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Outcomes of wound care nurses' practice in inpatients with pressure-induced skin and soft tissue injuries

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Abstract
Background: Pressure-induced skin and soft tissue injuries are a significant cause of morbidity among hospitalized patients worldwide. Wound care nurses play a critical role in preventing and managing these injuries through evidence-based interventions. This study aimed to evaluate the outcomes of wound care nurses' practice in inpatients with pressure-induced injuries in a tertiary hospital in Riyadh, Saudi Arabia.
Method: A quantitative, prospective study was conducted at Aster Sanad Hospital, enrolling 200 inpatients aged 18-85 years with existing pressure injuries or at high risk for hospital-acquired pressure injuries (HAPI). Participants were monitored over 8 weeks. Data on wound healing (assessed by the Pressure Ulcer Scale for Healing [PUSH]), incidence of new injuries, wound severity, and patient satisfaction were collected. Sociodemographic data were also recorded. Paired t-tests, chi-square tests, and repeated-measures ANOVA were used to assess changes over time.
Result: This study demonstrated significant improvements in wound healing, with mean PUSH scores decreasing from 15.2±3.4 at baseline to 8.6±2.7 post-intervention (p<0.001). The incidence of new HAPI decreased from 14% at baseline to 6% by week 8. Stage severity regression was observed, with 40% of Stage 3 wounds downgrading to Stage 2. Patient satisfaction scores were high across all domains, reflecting positive perceptions of care. Older age, immobility, and comorbidities were associated with slower healing.
Conclusion: These findings underscore the effectiveness of specialized wound care nurses in accelerating healing, preventing new injuries, and enhancing patient satisfaction. The study supports the integration of trained wound care nurses into hospital care teams and emphasizes the need for structured protocols and continuous monitoring. These results have implications for clinical practice, hospital policies, and future nursing education in Saudi Arabia, providing evidence for scalable and sustainable strategies to reduce the burden of pressure-induced injuries.

Keywords: Wound care, pressure injuries, skin and soft tissue injuries, nursing practice, inpatient care, healing outcomes

Introduction
Pressure-induced skin and soft tissue injuries, commonly termed pressure injuries or ulcers, remain a significant health concern in inpatient care settings globally. They result from sustained pressure, friction, or shear over bony prominences, leading to localized tissue damage (NPIAP, 2022) [17]. Hospital-acquired pressure injuries (HAPIs) are particularly concerning due to their association with increased morbidity, extended hospital stays, infection risk, and healthcare costs (Reddy, Gill, & Rochon, 2006; Coleman *et al*., 2014) [19, 6]. Prevalence rates range from 5-15% internationally, with higher rates in intensive care units and among patients with comorbidities, immobility, or advanced age (Sving, Nilsson, & Unosson, 2020; Jackson, Andersson, & Roberts, 2019) [21, 9,]. In Saudi Arabia, prevalence estimates in tertiary hospitals range from 10-18%, highlighting a substantial clinical challenge (Alanzi, Alshahrani, & Alzahrani, 2021; Almutairi & Alotaibi, 2019) [1, 3].
Specialized wound care nurses have been recognized as key contributors to improving outcomes in patients with pressure injuries. Through structured assessment, individualized care plans, evidence-based dressing selection, and preventive strategies, they can accelerate (Johnson & Taylor, 2017; Taylor & Anderson, 2012) [25, 22]. In South Korea, structured nurse-led interventions reduced wound severity and improved patient satisfaction (Lee & Kim, 2019) [13].

Despite these insights, gaps persist. Much of the evidence originates from Western healthcare systems, where nurse staffing ratios, clinical protocols, and resources differ substantially from Saudi settings (Coleman *et al*., 2014; Wilson & Clark, 2015) [6, 24]. In Saudi Arabia, studies are predominantly cross-sectional, focusing on prevalence and risk factors, rather than evaluating structured, quantitative interventions led by wound care nurses (Alanzi *et al*., 2021) [1]. Moreover, patient-reported outcomes, such as satisfaction, are rarely integrated with objective wound healing measures, limiting understanding of the holistic impact of care (Brown & Green, 2020; Davis & Miller, 2016) [5, 7].

Pressure injuries have profound physical and psychosocial consequences, including pain, infection, decreased mobility, and reduced quality of life (Sving *et al*.**,** 2020; Jackson *et al*., 2019) [21, 9]. Effective nurse-led interventions not only improve clinical outcomes but also enhance patient engagement and adherence to care protocols. Evidence-based practice emphasizes prevention alongside treatment, through early risk assessment, patient education, and continuous monitoring (Evans & Roberts, 2013; White & Black, 2018) [8, 23].

This study aimed to quantitatively assess the outcomes of wound care nurses' practice in inpatients with pressure-induced skin and soft tissue injuries at Aster Sanad Hospital, Riyadh. The objectives were to: (1) measure the impact on wound healing rates; (2) evaluate the prevention of new pressure injuries; (3) analyze regression in wound severity; and (4) assess patient satisfaction with care. By integrating standardized wound assessment tools, patient satisfaction surveys, and rigorous quantitative analysis, this study provides robust evidence to inform hospital policies, professional training, and best practices in Saudi Arabia.

The study addresses a critical gap in the literature by combining objective healing metrics with patient-reported outcomes in a Middle Eastern context, providing context-specific, generalizable findings. These results are expected to contribute to the optimization of inpatient care, reduction of HAPI incidence, and enhancement of overall patient well-being.

Methods

Study Design: A quantitative, prospective cohort study was conducted at Aster Sanad Hospital, Riyadh, Saudi Arabia, from January to August 2025. A single-arm intervention design was implemented with pre- and post-measures to assess wound healing and patient satisfaction.

Participants: Two hundred inpatients aged 18-85 years, with at least one Stage 1-4 pressure injury or at high risk for HAPI, were recruited via hospital admission records. Inclusion criteria included consent, anticipated hospital stay ≥8 weeks, and no contraindications to standard wound care protocols. Exclusion criteria included terminal illness or cognitive impairment preventing participation.

Intervention: Wound care nurses implemented evidence-based interventions, including:

- Comprehensive wound assessment using PUSH and NPIAP staging (NPIAP, 2022) [17].
- Individualized dressing selection and pressure-relief strategies.
- Repositioning protocols every 2 hours.
- Nutritional support and hydration monitoring.
- Education on mobility, skin care, and infection prevention.

Data Collection

- **Wound Healing:** Assessed using the PUSH tool weekly; reduction in score indicated improvement.
- **New HAPI Incidence:** Daily monitoring for development of new pressure injuries.
- **Wound Severity:** NPIAP staging documented at baseline, midline (week 4), and endpoint (week 8).
- **Patient Satisfaction:** Survey using a validated 5-point Likert scale (Brown & Green, 2020) [5].
- **Sociodemographic Data:** Age, gender, comorbidities, mobility status, length of stay.

Data Analysis

Data analysis was conducted using a combination of descriptive and inferential statistics. Descriptive statistics were applied to summarize baseline characteristics of the participants. Paired t-tests were performed to compare Pressure Ulcer Scale for Healing (PUSH) scores before and after the intervention. The chi-square test was used to evaluate the reduction in the incidence of hospital-acquired pressure injuries (HAPI). Changes in wound severity over time were examined using repeated-measures analysis of variance (ANOVA). In addition, multiple regression analysis was employed to identify predictors of healing rates, including age, comorbidities, and mobility. Statistical significance was established at $p<0.05$.

Ethical Considerations

Approval was obtained from the Aster Sanad Hospital IRB (Ref: ARC-02.00.00). Written informed consent was secured from all participants. Data confidentiality was maintained through de-identified records. Safety protocols minimized risks associated with repositioning and dressing changes. Participants could withdraw at any time.

Results

Sociodemographic Characteristics

Table 1 presents the sociodemographic profile of the study participants (n = 200). The majority were aged 41-60 years (42.5%), followed by 18-40 years (35%) and 61-85 years (22.5%), representing a diverse age distribution. Gender distribution was relatively balanced, with males comprising 55% and females 45% of the sample. Comorbidities were prevalent, with 55% of participants having one or two chronic conditions, 20% with more than two comorbidities, and 25% reporting no underlying health conditions. Mobility status varied, with 40% fully ambulatory, 35% partially mobile, and 25% immobile. This demographic profile reflects a representative inpatient population at risk for pressure-induced skin and soft tissue injurie

Table 1: Sociodemographic Characteristics of Participants (n=200)

Variable	Frequency (n=200)	%
Age (years)		
18-40	70	35
41-60	85	42.5
61-85	45	22.5
Gender		
Male	110	55
Female	90	45
Comorbidities		
None	50	25
1-2	110	55
>2	40	20
Mobility Status		
Ambulatory	80	40
Partially mobile	70	35
Immobile	50	25

Wound Healing Outcomes

Table 2 shows the changes in wound healing over the 8-week intervention period, measured using the Pressure Ulcer Scale for Healing (PUSH). The mean PUSH score decreased progressively from 15.2±3.4 at baseline to 11.9±3.0 at week 4, and further to 8.6±2.7 at week 8. Paired comparisons indicate statistically significant improvements at each time point (p<0.001), demonstrating both clinical and statistical significance in wound healing under the care of wound care nurses.

Table 2: Wound Healing Outcomes Measured by PUSH Score

Time Point	Mean PUSH Score ± SD	. p-value
Baseline	15.2±3.4	0.12
Week 4	11.9±3.0	<0.001
Week 8	8.6±2.7	<0.001

HAPI Incidence and Severity Regression

Table 3 presents the incidence of new hospital-acquired pressure injuries (HAPI) and changes in wound severity. The incidence of new HAPI decreased from 14% at baseline to 6% by week 8 (p=0.002), indicating a significant preventive effect of wound care nurse interventions. Wound severity showed significant regression: Stage 2 wounds increased from 60 to 75 (p=0.01), reflecting healing of more severe wounds; Stage 3 wounds decreased from 50 to 30 (p<0.001), and Stage 4 wounds decreased from 30 to 15 (p<0.001). These findings confirm both preventive and therapeutic effectiveness of specialised wound care nursing.

Table 3: HAPI Incidence and Wound Severity Regression

Outcome	Baseline	Week 8	p-value
New HAPI incidence	14%	6%	0.002
Stage 2 wounds	60	75	0.01
Stage 3 wounds	50	30	<0.001
Stage 4 wounds	30	15	<0.001

Patient Satisfaction

Table 4 reports patient-reported $_{satisfaction}$ across four domains: communication, timeliness, pain management, and overall satisfaction. Mean scores ranged from 4.4 to 4.6 on a 5-point Likert scale, reflecting high satisfaction with wound care nursing services. All domains showed statistically significant improvements compared to baseline (p<0.001), indicating that specialized wound care nursing not only improves clinical outcomes but also enhances patient perceptions and experience of care.

Table 4: Patient Satisfaction with Wound Care Nursing Services

Domain	Mean Score (1-5)	p-value
Communication	4.6	<0.001
Timeliness	4.5	<0.001
Pain management	4.4	<0.001
Overall satisfaction	4.5	<0.001

Discussion

The findings of this study demonstrate the significant impact of wound care nurses' interventions on patients with pressure-induced skin and soft tissue injuries. The observed reduction in PUSH scores over the 8-week period indicates that specialized, nurse-led interventions accelerate wound healing. This is consistent with prior research highlighting the critical role of trained nurses in implementing evidence-based wound care strategies that optimize healing rates (Taylor & Anderson, 2012; Johnson & Taylor, 2017) [22, 25]. The multifaceted approach, encompassing wound assessment, timely dressing changes, and individualized care plans, likely contributed to the observed improvements.

Prevention of new hospital-acquired pressure injuries (HAPI) was another key outcome. The reduction in HAPI incidence from 14% to 6% supports the effectiveness of structured preventive measures such as frequent repositioning, use of pressure-relieving devices, and early identification of high-risk patients. These findings align with Wilson and Clark (2015) and Evans and Roberts (2013) [24, 8], who emphasized that systematic nurse-led interventions can substantially lower the risk of HAPI in hospitalized patients. The integration of these preventive practices into routine care demonstrates the feasibility of achieving high-quality patient outcomes without requiring extensive additional resources.

The regression in wound severity and stage further underscores the clinical value of wound care nurse interventions. Significant reductions in Stage 2, 3, and 4 wounds suggest that timely and targeted interventions can halt progression and promote tissue regeneration. This observation corroborates findings from the National Pressure Injury Advisory Panel (NPIAP, 2022) [17], which recommends specialized nursing care for effective wound management. The ability to downgrade wound stages is not only clinically relevant but also has implications for reducing patient morbidity, hospital stay duration, and

overall healthcare costs (White & Black, 2018) [23].

Patient satisfaction scores were consistently high across domains, including communication, timeliness, and pain management. This aligns with the growing recognition that patient-reported outcomes are an essential component of quality care (Brown & Green, 2020; Davis & Miller, 2016) [5, 7]. High satisfaction likely reflects the personalized, responsive nature of wound care nursing practice, which fosters trust, adherence to care plans, and overall engagement in recovery. Moreover, positive patient perceptions are associated with improved clinical outcomes, suggesting a synergistic effect between technical expertise and interpersonal care (Smith & Jones, 2021) [20].

Sociodemographic analysis indicated that older age, presence of comorbidities, and immobility were associated with slower healing rates, consistent with previous studies (Lee & Kim, 2019; NPIAP, 2022) [13, 17]. This highlights the need for tailored interventions that account for patient-specific risk factors. The quantitative findings also suggest that nurse-led interventions are effective across diverse patient profiles, supporting their generalizability within inpatient settings.

Despite these positive outcomes, certain limitations must be acknowledged. The study was conducted in a single tertiary hospital, which may limit external validity. Additionally, while standardized assessment tools were used, some measurement bias may have occurred due to subjective interpretation of wound characteristics. Future studies could expand to multicenter trials and incorporate automated wound measurement technologies to enhance objectivity and scalability (Johnson & Taylor, 2017) [25].

The implications of these findings for clinical practice are substantial. First, the results provide robust evidence supporting the integration of specialized wound care nurses into inpatient care teams. Hospitals should consider structured training programs and formal protocols to enhance wound care competency. Second, preventive strategies demonstrated significant efficacy, highlighting the importance of routine risk assessments and early intervention in reducing HAPI incidence. Third, patient satisfaction outcomes emphasize that nursing care should balance technical skill with patient-centered communication, as both elements contribute to successful recovery.

Overall, this study contributes to the growing body of evidence that specialized wound care nursing practice is essential for improving outcomes in patients with pressure-induced skin and soft tissue injuries. The quantitative evidence presented not only confirms the effectiveness of interventions in promoting healing, reducing incidence, and mitigating severity but also reinforces the value of patient-centered approaches. These findings have the potential to inform hospital policies, professional nursing education, and future research in wound care management. By demonstrating measurable improvements in clinical outcomes and patient experience, this study provides a compelling argument for the continued expansion and recognition of wound care nursing as a critical specialty in inpatient healthcare settings.

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Conflict of Interest

The authors have declared no conflict of interest

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