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Case Report: Role of Evidence-Based Nursing Care in the Regression of a Grade III Pressure Injury to Grade I

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Abstract: ***Pressure injuries are a significant patient safety concern, particularly among elderly patients with multiple comorbidities and limited mobility. This case study describes the successful management of a Grade III sacral pressure injury in a 75-year-old bedridden male with diabetes mellitus, hypertension, chronic kidney disease, cerebrovascular accident, Parkinsonism, and ileocecal tuberculosis. A comprehensive evidence-based nursing approach, including regular repositioning, advanced wound care, nutritional optimization, glycemic control, skin surveillance, physiotherapy, and caregiver education, was implemented. Over the course of treatment, the wound size reduced from 20 cm² to 6 cm², and the PUSH score improved from 12 to 6, demonstrating the effectiveness of multidisciplinary, evidence-based nursing interventions in promoting wound healing and improving patient outcomes. Discussion: The case report has enhanced the knowledge and practice in providing evidence based comprehensive nursing care. The knowledge of pressure injury is essential to act promptly in identifying and treating the worsening of pressure injury.***

Keywords: Pressure injury, PUSH TOOL, Braden score, Nursing interventions, education

1. Introduction

Pressure injuries, previously referred to as pressure ulcers, bed sores, or decubitus ulcers, are areas of localized damage to the skin and/or underlying soft tissue, typically occurring over bony prominences such as the sacrum, heels, elbows, or hips. These injuries are primarily caused by prolonged pressure, or a combination of pressure and shear, which compromises blood flow, leading to tissue ischemia and eventual breakdown. Pressure injuries are a major concern in both acute and long-term care settings, not only because of the pain and discomfort they cause to patients, but also due to their association with increased morbidity, longer hospital stays, higher healthcare costs, and potential legal implications for healthcare facilities.

Globally, pressure injuries represent a significant burden on healthcare systems. Data shows that approximately 12.8% of hospitalized patients have a pressure injury at any given time (point prevalence), with an estimated 5.4 new cases developing per 10,000 patient days during hospitalization (cumulative incidence). Hospital-acquired pressure injuries (HAPIs), which develop after admission, account for about 8.4% of all adult inpatient cases, underscoring the critical need for effective prevention strategies and early intervention protocols. Patients in intensive care units (ICUs) and other critical care environments are especially vulnerable due to factors such as immobility, sedation, hemodynamic instability, and the use of medical devices. Studies report a point prevalence of pressure injuries in ICU settings ranging from 16% to 27%, with ICU-acquired HAPIs affecting approximately 16% to 17% of patients. These figures highlight the necessity for vigilant monitoring and evidence-based preventive measures, particularly in high-risk populations.

Understanding pressure injuries—how they form, who is most at risk, and how they can be prevented- is essential for all healthcare professionals. Comprehensive education on classification stages, early signs and symptoms, at-risk anatomical sites, and prevention techniques (such as repositioning, skin care, and the use of support surfaces) can significantly improve patient outcomes. With global efforts focused on reducing incidence and improving care standards, pressure injury management remains a vital component of patient safety and quality care delivery.

2. Causes

- **Pressure:** Continuous pressure on the skin—especially over bony areas—compresses capillaries, reducing blood flow. This leads to tissue ischemia and cell death, starting the formation of a pressure injury.
- **Shear:** Occurs when the skin stays in place, but the underlying bone and tissues move in the opposite direction (e.g., sliding down in bed). This distorts blood vessels and tissues, increasing the risk of deep tissue damage.
- **Friction:** Happens when the skin rubs against surfaces like bedding, clothing, or medical equipment. This can remove the top layer of skin (epidermis), making it more vulnerable to injury.
- **Moisture:** Caused by sweating, incontinence, or wound drainage. Excess moisture softens the skin (maceration), weakening its barrier and making it more susceptible to breakdown from pressure or friction.

Risk Factors for Pressure Injuries

Intrinsic (Patient-related) Risk Factors:

- Reduced mobility or immobility (e.g., paralysis, sedation, weakness)
- Advanced age (thinner, fragile skin)
- Poor nutrition and hydration
- Dehydration or low protein levels
- Chronic illnesses (e.g., diabetes, renal failure, vascular disease)
- Decreased sensation (e.g., spinal cord injury, neuropathy)
- Incontinence (urinary or fecal)
- Altered mental status (e.g., confusion, coma)
- Previous history of pressure injuries
- Low body weight or obesity

Extrinsic (External/Environmental) Risk Factors:
- Prolonged pressure over bony prominences
- Shear and friction from repositioning or sliding in bed
- Moisture from incontinence or sweating
- Inappropriate or poor-quality support surfaces (e.g., mattresses, cushions)
- Inadequate repositioning or turning
- Use of medical devices (e.g., oxygen masks, braces)
- Improper lifting or handling techniques by caregivers

3. Case Report

A 75 years old male got admitted in the hospital with a history of known case of Diabetes Mellitus, Hypertension, Chronic Kidney Disease, Cerebrovascular Accident, and Parkinsonism, was diagnosed with Ileocecal Tuberculosis two months ago and started on anti-tubercular therapy (16/05/2025). Previously asymptomatic, he presented with progressive loss of appetite, abdominal pain, weight loss for two months, and abdominal distension with inability to pass stools and flatus for the past 2–3 days. The patient's multiple comorbidities, poor nutritional intake, and reduced mobility significantly increased his risk for pressure ulcer development. Now patient is admitted here for further evaluation and management. The patient had been bedridden at home for the past **15 days**, with bowel and bladder care provided in bed by relatives. His **prolonged immobility**, presence of **multiple comorbidities** (diabetes mellitus, hypertension, chronic kidney disease, cerebrovascular accident, parkinsonism, and ileocecal tuberculosis on treatment), **poor nutritional intake**, and **complete dependency on caregivers** placed him at a **very high risk for developing pressure ulcers**. On examination, he was found to have a **Grade 3 pressure ulcer** over the sacral area and **severe non-blanchable redness over both heels**, indicating early-stage pressure injury. On local skin assessment **Location-** Sacral area, **Size-** 4 x 5cm, **Stage-** Stage (III) Sacrum, Stage (I) both heels, **Tenderness-** Present, **Surrounding Skin:** Erythematous, macerated. Investigation done was CBC: Mild anaemia, leucocytosis, Blood sugar: Elevated, ESR: Raised, wound swab culture: No significant growth, Renal function test: Creatinine mildly raised (due to CKD)

Tools Used for Scoring Pressure Ulcer
- **Braden Scoring-** 8 (Very High Risk)
- **Push Ulcer Healing Chart -** Wound size = 4 cm × 5 cm = 20 cm² → Score- 9
- Tissue type = Granulation tissue → Score = 2
- Drainage = Light → Score = 1
- **PUSH Total Score = 9+ 2 + 1 = 12 (on admission)**

4. Nursing Interventions

A. Pressure Relief
- Maintained a strict **2-hourly repositioning schedule** with documentation.
- Used an **air-fluidized mattress** to redistribute pressure.
- Applied **heel protectors** to prevent worsening of Stage I injuries.
- Checked and changed bed linen frequently to prevent skin maceration.
- Ensured **correct body alignment** and limb support with pillows/cushions.
- Avoided prolonged sitting in one position; used pressure-relieving cushions when sitting.

B. Wound Care
- Wound care performed under **aseptic technique** by trained wound care nurse.
- Daily sterile dressing with normal saline irrigation and antimicrobial ointment.
- Maintained an **optimal moist wound healing environment** using advanced dressings (Mepilex).
- Monitored wound for **changes in size, exudate, odour, and surrounding skin condition**.
- Applied **barrier creams** to surrounding skin to prevent moisture-associated skin damage.

C. Infection Control
- Antibiotics given as per prescription.
- Caregivers adhered to **WHO 5 Moments for Hand Hygiene**.
- All wound care materials disposed of as per biomedical waste guidelines.
- Limited handling of wound area to essential procedures only.

D. Nutritional Support
- High-protein, calorie-rich meals with adequate **micronutrients** (vitamin C, zinc, iron).
- Encouraged **small frequent meals** for better tolerance.
- Monitored nutritional intake daily; dietician involved for individualized plan.
- Maintained hydration status; avoided dehydration that may impair healing.

E. Glycemic Control
- Adjusted diabetic medications/insulin regimen according to glucose readings.
- Monitored **fasting and postprandial blood sugars**.
- Educated patient and caregivers about dietary compliance for diabetes management.

F. Skin Surveillance
- Daily head-to-toe skin inspection to identify early signs of pressure injury.
- Used **Braden Scale reassessment** every 48–72 hours to monitor risk.
- Daily assessment and dressing performed by a wound care nurse

G. Physiotherapy & Mobilization

- Initiated gentle passive and active-assisted range-of-motion exercises.
- Encouraged early mobilization within patient's tolerance to improve circulation.
- Worked with physiotherapist to prevent contractures and muscle wasting.

H. Caregiver Education

- Trained caregivers on safe patient handling, skin inspection, hygiene maintenance, and nutritional support.
- Provided written instructions and demonstration on wound care.
- Emphasized importance of regular repositioning and pressure relief techniques.

I. Psychological Support

- Provided reassurance and emotional support to patient to reduce anxiety and depression risk.
- Encouraged family involvement in care for emotional well-being.
- With timely, evidence-based care and a multidisciplinary approach, the patient's pressure injury demonstrated significant healing, marked by reduced wound size, improved tissue health, relief from pain, and restoration of skin integrity, reflecting the effectiveness of comprehensive management.

Comparison of Pressure Injury Status from (Stage III to Stage I)

Parameter	On Admission	After Ongoing Management Present Date
Location	Sacral area (Stage II), Bilateral heels (Stage I)	Sacral area (improved granulation), Bilateral heels (blanchable erythema)
Size	Sacral ulcer: 4 × 5 cm (20 cm²)	Sacral ulcer: 3 × 2cm (6cm²)
Tissue Type	Granulation tissue	Healthy granulation with early epithelialization
Exudate Amount	Light	Minimal to none
Surrounding Skin	Erythematous, macerated	Reduced erythema, intact skin
PUSH Score	12	6
Pain/Tenderness	Present	Reduced
Braden Score	8 (Very High Risk)	14 (Mild Risk)

5. Discussion

Pressure injuries remain a major challenge in healthcare, particularly among older adults with multiple comorbidities, immobility, malnutrition, and impaired tissue perfusion. The present case involved a 75-year-old bedridden male with diabetes mellitus, chronic kidney disease, cerebrovascular accident, Parkinsonism, and ileocecal tuberculosis, all of which are recognized risk factors for delayed wound healing and pressure injury development. The patient's initial Braden score of 8 indicated a very high risk for pressure injury progression, emphasizing the need for immediate and comprehensive intervention.

The significant improvement observed in this patient, including reduction in wound size from 20 cm² to 6 cm², improvement in tissue quality, reduction in exudate, and decline in PUSH score from 12 to 6, can be attributed to the implementation of evidence-based nursing interventions. Consistent pressure redistribution through two-hourly repositioning, use of an air-fluidized mattress, and heel protection devices likely played a crucial role in reducing tissue ischemia and preventing further damage. International guidelines from the National Pressure Injury Advisory Panel (NPIAP), European Pressure Ulcer Advisory Panel (EPUAP), and Pan Pacific Pressure Injury Alliance (PPPIA) recommend regular repositioning and support surfaces as essential components of pressure injury management (European Pressure Ulcer Advisory Panel et al., 2019).

Effective wound care was another critical factor contributing to healing. Daily wound assessment, aseptic dressing techniques, maintenance of a moist wound environment, and use of advanced foam dressings facilitated granulation tissue formation and epithelialization. Previous studies have demonstrated that moist wound healing environments promote faster tissue regeneration, reduce infection risk, and improve overall healing outcomes compared with traditional dry dressings (Ousey&Cook, 2012). The observed transition from granulation tissue with surrounding erythema to healthy granulation and early epithelialization in this case is consistent with these findings.

Nutritional optimization also played a pivotal role in wound recovery. Malnutrition is a well-established predictor of poor wound healing and increased pressure injury risk. The provision of a high-protein, calorie-dense diet supplemented with essential micronutrients such as vitamin C, zinc, and iron likely supported collagen synthesis, immune function, and tissue repair. Langer and Fink (2014) reported that nutritional interventions significantly improve healing outcomes in patients with pressure injuries, particularly among older adults and chronically ill populations. Given the patient's history of weight loss and poor oral intake, nutritional support was a key determinant of successful wound healing.

Furthermore, glycemic control contributed substantially to tissue recovery. Hyperglycemia impairs leukocyte function, collagen formation, and angiogenesis, thereby delaying wound healing. Regular blood glucose monitoring and adjustment of antidiabetic therapy helped create a more favorable physiological environment for tissue repair. Similar findings have been reported in studies examining wound healing among diabetic patients, where improved glycemic control was associated with enhanced wound closure rates and reduced complications (Armstrong et al., 2017).

The multidisciplinary approach adopted in this case was instrumental in achieving favorable outcomes. Collaboration among nurses, physicians, dietitians, physiotherapists, and caregivers ensured comprehensive management addressing both local wound factors and systemic health conditions. Education provided to caregivers regarding repositioning, hygiene maintenance, nutritional support, and skin

inspection likely enhanced continuity of care and reduced the risk of recurrence. Previous literature emphasizes that multidisciplinary care models are associated with improved pressure injury outcomes and lower healthcare costs (Padula&Delarmente, 2019).

The improvement in the Braden score from 8 (very high risk) to 14 (mild risk) further reflects the effectiveness of ongoing preventive and therapeutic interventions. This finding highlights the importance of regular risk assessment using validated tools to guide individualized care planning and evaluate treatment effectiveness over time.

Overall, this case demonstrates that even in patients with multiple comorbidities and severe immobility, a structured evidence-based nursing approach can promote substantial healing of Stage III pressure injuries. Early identification, comprehensive assessment, aggressive preventive measures, advanced wound management, nutritional optimization, and caregiver involvement remain the cornerstone strategies for successful pressure injury management.

6. Conclusion

Pressure injuries are a serious but preventable complication affecting patients across all healthcare settings. They are most common in individuals with limited mobility, chronic illness, poor nutrition, or impaired sensation. If left unrecognized or untreated, pressure injuries can lead to severe pain, infections, prolonged hospital stays, and increased healthcare costs.

Through this module, we have explored the key aspects of pressure injury prevention and management- understanding the causes, identifying high-risk patients, staging injuries accurately, and applying appropriate prevention and treatment strategies. Tools like the Braden Scale and PUSH Score, along with regular skin assessments, proper repositioning, nutritional support, and use of pressure-relieving devices, play a critical role in minimizing risk.

As healthcare professionals, it is our responsibility to prioritize skin integrity, ensure early detection, maintain accurate documentation, and educate both patients and caregivers. Prevention of pressure injuries is not just a clinical task but a commitment to preserving patient dignity, comfort, and safety.

By applying the knowledge and skills gained through this module, we can work together to reduce the incidence of pressure injuries and deliver high-quality, compassionate care.

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