalization (Lyder et al., 2012). Such risk factors are an important part of HAPU rates and therefore the efficacy of interventions aimed at lowering such rates. Risk factors also extend to the environment. For instance, patients in the Northeastern United States and Missouri have elevated risk of HAPUs (4.6% and 5.9%, respectively; Lyder et al., 2012). Patients who develop pressure ulcers have a higher risk of dying in-hospital (11.2%) and within 30 days after hospital discharge (15.3%; Lyder et al., 2012). These risk factors are also likely to influence the efficacy of interventions in these environments; my study was conducted in the Northeast.

Background and Context

The retrospective nature of the medical record makes it likely that HAPUs may not have been verified (Lyder et al., 2012) For example, clinicians do not always document the presence of community-acquired pressure ulcers on admission, leaving the research team to extrapolate from the clinical characteristics, location, and other aspects of a PU to determine whether the ulcer is hospital- or community-acquired. This may lead to improper designation of an ulcer that is community-acquired as hospital-acquired

(Lyder et al., 2012). Thus, the effect measured in this and other studies may be greater than reported.

Preventive measures (e.g., nutritional interventions, repositioning, and provision of support surfaces) should begin as soon as possible after identifying individuals at risk for HAPUs. The National Quality Forum (NQF, 2003) called for an evaluation of patients for pressure ulcers on the day of admission to an acute care setting and the re-evaluation of the plan of care within 72 hours of admission. The fact that HAPU development still exceeds the established acceptable prevalence rate of 2.9% in many U.S. hospitals (Lyder, 2003) suggests that NQF guidelines have not been universally followed. Prevalence of pressure ulcers as high as 38% have been reported in acute care settings and as high as 23.9% in long-term care facilities (Cuddigan, Ayello, & Sussman, 2001). With the graying of hospital patients and the increases in the acuity and severity of illness that attend it, as well as the growth in long-term care facility residents, the number of people at risk of developing HAPUs in such settings will increase in the future (Bennett, O'Sullivan, DeVito, & Remsburg, 2010). If HAPUs are fully preventable, health care practitioners should be able to prevent the increase of HAPU incidence event as risk factors multiply.

Summary

This literature review has identified research that shows that HAPUs as well as their health-adverse consequences are increasing as well as a set of interventions to address them. The prevention and management of HAPUs is a public health need, given their prevalence in acute care settings, their consequences, and mounting risk factors in

the U.S. population (Gunningberg, 2011). It also shows that, although involving the target population in a need assessment can build support for a program, if the key individuals or groups oppose the program, it will stand little chance of being implemented as planned or at all, resulting in a waste of time, money, and effort (Bash & Gold, 1986; Hodges, 2011). Such research shows the importance of studies such as the current one to illuminate interventions.

Section 3 describes the research design, participants, measures, and data collection process that characterize this study.

Section 3

Introduction

The purpose of this study was to investigate how a skin safety educational program provided to direct care providers affected HAPU prevalence rates. The overarching goal of the skin safety program was to provide direct care staff (i.e., RNs, LPNs, and NAs) with the knowledge and tools required to prevent, identify, treat, and manage HAPUs in order to reduce their frequency. The participating hospital required all nursing staff to attend the 7 hour session educational workshop and encouraged physicians and other direct care practitioners to attend as well. In this section, I outline the study's research design, participants, measures, data collection process, and procedures that were used in the analysis of data.

Skin Safety Educational Program

The skin safety training program consisted of a 7-hour, one session workshop intended to increase staff's understanding of why HAPUs occur and how to combat them. By gathering all stakeholders involved, developing a collaborative process, and giving every member of the health care interdisciplinary team the appropriate tools to prevent hospital acquired pressure ulcers, the workshop could lead to increased interest in HAPU prevention and improved adherence to best practices. In the educational workshop, I emphasized the importance of communicating a patient's HAPU development, results of risk assessment skin inspections, treatments administered, and changes in skin condition. This segment of the workshop included emphasis on how critical communication is between all members of the medical team immediately upon a patient's development of a

HAPU. The workshop was designed based on scientific evidence as to the needs of patients, clinicians, payers, and policymakers in a HAPU prevention and treatment program. The goal was to create lasting organizational change by providing an opportunity for all staff members to become empowered with the knowledge and confidence needed to be a part of change that produces better quality care. I was an employee of the participating hospital at the time that this study was implemented. However, I was not employed in the department that was responsible for designing and implementing the training program, nor was I involved in the collection of data from patients. While patient problems are the concern of all hospital staff members, HAPU prevention was not a problem that was assigned to me specifically.

Skin safety workshops were offered twice a month over the course of 6 months, from January through June 2013. Nursing administrators set up the workshop as a required in-house course to engage the medical center's nursing staff by taking a proactive and collaborative approach to promote the use of best practices. The hospital implemented the workshop in an attempt to change clinical practices that might bring its HAPU prevalence rate in line with the national target HAPU benchmark of 3.6 per 1,000 patients. The medical center identified a deficiency in nurses' knowledge with regard to HAPU development, which was consistent with Gould's (1992) finding that HAPU education was inadequate in many U.S. hospitals, and with Moore's (2010) research on the gaps between education and clinical practice. As Wilborn et al. (2009) pointed out; previously undertaken educational strategies have not prepared newly qualified nurses to

adequately prevent HAPUs. Thus, the hospital in which the study was undertaken reflects a reasonably typical example.

Research Design

The efficacy of the skin safety educational workshop in reducing the prevalence rate of HAPUs was evaluated using a retrospective analysis of archival data collected in a modified version of what was described by Campbell and Stanley (1963) as a separate-sample, pretest–posttest, quasi-experimental design, as illustrated below in Figure 1

	Pretest	Treatment	Posttest
	July–Dec 2012	Jan–June 2013	July–Dec 2013
Sample 1	O	(X)	
Sample 2		X	O

Figure 1. Separate-sample, pretest–posttest, quasi-experimental design

The rows represent the samples of patients available for observation during the pretest and posttest time periods; O indicates a pretest or posttest observation event, (X) serves as a place holder indicating the occurrence of a treatment not expected to produce an observed effect, and X indicates the occurrence of a treatment that is expected to produce a subsequently observed effect.

While Campbell and Stanley (1963) stated that the research design is a true experimental design using randomly assigned, equivalent samples, the samples in the study were not randomly assigned, but were simply convenience samples that were available during the pretest and posttest periods. As a result, the samples were considered to be nonequivalent, making the design quasi-experimental rather than a true

experimental research design. The limitations imposed by this quasi-experimental design will be considered later.

The pretest period ran from July 2012 to December 2012. During this time, data were collected for evaluation on the prevalence of HAPUs among several hundred patients admitted to two medical surgical units of a not-for-profit hospital in the metropolitan New York City area. Immediately following this pretest period, during the 6 months from January to June 2013, the HAPU prevention skin safety educational workshop (described above) was implemented. The posttest period followed next, during the 6 months from July to December 2013, and data on prevalence rates of HAPUs were again collected. The independent variable in the analysis was the HAPU educational intervention: pretest vs. posttest. The ratio scale dependent variable was the HAPU prevalence rate, measured as the percentage of patients during the pretest and posttest periods that were reported with HAPUs.

Data Source

The data were collected in two medical surgical units (designated 4N and 6E) of 35 beds each in a 726-bed acute care, not-for-profit hospital in the metropolitan New York City area; all adult patients admitted during the pretest and posttest periods composed the study sample. Some of the types of diagnoses found among the patient population were chronic obstructive pulmonary disease, chronic renal disease, coronary heart disease, diabetes mellitus, stroke, and syncope. The patients in the cohort included patients as young as 21 and as old as 100, of both genders. LOS was 5–10 days. HAPU incidence and other data were collected from the medical center's database. To protect

patient confidentiality, no data on individual patients were made available for this research. Rather, only aggregate data were provided for analysis. Consequently, no participant informed consent was required.

Procedure

Every patient was assessed weekly during the study period for the presence of HAPUs. HAPUs were identified using the stage definitions provided on the Braden Scale, but only the presence or absence of HAPUs served as data for purposes of this study; HAPU severity as reflected in Braden scores was not evaluated. Data collected from individual patients were aggregated into 26 weekly reports during the pretest phase and another 26 weekly reports during the posttest phase. These weekly reports provided by the hospital included information about the number of patients on each medical surgical unit in the study (census), the number of patients with HAPUs, LOS (in days), gender, and age (by categories of 18–40 years, 41–60 years, and 61 years and over). Data from the two medical surgical units involved in the study were kept separate and were separately analyzed as well so that findings observed in one sample could be cross-validated in the other sample.

Data Analysis

Pretest data consisted of 26 weekly reports that were aggregated from individual patients treated during those weekly periods. Each week was treated as a case in subsequent statistical analyses. No data were available for individual patients. Pretest and posttest raw data from Units 4N and 6E are shown in Table 1.

Table 1

Weekly Aggregated Average HAPU Percentage Incidence Rates for Units 4N and 6E at Pretest and Posttest with Sample Descriptive Statistics

Unit 4N Pretest Period

Week		percentHAPU
1		67.74
2		60.61
3		58.62
4		53.33
5		60.00
6		62.07
7		61.76
8		57.58
9		52.94
10		63.33
11		60.00
12		62.50
13		63.64
14		69.70
15		57.58
16		58.82
17		62.50
18		71.43
19		74.29
20		70.59
21		68.57
22		60.61
23		78.79
24		83.87
25		80.00
26		84.38
Total	N	26
	Mean	65.5859
	Std. Deviation	8.79595

Unit 4N Posttest Period

Week		percentHAPU
1		59.38
2		46.88
3		46.88
4		32.35
5		33.33
6		39.39
7		44.12
8		46.88
9		44.12
10		36.36
11		33.33
12		35.48
13		33.33
14		25.71
15		34.29
16		34.29
17		39.39
18		32.35
19		25.81
20		25.81
21		25.81
22		30.00
23		27.27
24		34.38
25		27.27
26		27.27
Total	N	26
	Mean	35.4413
	Std. Deviation	8.45405

Unit 6E Pretest Period

Week		percentHAPU
1		76.47
2		77.42
3		72.73
4		68.75
5		67.65
6		65.63
7		60.61
8		60.61
9		61.76
10		61.29
11		62.86
12		64.71
13		64.71
14		65.71
15		65.71
16		65.71
17		61.76
18		60.61
19		61.76
20		61.76
21		59.38
22		61.29
23		54.55
24		61.76
25		61.76
26		61.29
Total	N	26
	Mean	64.1634
	Std. Deviation	5.13042

Unit 6E Posttest Period

Week		percentHAPU
1		58.82
2		53.13
3		51.52
4		48.48
5		45.45
6		37.50
7		38.24
8		38.24
9		32.35
10		28.13
11		28.13
12		24.24
13		28.13
14		29.41
15		30.30
16		35.29
17		34.38
18		34.38
19		37.50
20		36.36
21		29.03
22		32.26
23		33.33
24		32.35
25		32.35
26		28.13
Total	N	26
	Mean	36.0547
	Std. Deviation	8.69992

The study included four sets of analyses. First, descriptive statistics described the characteristics of the patient samples involved in the study. Second, failure to assign patients randomly to the pretest and posttest samples meant that the samples may not have been equivalent, and this potential nonequivalence creates a challenge to the internal validity of the study in the form of sampling bias. Demonstrating that the pretest and posttest samples were equivalent on several demographics and other variables may

decrease this threat. The potential nonequivalence of samples was evaluated using independent samples *t* tests (for continuous variables) and chi square tests for independent samples (for categorical variables). The family-wise alpha error rate for the entire collection of demographic comparisons was kept at $\alpha = .05$ using the Bonferroni method (i.e., α for each test was set at .05/K, where K is the number of comparisons; Warner, 2008). Third, program efficacy was evaluated using two independent samples *t* tests (one for data from Unit 4N and the other for data from Unit 6E) to compare the 26 weekly averages of HAPU incidence rates from the pretest period with the 26 weekly averages of HAPU incidence rates from the posttest period. An independent sample *t* test provided a comparison of the means from the pretest and posttest period, not a repeated measures, paired sample, or dependent sample *t* test. This is because the pretest and posttest data came from different patients. The repeated measures type of *t* test would only be used if the same patients were measured before treatment and again after treatment.

The formula for the independent samples *t* test is:

$$t = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}}}$$

These *t* statistics were evaluated for significance using one-tailed tests using $df = (N_1 + N_2) - 2$ at the .025 level of significance, thus providing a Bonferroni adjustment for multiple comparisons. Significant *t* tests were further evaluated using Cohen's *d* statistic as an index of the relative strength of the skin safety training workshop's treatment effect (Cohen, 1988). Fourth, two single sample *t* tests provided a comparison of the mean

posttest HAPU incidence rates from Units 4N and 6E against the current national target HAPU benchmark rate of 3.6 per 1,000 patients. Using the Bonferroni method, each of these *t* tests was evaluated for significance at the .025 level of significance (two-tailed).

Limitations of the Research Design

This study, like many quasi-experimental program evaluations conducted in the field, does not provide the protections against threats to internal validity that are available from true experimental research designs with elaborate control groups conducted in the controlled environment of the laboratory. Even though the posttest HAPU prevalence rates are significantly lower at posttest than pretest, there were viable explanations other than treatment efficacy that could not be eliminated. Challenges to internal validity included the following:

- *History*. Any number of events, hospital policy changes, personnel changes, naturally occurring changes in the population of hospitalized patients, and the like may have taken place concurrent with the skin safety training workshop, which explained changes in HAPU prevalence rates. These concurrent events are confounded with the workshops evaluated, and it is impossible to separate the effects of the workshops from those of concurrent events. As one reviewer of this manuscript noted, "since the outcome [i.e., HAPU reduction] was an organizational priority, [there were] probably many strategies to decrease HAPUs at this time." The research design used in this study does not allow for the unambiguous

attribute of effects to the skin health educational training that was the focus of attention in this research.

- *Regression toward the mean*. When a sample drawn from a population exhibits an unusually high (or low) mean on a variable, it tends to be the case that a second sample drawn from that same population exhibits a mean on the variable that is less extreme and thus more probable (i.e., the second sample mean regresses toward the true population mean). In the present study where high HAPU rates presumably triggered the decision to develop a skin safety training workshop to address the problem of HAPUs, this kind of regression toward the mean may have been responsible for lower posttest HAPU prevalence rates.
- *Instrumentation*. The instrumentation threat to internal validity refers to the possibility that measurements taken at two points in time may differ, not because of an intervening treatment, but because of a change in the measurement process. Instrumentation is potentially relevant to any research involving measurement at two different points in time, particularly when the measurement includes an element of subjectivity. In the present research, it is conceivable that educating health care staff on HAPUs may have created a sense of pressure to reduce the prevalence of HAPUs and might also have altered the staff's sensitivity to or willingness to report HAPUs. However, I was not involved in either program implementation or data collection and, therefore, researcher bias is not an

issue in the interpretation of findings. While instrumentation would be more likely to influence subjective ratings of HAPU severity than simple judgments of the presence or absence of HAPUs, instrumentation effects were not ruled out in this study.

- *Selection.* Selection bias can occur when samples are not created through random assignment, but are chosen on the basis of availability and convenience. In the present study, without random assignment of patients to the pretest and posttest groups, the samples cannot be assumed to be equivalent; therefore, any differences in the characteristics of the two groups, such as their demographics, may have been responsible for some differences in HAPU prevalence rates, not just the skin safety training workshop.

Although it is impossible to entirely eliminate all of these challenges to internal validity, two steps were taken in this study to strengthen conclusions about program efficacy. First, program efficacy was evaluated in two separate samples. Of course, cross-validation of findings in two samples does not preclude the possibility that both samples show an effect for reasons other than the treatment, but replication of findings in different settings demonstrates the reliability of those findings. The second step taken to strengthen conclusions about program efficacy was from a comparison of the pretest and posttest samples to evaluate sample equivalence. The nonequivalence of samples in the study presents a sampling bias threat to internal validity. If the samples are demonstrated to be

similar on several demographic variables, this threat may be diminished, if not eliminated.

A second study limitation resulted from the necessity of using aggregated weekly reports provided by the hospital, rather than tracking outcomes for individual patients. Each medical surgical unit in the study was capable of caring for 35 patients at a time. Consequently, at least this many unique patients, possibly more, may have been cared for during each week of the pretest and posttest periods. Some patients may have carried over from one week to the next, while others were discharged. It is impossible to know exactly how many unique patients were included in the weekly aggregated reports. In lieu of exact sample size information, all statistical analyses used in this study treated each weekly report as a case, thus providing 26 cases in the pretest sample and another 26 cases in the posttest sample. There were far more than 26 patients who received care during the pretest period and more than 26 patients who received care during the posttest period, however, which means that the sample sizes used in the statistical calculations were smaller than the facts would warrant. These reduced sample sizes would have the effect of reducing the statistical power of the significant difference tests, making it more difficult to identify any differences between the pretest and posttest samples as statistically significant. While this provides for a more conservative test of the efficacy of the HAPU training program, it also means that the magnitudes of demographic differences between pretest and posttest samples were underestimated.

Summary

In this study, I evaluated the efficacy of an educational intervention designed to reduce HAPU prevalence rates. The intervention consisted of a 7-hour, 1-day workshop to instruct hospital direct care staff on the characteristics of HAPUs and their assessment, treatment, and prevention. Attendance at the workshop was mandatory for direct care staff and was recommended to all individuals involved in patient care. The training program was designed to gain the collaboration of all team members in HAPU prevention in order to bring the HAPU prevalence rate in line with the current national target HAPU benchmark of 3.6 per 1,000 patients. I used data collected from July 2012 to December 2013 from two medical surgical units in a metropolitan New York City hospital.

I used a separate-sample, pretest–posttest, quasi-experimental design with nonequivalent samples to compare HAPU prevalence rates among patients hospitalized prior to implementing the skin safety training with HAPU prevalence rates among patients hospitalized following this training. The study was retrospective and used archival data provided by the hospital in aggregate form. Data from the two medical surgical units in the study were analyzed separately in order to provide a mechanism for cross-validation of findings.

As is often true with research done in the field, the research design used in this study does not allow drawing definitive causal conclusions regarding program efficacy. However, finding significant pretest to posttest reductions in HAPU incidence rates would be consistent with the conclusion that the skin health education workshops was efficacious.

Section 4 provides the results of the statistical analysis.

Section 4

Introduction

The results of the statistical analyses outlined in the preceding section appear in this section. Demographic characteristics of the samples are presented first, followed by an evaluation of potential sample nonequivalence. Analyses related to establishing the efficacy of the skin safety educational program are presented next, followed by comparisons of posttest HAPU incidence rates to the current national target HAPU benchmark.

Participants and Sample Equivalence

Table 2 summarizes the demographics and other characteristics of patients on the two medical surgical units that participated in the study during the 6-month pretest (before HAPU training) and 6-month posttest (after HAPU training) periods. Unit 4N pretest and posttest samples differed significantly on only one variable: LOS. Pretest and posttest samples were equivalent in all other respects. The pretest sample averaged 8.38 days in the hospital (SD = 0.90) compared to a significantly shorter stay in the posttest sample, which averaged 6.46 days (SD = 1.17), t (50) = 4.15, $p < .001$ (two-tailed). Unit 6E patients showed the same pattern of longer hospitalizations in the pretest sample (M = 7.12 days, SD = 0.65) than in the posttest sample (M = 5.15 days, SD = 0.97), t (50) = 8.60, $p < .001$.

Table 2

Demographic and Personal Characteristics of Patients on Units 4N and 6E at Pretest and Posttest with Tests of Equivalence of Samples at Pretest and Posttest

	Pretest (n = 26 weekly reports)			Posttest (n = 26 weekly reports)			Pre-Post Sample		
Equivalence Tests	Min-Max	*M*	*SD*	Min-Max	*M*	*SD*		*df*	sig.
Unit 4N									
Census	29-35	32.23	1.88	30-35	32.65	1.44	t = -0.69	50	n.s.
Gender									
Male	15-22	18.73	1.87	17-22	19.46	1.39	χ^2 = 0.24	1	n.s.
Female	10-17	13.50	1.77	11-15	13.19	1.23			
Age									
18-40	0- 4	1.62	1.13	2-6	3.92	1.13	χ^2 = 3.05	2	n.s.
41-60	6-15	11.92	2.45	12-19	16.77	1.92			
61+	14-26	18.19	3.19	9-16	11.96	1.89			
LOS	7-10	8.38	0.90	5-9	6.46	1.17	t = 4.15	50	< .001
Unit 6E									
Census	31-35	33.27	1.31	31-34	32.81	0.98	t = 1.43	50	n.s.
Gender									
Male	14-19	16.46	1.30	15-19	17.08	0.93	χ^2 = 0.05	1	n.s.
Female	15-20	16.85	1.57	13-17	15.65	1.06			
Age									
18-40	2-5	3.54	0.81	3-5	3.77	0.91	χ^2 = 0.09	2	n.s.
41-60	12-16	14.42	1.03	12-18	15.04	1.87			
61+	12-18	15.46	1.70	10-18	14.00	2.23			
LOS	6-8	7.12	0.65	4-7	5.15	0.97	t = 8.60	50	< .001

Note: Values in Table 2 are aggregated from 26 weekly pretest reports and 26 weekly posttest reports. Census reports numbers of patients on each unit. Gender reports numbers of males and females. Age reports numbers of patients in each age category.

HAPU Training Efficacy

The efficacy of the skin safety education program in reducing the incidence of HAPUs was evaluated separately for patients in Units 4N and 6E, with each evaluation providing cross-validation for the other. Program efficacy for each unit reflects comparisons of the mean of 26 weekly average HAPU incidence rates from the pretest period (prior to providing staff with skin safety education) with the mean of 26 weekly average HAPU incidence rates from the posttest period (after staff received skin safety education) based on independent samples *t* tests. The results of these pretest–posttest comparisons are summarized in Table 3. HAPU incidence rate means and standard deviations were calculated from values provided by the participating hospital in 26 weekly reports covering the pretest period and another 26 weekly reports from the posttest period, thus providing degrees of freedom equal to $df = (n1 + n2) - 2 = 50$ (Diekhoff, 1996). It was hypothesized that skin safety education would reduce the incidence of HAPUs from the pretest to posttest periods and so the *t* tests were evaluated for significance using directional (i.e., one-tailed) tests (Diekhoff, 1996). The table below shows compares pretreatment and post treatment HAPU incidence rates on each of the two units.

Table 3

Pretreatment–Posttreatment Comparisons of HAPU Incidence Rates on Units 4N and 6E

	Pretest				Posttest						
	Pre–Post Comparisons (n = 26 weekly reports)				(n = 26 weekly reports)						
	Min-Max	*M*	*SD*	Min-Max	*M*	*SD*	*t*	*df*	sig.	Cohen's *d*
Unit 4N	52.94%-84.38%	65.59%	8.80%	25.71%-59.38%	35.44%	8.45%	12.60	50	<.0005	3.495
Unit 6E	54.55%-77.42%	64.16%	5.13%	24.24%-58.82%	36.05%	8.70%	14.19	50	<.0005	3.936

Note: Values in Table 3 are aggregated from 26 weekly pretest reports and 26 weekly posttest reports. Independent samples *t* tests were evaluated for significance using one-tailed tests.

Average HAPU incidence rates declined from the pretest to posttest periods on both medical surgical units that were evaluated. Among patients on Unit 4N, the incidence rate for HAPUs dropped from a weekly average of 65.59% (*SD* = 8.80%) during the 26-week pretest period to a weekly average of 35.44% (*SD* = 8.45%), t (50) = 12.60, $p < .0005$ (one-tailed) during the 26-week posttest period. Cohen's *d* statistic, calculated using the formula for equal-sized samples suggested by Warner (2008), was used to evaluate the strength of the treatment effect: $d = (M_1 - M_2) / \sqrt{[(s^2_1 + s^2_2)/2]}$., where, M_1 is the mean of the first sample, M_2 is the mean of the second sample, s^2_1 is the variance of the first sample, and s^2_2 is the variance of the second sample.

The numerator and denominator are calculated separately, then brought together to get Cohen's *d* statistic, which states that the numerator is 65.59 – 35.44 = 30.15 and the denominatoris $\sqrt{[(77.37 + 71.47) / 2]} = 8.63$.

The obtained value of Cohen's *d* was 3.494, indicating a strong treatment effect. Cohen's *d* evaluates the point difference between two sample means by comparing that difference to the samples' pooled standard deviation. In this way, Cohen's *d* resembles a *z*-score in the sense that both *d* and *z* use the standard deviation as a yardstick to measure the point distance between two values. Cohen (1988) suggested the following benchmark values of *d*: *d* = 0.2 is a small effect, *d* = 0.5 is a medium effect, and *d* as a large effect. By these standards, the obtained value of *d* is enormous and, in fact, off the charts. A further discussion of the large size of Cohen's *d* is presented later in this section.

While Cohen's *d* statistic makes it clear that the effect observed in this study was strong, common sense, not more statistics, will ultimately serve as the best method of evaluating the practical significance of any treatment effect. That standard suggests that the skin safety education program evaluated in this study was extremely effective. The risk of developing HAPUs on Unit 4N was reduced almost by one-half from pretest to posttest. Whereas HAPUs were normative during the pretest period, reported in well over half of the patients, only a minority of patients, a little over one-third, were reported with HAPUs during the posttest period.

The same analysis was repeated using data from Unit 6E as a cross-validation measure. Among patients on Unit 6E, the mean weekly incidence rate for HAPUs dropped from 64.16% (*SD* = 5.13%) during the pretest period to 36.05% (*SD* = 8.70%) during the posttest period, $t\,(50) = 14.19$, $p < .0005$ (one-tailed), Cohen's $d = 3.936$. On both Units 4N and 6E, the effect of skin safety training was strong, reducing average weekly HAPU incidence rates by almost half.

Although the efficacy of HAPU training in reducing the incidence rate of HAPUs was supported by two independent analyses performed in this study, the HAPU incidence rates in both of the posttest samples still exceeded nationally established benchmarks of 3.6 HAPUs per 1,000 patients (0.36%). Patients on Unit 4N averaged 35.44% across the 26 weeks of the posttest period (*SD* = 8.45), and patients on Unit 6E averaged 36.05% (*SD* 8.70) during that period. Both of these posttest rates are significantly higher than the nationally established benchmark. Sample deviations from the nationally established benchmark were evaluated using one-sample *t* tests with $df = n - 1$ (Diekhoff, 1996), where *n* represents the number of weekly average HAPU incidence rates reported by the hospital during the posttest period (i.e., 26). For Unit 4N, $t(25) = 21.17$, $p < .001$ (two-tailed); for Unit 6E, $t(25) = 20.92$, $p < .001$ (two-tailed).

Discussion and Conclusions

In this study, I evaluated the efficacy of an educational intervention designed to reduce HAPU prevalence rates. The intervention consisted of a 7-hour, 1-day workshop to instruct hospital direct care staff on the characteristics of HAPUs and their assessment, treatment, and prevention. Attendance at the workshop was mandatory for direct care staff and was recommended to all individuals involved in patient care. The training program's objective was to gain the collaboration of all team members in HAPU prevention in order to bring HAPU prevalence rate in line with the current national target HAPU benchmark of 3.6 per 1,000 patients. I used data collected from July 2012 to December 2013 from two medical surgical units in a metropolitan New York City hospital.

I used a separate-sample, pretest–posttest, quasi-experimental design with nonequivalent samples to compare HAPU prevalence rates among patients hospitalized prior to implementing the skin safety training with HAPU prevalence rates among patients hospitalized following this training. The study was retrospective and used archival data provided by the hospital in aggregate form. Data from the two medical surgical units in the study were analyzed separately in order to provide a mechanism for cross-validation of findings. Pretest–posttest comparisons showed statistically significant reductions in weekly average HAPU incidence rates on both medical surgical units involved in the study. HAPU incidence rates were cut nearly in half on both units.

Although the results are compelling, there are some caveats that cloud their interpretation. First, patients' average LOS during the posttest period was significantly shorter than during the pretest period. This was true on both units. On Unit 4N, the pretest LOS averaged 8.38 days (SD = 0.90), and the posttest LOS averaged 6.46 days (SD = 1.17); on Unit 6E, the pretest LOS averaged 7.12 days (SD = 0.65), and the posttest LOS averaged 5.15 days (SD = 0.97). It is possible that the abbreviated duration of hospitalization during the posttest period may have contributed to the reduction in HAPU incidence rates seen from pretest to posttest periods in this study. With less time in the hospital, there was less time for HAPUs to develop. On the other hand, it is possible that the lower LOS averages seen during the posttest period were the consequence of improved patient care that resulted from the skin health education program. With better patient care came fewer HAPUs, and fewer HAPUs meant fewer

complications that might prolong hospitalization. There is no way to sort out these possibilities from the available data.

The data were also limited with respect to the length of time over which they were collected. A single pretest period fails to establish a stable, reliable baseline against which subsequent improvement might be evaluated. Multiple pretest periods would have established a more reliable baseline. Similarly, a single posttest period does not enable a researcher to evaluate the persistence of the effect of training. It remains unclear how stable and long lasting the benefits of the skin safety education program will be.

Other study limitations also resulted from the aggregated nature of the data that were available for analysis. Instead of examining data for the many dozens of individual patients who were treated during the pretest and posttest periods, the participating hospital provided only aggregated weekly summaries of patient outcomes during these periods. The analysis of individual patients' data, rather than averages of the data from the many patients who were treated each week, would have shed light on the details of patients' circumstances that were masked by the aggregated data. The analysis of individual patients' data, for instance, would have enabled identifying groups of patients who particularly benefited from the skin health education program and those who did not benefit as much.

The analysis of aggregated data influenced the results of the study in other ways as well. The scores of a population of individuals will display greater variability than is seen in the means of samples drawn from that population. Specifically, the standard deviation of the means of samples of size *n* drawn from a population (called the standard

error of the mean and abbreviated as σ_M) will only be a fraction of the size of the standard deviation (σ) of the scores of the individuals in that population (Diekhoff, 1996). Specifically, $\sigma \sigma_M = \sigma/\sqrt{n}$. If, instead of comparing 26 weekly pretest mean HAPU incidence rates and 26 weekly posttest mean HAPU incidence rates, the presence or absence of HAPUs could have been recorded for individual patients throughout the pretest and posttest periods with values of 0 indicating the absence of HAPUs and values of 1 indicating their presence. The variances and standard deviations of those binary data would be expected to be greater than the variances and standard deviations of the weekly average HAPU incidence rates that were available for analysis in this study. The attenuated variances and standard deviations that were used in this study in calculating pretest–posttest comparisons and Cohen's *d* measures of effect strength inflated the obtained values of those statistics relative to the values that would have been seen in analyses of the data from individual patients. That is not to say that the analyses that were performed are invalid, because they are valid. However, the analyses used in this study need to be recognized for what they are and distinguished from what they are not. The pretest–posttest comparisons presented in this study evaluated differences in the means of weekly average HAPU incidence rates representing the pretest and posttest periods, which is different than evaluating differences in HAPU incidence rates during the pretest and posttest periods.

Finally, several threats to internal validity (i.e., the ability to unambiguously attribute pretest–posttest declines in HAPU incidence rates to the skin health care education program) resulted from the quasi-experimental research design that was

necessitated by the field study nature of this research: (a) events taking place concurrent with skin health education (e.g., hospital policy changes, personnel changes) may have contributed to the observed reductions in HAPU incidence rates from pretest to posttest, and the priority given to HAPU reduction by the participating hospital makes it likely that other factors were involved; (b) the high HAPU incidence rates observed during the pretest period may have been *spuriously* high and would be followed by lower rates during the posttest period due to regression toward the mean, even without the intervening skin health education program; (c) skin health care education received by staff may have not only affected their patient care practices, but might have also created a sense of pressure to reduce reported HAPUs, perhaps even leading to not reporting minor, borderline cases at all; and (d) the absence of random assignment of patients to treatment conditions (i.e., the pretest vs. posttest periods) means that the samples cannot be assumed to be equivalent in all respects. For instance, the patients' average LOS during the posttest period was shorter than that for patients during the pretest period, and there may have been other undetected differences that contributed to the difference in pretest and posttest HAPU incidence rates.

All of these things considered, I did not prove that improved HAPU incidence rates observed from pretest to posttest were the direct consequence of the skin health education program, and other factors were probably involved. On the other hand, the findings were consistent with that attribution, and the HAPU declines that were observed from pretest to posttest were not only statistically significant, but practically significant

as well. In two separate samples, weekly average HAPU incidence rates were cut almost in half.

Lest we become complacent, however, it should be remembered that even the much-reduced posttest HAPU incidence rates observed in this study were still considerably greater than the current national target benchmark used by the hospital of 3.6 per 1,000 patients. Of course, some patient populations are, by virtue of their characteristics, going to suffer a higher rate of HAPUs than others, and it is rewarding to have data that support the efficacy of efforts to bring down these rates.

Recommendations

Based on this study's results, it is recommended that the hospital continue offering mandatory skin health education programs to staff with responsibility for patient care, particularly in medical surgical units with high HAPU rates. Training in knowledge and skills alone, though, is unlikely to result in permanent changes in patient care practices. Training programs like the one evaluated in this study also recognize the important role played by social factors in moderating the effectiveness of a HAPU prevention training program. Programs that engender a sense of collaboration and collegiality are more effective, which emphasizes the important role every member of the health care team plays, and empowers individuals to make sound decisions based on well-learned principles of evidence-based health care. Additionally, it is important to recognize that behaviors that are not recognized and reinforced are unlikely to persist. Therefore, it is important that those in supervisory positions not only be trained in best practices as they relate to patient care, but also that these individuals receive training in

the principles of organizational behavior as they relate to pinpointing, cueing, modeling, and reinforcing desirable staff behaviors.

Analysis of Self

At a personal level, this study allowed me to draw a connection between my current role as a staff educator, my long-term goals of being a subject matter expert in staff education, and the outcomes of my project. The project suggests that educators have a duty to place an emphasis on increasing scholarly activity among learners. My project allowed to me to view and understand the importance of research to the improvement of the profession of nursing. Equally, this research allowed me, as a doctoral student, the ability to enhance my scholarly ability and amplify my understanding of the dynamics that impact doctoral student participation in scholarship. This study offered valuable evidence for me, as a nursing educator, to define the social context pertinent to the start and guideline of my self-determined drive necessary to the quest of scholarship at the doctoral level. The framework I have created for my professional growth, related to my experience within this doctoral program, helped me facilitate my enthusiasm, behavior, and progress through this project. In addition, by researching the implementation of an educational intervention and its outcomes, I was able to compare knowledge across doctoral study and curriculum advancement. I developed my understanding of the nursing professions through my examination of innovative training and development. Experiences I gained during this project facilitated motivation and increased my personal commitment to scholarship for me at the doctoral level. I believe that this will make me a better nurse.

Summary

HAPUs are a serious clinical complication that can lead to increased rates of infection, LOS, pain, and, potentially, death for patients (Armour-Burton, 2013; Chicano, 2009). The prevention and treatment of HAPUs in the hospital environment is tasked to direct care staff, who must not only be medically trained to understand the etiology, diagnosis, and treatment of HAPUs, but who must also develop the social skills that enable them to work collaboratively with the entire direct care team. While skin health training programs have been developed that can replace treatment based on myth and tradition with EBPs (Moore, 2010; Aulkowski, Ayello, & Wexler, 2007), it remains unclear which factors moderate the success of such programs. Evidence suggests that these moderating factors may be social in nature. Effective HAPU prevention requires the collegial involvement and support of all members of the interdisciplinary health care team and nursing staff, such that they feel empowered to make important judgments when attending to the needs of their patients (Ajzen & Madden, 1986; Moore, 2010). Successful HAPU prevention requires building a culture of diligence, expertise, and cooperation in which health care providers recognize HAPU prevention as a high priority.

The present study was an empirical evaluation of the effectiveness of one such skin safety training program developed for use in a metropolitan New York City hospital, motivated by HAPU incidence rates exceeding the national benchmark. The program, a mandatory 7-hour workshop, provided direct care staff with the information and tools required to prevent, identify, treat, and manage HAPUs in a way that would empower and

build the confidence of the staff. Of equal importance, the workshop sought to establish HAPU prevention as a collaborative process, giving each participant greater awareness of his or her role as an agent of change by emphasizing the importance of communication between all members of the medical team. The workshop sought to increase awareness of and interest in HAPU prevention, with the goal of creating lasting organizational change that would reduce the hospital's HAPU incidence rate.

Archival data were aggregated from the hospital's medical records from two medical surgical units during 2012–2013 to provide information about HAPU incidence rates for a 6-month period prior to launching the training program (the pretest period) and a second 6-month period following the conclusion of the training program (the posttest period). HAPU incidence rate data from the two units were evaluated separately, with the results of each unit serving to cross-validate the other. Statistical analyses used to compare HAPU incidence rates during the pretest and posttest periods showed dramatic and statistically significant reductions in HAPU incidence rates on both units involved in the study. In fact, on both units, HAPU incidence rates were cut nearly in half from the pretest period, during which a majority of patients were identified with HAPUs, to the posttest period, when about a third of patients were diagnosed with HAPUs.

As is true with most field research, the results of the present study cannot be unambiguously attributed to the skin health training program, and a number of alternative explanations for the dramatic reduction in HAPU incidence rates from pretest to posttest were offered. These ambiguities notwithstanding, the results of this study strongly suggest that a skin health training program can be effective in reducing HAPUs. Thus it is

important to provide training that confers knowledge and skills on health care providers while also recognizing the important role the social climate plays in HAPU prevention.

Section 5: Scholarly Product

Introduction

A pressure ulcer, sometimes called a bedsore, is an injury to the skin or underlying tissue, which pressure, friction, and moisture can cause, particularly in medical patients with limited mobility. When pressure ulcers are acquired during hospitalization, they are known as HAPUs. HAPUs are serious clinical complications that cause pain and infection as well as elevated risk of death and increased length of hospitalization (Armour-Burton, 2013; Chicano, 2009). Individuals with HAPUs experience elevated rates of mortality while in the hospital and for 30 days following discharge. Smith et al. (2013) reported that as many as three million Americans develop HAPUs each year, contributing to morbidity, mortality, and elevated health care costs. Older patients are particularly prone to developing pressure ulcers, and as the population ages the problem of HAPUs can be expected to grow (Gunningberg, 2011). HAPUs are not only a health care problem; they are a financial problem as well since insurance reimbursements, both federal and private, can be withheld for preventable hospital-acquired conditions (Hines, 2009). Thus, studies like the current one are likely to be of interest to many practitioners.

Successfully reducing the prevalence of HAPUs depends on the support of all members of the health care interdisciplinary team. However, the reality is that most health care organizations ultimately hold nursing leadership accountable for the prevalence of HAPUs and for taking steps to help decrease these events. Therefore, the effective training of nursing staff is critically important to the prevention of HAPUs

(Moore, 2010). Previous research has indicated that skin health education programs intended to reduce HAPU incidence rates are more effective if medical and technical skills training is accompanied by training related to nontechnical elements, including communication skills, interprofessional cooperation and collaboration, the importance of working as a team, and building a safe environment for all participants to express themselves, regardless of their positions in the social structure of the organization. The present study was an evaluation of the effectiveness of one such skin health education program provided to the direct care staff of a 726-bed acute care, not-for-profit hospital in metropolitan New York City. The program evaluation utilized a single outcome measure—HAPU incidence rates among hospitalized patients—in a separate-sample, pretest–posttest, quasi-experimental design.

NICE's *Pressure Ulcer Risk Assessment and Prevention* guidelines were published in 2001. The organization updated the publication in 2003, adding to the prevention guidelines, and again in 2005 with the launch of the program entitled *Prevention of Mid-Treatment of Pressure Ulcers*. The Department of Health's (2001) *Essence of Care Benchmarks for Pressure Ulcers* and the Welsh Assembly Government's (2003) equivalent, *Fundamentals of Care*, also set standards of care for preventing pressure ulcers. A majority of health care workers have received training in these standards of care, and this training is effective overall (Elliot, 2008), but a significant number of nursing care programs fail to effectively educate their students in the best health care practices as they relate to pressure ulcers (Gould, 1992; Moore, 2010). Because of this, HAPUs continue to challenge most health care organizations.

Even with improvements in evidence-based health care techniques and clear guidelines and recommendations for HAPU prevention and treatment, HAPUs continue to be problematic around the world. Health care practices are too often based on belief and anecdote (Zulkowski, Ayello, & Wexler, 2007) rather than research. Because of this, many hospitals continue to exceed the current national target HAPU benchmark rate of 3.6 per 1,000 patients.

The role of competent, well-trained nursing staff in the prevention and treatment of HAPUs is widely recognized, but there is scant evidence to indicate which training interventions effectively change routine clinical practices. Researchers have not provided the guidance that is needed to deploy training resources as effectively as possible. Elliot (2008) identified high-quality organizational leadership as one key to the success of educational training programs. Steelman (2001) added that a commitment to EBP needs to exist at multiple levels, beginning with upper management, but must include clinicians as well. Various other scholars have highlighted the importance of considering all facets and levels of the health care system when planning improvements to patient care—from the health care recipient, to the health care provider, to the organizational structure.

Some elements of effective HAPU prevention training are obvious. Practicing clinicians need to understand the epidemiology of pressure ulcers, the etiology of their development, the key factors predisposing individuals to risk, and the evidence-based strategies that are effective in combating HAPUs (EPUAP NPUAP, 2009). However, health care workers need more than technical knowledge if they are to effectively implement EBPs in patient health care. Armour-Burton (2013) found that a multifaceted,

multidisciplinary approach, in which every member of the interdisciplinary health care team provides support, could be effective in reducing HAPUs, but the design of these multidisciplinary wound care teams requires training health professionals to work in teams. Nontechnical training elements, such as communication techniques, practices that promote teamwork, and care models focused on patients, are critical to the success of these training programs, but have received relatively little attention compared to the technical aspects of training (World Health Organization, 2010). Disch (2013) pointed out that establishing a sense of participant safety is important when training clinicians to work collaboratively in a multidisciplinary team. This climate of safety requires interprofessional respect and trust between RNs, nursing assistants, wound care specialists, and other members of the skin care team. Established hierarchical structures that encourage some professions to dominate over others (e.g., medicine instead of allied health or nursing) may create a dynamic in which participants are afraid to disagree with those who represent more dominant professions (Disch, 2013). At the same time, venturing beyond the boundaries of one's own discipline can lead to censure, as this is viewed as undermining established and comfortably familiar behavioral patterns and power structures (Disch, 2013). Organizers of multidisciplinary wound teams need to educate members about team dynamics to improve the quality of skin care interventions. In addition, a regular review of team dynamics can help ensure that professional distinctions do not inhibit participation or limit the development of a team identity, while simultaneously ensuring that opportunities are provided to display one's individual professional identity (Disch, 2013). Research suggests that achieving this balance will

promote patient satisfaction as well as health professionals' job satisfaction (Chang, Ma, & Chiu, 2009). Thus, interventions that lower HAPU incidence should promote team identity.

The Skin Safety Educational Workshop

The present study was an empirical evaluation of the effectiveness of a skin safety educational workshop developed for use in an acute care hospital in metropolitan New York City, motivated by HAPU incidence rates at the facility that exceeded the national benchmark of 3.6 cases per 1,000 patients. the Iowa model provided the framework for the program. Titler (2001) created the Iowa Model to outline the process of knowledge transformation and guide the implementation of research into clinical practice. The program—a 7-hour workshop for 30–35 direct care workers—was mandatory for nursing staff. Physicians and other direct care practitioners were encouraged to attend as well. Workshops were offered over a 6-month time period from January through June 2013. Nursing administrators designed the workshop with important input from stakeholders and representatives, as recommended by Kettner (2008). The overarching goal was to engage and encourage the nursing staff to take a proactive and collaborative approach in encouraging the use of best practices in skin health care. The workshop provided participants with the knowledge and tools required to prevent, identify, treat, and manage HAPUs in a way that would empower and build the confidence of the staff. Equally important, the workshop sought to establish HAPU prevention as a collaborative process, giving each participant greater awareness of his or her role as an agent of change by emphasizing the importance of communication between all members of the medical team.

The workshop sought to increase awareness of and interest in HAPU prevention with the goal of creating lasting organizational change that would ultimately reduce the hospital's HAPU incidence rate. It should be noted I was an employee of the participating hospital at the time that this study was implemented, but I was not involved in the neither in the design or implementation of the skin safety training, nor in the collection of data from patients.

It was hypothesized that HAPU incidence rates (measured as the percentages of patients on two medical surgical wards of the participating hospital) would decline significantly from a 6-month pretest period from July–December 2012 (i.e., prior to implementing a skin safety education program) to a 6-month posttest period from July–December 2013 (i.e., following the implementation of that program).

Research Design

The efficacy of the skin safety educational workshop in reducing the prevalence rate of HAPUs was evaluated using a retrospective analysis of archival data collected in a modified version of what was described by Campbell and Stanley (1963) as a separate-sample, pretest–posttest, quasi-experimental design, illustrated in Figure 1.

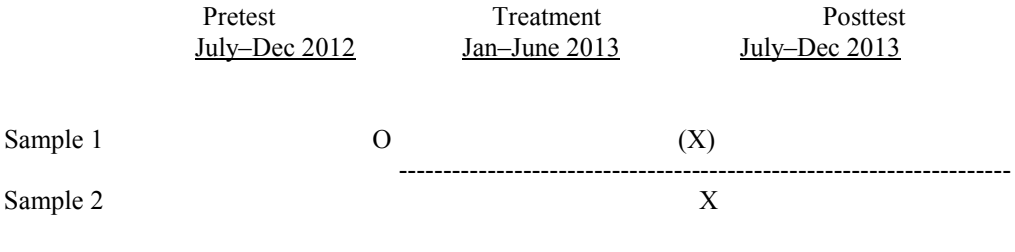

Figure 1. separate-sample, pretest–posttest, quasi-experimental design

The separate-sample, pretest–posttest, quasi-experimental design used in this study compared HAPU incidence rates in two convenience samples of patients hospitalized during a pretest period and a posttest period. In Figure 1, the rows represent the samples of patients available for observation during the pretest and posttest periods; O indicates a pretest or posttest observation event, (X) serves as a place holder indicating the occurrence of a treatment not expected to produce an observed effect, and X indicates the occurrence of a treatment that is expected to produce a subsequently observed effect.

While Campbell and Stanley (1963) conceived of the research design as a true experimental design utilizing randomly assigned, equivalent samples, the samples in this study were not randomly assigned, but rather were convenience samples of patients who were hospitalized in the participating hospital during the pretest and posttest periods. As a result, the samples must be considered to be potentially nonequivalent, making the research design quasi-experimental, rather than a true experimental research design. The limitations imposed by this quasi-experimental design will be considered later.

The pretest period ran from July 2012 to December 2012. During this time, data were collected for evaluation on the prevalence of HAPUs among several hundred patients admitted to two medical surgical units of the participating hospital. Immediately following this pretest period, during the 6 months from January to June 2013, the HAPU prevention skin safety educational workshops were implemented. The posttest period followed next, during the 6 months from July to December 2013, and data on HAPU incidence rates were collected again. The between-subjects independent variable in the analysis was the HAPU educational intervention: pretest sample vs. posttest sample. The

dependent variable was HAPU incidence rate, measured as the percentages of patients who were diagnosed with HAPUs during each of the 26 weeks comprising the pretest and posttest periods. No attempt was made to distinguish between patients who had pressure ulcers at the time of admission to the hospital and patients who developed pressure ulcers while hospitalized.

Participants

Data on HAPU incidence rates were collected in two separate medical surgical units (designated as 4N and 6E) of 35 beds each in the participating hospital, and all adult patients admitted during the pretest and posttest periods composed the study samples. Some of the major types of diagnoses found among the patient population were chronic obstructive pulmonary disease, chronic renal disease, coronary heart disease, diabetes mellitus, stroke, and syncope. To protect patient confidentiality, no data on individual patients was made available for this research. Rather, only aggregated data were provided for analysis. Consequently, no participant informed consent was required. Table 4 presents the characteristics of patients on the two medical surgical units that participated in the study during the 6-month pretest and 6-month posttest periods. Because patients were not randomly assigned to pretest and posttest groups, the samples were not equivalent. Therefore, it was important to evaluate the equivalence of the samples on as many demographic and personal characteristics as possible. Independent samples *t* tests (for the continuous dependent variables of unit census and LOS) and chi square tests for independent samples (for the categorical dependent variables of gender and age) provided these comparisons. The results of these sample equivalence analyses are also summarized

in Table 4. Pretest and posttest samples on both units differed significantly on only one variable: LOS, measured in days. Pretest and posttest samples were equivalent in all other respects. As is detailed in Table 4, both units' pretest samples averaged significantly longer hospitalizations than did posttest samples. Implications of this finding will be considered later.

Table 4

Characteristics of Patients on Units 4N and 6E at Pretest and Posttest with Tests of Equivalence of Samples at Pretest and Posttest

		Pretest (n = 26 weekly reports)			Posttest (n = 26 weekly reports)			Pre–Post Sample Equivalence Tests		
		Range	*M*	*SD*	Range	*M*	*SD*		*df*	sig.
Unit 4N										
Unit Census		29-35	32.23	1.88	30-35	32.65	1.44	t = -0.69	50	n.s.
Gender										
	Male	15-22	18.73	1.87	17-22	19.46	1.39	χ^2 = 0.24	1	n.s.
	Female	10-17	13.50	1.77	11-15	13.19	1.23			
Age										
	18-40	0- 4	1.62	1.13	2-6	3.92	1.13	χ^2 = 3.05	2	n.s.
	41-60	6-15	11.92	2.45	12-19	16.77	1.92			
	61+	14-26	18.19	3.19	9-16	11.96	1.89			
LOS (days)		7-10	8.38	0.90	5-9	6.46	1.17	t = 4.15	50	< .001
Unit 6E										
Unit Census		31-35	33.27	1.31	31-34	32.81	0.98	t = 1.43	50	n.s.
Gender										
	Male	14-19	16.46	1.30	15-19	17.08	0.93	χ^2 = 0.05	1	n.s.
	Female	15-20	16.85	1.57	13-17	15.65	1.06			
Age										
	18-40	2-5	3.54	0.81	3-5	3.77	0.91	χ^2 = 0.09	2	n.s.
	41-60	12-16	14.42	1.03	12-18	15.04	1.87			
	61+	12-18	15.46	1.70	10-18	14.00	2.23			
LOS (days)		6-8	7.12	0.65	4-7	5.15	0.97	t = 8.60	50	< .001

Note: Values in Table 4 are aggregated from 26 weekly pretest reports and 26 weekly posttest reports. Unit census reports numbers of patients on each unit. Gender reports numbers of males and females. Age reports numbers of patients in each age category.

Procedure

Every patient was assessed for HAPUs weekly during the pretest and posttest periods. During the skin health education workshop, staff received instruction on how to determine the presence of pressure ulcers and how to record data in a consistent and uniform format, ensuring that data would be available for this program evaluation research. Data collected from individual patients were aggregated by the hospital into 26

weekly reports during the pretest period and another 26 weekly reports during the posttest period. Each of these 26 weekly observations was treated a case in subsequent analyses. Each weekly report included information about numbers of patients on each medical surgical unit each week, patients' average LOS (in days) during each week, numbers of male and female patients each week, numbers of patients falling into each of the three age categories during each week (18–40 years, 41–60 years, and 61 years and over), and the percentages of patients on each unit that were diagnosed with HAPUs each week. Data from the two medical surgical units involved in the study were analyzed separately so that each unit's findings could provide cross-validation for findings from the other unit.

Results

Program efficacy was assessed on each medical surgical unit, comparing the mean of 26 weekly HAPU incidence rates with the pretest period vs. the mean of 26 weekly HAPU incidence rates from the posttest period using an independent samples *t* test. The results of these pretest–posttest comparisons for Units 4N and 6E are summarized in Table 5. As shown in Table 5, average HAPU incidence rates declined significantly and dramatically from the pretest to posttest periods on both medical surgical units that were evaluated.

Table 5

Pretreatment–Posttreatment Comparisons of HAPU Incidence Rates on Units 4N and 6E

Pretest (n = 26 weekly reports)			Posttest (n = 26 weekly reports)			Pre–Post Comparisons			
Min-Max	*M*	*SD*	Min-Max	*M*	*SD*	*t*	*df*	Sig. (1-tail)	Cohen's *d*
Unit 4N									
52.94%-84.38%	65.59%	8.80%	25.71%-59.38%	35.44%	8.45%	12.60	50	<.0005	3.495
Unit 6E									
54.55%-77.42%	64.16%	5.13%	24.24%-58.82%	36.05%	8.70%	14.19	50	<.0005	3.936

Note: Values in Table 5 are aggregated from 26 weekly pretest reports and 26 weekly posttest reports. Independent samples *t* tests were evaluated for significance using one-tailed tests. Although values of the Cohen's *d* measure of effect strength are provided, these values are inflated by the reduced data variability that resulted from the analysis of aggregated weekly data reports.

Although the efficacy of HAPU training in reducing the incidence rate of HAPUs was strongly supported by two independent analyses performed in this study, it should be noted that HAPU incidence rates in both of the posttest samples still exceeded the nationally established benchmark of 3.6 HAPUs per 1,000 patients (0.36%) by large margins. Even after the skin health education workshops were implemented, patients on Unit 4N averaged 35.44% HAPU prevalence across the 26 weeks of the posttest period (*SD* = 8.45), and patients on Unit 6E averaged 36.05% HAPU prevalence (*SD* = 8.70) during that period. Both of these posttest rates are significantly higher than the nationally established benchmark. For Unit 4N, t (25) = 21.17, $p < .001$ (two-tailed); for Unit 6E, t (25) = 20.92, $p < .001$ (two-tailed). While the posttest HAPU incidence rates are very high, they are not unprecedented. Cuddigan, Ayello, and Sussman (2001) reported HAPU incidence rates as high as 38% in acute care settings. Perhaps more importantly, posttest HAPU prevalence was about half that of the pretest rate in both medical surgical units.

Discussion

This study was an evaluation of the efficacy of a skin health education workshop implemented in a 726-bed, not-for-profit acute care hospital in metropolitan New York City. The workshop was mandatory for all nursing staff and was recommended to everyone involved in patient care. The workshop not only provided technical information about the epidemiology, etiology, prevention, and treatment of HAPUs, but also sought to establish HAPU prevention as a collaborative process, giving each participant greater awareness of his or her role as an agent of change by emphasizing the importance of communication between all members of the medical team. The workshop sought to increase awareness of and interest in HAPU prevention, with the goal of creating lasting organizational change that could reduce the hospital's HAPU incidence rate. The study was retrospective and used archival data provided by the hospital in aggregate form. Separate analyses of data from two medical surgical units in the participating hospital both found that average HAPU prevalence (measured as the percentages of patients diagnosed with HAPUs) declined significantly and dramatically from a 26-week pretest period to a 26-week posttest period. HAPU prevalence rates were cut nearly in half on both units that were involved in the study.

Although these results are compelling, there are some caveats that cloud their interpretation. First, it was noted previously that patients' average LOS during the posttest period was significantly shorter (by about 2 days) than during the pretest period. It is possible that the reduction in HAPU incidence rates seen from pretest to posttest periods in this study can be attributed to the abbreviated duration of hospitalization

during the posttest period. In other words, with less time in the hospital, there was less time for HAPUs to develop. On the other hand, it is possible that the lower LOS averages seen during the posttest period were the consequence of improved patient care that resulted from the skin health education program. That is, with better patient care came fewer HAPUs, and fewer HAPUs meant fewer complications that might prolong hospitalization. There is no way to sort out these possibilities from the available data. Second, events taking place concurrent with skin health education (e.g., hospital policy and procedure changes, personnel changes) may have contributed to the observed reductions in HAPU incidence rates from pretest to posttest, and the importance assigned to HAPU reduction by the participating hospital makes it likely that factors other than the skin health training program were involved in achieving the observed outcome. Third, the extremely high HAPU incidence rates observed during the pretest period may have been *spuriously* high and would inevitably be followed by lower rates during the posttest period due to regression toward the mean, even without the intervening skin health education program. Fourth, skin health care education received by staff may have not only affected their patient care practices, but might have also created a sense of pressure to reduce reported HAPUs, perhaps even leading to a reluctance to report minor, borderline cases. In sum, this study did not establish unambiguously that improved HAPU incidence rates that were observed from pretest to posttest were the direct consequence of the skin health education program; there are certainly alternative explanations. On the other hand, the findings are consistent with the efficacy of the workshop.

These limitations notwithstanding, the results of the study strongly suggest that a skin health training program that emphasizes the training of knowledge and skills while also recognizing the important role played by the social climate in HAPU prevention can be effective in reducing HAPU incidence rates. Training in knowledge and skills alone is unlikely to result in substantial, permanent changes in patient care practices, however. Practices that are not encouraged, recognized, and socially reinforced are unlikely to persist. Because of this, skin health training interventions that (a) engender a sense of collaboration, cooperation, and collegiality; (b) emphasize the important role all members of the health care team plan; (c) empower individuals to make sound decisions; and (d) include changes in the social climate on the ward, will have an advantage over programs that focus exclusively on the technical aspects of HAPU prevention.

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Appendix A: The Skin Safety Educational Workshop Program Agenda

Skin Safety
A Priority at Montefiore

Purpose: To engage nursing staff and create a culture of skin safety as a high priority at Montefiore by taking a proactive and collaborative approach using Best Practices.

Objectives:

For the participant to:

- Internalize their role and responsibility as a team member in promoting skin safety and preventing pressure ulcers in patients.
- Identify specific risk factors for pressure ulcers in ALL patients
- Discusses unit specific pressure ulcer risk factors, i.e. geriatric, orthopedic, neurological units.
- Identify specific actions to impact patient specific risk factors:
  - *minimizing friction/sheer*
  - *off-loading pressure*
  - *providing support surfaces*
  - *managing moisture*
  - *maintaining nutrition/hydration*
  - *collaborating with/educating patient and family.*
- Compare and contrast indication for the use of specific skin care products to reduce the risk of pressure ulcers.
- Discuss appropriate communication of patient risk factors, development of plans of care, and evaluation of actual patient outcomes between nursing staff.
- Apply concepts discussed in class to develop a plan of care including appropriate documentation and handoff
- Demonstrate correct data collection and use of the NDNQI pressure ulcer data collection tool.

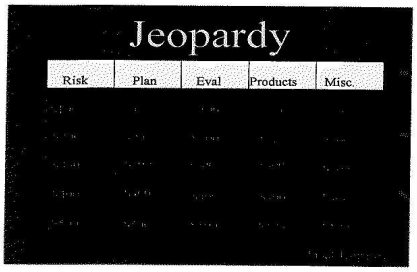
Methods:

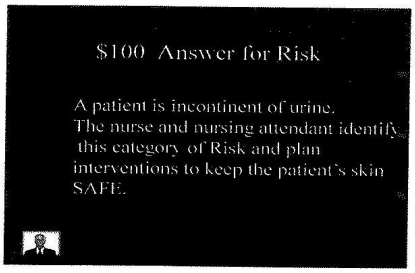
- Lecture/discussion
- Case studies
- Team activities: charades, jeopardy
- Group presentations
- Follow-up: clinical component

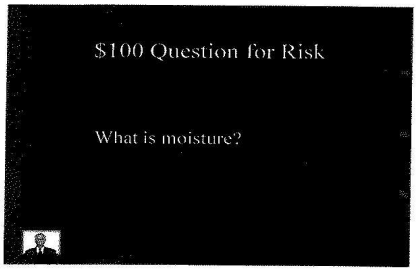
Time frame: 7 hours

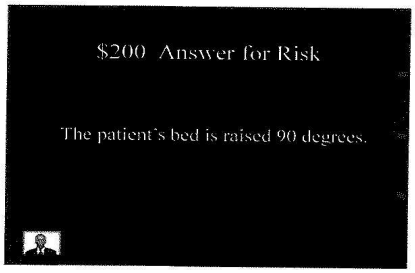
Appendix B: The Evaluation Tool: *Jeopardy* Game

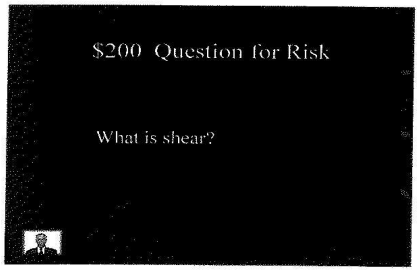
7/22/2013

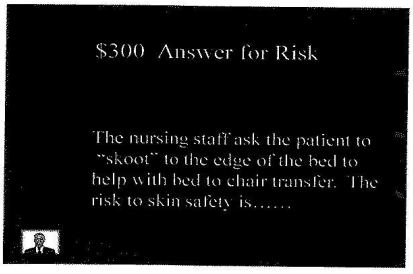












$300 Question for Risk

What is friction?

$400 Answer for Risk

The nursing staff would predict that a 92 year old patient admitted with a diagnosis of pneumonia and dehydration would have these 2 risks to skin safety.

$400 Question for Risk

What is nutrition/hydration and pressure?

$500 Answer for Risk

A 71 year old patient is admitted for a fever workup. Past medical history includes chronic kidney disease (CKD), diabetes, and hypertension. She cannot walk unassisted and needs help with all ADLs. Risks to skin safety that the nursing team should consider and explore are ……. (name 3 and give rationale)

$500 Question for Risks

What are: pressure, friction, shear, nutrition/hydration?

$100 Answer for Plan

The most important team member when developing a Skin Safety Plan to prevent pressure ulcers is…..

$100 Question for Plan

Who is the patient?

$200 Answer for Plan

The nursing team recognizes that a patient with an acute confusion will likely need reminders to …… …. in order to maintain intact skin.

$200 Question for Plan

What is help with toileting and positioning?

$300 Answer for Plan

A postoperative patient (post op day 1) is complaining that he is never comfortable being positioned on his right side. The nursing team should……

$300 Question for Plan

What is: collaborate with the patient and develop a plan that the patient agrees with?

$400 Answers for Plan

A 62 y/o patient is admitted with a diagnosis of pneumonia and COPD exacerbation. She states that she has recently lost 15 pounds and has no desire to eat. The priority intervention to promote Skin Safety would be ……..

$400 Question for Plan

What is call for a nutrition consult?

$500 Answers for Plan

Best practices Skin Safety Bundle has been proven to prevent pressure ulcers. At Montefiore we are committed to promoting skin safety & will assess/manage……..(6)

$500 Question for Plan

What is:

- Friction and shear
- Pressure
- Need for support surfaces
- Moisture
- Nutrition/hydration
- Patient/family collaboration & ed

$100 Answer for Evaluation

To demonstrate that the Montefiore Skin Safety program is effective, NDNQI pressure ulcer numbers should be …..

$100 Question for Evaluation

What is LOW?

$200 Answer for Evaluation

A patient who was identified as at risk for impaired skin integrity r t poor nutrition has gained 5 pounds over that last 2 weeks, is eating 75% of all meals, and has intact skin.

The nursing team would evaluate that the plan of care was this.

$200 Question for Evaluation

What is effective.

$300 Answer for Evaluation

The nursing team evaluates that education and collaboration with the patient regarding types of foods and fluids that promote Skin Safety was effective when they observe that the following foods were eaten on the meal tray. Name 3

$300 Question for Evaluation

What is:

- Protein sources
- Supplements
- Patients preferences?

$400 Answer for Evaluation

The desired outcomes for a patient with an identified problem of *risk for impaired skin integrity: pressure related r/t incontinence and immobility* would be these. Name 3

$400 Question for Evaluation

What are:

- Intact skin
- Patient is able to help with positioning: position changed q2h
- Patient is using the bedpan when offered. Used the bedpan 4x this shift.
- Pt. states that they are satisfied with the plan of care

$500 Answer for Evaluation

The registered nurse and the nursing assistant discuss risks to skin safety for a newly admitted patient. They then discuss their proposed plan of care with the patient and her daughter. They agree and add that the patient needs to use the bedpan as soon as she gets the urge to void. At the change of shift, the NA hands off the plan to the oncoming NA and the RN hands off the plan to the oncoming RN. This is an example of …..

$500 Question for Evaluation

What is: excellent teamwork and patient centered care.

$100 Answer for Products

The most effective method to prevent pressure ulcers is to do this.

$100 Question for Products

What is prevent them?

$200 Answer for Products

The best method to clean the skin from contamination of urine and feces is this.

$200 Question for Products

What is a mild cleansing solution?

$300 Answer for Products

The nurse may consider using this product to protect a patient's saeral/coccyx are from pressure, friction and shear.

$300 Question for Products

What is an Allevyn dressing?

$400 Answer for Products

The nursing team would discuss the use of this product to protect the skin from urine and feces.

$400 Question for Products

What is protective ointment?

$500 Answer for Products

A patient is at risk for impaired skin integrity of the heels. This intervention is considered very effective in eliminating pressure.

$500 Question for Products

What is place a pillow lengthwise under the patient's legs and float the heels?

$100 Answer for Miscellaneous

The nursing attendant reports that an area on a patient's coccyx is red and does not disappear when pressure is relived. The area Is still red when the nurse also assesses the patient's skin and the area is non-blanchable. This area will be reported to the provider as .

$100 Question for Miscellaneous

What is a stage I pressure ulcer?

$200 Answer for Miscelanous

The body's first line of defense against infections/microorganisms is……

$200 Question for Miscelanous

What is the skin?

$300 Answer for Miscelanous

These three body areas are at the highest risk for skin breakdown.

$300 Question for Miscelanous

What are the coccyx/sacrum, hip, and heels?

$400 Answer for Miscelanous

The other name for a pressure ulcer. Choose 2.

$400 Question for Miscellaneous

What is:

- a bed sore
- decubitus ulcer
- Impaired skin integrity?

$500 Answer for Miscellaneous

Three nursing or medical interventions that increase a patients risk for pressure ulcer (impaired skin integrity: pressure related).

$500 Question for Miscellaneous

What are: restraints, medications (such As diuretics, opiates, BP, laxatives), NPO status, bed rest, bandages, casts, splints, drainage tubes.

Final Jeopardy

This author wrote, "We shall never know all the good that a simple smile can do."

Final Jeopardy Answer

Who is Mother Theresa?

Appendix C: The Braden Scale

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

DATE OF ASSESS ➡

RISK FACTOR	SCORE/DESCRIPTION				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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Appendix D: Monthly Pressure Ulcer Audit Tool

Montefiore Monthly NDNQI Pressure Ulcer Audit Tool

Date:_____

Unit Name and Division:_____

Unit Census:_____

Number(s)of Patient(s) Excluded From Audit_____: Off Unit_____ Refused_____ Unsafe For Patient_____ Actively Dying_____

Number(s) of Hosptial Acquired Pressure Ulcers_____ Copies submitted to Mailbox in Nursing Office by:_____

Circle Scale Used: Braden-Adults or Braden Q-(Pediatric and Neonates)

NUMBER OF PATIENTS ASSESS MUST EQUAL TOTAL CENSUS

IF PT HAS MORE THAN 1 ULCER USE AS MANY ROWS AS NEEDED

Medical Record	Age	Admission Assessment				Check (√) When Last Risk Assessment was Done (Braden Scale)							Risk Assessment	Prevention Interventions For Patients at Risk Within Last 24 Hours (Braden Score 16 or lower)						Write NUMBER of How Many Pressure Ulcers by Stage - List All **Use one row per ulcer**						Hospital Acquired Pressure Ulcers **Use one row per Ulcer**			NON-Hospital Acquired Pressure Ulcers **Use one row per Ulcer**	
		Was Skin Assess-ment Done on Date of Admission? (Nsg Adm Database/ PHQ)		Was Risk Assess-ment (Braden Scale) done on date of Adm?		Day of Survey	Day BEFORE Survey	2 Days BEFORE Survey	3 Days BEFORE Survey	4-6 days BEFORE Survey	1 week BEFORE Survey	Never Assessed	**Write Down # of Last** Braden Score	Pressure Redistri-bution of Surface Area (i.e. special bed/pillows etc)		Reposition		Nutrition Support (i.e. supple-ments/ consult)		Moisture Manage-ment		Stage I	Stage II	Stage III	Stage IV	DTI (Deep Tissue Injury)	Unstageable	Write down PU Location	Was Pressure Ulcer formed on this Unit?		# of PUs pt had BEFORE Hosp. Adm. (i.e. if pt came from NH/Home/ Other, with PU, how many).	Write down PU Location
List MR #s Below		Yes	No	Yes	No									Yes	No	Yes	No	Yes	No	Yes	No								Yes	No		

*PU = Pressure Ulcer *Patient Health Questionaire *NH = Nursing Home *HA = Hospital Acquired **Locations:** A= Ankle B= Buttock C= Coccyx EA = Ear EL= Elbow H= Heel K = Knee L = Left M= Medial MT= MTP joint OC= Occiput R= Right S= Scapula SR= Sacrum TH= Thigh TR= Trocanter (Hip) IC= Lliac Crest IS = Ischium

9/11 mdefino/rcepeda

Source: Montefiore Medical Center