A Prospective, Descriptive, Quality Improvement Study to Decrease Incontinence-Associated Dermatitis and Hospital-Acquired Pressure Ulcers

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Abstract

Incontinence is a common problem among hospitalized patients and has been associated with multiple health complications, including incontinence-associated dermatitis (IAD) and hospital-acquired pressure ulcers (HAPUs). A prospective, descriptive study was conducted in 2 acute care neurology units to 1) assess the prevalence of incontinence and incidence of IAD and HAPUs among incontinent patients, and 2) evaluate the effect of caregiver education and use of a 1-step cleanser, moisturizer, barrier product on the development of IAD and HAPUs among patients with incontinence. During a period of 1 month, the incontinence status of admitted patients was recorded and skin was assessed for the presence/absence of IAD and HAPUs twice per day. After the 1-month data collection, all clinicians on the study units completed a facility-based online education program about IAD, HAPUs, and skin care followed by the implementation of a 1-step cleanser/barrier product for skin care of all patients with incontinence. Data collection procedures remained the same. Data were collected using a paper/pencil instrument and entered into a spreadsheet for analysis. Descriptive statistics were calculated and prevalence and incidence rates were compared between the pre-intervention and post-intervention phase using Fisher's exact analysis. During the first phase of the study, 17 of 40 admitted patients (42.5%) were incontinent. Of those, 5 (29.4%) developed IAD and all of these patients developed HAPUs (5 of 40 admitted, 29.4%) during an average length of stay of 7.3 (range: 2–14) days. In the intervention phase of the study, 25 of 46 (54.3%) patients were incontinent and none developed IAD or a HAPU during an average length of stay of 7.4 (range: 2–14) days. The average Braden scale score was 14.14 in the pre-intervention group of patients with incontinence and 12.74 in the intervention group. The prevalence of incontinence among patients admitted to acute care neurology units and the rate of IAD in these populations is high. After educating clinicians and implementing incontinence care procedures with a 1-step product, the rate of HAPUs decreased significantly but the rate of IADs remained the same. Clinicians should consider the results of this and other studies when developing incontinence-care protocols. Controlled clinical studies utilizing more detailed IAD assessments will help elucidate these observations.

Keywords: observational study, neurology, incontinence, dermatitis, pressure ulcer

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Incontinence is a common problem for hospitalized patients and has been associated with multiple health complications such as incontinence-associated dermatitis (IAD) and hospital-acquired pressure ulcers (HAPUs).[1-6] In their descriptive, observational study of 608 acute care patients in medical-surgical and intensive care patients, Junkin and Selekof[6] found a prevalence of incontinence of 19.7% with some type of injury to the skin in 42.5% of the patients with incontinence. IAD has been identified as a risk factor for the development of HAPUs and following the Centers for Medicare and Medicaid Services (CMS) decision to no longer reimburse hospitals for the development of Stage III and greater HAPUs, attention on effective prevention and identification of IAD has increased.[7,8]

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Key Points

- Researchers examined the prevalence of incontinence and incidence of incontinence-associated dermatitis (IAD) and hospital-acquired pressure ulcers (HAPUs) among patients admitted to acute care neurology units using standard protocols of care and after implementing an education program and 1-step incontinence care product.
- During both the pre-intervention and intervention phases, the rate of incontinence and IAD was high (42.5% and 54.3%, respectively).
- The rate of HAPU among patients with incontinence was 29.4% in the pre-intervention and 0% in the intervention phase.
- Results of this study are worth considering when developing protocols of incontinence care.
- Additional studies are needed to optimize the evidence-base for incontinence care and to reduce the rate of IAD and resultant HAPUs.

Literature Review

Effluent from urine and stool contains a variety of micro-organisms, chemical irritants, and moisture that increases the risk for irritation, inflammation, and breakdown in nearby skin.[1,2] In the past, the condition associated with this process was referred to by many terms, including *diaper rash*, *heat rash*, *moisture maceration injury*, *perineal dermatitis*, *irritant dermatitis*, *contact dermatitis*, and *intertrigo* — terms that fell short of encompassing the true nature of the problem.[1,2] In 2007, a group of skin care/incontinence experts developed the first consensus statement relative to this condition and adopted the term *incontinence-associated dermatitis* (IAD). The consensus statement defines IAD as "skin inflammation and erythema, with or without erosion or denudation, due to irritants of urine and/or fecal incontinence."[2]

Pressure ulcers (PUs) and IAD often are misidentified because of varying degrees or stages of skin inflammation and erosion, especially in the area of the buttocks.[6,8] It is important to differentiate between IAD and PUs because appropriate prevention and treatment require specific plans that address the underlying causative problems.[1-6,8] Patients with IAD are at an increased risk for developing PUs, raising concern regarding the best strategies to prevent and limit the impact of this problem.[9,10]

In 2007, the Institute for Healthcare Improvement (IHI) noted preventing HAPUs was one of the goals in the *5 Million Lives* campaign. The IHI highlighted appropriate incontinence care as a first line defense against HAPUs and identified best practice to protect a patient's skin: 1) keeping supplies at the bedside of patients who are incontinent for timely incontinence clean-up; 2) using moisture-wicking underpads and limiting use of disposable briefs; and 3) providing premoistened, disposable barrier wipes for protection against IAD.[11]

A 2010 consensus panel of skin care/incontinence experts reviewed current knowledge of moisture-associated skin damage and provided recommendations for prevention and management.[12-14] The panel reinforced the IHI evidence-based recommendations that prompt skin cleansing, moisturizing, and applying a skin protectant are effective for the prevention of IAD in patients with urinary and fecal incontinence.

Beeckman et al[15] conducted a randomized controlled trial (N = 141) comparing the effectiveness of a 3-in-1 perineal washcloth impregnated with a 3% dimethicone formula with soap and water in prevention and treatment of IAD. They found the product had a significant effect on IAD prevalence (8.1% experimental; 27.1% control, $P = 0.003$) and concluded the 3-in-1 product was a more effective intervention than the use of soap and water. In their comparison cohort study, Park and Kim[16] examined the effect of a structured skin care regimen on critical care patients (N = 76) with fecal incontinence. The experimental group used a no-rinse skin cleanser, a skin protectant, and an indwelling fecal drainage system when indicated. Patients in the intervention group had significantly lower IAD screening scores ($P < 0.001$) and were less likely to develop a PU than persons in the control group who received skin care with pH-neutral soap and water ($P = 0.001$).

Beeckman et al[17] reviewed 36 publications that addressed 25 studies that explored prevention and treatment of IAD. Based on this review, the authors noted perineal skin cleansers, rather than soap and water, application of a skin protectant, and skin care following each episode of incontinence are consistent recommendations. However, the quality of the methods in the studies reviewed was lacking, and additional research was warranted.

The purpose of this prospective, descriptive quality improvement study was 1) to identify the prevalence of incontinence and incidence of IAD and HAPUs in patients hospitalized in selected units in an acute care facility and 2) to evaluate the effect of caregiver education and the use of a 1-step cleanser, moisturizer, barrier product (Sage Shield Barrier Cream Cloth®, Sage Products, Cary, IL) on the incidence of IAD and HAPUs among patients who were incontinent.

Methods

Setting and procedures. The study was conducted in the Neurotrauma Intensive Care Unit (NTICU) and the Neurotrauma Progressive Care Unit (NTPCU) at a Magnet-designated facility, a 703-bed Level I Trauma Center in Southwest Virginia. These units were selected because patients admitted to these units often have neurological

impairments with associated immobility and incontinence, placing them at high risk for developing IAD. The average length of stay for patients on these units is 7 days, compared to a 5-day average length of stay on other units. Given the reported time to onset of IAD in critically ill adults with fecal incontinence ranges from 1–6 days,[18] the patient populations of these units were well suited to the study purposes.

The Institutional Review Board deemed this a quality improvement study and patient consent was not required.

Participants' inclusion/exclusion criteria. All patients admitted to the NTICU and the NTPCU were assessed for incontinence on admission and were deemed eligible for the study if they were >18 years old and were incontinent of urine, feces, or both. Patients were excluded from the study if they had IAD or PUs documented upon admission to either of the study units.

Outcome measures. The primary outcome measures for the study were the prevalence of incontinence (defined as the proportion of the patient population that was incontinent on admission to the unit) and incidence (defined as the occurrence of new cases of HAPUs or IAD in patients in the study units during the time of the study).[19] For the purposes of this study, incontinence is defined as urine or feces coming in contact with the skin; patients with an indwelling urinary catheter or fecal collection device were not considered incontinent. Incontinence status (incontinent of urine, feces, or both) was documented for all patients. IAD was identified as present or not; characteristics considered included redness, excoriation, or denudement. PUs were staged according to the National Pressure Ulcer Advisory Panel's (NPUAP) guidelines for pressure ulcer staging.[20] Secondary data collected included gender, age, and Braden scores.

Study phases.

Phase 1: assessment. In Phase 1, study nurses reviewed the admission assessments that were completed on all patients admitted to the units from February to March 2011 to identify those who met inclusion criteria. Patients who met inclusion criteria were assessed twice daily from admission until discharge from the study units or for up to 14 days following admission. No study product intervention was provided during this phase of the study; nursing staff provided only standard care (ie, soap and water and a variety of moisturizing products, based on stock items available on the units). Standard hospital HAPU prevention interventions include the use of nonpowered, pressure-redistribution mattresses, moisture-wicking underpads, and a turning regimen of every 2 hours. These interventions remained constant throughout both phases of the study.

Phase 2: intervention. Before initiating Phase 2, all clinicians on the study units completed a facility-based online education program about IAD. Staff had approximately 2 weeks to complete this 1-hour, Power Point presentation that included extensive information about IAD and HAPUs, including risk factors, etiology, proper identification, assessment, differentiation between IAD and HAPUs, best practices for prevention and treatment, proper techniques for incontinence cleansing, and appropriate use of skin products. Multiple choice questions were embedded in the education to ensure the information was integrated by the learners. Signs were placed outside the rooms of the patients enrolled in the study to provide visual reminders to the staff to use the intervention product rather than soap-and-water cleansing.

In Phase 2, study nurses identified patients who met inclusion criteria from among patients admitted to the study units during the study period. All study patients were followed from admission until discharge or for up to 14 days following admission. None of the patients in Phase 1 was included in Phase 2.

For each patient in Phase 2 (the intervention group), clinicians provided incontinence care with a 1-step disposable, premoistened, barrier cloth. This cloth includes a pH-balanced skin cleanser, a moisturizer, and a 3% dimethicone skin barrier formula designed to be used in a 1-step process. The products were kept at the bedside to ensure ease of use by the clinicians, and all other perineal skin care products were removed from patient rooms and the unit-supply area to ensure consistent use of the study product.

Data collection. The primary investigator (PI, a doctorally prepared, wound, ostomy and continence Clinical Nurse Specialist) trained 6 registered nurses to complete skin assessments on each patient admitted to the units and enrolled in the study. These nurses completed skin assessments on each study patient twice per day, with particular attention to buttocks, sacrum, and perineal areas. Data were recorded on a paper/pencil assessment tool developed by the PI. Study nurses documented if patients had IAD or HAPUs. The PI verified any documented incidence of impaired skin integrity and entered all data into an Excel spreadsheet for analysis.

Data analyses. Descriptive statistics for age, gender, and total Braden score were reported in frequencies (percentages) and means. Fisher's exact test was performed to determine statistical significance between the incidence of IAD and HAPUs in Phase 1 and Phase 2 of the study after the implementation of an educational program and the 1-step cleanser barrier product.

Results

Phase 1. During Phase 1 of the study, 40 patients were admitted to the study units (17 female, 23 male; age range 18–89 years, mean 53.8). Of those, 17 (42.5%) (9 female, 8 male; age range: 22–89 years, mean 54.9) were incontinent. The average Braden score for patients admitted to the units was 15.86 (range: 11–23); the average Braden score for the patients with incontinence was 14.14 (range: 11–21).

During an average length of stay of 7 days (range: 2–14 days), 5 out of 17 patients (29.4%) developed IAD. Of those 5, all (100%) developed a Stage II HAPU, defined by the NPUAP[20] as an open, shallow partial-thickness ulcer or loss of dermis with a red pink wound bed, without slough. Thus, for all patients with incontinence, the incidence of IAD was 29.4% and the incidence of HAPU was 100% of the patients who developed IAD.

Phase 2. During Phase 2 of the study, 46 patients (20 female, 26 male; age range 18–90; mean 53.71) were admitted to the units. Of those, 25 (54.3%) (11 female, 14 male; age range 18–84 years, mean 55.58) were incontinent. The average length of stay for participants was 7.3 days (range: 3–14 days). The mean total Braden score for all patients admitted to the units was 16.37 (range: 13–23); the mean total Braden score for the patients who were incontinent was 12.74 (range: 8–17). Of the 25 patients who were incontinent, no one developed IAD and no one developed a HAPU. Thus, following the education and incontinence care intervention, the incidence of IAD and the incidence of HAPUs among patients with incontinence patients were both 0%.

Pre-intervention and post-intervention. The groups in Phase 1 and Phase 2 did not differ significantly in terms of age, total Braden scores, or length of stay. The results of the Fisher's exact test indicates a significant difference ($P = 0.01716$) between the incidence of IAD and HAPUs between Phase 1 and Phase 2 following the education and use of the 1-step barrier cleanser product.

Discussion

The 2-phased study captured incontinence prevalence and IAD and HAPU incidence data in a population of 86 high-risk patients and evaluated the effect of a caregiver education program and change in incontinence care procedures on the development of IAD and HAPUs. This study found incontinence prevalence rates of 42.5% and 54.3% among patients admitted to 2 intensive care units, higher than earlier reports of 19.7% in the general acute care setting.[6] This may have been due to the severity of illness and neurological diagnoses of patients admitted to the study units. However, a review of the literature[1-7] found no reports of the incidence of incontinence in intensive care populations. Given the high prevalence of incontinence, these patients were at high risk for development of IAD and HAPUs.

Patients in the study developed IAD at dissimilar rates (50% in Phase 1; 0% in Phase 2). In Phase 2, none of the 25 patients with incontinence developed either IAD or HAPUs, compared with 17 (29.4%) in Phase 1. This finding suggests the education and incontinence care interventions implemented may help reduce the rate of HAPUs.

This study demonstrates an integrated approach of staff education regarding IAD and HAPUs, coupled with the use of a 1-step cleanser, moisturizer, and barrier cloth for incontinence, may be beneficial in preventing HAPUs.

Limitations

As a quality improvement project, this study has limitations in terms of generalizability. Study findings are based on a small sample of patients. The intervention was provided within the clinical environment by a variety of caregivers, a factor that influences consistency of care. Future studies should incorporate the use of the IAD standardized assessment guidelines to grade the severity and progression of IAD in order to better assess the impact of the intervention.

Conclusion

The documented link between IAD and HAPUs is driving quality improvement efforts and research regarding the most effective products to prevent and treat these serious conditions. This study provides insight into the prevalence of incontinence in a high-risk, acute care population and provides additional evidence to support the effectiveness of caregiver education and use of a 1-step cleanser, moisturizer, and barrier cloth for prevention of HAPUs following the development of IAD. Additional research is needed to further explore and confirm these observations. ■

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