



Emergency Medicine

PATTERN AND OUTCOME OF BULL GORE / BULL RELATED INJURIES PRESENTING TO THE EMERGENCY DEPARTMENT: RURAL TERTIARY CARE CENTRE IN SOUTH TAMIL NADU

Dr. Sivashankar S

M.S (ortho), Department of Emergency Medicine, Government Sivagangai Medical College & Hospital, Sivagangai, Tamil Nadu

Dr. Vignesh M*

MD (EM), Department of Emergency Medicine, Government Sivagangai Medical College & Hospital, Sivagangai, Tamil Nadu *Corresponding Author

ABSTRACT **Background:** Jallikattu is an ancient bull-taming sport in Tamil Nadu. While culturally significant, it is associated with frequent bull gore injuries. Despite high incidence during festival seasons, systematic rural data remain scarce. **Aim:** To evaluate the pattern, severity, clinical outcomes, and emergency care burden of bull gore and bull-related injuries in a rural tertiary care centre in South Tamil Nadu. **Methods:** This prospective observational study was conducted in the Emergency Department of Government Sivagangai Medical College & Hospital, Tamil Nadu, between September 2023 and February 2025. All patients with bull gore injuries were included (n = 548). Data on demographics, event type, role (tamer, spectator, raiser, bystander), triage classification (TAEI system), anatomical injuries, surgical referrals, and outcomes were analyzed using SPSS. **Results:** total of 548 patients were included. Majority were male (95%), aged 18–40 years (66%). Roles: tamers 53%, spectators 24%, raisers 22%. Velivirattu (open-field chasing) accounted for 53% of cases and all six deaths. Injuries: extremity soft tissue (42%), thorax (22%), head/neck (17%), abdomen (12%), perineum (8%), fractures (6%). Triage: Red 20%, Yellow 42%, Green 37%, Black 1%. Management: suturing/dressing 75%, ICD 12%, laparotomy 4%; referrals included CTVS, neurosurgery, vascular, plastic, and surgical gastroenterology. Outcomes: 87% discharged, 11% referred, 1% deaths (n=6), 1% LAMA. Spectators had the highest mortality burden. **Conclusion:** Bull gore trauma poses a predictable but preventable burden in Tamil Nadu. Velivirattu is the riskiest event, particularly for spectators. Mortality was strongly linked to delayed hospital transfer, lack of PPE, and inadequate trauma preparedness. Policy interventions including PPE, structured arenas, insurance schemes, and ATLS-trained onsite trauma teams are essential to reduce preventable deaths and DALYs while preserving cultural heritage.

KEYWORDS : Bull Gore Injuries, Jallikattu, Velivirattu, Trauma, Emergency Medicine, Rural India

1. INTRODUCTION

Bull taming, particularly Jallikattu, is deeply rooted in Tamil Nadu's cultural identity for over 2000 years. It symbolizes valor, fertility, and agrarian pride. Unlike Spanish bullfighting, which ends in the killing of bulls, Jallikattu focuses on taming. However, the sport is linked with frequent trauma ranging from superficial lacerations to life-threatening thoracoabdominal impalements. Rural Tamil Nadu faces added challenges due to limited trauma systems, delayed EMS, and poorly regulated event environments (Crenshaw & Kelly, 1998; Nagarajan et al., 2020).

2. AIM AND OBJECTIVES

Aim: To evaluate the pattern, severity, clinical outcomes, and emergency care burden of bull gore and bull-related injuries in a rural tertiary care centre in South Tamil Nadu.

Objectives:

- To analyze injury spectrum and outcomes.
- To categorize patients by role (tamer, spectator, raiser, bystander) and event type (Vadamadu, Vadivasal, Velivirattu, domestic).
- To assess EMS utilization, triage patterns (TAEI), surgical referrals, complications, ICU admissions, and mortality.
- To compare results with national and international studies and suggest preventive strategies.

3. Literature Review

Internationally, Pamplona bull runs (Spain) report thoracoabdominal impalements with mortality 0.9–2.5% (Crenshaw & Kelly, 1998). Rodeo studies in Texas showed blunt injuries with <1% mortality due to protective gear (Criddle, 2001). Rare vascular injuries such as aortic penetration have been documented (Science Direct, 1982).

In India, Wasadikar & Paunikar (1997) described abdominal and perineal trauma in Maharashtra. Indore studies (2011–2015) classified blunt vs penetrating injuries. In South India, Akkidas et al. (2020) documented delayed referrals but no deaths, Coelho et al. (2020) at CMC Vellore described 129 cases with multispecialty referrals, and Nagarajan et al. (2020) reported 22.5% ICU admission and 3.8% mortality. Kauvery Hospitals (2023) highlighted structured trauma care with 0% mortality.

Spectator-related deaths (PETA, 2022) and ocular trauma (Research Gate, 2023) underline gaps in safety. DALYs and socioeconomic costs remain under-studied in Indian data.

4. Historical Evolution of Bull Taming

From Sangam-era texts (Aeruthazhuvuthal in Silappathikaram, Agananuru) to temple rituals under Pandya rule, bull taming has been documented. Colonial rule restricted it, but rural persistence ensured continuity. Post-independence, Jallikattu became a Tamil pride symbol. In 2017, Supreme Court bans led to Marina protests, after which Tamil Nadu legalized the sport under state ordinance. Despite this, modern events continue with high injury burden.

5. MATERIALS AND METHODS

Design: Prospective observational study, Sept 2023 – Feb 2025.

Setting: ED, Govt Sivagangai Medical College Hospital.

Population: 552 patients screened; 548 included.

Inclusion: All bull gore injuries.

Exclusion: Non-bull trauma, incomplete data, DOA without confirmation.

Data: Demographics, event type, victim role, triage (TAEI), anatomical site, procedures, outcomes.

Ethics: IEC approval obtained, informed consent taken.

Analysis: Excel + SPSS, descriptive & inferential.

6. Results

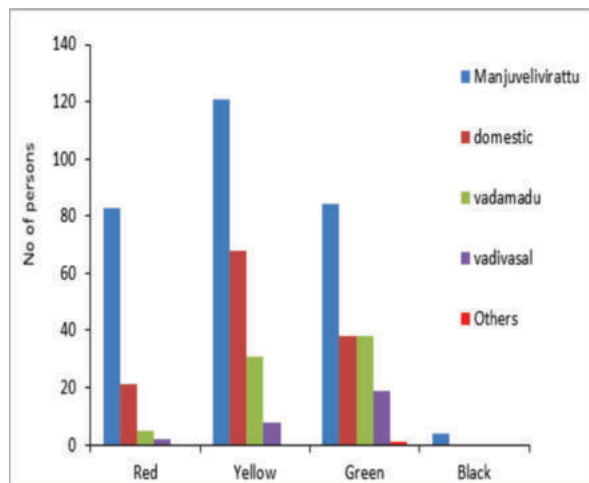
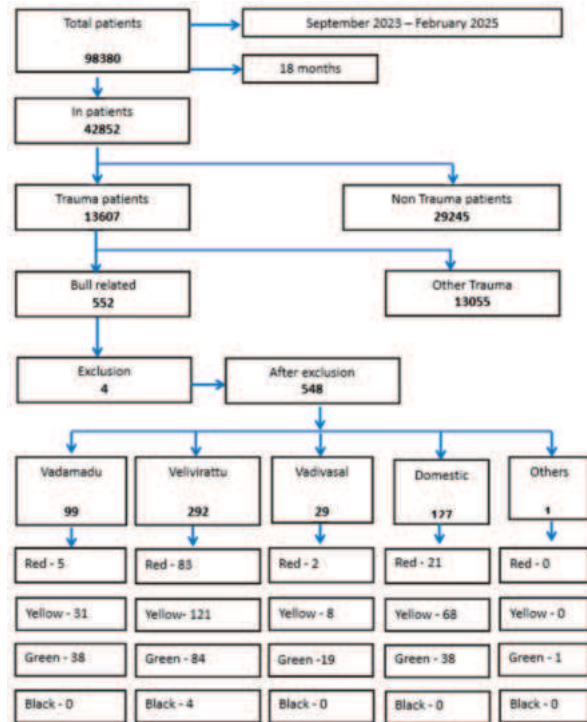


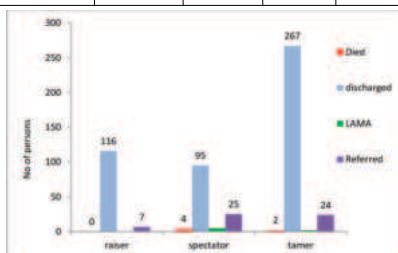
Fig 1: Distribution of Type of Bull taming vs triaging associated with Bull related injuries

Chart 1: Flowchart Showing Distribution of Type of Bull Gaming with Triaging**Table 1: Socio-demographic characteristics of the patients turned out for Bull related injuries N = 552**

Characteristics	Frequency (n)	Percentage (%)
Age group		
<18	29	(5)
18-40	368	(67)
41-60	110	(20)
>60	45	(8)
Gender		
Female	28	(5)
Male	522	(95)
Mch	2	(0)
Mode of referred in		
108	510	(92)
Own	42	(8)
Category		
Raiser	123	(22)
Rider	1	(0)
Spectator	129	(24)
Tamer	293	(53)
Victim	3	(1)

Table 2: Characteristics of the patients turned out for Bull related injuries by type of Bull taming vs triaging N = 548

TYPE	Red	Yellow	Green	Black	Total
Manjuvelivirattu	83	121	84	4	292
Domestic	21	68	38	0	127
Vadamaru	5	31	38	0	99
Vadivasal	2	8	19	0	29
Others	0	0	1	0	1
TOTAL	111	228	205	4	548

**Fig 2: Distribution of Type of Outcome vs triaging associated with Bull related injuries**

Among 552 bull gore injury cases (fig A), males predominated (95%), with most victims aged 18–40 years (66%), while 8% were above 60 years and 5% were under 18. Tamers constituted 53% of cases, followed by spectators (24%), raisers (22%), and a few victims (1%). Velivirattu accounted for 53% of events and all six deaths, while Domestic (23%), Vadamaru (18%), and Vadivasal (5%) contributed fewer fatalities. Injuries mainly involved soft tissues of the extremities (42%), followed by thoracic (22%), head/neck (17%), abdominal (12%), perineal (8%), and fractures (6%). Triage distribution showed 20% red, 42% yellow, 37% green, and 1% black. Outcomes included 87% discharged, 11% referred, 1% deaths (n=6; 2 tamers and 4 spectators), and 1% LAMA. Management was primarily local, with 75% undergoing suturing/dressing, 12% intercostal drainage, and 4% laparotomy, while referred cases required CTVS, neurosurgical, vascular, plastic, or gastroenterology interventions.

7. DISCUSSION

Findings align with Spanish and Indian studies: young male predominance, extremity trauma most common, thoracoabdominal trauma drives mortality. Velivirattu posed greatest risk due to uncontrolled crowds. Spectators were at highest risk of fatality, unlike prior studies that only documented tamers. EMS utilization (92%) was higher than Andhra (<30%). Structured TAEI triage ensured rapid allocation: Red-tagged required immediate resuscitation; Yellow needed urgent monitoring; Green were minor. This is the first rural study with systematic TAEI triage reporting. Mortality (1%) was lower than Nagarajan (3.8%) but similar to CMC (<1%). ICU admissions (19%) comparable to regional studies. Long-term morbidity included post-thoracotomy syndrome and visual loss.

8. CONCLUSION

Bull gore trauma is a preventable rural emergency. Velivirattu events are disproportionately hazardous, particularly for spectators. Mortality is linked to delayed transport, lack of protective gear, and inadequate trauma systems.

Recommendations: PPE for tamers, structured barricades, trauma teams at event sites, licensing & insurance, centralized trauma registry, and culturally sensitive safety campaigns.

9. Limitations

This study has several limitations. Being a single-centre, rural-only analysis, the findings may not be generalizable to other settings. Outcomes were assessed only in the short term, with no disability-adjusted life year (DALY) quantification. Minor or domestic injuries are likely underreported, and event seasonality may have influenced case distribution. The absence of a control group and incomplete prehospital data further limit interpretation. Additionally, sociocultural factors were not explored, and observer bias in triage categorization is possible.

10. REFERENCES

- Crenshaw, R., & Kelly, P. (1998). Injuries sustained during the running of the bulls in Pamplona, Spain. *Journal of Trauma*, 44(6), 1100–1105.
- Criddle, L. (2001). Rodeo-related injuries in Texas: Patterns and prevention. *Journal of Emergency Nursing*, 27(4), 327–333.
- Wasadikar, P. P., & Paunikar, R. G. (1997). Bull gore injuries: Management and outcome. *Journal of Postgraduate Medicine*, 43(3), 70–74.
- Akkidas, A., Reddy, B., & Kumar, P. (2020). Bull gore injuries: Clinical profile and outcomes from a rural center in Andhra Pradesh. *International Journal of Surgery Case Reports*, 75, 200–205.
- Coelho, R., Rajagopal, S., & Koshy, R. (2020). Bull-related injuries in South India: A descriptive study of 129 cases from a tertiary trauma center. *Indian Journal of Critical Care Medicine*, 24(7), 541–547.
- Nagarajan, R., Arumugam, S., & Murugan, R. (2020). Jallikattu-related trauma: An observational study from Tamil Nadu. *Journal of Clinical Orthopaedics and Trauma*, 11(5), 863–868.
- Kauvery Hospitals. (2023). Trauma patterns and surgical demand during Jallikattu events: Institutional experience. *Indian Journal of Trauma & Emergency*, 9(2), 101–108.
- PETA India. (2022). Human fatalities associated with Jallikattu in Tamil Nadu (2017–2021): Report. Retrieved from <https://www.petaindia.com>
- ResearchGate. (2023). Ocular injuries associated with bull taming festivals: A case series. *Ophthalmology and Eye Trauma Reports*, 12(3), 145–150.
- Science Direct. (1982). Case report: Aortic penetration by bull horn trauma. *Injury*, 14(1), 57–59.