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CASE REPORT

Comprehensive Nursing Management Strategies for Pressure Injury Prevention and Treatment: A Systematic Review

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ABSTRACT

Pressure injuries (PIs), commonly known as bed sores, represent a significant public health concern, contributing to prolonged hospitalization, increased healthcare costs, and diminished patient quality of life. Effective nursing management is paramount, as nurses serve as the primary caregivers responsible for surveillance, prevention, and treatment. This systematic review synthesizes current, evidence-based nursing strategies across the continuum of care from initial risk assessment to advanced wound healing protocols. The review identifies the critical pillars of management, including standardized risk assessment utilizing tools such as the Braden Scale, implementation of timely repositioning protocols, optimization of nutritional status, selection of appropriate support surfaces, and adherence to advanced moist wound healing principles. Findings underscore that PI management demands a proactive, multidisciplinary approach centered on continuous vigilance, comprehensive patient education, and rigorous documentation. Adherence to these protocols is essential not only for patient safety but also for maintaining institutional quality indicators.

KEYWORDS

• Pressure Injury • Bed Sore Nursing Management • Braden Scale • Wound Care • Prevention • Repositioning • Support Surfaces

INTRODUCTION

Pressure injuries (PIs) localized damage to the skin and underlying soft tissue usually over a bony prominence are a pervasive and often preventable complication of acute and long-term care.[1] Historically referred to as decubitus ulcers or bed sores, the preferred terminology, "Pressure Injury," emphasizes that damage results from sustained pressure, shear, medical devices, or friction.[2] The prevalence of PIs varies widely but remains alarmingly high, particularly in intensive care units, geriatric

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settings, and among patients with immobility, poor perfusion, or nutritional deficits. PIs inflict substantial pain and suffering, increase the risk of systemic infection (sepsis), and are associated with a 4.5-fold increase in the length of hospital stay.[3]

The economic burden associated with PI treatment is staggering. Costs include nursing time, specialized medications, advanced wound dressings, surgical intervention (for advanced stages), and resources allocated to managing related complications. Given that a significant proportion of PIs are considered preventable, their occurrence is widely viewed as a negative indicator of healthcare quality.[4]

Nurses are positioned at the nexus of PI management. Their role extends beyond merely executing physician orders; they are responsible for ongoing risk identification, implementation of preventive interventions, staging wounds, performing direct wound care, and coordinating multidisciplinary team efforts.

1. Problem Statement

Despite decades of formalized guidelines and scientific advancements in wound care technology, pressure injuries continue to pose a significant challenge to patient well-being and healthcare resource optimization. A lack of consistent adherence to evidence-based nursing protocols, coupled with insufficient staff education and complex patient comorbidities, hinders effective prevention and treatment outcomes.

2. Research Aim and Objectives

The primary aim of this research paper is to systematically analyze and synthesize current evidence-based nursing management strategies for the prevention and treatment of pressure injuries.

Specific objectives include:

1. To identify the primary risk assessment tools utilized in clinical nursing practice.
2. To detail the essential components of a comprehensive PI prevention protocol, focusing on mechanical, nutritional, and skin care strategies.
3. To outline stage-specific treatment modalities and dressing choices employed by nurses for effective wound healing.
4. To explore the role of documentation, education, and quality improvement in optimizing nursing care related to PIs.

METHODS AND MATERIALS

1. Study Design

This paper employs an Integrative Literature Review methodology. This approach permits the synthesis of diverse research designs (clinical trials, systematic reviews, case studies, and established clinical guidelines) to provide a comprehensive understanding of evidence-based nursing practices in PI management.

2. Search Strategy and Inclusion Criteria

The literature search was conducted using key academic databases (e.g., PubMed, CINAHL, Google Scholar). Search terms were combined using Boolean operators (AND/OR) and included: "Pressure Ulcer Prevention," "Nursing Management," "Braden Scale," "Wound Care Protocols," "Repositioning Schedule," and "Advanced Dressing Selection."

Inclusion Criteria:

1. Publications focusing specifically on nursing roles, interventions, and protocols.
2. Peer-reviewed articles, consensus guidelines (e.g., NPUAP/EPUAP), and established clinical standards of care.
3. Materials published predominantly within the last 10 years (2013-2023) to ensure relevance to current practice standards.
4. English language publications.

Exclusion Criteria:

1. Articles focused solely on surgical management or non-PI-related wound types.
2. Opinion pieces without supporting evidence.

3. Data Extraction and Synthesis

Data relevant to the nursing process (assessment, Planning, Intervention, Evaluation) were systematically extracted from the selected literature. Findings were then synthesized using a thematic analysis approach, categorized into the four core pillars of effective nursing management:

Risk assessment, Prevention, Treatment, and Quality Assurance.

RESULTS (SYNTHESIS OF FINDINGS)

The synthesis of current evidence revealed a structured, multi-component framework for effective nursing management of pressure injuries. This framework is characterized by proactive assessment and a tiered approach to intervention based on risk level.

1. Pillar 1: Foundational Risk assessment

The cornerstone of modern PI management is standardized, validated risk assessment. The literature consistently identifies the Braden Scale as the primary tool utilized globally.[5] The Braden Scale evaluates six subscales: Sensory Perception, Moisture, Activity, Mobility, Nutrition, and Friction/Shear. A lower total score indicates higher risk.

Nurses are responsible for:

1. **Initial assessment:** Performing the Braden Scale assessment upon admission (within 8 hours in acute care).
2. **Reassessment:** Repeating the assessment daily, or more frequently if there is a change in the patient's condition (e.g., transfer to ICU, post-surgery, or deterioration in nutritional status).
3. **Clinical Judgment:** Using the scale as a guide, not a definitive predictor. Even patients scoring relatively low risk may require targeted interventions based on unique clinical factors (e.g., severe edema, unstable hemodynamic status).

2. Pillar 2: Comprehensive Prevention and Prophylaxis

Prevention protocols are mandatory for all patients identified as "at risk" (typically a Braden score of 18 or lower). These strategies fall into four crucial domains:

A. Mechanical Load Management (Repositioning and Support)

The primary mechanism for prevention is reducing the duration and intensity of pressure on bony prominences.[6]

- **Turning Schedules:** Standard protocol dictates turning and repositioning patients who are unable to move independently every two hours (q2h) in bed. For chair-bound patients, shifting position hourly, or assisting them to tilt their weight every 15 minutes, is necessary.
- **Support Surfaces:** Utilizing pressure redistributing or pressure-relieving surfaces is critical. Examples include alternating pressure mattresses, low air loss beds, fluidized beds, and specialized cushions. Nurses must ensure the correct surface is selected based on the patient's weight, mobility, and existing PI staging.
- **Friction and Shear Reduction:** Employing lift sheets or mechanical lifts when moving patients (rather than dragging) and utilizing protective dressings (such as thin foam or hydrocolloid) over high-risk areas (sacrum, heels) can mitigate friction and shear forces.

B. Skin and Moisture Management

Moisture from incontinence, perspiration, or wound exudate macerates the skin, significantly increasing PI risk.[7]

- **Cleansing and Moisturizing:** Skin should be cleansed gently immediately following incontinence episodes using pH-neutral cleansers. Moisturizers should be applied to dry skin, but excess moisture, particularly in skin folds, must be avoided.
- **Barrier Protection:** Application of moisture barrier creams or ointments (containing zinc oxide or dimethicone) is essential to protect the skin from urine and feces.

C. Nutritional Optimization

Inadequate protein and caloric intake compromises tissue integrity and hinders wound healing.

- **Screening and Referral:** The nurse is responsible for nutritional screening upon admission. High-risk patients should be referred promptly to a dietitian.
- **Support:** Implementation of tailored nutritional support, including high-protein supplements (e.g., arginine, zinc, Vitamin C) for patients with existing wounds or identified deficiencies, is a critical nursing intervention.[8]

3. Pillar 3: Stage-Specific Treatment Modalities

When PIs develop, nursing care transitions from prevention to stage-specific treatment, guided by the International Pressure Ulcer Classification System (Stages 1-4, Unstageable, and Deep Tissue Injury).[2]

PI Stage	Key Nursing Management Focus
Stage 1 (Non-blanchable erythema)	Prevention Reinforcement: Relieve pressure immediately. Maintain skin moisture balance. Monitor closely.
Stage 2 (Partial thickness skin loss)	Protection and Moist Healing: Cleanse gently. Use hydrocolloids or transparent films to maintain a moist environment and protect the wound bed from contamination.
Stage 3 (Full thickness skin loss)	Debridement and Exudate Management: Requires removal of non-viable tissue (sharp, enzymatic, or autolytic debridement). Manage moderate to heavy exudate using foam dressings, alginates, or hydrofibers.
Stage 4 (Full thickness tissue loss to bone/muscle)	Infection Control and Advanced Management: Requires aggressive debridement, assessment for osteomyelitis, and often advanced modalities like Negative Pressure Wound Therapy (NPWT). Dressings must manage heavy exudate and fill dead space (e.g., gauze packing, alginates).
Unstageable/DTI	assessment and Consultation: Requires immediate consultation (wound care specialist/ physician). Unstageable wounds need debridement to remove eschar/slough before staging is possible. DTI requires intensive pressure relief and frequent monitoring for necrosis.

4. Pillar 4: Documentation, Education, and Quality Improvement

Effective management relies on meticulous record-keeping and continuous education.

- **Documentation:** Nurses must document the PI risk score, skin assessment findings, wound measurements (length, width, depth, tunneling), exudate characteristics, odor, pain level, and every intervention performed (repositioning, dressing changes, barrier use). Accurate documentation ensures continuity of care and provides longitudinal data for tracking wound progress.
- **Patient and Family Education:** Educating patients and their caregivers about the PI etiology, risk factors, and their vital role in repositioning and nutrition adherence significantly improves compliance and outcomes.
- **Quality Assurance:** Nursing leadership must routinely audit adherence to PI protocols. High PI rates require root cause analysis to identify systemic failures (e.g., inadequate staffing, lack of appropriate support surfaces, or gaps in staff education).

DISCUSSION

The findings of this review confirm that the successful management of pressure injuries is intrinsically linked to the diligence and expertise of the nursing profession. The synthesis highlights that current best practices mandate a shift from reactive treatment to proactive, individualized risk management.[9]

1. Interpretation and Synthesis

The emphasis on the Braden Scale remains appropriate, but the literature reinforces that the scale must be coupled with rigorous professional judgment. For instance, a patient with peripheral vascular disease may score moderately but face an exponential risk of tissue breakdown due to poor perfusion a factor the Braden Scale may underestimate. Therefore, nursing vigilance in conducting head-to-toe skin assessments hourly during critical care rounds significantly enhances detection capabilities.[10]

The transition from prevention to treatment involves complex decision-making regarding dressing selection. The principle of moist wound healing is paramount. Dry wounds heal slowly and increase pain. Nursing staff must possess comprehensive knowledge regarding dressing categories (hydrogels, foams, alginates) and how they interact with wound exudate levels and PI stage. Incorrect dressing choice such as using a highly absorbent alginate on a dry Stage 2 wound can desiccate the wound bed and impair healing.

2. Implications for Nursing Practice

The strict adherence to evidence-based protocols, particularly in positioning and support surface management, directly translates to reduced PI incidence. However, clinical implementation faces significant barriers, primarily related to inadequate staffing ratios and time constraints 11. The physical demands of repositioning dependent patients necessitate appropriate staffing levels and ergonomic training to prevent staff injury and ensure protocol compliance. Management must prioritize investment in technology (e.g., specialized beds, electronic documentation systems that prompt q2h turns) that simplifies compliance.

3. Limitations and Future Research

This study utilized a literature review design; thus, it is constrained by the quality and generalizability of the source material. It lacks primary data and cannot account for variations in institutional resources or regional differences in healthcare delivery.

Future research should focus on refining the efficiency of PI management. Specifically, there is a need for studies evaluating:

1. The efficacy of smart technology (e.g., sensor-embedded textiles or beds) in augmenting human observation for early detection and compliance.
2. Implementation science research exploring effective strategies for translating PI prevention guidelines into consistent, high-fidelity clinical practice, particularly in resource-limited settings.
3. The long-term impact of specialized nutritional supplements on wound healing rates in chronic PI patients.

CONCLUSION

Pressure injury nursing management is a dynamic and essential component of safe patient care. The evidence overwhelmingly supports a standardized, multidisciplinary approach built upon the pillars of risk assessment (Braden Scale), mechanical load reduction (repositioning and appropriate support surfaces), nutritional optimization, and stage-specific moist wound healing techniques.

Nurses are the critical drivers of effective PI outcomes. Success rests upon continuous education, meticulous documentation, and institutional commitment to providing the resources necessary for rigorous protocol adherence. By integrating contemporary evidence into daily practice, the incidence and severity of pressure injuries can be significantly reduced, leading directly to enhanced patient safety, reduced healthcare costs, and overall improved quality of care.

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