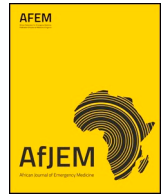


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Guest Editorial: Introduction to the Trauma Special Issue



Trauma, the consequences and management of non-iatrogenic injury, whether intentional or unintentional, is a potentially preventable, yet everyday occurrence on the roads and in the homes of people across Africa. Almost 90% of the trauma-burden is in the developing world (LMIC's), while the resources for treating trauma abound in higher income economically developed countries. [1]

This Special Injury Issue of AfJEM aims to highlight the work being done in assessment, prevention and management of trauma in Africa, through a series of papers addressing various aspects of trauma, from the pre-hospital, the Emergency Centre, injury identification and definitive care perspectives and also illustrating the role of intensive care in the LMIC environment.

The first paper in this special issue details the results of a survey of resources required and available for trauma care in LMIC's, highlighting that many "basic" resources are not available in many of the countries on this continent, ranging from consumables to analgesia, imaging to specialist services, both pre-hospital and in-hospital. The comparison with available resources in the high-income environment was stark, with differences of around 50% or more, even though some of the LMIC practitioners were from the private sector. [2]

When the resources are made available and care protocols exist, that still does not end the process of system development. As the next step required to plan trauma care services to a given geographic region, it is essential to determine the disease burden and the relative disease spectrum. This aspect is addressed in four of the papers included in this special issue, ranging from low income to middle income countries. [3,5–7]

Starting off at the district hospital level, the appreciable violence of the Cape Peninsula is evaluated by Zaidi and co-authors, who delved into the injury burden at the community district facility, Wesfleur Hospital, in Atlantis. They highlight the almost 20% trauma burden for the non-specialist staffed emergency centre, without locally based surgical services. The 40:60 split of intentional: non-intentional trauma was once-again noted in this study as previously documented in a large national review paper. [4] This paper also noted that stabs and gunshots had double the incidence of motor-vehicle crashes, very different to other parts of Africa. [3]

In their retrospective observational study from Sierra Leone, Bundu and co-authors, working in a tertiary referral centre highlight that the injury burden was different, with road traffic-related injuries taking centre-stage at 55%, followed by falls and with assault a distant third at 14%, with head and limb injuries accounting for about 70% of the injury burden. This presents a very different spectrum from the South African experience mentioned above. [5]

What we know about trauma burden mostly comes from work with adults, but are the injury patterns in children similar? Ndung'u and co-authors examined this aspect in a Kenyan emergency centre attached to

Aga Khan University, including children and younger adolescents (under 15 years of age). [6] They noted that paediatric injury was common in the younger child, around 6 years of age, due to domestic incidents and falls, while a smaller number had penetrating trauma. Admissions were predominantly for limb fractures, with only 4% of the total cohort resulting from intentional injury, very different from the adult population. They found, however that head trauma, burns and those with multiple injuries fared poorly.

In a focussed systematic review from Ethiopia, Endalamaw and colleagues identified a particularly high road traffic injury burden of almost 32% in their study, with the intent to estimate a pooled national road-injury prevalence among the Ethiopian population. [7] They also noted that the prevalence was almost double in the southern part of the country, compared to the capital Addis Ababa. In keeping with other studies from other countries, adults were the main victims, however children were injured almost 15% of the time. They call for implementation of effective prevention strategies to reduce this increasing scourge.

Moving from general disease burden to the evacuation and emergency care of the trauma patient, there are various aspects of clinical care and resource utilisation included in this Special Issue. Firstly, the military experience of casualty evacuation is addressed by Schauer and colleagues, who describe the different injury patterns and treatment requirements of injured military personnel from the African perspective compared to the well-known Middle Eastern patterns of improved bombs and automatic weapon injury. [8] In Africa they found far more often the injuries were related to sports and secondly related to battle-injury. Vehicle crashes (including helicopter crash) were the third most common. This is more in keeping with the local African injury patterns. They also discuss the less well-developed evacuation system in Africa.

Regarding emergency centre trauma care, Wearmouth and Smith report on their clinical governance project in a rural South African district hospital in KwaZulu-Natal, where they aimed to improve the administration of tranexamic acid to pertinent trauma admissions using a nurse-led protocol, since the delays to administration were identified in a prior audit at their facility. [9] They report a good experience and low protocol deviation rate and postulate that this intervention may reduce mortality in rural trauma cases.

In a similar vein, Morris and co-workers from Cape Town examined the availability and use of emergency blood at 4 hospitals in the Western Cape, South Africa. [10] They found that trauma remains the major reason for emergency transfusion, along with surgical haemorrhage from other causes. What was concerning was the use of such blood products for treating symptomatic anaemia without first using other suitable options. This again highlights the need for optimal patient blood management protocols in South Africa and other LMIC's where access to blood products may be less available. Additionally,

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they highlighted the huge rate of penetrating trauma treated in the four hospitals under review, with over 80% of trauma cases due to some form of penetrating trauma. It was noted that, as expected the use of blood at the tertiary centre was higher than at the secondary regional centres.

Imaging is a vital component in evaluation of the trauma patient. Jessica Willett comprehensively reviewed the literature and provides a useful set of guidelines for the imaging of the injured patient, from the emergency centre to the specialist care level. She highlights the need for bedside imaging of the unstable patient, along with more in-depth imaging of the haemodynamically normal patient. [11] She furthermore provides useful algorithms for the evaluation of the various body regions.

Bairagi and co-authors report a case of a rare, but rapidly fatal bullet embolism and review the relevant literature demonstrating the need for surgical foresight and rapid operative access in such cases. [12] The patient was shot in the right chest, with major bleeding and once the chest was open demised despite surgical control. The post-mortem revealed that the bullet had embolised to the main left pulmonary artery, thus leading to both lungs being non-functional.

Intra-operative care includes adequate anaesthesia and this is often frustrated in Africa and other LMIC's by the lack of access to trained anaesthetists, whether in the operative environment and especially for procedures outside the operating theatre. Villegas and co-workers report a set of patients from rural Kenya, who underwent ketamine-based sedation or anaesthesia by non-anaesthetists. [13] In this study ketamine was shown to be safe in the doses used, with dreams the most commonly reported unusual experience during recovery and lower numbers of reported episodes of either awareness (almost 25%, mainly during procedural sedation) or pain. Most reported the recovery period as the worst part, but would recommend ketamine anaesthesia to other patients.

Finally, to round off this special issue we venture beyond the emergency centre and the operating room to the ICU. From a Nigerian ICU comes this report on the relative trauma-ICU burden and the fact that the burden from violence is an ever increasing one, despite the limited resources available for ICU care in many LMIC's. [13] Trauma constituted a quarter of the ICU admission load, with bomb blast victims and gunshots comprising almost 25% of the trauma cohort. Many of these patients had burn injuries and these cases carried a mortality in excess of 80%, while the mortality for non-burned admissions was far lower. As in ICU's across the globe, the other pathology with a high mortality remains traumatic brain injury, likely more so in countries with limited access to CT-scan and neurosurgery services.

As the reader will see, we have attempted to address all aspects in the trauma-chain-of-survival and in the context of improving trauma systems in Africa. There is still much work to be done, however this Special Issue is aimed at inspiring the workers at the coalface and recognising their dedication and achievements, while also aiming to highlight to African leaders the need for good health systems.

References

- [1] Gosselin RA, Spiegel DA, Coughlin R, Zirkle LG. Injuries: the neglected burden in

- developing countries. *Bull World Health Organ* 2009;87:246.
- [2] Alibhai A, Hendrickse C, Bruijns SR. Poor access to acute care resources to treat major trauma in low- and middle-income settings: a self-reported survey of acute care providers. *Afr J Emerg Med* 2019 Special Issue: xx-xx.
- [3] Zaidi AA, Dixon J, Lupez K, De Vries S, Wallis LA, Ginde A, Mould-Millman N. The burden of trauma at a district hospital in the Western Cape Province of South Africa. *Afr J Emerg Med* 2019 Special Issue: xx-xx.
- [4] Hardcastle T, Oosthuizen G, Clarke D, Lutge E. Chapter 15: trauma, a preventable burden of disease in South Africa: review of the evidence, with a focus on KwaZulu-Natal. In: Padarath A, King J, Mackie E, Casciola J, editors. *South African Health Review* 2016. Durban: Health Systems Trust; 2016. p. 179–89. URL <<http://www.hst.org.za/publications/south-african-health-review-2016>>.
- [5] Bundu I, Lowsby R, Vandy HP, Kamara SP, Jalloh AM, Scott COS, Benyon F. The burden of trauma presenting to the government referral hospital in Freetown, Sierra Leone: an observational study. *Afr J Emerg Med* 2019 Special Issue: xx-xx.
- [6] Ndung'u A, Sun J, Musau J, Ndirangu E. Patterns and outcomes of paediatric trauma at a tertiary teaching hospital in Kenya. *Afr J Emerg Med* 2019 Special Issue: xx-xx.
- [7] Endalamaw A, Birhanu Y, Alibel A, Demsie A, Habtewold TE. The burden of road traffic injury among trauma patients in Ethiopia: a systematic review and meta-analysis. *Afr J Emerg Med* 2019 Special Issue: xx-xx.
- [8] Schauer SG, April MD, Naylor JF, Maddry JK, Keen DE, Cunningham CW, et al. A descriptive analysis of casualties evacuated from the Africa area of operations. *Afr J Emerg Med* 2019 Special Issue: xx-xx.
- [9] Wearmouth C, Smith J. Development of a nurse-led tranexamic acid administration protocol for trauma patients in rural South Africa. *Afr J Emerg Med* 2019 Special Issue: xx-xx.
- [10] Morris D, Von Hoving D, Stander M, Bruijns S. Utilisation of emergency blood in a cohort of South African emergency centres with no direct access to a blood bank. *Afr J Emerg Med* 2019 Special Issue: xx-xx.
- [11] Willett J. Imaging in trauma in limited-resource settings: a literature review. *Afr J Emerg Med* 2019 Special Issue: xx-xx.
- [12] Bairagi A, Hardcastle TC, Muckart DJJ. Left pulmonary artery bullet embolism following a penetrating cardiac gunshot injury. *Afr J Emerg Med* 2019 Special Issue: xx-xx.
- [13] Villegas S, Suarez S, Owuor J, Wuyke GM, Nelson BD, Imbamba J, et al. Intraoperative awareness and experience with a ketamine-based anaesthesia package to support emergency and essential surgery when no anaesthetist is available. *Afr J Emerg Med* 2019 Special Issue: xx-xx.

Further reading

- [14] Amaefule KE, Dahir IL, Sule UM, Ejagwulu FS, Maitam MI, Ibrahim A. Trauma intensive care in a terror-ravaged, resource-constrained setting: are we prepared for the emerging challenge? *Afr J Emerg Med* 2019 Special Issue: xx-xx.

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