



## Assessment of treatment profile and covariates of outcome of burn injury in a Tertiary care centre

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### Abstract

**Background:** The present study was conducted for assessing treatment profile and covariates of outcome of burn injury.

**Materials & methods:** A total of 100 patients of recent burn injuries whose admission and outcome (in terms of discharge or death) both occurred. After studying the questionnaires used in related prior studies and several literature relating to burn injuries, a pre-designed, pre-tested, semi-structured programme was created. The ideas were used to modify the questionnaire. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis. Multivariate analysis was used for evaluation of results.

**Results:** Out of 200 subjects enrolled in the present study, death occurred in 75 patients while improvement (discharge) occurred in 125 patients. Treatment done was debridement in 64.5 percent of the patients. Split-thickness skin graft was done in 34.5 percent of the patients. Involvement of head and/or neck region, history of non cotton clothing at the time of injury and presence of associated inhalational injury found to be major predictors of adverse outcome (mortality) of burn injury. Greater involvement of TBSA on admission was also found to increase the risk of mortality significantly. Duration of hospital stay was inversely related with the mortality.

**Conclusion:** The current study discovered that burn injuries have a very poor prognosis in terms of survival which is not only due to the severity of the injury but also to other factors like delayed hospitalisation and inadequate pre-hospital burn care.

**Key words:** Burn injury, Outcome

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### Introduction

Burn injuries are an under-appreciated trauma that can affect anyone, anytime and anywhere. The injuries can be caused by friction, cold, heat, radiation, chemical or electric sources, but the majority of burn injuries are caused by heat from hot liquids, solids or fire<sup>1</sup>. Although all burn injuries involve tissue destruction due to energy transfer, different causes can be

associated with different physiological and pathophysiological responses.<sup>1, 2</sup> Because most burns are small and classified as minor burns, the history and physical can proceed as usual. If the patient appears to have burns classified as severe, then the approach should be like that of a major trauma patient. The American Burn Association recommends burn center referrals for patients with: partial thickness burns greater than 10% total body surface area, full thickness burns, burns of the face, hands, feet, genitalia, or major joints, chemical burns, electrical, or lightning strike injuries, significant inhalation injuries, burns in patients with multiple medical disorders and burns in patients with associated traumatic injuries. Patients being transferred to burn centers do not need extensive debridement or topical antibiotics before transfer. Whether transferring or referring to a burn center, you should contact them before beginning extensive local burn care treatments.<sup>3- 5</sup> Hence; the present study was conducted for assessing treatment profile and covariates of outcome of burn injury.

### Materials & methods

The present study was conducted for assessing treatment profile and covariates of outcome of burn injury. A total of 100 patients of recent burn injuries whose admission and outcome (in terms of discharge or death) both occurred. After studying the questionnaires used in related prior studies and several literature relating to burn injuries, a pre-designed, pre-tested, semi-structured programme was created. The ideas were used to modify the questionnaire. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis. Multivariate analysis was used for evaluation of results.

### Results

Mean age of the patients was 38.4 years. Majority proportion of the patients were females. treatment given was cooling with water in 51.5 percent of the patients. Duration of hospital stay was less than 1 week in 21.5 percent of the patients. Duration of hospital stay was 1 week to 2 weeks in 18.5 percent of the patients. Out of 200 subjects enrolled in the present study, death occurred in 75 patients while improvement (discharge) occurred in 125 patients. Treatment done was debridement in 64.5 percent of the patients. Split-thickness skin graft was done in 34.5 percent of the patients. Involvement of head and/or neck region, history of non cotton clothing at the time of injury and presence of associated inhalational injury found to be major predictors of adverse outcome (mortality) of burn injury. Greater involvement of TBSA on admission was also found to increase the risk of mortality significantly. Duration of hospital stay was in inversely related with the mortality.

**Table 1: Demographic and clinical variables**

Variable		Number	Percentage
Age group (years)	Less than 40	108	54
	More than 40	92	46
Gender	Males	84	42
	Females	116	58
Treatment given	Cooling with water	103	51.5

	Application of medical ointment	35	17.5
	Application of tooth paste	32	16
	Application of mud	20	10
	None	10	5
Duration of hospital stay	Less than 1 week	43	21.5
	1 week to 2 weeks	37	18.5
	2 weeks to 4 weeks	59	29.5
	More than 4 weeks	61	30.5

**Table 2: Treatment done**

Treatment done	Number	Percentage
Debridement	129	64.5
STSG	69	34.5
Limb amputation	12	6
Eye amputation	8	4
MTP	5	2.5
Others	6	3
No surgery	71	35.5

**Table 3: Outcome**

Outcome	Number	Percentage
Death	75	37.5
Improvement (discharge)	125	62.5
Total	200	100

**Table 4: Covariates of outcome**

Independent variables		Outcome (n)		AOR	Lower CI	Upper CI
		Death	Improvement			
H/O chronic disease	Present	24	37	2.854	1.274	4.658
	Absent (Ref)	51	88			
Types of clothing	Synthetic	48	76	4.125	2.312	8.315
	Cotton (Ref)	27	49			
Percentage of TBSA involved	Continuous	-		1.312	1.278	1.845
Head and neck involvement	Yes	59	33	4.813	2.017	9.337
	No (Ref)	16	92			
Duration of hospital stay	Continuous	-		0.982	0.913	0.998

## Discussion

The World Health Organization (WHO) reports that burn injuries account for an estimated 265,000 deaths annually. In addition to inflicting substantial mortality, millions of non-fatal cases often leave people with lifelong disabilities and disfigurements. In 2013, such injuries accounted for an average of 12.3 disability adjusted life years per person. Lack of access to appropriate clinical care and the inability to subsequently integrate burn victims back into their communities, creates an enormous social and economic burden for these victims and their family members. Benchmarking clinical performance is becoming an increasingly popular quality improvement tool in healthcare. Clinical quality registries are a key contributor to this surge in popularity. A key component of benchmarking is comparing care providers against their peers or a recommended standard. Multiple national and international burn registries exist. Despite the vast amount of research relating to data held within these registries, there is limited research focusing on variation in practice and benchmarking burn care.<sup>6-8</sup> Hence; the present study was conducted for assessing treatment profile and covariates of outcome of burn injury.

Mean age of the patients was 38.4 years. Majority proportion of the patients were females. treatment given was cooling with water in 51.5 percent of the patients. Duration of hospital stay was less than 1 week in 21.5 percent of the patients. Duration of hospital stay was 1 week to 2 weeks in 18.5 percent of the patients. Out of 200 subjects enrolled in the present study, death occurred in 75 patients while improvement (discharge) occurred in 125 patients. Treatment done was debridement in 64.5 percent of the patients. Spronk I et al reviewed predictors of health-related quality of life (HRQL) in burn patients. Thirty-two studies were included. Severity of burns, postburn depression, post-traumatic stress symptoms, avoidance coping, less emotional or social support, higher levels of neuroticism, and unemployment postburn were found to predict a poorer HRQL after burns in multivariable analyses. In addition, weaker predictors included female gender, pain, and a postburn substance use disorder. Risk of bias was generally low in outcome measurement and high in study attrition and study confounding. HRQL after burns is affected by the severity of burns and the psychological response to the trauma.<sup>10</sup>

In the present study, Split-thickness skin graft was done in 34.5 percent of the patients. Involvement of head and/or neck region, history of non cotton clothing at the time of injury and presence of associated inhalational injury found to be major predictors of adverse outcome (mortality) of burn injury. Greater involvement of TBSA on admission was also found to increase the risk of mortality significantly. Duration of hospital stay was inversely related with the mortality. Jafaryparvar Z et al determined the predictors of hospital stay and mortality in patients with burns. Also, 6.9% of the patients died after burns. The mean length of hospital stay was  $12.62 \pm 13$  days. Age (OR = 1.07), total body surface area (TBSA%) (OR = 1.12) and length of ICU stay (OR = 1.06) were the strongest predictors of mortality. Gender (IRR = 0.85), TBSA% (IRR = 1.01), location of burn (IRR = 1.1), skin graft (IRR = 2.12), length of ICU stay (IRR = 1.04), re- hospitalization (IRR = 1.77) and burn degree (IRR = 1.09) were the predictors of the length of hospital stay. BSA is still an important predictor of mortality and length of hospital stay, as the most important short- term outcomes of burns.<sup>11</sup> Bourgi J et al characterized generic and burn-specific quality of life and their predictors among adult burn patients admitted to a Lebanese burn care center. Results

showed that burn patients continue to exhibit impairments on various generic and burn-specific quality of life subdomains. Education, pain and total body surface area (TBSA) burned were consistently and significantly correlated with both BSHS-B and SF-36 component scores, while inhalation injury exhibited an association with total BSHS-B score. Education and pain emerged as independent predictors of SF-36 components as well as total BSHS-B score. The latter was additionally associated with BMI and burn degree, while TBSA burned negatively correlated with SF-36 physical component scores.<sup>12</sup>

## Conclusion

The current study discovered that burn injuries have a very poor prognosis in terms of survival which is not only due to the severity of the injury but also to other factors like delayed hospitalisation and inadequate pre-hospital burn care.

## References

1. American Burn Association. National Burn Repository 2019 Update, Report of data from 2009–2018 [ameriburn.site-ym.comhttps://ameriburn.site-ym.com/store/ViewProduct.aspx?id=14191872](https://ameriburn.site-ym.com/store/ViewProduct.aspx?id=14191872) (2019).
2. Nguyen, C. M., Chandler, R., Ratanshi, I. & Logsetty, S. in Handbook of Burns Vol. 1 (eds. Jeschke, M. G., Kamolz, L.-P., Sjöberg, F. & Wolf, S. E.) 529–547 (Springer, 2020).
3. Devinck F, Deveaux C, Bennis Y, Deken-Delannoy V, Jeanne M, Martinot-Duquennoy V, Guerreschi P, Pasquesoone L. [Deep alkali burns: Evaluation of a two-step surgical strategy]. *Ann Chir Plast Esthet.* 2018 Jun;63(3):191-196.
4. Regan A, Hotwagner DT. StatPearls [Internet]. StatPearls Publishing; Treasure Island (FL): Jun 23, 2022. Burn Fluid Management.
5. Burn and Trauma Branch of Chinese Geriatrics Society. Ming J, Lei P, Duan JL, Tan JH, Lou HP, Di DY, Wang DY. [National experts consensus on tracheotomy and intubation for burn patients (2018 version)]. *Zhonghua Shao Shang Za Zhi.* 2018 Nov 09;34(11):E006.
6. Hart DW, Wolf SE, Chinkes DL, Beauford RB. Effects of early excision and aggressive enteral feeding on hypermetabolism, catabolism and sepsis after severe burn. *J Trauma.* 2003;54:755–762.
7. Gore DC, Wolf SE, Sanford A, Herndon DN, Wolfe RR. Influence of metformin on glucose intolerance and muscle catabolism following severe burn injury. *Ann Surg.* 2005;241:334–342
8. Barret JP, Dziewulski PM, Ramzy P, Wolf SE. Biobrane versus 1% sulfadiazine in second degree pediatric burns. *Plast Reconstr Surg.* 2000;105:62–65.
9. Rose JK, Desai MH, Mlakar JM, Herndon DN. Allograft is superior to topical antimicrobial therapy in the treatment of partial-thickness scald burns in children. *J Burn Care Rehabil.* 1997;18:338–341.
10. Spronk I, Legemate CM, Dokter J, van Loey NEE, van Baar ME, Polinder S. Predictors of health-related quality of life after burn injuries: a systematic review. *Crit Care.* 2018;22(1):160. Published 2018 Jun 14. doi:10.1186/s13054-018-2071-4

11. Jafaryparvar Z, Adib M, Ghanbari A, Ali Yazdanipour M. Predictors of short-term outcomes of burn in a newly established burn centre in Iran. *Nurs Open*. 2021;8(6):2986-2995. doi:10.1002/nop2.1010
12. Bourgi J, Sleiman Z, Fazaa E, et al. Predictors of generic and burn-specific quality of life among adult burn patients admitted to a Lebanese burn care center: a cross-sectional single-center study. *Int J Burns Trauma*. 2020;10(3):81-89. Published 2020 Jun 15.