Patients who develop a hospital-acquired pressure ulcer (HAPU) have higher mortality, longer lengths of stay, and are more likely to be readmitted to the hospital less than 30 days following initial discharge. The Braden Scale for Predicting Pressure Sore Risk was created in 1987 to assist with the prevention of pressure ulcer formation and is now actively used in over 30 countries. This assessment tool measures a number of factors specific to the patient and calculates the patient’s risk of developing a pressure ulcer. When used in conjunction with nursing judgment and reliably implemented interventions, it decreases a patient’s chance of developing a HAPU.

We examine the literature on HAPU development to determine which strategies, used along with the Braden Scale, are most effective in pressure ulcer prevention.

What does the literature say?
A literature search on pressure ulcer prevention in the hospital setting was conducted using the Cumulative Index to Nursing and Allied Health Literature (CINahl) and PubMed. A total of 24 articles were found: 16 PubMed articles and 8 CINahl articles using the medical subject headings “pressure ulcers,” “nursing,” and “hospital setting.” The following filters were placed on the CINahl search: age, publication date, and geographic location of the studies. The search was conducted over a 4-week period and articles were excluded from this review when determined to be irrelevant due to their titles, methodologies, or usefulness of the results. This left 10 relevant articles for abstract review. Five of these articles were selected for a detailed review following the abstract review.

Call light response time
One exploratory cross-sectional study was conducted to assess the significance of call light response time on stage II pressure ulcers in the acute care setting (see National Pressure Ulcer Advisory Panel pressure ulcer staging). The hypothesis was that stage II pressure ulcers occur in higher percentages among patients with nurses whose average call light response times were longer.

This study was conducted in nine different inpatient departments at an acute care hospital in Michigan. The call light response time was obtained from tracking system reports that measured the response time and the number of patients with stage II or greater pressure ulcers. Data collection occurred over 9 months.

The response times were measured in seconds and placed in 1 of 10 groups (from low...
to 164.80 seconds to more than 3,654 seconds). Using these criteria, 207 unit cases were analyzed; the mean response time was more than 214 seconds, up to 253 seconds. The surveyed patients with a lower incidence of stage II pressure ulcers during this study also had decreased call light response times.

**Nurse job satisfaction**

Another cross-sectional study was performed to determine whether there was a linkage between stage II pressure ulcers in the acute care setting and nurse satisfaction with job performance. Data on 3,329 adult care units from 561 National Database of Nursing Quality Indicators® (NDNQI®) hospitals, along with staffing and pressure ulcer data, were collected during the study. A trained NDNQI member collected data on patients’ skin condition.

This study concluded that hospitals with nurses who are satisfied with their jobs had less HAPUs and better patient outcomes overall.

**Continuous bedside pressure mapping**

Continuous bedside pressure mapping (CBPM) was used as an intervention at a Detroit hospital to assess pressure areas to determine when to reposition the patient. A controlled cohort pilot study was conducted over a 2-month period in which CBPM was used for 307 patients. This was compared with a previous year’s data on 320 patients without CBPM. The CBPM provided pressure images at the bedside through different colorations (red indicated higher pressure) on a mat under the patients. In the intervention group, there was a 0.3% pressure ulcer rate over 2 months, whereas the control group had a 5% pressure ulcer rate.

The CBPM technology assisted in improving the effectiveness of repositioning patients, and the investigators reported that they implemented this tool in practice to lower the incidence of HAPUs.

**Repositioning every 2 hours**

Repositioning a patient every 2 hours is the standard of care for prevention of pressure ulcers. However, studies have been performed that showed this primary intervention wasn’t effective in preventing pressure ulcer formation in the acute care setting. Despite repositioning every 2 hours, the patient has a triple jeopardy area (sacrum, coccyx, and ischial tuberosity) on which pressure isn’t fully relieved with the use of wedges or pillows to support the patient in the lateral position.

A descriptive, observational study was conducted from 2007 to 2009 with 170 ICU and intermediate care beds. Twenty-three bedridden patients with a Braden score of less than 18 who were receiving routine lateral repositioning were enrolled in the study. A CBPM system was placed beneath the patients’ underpadding to ensure data collection on the triple jeopardy areas. Data were recorded every 30 seconds and included lateral turning for 6 hours.

The results indicated that repositioning didn’t relieve the pressure on the triple jeopardy areas in high-risk patients. Therefore, repositioning practices may need improvement.

**Early recognition of risk factors**

Medicare protocols have been initiated to address hospital reimbursement and pressure ulcer formation. If a patient develops a pressure ulcer, or the existing pressure ulcer increases to stage III or VI, hospitals won’t be reimbursed for care and/or services related to the pressure ulcer. A cohort

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### Pressure ulcer prevention in high-risk patients

- Perform skin assessments every 8 hours using the Braden Scale.
- Reposition the patient from left, right, and back every 2 hours to offload pressure using a pillow or wedge.
- Ensure adequate nutritional status to improve wound healing.
- Maintain adequate hydration.
- Eliminate friction or shear by limiting linen layers.
- Manage moisture or incontinence.
- Initiate barrier ointments or creams.
- Effectively communicate and document staging, treatment plans, and changes to interventions.
- Assess the need for a specialty mattress or bariatric bed.
- Encourage the patient to make position changes if able every 15 minutes.
- Educate family members.
Patients at high risk for pressure ulcer development

The following conditions increase a patient’s risk of developing a pressure ulcer:

- dementia
- stroke
- myocardial infarction
- gastrointestinal bleed
- orthopedic surgery
- neurologic disorders
- peripheral vascular disease
- spinal cord injuries
- diabetes
- renal disorders
- past history of pressure ulcer development.

study was conducted to assess the early recognition of risk factors for pressure ulcers in Medicare patients during hospitalization. Vulnerability assessment to improve recognition of patients at increased risk can indicate which patients will benefit from preventive measures (see Pressure ulcer prevention in high-risk patients).

According to the study, 214 Medicare beneficiaries admitted to a large academic center were selected to use the risk assessment protocols developed in a quality improvement project within 24 hours of hospital admission. Examples of data collected included hospital-acquired infections, adverse drug reactions, falls, comorbidities, and 30-day readmissions. Polypharmacy (51.7%), anemia (48.1%), more than four active comorbidities (73.8%), and age older than 75 years were the highest risk factors for pressure ulcer development (see Patients at high risk for pressure ulcer development). These characteristics, if recognized within 24 hours of hospital admission, were used to assess adverse events and 30-day readmissions.

The study concluded that early assessment of high-risk patients decreases the probability of readmission if the risks of pressure ulcer development were detected within 24 hours of hospital admission.

**What does this mean for you?**

Findings from these studies suggest commonalities in standards of care to prevent pressure ulcers, such as repositioning every 2 hours. However, repositioning alone isn’t effective to protect high-risk patients. Therefore, additional interventions, such as targeting high-risk patients’ comorbidities and age, need to be implemented to prevent pressure ulcer formation. The Braden Scale, along with clinical nursing judgment, should be utilized to assess risk factors for skin breakdown. Decreasing call light response time, increasing nurse job satisfaction, and implementing CBPM use may also improve pressure ulcer prevention strategies.

Nurses and unlicensed assistive personnel can use the findings from this literature review to tailor assessment of patients at high risk for pressure ulcer development, facilitating early recognition of risk factors during the first 24 hours following hospital admission. This assessment can decrease adverse reactions from the hospital stay, aid in cost management and reimbursement, and reduce hospital readmission within 30 days of discharge.

**REFERENCES**


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