

FACTORS AFFECTING LENGTH OF HOSPITAL STAY IN BURN PATIENT AND DEVELOPING A SCORING TOOL TO REDUCE THE LENGTH OF HOSPITAL STAY

Introduction

Globally, burn injuries are a leading cause of death and permanent disability, with an annual incidence rate of 2.1% per 100,000 events in Western and other developed countries (Usmani et al., 2022). According to the National Burns Program, 91 000 women sustain burn injuries. Children and women of childbearing age are three times more likely than men to die from burn-related injuries (Natarajan, 2019). The largest organ of the organism is the skin. It functions to regulate homeostasis, including fluid balance, thermoregulation, and an immune barrier (Young et al., 2019). Any factor causing trauma to the skin offset the functions of the skin and this can be detrimental to body system. Burn injuries cause the systemic inflammatory reaction syndrome, which can result in widespread tissue and organ damage. Neutrophils and macrophages are the first immune cells to arrive at the wound site after a burn injury, kicking off the acute phase of the immune reaction (Borhan et al., 2023).

Pain control is a significant challenge in the management of burn patients from the time of injury through rehabilitation and afterwards(Griggs et al., 2017). Most interventions required to treat burn injuries, including as dressing changes, excision and grafting, and physical therapy, come with pain, which can make pain management even more challenging for patients. Resuscitation and the acute period of the first three days following burn trauma have previously been optimized as the initial critical situation, and future advancements are still boosting the survival probability even for severely burned patients. However, sepsis, the second major problem in burn care, remains the leading cause of death during the first 24 hours of trauma (Boehm & Menke, 2021). Patients who suffer from both inhalation injury and extensive burns may be at a higher risk for infection, have a higher mortality rate, and require longer hospital stays (Ji et al., 2023).

Removal of necrotic tissue, creation of a healthy wound bed, and provisional closure are the current gold standards for deep contaminated wounds prior to closure, followed by intensive local wound care (Blome-Eberwein et al., 2018). Burn patients cannot recover without adequate enteral nutritional assistance. When given early on, enteral nutrition helps reduce inflammation and protect the gut's structure and function. Burn victims experience a rapid metabolic and catabolic response, both of which can be mitigated with proper nutrition. Major burn patients have higher nutritional needs than those with other forms of critical illness because of this response, which causes them to lose a lot of muscle mass (Sheckter et al., 2018). Even while burn injuries account for a very low percentage of hospitalizations, they can have profound effects on patients' quality of life and ability to resume normal activities (Schmitt et al., 2018). Constant review is required for improved care management, interdisciplinary intervention approaches, cost-effective funding, and prevention initiatives due to the frequent occurrence and complex aetiology of burn injuries. To better understand burn patients, it would be helpful to have a well-developed prediction model of the length of stay on admission so that important



factors may be identified and managed. The predictive model would also help with patient triage, the creation of personalized care paths, resource planning, and counseling patients, their families, and friends about when they are likely to leave the hospital (Onah et al., 2021).

Factors that affect length of hospital stay

The duration of hospitalization for burn patients can be affected by a number of variables, including the severity of the burn injury, its extent, the presence of associated injuries or medical conditions, and the efficacy of the treatment provided. Complications such as infections, delayed wound healing, and the need for surgical intervention may also contribute to a prolonged hospital stay. Severe burn injuries have acute and frequently long-lasting physiological, physical, and psychological consequences on patients. Recovery from such burns is frequently lengthy and requires long-term care to guarantee proper wound and patient healing (Kishawi et al., 2020). Burn patients already face a significant risk of death and a long hospital stay due to problems that arise while they are there. Renal failure, pulmonary failure, and multiple organ failure rank among the most common consequences in patients who have been severely burned (Lopes et al., 2020). In patients admitted to burn centres, the duration of their hospital stays is influenced by the severity of their burn injuries and complications that arise within the hospital. patients' comorbidities and socioeconomic status (Farroha, 2020).

O'Brien and Lushin argued that psychological issues, such as psychosis, anxiety, depression, post-traumatic stress disorder, and substance abuse, have been inconsistently linked to slower recovery and longer hospital stays among hospitalized burn survivors (O'Brien & Lushin, 2019). It is challenging to establish a correlation between LOS and healthcare quality. Multiple supply and demand factors that operate at the macro-, meso-, and micro-levels determine LOS through a complex intertwining network (Clarke, 2002). Studies in the past have found that total burn surface area (TBSA), age, the appearance of an inhalation injury, comorbidities, complications, and, in some cases, the patient's gender are all good predictors of how length of stay (LOS) in the hospital (Onah et al., 2021). In terms of health policy, length of stay remains a readily measurable indicator of "efficiency." Among the leading causes of hospitalization, morbidity, and mortality, and a major contributor to the high expenditures associated with rehabilitation and hospital health care, are burn injuries (Lopes et al., 2020).

The long-term difficulties of functional recovery, community reentry, and quality of life for seriously injured individuals persist despite increased survival rates. individuals who suffer thermal injury have been shown to have a reduced quality of life compared to individuals who do not suffer thermal injury (Deeter et al., 2019). Psychologically impaired patients may experience decreased hope or motivation to participate in their recovery or rehabilitation, as well as maladaptive behaviors like aggression and agitation that interrupt treatment. Distress can inhibit immunological function, increase



discomfort, and postpone functional gains (O'Brien & Lushin, 2019). Also, stress hormones released by burn injuries may worsen psychological anguish and anxiety in acute care burn patients. The management of burn injuries is time- and resource-intensive. The majority of patients require lengthy hospital stays, which incur substantial costs. The socioeconomic impact of burn injuries is substantial. Depending on the severity of the injury, medical costs are a tremendous burden, and the family's personal and per capita income is drastically reduced.

Development of a scoring tool to reduce LOS

A comprehensive evaluation of the patient's condition, medical history, and treatment progress is required to develop a scoring tool for reducing the duration of hospital stays for burn patients. The scoring instrument should consider the severity of the burn injury, the patient's age and overall health, and the prevalence of associated injuries and medical conditions. In addition, the instrument should evaluate the efficacy of the provided treatment, including wound care and pain management. Ultimately, the development of a scoring tool to reduce the duration of hospitalization for burn patients requires the collaboration of a multidisciplinary team of healthcare professionals, such as burn surgeons, nurses, and rehabilitation specialists. By collaborating and employing evidence-based practices, such a team can enhance the outcomes for burn patients and decrease their hospitalization burden.

Burn victim patients who are dissatisfied with their lives may have a lower quality of life. Life satisfaction is an international measure for assessing burn victims' views of quality of life (Parvizi et al., 2023). It is influenced by a variety of physical, psychological, and social aspects that are essential in burn victims and may be utilized to assess their well-being. Also, as a result of improvements in burn care, burn patients are receiving more care in outpatient settings, where medical costs are lower. The American Burn Association guidelines recommend transferring patients with extensive burns or those requiring complex care to a burn center (Armstrong et al., 2021). It classifies burn into minor, moderate and major (Young et al., 2019). The improved survival rate presumably influenced the trends in length of stay for patients with severe burns, as these patients have longer LOS (O'Brien & Lushin, 2019). Future quality enhancement initiatives for this patient population could aim to reduce lengths of stay while maintaining a high standard of care. Length of hospital stay (LOS) is frequently employed to quantify the severity of burns. Although LOS increases linearly with TBSA consumed, its effect on post-burn adjustment may differ from TBSA (Huang & Su, 2021). A longer hospital stay may indicate a more complex hospital course, a sluggish recovery, and a delayed return to daily activities. Post-burn PTSD and depression has been found to be predictably associated with a composite measure of burn severity.

The Abbreviated Burn Severity Index (ABSI) is a five-variable scale used to evaluate the severity of burns. According to studies, the ABSI score's high sensitivity and specificity



allowed it to identify both patients who were likely to die at the unit (true positives) as well as those who were likely to survive (no false negatives)(Boissin et al., 2019). The consistent dose-response relationship between burn severity and outcome is a distinguishing feature of burn injuries. (that is, the larger the burn size, the worse the outcome). The Baux score, first described fifty years ago, takes into account both the severity of the burn and the patient's age. Age of patient and burn size (% TBSA) contribute equally to the Baux score, which is used to predict mortality after burn injury(Jeschke et al., 2020). Patients of all ages, including children, can use the Modified Baux score, which incorporates inhalation damage (whether present or absent) and is now the most frequently accepted outcome predictor. The first stage in developing a pain treatment strategy is assessing the patient's pain, which can range from minor to terrible in the case of burn injuries, and understanding the kind and chronicity of a patient's pain is essential for personalizing pain management tactics. The Patterson burn pain paradigm provides a road map for managing burn pain throughout five distinct stages of injury, treatment, and recovery(Griggs et al., 2017). Evidence has proven that high-dose vitamin C therapy has the potential to shorten hospital stays for patients with severe burns by addressing organ dysfunction and lowering sepsis rates. The efficiency of high-dose vitamin C is evaluated using propensity score matching. According to studies, high-dose vitamin C therapy reduces in-hospital mortality in patients with severe burns who are in within the first two days and have burns that are at least 10 g in size(Nakajima et al., 2019). The SOFA score is also a quantitative scoring measure that dynamically describes organ dysfunction due to sepsis, including renal, cardiovascular, respiratory, and coagulation system malfunction. Studies have revealed a strong link between the SOFA score and mortality in burn patients with sepsis, indicating that it can be used to diagnose sepsis in burn patients early.

It's crucial to remember that a scoring tool should only be used as a general indication of how long a patient will stay, not as a guarantee. How long a patient must spend in the hospital can also be influenced by additional variables, such as unanticipated problems or changes in their condition. Therefore, while making decisions about patient care and discharge planning, the scoring tool should be used in addition to clinical judgment and other pertinent data.

Conclusion

Reducing duration of stay is a common objective for many healthcare facilities, as it can lead to better patient outcomes and lower costs. Developing a scoring instrument can aid in identifying patients who are at risk for prolonged hospitalization and enable earlier implementation of interventions. A long hospital stay may also be caused by complications like infections, slow wound healing, and the requirement for surgery. Identifying all the key factors that increases length of stay would be a positive end in developing a scoring tool. Using scoring toolkit has been reported to improve patient outcomes. This approach of using scoring tool neatly aligns with burn care guidelines because, unlike regular ICU patients, burn patients typically exhibit a wide range of signs



and symptoms before their organs deteriorate more quickly. Thus, it is essential to incorporate thorough screening, prompt resuscitation, and successful antimicrobial treatment into burn care in the same way. Several adjustments to the scores of the various screening methods may be required to address the unique issues of burn patients.



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