Pressure Injury Current Awareness Service

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Background: Pressure ulcer is not a plague of modern man; it is a serious medical problem that can affect a bedridden patient in any health care setting. Pressure ulcer can cause extreme discomfort to the patient and often lead to damage to tissue, underlying muscles, bones, or joints. Pressure ulcer occurs across the spectrum of health care settings. Lack of practical skill is also another problem which raises the incidence of pressure ulcer. Aims: The overall aims of the present study were to assess the expressed practices among nurses regarding prevention of pressure ulcer among patients and develop guidelines for care of pressure points. Methodology: Quantitative approach was adopted for descriptive study and conducted in MMIMS&R, Hospital, Mullana, Ambala during a period from September, 2017 to April, 2018. 157 nurses were selected by total enumerative sampling technique. The data was collected by assessing expressed practices of nurses by expressed practice questionnaire. Results: The majority of nurses were found to be significant at a 0.05 level of significance. In addition to this, majority of nurses were performed expressed fair practices (93.35%) followed by 573% good practices and 19.1% poor practices regarding prevention of pressure ulcer. Nurses do not assess patient for presence of pressure ulcer neither use any risk assessment tool. So, the researcher had decided to develop “Guidelines for the Prevention of Pressure Ulcer” which include assessment, prevention and management of pressure ulcer and also distributed to nurses in selected wards.

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Findings and reliability: The reliability coefficient for BWAT score (all participants, all anatomic locations) was high (r 0.90; p < 0.0001; n 1,161 observations). Weighted Kappas for characteristics ranging from 0.46 (skin color surrounding wound) to 0.79 (undermining) were consistent for all participants. BWAT scores showed the strongest agreement coefficients for stage 4 pressure injury (r 0.69), pressure injuries among Asian and White ethnicity/racial groups (r 0.89, and r 0.91, respectively), and sacrum anatomic location (r 0.92).
indicating scores are better correlated to fair skin tones. Lower agreement coefficients were demonstrated for stage 2 pressure injury (r = 0.38) and pressure injuries among African American and Hispanic ethnicity/racial groups (r = 0.88 and 0.87, respectively). BWAT scores were significantly different by pressure injury stage (F = 4967, df 6, p < 0.0001) and anatomic location (F = 3376, df 8, p < 0.0001). BWAT scores correlated with pressure injury natural history (ulcer resolved 184 ± 74, ulcer persisted 249 ± 100; F = 7011, df 2, p < 0.0001), but not with comorbidities. The BWAT provides reliable, objective data for assessing pressure injury healing progress.

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Root cause analysis (RCA) is a systematic process for identifying the causes of an adverse occurrence or combined with an approach for a response designed to prevent recurrences. This method may be used for continuous quality improvement in a facility or health system. Root cause analysis can aid nurses and hospital risk managers to determine how the system can improve to reduce the number and severity of pressure injuries. The process of RCA begins with being certain the wound is a pressure injury using differential diagnoses of similar appearing skin disease and injury, followed by an examination of the processes of care (human roots) for missed actions or inactions that are linked to development of a particular pressure injury. The final step of RCA is a critical examination of the system (including people and processes) to look for modifiable trends or patterns that are identified that are used to prevent recurrences.

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Prolonged mechanical loading on soft tissues adjacent to bony prominences can lead to pressure ulcers. The presence of moisture at the skin interface will lower the tolerance to load. Absorbent pads manage moisture in individuals with incontinence, although their role in maintaining skin health is unknown. The present study investigated the effects of moist incontinence pads on skin physiology after periods of mechanical loading. Twelve healthy participants were recruited to evaluate a single incontinence pad design under three moisture conditions: 0% (dry), 50% and 100% fluid capacity. For each pad condition, pressure (9 kPa) or pressure in combination with shear (3 N) was applied to the sacrum, followed by a period of off-loading. Measures included trans-epidermal water loss (TEWL) and inflammatory biomarkers sampled at the skin interface. Results revealed no change in TEWL in the loaded dry pad condition. By contrast, when the pads contained moisture, significant increases in TEWL were observed. These increases were reversed during off-loading. Inflammatory biomarkers, specifically IL-1α/total protein ratio, were up-regulated during dry pad loading, which recovered during off-loading. Loaded moist pads caused a significant increase in biomarkers, which remained elevated throughout the test period. The study revealed a marked compromise to stratum corneum integrity when the skin was exposed to moist incontinence pads in combination with mechanical loads. These physiological changes were largely reversed during off-loading. Incontinence pads provided some protection in the dry state, although more research is required to determine optimal clinical guidance for their use. Dry incontinence pads provide some skin barrier protection during mechanical loading. Addition of moisture within the incontinence pads reduces the skin barrier function, with recovery during off-loading. Inflammatory cytokines levels increased after loading with moistened pads, with partial recovery during off-loading. Periods of pressure relief and careful management of moisture are critical for the maintenance of skin health.

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Background: Hospital-acquired pressure ulcers (HAPUs) are largely preventable yet still common occurrences in hospitals. The purpose of the current study is to determine how data from the electronic medical record can be used to better understand and predict HAPU formation over the course of a hospital admission. Methods: A case-control study on HAPUs was performed over an 8-month period at Yale New Haven Hospital. A Cox regression analysis model analyzed the impact of multiple factors on HAPU development including friction and shear, among other Braden score components. A receiver operating characteristic curve was calculated to determine the sensitivity and specificity of changes in these factors in predicting
HAPU development; Results: On a sample of 8,790 admissions, HAPU incidence was 42% over the study period (63% per annum) The average hospital day for HAPU development was day 156 (± 193) The Cox regression analysis demonstrated that the volatility of the friction and shear component of Braden scores had a risk ratio of 286 (P < 0.01; CI, 145-564) Volatility in the friction and shear component was the most predictive factor with a high receiver operating characteristic curve area of 0.865 (CI, 0.847-0.882); Conclusions: Volatility of the friction and shear component of Braden scores appears to be the most significant factor preceding HAPU development at Yale New Haven Hospital Efforts to place more focus on identifying and reducing volatility of this factor may help decrease HAPU risk for future patients;

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Patients undergoing operative and other invasive procedures are at high risk for developing pressure injuries This study aimed to determine the incidence of perioperative pressure injuries in patients who underwent procedures lasting two hours or more in Turkey and the risk factors that affect the development of pressure injuries Data were collected during the perioperative period The incidence of perioperative pressure injuries was 404% The results of univariate logistic regression analysis showed that intraoperative vasopressor use, skin turgor, and diastolic blood pressure less than or equal to 60 mm Hg were significantly related to the development of pressure injuries There was no significant difference between patients who developed pressure injuries and patients who did not when comparing their preoperative Braden Scale scores Perioperative nurses should assess each patient for pressure injury risk and perform interventions to prevent pressure injuries during each stage of the patient's perioperative course

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Significance: It is estimated that up to 50% of hospitalized patients are malnourished Malnutrition can lead to longer hospital stays, altered immune function, and impaired skin integrity and wound healing Malnutrition has been found to be a significant factor influencing pressure injury (PI) risk and wound healing While PI prevention requires multidimensional complex care using a variety of evidence-based strategies, hospitalized patients benefit from interventions that focus on improving oral nutrition to reduce PI risk and enhance wound healing Unfortunately, malnutrition is often under-recognized and inadequately managed in hospitalized patients and this can lead to higher rates of complications such as PI Recent Advances: Recent studies suggest that nutritional care has a major impact in PI prevention and management Strategies, including early identification and management of malnutrition and provision of specially-formulated oral nutritional interventions to at-risk patients, optimization of electronic health record systems to allow for enhanced administration, monitoring, and evaluation of nutritional therapies, and implementation of protocol-based computerized decision support systems, have been reported to improve outcomes Critical Issues: Unfortunately, there are gaps in the implementation of nutritional care in hospitals Timely identification and management of malnutrition is needed to advance quality care for hospitalized patients and reduce malnutrition and associated PI Future Directions: Further research on effective, evidence-based strategies for implementation of all stages of the nutrition care process is needed to reduce pressure injuries and malnutrition in hospitalized patients

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Fletcher, J (2019) "Why do we make things so complicated?” Wounds UK 15(3): 6-6

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This report is based on an advisory board meeting that took place in London on 7th February 2019 The meeting convened an expert group to discuss the use of negative pressure wound therapy (NPWT), and specifically
NPWT with instillation and dwell time (NPWTi-d), for managing Category 3 and 4 pressure ulcers (PUs).

The aims and objectives of the meeting were to identify why there is currently an underuse of NPWTi-d for Category 3 and 4 PUs in the UK; to understand how to align recommendations for NPWTi-d with the national strategy for PUs; to propose actions needed to change practice; to suggest a framework for integrating NPWTi-d for this indication across trusts in the UK.


Objective: To confirm the safety and wound healing activity of a topical spray powder containing hyaluronic acid (HA) and metallic silver (Hyalosilver, Fidia Farmaceutici SpA, Italy), and investigate its effect on the control of bacterial load in vascular ulcers or category I-II pressure ulcers (PU).

Methods: This is a single site, prospective, open label study involving patients with a vascular ulcer or category I-II PUs, presenting signs of critical bacterial colonisation. Patients with a wound size of ≤15 cm² were enrolled at baseline. A swab was taken of each wound for a semi-quantitative analysis of bacterial load and the first treatment of topical spray powder was applied. The patient was then requested to self-apply the medication once a day for 28 days and to return on days one, seven and 28 for clinical and microbiological assessments.

Results: A total of 25 patients were enrolled in the study. Treatment with the topical spray powder enhanced the healing rate of chronic wounds in terms of a reduction of wound area as well as bacterial load (p<0.025) and the overall clinical status of wound (odour, exudate, erythema of periwound skin; p<0.017). Moreover, the spray powder increased overall patient perception of improvement in the wound (p<0.005).

Conclusion: The data demonstrated good safety and tolerability of the topical spray powder suggesting that the product is effective not only in reducing wound area, due to the presence of HA, but in keeping the bacterial colonisation under control.


Objective: The prevalence and costs associated with treating pressure ulcers (PU) are at high levels. Frequently, PUs heal slowly or not at all, which may be due to the patient’s catabolic state which may include protein energy malnutrition. The objective of this open label clinical trial was to improve healing rates by providing patients with a patented, high-quality protein containing all essential amino acids to ensure positive nitrogen balance. An additional benefit of this protein is the delivery of bioavailable cysteine (cystine) to promote glutathione (GSH) synthesis which supports immune function and heightens antioxidant defences.

Methods: Patients with category II, III and IV PUs were fed 20g BID whey protein dietary supplement for 16–120 days, without change in ongoing ‘best practice’ PU management and their progress recorded.

Results: A total of 10 patients were recruited, with an average age of 77 years. Most had shown no improvement in healing for ≥2 months before treatment and usually had other complications including chronic obstructive pulmonary disease (COPD), diabetes and various cardiovascular diseases. There were a total of 23 PUs, with some patients having more than one. Of these, 44% (n=10) showed complete resolution 83% (n=19) had better than 75% resolution over the observation period. Healing rates ranged from 169–02cm²/month (healed PUs) and 600–16cm²/month for resolving PUs.

Conclusion: By providing the necessary amino acids to rebuild tissues and bioactive cysteine (cystine) to promote synthesis of intracellular GSH and positive nitrogen balance, improvement in PUs healing was achieved.
Hariri, A, F Chen, et al (2019) "Noninvasive staging of pressure ulcers using photoacoustic imaging" Wound Repair And Regeneration: Official Publication Of The Wound Healing Society [And] The European Tissue Repair Society. Ulcers including pressure ulcers and diabetic foot ulcers damage the skin and underlying tissue in people with compromised blood circulation. They are classified into four stages of severity and span from mild reddening of the skin to tissue damage and muscle/bone infections. Here, we used photoacoustic imaging as a noninvasive method for detecting early tissue damage that cannot be visually observed while also staging the disease using quantitative image analysis. We used a mouse model of pressure ulcers by implanting subdermal magnets in the dorsal flank and periodically applying an external magnet to the healed implant site. The magnet-induced pressure was applied in cycles, and the extent of ulceration was dictated by the number of cycles. We used both laser- and light-emitting diode (LED)-based photoacoustic imaging tools with 690 nm excitation to evaluate the change in photoacoustic signal and depth of injury. Using laser-based photoacoustic imaging system, we found a 44-fold increase in the photoacoustic intensity in stage I vs baseline (no pressure). We also evaluated the depth of injury using photoacoustics. We measured a photoacoustic ulcer depth of 0.38 ± 0.09 mm, 0.74 ± 0.11 mm, 1.63 ± 0.4 mm, and 2.7 ± 0.31 mm (n=4) for stages I-IV, respectively. The photoacoustic depth differences between each stage were significant (p < 0.05). We also used an LED-based photoacoustic imaging system to detect early stage (stage I) pressure ulcers and observed a 25-fold increase in photoacoustic signal. Importantly, we confirmed the capacity of this technique to detect dysregulated skin even before stage I ulcers have erupted. We also observed significant changes in photoacoustic intensity during healing suggesting that this approach can monitor therapy. These findings were confirmed with histology. These results suggest that this photoacoustic-based approach might have clinical value for monitoring skin diseases including pressure ulcers; © 2019 by the Wound Healing Society. Check for full text.


Hödl, M, D Eglseer, et al (2019) "Does Conducting a Risk Assessment Facilitate Better Care for Patients at Risk of Pressure Injuries?" Advances in Skin & Wound Care 32(8): 365-369. OBJECTIVE: To evaluate if the use of a pressure injury (PI) risk assessment is associated with the more frequent use of international evidence-based guideline interventions in patients at risk of PI. METHODS: Data were collected through a multicenter cross-sectional prevalence study conducted on November 14, 2017. Study authors analyzed data from 532 patients 65 years at risk of PI or older in Austrian hospitals. MAIN OUTCOME MEASURES: Repositioning, mobilization, floating heels/heel devices, moisture/barrier cream, patient education, malnutrition screening, referral to a dietitian, and hydration/nutrition management. MAIN RESULTS: The risk assessment was documented on admission for 80% (n=435) of the at-risk patients. Patients for whom a PI risk assessment was conducted were older and more care dependent, and nearly 20% had a PI compared with patients for whom no risk assessment was conducted upon admission. Conducting a risk assessment led to a statistically significantly higher number of internationally recommended PI preventive interventions being performed for at-risk patients, such as provision of moisture/barrier cream, mobilization specific for PI, malnutrition screening, and floating heels or heel suspension devices. CONCLUSIONS: These results showed that conducting and documenting a risk assessment led to more recommended interventions being performed. Although such interventions are recommended for all patients, these findings are especially relevant for patients at mild or moderate risk of PI who might be otherwise overlooked, which in turn could reduce hospital-acquired PI rates. Check for full text.


Hultin, L, A-C Karlsson, et al (2019) "Information and Communication Technology Can Increase Patient Participation in Pressure Injury Prevention: A Qualitative Study in Older Orthopedic Patients" Journal Of Wound, Ostomy, And Continence Nursing: Official Publication Of The Wound, Ostomy And Continence Nurses Society. Purpose: The aim of this study was to assess the participatory capabilities of hospitalized older adults in response to the Continuous Bedside Pressure Mapping system placed on the beds to prevent pressure injuries. Design: Descriptive study; Subjects and Setting: A convenience sample of 31 orthopedic patients were recruited.
from an orthopedic rehabilitation unit at a university hospital in Uppsala, Sweden, that served patients aged 65 years and older; Methods: Semistructured interviews were conducted between November 2016 and February 2017, audio-recorded, and transcribed verbatim. Data were analyzed using qualitative content analysis; Result: The overall theme from 21 interviews was "A new way of understanding helped patients to recognize vulnerable pressure points and to take action in their own care" from which 2 categories, "awareness" and "action," emerged. The study showed that verbally adapted information combined with using information and communication technology increased most participants' knowledge and as they became aware of increased pressure, they started to take preventative action by changing position; Conclusions: It is possible for older participants in a rehabilitation unit who had recent orthopedic surgery to understand and use new information and communication technology and should be invited to participate in pressure injury prevention;


Introduction: Globally, nurses are known to care for hospitalized patients and the presence or absence of pressure ulcers is being regarded as a performance measure of quality nursing care. The study aims to determine the knowledge and practice of caregivers towards pressure ulcer prevention for hospitalized patients in National Orthopaedic Hospital, Enugu; Method: A cross sectional descriptive survey design was adopted among eighty-five (85) caregivers who met the inclusion criteria and participated in the study. Ethical approval and informed consent of participants was obtained before data collection using a pre-tested semi-structured questionnaire and checklist. Descriptive analysis and Chi-square statistical test was used to test for association between variables; Result: Results revealed poor knowledge 67.3% of pressure ulcer prevention among caregivers. Inadequate staffing 93.5%, heavy workload 92.9%, were highest perceived barriers to pressure ulcer prevention. The test of hypothesis showed that there is a significant relationship between years of service of caregivers and knowledge of pressure ulcer. P < 0000; Conclusion: It was concluded that in-service training, recruitment of more staff and ensuring availability of the necessary equipment are some of the important steps to improve nurses' knowledge and practice regarding prevention of pressure ulcer;

Kapp, S, M Gerdtz, et al (2019) "An observational study of the maintenance of the 30° side-lying lateral tilt position among aged care residents at risk of developing pressure injuries when using the standard care pillow and a purpose-designed positioning device" International Wound Journal. The aim of the study was to evaluate the maintenance of the 30° side-lying lateral tilt position among aged care residents at the risk of developing pressure injuries when using the standard care pillow and a purpose-designed positioning device. An observational study was conducted. Participants were monitored during positioning under two conditions, with pillows and with a fluidised positioner. Body angle measurements were taken at three time points (baseline, 1 hour, and 2 hours) on 10 occasions. Repeated-measures analysis assessed the difference in the degree of the angle of the body. The sample (n = 12) had an average age of 83 years, and the participants were immobile when in bed. The average angle with the pillow condition was 26° at baseline, 215° at 1 hour, and 166° at 2 hours. The average angle with the fluidised positioner condition was 30° at baseline, 293° at 1 hour, and 268° at 2 hours. The main effects of Condition and Time were significant. Condition: F(1, 11) 14378, P < 001, Time: F(2, 22) 45858, P < 001. There was a statistically significant interaction between the effects of Condition and Time on the average lateral tilt position, F(2, 22) 15574, P < 001. The lateral tilt body position was better maintained with the positioning device than the pillow. Further research is required to determine the effectiveness of the fluidised positioner for pressure injury prevention; © 2019 Medica1helplines.com Inc and John Wiley & Sons Ltd;


PURPOSE: To evaluate prevalence and risk factors of incontinence-associated dermatitis (IAD). DESIGN: Retrospective analysis of 2016 International Pressure Ulcer Prevalence survey data. SUBJECTS AND SETTING: Adult patients who were in acute care, long-term acute care, long-term care, and rehabilitation facilities in the United States and Canada. METHODS: IAD prevalence was calculated among all patients surveyed, among the incontinent patients only, across multiple care settings, and by incontinence type A.
logistic regression examined risk factors for IAD in the incontinent population RESULTS: Nearly 1 in 5 incontinent patients had IAD documented Incontinence-associated dermatitis prevalence in the entire patient population was 43% while incontinence prevalence was 18% Of incontinent patients, prevalence of IAD ranged from 84% in long-term care facilities to 19% in acute care facilities Facilities with higher rates of incontinence did not necessarily have higher prevalence of IAD Incontinence-associated dermatitis prevalence by incontinence type ranged from 12% for patients with urinary incontinence to 26% for patients with fecal management systems Regression results support the association of the following factors with an increased likelihood of IAD documented: all types of incontinence, fecal management systems, higher body weight, diminished mobility, additional linen layers, longer length of stay, and lower Braden Scale scores CONCLUSIONS: Incontinence-associated dermatitis remains a concern in acute care settings Risk factors associated with IAD were similar to risk factors previously reported for hospital-acquired pressure injuries, such as limited mobility, longer lengths of stay, and additional linen layers By consistently documenting IAD as well as pressure injury prevalence, facilities may benchmark overall skin prevention models

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Kennedy terminal ulcers, a subset of pressure injuries, are associated with the dying process This scoping review aimed to identify and map the published literature on Kennedy terminal ulcers in terms of its definition, prevalence, assessment, treatment, management, health care costs, and quality of life for patients in all health care settings Using the Arksey and O’Malley scoping review framework, we systematically searched the Cochrane Library, CINAHL, EMBASE, MEDLINE, and ProQuest databases and 5 guideline repositories between 1983 and 2018 The following search terms were used: Kennedy ulcers, Kennedy terminal ulcers, terminal ulcer, skin failure, and Skin Changes at Life's End Data were extracted using a purposely developed data collection tool Initial searches yielded 2997 sources, with 32 included in this review Most Kennedy terminal ulcer literature was published by nurses in the United States Kennedy terminal ulcer prevalence data are limited, with no validated assessment tools available Kennedy terminal ulcers may be misclassified as pressure injuries, potentially resulting in financial penalties to the institution This scoping review revealed significant knowledge and clinical practice gaps in patient assessment, management, and treatment of Kennedy terminal ulcers Timely patient education may help them to make informed care and quality end-of-life decisions Further research is needed to inform clinical practice to improve patient care

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Background: Core outcome sets (COS) are being developed in many clinical areas to increase the quality and comparability of clinical trial results as well as to ensure their relevance for patients A COS represents an agreed standardized set of outcomes that describes the minimum that should be consistently reported in all clinical trials of a defined area It comprises a core domain set (defining what core outcomes should be measured) and a core measurement set (defining measurement/assessment instruments for each core domain) For pressure ulcer prevention trials a COS is lacking The great heterogeneity of reported outcomes in this field indicates the need for a COS; Methods/design: The first part of this project aims to develop a core domain set by following established methods, which incorporates four steps: (1) definition of the scope, (2) conducting a scoping review, (3) organizing facilitated workshops with service users, (4) performing Delphi surveys and establishing consensus in a face-to-face meeting with different stakeholders; Discussion: After achieving consensus on the core domain set, further work will be undertaken to determine a corresponding core measurement set This will lead to better pressure ulcer prevention research in the future There are a number of methodological challenges in the field of COS development To meet these challenges and to ensure a high-quality COS, the OUTPUTs project affiliates to current standards and works in close collaboration with international experts and with existing international service user groups; Trial Registration: The OUTPUTs project is registered in the COMET database: (1) Registered on 2015;

The use of sacral dressings for pressure ulcer prevention is growing rapidly. In addition to their passive biomechanical role in pressure and shear reduction, in the near future, prophylactic dressings may also provide active tissue protection by releasing preventive agents or drugs into skin and deeper tissues. We investigated delivery of sodium pyruvate (NaPy) from an active dressing to potentially protect the sacral skin and underlying tissues in addition. We used four finite element model variants describing different skin roughness levels to determine time profiles of NaPy diffusion from the dressing into the skin layers. The NaPy concentrations for the different modelled cases stabilised after 1 to 65 hours from the time of application of the dressings, at 1% to 3% of the NaPy concentration in the dressing reservoir, which is considered potent. We conclude that prophylactic sacral dressings have the potential to deliver NaPy into skin and subdermally, to potentially increase soft tissue tolerance to sustained bodyweight-caused cell and tissue deformations. The time durations to achieve the steady-state potent NaPy dermal concentrations are clinically feasible, for example, for preparation of patients for surgery or for use in intensive care units.

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Aim: To explore factors associated with the presence of category I-IV pressure ulcers on the sacrum and heels; Design: Cross-sectional, secondary data analysis using data collected from the Landelijke Preventiemetting Zorgproblemen (LPZ) project, a multicentre prevalence study including nursing home residents and community care clients (N = 4842) in the Netherlands in 2017; Methods: A single binary logistic regression model was designed to identify factors associated with the presence of pressure ulcers. Additionally, a multiple binary logistic regression model including modifiable explanatory factors associated with the presence of pressure ulcers was designed; Results: Impaired mobility, friction and shear (evaluated using the Braden Scale) are significantly associated with the presence of both sacral and heel category I-IV pressure ulcers. Incontinence-associated dermatitis is significantly associated with category I-IV sacral pressure ulcers; Conclusion: In pressure ulcer prevention, nursing interventions should focus on frequent repositioning and mobilisation while avoiding exposure of the skin to friction and shear. The need to consider incontinence-associated dermatitis, incontinence and moisture as important factors in pressure ulcer risk assessment is confirmed; Impact: Pressure ulcers occur when skin and tissues are deformed between bony prominences and the support surface in a sitting or lying position. They are the result of a complex interaction between direct causal factors and a wide range of indirect factors. Recognition of these factors influences risk assessment guidance and practice. Knowledge of skin-specific factors at the patient level, modifiable by nursing interventions, enable a better targeted and tailored preventive approach. This article is protected by copyright. All rights reserved; This article is protected by copyright. All rights reserved.

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Pressure injuries are caused by prolonged pressure to an area of the body, which can result in open wounds that descend to the bone. Pressure injuries should not occur in healthcare settings and yet they still affect 25 million patients in the US and have an impact on quality of life. Pressure injuries come at a cost of $11 billion in the US and 90% of pressure injuries are a secondary condition. In this work, we survey the literature on preventative techniques to address pressure injuries, which we classify into two categories: Active Prevention Strategies and Sensor-Based Risk-Factor Monitoring. Within each category of techniques, we discuss the literature and assess each class of strategies based on its commercial availability, results of clinical trials when available, the ability for the strategy to save time for healthcare staff, and whether the technique can be tuned to an individual. Based on our findings, the most promising current solutions supplementary to nursing guidelines are Electrical Stimulation, Pressure Monitoring, and Inertial Measurement Unit Monitoring. We also find a need for a clinical software system that can easily integrate with custom sensors, use custom analysis algorithms, and provide visual feedback to the healthcare staff as a necessity.

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Background Surgical patients are at high risk of developing pressure injuries (PIs) due to anaesthesia-induced immobility as well as risk factors such as length of surgery and co-morbidities Few Australian studies have investigated the incidence of PIs in surgical patients This prospective cohort study assessed the incidence of post-surgical PIs and identified gaps in pressure injury prevention (PIP) for elective surgical patients Methods Consecutive elective surgery patients at an urban tertiary referral hospital were recruited who had an expected length of stay of >48 hours Baseline PI risk (measured by the Waterlow scale) and PIP strategies implemented at five time points were collected from medical records Two prospective outcome assessments were conducted at 24 and 48 hours post-operatively Data were analysed descriptively Results One patient out of 150 (incidence rate 07) developed an intra-operative Stage 1 PI Four patients developed skin tears PIP strategies were applied inconsistently throughout the patient journey, regardless of risk status Conclusions While the incidence of surgically acquired PIs in this study was low, ongoing staff education is needed about the importance of consistent skin and risk assessments and of implementing strategies appropriate for level of PI risk What is already known: *PIs are widely considered to be an adverse event of hospitalisation and are largely preventable *Surgical patients are at risk of developing a PI primarily due to immobilisation following anaesthesia, length of surgery and co-morbidities *There are few studies on PI incidence and prevention strategies used in the post-operative period What this manuscript contributes: Although the incidence of post-surgical PIs among elective surgical patients was low, there are gaps in PIP for this group of patients, including for those deemed at high risk of PI There is a need for clinicians to improve documentation of risk assessment and strategies implemented to reduce the risk of PIs, throughout the surgical patient journey

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Aim: To determine the duration of out-of-bed sitting time and equipment used by older inpatients admitted to an aged rehabilitation (post-acute) hospital Methods: This study was a prospective observational study of n=32 older inpatients Behavioral mapping with a purpose-designed audit tool was used to determine the proportion of the day spent out of bed and specifications of chairs used by participants Results: On average, patients sat out of bed for 38 hours (sd 25) over an 85 hour audit period Four chair designs were recorded as being used with and without pressure relieving devices Risk factors associated with pressure injuries included incontinence, reduced mobility, and Body Mass Index (BMI) scores Conclusion: Findings suggest that older inpatients spend sufficient time sitting in chairs to be at risk of developing pressure-related ulcers during hospitalization Prescription of physical activity and pressure-relieving interventions warrants further investigation in this group

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Purpose: Pressure injuries are a complication due to spinal cord injury The objective of the study is to compare the pressure distribution in the wheelchair seat of subjects with spinal cord injury using 3 pads (Roho®, Varilite® and Jay®) Methods: Pressure analysis was performed on 10 participants in two situations: (a) the participant sitting in static posture and (b) with the wheelchair being used for locomotion Results: In the static position: Jay® showed the best rates for average pressure and also the contact area, the Roho® had the lowest average for the peak pressure During the wheelchair moving, Jay® showed the best average pressure, Roho® had a lower average for peak pressure and Varilite® provided a highest means for the contact area of the buttocks and thighs Conclusions: The use of appropriate cushion is an effective measure in people with spinal cord injury Pressure injuries are a complication due to spinal cord injury Study to compare the pressure distribution in the wheelchair seat of subjects with spinal cord injury is important to minimize the injuries resulting from pressure injuries The comfort resulting from the use of the cushion suited to the demands of the subjects with spinal cord injury is fundamental for the process of rehabilitation and social participation of the people affected Understanding and minimizing pressure points can contribute to the appropriate rehabilitation process

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The use of pressure-offloading support surfaces is considered the standard of care for pressure ulcers (PUs) by most surgeons. The fluid immersion simulation system (FIS) has shown significant results in previous studies. We compared it, for the first time, with a representative air-fluidised bed (AFB) for outcomes related to post-surgical flap closures. This trial was performed over 25 months, in which 40 subjects between 18 and 85 years of age with ≤2 PUs and history of <3 surgical closures underwent reconstruction by one surgeon. Subjects were randomly assigned to either treatment group for 2 weeks after closure. The primary endpoint was success of closure after the study period. Secondary endpoints included incidence of complications and nursing and patient acceptability of the device. The FIS group included 19 subjects, and the AFB group included 21. Flap failure rate was similar between groups (15% vs 17%; P = 0.99). The minor complications rate, particularly dehiscence, was higher in the FIS group (66.7% vs 15%; P = 0.02). Nurse and patient self-reported acceptability had better mean numeric scores in the FIS compared with AFB (nurse: 15 vs 19; P = 12; patient: 13 vs 22; P = 14). Further analysis will be conducted to gain better insight on the FIS as an alternative treatment for PUs.

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The majority of pressure ulcers (PUs) including deep tissue injuries (DTIs) are preventable, and even reversible if detected in their early phase. One of the greatest barriers in PU prevention is that clinicians traditionally depended on subjective and qualitative techniques, particularly routine visual skin assessments that would only document existing, macroscopic PUs/DTIs, rather than preventing them or detecting them at their microscopic phase. At the early phase of cell damage, when a forming PU is still microscopic, there is a local increase in extracellular fluid contents within affected tissues, which is called sub-epidermal moisture (SEM). This new understanding has led to an emerging technology, a SEM Scanner (BBI LLC, Bruin Biometrics) that has been designed to effectively examine the health status of tissues, by measuring local changes in the biophysical SEM marker. In the present work, the SEM Scanner was tested under controlled laboratory conditions to experimentally determine its sensitivity and precision in identifying small (1 mL) water content changes in phantoms of the human heel and skull/face, which simulated common PU development scenarios. In both phantom configurations, the locally increased water contents resulted in consistent, statistically significant elevated SEM readings, which confirms that the SEM Scanner is able to detect fluid content changes that are as small as 1 mL. In agreement with a simplified theoretical (mathematical) SEM model, which was also developed here, changes in water contents had a consistent trend of effect on SEM delta values, which increased with each 1 mL increment in intra-tissue-substitute water contents.

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Purpose/goals: Pressure injuries in the critically ill patient population are a challenging clinical problem and cannot be properly managed by any one member of the healthcare team. This presentation will describe a team-based approach led by registered nurses (RNs) and physicians (MDs) that was developed to try to prevent and treat pressure injuries in the sickest patients. Using a variety of approaches including standardized wound photography, a simplified approach to pressure injury dressings using a ‘basket’ system, and a specialized surface selection algorithm will be shared. Outcome 1: Outline simple measures that can be adopted to help prevent, document and treat pressure injuries in critically ill patients. Outcome 2: Demonstrate the use of standardized wound photography to help document pressure injuries and track progress or worsening. Session description: In this presentation, the goal is to describe a series of simple measures that could be implemented in other critical care units (CCUs) to encourage both nurse and physician engagement in the care of pressure injuries in intensive care unit (ICU) patients. The session will review a team-based approach developed in critical care units to help facilitate the care of these patients.
challenging wounds Discussion will include standard assessment practices, documentation of wounds, including wound photography, an algorithm for selection of the appropriate bed or mattress for the patient, and a simplified approach to wound care and dressings for nurses

Richman, M (2019) "New Tool To Measure Pressure Ulcers" PN 73(7): 56-58
The article offers information on the popular SCI pressure ulcer monitoring tool, SCIPUMT, a manual system It mentions the instrument's strength is its ability to capture 3D images with a camera mounted to a tablet; and also mentions SCI-PUMT is the only validated system for evaluating pressure ulcer healing in veterans with SCI

Objectives: There is currently a low level of evidence for the impact of patient education on the management of patients with chronic neurological disease at risk of developing pressure ulcers The objective of this study was to assess the impact of a patient education programme on pressure ulcer prevention in patients with chronic spinal cord injuries; Materials and Methods: This study included adult patients with any spinal cord injury, regardless of the cause Participants attended 2 group workshops focusing on pressure ulcer prevention Various clinical data were gathered during an initial individual interview and at 3, 6 and 12 months, along with rating scale values from the Hospital Anxiety and Depression Scale, Rosenberg self-esteem scale, Schwarzer self-efficacy scale, a quality of life scale (SF-36) and the revised Skin Management Needs Assessment Checklist (Revised SMnac), which was used as the primary endpoint; Results: Twenty patients were included in the study The mean patient age was 52 years (SD: 9.8) Sixteen patients had traumatic spinal cord injuries, with a median injury duration of 234 months (IQR: 123-407) Seventy-five percent had had a pressure ulcer in the twelve months prior to the study Patient education was shown to have a significant impact on skin management ability, with a highly significant increase in the overall revised SMnac score at 3 months These results were stable over time, from 6 to 12 months Six patients developed a pressure ulcer during the study (30%); Conclusion: This study supports the hypothesis that a therapeutic educational program conducted at the chronic phase in spinal cord injured individuals has an impact; Copyright © 2019 Tissue Viability Society Published by Elsevier Ltd All rights reserved

Rodríguez-Núñez, C, A Iglesias-Rodríguez, et al (2019) "Registros enfermeros, medidas de prevención e incidencia de úlceras por presión en una Unidad de Cuidados Intensivos" Enfermería Intensiva 30(3): 135-143
The aim of this paper is to determine the incidence and most incident pressure ulcers (PU) category Establish the main clinical characteristics of these PU Determine whether there is adequate documentation of PU and of the measures used to prevent them Observational descriptive and retrospective study during 2014 at Intensive Care Unit (ICU)-University Hospital of Araba Study sample, all patients suffering from PU at the time of the study by accidental sampling Computerised records regarding risk assessment, clinical assessment and pressure sore treatment, provided by the 'Metavision' computer programme and descriptive statistics using SPSS version 220 Approval from the Ethics Committee for Clinical Research of the University Hospital of Araba was obtained The incidence of patients suffering from PU during 2014 was 678% The most common locations for PU were the sacral region and the heels: the most incident pressure ulcers category was grade II, followed by grade I Out of the 98 PU treated in our patients, 43 occurred outside the ICU and 55 in the unit itself The lack of records, in all the variables described about PU, was 1910% The incidence of pressure ulcers was lower than in the current literature The most frequent category, location and clinical characteristics are comparable to previous studies There is a high rate of failing to record the characteristics of the PU declared Good PU prevention measures and recording were carried out

Patient-reported outcomes can be included as end points in pressure ulcer (PU) intervention trials to provide information to inform decision-making and improve the lives of patients. However, the challenge for researchers and clinicians is identifying and choosing an appropriate instrument for each particular application that suits their research questions and clinical context. To provide researchers and clinicians with the information needed to inform choice of patient-reported outcome measures, we compared a generic and disease-specific measures’ ability to discriminate between clinical groups known to differ, and determined their responsiveness to change. We performed analyses on a subset of patients recruited to the PRESSURE 2 trial that completed the pressure ulcer quality of life instrument—prevention version (PU-QOL-P) and Short Form 12 Questionnaire (SF12) measures at baseline and 30-day posttreatment. Known-group validity and responsiveness-to-change analyses were conducted. The analysis sample consisted of 617 patients that completed both measures at baseline. Known-group validity revealed that some PU-QOL-P symptoms and function scales differentiated between people with category 2 PUs and those without PUs. A less meaningful pattern of results was observed for the SF12 scales, suggesting that the PU-QOL-P is more sensitive to differences between PU and non-PU populations. Responsiveness analysis revealed that the PU-QOL-P was more responsive in detecting disease severity than the SF12. The PU-QOL-P provides a standardized method for assessing PU-specific symptoms and functioning outcomes and is suitable for quantifying the benefits of PU interventions from the patient's perspective. Generic measures are useful for group comparisons of global quality of life domains. Choice of measure for each particular application should be determined by the purpose of the measurement and the information required.


Good primary care improves the health and wealth of nations, as it is the context in which the majority of health care is delivered. Improving the quality of palliative care and reducing adverse patient-related events are priority areas for improvement in primary care. One aspect that community nurses can improve is the quality of end-of-life skin care. Given that the main objective of all end-of-life care is to facilitate a comfortable and dignified death for the patient in line with their wishes, it is important for nurses in primary care to be aware of what they can do to ensure the consistent delivery of safe end-of-life skin care. This paper highlights key elements of end-of-life skin care that should be considered by community nurses in their efforts to improve the prevention of pressure ulcers in primary care.


PURPOSE: The purpose of this study was to develop and compare 3 predictive models for pressure injury (PI) occurrence in surgical patients. DESIGN: Retrospective case-control study. SUBJECTS AND SETTING: Data on PI risk assessment and preanesthesia evaluation records from 400 patients (80 patients who developed PIs after surgery and 320 patients who did not) in a South Korean acute care setting who underwent surgery between January 2015 and May 2016 were extracted from the electronic health record. METHODS: Three models were developed with items from the Braden Scale (model 1), the Scott Triggers tool (model 2), and the Scott Triggers tool in addition to type of anesthesia, laboratory test results, and comorbid conditions (model 3) using logistic regression to analyze items (factors) in each model. Predictive performance indices, which included sensitivity, specificity, positive predictive value, negative predictive value, area under the receiver operating characteristics curve, and Akaike information criterion, were compared among the 3 models. RESULTS: Findings showed there were no significant factors in model 1, the estimated surgery time and serum albumin level were significant in model 2, and the estimated surgery time, serum albumin level, and brain disease were significant in model 3. The model performance evaluation revealed that model 2 was the best fitting model, demonstrating the highest sensitivity (844%).
highest negative predictive value (94.6%), and lowest Akaike information criterion (30203). CONCLUSIONS:
The Scott Triggers tool in model 2, which consists of simple items that are easy to extract from preanesthesia evaluation records, was the best fitting model. We recommend the Scott Triggers tool be used to predict the development of PIs in surgical patients in acute care settings.

Pressure injuries (PIs) are a significant health issue worldwide, and contribute substantially towards the economic burden in healthcare systems. This is primarily because PIs increase the length of hospital stays; and longer hospital stays also predict PI development. PIs are also used to measure the performance of health staff and facilities in a variety of settings. Inappropriate management of PIs can lead to further complications, necessitating an increase in resources in the hospital for assessment, monitoring and treatment. However, over time, challenges in regard to identifying, assessing and reporting PIs have proven to be problematic for a number of reasons. This paper explains the main challenges to PI assessment, and presents a series of best practice recommendations to rectify these challenges.

Waugh, S M and S Bergquist-Beringer (2019) "Methods and Processes Used to Collect Pressure Injury Risk and Prevention Measures in the National Database of Nursing Quality Indicators® (NDNQI®)" Journal Of Nursing Care Quality
Background: Previous research found that reliability estimates for chart-extracted quality of care data vary. Purpose: The purpose was to examine methods and processes used to gather data on the National Database of Nursing Quality Indicators (NDNQI) pressure injury (PI) risk and prevention measures to identify factors that may influence their reliability. Methods: Study participants (N 120) from 36 hospitals completed a 35-item online survey. Included were the NDNQI PI Survey Team member with the most experience and/or skill in patient record review from each hospital (n 36) and 84 other NDNQI PI Survey Team members. Results: In general, participants followed NDNQI PI data collection guidelines. However, deviations were noted such as 60 (50%) participants collected PI data on units where they work, and 92 (76.7%) determined whether moisture management was performed by direct observation of patients rather than chart documentation. Conclusions: Findings provide insight on how to improve the reliability of hospital-acquired PI risk and prevention measures that includes clarification of the data collection guidelines.

To examine the inter-practitioner variability of repositioning for pressure ulcer prevention, the effectiveness of the intervention, and whether the provision of written guidance influenced the repositioning technique, a pre-test post-test study design was utilised. Descriptive data regarding the work history of participants was collected. Participants were invited to reposition a healthy volunteer before and after reviewing guidance detailing the 30° side-lying technique. The researchers measured the resulting turn angles and assessed offloading of bony prominences. The repositioning technique varied considerably in the sample of nurse participants. Turn angles decreased following the guidance, but offloading of body sites vulnerable to pressure damage remained sporadic. Pressure ulcer prevention training should include practical demonstrations of repositioning. Clear guidance regarding the optimal repositioning technique for pressure ulcer prevention is needed.

Aims Of the Study: The effective management of spinal cord injury (SCI) requires partnership between people with SCI and health professionals (HPs). This paper identifies HPs' perceived challenges in building and maintaining this partnership, with a specific focus on how people with SCI and HPs collaborate in the prevention and treatment of pressure injuries (PIs) in SCI. Design: This study has a qualitative and explorative design. Data were collected through semi-structured interviews and analysed following the principles of thematic analysis. Population and Setting: The study population consisted of a purposive
sample of HPs (n = 26) working in inpatient and outpatient care in Switzerland with experience in the care of people with SCI; Results: The analysis identified three main challenges: defining responsibilities and expectations, negotiating priorities and establishing and strengthening trust and respect The HPs argue that the prevention of PIIs and self-management are mainly the responsibility of the person with SCI The HPs have, however, the responsibility to empower, guide, and support persons with SCI in self-management by educating and motivating them; Conclusion: Building and maintaining a partnership with individuals with SCI to prevent and treat PIIs is crucial, but it is not an easy task for HPs Specific communication skills can help HPs and patients find personalised solutions that take into account the patients’ expertise and preferences Additionally, the healthcare system must develop solutions that go beyond personal partnership to better integrate the prevention and treatment of PIIs into the lifelong self-management of SCI Assistive technologies, such as mobile technology, might help in this endeavour;
Websites


“Risk Assessment and Prevention of Pressure Ulcers: a clinical practice guideline from the American College of Physicians” (2015)
http://annals.org/article.aspx?articleid=2173505


NICE Guideline: “Pressure ulcers: prevention and management of pressure ulcers” (April 2014)
http://www.nice.org.uk/guidance/CG179


The Trans Tasman Dietetic Wound Care Group, Evidence based practice guidelines for the nutritional management of adults with pressure injuries (2011)

Registered Nurses’ Association of Ontario - Risk assessment and prevention of pressure ulcers (2011 revised)

National Guideline Clearinghouse – predefined search
https://search.ahrq.gov/search?q=%22pressure+ulcer%22+or+%22pressure+injur%22


Cochrane Wounds Group
https://wounds.cochrane.org/news/reviews
The Cochrane Wounds Group was established in 1995 with the aim of using evidence from trials to conduct systematic reviews to establish the effectiveness of interventions for the prevention and treatment of wounds, and interventions for the prevention and treatment of wound complications.

National Pressure Ulcer Advisory Panel
http://www.npuap.org/
e-Journals

- Advances in Skin & Wound Care  (Tables of Contents only)
- Eplasty (formerly Journal of Burns & Wounds)  (full text)
- EWMA Journal  (full text)
- International Wound Journal  (Tables of Contents only)
- Journal of the American College of Clinical Wound Specialists  (full text)
- Journal of Tissue Viability  (full text)
- Journal of Wound Care  (full text)
- World Council of Enterostomal Therapists Journal  (full text 2010 onwards)

- World Wide Wounds: the premier online resource for dressing materials and practical wound management information  (full text)
  The mission of World Wide Wounds is to be the premier online resource for peer-reviewed information on dressing materials providing practical guidance on all aspects of wound management to health professionals worldwide.
- Wound Care Advisor  (full text 2014 onwards)
- Wound Management and Prevention  (Table of Contents only)
- Wound Practice & Research  (full text)
- Wound Repair & Regeneration  (full text with 12-month delay)
- Wounds International  (full text 2012 onwards)
- Wounds UK Journal  (full text 2011 onwards)

e-Books

- Acute and chronic wounds  5th ed, 2016
- Fast facts for wound care nursing : practical wound management in a nutshell  2011
- Nutrition and wound healing  2007
### Queensland Health Libraries and Contact Numbers

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