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Implementation of Pressure Injury Prevention Intervention in a Long-Term Care Facility

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Implementation of Pressure Injury Prevention Intervention in a Long-Term Care Facility

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Abstract

Background: Pressure injuries (PIs), formerly known as pressure ulcers, affect approximately 2.5 million people in the United States and cost the American healthcare system more than \$11.6 billion annually. The goal of this project was to reduce the pressure injury incidence rate at the project site by 50% within a period of six months.

Methods: The purpose of this project was to evaluate the impact of implementation of PI prevention measures in a medium-sized long-term care facility in central Massachusetts. The project utilized parts of the MISSCARE survey and AHRQ checklists as a pre-test. Collection of data from nurses and certified nurse's assistants was done using hard copies that were distributed before and after the educational presentation.

Results: The results of the PI prevention pre-test were compared with the three-week post-test consisting of these two surveys to assess the effectiveness of the initiative. Rates of new pressure injuries were tracked for four months after the educational intervention as well as documentation of prevention efforts in medical records by nursing staff. Nursing compliance with PI prevention measures and treatment improved significantly. Pressure injury rate decreased from 3.6% to 1.4% in six months.

Conclusion: There was high correlation between PI prevention and PI rate reduction. The project helped improve patient care and safety in the project site. There was improvement in PI preventive measures and compliance with treatment plan.

Key Words: *Pressure ulcers prevention, pressure ulcer interventions in long-term care, nursing.*

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Implementation of Pressure Injury Prevention Intervention in a Long-Term Care Facility

Pressure injuries (PIs), formerly known as pressure ulcers, affect approximately 2.5 million people in the United States and cost the American healthcare system more than \$11.6 billion annually (Agency for Healthcare Research and Quality [AHRQ], 2014). According to the National Pressure Ulcer Advisory Panel (2016), the Centers for Medicare and Medicaid Services does not reimburse healthcare organizations whose patients develop stages three and four PIs during admission because PIs are classified as a preventable adverse condition. Pressure injuries cause significant pain to affected patients, damage patients' skin integrity, and cause life-threatening infections (Boyko, Longaker, & Yang, 2018). More than 60,000 PI-related deaths occur in the United States each year; and each year, more than 17,000 lawsuits are filed in PI-related cases (AHRQ, 2014). Pressure injuries and their adverse effects are more common in the long-term care (LTC) setting than other health care settings primarily because the majority of people admitted to LTC usually have limited or no mobility, compromised health conditions, and multiple diagnoses which make them high risk for the development of PIs.

Background

An increasing number of people in America need assistance with their activities of daily living due to four main factors (increasing population of the aged, increasing rate of obesity, increasing number of people with diabetes, and increasing population of people with cardiovascular disease). The fastest growing population in America is people 65 years and older (Boyko et al., 2018). Aging is associated with multiple chronic diseases and compromised health conditions, skin breakdown, and immobility all of which are risk factors for the development of PI. Obesity increases immobility and exertion of pressure on the bony projections of the body which are major risk factors for PI development. Diabetes is associated with nerve damage, poor

circulation, and poor sensation which increase susceptibility to the development of PIs due to the patient's inability to feel the need to reposition the affected parts of the body. Similarly, cardiovascular disease, especially advanced-stage cardiovascular disease, is associated with "low cardiac output and decrease oxygenation, resulting in hypotension, decreased blood perfusion, and peripheral ischemia" (Jaul, Barron, Rosenzweig, & Menczel, 2018, p. 308). People with these risk factors have decreased mobility and are, therefore, susceptible to the development of pressure injury. The majority of the patients in the project site had neurological and sensory deficits, increasing their susceptibility to PI. These factors might explain, in part, the high PI incidence rate at the project site.

Problem Statement

Increased risk of pressure injuries among residents in this long-term care setting were indicated by an increased incidence rate of 3.6% resulting from decreased mobility, older age, and multiple comorbidities as well as a lack of standardized PI risk assessment and preventive care. Therefore, addressing this problem was important because PIs damage patients' skin integrity, cause life-threatening infections, and significant pain to patients (Boyko et al., 2018). Also important was managing the associated financial burden of PIs. Given that it costs "\$500 to \$70,000" to treat "a single wound", PI treatment costs the project site and patients significant sums of money (Boyko et al., 2018, p. 57).

Organizational "Gap" Analysis of Project Site

Evidence suggests that the incidence of pressure injuries could be minimized if nursing staff could detect pressure injury risk early and implement appropriate PI preventive measures. Preventive measures include skin assessment on admission and shift change, scheduled skin inspection for at-risk patients, and two-hour client repositioning (Cooper, 2013). The site of the

DNP project was a long term-care institution with specialty in neurological rehabilitation located in the southern part of Worcester County, Massachusetts. Most of the patient population at the project site was made up of older adults with neurological deficits and these patients had multiple chronic diseases, including hypertension, diabetes, and dementia which predisposed them to PI risk and development. With limited mobility, compromised immune system, and urine and fecal incontinence, the majority of the residents are high risk for PI extrinsic and intrinsic factors.

Review of the Literature

An in-depth search of the following databases and search engines was done: Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline, Google Scholar, and PubMed. The combination of keywords used in the search included *pressure ulcer*, *pressure ulcer prevention*, *pressure ulcer measures*, *pressure ulcer interventions*, and *long term-care*. Inclusion criteria were articles published in the last ten years, available in full text and in abstract, published in the English Language, peer reviewed, and evidence-based. Exclusion criteria were articles published in languages other than English, before 2009, and not peer-reviewed. In all, twenty-five research articles and ten evidence-based guidelines were reviewed; of these seventeen research articles and five evidence-based guidelines were selected for literature review because of their relevance to the project topic and objectives.

Four major findings emerged from the review of the research articles and evidence-based guidelines, namely nursing knowledge about PI prevention measures (Strand, & Lindgren, 2010; Smith & Waugh, 2009), perceived barriers to PI prevention (Strand, & Lindgren, 2010; Källman & Suserud, 2009), nursing attitude towards PI prevention practice (Beeckman, Vanderwee, Demarré, Paquay, Van Hecke, & Defloor, 2011; Etafa, Argaw, Gemechu, & Melese, 2018), and

evaluation of PI care bundles (Roberts et al., 2017; Chaboyera et al, 2016). Each of these findings are described below.

Nursing Knowledge About PI Prevention Measures

The review of the literature revealed conflicting results about the relationship between nursing knowledge and PI prevention. While some studies found some correlation between nursing knowledge about PI prevention and PI preventive strategies (Källman & Suserud, 2009; Dalvand, Ebadi, & Gheshlagh, 2018), other studies found little to no such correlation (Strand & Lindgren, 2010). The majority of the articles reviewed revealed that inadequate nursing knowledge is a common limitation to the prevention of PIs (Beeckman, 2010; Dalvand et al., 2018; Källman & Suserud, 2009). Overall, nurses, nursing students and CNAs displayed lower than the sixty percent recommended level of knowledge about PI prevention (Dalvand et al., 2018). Also, nurses lacked adequate knowledge about the most up-to-date PI prevention protocols and strategies, and in most cases, nurses' knowledge about PI prevention was based on habit, experience, and/or intuition (Beeckman, 2010; Dalvand et al., 2018).

A descriptive cross-sectional quantitative study using a 47-item questionnaire was conducted in six hospitals and six clinics in Sweden to investigate how the knowledge and attitude of registered nurses [RN] (n=120) and nurse's assistants [NA] (n=120) impacted the performance of PI prevention and treatment (Källman & Suserud, 2009). The researchers found that though respondents generally had adequate knowledge about PI prevention and treatment, their performance of PI prevention and treatment was inadequate. Furthermore, the subjects were not up-to-date with recent guidelines and research findings on PI prevention and treatment. Additionally, only 37% of the respondents said their units had adopted and used an evidence-based PI prevention strategy. The researchers reduced bias and misleading responses by offering

anonymity and confidentiality to subjects. The main limitation of the study might be the instrument used, as the researchers questioned its validity and admitted that some of the items were difficult to interpret (Källman & Suserud, 2009).

In a systematic review of seven studies, Strand and Lindgren (2010) investigated the relationship between nursing knowledge and PI prevention and found that nursing knowledge was not significantly correlated with the application of adequate PI prevention. It was discovered that in units where nurses scored high on the knowledge score, there was a corresponding high application of PI preventive measures, indicating lack of knowledge transfer to practice.

Some studies suggest that highly educated nurses scored higher in knowledge scores while other studies found significant difference in knowledge scores for nurses with higher education (Strand & Lindgren, 2010). There was positive correlation between in-service training and higher knowledge scores in nurses (Strand & Lindgren, 2010). One limitation of the research was its failure to include certified nurse' assistants (CNAs) in the search. The omission is important since CNAs play a critical role in the prevention of PI under the supervision of RNs. The findings underscore the need to close the gap between research and practice. Continuing education is essential for minimizing the incidence rate of PI at the project facility.

Nursing Attitude Towards PI Prevention Practice

The literature review found unanimous correlation between nursing attitude and implementation of PI prevention measure. In a cross-sectional study involving 553 nurses in 14 Belgian hospitals, Beeckman et al. (2011) found a significant correlation between nurses' attitude and PU prevention practice. For example, Beechman et al. (2011) found that only 13.9% of at-risk patients received adequate PI prevention nursing care in hospitals that scored 50% on

the attitude scale. A descriptive cross-sectional study conducted by Strand and Lindgren (2010) collaborated direct correlation between nursing attitude PI prevention.

Perceived Barriers to PI Prevention

In two studies investigating perceived barriers to PI prevention, nurses reported several barriers to PI prevention that included a lack of continuity of care, time, and knowledge, as well as inadequate number of nursing staff, work overload, physical condition of patients, and inadequate equipment or resources such as wedges, Hoyer lifts, barrier creams, and cushions (Källman & Suserud, 2009; Strand & Lindgren, 2010). The findings in the study would be readily applicable to the project because the perceived hindrances identified in the studies are similar to the perceived barriers nurses at the project site noted such as staff shortage, pressure of work due to work overload, inadequate information sharing, and ineffective communication between nurses and CNAs.

Evaluation of PI Care Bundles

Using mixed methods to evaluate the effectiveness of a PI prevention care bundle (called INTACT) in eight Australian hospitals, Roberts et al. (2017) observed an average of 42% reduction in risk of pressure ulcer in the intervention hospitals. Both nurses and patients found the intervention useful and expressed willingness to engage with the PI intervention care bundle. Earlier in 2015, Chaboyera et al. had reported 52% reduction in the risk of hospital-acquired pressure injury (HAPI) with the care bundle intervention compared with standard care. In contrast, evaluation of a PI prevention care bundle developed and used by Zuo and Meng (2015) did not find significant difference in PI incidence rates in the intervention hospitals versus the control hospitals.

Summary of Literature Review

Four main areas regarding pressure injury (PI) prevention emerged in the articles reviewed: 1. Nursing knowledge about PI prevention measures, 2. Perceived barriers to PI prevention, 3. Nursing attitude towards PI prevention practice, and 4. Evaluation of PI care bundles. While some of the studies reported direct correlation between increased nursing knowledge and PI prevention implementation, in other studies found no significant correlation (Källman & Suserud, 2009; Dalvand, Ebadi, & Gheshlagh, 2018).

There was unanimous correlation between nursing attitude and implementation of PI prevention measure in the articles reviewed (Beeckman et al., 2011; Strand & Lindgren, 2010). Pressure injury rates were lower in settings where nurses considered PIs as serious preventable quality indicators than in settings where nurses considered PIs as less serious quality indicators (Beeckman et al., 2011; Strand & Lindgren, 2010). The research reviewed also identified several perceived barriers to PI prevention; the common ones being understaffing, work overload, and ineffective communication. There was no unanimity about the effectiveness of care bundle on PI risk assessment and PI rates (Källman & Suserud, 2009; Strand & Lindgren, 2010). While some studies reported improved PI risk assessment and PI rate reduction, others did not report any such correlation. Finally, participants in nursing homes and home health care reported using facility-approved PI guidelines (Chaboyera et al., 2015; Zuo & Meng, 2015).

The findings about nursing knowledge demonstrate that nursing knowledge about PI must be translated to practice to minimize the high PI incidence rate at the project agency. Implementing evidence-based PI prevention strategies and guidelines can significantly improve prevention and treatment of PI at the project site. The attitude of the nursing staff at the project site is important to determine if it contributes to the high PI rates at the facility. Also, based on this review, the nursing staff at the project facility could learn how to overcome these barriers

from the experience of their counterparts in the literature studied. Finally, the care bundle approach Roberts et al. (2017) used was found to be easy to understand and was acceptable to both nurses and patients and found to be easily implemented in this project site.

Evidence Based Practice

The project intervention was based on the pressure injury prevention guidelines called “The Bundle” developed by the Agency for Healthcare Research and Quality ([AHRQ] 2014). The Bundle comprises three components: comprehensive skin assessment, standardized PI risk assessment, care planning and implementation. Nurses must perform comprehensive skin assessment from head-to-toe on admission and readmission to identify any abnormalities such as the presence of existing PIs and other lesions that may precipitate further development of more PIs; stratify PI risk and collect data for calculating PI incidence rates (AHRQ, 2014). Particular attention must be paid to the bony prominences. It is also critical for nurses to do PI risk assessment on admission and readmission to identify high-risk patients and quantify the risk, and to customize plan of care for each at-risk patient. Care planning and implementation must also be done not only to guide treatment and ensure patient safety and comfort but also as a patient and family education tool (AHRQ, 2014).

Theoretical Framework

The DNP project was guided by Lewin’s Change Theory, which was developed in 1947 by the German physicist Kurt Lewin. The theory was used to explain how to build a cohesive nursing team at the project site. It was also applied to promote positive change in behavior in the nursing staff, which is necessary for effective implementation of a PI prevention intervention (Marquis & Huston, 2014). Lewin’s Change Theory was composed of three phases, namely the unfreeze stage, the change stage, and the refreeze stage (Appendix A).

In the unfreeze stage, the DNP student identified and clearly communicated to the nursing staff the need for the change and what needed to be changed (Lewin, 2011). The student also challenged participants to appraise current practices, behaviors, and attitudes that drive organizational culture (Marquis & Huston, 2014). Additionally, he explained the vision of the project and team goals to the nursing staff and taught them conflict management skills to ensure effective teamwork and collaboration.

In the change stage, the DNP student guided team members to embrace the shift in equilibrium, own the change, and implement standard PI prevention measures. The leader encouraged all nurses and CNAs to actively participate in the change initiative. Concerns and grievances of team members were addressed promptly.

In the refreeze phase, the DNP student developed strategies for sustaining and consolidating the change. Nurses and CNAs were encouraged to integrate the change into their practice. The DNP student provided support and training to every team member and encouraged the team to sustain the change (Lewin, 2011).

Methods

The quality improvement project design was a pre/post-test evaluation of a practice intervention involving pressure injury education for the nursing staff to effect behavioral change as a means to increase nursing compliance with PI prevention measures. Current compliance and evidence of improvement was measured by the administration of standardized pre and post tests and review of nursing documentation in medical records.

The goal of this project was to reduce the rate of pressure injuries in the project center from 3.6% to 1.8% in six months through the implementation of evidenced-based PI prevention

strategies. Though the PI rate was lower than both the state (5.7%) and the national average (7.3%) PI rate, the project evaluated the impact of PI prevention implementation in the facility. The six-month time frame was chosen based on the time of administering surveys pre-test and post-test and giving nursing staff adequate time to adapt and implement the PI prevention intervention.

The project was guided by three objectives.

1. The first objective was PI risk assessment using the Braden scale and the AHRQ checklists completed on admission would increase from current baseline of 85% to 100% one month after the intervention was completed (AHRQ, 2014).
2. The second objective was nursing compliance with PI prevention measures such as skin and PI risk assessment on admission and shift change, documentation of existing wound(s) on admission, setting treatment goals for high-risk patients, and repositioning patients every two hours would improve from current low of 85% to 95% (Bergstrom et al, 2013).
3. The third objective was compliance with PI treatment plans would increase from current baseline of 80% to 100% (Bergstrom et al, 2013). Areas evaluated included nursing compliance with the facility's protocol for pressure injury prevention such as two-hour pressure relief, moisture management, and skin inspection once each shift, and whether nurses referred at-risk patients and patients with wounds to their primary care physicians for specialized wound care.

Evaluation Plan

A quality improvement tool used to evaluate the effectiveness of the intervention was the Plan, Do, Study, and Act (PDSA) model (Appendix B). The PDSA model is a simple, but useful

cyclical practice documentation for testing a change by following a planning the change, implementing it, observing and analyzing the results, and acting on the observations (AHRQ, 2013). The steps in the PDSA might be summarized as follows:

Plan – At the plan phase, the DNP student developed the PI prevention education material which was used as the intervention and fixed dates for the 25-minute educational PowerPoint presentations and the venue.

Do – At the Do phase, the DNP student documented what actually happened when the pre- and post- test were administered, including unexpected events or unintended outcomes.

Study – At the study phase, results of the pre- and post-test were analyzed and compared with test prediction.

Act – Based on the lessons learned in this cycle, the DNP student modified the plan to improve the quality of PI prevention at the project site.

Project Site and Population

The project site was a 108-bed, medium-sized long term-care facility located in relatively low-income area in Worcester County, Central Massachusetts. It is a participant in Medicare and Medicaid and is a for-profit, private organization. The quality measures of the project site such as number of falls with injury, number of residents with urinary tract infection, and pressure injury rate were much better than the state and national average values (US News, 2019). With respect to staffing, the facility's average licensed nursing hours per day per resident of 1.52 was slightly higher than the national average hours of 1.34 (Nursing Home Site, 2019). Additional specialized health care services the facility provides include physical therapy, occupational therapy, dietician, speech therapy, and social work (Nursing Home Site, 2019).

The project site provided short-term and long-term rehabilitation and skilled nursing care

for patients across the age continuum, but mostly elderly patients. The majority of the patients at the center had multiple chronic diseases, and many had neurological defects, impaired mobility, difficulty staying nourished, and few are totally bed-ridden (J. Robichaud, personal communication, July 20, 2019). The compromised health conditions of the patients at the project made them at high-risk for PI development. The task of PI control and prevention demanded interdisciplinary collaboration (Dalvand et al., 2018).

The inclusion criteria were all registered nurses, licensed practical nurses, and certified nurse's aides who provided direct care and work full-time, part-time, and/or per diem at the project site. The DNP student sent an official letter to the facility's Administrator asking for permission to conduct the project at the facility (Appendix C). The letter explained the nature and scope of the project, who would be involved, the role and expectations of participants, compensation for participants (if any), and the support needed from the administration and the nursing staff.

The educational intervention for practice change consisted of an educational presentation on pressure injuries for nursing staff, pre and post tests to measure knowledge and evaluate the effectiveness of the implementation of the practice intervention. The DNP student conducted a chart review with objective measurements of nursing compliance with PI risk assessment, PI prevention measures, and PI treatment plans using the Data Collection Sheet for Chart Review checklist (Appendix D).

Measurement Instruments

In order to measure the outcomes of this DNP Project the following instruments were used as the pre-test: parts B and C of the MISSCARE Nursing Survey (Kalisch & Williams, 2011; Appendix E) and the AHRQ assessment checklists (AHRQ, 2014; Appendix F). The

MISSCARE Survey was used to assess nursing compliance with PI prevention measures pre-intervention and post-intervention. The AHRQ facility checklists were used to assess nursing compliance with screening for PI risk using the Braden scale and for the development of a PI care plan and implementation pre-test and post.

The DNP student requested for and obtained permission from the copyright owner of the MISSCARE Survey for the use of the MISSCARE Nursing Survey instrument. The AHRQ assessment checklists, however, are in the public domain and did not require permission to use them. Both instruments had high reliability and validity indexes. The MISSCARE Nursing Survey had a high reliability of 0.88 (Kalisch & Williams, 2011) while the AHRQ assessment checklists also had high average reliability index of 0.80 (AHRQ, 2014). The MISSCARE Nursing Survey had a high validity index of 0.88 (Kalisch & Williams, 2011) and the AHRQ assessment checklist also had a high validity index (AHRQ, 2014).

Implementation

The DNP student sought from the University of Massachusetts Amherst Institutional Review Board (IRB) prior to the implementation of the project. In its response on August 27, 2019, the IRB stated that the proposed project did not meet the definition of human subject research under federal regulations [45 CFR 46. 102(d)] and, therefore, submission of an application to UMass Amherst IRB was not required. The implementation process began with recruitment of eligible participants and review of nursing documentation in September 2019, administration of two surveys pre-test, presentation of the education intervention, and ended with review of nursing documentation and administration of surveys post-test.

During the recruitment phase, the DNP student emailed an invitation letter to all nurses and CNAs at the facility to invite them to participate in the project initiative and briefly

explained the nature and scope of the project, who would be involved, and the role and expectations of participants to them (Appendix G). Hard copies of pre-test consisting of the MISSCARE Nursing Survey and the AHRQ assessment checklists were administered to the nurses (n = 16) and CNAs (n = 22). Additionally, the DNP Student reviewed all PI-related nursing documents and recorded findings on the Data Collection Sheet pre-test and post-test (Appendix C).

Next, the DNP student presented a 25-minute PI prevention education PowerPoint in-person to the participants (Appendix H). This educational material served as the intervention. Hard copy post-intervention survey was administered to the participants. Finally, The DNP student conducted a post-intervention review of nursing documentation. All data were collected anonymously to ensure confidentiality and privacy of subjects.

Data Analysis

The project was guided by the following practice-centered question: “By what percentage was the practice change intervention effective in terms of nursing compliance with PI risk assessment on admission and shift change, PI preventive measures, and PI treatment plans?” To address this question, the DNP student conducted surveys and a review of nursing documentation to collect PI prevention data pre-test and post-test and compared the results. The data was analyzed using descriptive statistics and Statistical Package for the Social Sciences (SPSS) version 26 (IBM Corp, 2019), a program for performing software analysis and descriptive statistics.

Protection of Human Subjects

Data was collected anonymously to ensure the confidentiality and privacy of participants (Grove, Burns, & Gray, 2013). All hard copies of questionnaires and data collected were kept

securely in a binder in the DNP student's office. Each participant was assigned a number for surveys with a list of names and numbers in a password protected computer. All electronic data were encrypted and protected by a password. In addition, complete and accurate records of the project will be maintained for at least five years.

Results

The project was conducted in a mid-size long-term skilled nursing and rehabilitation center situated in the southern part of Worcester County, Massachusetts. The project site has a resident population of one hundred and eight, about sixty percent of whom are confined to bed or wheelchair or both. With nursing staff of thirty-eight (sixteen nurses and twenty-two CNAs), the nurse-resident ratio of 1: 7 and CNAs-resident ratio of 1:5 was quiet low. Although all thirty-eight-nursing staff were given the questionnaires, only twenty-eight returned their completed surveys. All thirty-eight-nursing staff, however, participated in the educational intervention.

The purpose of this project was to evaluate the impact of implementation of PI prevention measures in a medium-sized long-term care in central Massachusetts. The project was guided by the following practice-centered question: "By what percentage was the practice change intervention effective in terms of nursing compliance with PI risk assessment on admission and shift change, PI preventive measures, and PI treatment plans?" Areas evaluated included nursing compliance with the facility's protocol for pressure injury prevention such as two-hour pressure relief, moisture management, and skin inspection once each shift, and whether nurses referred at-risk patients and patients with wounds to their primary care physicians for specialized wound care.

Objective 1: To increase PI risk assessment at admission from current baseline of 85% to 100% using the Braden scale one month after the intervention was completed.

The first objective was assessed by examining the results of skin assessment at admission flow sheets (Appendix I), MISSCARE Nursing Survey (Appendix E), the AHRQ checklists (Appendix F), twelve randomly-selected PI-related nurses' care plans (Appendix J) and fifteen CNAs' charts, preliminary risk assessment chart (Appendix K), and daily repositioning and skin inspection chart pre-test (Appendix L). The results post-test data were similarly analyzed and compared with the results pre-test (Appendix M, Table 1).

Prior to the implementation of the evidence-based intervention, nursing documentation showed that 85% of nurses used the Braden scale and the AHRQ checklists to perform skin and PI risk assessment on admission and any time the resident's changed (Table 1). Nine out of ten nurses developed and implemented care plans to address PI(s) identified during the risk assessment. Elements addressed in nurses' care plans included fecal and urinary incontinence, impaired mobility, skin condition check, and pressure relief. Most of the CNAs checked the skin whenever they repositioned, washed, or changed the residents. The majority of the CNAs maintained clean skin, applied body lotion, and/or protective skin barrier per care plan (Table 1). The results of the nursing documentation post-test followed similar trend but there were significant improvements in risk assessment and care plan (Appendix M, Table 1). The results of the MISSCARE Nursing Survey pre-test and post were also analyzed and compared to determine the most frequently missed nursing care as well as the least frequently nursing care. Prior to the implementation of the evidence-based intervention, the three most frequently missed care were ambulation three times a day or as ordered, two-hour turning, and hand washing in descending order (Appendix N, Table 2). Skin/wound care, monitoring input/output, and discharge planning and teaching were the least frequently missed care in ascending order (Appendix N, Table 2).

The results of the MISSCARE Nursing Survey post-test followed a similar but significantly improved trend. Ambulation three times a day or as scheduled was the most frequently missed care post-test, followed by two-hour turning, and hand washing. Skin/wound care was the least missed care post-test, followed by monitoring input/output, and discharge planning and teaching (Appendix O, Table 3). The average improvement in risk assessment was 98%.

Objective 2: To improve nursing compliance with PI prevention measures from current low of 85% to 95%.

The second objective was achieved by reviewing, documenting, and analyzing twelve randomly-selected PI-related nurses' care plans (Appendix J) and fifteen CNAs' charts pre-test and post-test. The results of the analysis of the nursing documentation showed a significant improvement in all factors of PI prevention measures. Risk assessment saw the most significant improvement from 85% pre-test to 98% post-test (Table 1). The least improved factor of PI prevention measure was urinary incontinence which improved slight from 88% pre-test to 90% post-test (Table 1). The average improvement in nursing compliance with PI prevention measures was 95.4% %.

Objective 3: To increase PI treatment compliance from current baseline of 80% to 100%.

The third objective was compliance with PI treatment plans would increase from current baseline of 80% to 100% (Bergstrom et al, 2013). To achieve this objective, nursing documentation on the following areas were evaluated pre-test and post-test: comprehensive skin inspection once each shift, categorization of PI, wound care, reassessment, medication administration, patient education, moisture management, two-hour management, and referring at-risk residents and residents with wounds to their primary care physicians for specialized

wound care. Overall, there was significant improvement in PI treatment post-test. Patient reassessment had the most significant improvement from 80% pre-test to 90% post-test (Table 1). With a slight improvement from 80% pre-test to 85% post-test, patient education was the least improved area of PI treatment (Table 1).

The implementation of the project resulted in a significant increase in all the quality indicators except patient education. There was remarkable improvement in PI preventive measures. For example, risk assessment post-intervention improved by 13%, skin care improved by 12%, and reported skin changes increased by 11% (Table 1). Similarly, there were improvements in all the factors of PI treatment post-test. With an increase from 75% to 90%, reassessment was the most significant area of treatment compliance post-test (Table 1). There was also steady improvement in PI incidence rates during the implementation period from 3.6% to 1.4%, representing 61.1% reduction in PI incidence rate (Appendix P, Figure 1). Thus, the project goal of 50% reduction in PI incidence rate was exceeded.

The results from the SPSS analysis indicated high correlation ($p = 0.91$) between improvement in PI prevention measures and the evidence-based intervention. There was a significant difference in the scores for pre-intervention ($M = 92.69$, $SD = 5.66$) and post-intervention ($M = 98.33$, $SD = 2.89$) measures, $t(2) = 3.002$, $p = 0.095$. The Cohen effect size ($d = M/SD = 1.73$) was large, meaning the evidence-based intervention had a significant impact on PI prevention measures in the project site.

Despite exceeding the overall goal of the project, two of the ambitious project objectives were missed. The first objective was two percentage points shy of the set goal, the second objective was met, and the third objective was less than seven percentage points shy of the set goal (Appendix Q, Table 4). The theoretical framework of Lewin's change theory does reflect a

positive change in nursing practice based on this intervention. Quality factors that need ongoing improvement are patient education, urinary incontinence care, ambulation, hand washing, and two-hour turning (Table 1, Table 3).

Evidence-based literature show that PIs are unnecessary adverse conditions which can be prevented by comprehensive skin assessment, standardized risk factor assessment, and the development and implementation of nursing care plans to address identified PI risks. The AHRQ (2014) recommends a head-to-toe patient examination at admission readmission, transfers, discharge, and at least once a day to identify any abnormalities such as existing PIs or skin lesions that might predispose the patient to develop a PI.

During skin assessment, it is critical for nurses to pay particular attention to the patient's bony prominences, document all results in the patient's health records, and share results with all relevant care providers (NPUAP, 2014). Prior to the evidence-based intervention, nurses at the project site had reported time constraint as a reason for missing skin assessment. To overcome the challenge of time constraint, the AHRQ (2014) recommends that skin assessment must be integrated into the nursing work. Comparison of the results of review of nursing documentation pre-test and post-test showed significant improvement in skin assessment and care post-test (Table 1).

Discussion

Pressure injury prevention guidelines recommend that PI risk factor assessment must be done at admission, once daily, and whenever there is a change in the skin condition (AHRQ, 2014). There was significant improvement in risk assessment from 85% pre-test to 98% post, indicating significant effectiveness of the evidence-based intervention. Also, per PI prevention

guidelines, nurse's assistants must inspect and report changes in skin condition to their supervising nurses, and document their observation in the flow charts (AHRQ, 2014). The CNAs' flow charts showed a remarkable improvement in skin care from an average of 86.7% pre-test to 96.2% post-test (Table 1). Moreover, nurses are required to develop and implement actionable care plans to address PI risks identified during the risk assessment (AHRQ, 2014). Nurses at the project site complied with this guideline nearly all the time (Table 1). The statistical results of this intervention, showed a high correlation between improvement in PI preventive measures and the evidenced based intervention. The evidenced based intervention has a significant impact on the PI prevention measures.

Cost-Benefit Analysis/Budget

The cost of PI treatment was estimated to be "2.5 times more than its prevention" (Dalvand et al., 2018, p. 613). There was also indirect, almost-impossible-to-quantify PI-related cost such as longer hospital stays ranging from four to thirty days, decreased quality of life, increased pain, and increased morbidity and mortality rates (Black et al., 2011). For example, it cost the project center estimated \$4, 858, 250.4 to treat one hundred and eight (108) patients with Stage 3 PI in a year. It cost the center estimated \$149, 580.00 to treat fifty-four (54) patients for Stage 1 and 2 PI. Total direct cost per annum was \$5, 007, 830.4. Therefore, the project site would save an average of \$2, 003, 132.16 ($\$5, 007, 830.4/2.5$) in direct treatment cost each year if it adapted PIs prevention measures outlined in this project (Table 5).

An evidence-based PI prevention quality improvement initiative usually require resources such as staff time for training and education, data systems for collecting PI risk assessment, early detection, and PI prevention measures. New products such as special mattresses and barrier

creams may require additional financial commitment (Table 5). In analysis of the cost-benefit, multiplying \$2,770.54 by the 108 patients at the project site gives \$299, 218.32. Thus the cost of standard care for 108 patients = \$2,003,132.16 and the cost of PI prevention for 108 patients = \$299,218.32. Savings from PI prevention intervention = \$2,003,132.16 – \$299, 218.32= \$1,703, 913.84 a significant return.

Implications

The findings of this project have practice, policy, research, and social change implications. Nurses and their assistants will be motivated to implement PI preventive measures, based on the remarkable results of the project. Seeing the remarkable quality improvement achieved in the project site will challenge nurse supervisors in nursing homes to step up the implementation of PI prevention measures in their facilities.

Policy makers will also benefit from the findings of this project. Given the relatively higher rates of PIs in nursing homes, policy makers could learn lessons from this project regarding how to minimize PI rates in nursing homes. Healthcare policy makers such as The Joint Commission and the Centers for Medicare and Medicaid Services (CMS) could use the results of the project to assess the reporting and reimbursement systems for nursing homes. For example, currently health organizations that report stages 3 and 4 PIs are denied reimbursement from the CMS, thus losing funds they had actually spent (NPUAP, 2016). Given how easy it is to prevent incidences of PIs, as evidenced in this project, policy makers could introduce a reward system for health organizations that excel in quality indicators such as PIs.

Moreover, researchers will benefit from the results of this study. Most literature on PI prevention focus on the acute care setting. Any work done to evaluate the implementation of PIs in the long-term care setting will definitely be a welcome addition to the existing body of

knowledge. The results of the project will, therefore, be a useful resource to researchers and future scholars and importantly practitioners.

Although, the PI rate of the project site prior to the implementation of the project was lower than the national and state average PI rates, participating in the project afforded the nursing staff the opportunity to refresh their minds on the importance of PI prevention. Evidence shows that teams work better when they are knowledgeable about the concepts governing practice guidelines (Silva et al., 2018; Queirós, 2016). The project helped create a positive social change and a culture of teamwork and collaboration among the nursing staff. Nurses and CNAs improved interpersonal communication as they understood that PI prevention is a collaborative effort. Thus, the project afforded the participants to implement best nursing practices, created a healthy working condition, and produced a positive social change.

Lessons Learned from the Results

The increasing complex demands of health care delivery call for nurses with advanced education, training, and expertise. The DNP program prepares nurses with advanced clinical skills, team-building skills, and competences for leading nursing teams to provide safe, efficient, and timely nursing care. The DNP project is one of the means by which nurses are prepared to identify practice gaps, initiate appropriate interventions, and lead the nursing team to implement the intervention to address the identified need. Implementing this project has sharpened my scholarly, project development, and leadership skills.

Additionally, lessons learned from this project include that evidence-based educational interventions must explain the need for implementing PI prevention measures using stories the nursing staff are familiar with and statistics that would shock them into. Emphasizing the benefits of PI prevention to the nursing staff helped the participants to embrace the intervention.

Leading the nursing team to evaluate the implementation of PI prevention in the project site provided me the opportunity to put into practice important leadership skills learned throughout my graduate studies. Implementing the evidence-based intervention allowed me to practice transformational leadership skills such as building a cohesive team, shaping workplace culture, networking, communication, and motivation (Marshall & Broome, 2017). Most importantly, this project afforded me the opportunity to challenge some of the nurses to lead and own the culture of quality improvement we implemented during the project.

Conclusion

The problem this DNP project sought to address was the high incidence rate of pressure injury (PI) in a long term-care facility in Worcester County, Massachusetts. The goal of the project was to reduce the PI rate from 3.6% to 1.5% in six months through the implementation of evidenced-based PI prevention strategies. To achieve the project goal, three goals were set: increase risk assessment using the Braden scale and the AHRQ checklists completed on admission from 85% to 100%, nursing compliance with PI prevention measures from 85% to 95%, and compliance with treatment plans from 80% to 100%. Evidence shows that the incidence of PIs can be minimized through early detection of PI risk factors and implementation of PI prevention measures.

Data was collected using the MISSCARE Nursing Survey, the AHRQ PI Prevention Checklists, and review of nursing documentation. Analysis of the data was done by comparing results pre-test and post-test and using descriptive statistics. Pressure injury prevention education and the Lewin's Change Theory were used to effect behavioral change and to establish a new culture of prevention in the project center. The evidence-based intervention emphasized comprehensive skin assessment, standardized risk factor assessment, and the development and

implementation of nursing care plans to address identified PI risks. There a steady reduction PI incidence rates during the period of the project culminating in an overall reduction in PI incidence from 3.6 to 1.4%; thus, the goal of the project was exceeded. Two of the three objectives were slightly missed.

The project findings also showed that a successful implementation of a PI prevention intervention can save the long-term care facility millions of dollars annually, minimize the incidence of PI, improve the center's quality measures, and save patients from unnecessary pain and loss of dignity. Given the small volume of literature on PI prevention in long-term care, the findings of the project will be a useful addition to the already existing body of knowledge and literature. The findings of the project will be helpful resource for clinicians, policy-makers, and future scholars. While the findings are limited to a single facility, as a focused quality improvement project, these results are therefore, not generalizable, they will nevertheless provide useful insight into PI prevention in long-term care facilities and are recommended.

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Appendices

Appendix A: Lewin Change Model

Kurt Lewin Change Model



Adapted from *Leadership roles and management functions in nursing: Theory and application* (p. 169), B. L. Marquis & C. J. Huston, 2014, Philadelphia, PA: Lippincott Williams Wilkins. Copy 2014 by Lippincott Williams Wilkins. Reprinted with permission.

Appendix B: PDSA Model



Appendix C: Letter of Approval & Support

July 25, 2019

Alfred Owusu-Ansah
University of Massachusetts
Amherst, MA 01003

Dear Sir/Madam.

Letter of Support

This letter is to formally confirm our support and authorization to grant Alfred Owusu-Ansah, a DNP student of University of Massachusetts Amherst, permission to undertake his quality improvement project in our facility.

Yours Sincerely,

Director of Nursing

Appendix D1: Data Collection Sheet for Chart Review (Nurses)

Nurse Code	Performed Head-to-toe assessment & risk assessment using the Braden Scale.	Developed care plan for at-risk patients.	Implemented care plan.	Referred at-risk patients to wound nurse and nutritionist.	Notified patient's physician of any skin problems.	Ensured two-hour turning, incontinent care, fluid intake as ordered.	Educated patient and family about risk factors.
001							
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Appendix E: The MISSCARE Nursing Survey

MISSED NURSING CARE (*The MISSCARE Survey*)

Section A — Missed Nursing Care

Nurses frequently encounter multiple demands on their time, requiring them to reset priorities, and not accomplish all the care needed by their patients. To the best of your knowledge, **how frequently** are the following elements of **nursing care MISSED by the nursing staff (including you) on your unit?** *Check only one box for each item.*

	Always missed	Frequently missed	Occasionally missed	Rarely missed	Never missed
1) Ambulation three times per day or as ordered					
2) Turning patient every 2 hours					
3) Feeding patient when the food is still warm					
4) Setting up meals for patient who feeds themselves					
5) Medications administered within 30 minutes before or after scheduled time					
6) Vital signs assessed as ordered					
7) Monitoring intake/output					
8) Full documentation of all necessary data					
9) Patient teaching about illness, tests, and diagnostic studies					
10) Emotional support to patient and/or family					
11) Patient bathing/skin care					
12) Mouth care					
13) Hand washing					

	Always missed	Frequently missed	Occasionally Missed	Rarely missed	Never missed
15) Bedside glucose monitoring as ordered					
16) Patient assessments performed each shift					
17) Focused reassessments according to patient condition					
18) IV/central line site care and assessments according to hospital policy					
19) Response to call light is initiated within 5 minutes					
20) PRN medication requests acted on within 15 minutes					
21) Assess effectiveness of medications					
22) Attend interdisciplinary care conferences whenever held					
23) Assist with toileting needs within 5 minutes of request					
24) Skin/Wound care					

Appendix F: The AHRQ PI Assessment Checklist

Does the resident care plan address the following interventions and risk factors (as they apply)?

	Yes	No	Needs Improvement
Impaired Mobility			
• Assist with turning, rising, position	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Encourage ambulation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Limit static sitting to 1 hour at any one time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pressure Relief			
• Support surfaces - Bed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Support surfaces - Chair	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Pressure relief devices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Repositioning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Malnutrition Improvement			
• Supplements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Feeding assistance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Adequate fluid intake	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Dietician consult as needed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Urinary Incontinence			
• Cause identified and treated as appropriate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Toileting plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Wet checks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Treat causes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Assist with hygiene	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fecal Incontinence			
• Cause identified and treated as appropriate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Toileting plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Soiled checks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Skin Condition Check			
If resident is not currently deemed at risk, is there a plan to rescreen at regular intervals?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do you use either the Norton or Braden pressure ulcer risk assessment tool? (If yes, STOP. If No, please continue to next question.) Note: Federal regulations (F-314) recommend the use of standardized risk assessment tools.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Yes	No	Needs Improvement
Treatment			
• Physician prescribed regimen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Appropriateness to wound staging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Treatment reassessment time frame	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pain			
• Screen for pain related to ulcer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Choose appropriate pain med	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Provide regular pain administration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Reassess the effectiveness of med	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Assess/treat side effects			
• Change, increase, or decrease pain med as needed			
Infection			
• Dressing containment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Keep dressing dry/intact	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Assess for s/sx infection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

THANK YOU FOR YOUR PARTICIPATION!

Appendix G: Invitation Letter to Participants

September 15, 2019

The Director Nursing

Dear Nurses and CNAs,

Invitation to Participate in a Quality Improvement Project

This letter is a formal invitation to you to participate in a quality improvement project in your healthcare facility. The project is part of my capstone course for my Doctor Nursing Practice (DNP) program but the results will be shared with your facility. Thus, your facility stands to gain from the project. The purpose of the DNP project is to evaluate the impact of implementation of PI prevention measures in facility. The goal of the project is to reduce the rate of PI in the project center by 50% in six months through the implementation of evidenced-based PI prevention strategies. within six months through effective teamwork.

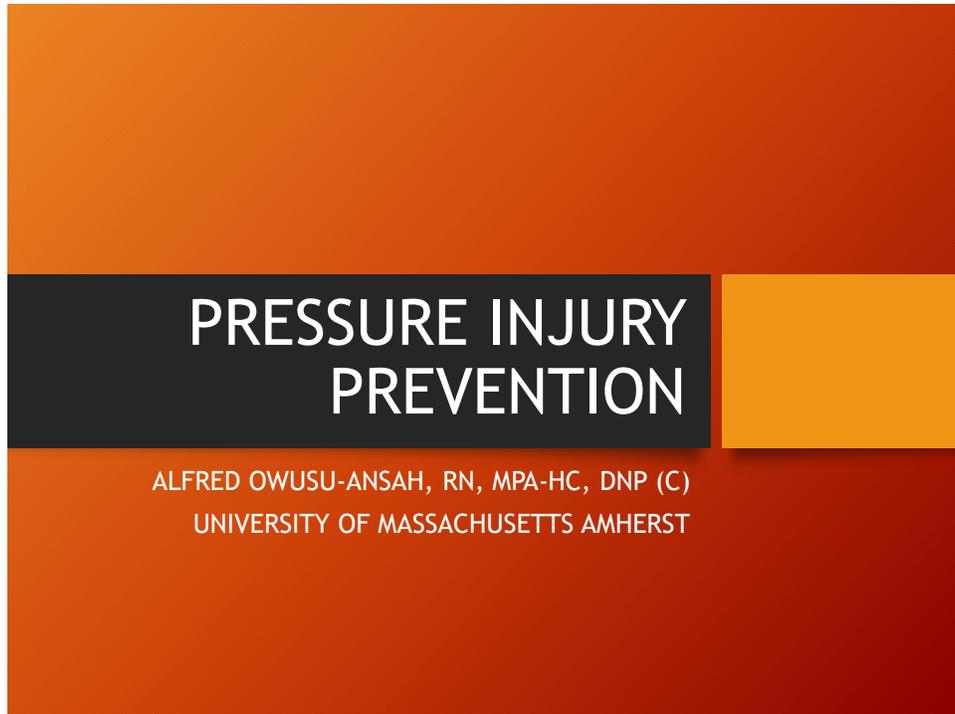
There will be two surveys, one before the intervention, and the same survey two months after the intervention. Each test is estimated to last for 10 minutes. You will be given one week to complete each survey electronically and return it to me electronically. A 25-minute PI prevention education, which will serve as the intervention, will be presented in-between the pre-test and post surveys. Each participant will be given a \$10 gift card as my appreciation for participating. Thank you in advance for your cooperation.

Yours Sincerely,

Alfred Owusu-Ansah, DNP (C), MPA-HC, RN

Appendix H: Pressure Injury Prevention: Education

Double click the icon to view the PowerPoint



Appendix I: Skin Assessment Chart

Circle Yes or No

SKIN COLOR

Changes in skin tone	Yes	No
Difference in color between body parts	Yes	No
Discolored areas	Yes	No
Paleness	Yes	No
Flushing	Yes	No
Cyanosis	Yes	No

SKIN TEMPERATURE

Cool	Yes	No
Warm	Yes	No

SKIN Turgor

Normal/abnormal	Yes	No
-----------------	-----	----

MOISTURE

Wet/Dry/oily	Yes	No
--------------	-----	----

SKIN INTEGRITY

Intact/not intact	Yes	No
Bruising	Yes	No
Excoriations	Yes	No
Lesion	Yes	No
Redness	Yes	No

Comments

Appendix J: Nurses' Care Plan

..... Skilled Nursing Home

Client Name: _____ Date: _____

Nursing Care Plan			
Nursing Diagnosis	Goal	Intervention	Outcome
1.			
2			
3			
4			

Appendix M: Results of PI-Related Nursing Documentation

Table 1

Results of PI-Related Nursing Documentation

Variable	Pretest	Posttest
Risk Assessment	85%	98%
Care Plan	90%	95%
Elements Addressed in Nurses' Care Plan		
Impaired mobility	92%	98%
Pressure relief	91%	98%
Skin condition check	90%	95%
Urinary incontinence	88%	90%
Fecal incontinence	89%	95%
Elements Addressed in CNAs' Care Plan		
Skin care	87%	99%
Reported skin changes	88%	99%
2 – hour turning	89%	99%
Offered liquids	81%	90%
Applied skin barrier	87%	95%
Applied lotion	88%	95%
PI Treatment		
Comprehensive skin assessment	83%	90%
Categorization of PI	90%	95%
Reassessment	75%	95%
Wound care	92%	98%
Medication administration	95%	97%
Patient education	80%	85%

Appendix N: Abridged Results of the MISSCARE Nursing Survey Pre-Test

Table 2

Abridged Results of the MISSCARE Nursing Survey Pre-Test

Variable	Always Missed	Frequently Missed	Occasionally Missed	Rarely Missed	Never Missed
Most Frequently Missed Care					
Ambulation three times a daily or as ordered	20.50%	38.25%	25.90%	15.35%	0.00%
Turning patient every two hours	2.75%	36.15%	30.52%	23.42%	7.16%
Hand Washing	0.00%	25.50%	25.12%	35.75%	13.63%
Least Frequently Missed Care					
Skin/wound care	0.00%	0.00%	15.57%	45.75%	38.68%
Monitoring input/output	0.00%	5.85%	35.25%	48.85%	10.05%
Discharge planning and teaching	2.05%	6.95%	30.55%	56.00%	4.45%

Note: Kalisch, B. J. (2009). *The MISSCARE Nursing Survey*. Used with permission.

Appendix O: Abridged Results of the MISSCARE Nursing Survey Post-Test

Table 3

Abridged Results of the MISSCARE Nursing Survey Post-Test

Variable	Always Missed	Frequently Missed	Occasionally Missed	Rarely Missed	Never Missed
Most Frequently Missed Care					
Ambulation three times a daily or as ordered	10.50%	25.75%	40.95%	22.80%	0.00%
Turning patient every two hours	1.50%	25.75%	58.58%	10.20%	5.47%
Hand Washing	0.00%	15.50%	25.12%	35.75%	12.13%
Least Frequently Missed Care					
Skin/wound care	0.00%	0.00%	10.57%	25.55%	63.88%
Monitoring input/output	0.00%	3.75%	30.23%	45.25%	20.77%
Discharge planning and teaching	1.55%	3.85%	52.65%	32.99%	8.96%

Note: Kalisch, B. J. (2009). *The MISSCARE Nursing Survey*. Used with permission.

Appendix P: Monthly PI Incidence Rates

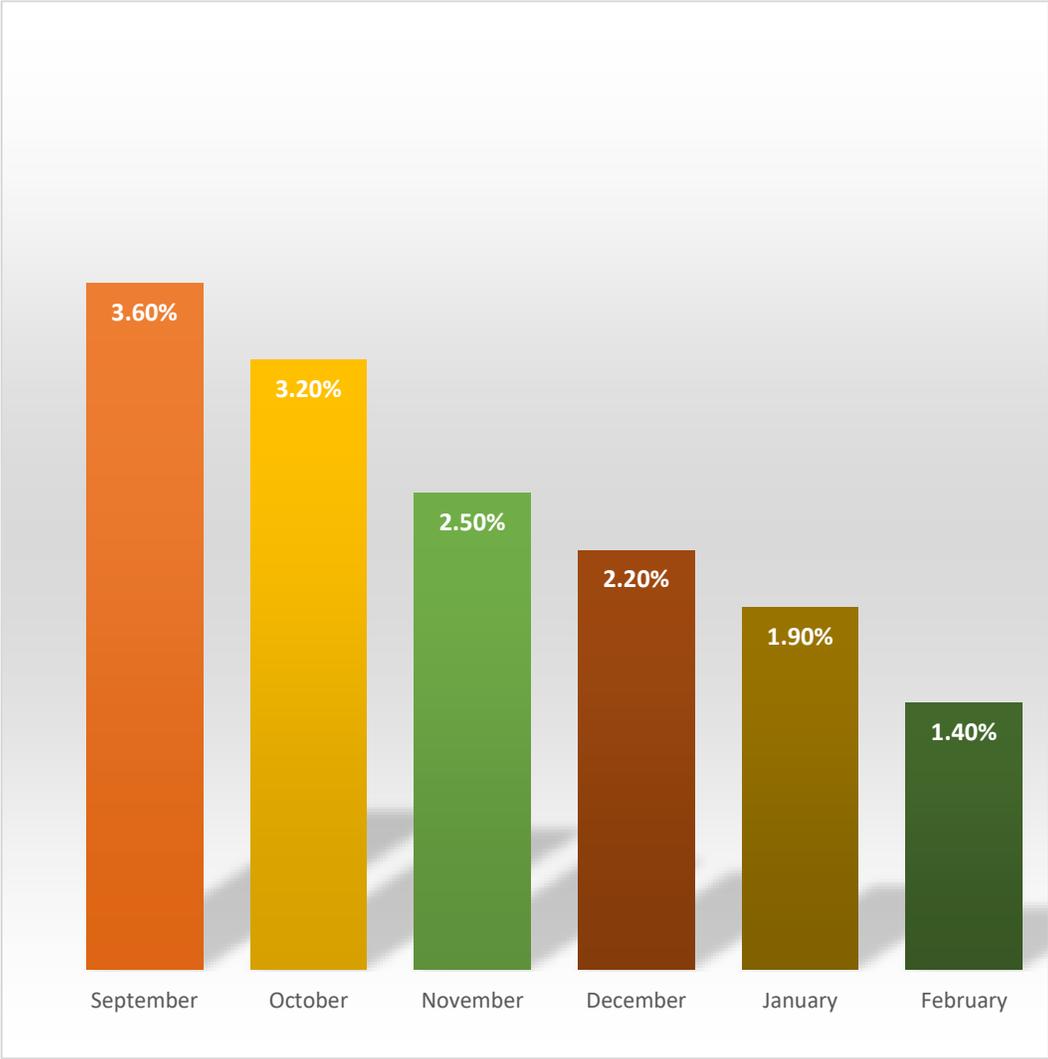


Figure 1. Monthly PI Incidence Rates from November 2016 to April 2017.

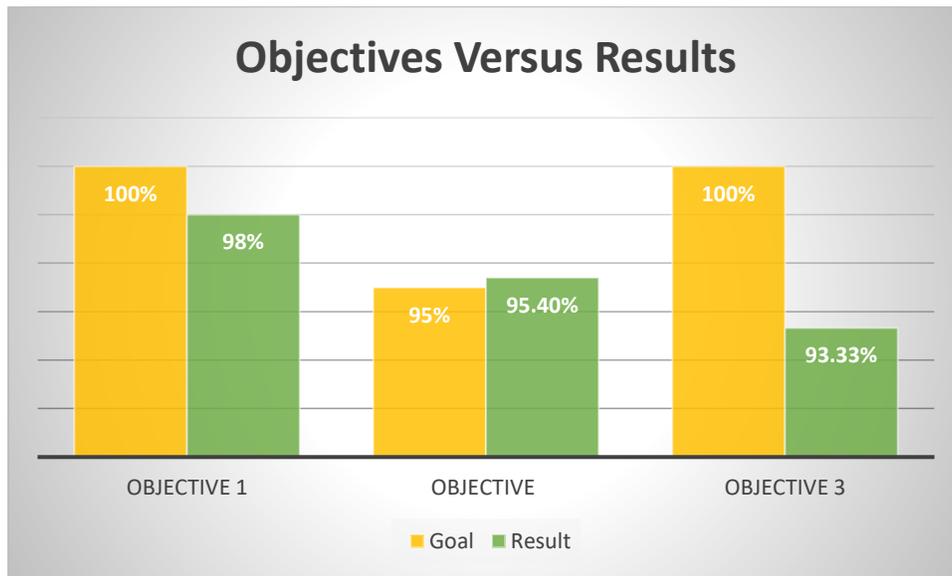
Appendix Q: Evaluation of Objectives

Table 4

Evaluation of Project Objectives

Objective	Goal	Result	Difference
Objective 1	100% Risk assessment	98.00%	- 2.00% *
Objective 2	95% PI Prevention	95.40%	- 4.60% *
Objective 3	100% Treatment compliance	93.33%	- 6.67% *

Note: * indicates the percentage points missed from the set goal.



Appendix R: Cost-Benefit Analysis

Table 5

Cost of Quality Improvement Initiative Versus Cost of Standard Care

Intervention	Cost (2009 \$)
Support surfaces	148.56
Moisture/incontinence	114.34
Repositioning	12.27
Chair cushion	0.17
Nutrition	1.10
Risk assessment	2.55
Topical antibiotics	15.40
Inpatient costs	1,922.04
Unforeseen costs	544.11
Total costs	2,770.54

Braden (2016)

Appendix S: Project Timeline

Table 6

Cost of Quality Improvement Initiative Versus Cost of Standard Care

Task	September	October	November	December	January	February	March
Recruitment of eligible participants	X						
Administer MISSCARE survey & AHRQ checklists pre-test		X					
Review of nursing documentation pre-test	X	X	X				
Present PI education intervention			X				
Administer MISSCARE survey & AHRQ checklists post-test				X			
Review of nursing documentation post-test				X	X	X	
Do statistical and descriptive analysis							
Analyze data						X	
Analyze results							X