The World Health Organization estimates that more than 4.4 million people die due to injuries, comprising 8% of global mortality. More than 90% of these deaths occur in low- and middle-income countries (LMICs). This reflects both higher rates of injury in LMICs as well as weaker trauma care systems to treat injury. Further, Road Traffic Crashes (RTC) are a main cause of injury globally accounting for around 30% of death due to injury with 1.35 million annual deaths. This burden is especially high in Sub-Saharan Africa and countries like Malawi, which is in the top 20 countries in terms of fatalities from RTCs.

Malawi is a prime example of this precarious situation, showing both high numbers of annual RTCs and a weak emergency response system, including pre-hospital care. To address this challenge, the Government of Malawi developed an Emergency Medical Services Pilot (EMS Pilot), to respond to RTCs and other injuries and trauma that need urgent medical attention. The EMS pilot is being implemented along the busiest stretch of Malawi’s largest road, the M1, between Lilongwe and Blantyre, where many RTCs happen and the need for emergency post-crash response is the highest. This pilot is funded by the World Bank through the Southern Africa Trade and Transport Facilitation Program (SATTFP), and it is being implemented by the Ministry of Health (MoH).

In order to better understand trauma injuries and care in Malawi, as well as to support the evaluation of the new EMS pilot once it becomes functional, high-quality Trauma Registries (TR) were set up in 10 health facilities by the by the World Bank’s Development Impact Evaluation Team (DIME) in collaboration with the Ministry of Health. Data was collected for almost 3 years (August 2018 – June 2021). The team produced the largest multi-site dataset on trauma cases in Malawi, comprising over 118,000 cases. The TR collected detailed data on patient demographics, trauma causes, care, medical outcomes, and injuries. In this brief, we present a few key results from analyzing these data. The analysis is done using 49,214 adult trauma cases prior to the surge of COVID-19 (Sept. 2018 – Mar. 2020), out of which 9,595 are road traffic crashes.
Epidemiology of Trauma in Malawi

The data shows distinct gender and age patterns in the incidence of trauma in Malawi. Two thirds of cases are male and around 50% of adult trauma cases are between the ages of 15 and 30. The most common diagnoses across all trauma cases are soft tissue injuries (42%), followed by fractures (27%), lacerations (12%), bite/stab/abrasion/burn (10%), contusions (4%), dislocations (2%), and head/spine/internal (1%). In terms of cause of trauma, while falls make up 46% of all trauma cases recorded, they are only 22% of trauma hospital admissions.

Road Traffic Crash Trauma

RTCs make up almost half of admitted trauma cases recorded (48%). While compared to all trauma, soft tissue injuries and fractures make up the majority of injuries for RTCs as well, contusions and
Non-motorized users (pedestrians and cyclists) have a higher share of RTCs happen during those peaks and almost none in the night hours. By contrast cars, trucks, and buses have a higher share of crashes happening between 23:00 – 4:00, possibly due to lower visibility, fatigue, or speeding.

**Post-crash Trauma Care**

The data from the TR show that there are major delays between the time of injury and the time the patients reach the hospitals. Around one quarter of patients come to facilities more than 24 hours after the trauma. Focusing on those cases where the patient arrived within 24 hours of the trauma, RTC cases have around 1.4 hours between the time of trauma and the time of arrival. All serious trauma cases (including RTCs) arriving within 24 hours have a median time to arrival of 2 hours. Serious non-RTC cases have a median time to arrival of 4 hours. For admitted cases that are not referrals, 29% arrive by private vehicle, 21% use commercial vehicles such as taxis, 16% come using public minibuses, and only 6% use an ambulance. In contrast, ambulances are the most-used mode of transport for referral cases between facilities (39%). Once at the health facility, serious cases are attended within a median time of 10 min, all RTC cases are attended within 35 minutes and all trauma cases are attended within a median time of 49 minutes.

Notably, almost half (49%) of RTC victims are non-motorized road users such as pedestrians and cyclists. Additionally, 48% of patients who were drivers of motor vehicles such as cars, buses, and trucks report not having worn a seatbelt. This goes up to 84% of patients when looking at passengers. 52% of patients who were drivers or passengers of motorbikes report not wearing a helmet. There are two peaks of RTCs, consistent across all the road users, coinciding with morning and evening rush hours, one between 4:00 – 8:00, and a second peak between 16:00 – 20:00.

**Discussion and Policy Relevance**

It is widely understood that trauma is a growing problem in many sub-Saharan African countries, including Malawi, but often details to understand the causes and outcome of trauma cases are not available to support data-driven policy decisions. The TR sought to fill the knowledge gap about trauma in Malawi with a larger-scale data collection from both central and district hospitals. A few key findings arise from this initial analysis:
Epidemiology of Trauma

The overrepresentation of males and younger in the data demonstrates the potentially large economic losses given that these are the most economically active groups. The need to understand and reduce the high incidence of falls (46% of all trauma cases) is important in order to reduce the high number of patients that facilities receive. Yet, when focusing on the admitted cases that require the most resources, RTCs make up almost half, illustrating the large burden that needs to be addressed through more effective prevention. Furthermore, the nature of the RTCs in this setting is distinctive. In other settings, such as Tanzania, motorcycles are found to be a major contributor to RTCs. In the Malawi TR, roughly half (49%) of RTC victims are pedestrians and cyclists. This suggests the need for targeted policies and infrastructure to improve road safety for these vulnerable users.

Road Safety Practices

The analysis of the data also shows limited adherence to safety practices for motorized RTCs. Malawi law requires drivers and front seat passengers to wear seat belts, yet the TR data shows that 84% of patients who were passengers of motor vehicles report not having worn a seat belt. Similarly, helmets are required for both drivers and passengers of motorbikes, yet 52% of patients who were drivers or passengers of motorbikes report not wearing a helmet. This highlights the scope for increased seat belt and helmet use to reduce RTC-related trauma in Malawi, potentially through increased education and enforcement.

Post-crash Care Timing

Another concerning finding, which relates directly to the EMS pilot, is the delay observed in time to reach health facilities. Patients in this registry report long delays between the time of their injury and the time they reach the hospital. Notably, being close to the road is more closely linked to timely care than injury severity. RTCs (both serious and non-serious), which happen on the road where transport options are present, have a median time to arrival of 1.4 hours. By contrast, all serious non-RTC cases have a median time to arrival of 4 hours, highlighting major barriers to transport for these cases. Furthermore, ambulance transport is primarily used for referral across facilities than for emergency transport from the trauma site to hospitals.

Recommendations

- The data demonstrates road traffic crash victims to be a large burden for health facilities and the need to implement additional policies that can decrease RTCs, which will help to alleviate resource needs within health facilities.
- There is a need to target policies and infrastructure to improve road safety for the most vulnerable users — pedestrians and cyclists.
- The data collected shows the opportunity for increased seat belt and helmet use to reduce RTC-related trauma in Malawi, which may require higher enforcement of existing laws.
- There is scope for significant reductions in the time between the occurrence of trauma and the care provided through continued investment in establishing emergency medical services that can help bring trauma patients to health facilities faster.

Team and Funding

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