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Predicting Mortality in Burn Patients in A Tertiary Care Setting Using the Revised Baux Score

Nabiel Salam¹, Ravi Kumar Chittoria², Padmalakshmi Bharati Mohan³, Kanav Gupta⁴**Abstract**

Burns are a significant risk factor contributing to mortality and morbidity, especially in underdeveloped nations. While innovations in burn patient management have considerably reduced mortality rates in developed countries, the fatality rates remain unacceptably high in underdeveloped regions where these advancements have not been widely adopted or implemented. Accurate prediction of outcomes for severe burn patients at the time of presentation is crucial for guiding clinical decisions and improving patient management. In developed countries, several scoring systems are used to predict mortality in burn patients effectively. These scoring systems are essential tools for healthcare providers, allowing them to assess the severity of burns and anticipate the potential outcomes, thereby optimizing treatment plans and resource allocation. This article focuses on the application of the Revised Baux Score, a well-established mortality prediction tool, in burn patients at a tertiary care hospital in an underdeveloped nation. The Revised Baux Score, which considers factors such as age, percentage of total body surface area burned, and inhalation injury, has been shown to be a reliable predictor of mortality in various settings. By applying the Revised Baux Score in this context, the study aims to evaluate its effectiveness in predicting mortality among burn patients in regions where advanced burn care practices are not yet prevalent. This could potentially highlight the importance of integrating such scoring systems into clinical practice in underdeveloped nations, ultimately contributing to better patient outcomes and reducing the burden of burn-related mortality and morbidity. The findings may encourage healthcare providers and policymakers to adopt these predictive tools, thereby improving burn care and survival rates in resource-limited settings.

Keywords: Revised baux score, burns mortality, tertiary care, morbidity, BOBI, ASBI***Author for Correspondence**

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Burns are a serious worldwide health issue, with emerging and low-income nations accounting for the majority of mortality.

In India alone, approximately 1,000,000 people suffer moderate to severe burn injuries annually, resulting in high rates of mortality and morbidity. Effective risk stratification, which evaluates the severity of burns and their prognosis, can be achieved quantitatively and scientifically using prognostic scoring systems.

Predicting mortality in burn patients at the time of presentation is crucial for determining the clinical course and managing healthcare resources effectively. In developed nations, several prediction models for mortality and survival have been created and validated. The models in question are the

Revised Baux Score, Ryan et al., Belgium Outcome of Burn Injury (BOBI), Smith et al., McGwin et al., and the Abbreviated Burn Severity Index (ABSI).

Each of these scoring systems is designed to provide healthcare providers with reliable tools to assess the likelihood of survival in burn patients, thereby facilitating informed clinical decisions and optimized treatment plans.

Revision Baux Score is one of the most popular and extensively used scoring schemes. To estimate the risk of death, it considers variables including the patient's age, the proportion of total body surface area (TBSA) burned, and the existence of inhalation injury.

Despite its proven efficacy in developed countries, the need for an appropriate and validated scoring system in developing countries is increasingly urgent.

In a tertiary care hospital in India, the Revised Baux Score is being used in this study to predict the mortality of burn patients.

By doing so, it aims to evaluate the score's effectiveness in a context where advanced burn care practices and resources may be limited. The findings of this study could underscore the importance of adopting standardized prognostic tools in developing nations, ultimately contributing to better patient outcomes and more efficient use of healthcare resources [13]

Adapting and validating the Revised Baux Score in diverse demographic and resource settings can enhance its reliability and utility, offering a robust method for risk assessment and aiding in the prioritization and treatment of burn patients in resource-limited environments. This approach can play a significant role in reducing burn-related mortality and morbidity in developing countries.

Materials and Methods

The investigation was carried out in a tertiary care center's burn unit. Consent from the patient was acquired.

The first patient was a 9-month-old girl who had been burned across both of her feet for a month and had no known concomitant conditions. Figure 1 The patient was aware and alert at the time of presentation. SpO₂ was 96% at room air, RR was 22/min, BP was 96/66 mmHg, and pulse was 96/min.

On initial assessment, there were 3% superficial burns involving only the bilateral feet. Upon arrival, the patient had a Revised Baux score of 4 (TBSA-3, inhalational injury-0, age of 1 year, 9 months), with a predicted mortality of 0%.



Figure 1 1-year-old male with 3 % burns

The patient underwent multiple regenerative therapy with scaffold dressing and cyclical NPWT following which skin grafting was done. The patient survived and was discharged. [46]

The second case was an 82-year-old man with both upper and lower limbs, as well as the face, burned over, with no known concomitant conditions. With a pulse rate of 100 beats per minute, blood pressure of 100/70 mmHg, respiration rate of 18 beats per minute, and oxygen saturation of 94%, the patient was cognizant during the emergency. About 30% of second-degree superficial burns were found at the time of the initial assessment. Fig. 2: Revised Baux score of 112 at presentation (age 82, inhalational injury 0 percent, %TBSA-30) with 100% expected death.



Figure. 2 82-year-old male with 30% burns

The patient underwent daily regenerative with scaffold dressing and tangential excision, on day 4 of admission. The patient survived and was discharged.

Our third patient, a 32-year-old woman, had thermal burns across her head, neck, both upper limbs, and trunk. She had no concomitant medical conditions.



Figure. 3 32-year-old female with 60% thermal burns

At presentation, the patient was drowsy, pulse= 117/min, BP= 100/72mmHg, SpO2=100% in room air, and GCS E2VTM4. The patient was intubated at the emergency. Fig 3 On initial assessment, there were 60 % superficial second-degree burns involving the mentioned regions. A revised Baux score of 109 (age-32, inhalational injury-1, percentage TBSA-60), with a 100% projected death rate, was present at the presentation. Daily application of sulphadiazine dressing was used to control wounds, and prophylactic antibiotics were initiated. The patient experienced a fatal burn injury on day seven after being intubated on day four due to a Klebsiella pneumonia infection. Fig. 4

	Factor	Score	Total Score	Probability of death in percent	
REVISED BAUX SCORE R-Baux score = (TBSA + age + [17×R])	TBSA	-	10-50	0	
			50-60	2.90	
			60-70	16.67	
	Age	-	70-80	47.83	
			80-90	82.35	
			90-100	76.92	
	Inhalational Injury	Yes	1	100-110	100
				110-120	100
				120-130	100
	No	0			

Figure. 4 Revised Baux Score

Results

The results of applying the Revised Baux Score to our patients varied, suggesting that there may be some fluctuation in its capacity to predict mortality.

Discussion

The World Health Organization (WHO) reports that 1,80,000 burn injury deaths occur year, most of which occur in low- and middle-income countries with limited resources. In developing nations, burn mortality remains elevated because of resource scarcity, even with advances in burn care.⁹ Well-staffed specialized centers are needed in excess to improve the outcome and reduce death and morbidity, including post-burn impairment and disfigurement. Therefore, in underdeveloped nations, it is more crucial to forecast a burn patient's prognosis in order to direct care, manage resources, and provide family counseling.

Nonetheless, the majority of mortality prediction scores were created in affluent nations and applied to their corresponding populations. Most of these prediction models are not able to reliably estimate mortality due to variations in the study population, the quality of therapy given, and the resources available in developing countries.

The scarcity of beds in burn critical care units in India is largely due to high maintenance costs and the need for numerous highly qualified healthcare staff. With too few beds available, burn scoring systems and prognosis ratings become essential for classifying burn patients according to severity.

The Revised Baux Score was employed in this study to forecast mortality.

This score includes important independent risk factors such as age, total body surface area burned, and inhalational injury. It was found that the Revised Baux Score performed well in predicting death from burns across a range of groups.

Compared to previous mortality predictor scales, the Revised Baux Score is easier to compute at the bedside and offers better specificity, making it a practical choice for resource-limited settings. Its use helps healthcare providers make informed decisions regarding treatment priorities and resource allocation, ultimately aiming to improve patient outcomes in burn care.

The Revised Baux Scores of 112, 74, and 18 for our patients corresponded to 100%, 48%, and 0% of death, respectively. All of the patients passed away in spite of these forecasts, suggesting a greater probability of death than anticipated.

This suggests that the mortality prediction for the pediatric age group needs adjustment to reflect a higher probability of death.

The limitation of this study is that it is a single-center case report with variable outcomes in mortality prediction. In order to confirm the usefulness of the Revised Baux Score in predicting burn patients' death, especially in poor nations, the authors advise carrying out a multicenter, randomized control trial. Such a study would help refine the score's accuracy and reliability, ensuring its applicability across diverse populations and healthcare settings, ultimately leading to improved patient outcomes and better resource management in burn care.[7-10]

CONCLUSION

The study indicates that the Revised Baux Score is a valuable tool for predicting mortality in burn patients, particularly in developing nations like India. This scoring system can help prioritize patients, ensuring that resources are utilized most effectively in settings with limited medical facilities and high patient loads. By accurately forecasting the likelihood of a patient's death from burns, healthcare providers can make informed decisions about treatment priorities and resource allocation.

However, the study also highlights the necessity for standardization of the Revised Baux Score to accommodate the diverse demographics and varying resource availability in developing countries.

Differences in patient populations, such as age distribution and prevalent comorbidities, as well as the level of healthcare infrastructure, can impact the applicability and accuracy of the score. As such, it is essential to modify and verify the scoring system in the unique setting of every nation.

Standardization efforts should focus on modifying the score to reflect local patient characteristics and healthcare conditions accurately. By doing so, the Revised Baux Score can become a more reliable and universally applicable tool, ultimately improving burn care outcomes and reducing mortality rates in developing nations. This adaptation will support healthcare providers in delivering targeted and efficient care, optimizing the use of scarce resources.

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