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WOUND CARE

Preventing Heel Pressure Ulcers

Sustained Quality Improvement Initiative in a Canadian Acute Care Facility

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ABSTRACT

The setting for this quality improvement initiative designed to reduce the prevalence of facility-acquired heel pressure ulcers was a regional, acute-care, 490-bed facility in Ontario, Canada, responsible for dialysis, vascular, and orthopedic surgery. An interdisciplinary skin and wound care team designed an evidence-based quality improvement initiative based on a systematic literature review and standardization of heel offloading methods. The prevalence of heel pressure ulcers was measured at baseline (immediately prior to implementation of initiative) and at 1 and 4 years following implementation. The prevalence of facility-acquired heel pressure ulcers was 5.8% when measured before project implementation. It was 4.2% at 1 year following implementation and 1.6% when measured at the end of the 4-year initiative. Outcomes demonstrate that the initiative resulted in a continuous and sustained reduction in facility-acquired heel pressure ulcer incidence over a 4-year period.

KEY WORDS: Canadian heel pressure ulcer prevention, Heel pressure ulcer prevention, Heel protectors, HPU prevention

Introduction

Pressure ulcers (PUs) diminish health-related quality of life, prolong hospital length of stay, and increase costs.[1-3] The heel is at particular risk for pressure-related injury, owing to its limited soft tissue and potential exposure to prolonged pressure, friction, and shear.[4-6] Patient-specific risk factors for the development of heel PUs (HPUs) include advanced age, poor nutrition, immobility, obesity, and the presence of comorbid conditions such as diabetes mellitus, end-stage renal disease, and peripheral vascular disease.[3,7-9] The Registered Nurses' Association of Ontario recommends frequent inspection of the heels and elevation off the bed surface as key preventive interventions.[10] The European Pressure Ulcer Advisory Panel and the National Pressure Ulcer Advisory Panel (EPUAP/NPUAP) recommend the use of heel-protection devices for offloading the heels.[11]

Our acute care facility (Peterborough Regional Health Centre, Ontario, Canada) identified the need for a quality improvement (QI) initiative after the results of a point prevalence survey in 2006 revealed that 21.1% of our patients had developed facility-acquired PUs. By 2009, the prevalence of facility-acquired PUs had decreased to 10.5%, but the prevalence of facility-acquired HPU had paradoxically risen. As a result of these findings, our interdisciplinary skin and wound care team developed and implemented an evidence-based QI initiative with the aim of achieving a clinically significant reduction in facility-acquired HPUs within a period of 6 months (April to September 2009). The aim of this article was to describe the QI initiative and present outcomes measured over a 4-year period, from 2009 to 2013.

Development of the Initiative

The setting for this QI initiative was a regional, acute-care, 490-bed facility in Ontario, Canada, responsible for dialysis, vascular, and orthopedic surgery. The facility serves a diverse patient population, including First Nations peoples and the region with the greatest number of elderly (per capita) in Canada.

Prior to development of the QI initiative, an interprofessional team comprising clinical and management personnel conducted a literature review on research related to facility-acquired HPUs. We searched the MEDLINE database, using the key terms "heel pressure ulcers" and identified 299 citations. The search was refined using the Medical Subject Headings "Pressure Ulcer" and "Heel." The search was further limited to randomized controlled trials (RCTs),

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meta-analyses, nonrandomized clinical trials, practice guidelines, and reviews. The modified search yielded 2 RCTs, 3 nonrandomized clinical trials, and 2 review articles.

Review of these articles supported implementation of evidence-based prevention strategies.[12] One article described the pathophysiology of HPU development and noted the heel as being designed for the task of shock absorption (during ambulation) but predisposed to tissue breakdown with prolonged pressure, which occurs with immobility.[13] Clegg and colleagues[8] discussed the findings of a multisite study designed to identify risk factors for HPU development and identified advanced age, malnutrition, high body mass index, and multiple comorbid conditions.

We found limited evidence supporting the efficacy of heel protectors for HPU prevention.[14] We also found no definitive guidance within EPUAP/NPUAP guidelines detailing characteristics of an optimal heel protector.[11] A comparative study of wedge-shaped, bed-wide, viscoelastic cushions versus standard hospital pillows found that the use of the wedge-shaped cushion reduced the risk of developing an HPU by 85% when compared to a standard pillow.[15] However, study findings were calculated by compiling data from 2 RCTs and were limited to a nursing home patient population. A 2009 systematic review by Junkin and Gray[14] concluded that additional research was urgently needed to determine which heel protector was optimal for the prevention of HPU; our review confirmed such a need.

The economic impact of HPU was evaluated by Padula and colleagues,[16] who used a semi-Markov model to compare the estimated cost of preventing facility-acquired PUs versus the cost of standard care. They found that the expected cost of prevention was less than that for standard of care when factoring in both direct and indirect costs related to PUs.

In addition to the literature review, our team developed the QI strategy based on (1) interviews with colleagues from our and similarly sized acute care facilities to determine how others were addressing HPU prevention; (2) review of change management strategies that promote caregivers' willingness to change, compliance, and accountability; (3) development of a data collection and dissemination plan; (4) establishment of facility-specific HPU-reduction targets; (5) development of a plan for review of qualitative and quantitative feedback; and (6) a process for modifying interventions when needed. The principal steps used to develop the QI initiative are summarized in Box 1.

Our team elicited corporate support for aligning the HPU-prevention program with corporate strategic planning efforts and for ensuring that all clinical staff, including support staff and physician groups, received education on the HPU QI initiative (corporate support provided by Sage, LLC, Chicago, Illinois). Based on this process, we identified essential components of the QI initiative defined the following as essential elements of the QI intervention including (1) baseline and ongoing data collection and analysis, (2) business case development, allowing provision of heel protectors without charge to patient, (3) clinician education, (4) timely access to heel protectors, (5) process for nurse and patient adherence monitoring, and (6) plan for monitoring outcomes and dissemination of results.

The team used the Logic Program Management Model[17] for selecting a heel protector device selection. Three heel off-loading devices were subjected to trial at 2 hospitals. Device selection was based on evaluation of heel elevation; reduction in friction and/or shear; maintenance of foot position; ease of use; and patient comfort.

Business Case Development

Stakeholders involved in the development of the QI initiative felt strongly that the device needed to be provided at no additional cost to patients who met inclusion criteria: Braden Scale score 18 or less, limited mobility, and the presence of 2 or more comorbid conditions associated with an increased likelihood of HPU development. In addition, the device needed to be accessible and applied as soon as HPU risk was identified. A business case was developed to obtain administrative and financial support for

BOX 1.

Principal Steps Undertaken to Develop and Implement the Heel Pressure Ulcer Prevention Initiative

- Select a heel protector using a logic program management model.
- Develop criteria for patients who require heel protectors.
- Development facility policies for heel pressure ulcer prevention, provision for nursing judgment to be used for selection of the optimal method for heel off-loading when a heel protector was not feasible.
- Ensure adequate inventory and ready availability of the heel protector on inpatient units and emergency room.
- Enable staff to apply heel protector without a physician order.
- Provide ongoing education for the quality initiative team (skin and wound care champions), to include targeted outcomes and their role in the quality improvement initiative.
- Educate hospital staff, including nurses, physical therapists, and occupational therapists, about the importance of heel pressure ulcer prevention and implementation of preventive interventions.
- Educate physicians, surgeons, managers, directors, and support staff about the initiative and its impact on patient outcomes.

the initiative. The business case was designed to ensure the initiative aligned with corporate goals and improved patient care outcomes while minimizing costs.

We reviewed our patient population to estimate the annual usage and cost of the selected heel off-loading device. Target HPU occurrence rates were identified, and cost associated with the anticipated rates was calculated according to 2 methods: (1) cost per HPU based on stage and (2) the Canadian Association of Wound Care cost/PU calculator. The business case was accepted, with the provision that audits would be conducted at predetermined intervals to assess adherence to appropriate device usage, HPU rates, and dollars spent on devices. The QI initiative was initially evaluated at 6 months. The initiative was adopted as standard of care in October 2009 after reviewing initial outcomes. Point prevalence data were collected through 2013.

Data Analysis

The team developed a data collection and analysis plan to study the effectiveness of the initiative. We received approval from the institutional ethics review board to retrospectively analyze and disseminate the results of the 4-year initiative. A 2009 point prevalence survey was used as a historical baseline and was compared with benchmarks for facility-acquired HPU after the initiative was launched. Designated staff were trained to conduct periodic surveys to capture facility-acquired HPU prevalence, and adherence to the use of heel protectors as specified in the prevention protocol. Competency in conduct of the survey was confirmed by the educational supervisor. Our goals were a 25% reduction in occurrences of facility-acquired HPUs over the initial 6-month period and a 50% decrease in subsequent years. We sought to remain below the Canadian benchmark for facility-acquired HPU. Facility-acquired HPU occurrence rates were plotted graphically to ensure up-to-date communication with the staff regarding outcomes.

Outcomes

Retrospective analysis over a 4-year period (2009-2013) revealed that 45% of inpatients were deemed at risk for a heel PU and nurses applied heel protectors for 36% of these patients. At 1 year after QI initiative implementation, the prevalence survey revealed a 28% decrease in the prevalence of facility-acquired HPUs (5.8% vs 4.2%). Prevalence of HPUs from 2009 to 2013 declined from 5.8% at baseline to 1.6%, representing a 72% decline over this 4-year period.

Discussion

Following implementation of a QI initiative, we documented a sustained reduction in facility-acquired HPUs over a 4-year period. Our results differ from those of Gunninberg and Stotts,[18] who did not find sustained reductions in facility-acquired PUs with prolonged QI interventions. We believe that our sustained improvement can be attributed to several factors. We ensured organizational change by gaining corporate, leadership, and interprofessional support at the beginning of the project. The acceptance of the business case that provided a justification of heel protectors at no charge to at-risk patients based on cost avoidance associated with the treatment of facility-acquired HPUs was also essential. We believe that regular compliance auditing and feedback from skin and wound care champions and unit managers was essential because it ensured nursing accountability with HPU prevention efforts. In addition, provision of an evidence-based protocol in place that enabled nurses to use clinical judgment when applying heel protectors, while simultaneously removing the need for a physician order, fostered a practice change. Finally, we designed a means for ensuring the devices were easily obtainable encouraged practice changes needed to reduce HPU occurrences.

Conclusions

An interdisciplinary skin and wound care team designed and implemented a QI initiative to reduce the occurrence of facility-acquired HPUs. While definitive conclusions concerning efficacy cannot be drawn based on outcomes of a QI initiative, the sustained downward trend in facility-acquired HPU we achieved demonstrates the potential for ensuring sustained change with a carefully planned and executed QI initiative.

KEY POINTS

✔ An interdisciplinary skin and wound care team designed and implemented a QI initiative to improve prevention of facility-acquired HPUs.

✔ Standardization of heel offloading methods and devices helped staff adhere to best practices for HPU prevention.

✔ Heel protectors were made easily accessible to staff; volumes were regularly assessed, and stock was maintained on each nursing unit.

✔ Ongoing education and adherence monitoring enhanced staff accountability and contribute to sustained positive outcomes.

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