

# Optimizing Wound Healing And Infection Prevention: A Review Of Nursing Interventions

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## Abstract

Despite the emphasis on preventing pressure injuries (PI) in emergency rooms, pressure injuries acquired in the hospital still happen in these types of environments. To systematically compile the research on the most efficient nursing treatments for preventing pressure injuries in critical care patients. A systematic search was conducted across four electronic databases to identify relevant research. The studies that were included underwent a screening process and were subsequently evaluated utilizing the suitable Joanna Briggs Institute rating technique. The data were analyzed and published using an analytical narrative methodology. Nurses possess the necessary qualifications to assume leadership roles in avoiding the occurrence of injuries due to pressure in emergency rooms. Each patient who is critically sick needs actions to avert pressure injuries, and the avoidance of PIs should be seen as a multifaceted strategy. Nurses are required to strategize and execute evidence-based treatment in order to avoid many forms of pressure injuries, such as those caused by medical devices. Education and training programs focused on pressure injury prevention are crucial for nurses to effectively avoid pressure injuries. Nursing interventions should be founded on evidence and organized into cohesive sets of actions, known as 'bundles', which may be tailored to meet the specific requirements of individual patients. In order to minimize pressure injuries in critically sick patients, nurses must possess a high level of competence and education. They should also consistently follow essential measures to enhance movement and relieve pressure.

**Keywords:** Pressure injury, wound healing, infection prevention, review, nursing intervention, emergency rooms.

## 1. Introduction

Pressure injury (PI) in critical care patients results in substantial comorbidities and contributes to unfavorable patient outcomes (Chaboyer et al., 2018). The clinical practice guidelines established by the European Pressure Ulcer Advisory Panel (EPUAP), the National Pressure Injury Advisory Panel (NPIAP), and the Pan Pacific Pressure Injury Alliance (PPPIA) define pressure injuries (PI) as specific damage to the skin or tissues caused by pressure alone, pressure combined with shear, or the use of medical or other devices (EPUAP, NPIAP, & PPPIA, 2019). PIs are categorized into stages I, II, III, IV, unstageable, and deep tissue damage according to the classification provided by EPUAP, NPIAP, & PPPIA in 2019. The diagnosis of these phases is determined by a thorough skin evaluation conducted by nurses (Strazzieri-Pulido et al., 2019). Pressure injuries often occur in critically sick patients as a result of the intricate nature of their health situations (Strazzieri-Pulido et al., 2019). Patients in critical care settings are at risk of developing pressure injuries due to factors such as limited movement, the need for ventilators and vasopressor medications, and the use of invasive medical equipment (Jackson et al., 2019; Strazzieri-Pulido et al., 2019). PIs may lead to significant problems, such as intense pain, infections, extended hospital stays, psychological discomfort, delayed healing, and even mortality (Lin et al., 2020).

A recent systematic analysis conducted by Chaboyer et al. (2018) found that among critical care patients, the prevalence rate of pressure injuries (PIs) ranged from 16.9% to 23.8% (95% confidence interval), whereas the incidence rate ranged from 10.0% to 25.9% (95% confidence interval). The prevalence rates among hospitalized patients usually range from 6% to 18.5% (Tubaishat et al., 2018), whereas Australian acute care hospitals have a rate of 9.5% to 16.8% (Rodgers et al., 2020). A global investigation on the incidence of pressure injuries (PIs) in intensive care unit (ICU) patients found that 59% of all detected PIs were acquired inside the unit (Labeau et al., 2020). Patients who have a pulmonary infection (PI) have a higher likelihood of mortality (22.5%, 95% CI, 21.8–23.3). Additionally, the occurrence of a PI is linked to longer hospital stays (Labeau et al., 2020). While pressure injuries (PIs) are often seen in critically sick patients, they are considered entirely avoidable by the provision of excellent nursing care (Whitty et al., 2017).

Nurses have a major problem in preventing pressure injuries (PIs) when caring for critically sick patients (Pittman et al.,

2019). In order to avoid pressure injuries (PIs), nurses should use evidence-based treatments, possess a thorough understanding of PI prevention, adopt a methodical but personalized strategy to satisfy patient care requirements, and include the multidisciplinary team in PI prevention endeavors (Zuo & Meng, 2015). Multiple studies highlight the nursing role in assuring the effective implementation of PI preventive methods (Lin et al., 2020; Martin et al., 2017; Pittman et al., 2019). Nevertheless, constraints such as time limitations, excessive workloads, and insufficient understanding of the causes of pressure injuries (PIs) are some of the reasons that impede the provision of top-notch nursing care (Coyer et al., 2019; Tayyib et al., 2016).

The EPUAP, NPIAP, and PPPIA issued international clinical practice recommendations on the prevention and management of pressure injuries in 2009, 2014, and 2019. Nevertheless, prior research has shown that just having standards is not enough to effectively implement best practices in care settings, since the recommendations themselves do not provide conclusive solutions for enhancing care (Coyer et al., 2019; Zuo & Meng, 2015). Various PI prevention programs including numerous therapies, often referred to as bundles, have been created to enhance the care of critically sick patients (Chaboyer et al., 2018). The presence of PI prevention bundles is hindered by disparities and variability in nursing interventions used within these bundles and across different practice contexts, which hampers attempts to prevent PIs (Lin et al., 2020). Hence, this research aimed to ascertain the most efficacious nursing treatments for preventing pressure injuries (PIs) in patients admitted to critical care units.

## **2. Main measurement of the primary result**

The major outcome measure in all included studies was the formation of a PI. PIs were less frequent in 13 out of 14 trials. Twelve studies analyzed outcomes using all the stages of pressure ulcers as defined by EPUAP/NPIAP/PPPIA (I, II, III, IV, Unstageable, Deep tissue injury; Anderson et al., 2015; Barakat-Johnson et al., 2019; Coyer et al., 2015; Darvall et al., 2018; Gray-Siracusa & Schrier, 2011; Mendonça et al., 2018; Otero et al., 2017; Rodríguez-Núñez et al., 2019; Rogenski & Kurcgant, 2012; Swafford et al., 2016; Tayyib et al., 2015; Yilmazer & Bulut, 2019). Two studies omitted stage I principal investigators (de Laat et al., 2007; Manzano et al., 2014). The

prevalence of multidrug-resistant *Pseudomonas* infections (MDRPI) reduced in the seven studies that investigated this outcome (Anderson et al., 2015; Barakat-Johnson et al., 2019; Coyer et al., 2015; Manzano et al., 2014; Otero et al., 2017; Swafford et al., 2016; Tayyib et al., 2015).

The nurses in the trials conducted the identification and staging of PIs. Eight studies examined the identification and staging of pressure injuries by critical care unit nurses who received training in their facilities (Coyer et al., 2015; Darvall et al., 2018; de Laat et al., 2007; Gray-Siracusa & Schrier, 2011; Manzano et al., 2014; Rodríguez-Núñez et al., 2019; Rogenski & Kurcgant, 2012; Tayyib et al., 2015). Four investigations corroborated the diagnosis made by critical care nurses via the evaluation of independent nurses or researchers (Anderson et al., 2015; Barakat-Johnson et al., 2019; Darvall et al., 2018; Yilmazer & Bulut, 2019). The nurses that took part in evaluating outcomes were reported in two studies as having significant training and were referred to as 'champions' (Anderson et al., 2015; Coyer et al., 2015). In a study conducted by Otero et al. (2017), a member of the research team was used to identify Principal Investigators (PIs). However, no details were given on the PIs' particular abilities or expertise. The investigations conducted by Mendonça et al. (2018) and Swafford et al. (2016) did not give any details about the identification and diagnosis of PIs.

The included studies demonstrated variation in the first PI evaluation upon admission to the critical care unit. Five investigations used evaluations to determine the first occurrence of a potentially infectious (PI) condition upon admission (Anderson et al., 2015), within 4 hours (Coyer et al., 2015), 8 hours (Yilmazer & Bulut, 2019), or within the first 48 hours of admission (de Laat et al., 2007; Rogenski & Kurcgant, 2012). Several writers, including Anderson et al. (2015) and Coyer et al. (2015), offered specific information about the components of this first assessment. The ongoing examination for diagnosing a primary immunodeficiency (PI) also has a range of variability. Several studies conducted regular assessments by registered nurses (RNs) at different time intervals. Gray-Siracusa and Schrier (2011) performed assessments every 6 hours, while Barakat-Johnson et al. (2019) conducted assessments every 8 hours. Other studies, including those by Coyer et al. (2015), de Laat et al. (2007), Mendonça et al. (2018), Rogenski and Kurcgant (2012), Tayyib et al. (2015), and Yilmazer and Bulut (2019), indicated that daily skin

assessments were carried out. Data extraction regarding the existence of a PI from electronic datasets was used in three research (Anderson et al., 2015; Darvall et al., 2018; Rodríguez-Núñez et al., 2019). None of the studies provided an assessment of whether a physician investigator (PI) was present during or after discharge from the critical care unit.

### **3. Additional results**

The included studies used several risk assessment approaches to identify individuals who are most susceptible to pressure injuries (PI). The Braden scale is the predominant risk assessment measure used in several studies (Anderson et al., 2015; Gray-Siracusa & Schrier, 2011; Manzano et al., 2014; Mendonça et al., 2018; Rogenski & Kurcgant, 2012; Swafford et al., 2016; Tayyib et al., 2015; Yilmazer & Bulut, 2019). Several studies collected measures of illness severity, such as the sequential organ failure assessment score (SOFA; Coyer et al., 2015; Tayyib et al., 2015), the Acute Physiology and Chronic Health Evaluation (APACHE III; Darvall et al., 2018), and one study utilized both SOFA and APACHE III (Barakat-Johnson et al., 2019).

### **4. Strategies for preventing Pressure Injuries**

Research-supported preventative bundles have been shown to substantially reduce the occurrence of pressure injuries, as shown by studies conducted by Anderson et al. (2015), Coyer et al. (2015), de Laat et al. (2007), Gray-Siracusa & Schrier (2011), Swafford et al. (2016), Tayyib et al. (2015), and Yilmazer & Bulut (2019). Four studies demonstrated a decrease in the occurrence of severe pressure injuries after implementing a bundle of preventive measures (Anderson et al., 2015; Gray-Siracusa & Schrier, 2011; Tayyib et al., 2015; Yilmazer & Bulut, 2019), while two studies reported a reduction in the overall number of pressure injuries after implementing the same bundle (Anderson et al., 2015; Tayyib et al., 2015). Several bundles included similar measures, such as admission and continuous evaluation of the skin, assessment of risk, maintaining skin cleanliness, elevating the heels, repositioning, and evaluating diet. Several suggested additional measures include encouraging regular movement (Coyer et al., 2015; Tayyib et al., 2015), providing support surfaces and elevating the head (Gray-Siracusa & Schrier, 2011; Tayyib et al., 2015), monitoring temperature (Coyer et al., 2015), and utilizing

fluidized positioners and applying gel adhesive dressings (Swafford et al., 2016).

Different approaches were noted in the interventions used in PI prevention bundles, and a shared framework including these treatments was identified. PI prevention bundles may be classified according on the specific therapies they include. The categories included treatments that specifically addressed (a) evaluating the condition of the skin, (b) implementing measures to avoid pressure-related injuries, and (c) using techniques to safeguard against pressure forces. Two studies categorized their treatments inside bundles in accordance with these categories (Coyer et al., 2015; Gray-Siracusa & Schrier, 2011). Both studies observed a reduction in the occurrence of PIs; however, only one research conducted statistical analysis (Coyer et al., 2015). Coyer et al. (2015) outlined many techniques for executing each intervention, offering different possibilities for carrying out the intervention.

Two studies identified many treatments but did not explicitly categorize them as bundles for the prevention of pressure injuries (Rodríguez-Núñez et al., 2019; Rogenski & Kurcgant, 2012). Both trials reported a reduction in the occurrence of PI associated with their therapies, but they did not provide any statistical analysis. The authors failed to give a justification or empirical foundation for selecting these strategies.

## 5. Summary

This systematic study examines nursing strategies aimed at preventing pressure injuries (PIs) in critical care settings. The study offers recommendations on the use of evidence-based preventative bundles for pressure injuries (PI), frequent repositioning, prevention of multidrug-resistant PI (MDRPI), and the significance of education in enhancing PI outcomes. Standard prophylactic measures should be regularly implemented for critically sick patients, with a particular emphasis on preventing multidrug-resistant pulmonary infections (MDRPIs). PI prevention strategies resulted in a decrease in both the quantity and intensity of PIs in all of the trials that were included. It is recommended to use evidence-based preventative bundles for the purpose of enhancing the outcomes of critically sick patients (Lin et al., 2020). Nurses must possess a high level of education and possess a

comprehensive understanding of their role in preventing healthcare-associated infections.

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