African Journal of Emergency Medicine 14 (2024) 224–230

Contents lists available at ScienceDirect

African Journal of Emergency Medicine

journal homepage: www.elsevier.com/locate/afjem

Characteristics of paediatric injuries as predictors of 24-hour disposition from the Emergency Department of a teaching hospital in Southwestern Uganda

Daniel Olinga [a,c,*], Felix Oyania [b,c], Kenneth Bagonza [a,c,d], Justine Athieno Odakha [a,c], Mabiala Constant Balu [a,c], William Mwanje [c], Andrew Flanery [a,c,d], Ambrose Okello [a,c], Evelyn Mwende Musau [a,c], Prisca Mary Kizito [a,c]

[a] Mbarara University of Science and Technology, Faculty of Medicine, Emergency medicine Department, Uganda
[b] Mbarara University of Science and Technology, Faculty of Medicine, Surgery Department, Uganda
[c] Mbarara Regional Referral Hospital, Uganda
[d] Seed Global Health, Uganda

ARTICLE INFO

Keywords:
24-hour disposition
Paediatric injuries
Emergency department
Trauma
Initial management

ABSTRACT

Background: Paediatric injuries are among the leading causes of morbidity and mortality globally, especially in low- and middle-income countries. We aimed to characterize paediatric injuries as predictors of disposition from Mbarara Regional Referral Hospital Emergency Department (ED) Southwestern Uganda.

Methods: This was a prospective cohort study done from 12th December 2022 to 31st March 2023. We described the characteristics of injuries sustained by children and evaluated the predictors of 24-hour disposition from the ED using logistic regression.

Results: Of the 160 children followed up, 64.4% were male with a median age of 7 years, brought in with road traffic accidents (RTAs) (40.6%) and falls (35.6%) as the commonest mechanism of injury. Over half of the patients were triaged as yellow (urgent); polytrauma and head injuries were the top injury patterns. The majority (45.6%) of the children were admitted to the inpatient surgical ward. Only 1.9% and 5.0% ended up in intensive care unit (ICU) and died (to mortuary), respectively. The median time to disposition was 8 h and 14% stayed in the ED beyond 24-hours. Patients who needed more intensive initial treatment, including additional medications or interventions, were significantly more likely to be admitted to the ward (AOR= 5.3, 95%CI: 2.0-13.0, p <0.01).

Conclusion: Paediatric injuries were caused mainly by RTAs and presenting with polytrauma and head injuries. Most patients were disposed of to the inpatient surgical ward within 24 h with severe KTS and initial management being strongest predictors of admission. These findings can be used to tailor quick risk stratification and decision-making tools and improve ED disposition of paediatric injuries in Low- and Middle- income countries.

African relevance

- Knowledge of the clinical profiles of paediatric injuries in the Emergency Department can greatly improve patient flow and outcomes in African healthcare settings.
- By using locally available tools and injury characteristics to predict outcomes, health workers can prioritize management better even in resource-constrained areas.
- Dedicated triage officers and paediatric trauma rooms might enhance emergency care and utilization of available resources in sub-Saharan African settings.

Introduction

Trauma is among the leading causes of mortality globally today and is increasingly becoming a public health threat to the human population

* Corresponding author.
E-mail address: dolinga86@gmail.com (D. Olinga).

https://doi.org/10.1016/j.afjem.2024.08.001
Received 3 April 2024; Received in revised form 4 August 2024; Accepted 8 August 2024

[1]. Paediatric injuries are a major global public health concern with associated unintentional injuries like falls and road traffic accidents being one of the highest contributors to paediatric morbidity and mortality [2,3]. With children contributing approximately 30% of the global population, a report from the Global Burden of Disease 2017, suggested that approximately 1900 adolescents and children die daily because of injury [4].

In the United States, nearly 19 children die daily from accidental injuries. Of these 25% are severely injured yearly which may result in missing school, and work, having bed rest, or result in seeking medical intervention [5]. In 2016, for every paediatric accidental injury-related death there were 33 associated admissions and 1053 Emergency Department (ED) visits [6]. Injuries occurring to children living in low resource settings have greatly contributed to the global report above on paediatric-related injuries at approximately 90% of accidental injury-related mortality [7].

Different ED settings employ various tools for the disposition of paediatric patients. Some of these entail parameters like early warning scores and observation priority scores which aid prediction of the disposition from the ED [8]. Emergency management relies on identifying injury severity, timely diagnosis, treatment, and referral [9]. Inadequate use of triage tools in low and middle income countries (LMIC) health facilities result in delays in obtaining treatment that can be lifesaving in severe injuries [10-12].

In Uganda, a study showed that the commonest causes of childhood injury were 34% traffic crashes, 18% falls, and 15% violence. Using the Kampala trauma score for grading the severity; - 87% of children were mildly injured, only 1% were severely injured, and 6% of those admitted died after 2 weeks [13].

Previous work done at Mbarara Regional Referral Hospital (MRRH) focused on patterns of injuries sustained and outcomes at discharge with little information on paediatric patients [14]. A related study on patterns and short-term outcomes for unintentional injuries in children showed a mortality rate of 9.2% [15]. However, there is inadequate literature on disposition rates and their association with patient presentation.

Globally triage and characterization of patients with injuries have been key to proper management and early disposition from the ED [16]. Delays in identifying the different forms of injuries may result in poor patient outcomes including death, disability, or complications requiring critical care or operative services [17]. This is coupled with the stretching of meager ED resources, specialist services, and nursing care and subsequently leads to overcrowding in the ED [18].

The findings of this study can inform the need for regular triage among children with injuries in the ED, and guide appropriate diagnostic and disposition protocols. This may subsequently improve patient flow, minimizing overcrowding. The outcomes may highlight the importance of triaging injured patients using locally available tools to enhance early decision-making for better patient outcomes. The results will also serve as baseline data for further studies on the underlying gaps and recommendations.

This study sought to look at how paediatric patients with injuries present, their initial management, and how best this predicts their transfer from the ED to other hospital units within 24 h of the initial review.

Study methods

This was a prospective cohort study among patients aged 0 to 17 years and was carried out for three and half months from 12 December 2022 to 31 March 2023, at the MRRH ED. MRRH is a government referral and teaching hospital that receives a high number of trauma patients daily.

The ED has a bed capacity of approximately 15 beds in the surgical emergency ward, a resuscitation room with 2 beds and functional monitoring equipment, a resuscitation bay that has 2 triage desks and 2 beds for initial assessment and operates and operates for 24 h a day and 7 days a week. The ED receives 25 to 30 trauma patients per day.

We aimed to consecutively enrol 160 children, with a sample size calculation adopted from Green (1991) for multiple regression.

We included all newly admitted paediatric patients with all diagnoses of trauma presenting to the surgical ED and those who provided parental consent or individual assent. We excluded those re-admitted from the ward with the same injury and whose injuries resulted from animal bites. At analysis, we excluded those who stayed in the ED beyond 24 h, and patients referred out of the hospital within 24 h (because the study was looking into the impact of disposition or rates of disposition within the in-hospital departments).

The research team did not interfere with patient stabilization and the process included obtaining a detailed history from the patient or legal guardians and documenting it in the structured questionnaires provided by the research team.

Data were collected using pretested interviewer-guided structured questionnaires administered using a language the participants best understood. This was done by the principal investigator (PI) or trained research assistants. The study background was explained to each patient/parent for informed consent/assent to participate. They were assured of confidentiality for the information they provided.

The research assistants were Emergency Medicine postgraduates and the nurses on duty who followed up the patients in the ED after the final decision of disposition and patient stability was ensured. The questionnaire comprised; patient socio-demographics, clinical patterns and mechanisms of injury, initial management, triage category, and injury severity.

Data analysis

The outcome variable was 24-hour disposition from MRRH ED to the parent ward, theater, Intensive Care Unit (ICU), discharge, or death. The independent variables included socio-demographics, referral status, mode of arrival, mechanism of injury (fall, RTA, assault, and abuse), pattern of injury (fracture, head injury, burns, trunk injuries), initial management (analgesics, fluids, oxygen or a combination of any two or all regimen), triage category (red, yellow, green) and injury severity (using the Kampala Trauma Score-KTS-II).

Data was entered into Microsoft Excel and imported to STATA 17. Continuous variables were computed as means or medians depending on their distribution. Categorical variables were summarized as frequencies and percentages. Factors predicting disposition were subjected to a bivariate analysis. The relationship between the independent and the dependent variables was measured using crude (COR) and adjusted odds ratios (AOR).

The significant, biologically plausible, and meaningful factors with $\boldsymbol{p < 0.2}$ or crude odds ratios of either $\geq$ **2 or** $\leq$**0.5** were entered into multiple logistic regression models to determine the relationship between characteristics of paediatric injuries and the 24 hrs disposition from the ED. Multivariate logistic regression was done and P-values of $\leq$0.05 at a 95% CI were considered for significance.

Quality control

Research assistants were trained by the PI to ensure the uniformity of the data collected. The questionnaires were pretested and standardized before the commencement of the research process. The PI reviewed the data collected for each participant for errors and completeness before data entry.

Ethical considerations

Ethical approval was obtained from the Mbarara University of Science and Technology Research Ethics Committee (REC).

Results

Over 3.5 months, of the 947 patients who presented with trauma, paediatric trauma contributed 24.8% (235). Some 75 of these were excluded from the eventual analysis (Fig. 1). Baseline characteristics of the 160 paediatric trauma patients presenting with injuries at the MRRH ED are shown in Table 1. It provides a comprehensive overview of the demographic and clinical features of the injured children, setting the context for subsequent analyses. The association between various characteristics of paediatric injuries and their impact on the 24-hour disposition of patients from the MRRH ED is shown in Fig. 2. It highlights the relationship between specific injury factors and the likelihood of admission, discharge, or death within the critical first 24 hours.

24-hour discharge of paediatric injury patients at MRRH ED

Bivariate analysis results are shown in Table 2, identifying the characteristics of paediatric injuries associated with different disposition outcomes in MRRH ED. The significant, biologically plausible, and meaningful factors with p<0.2 or crude odds ratios of either ≥ 2 or ≤ 0.5 were then entered into multiple logistic regression models to determine the relationship between these characteristics and the 24-hour disposition from the ED. It provides insight into the direct relationships between various injury factors and patient outcomes, serving as a precursor to the more detailed multivariate analysis. Mode of transport, initial management, and injury severity were associated with discharge ($p < 0.05$). Patients who arrived by car were less likely to be discharged (AOR= 0.1, 95%CI: 0.2–0.7, $p < 0.05$). Children who were initially managed by two or all regimens were less likely to be discharged compared to those who received analgesics only (AOR= 0.1, 95%CI: 0.0–0.3, $p < 0.001$ versus AOR= 0.9, 95%CI: 0.1–15.4, $p > 0.05$). Those with severe injuries were less likely to be discharged compared to those with mild injuries (Moderate AOR= 0.1, 95%CI: 0.0–0.4, $p < 0.001$; severe AOR= 0.1, 95%CI: 0.0–0.3, $p < 0.001$]).

24-hour ward disposition of paediatric injury patients from MRRH ED

Multivariate analysis results identifying key characteristics of paediatric injuries that are associated with the disposition outcomes from the MRRH ED are shown in Table 3. It provides insights into the factors that most significantly influence whether paediatric patients are admitted, discharged, or require further interventions within 24 hours of presenting to the ED. The table summarizes the adjusted odds ratios (AOR) and confidence intervals (CI) for various predictors. Mode of transport, initial management, and triage were associated with admission ($p < 0.05$). Those who arrived at MRRH by car were over 3 times more likely to be admitted (AOR= 3.8, 95%CI: 1.5–9.6, $p < 0.001$) compared to those on motorcycles. Patients who were initially managed by two regimens were more likely to be admitted compared to those administered with analgesics only (AOR= 5.3, 95%CI: 2.0–13.0, $p < 0.01$). The red category (AOR= 0.2, 95%CI: 0.1–0.7, $p < 0.05$) was less likely to be admitted to the inpatient surgical ward compared to the yellow triage category. None of the factors was associated with a disposition to ICU and theater. Mechanism of injury was independently associated with death. Specifically, assault patients were more likely to die (AOR= 5.9, 95%CI: 1.0–34.7, $p < 0.05$) compared to RTA.

Discussion

Paediatric injuries contributed 24.8% to trauma visits at MRRH ED. This was close to that seen in prospective cohort studies done in Tanzania and Rwanda [11,12]. This finding is potentially explained by similar predisposing factors, for example, falls and road traffic accidents causing injuries in children in developing countries. The prevalence was, however, lower in high income countries (HIC) with better traffic control rules and good monitoring of children's activities by adults. In South Africa, paediatric poly-trauma accounted for about 16% of hospital admissions, similar to the findings in trauma registries in Nigeria [19, 20].

These injuries being more frequent in males 2–11 years could be because this age group is more explorative, for example climbing heights

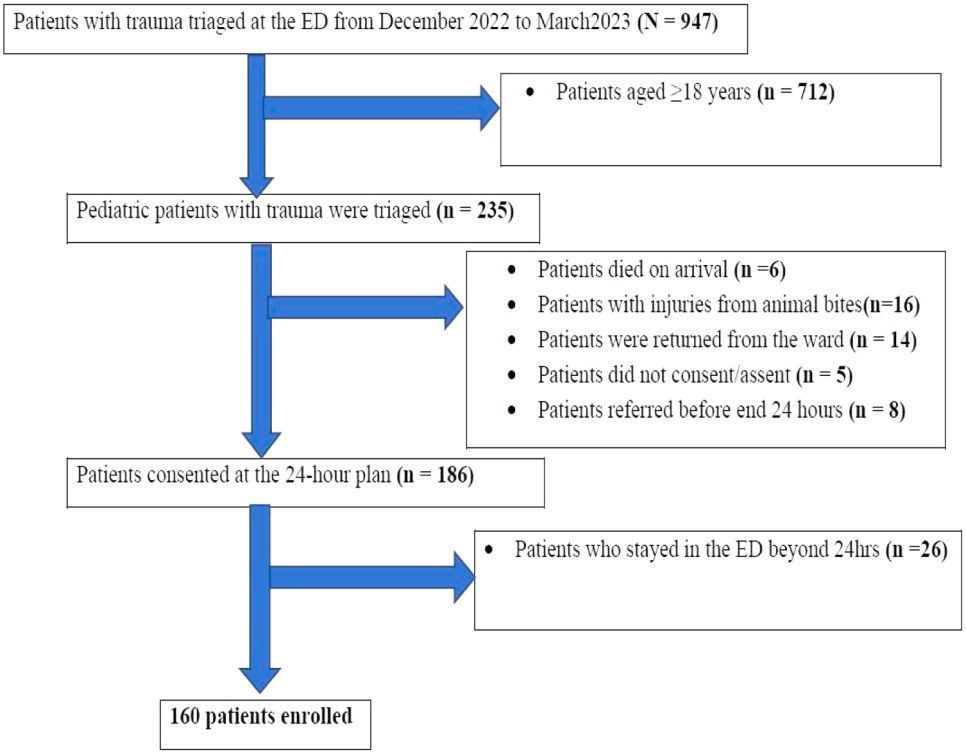

Fig. 1. Study flowchart.

Table 1
Baseline Characteristics of 160 paediatric injuries among paediatric trauma patients attending MRRH ED.

Characteristics			N (%)
Sex	Male		103 (64.4)
	Female		57 (35.6)
Age	Median (IQR)		7 (3–13)
	<2 years		18 (11.3)
	2–11 years		93 (58.1)
	12–17 years		49 (30.6)
Education of patient	<Primary		63 (39.4)
	Primary		70 (44.0)
	Secondary		27 (16.6)
Referral status	Self/Direct		92 (57.5)
	Referred		68 (42.5)
Mode of transport	Motorcycle		94 (58.8)
	Car		56 (35.0)
	Walking		10 (6.2)
Mechanism of injury	Fall		57 (35.6)
	RTA		74 (46.3)
	Assault/abuse		29 (18.1)
Pattern of injury	Head injury		45 (28.1)
	Fracture		38 (23.8)
	Burns		24 (15.0)
	Chest trauma		5 (3.1)
	Polytrauma		48 (30.0)
Initial management	Analgesia only		71 (44.4)
	Two regimens	1. Ana + FL	37 62 (38.8)
		2. Ana + O2	21
		3. FL + O2	4
	More than two regimens		27 (16.9)
Triage	Emergent (Red)		36 (22.5)
	Urgent (Yellow)		85 (53.1)
	Non-urgent (Green)		39 (24.4)
The severity of injury (KTS II)	Mild		46 (28.7)
	Moderate		72 (45.0)
	Severe		42 (26.3)
Disposition	Discharged home		48 (30.0)
	Ward		73 (45.6)
	Mortuary (Died)		8 (5.0)
	ICU		3 (1.9)
	theater		28 (17.5)
Time to disposition (hours)	Median (IQR)		8(4–13)
	≤4 h		44 (27.5)
	5 – 24 h		116 (72.5)

Ana-Analgesia, FL-Fluids, O2-Oxygen, IQR-Interquartile range, RTA-Road traffic accident, ICU-Intensive Care Unit, KTS II-Kampala Trauma Score II.

and trees. They also have inadequate knowledge of traffic rules amidst limited supervision by adults. In addition to indulging in dangerous activities that risk injury, boys start riding motorcycles at an early age, often with inadequate training, predisposing them to road traffic accidents. These findings have been reported by other East African countries, Nigeria, and South Africa [19-21]..

Findings on the mechanism of injury showed that most injuries were attributed to RTAs which resulted in polytrauma and head injuries. This was higher than that seen in a study done in Kampala (34%), however, this was over 10 years ago(13). The many RTAs could be explained by the increasing number of automobiles in southwestern Uganda resulting in unregulated traffic use and more trauma. There are also no traffic lights, few zebra crossings, and narrow or no pedestrian walkways with limited adult supervision of these children. For similar reasons, RTAs also contributed to paediatric injuries in a retrospective study done in Nigeria [20]. However, in other East African countries falls contributed more to injuries [11], [12,21].

Assault and abuse as being intentional forms of trauma majorly contributed to polytrauma. Key to note, the youngest child abused was 6 months old and ended up dying while in the ED due to multiple injuries and hence multiple organ failure.

Disposition

The study findings suggest that within 24 h, most patients were transferred to the ward or discharged home. This could indicate that most injuries were not severe enough to require admission to the ICU or theater, and those that needed monitoring and further management were transferred to parent wards. A few patients (14%) stayed in the ED beyond 24 h, however, our study did not focus on this population.

Notably, 72.5% had disposition from the ED between 5 and 24 h, beyond one of the HIC thresholds for ED stay of 4 h. This high proportion suggests that the ED may have been overwhelmed in terms of staff and resources, leading to delays in treatment. Moreover, the high proportion of patients triaged yellow may indicate that the ED was operating at or above capacity, this acuity is often associated with moderate to severe injuries requiring care within one hour (Uganda Triage and Treatment Algorithm, UTAT).

A study in a Saudi Arabia ED showed that approximately 73.5% of the patients in the red category had stayed for <4 h [22]. This is a clear contrast to our study, possibly because the MRRH ED is still establishing a fully functional ED with clear protocols and flow of patients. Despite MRRH ED having inadequate resources, it has most of the additional resources for critically ill patients compared to other hospital areas. This could explain the extended ED length of stay of patients observed.

The finding that most injuries were self-referred and that patients arrived at the ED by motorcycle is not surprising. Motorcycles are a popular mode of transportation in Uganda, especially in rural areas, where they are often the only means of transport available.

Regarding the factors associated with disposition, patients who arrived by car were less likely to be discharged within 24 h compared to those who walked in. This speaks to their injury severity at presentation, which probably necessitated a car (ambulance or private car) to get to the ED. This emphasizes that ED staff should be alert while managing patients brought in by car. It also calls for a well-coordinated Emergency Medical Service (EMS) with clear communication to the ED before arrival for more timely interventions [23].

Secondly, children in the red or green category were less likely to be admitted to the parent ward compared to the yellow category. This was because patients in the green category had less severe injuries and did not need intense management and further investigations whereas those in the red category mostly had polytrauma requiring intense management and monitoring in the ICU, theater, if not dead in the ED.

Thirdly, children who were managed using multiple treatment modalities ("regimens") were less likely to be discharged compared to those administered with analgesics only. This intense initial management also indicated that the patients were severely ill and hence needed to be admitted for further care as in-patients or even died. Appropriate initial treatment facilitates timely patient disposition. Initial resuscitation restores the patient's physiology and identifies the need for further interventions including volume resuscitation, pain management, and oxygen therapy [24].

Lastly, mild injuries were more likely to be discharged, and vice versa is true. This is mainly explained by the need for close monitoring, critical interventions, and or investigations for severe injuries compared to patients with mild injuries. As in a study on traumatic brain injury patients, injury severity is a key determinant and is inversely related to the patients' disposition [25].

Strengths and Limitations

Among the strengths of this study, we did not interrupt the normal flow and emergency care, and any study procedure or documentation was complementary to ongoing patient care. Since the study was conducted in a single health facility, the results may not be generalizable to the whole Ugandan population. Additionally, the small sample size could have hidden the significance of some factors in predicting paediatric injuries. However, the study was powered at 80% which is the

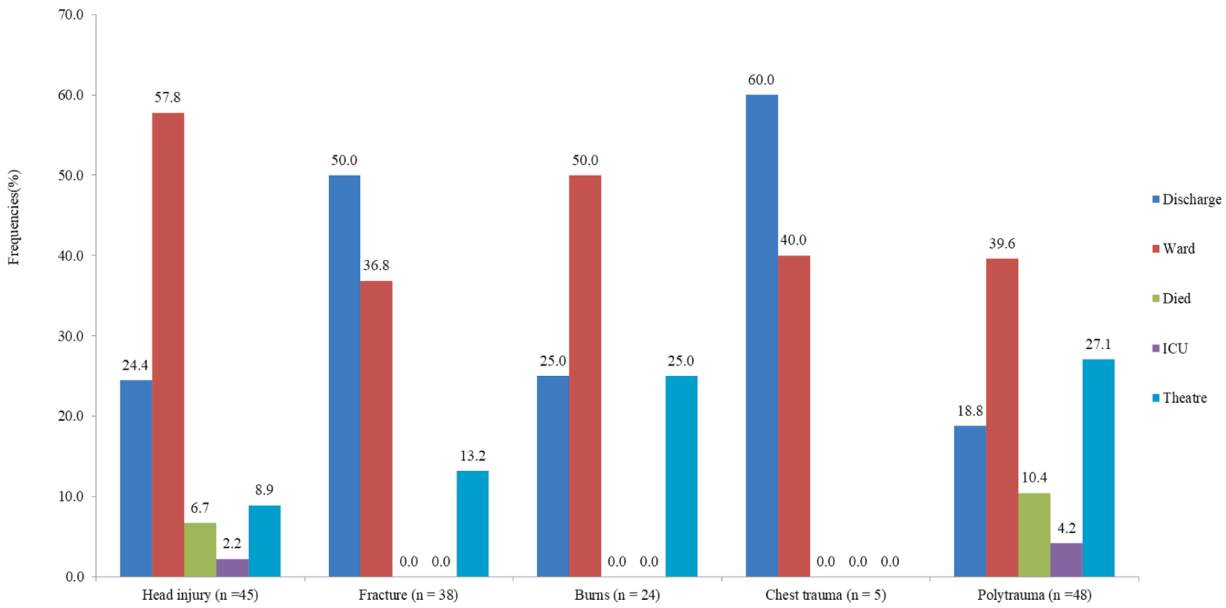

Fig. 2. Association between characteristics of paediatric injuries and disposition from the MRRH ED in 24-hours.
ICU-Intensive Care Unit,**%**- Percentage, Most patients discharged within 24 h had fractures (50.0%) and chest trauma (60.0%) while head injuries (57.8%), polytrauma (39.6%), and burns (50.0%) were admitted.

Table 2
Bivariate analysis results of characteristics of paediatric injuries associated with disposition from the MRRH ED ($N = 160$).

Factors	Discharged Home		ward		theater		Mortuary (Died)		ICU
	COR	P-Value	COR	P-Value	COR	P-Value	COR	P-Value	
Referral	Ref.		Ref.		Ref.		Ref.		
Self/Direct									
Referred	0.1(0.1–0.3)	<0.001***	2.6(1.3–4.9)	0.004**	0.1(0.1–0.3)	<0.001***	0.8(0.2–3.5)	0.770	–
Transport	Ref.		Ref.				Ref.		
Motorcycle									
Car	0.1(0.0–0.2)	0.298	3.5(1.7–7.0)	<0.001***	–	–	4.4(0.8–23.6)	0.083	–
Walk-in	2.1(0.6–8.1)	<0.001***	0.8(0.2–3.2)	0.713	–	–	5.0(0.4–60.7)	0.206	–
Mechanism of injury	Ref.		Ref.		Ref.		Ref.		
RTA									
Fall	2.3(1.1–5.0)	0.037*	0.6(0.3–1.2)	0.162	1.0(0.4–2.2)	0.913	0.7(0.3–1.2)	0.162	–
Assault/Abuse	2.8(1.1–7.0)	0.032*	0.5(0.2–1.3)	0.180	0.1(0.0–1.1)	0.060	0.9(0.2–1.3)	0.180	–
Initial management	Ref.		Ref.		Ref.				
Analgesics only									
Two regimen	0.1(0.0–0.2)	<0.001***	5.3(2.5–11.2)	<0.001***	1.6(0.7–3.8)	0.299	–	–	–
More than two regimen	0.1(0.0–0.3)	<0.001***	2.5(1.1–6.3)	0.047*	0.7(0.2–2.7)	0.581	–	–	–
Triage category	Ref.		Ref.		Ref.				
Urgent(Yellow)									
Non-urgent(Green)	5.1(2.3–11.5)	<0.001***	0.3(0.1–0.6)	0.003**	0.5(0.2–1.7)	0.294	–	–	–
Emergent(Red)	0.1(0.1–0.6)	0.016*	0.6(0.3–1.4)	0.276	1.6(0.6–3.8)	0.036*	–	–	–
The severity of injury	Ref.		Ref.		Ref.				
Mild									
Moderate	0.2(0.1–0.3)	<0.001***	1.1(0.5–2.3)	0.886	1.5(0.6–3.9)	0.376	–	–	–
Severe	0.3(0.00–0.6)	<0.001***	0.5(0.2–1.1)	0.099	0.1(0.0–0.8)	0.030*	–	–	–

*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$: COR = Crude odds ratio and - = Meaningless values that could not be run in the model, ICU- Intensive Care Unit, Ref.=Reference, RTA= Road Traffic Accident.*

minimum recommended power. Due to poorly defined patient flow in MRRH, some patients ended up in the outpatient department or paediatric ward instead of the ED. This was mitigated by regularly advising staff at those points to redirect patients to the ED.

Conclusion

Paediatric injuries at MRRH ED were caused mainly by RTAs and presented with polytrauma and head injuries. Most patients were disposed of to the inpatient surgical ward within 24 h with severe KTS and initial management being strongest predictors. There was a low ICU admission and ED mortality rate.

We recommend that at MRRH ED, efforts should target the reduction of the time to disposition for paediatric trauma patients. Some of these include training healthcare providers in trauma management and developing risk stratification tools using the factors found significant in this study. These interventions will help hasten the process of triaging and initiating the management of injured paediatric patients. Quality improvement initiatives should be implemented, such as protocols for prompt diagnosis and treatment of severe injuries, to improve patient outcomes and further reduce mortality and ICU rates.

Restructuring of EDs, which may include dedicated triage officers to hasten the process of injury pattern recognition, as well as designated paediatric ED areas for initial management of the moderate to severely

Table 3
Multivariate analysis results of characteristics of paediatric injuries associated with disposition from the MRRH ED ($N = 160$).

Factors	Discharged Home		ward		theater		Mortuary(Died)		ICU
	AOR	P-Value	AOR	P-Value	AOR	P-Value	AOR	P-Value	
Referral	Ref.		Ref.		Ref.				
Self/Direct									
Referred	0.4(0.1–1.4)	0.132	1.5(0.6–3.5)	0.401	1.6(0.6–4.0)	0.364	–	–	–
Transport	Ref.		Ref.		Ref.		Ref.		
Motorcycle									
Car	0.1(0.0–0.7)	0.000***	3.8(1.5–9.6)	0.005***	–	–	6.2(1.0–37.0)	0.047*	–
Walk-in	2.0(0.2–15.9)	0.265	0.5(0.1–2.7)	0.390	–	–	2.1(0.1–28.8)	0.589	–
Mechanism of injury	Ref.		Ref.		Ref.		Ref.		
RTA									
Fall	0.8(0.3–2.0)	0.583	0.6(0.3–2.0)	0.703	1.4(0.6–5.7)	0.476	0.5(0.0–5.0)	0.532	–
Assault/Abuse	1.3(0.4–4.1)	0.639	1.7(0.6–4.5)	0.934	0.1(0.0–1.2)	0.077	5.9(1.0–34.7)	0.049*	–
Initial management	Ref.		Ref.						
Analgesics only									
Two regimen	0.1(0.0–0.3)	<0.001***	5.3(2.0–13.0)	<0.001***	–	–	–	–	–
More than two regimen	0.6(0.0–13.1)	0.803	2.0(0.2–8.1)	0.390	–	–	–	–	–
Triage category	Ref.		Ref.		Ref.				
Urgent(Yellow)									
Non-urgent(Green)	2.1(0.6–7.6)	0.277	0.6(0.2–2.0)	0.462	0.2(0.2–2.4)	0.513	–	–	–
Emergent(Red)	0.4(0.0–7.5)	0.515	0.2(0.1–0.7)	0.015*	1.8(0.6–5.7)	0.325	–	–	–
The severity of injury	Ref.		Ref.		Ref.				
Mild									
Moderate	0.1(0.0–0.4)	<0.002***	0.8(0.2–2.3)	0.623	2.1(0.7–6.6)	0.192	–	–	–
Severe	0.1(0.0–0.6)	<0.020**	0.5(0.1–2.9)	0.273	0.2(0.0–1.5)	0.111	–	–	–

*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$: AOR = Adjusted odds ratio and - = Meaningless values that could not be run in the model, ICU- Intensive Care Unit, Ref.=Reference, RTA= Road Traffic Accident.*

ill would be ideal. The city administration should set up motorcyle lanes, and zebra crossings and widen pedestrian walkways to reduce RTAs.

Future research should explore factors that contribute to the high prevalence of injuries among male children aged 2–11 years, and a larger sample size to study mortality and ICU disposition.

Dissemination of results

The results from this study were shared with the MRRH clinical care team and administration, as well as University Departments involved.

Authors' contribution

Authors contributed as follows to the conception or design, acquisition, analysis, or interpretation of data, and drafting the work or revising it critically for important intellectual content: DO 50%; PMK 17%, FO 8%, JAO 6.5%, KB 6.5%, AF 3%, MW 3%; BHM, EMM, and OA contributed 2% each.

All authors approved the version to be published and agreed to be accountable for all aspects of the work.

Declaration of competing interest

The authors declare no conflict of interest.

Acknowledgments

We are grateful to the patients, residents, specialists, and friends of AFEM who provided a grant to support this work.

References

[1] World Health Organisation. Injuries and violence: the facts 2014 Geneva, 27. Switzerland: World Health Organisation; 2014.
[2] GBD 2016 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. Lancet (Lond, Engl) 2017;390(10100): 1211–59.
[3] Kassebaum N, Kyu HH, Zoeckler L, Olsen HE, Thomas K, Pinho C, et al. Child and Adolescent Health From 1990 to 2015: findings From the Global Burden of Diseases, Injuries, and Risk Factors 2015 Study. JAMA Pediatr 2017;171(6): 573–92.
[4] GBD 2017 Causes of Death Collaborators. Global, regional, and national age-sex-specific mortality for 282 causes of death in 195 countries and territories, 1980-2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet (Lond, Engl) 2018;392(10159):1736–88.
[5] Sleet DA. The global challenge of child injury prevention. Int J Environ Res Public Health 2018;15(9).
[6] Ballesteros MF, Webb K, McClure RJ. A review of CDC's Web-based Injury Statistics Query and Reporting System (WISQARS™): planning for the future of injury surveillance. J Safety Res 2017;61:211–5.
[7] Tupetz A, Friedman K, Zhao D, Liao H, Isenburg MV, Keating EM, et al. Prevention of childhood unintentional injuries in low- and middle-income countries: a systematic review. PLoS ONE 2020;15(12):e0243464.
[8] Hannon C, Roland D, O'Sullivan R. Prediction of Pediatric Patient Admission/Discharge in the Emergency Department: Irish Pediatric Early Warning Score, Pediatric Observation Priority Score, and Irish Children's Triage System. Pediatr Emerg Care 2022;38(6):e1320–e6.
[9] Duke T, Cheema B. Paediatric emergency and acute care in resource poor settings. J Paediatr Child Health 2016;52(2):221–6.
[10] Osifo OD, Iribhogbe PE, Ugiagbe EE. Epidemiology and pattern of paediatric and adolescent trauma deaths in a level 1 trauma centre in Benin city, Nigeria. Injury 2012;43(11):1861–4.
[11] Sawe HR, Milusheva S, Croke K, Karpe S, Mfinanga JA. Pediatric trauma burden in Tanzania: analysis of prospective registry data from thirteen health facilities. Inj Epidemiol 2022;9(1):3.
[12] Petroze RT, Martin AN, Ntaganda E, Kyamanywa P, St-Louis E, Rasmussen SK, et al. Epidemiology of paediatric injuries in Rwanda using a prospective trauma registry. BJS Open 2020;4(1):78–85.
[13] Hsia RY, Ozgediz D, Jayaraman S, Kyamanywa P, Mutto M, Kobusingye OC. Epidemiology of child injuries in Uganda: challenges for health policy. J Public Health Afr 2011;2(1):e15.
[14] Kayondo G. Patterns of injuries sustained and outcome at discharge of patients admitted in Mbarara Regional Referral Hospital Following Road Traffic Accidents. Surg 2014 [Dissertation]. In press.
[15] A. Abdirahiman. Patterns and short-term outcomes for unintentional injuries in children atending mbarara regional referral hospital,. [DISSERTATION]. In press 2019,.
[16] Bazyar J, Farrokhi M, Khankeh H. Triage systems in mass casualty incidents and disasters: a review study with a worldwide approach. Open access Macedon J Med Sci 2019;7(3):482–94.
[17] Lampi M, Junker JPE, Tabu JS, Berggren P, Jonson CO, Wladis A. Potential benefits of triage for the trauma patient in a Kenyan emergency department. BMC Emerg Med 2018;18(1):49.
[18] Beltrán Guzmán I, Gil Cuesta J, Trelles M, Jaweed O, Cherestal S, van Loenhout JAF, et al. Delays in arrival and treatment in emergency departments: women, children and non-trauma consultations the most at risk in humanitarian settings. PLoS ONE 2019;14(3):e0213362.

[19] Naidoo N, Muckart DJ. The wrong and wounding road: paediatric polytrauma admitted to a level 1 trauma intensive care unit over a 5-year period. S Afr Med J 2015;105(10):823–6.
[20] Oboirien M. Pattern of paediatric trauma in Sokoto, North West Nigeria. Afr J Paediatr Surg 2013;10(2):172–5.
[21] 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;9(Suppl): S47–s51.
[22] Al Nhdi N, Al Asmari H, Al Thobaity A. Investigating indicators of waiting time and length of stay in emergency departments. Open Access Emerg Med 2021;13:311–8.
[23] Choi J, Carlos G, Nassar AK, Knowlton LM, Spain DA. The impact of trauma systems on patient outcomes. Curr Probl Surg 2021;58(1):100849.
[24] Coughenour J. Initial evaluation and management of the injured patient. Mo Med 2018;115(5):429–33.
[25] Mehmood A, Zia N, Kobusingye O, Namaganda RH, Ssenyonjo H, Kiryabwire J, et al. Determinants of emergency department disposition of patients with traumatic brain injury in Uganda: results from a registry. Trauma Surg Acute Care Open 2018;3(1):e000253.