



Original article

The characteristics and outcomes of trauma admissions to an adult general surgery ward in a tertiary teaching hospital

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ABSTRACT

Background: Traumatic injuries are proportionally higher in low- and middle-income countries (LMICs) than high-income countries. Data on trauma epidemiology and patients' outcomes are limited in LMICs.

Methods: A retrospective review of medical records was performed for trauma admissions to the Princess Marina Hospital general surgical (GS) wards from August 2017 to July 2018. Data on demographics, mechanisms of injury, body parts injured, Revised Trauma Score, surgical procedures, hospital stay, and outcomes were analysed.

Results: During the study period, 2610 patients were admitted to GS wards, 1307 were emergency admissions. Trauma contributed 22.1% (576) of the total and 44.1% of the emergency admissions. Among the trauma admissions, 79.3% (457) were male. The median[interquartile range(IQR)](range) age in years was 30[24–40] (13–97). The main mechanisms of injury were interpersonal violence (IPV), 53.1% and road traffic crashes (RTCs), 23.1%. More females than males suffered animal bites (5.9% vs. 0.9%), and burns (8.4% vs. 4.2%), while more males than females were affected by IPV (57.8% vs. 35.3%) and self-harm (5.5% vs. 3.4%). Multiple body parts were injured in 6.6%, mainly by RTCs. Interpersonal violence (IPV) and RTCs resulted in significant numbers of head and neck injuries, 57.3% and 22.2% respectively. More females than males had multiple body-parts injury 34.5% vs. 18.5%. Revised Trauma Score (RTS) of ≤ 11 was recorded in IPV, 38.4% and RTCs, 33.6%. Surgical procedures were performed on 44.4% patients. The most common surgical procedures were laparotomy (27.8%), insertion of chest tube (27.8%), and craniotomy/burr hole (25.1%). Complications were recorded in 10.1% of the patients (58) including 39 deaths, 6.8% of the 576.

Conclusion: Trauma contributed significantly to the total GS and emergency admissions. The most common mechanism of injury was IPV with head and neck the most frequently injured body part. Further studies on IPV and trauma admissions involving paediatric and orthopaedic patients are warranted.

African relevance

- Literatures on general surgical trauma admissions and outcome studies are limited in Africa.
- This study depicts the characteristics, burden and outcomes of the surgical trauma admissions in one of the African country hospital, Princess Marina Hospital, Botswana.
- The findings in this study advises the stakeholders, hospital administrators and trauma team members, on the common trauma mechanisms, body parts affected and outcomes of the care provided and helps them to design a focused surgical training/program and human

resource and supply allocations in Botswana and other African countries.

Introduction

Traumatic injuries vary by causes, age, gender, regions of the country and world, and time; these injuries cause significant morbidity and mortality. Trauma accounts for 10.1% of the global burden of diseases [1,2]. Road traffic crashes (RTCs), burn, interpersonal violence (IPV), and falls constitute much of modern-day trauma [2]. Road traffic crashes and IPV predominate in Latin America and sub-Saharan Africa [1]. Nearly a billion people sustained some form of injury in 2013;

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almost 5 million died from their injury [1]. This exceeds the number of deaths from HIV/AIDS, malaria and TB combined [3]. Injury burden is proportionally higher in low- and middle-income countries (LMICs) [1,2,4–9] than high-income countries (HICs). Injuries contribute to a vicious cycle of poverty and economic and social costs negatively affecting individuals, community, and society. Globally, the overall incidence of injury is increasing; but the burden in terms of disability-adjusted life years and cause-specific mortality has decreased [1,10], perhaps due to infrastructure and health care improvements [10]. However, this is not the case with Oceania, and West, Central, and Southern sub-Saharan Africa [1]. The impact is magnified in LMICs where organised trauma systems including injury surveillance and prevention, in-hospital care and post-discharge rehabilitation, and social welfare infrastructure are poorly developed [4,11,12]. Injury surveillance in a well-developed trauma system translates to an effective resource allocation, personnel training, and quality improvement [2,4,10,12–14]. The Revised Trauma Score (RTS) was originally developed as a triage tool with lower scores indicating higher injury severity but later its use expanded to include the prediction of outcome following traumatic injury [15]. Trauma, like other diseases, has an epidemiology with causes and antecedents. Hence, we will use the words “crash” in preference to “accident”. RTCs often occur secondary to over speeding, alcohol intake, distractions such as texting, maintenance and tire deficiencies, road, and weather conditions, etc., and are predictable, not “accidents” or “acts of God”.

In many LMICs, data on injury epidemiology and patient outcome are lacking or poorly documented [4,5,11,13]. Most data on evidence-based interventions for RTCs, especially for non-fatal outcomes, are from high-income countries (HICs) which cannot be applied to LMICs’ environments [4]. Inferior quality data, limited resources, inadequate pre-hospital care and administrative and organisational concerns are described as the major challenges in developing trauma registries in LMICs [13,14]. Hospital-based data on trauma admissions can be particularly helpful to establish the local injury burden and characteristics, both of which are central to organise and utilise trauma care systems to provide optimal patient care [16,17].

Botswana, an upper-middle-income country the size of France located in southern Africa, has a population of about 2.3 million. In 2011, trauma was second only to infections among patients presenting to Princess Marina Hospital (PMH) Emergency Department [18]. Trauma victims contribute 6.0%–20.0% of patients presenting to emergency departments in Botswana public and private hospitals [18,19]. Hospitals here are reasonably well supplied with human and physical resources, although some deficiencies were noted [2]. No hospitals had local trauma guidelines, audit systems, education plans, defined trauma teams, or educational trauma simulations [2]. Although feasible, Botswana currently has no electronic trauma registry [14]. Traumatic injuries account for approximately 8.0% of mortalities [20]. In 2016 and 2017, RTCs accounted for 2.4% and 2.5% of mortalities, respectively [22].

Literature is limited on the burden, characteristics, and outcomes of trauma admissions to a GS service in Botswana. Prior studies from Botswana shed some light on trauma [2] and the characteristics and patient-burdens presented to the Emergency Department at PMH [18]. Others reported on patient-burden, characteristics, and process of care in blunt and penetrating trauma at the emergency department of three hospitals in Botswana [19] and reported on the feasibility of development of an electronic trauma registry [14]. None of these studies depicted the GS trauma admission burden, characteristics, and outcomes from various mechanisms of trauma. This study documents the burden and characteristics of all injured patients, injury mechanisms, and patterns, the surgical care provided, and outcomes of trauma patients admitted to an adult GS service in a 12-month period at PMH, the nation’s largest tertiary and teaching hospital, in the capital Gaborone.

Methods

Study design

Medical records of all injured patients admitted to PMH adult GS wards from 1st August 2017 to 31st July 2018 were reviewed retrospectively.

Setting

PMH, with a catchment area of about a million population, has a 567-bed capacity: 80 beds are designated for adult surgical patients, 13-years-old and older (PMH admission policy).

Participants

Trauma admissions to GS wards include general surgery, neurosurgery, urology, cardiothoracic, and plastic surgery patients. Orthopaedic and paediatric trauma patients are admitted to different wards and not included in this review. Iatrogenic traumas that required treatment were included in this study.

Variables

Data were collected on demographics, admission and discharge dates, mechanisms of injury, body-parts injured, Revised Trauma Score (RTS), referring facilities, surgical procedures, length of hospital stay, and outcomes.

Data analysis and measurement

The data were analysed using IBM SPSS version-27. Percentages and median [interquartile range, IQR] were used to describe the data. Chi-square, Mann-Whitney *U* test, and Fisher’s exact test were used to compare groups and p-values <0.05 were considered statistically significant. To ensure confidentiality no patient identifiers were collected. Institutional Review Board of PMH granted permission to conduct this study: reference, PMH 5/79(406-1-2017). To ensure confidentiality no patient identifier was used.

Results

During the study period 2610 patients were admitted to the adult male and female surgical wards: 1307 emergency and 1303 elective. There were 576 trauma admissions, contributing to 22.1% total surgical admissions and 44.1% emergency surgical admissions. Sources of patients included: 44.6% (257) hospital referrals; 27.1% (157) clinic referrals; 12.7% (73) emergency medical rescue; 12.5% (72) self-referrals; and 3.1% (18) unidentified referrals. Males dominate the trauma admissions, 79.3% (457). The overall median [IQR] (range) in years was 30 [24–40] (13–97): males, 30 [24–38] (13–88) and females, 34 [26–48] (15–97). Except for 60-years and older, male admissions were significantly higher, $p < 0.001$ (Fig. 1).

Interpersonal violence contributed significantly to total trauma admissions 53.1% (306), $p = 0.02$. Trauma admissions were higher 31.8% (183) during summer, peaking in November, 12.2% (70). Road traffic crashes and falls contributed 23.1% (133) and 6.9% (40) respectively. Twenty-eight other injuries constituting 4.9% of the total include one iatrogenic injury of the urethra during catheterisation in a 45-year-old male and 27 injuries of unknown mechanisms (Fig. 2).

There were 382 (66.3%) blunt and 194 (33.7%) penetrating injuries. Among the IPV mechanism there were 158 (51.6%) penetrating (only three involved firearms) and 148 (48.4%) blunt injuries. Main agents of penetrating injuries include knives, screw drivers, and broken bottles. Interpersonal violence and RTCs contributed 148 (38.7%) and 133 (34.8%) to blunt trauma.

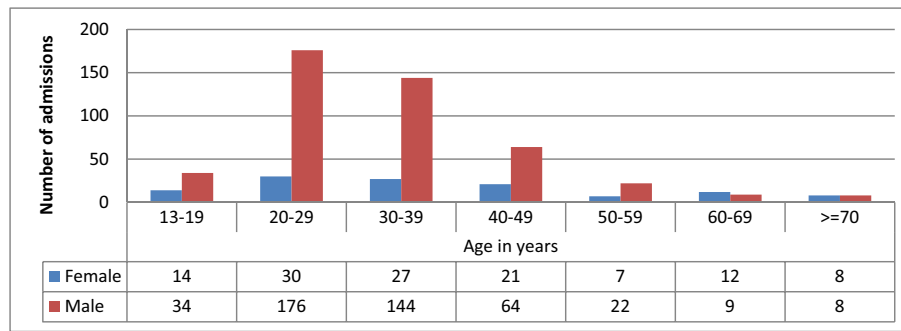


Fig. 1. Number of admissions by age and gender, August 2017–July 2018.

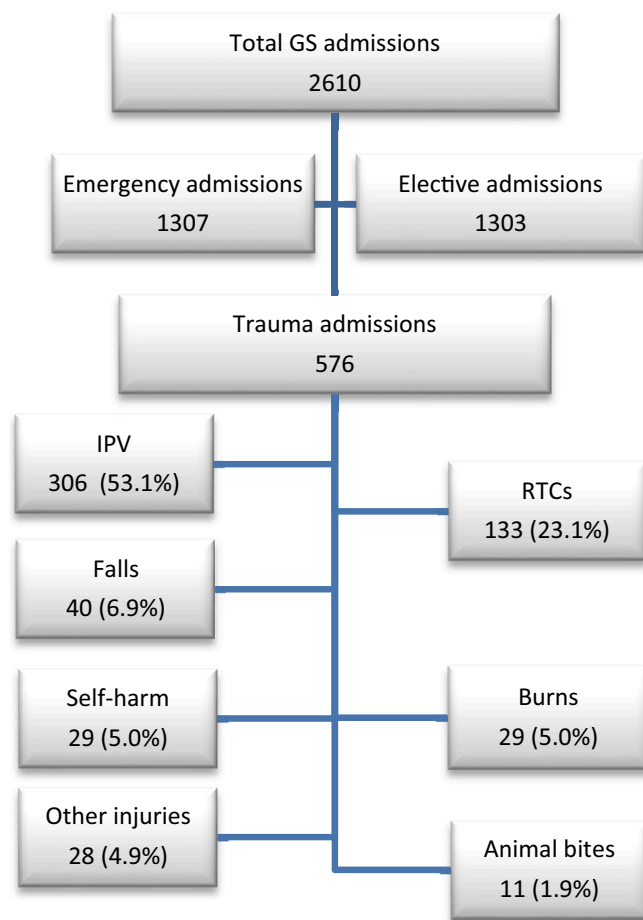


Fig. 2. Flow chart – the burden and mechanisms of injury, August 2017–July 2018.

Females were injured more than males by animal bites (5.9% vs. 0.9%) and burns, (8.4% vs. 4.2%), $p < 0.001$ each. Males were injured more frequently than females by IPV, 57.8% vs. 35.3% and self-harm, 5.5% vs. 3.4%, $p < 0.001$ each. Patients aged 13–65 years were mainly affected by IPV, 54.5% and RTCs, 23.6%, while age groups 65-years and older were mainly affected by falls and IPV, 20.8% each (Table 1).

Multiple body parts were injured in 6.6% (38) of admissions. Though not statistically significant, more males sustained multiple injuries than females, 7.0% (32) vs. 5.0% (6), $p = 0.44$. RTCs contributed significantly to multiple body-parts injuries, 68.4% (26), $p < 0.001$. Interpersonal violence and RTCs significantly contributed to head and neck injuries, 57.3% and 22.2%, respectively, $p < 0.001$ each (Table 2).

Table 1

Mechanisms of injury in relation to gender and age, August 2017–July 2018.

	Female	Male	13–65	>65-year
IPV	42 (35.3%)	264 (57.8%)	301 (54.5%)	5 (20.8%)
RTCs	33 (27.7%)	100 (21.9%)	130 (23.6%)	3 (12.5%)
Falls	10 (8.4%)	30 (6.6%)	35 (6.3%)	5 (20.8%)
Burns	10 (8.4%)	19 (4.2%)	25 (4.5%)	4 (16.7%)
Self-harms	4 (3.4%)	25 (5.5%)	29 (5.3%)	0 (0.0%)
Animal bites	7 (5.9%)	4 (0.9%)	10 (1.8%)	1 (4.2%)
Unknown causes	13 (10.9%)	15 (3.3%)	22 (4.0%)	6 (25.0%)
Total	119 (100%)	457 (100%)	552 (100%)	24 (100%)

Most patients had a Revised Trauma Score (RTS) of 12, 78.2% (449), indicating lower injury severity, while 21.7% (125) had a score of ≤ 11 . Patients with RTS of ≤ 11 had significantly higher rates of multiple body-part injury than those with a score of 12, 13.6% vs. 4.7%, $p < 0.001$. Females had a statistically-significant higher injury severity (RTS of ≤ 11) than males, 34.5% vs. 18.5%, $p < 0.001$. Although it did not reach statistical significance, age group >65 -year-old had higher injury-severity score (RTS ≤ 11) than 13–65 year group, 33.3% vs. 21.3%, $p = 0.16$. IPV and RTCs contributed significantly to higher injury-severity score (RTS of ≤ 11), 38.4% and 33.6% respectively, $p < 0.001$ each (Table 3).

Procedures were performed on 44.4% (256) patients: 74 insertions of chest tube (28.9%); 70 laparotomies (27.3%); 65 burr hole/craniotomy (25.4%); 21 wound explorations with or without suturing (8.2%). Other procedures were skin grafts 3.1% (8), amputations 2.0% (5), thoracotomy and foreign body removal each 1.2% (3), external genitalia repair, vascular repair, and endoscopy each 0.8% (2), and tracheostomy accounted for 0.4% (1). Operative procedures for IPV were performed in 51.0% (156), self-harms 48.3% (14), burns 41.4% (12), falls 35.0% (14), RTC 32.3% (43), and animal bites 9.1% (1). A significantly higher number of patients with penetrating injury underwent operative procedures than did bluntly-injured patients, 61.3% vs. 35.6% respectively, $p < 0.001$. Procedures for patients with RTS ≤ 11 was higher than those with RTS of 12, but not significant, 51.2% vs. 44.9% respectively, $p = 0.09$.

Operative procedures were performed in 51.3% (20/39) of those who died and in 43.9% (236/537) of those who survived, $p = 0.37$. Patients who had RTS of ≤ 11 had significantly-higher overall complication rate and mortality rate than those with RTS of 12, 38.4% (48/125) vs. 2.2% (10/449), and 31.2% (39/125) vs. 0.0% (0/449) respectively, $p < 0.001$ each.

Complications were noted in 58 patients (10.1%), with 39 deaths (30 males and 9 females), 27.6% (16) superficial surgical site infections, two pressure sores, and one acute kidney injury. During the study period a total of 159 mortalities occurred among all GS admissions (includes elective); trauma accounted for 24.5% (39). The mortality rates between females and males did not differ statistically, 7.6% (9/119) vs. 6.6% (30/457), $p = 0.69$. Blunt-injury mortality was significantly higher than

Table 2
The common mechanisms of injury and body parts injured, August 2017–July 2018.

	Head & Neck (n = 248)	Face (n = 13)	Chest (n = 89)	Abdomen (n = 85)	Extremity & pelvic-girdle (n = 65)	Multiple (n = 38)	
						Male (n = 32)	Female (n = 6)
IPV	142 (57.3%)	9(69.2%)	63 (70.8%)	61 (71.8%)	12 (18.5%)	8 (25.0%)	2 (33.3%)
RTCs	55 (22.2%)	2(15.4%)	13 (14.6%)	21 (24.7%)	16 (24.6%)	23 (71.9%)	3 (50.0%)
Falls	26 (10.5%)	0 (0.0%)	5 (5.6%)	2 (2.4%)	4 (6.2%)	1 (2.8%)	1 (16.7%)

Table 3
RTS in relation to gender, age, and mechanism of injury, August 2017–July 2018.

		RTS ≤ 11	RTS = 12
Gender	Female	41 (34.5%)	78 (65.5%)
	Male	84 (18.5%)	371 (81.5%)
Age in years	13–65	117 (21.3%)	433 (78.7%)
	>65	8 (33.3%)	16 (66.7%)
Mechanism of injury	Animal bites	1 (0.8%)	10 (2.2%)
	Burns	11 (8.8%)	18 (4.0%)
	Falls	10 (8.0%)	29 (6.5%)
	IPV	48 (38.4%)	258 (57.5%)
	RTCs	42 (33.6%)	90 (20.0%)
	Self-harm	2 (1.6%)	27 (6.0%)
	Other mechanisms	11 (8.8%)	17 (3.8%)

penetrating-injury mortality, 9.2% (35/382) vs. 2.1% (4/194), $p < 0.001$. Age group 65-years and older had significantly higher mortality than younger age groups, 33.3% (8/24) vs. 5.6% (32/552), $p < 0.001$. Burn patients had significantly higher mortality than other injury types, 15.8%, $p = 0.002$.

The overall median[IQR](range) length of hospital stay in days was 6 [3–11](0–93); 25[8–36](1–93) for burns, 7[3–13](0–39) for falls, 6 [3–10](0–86) for IPV, 6[3–12](0–52) for RTCs, 3[3–7](1–17) for animal bites, and 4[3–10](0–39) for self-harms. Burn patients had significantly longer hospital stays, $p < 0.001$. Patients with operative procedures had significantly longer hospital stays than those treated non-operatively, 8[5–13](0–93) vs. 5[3–11](0–52), $p < 0.001$. Patients with RTS ≤ 11 had significantly longer median hospital stay than those with RTS = 12, 8 vs. 6, $p = 0.012$ (Table 4).

The majority of trauma patients, 85.6% (493) were discharged home, 37 (6.4%) were referred to another hospital, and 7 (1.2%) refused further hospital treatment with an overall mortality of 6.8% (39/576). Mortalities occur in 10.3% (4/39), 28.2% (11/39), and 61.5% (24/39) during the first, second to six, and after sixth days of admission, respectively.

Discussion

Trauma is an inadequately-addressed public health priority in LMICs with >90% of the world’s injury-related deaths occurring in LMICs [4,6,11,21]. Factors contributing to the higher trauma morbidity and mortality in LMICs vary. Most clinicians in LMICs work in resource-limited environments and manage patients who cannot afford treatment costs. These patients often present late after complications occur [6,21]. Lack of emergency services at the incident site, deficiency of

Table 4
Revised Trauma Score, complications, hospital stay, and mortality, August 2017–July 2018.

	All Complications		Hospital stay in days Median [IQR](Range)	Mortality
	Yes	No		
RTS ≤ 11	48 (38.4%)	77 (61.6%)	8[4–14](0–93)	39 (31.2%)
RTS = 12	10 (2.2%)	439 (97.8%)	6[3–11](0–86)	0 (0.0%)

qualified staff at primary and secondary care centres, coupled with poverty and ignorance complicate the challenges. [21]. About 5.8% of all trauma patients warrant inpatient care [1]. Trauma accounts for 10%–30% of all hospital admissions [7,19], and a significant number of total and emergency surgical admissions [8,11,16,23]. In this study trauma contributed 22.1% of total GS admissions and 44.1% emergency surgical admissions. Like other reports [23,24], we found a higher volume of trauma during summer seasons. Pre-hospital transport was handled by the public inter-hospital ambulance network followed by emergency medical rescue ambulances similar to another report from Botswana [19]. Self-referral to our hospital occurred in 12.7% as opposed to 62.7% reported by Solon et al. [16], perhaps reflecting the tertiary-level status of our hospital. This could also be due to the well-developed public inter-hospital ambulance transfers run by the government.

Road traffic crashes in the 15–49 years in LMICs have an eightfold increase in rates compared to HICs. [1]. As reported by others [16,17,19,25], most of our trauma patients were young with a median age of 30 years. Injury rates are higher in males than females except for 80 years and older where the gender difference disappears [1]. Patients aged 65-year and older contributed 4.5% of trauma admissions; this is lower than the 15.4% reported by Heim in Switzerland [25] and is partly due to the difference in the proportion of this age group in these two countries. Most of our trauma patients were in the age group 15–44 years similar to one other study [8]. This age group is generally active and vulnerable to trauma and constitutes the majority of the population in LMICs. Males constituted 79.3% of trauma admissions in agreement with others with ranges from 57.7%–82.5% [5,7–9,16,17,19,23,25–27].

Blunt-trauma admission of 66.3% in this study is consistent with prior reports ranging from 54.5%–91.5% [17,23,25–27]. We found multiple body-part injuries in 6.6% of the patients, much lower than the 39.2% reported by Laing et al. [23]. This difference could be partly due to documenting variability where some minor injuries, e.g., skin and subcutaneous injuries, may not be reported along with major visceral injuries. Our admissions were dominated by IPV which potentially causes a single body-part injury. The 23.1% RTC-associated trauma admission in this study agrees with other reports, 17.6%–62.9% [5–8,16,17,25–27]. In this study RTCs contributed 34.8% of the blunt trauma, lower than other reports of 47.0%–60.0% [8,25–27].

Intentional trauma includes IPV, war and conflict injuries, and intentional self-injury while unintentional trauma includes RTCs, falls, drowning, burns, and poisonings [6]. Our intentional injury rate of 53.3% is similar to 51.0% reported from South Africa [5], but higher than other reports ranging from 5.3%–31.0% [6,8]. Interpersonal violence and RTCs are the main causes of trauma in sub-Saharan Africa [1,19]. The economic development in LMICs increased the number of vehicles with resultant increases in traffic-related injuries and deaths [4]. The IPV rate of 53.1% in this study is far higher than other reports, 6.3%–37.0% [7,17,19,25,26,28]. This could be related to alcohol abuse which is also described in relation to MVCs (22). Similar to other reports, 24.8%–37.4% [5,27], stab injuries constituted 27.4% of our trauma admissions. However, our firearm injury rate of 0.5% is far less than other reports, 4.9%–18.4% [5,6,17,25,26]. This is likely due to the stringent firearm permit policy in Botswana. The 6.9% admission for falls is lower than the 15.7%–54.8% reported by others [5–8,17,25,27]. Falls frequently dominate injury mechanisms in the elderly [1]; it contributed 20.8% of injuries in our patients aged 65-years and older.

Burns, animal bites, and self-harm admissions were reported elsewhere in 5.3%–9.3% [6,25], 1.3%–3.3% [6,23], and 2.1%–7.8% [5,6,25], respectively. These are similar to our findings of 4.9%, 1.9% and 0.5%, respectively, for the same mechanisms. Operative procedures were reported in 59.1% [25] of trauma patients in Switzerland, higher than our 44.4%. This could be due to the difference in admission criteria where we admit patients for observations for lack of timely imaging, e.g., CT scan during the night.

For every documented trauma-related injury, there are many who do not report their injury or seek medical assistance; others visit emergency departments, may be hospitalised, and yet others sustain permanent disabilities, or even die [4]. During the study period trauma contributed 24.5% of all GS admission mortalities and this is lower than the 42.4% reported by Ekeke in Nigeria [9]. A substantial number of mortalities occur within the first day (33.0%) and after 6 days (36.0%) of admissions [17]. In this study 10.3% of trauma patients died within the first day and 61.5% died after six days of admission. Ovadia et al. [17] found significant number of early mortalities related to penetrating injury while significantly-higher late mortality for blunt.

Our trauma mortality of 6.8% is in the range reported by others, 3.4%–17.1% [6,8,16,17,21,23,25–27]. Females are more likely to die of injury than males [27], which is consistent with our study though it did not reach statistical significance. Males constituted 76.9% of our mortalities, which is in the range of 67.6%–71.4% [25,29] reported by others; but our male-to-female mortality ratio of 3.3:1 is far lower than 7:1 reported by Ugare et al. [21]. Trauma mortality increases steeply over the age of 75-year [10]. In our study age group 65-years and older had significantly higher mortality than younger age groups. This could be related to their frail state and comorbid conditions as they get older.

Among our mortalities, 89.7% were blunt trauma victims which is higher than 56.0%–62.0% [23,26] reported elsewhere. Major causes of injury-related deaths were RTCs 29.1%, self-harm 17.6%, falls 11.6% and IPV 8.5% [1]. In this study IPV and RTCs contributed 25.6% and 23.1% to the mortalities, respectively, higher than the report by others 8.5%–14.0% for IPV but lower than 29.1%–80.3% for RTCs [1,6,21,26,29]. This depicts the severity of IPV in our setup and the less severity of RCTs or our lax admission criteria for MVC victims. Burns continue to be a leading source of morbidity and mortality in LMICs [9]. Our burn mortality of 15.4% is higher than the 9.5%–11.6% reported by others [1,29]. This could be partly explained by the absence of a burn centre in Botswana. Fall-victims mortality of 15.4% in this study is higher than the 4.8% mortality reported by Solagberu et al. [29].

The overall median length of hospital stay reported by others was 5–7 days [7,11,25], which agrees with the 6 days in our study. We found significantly higher lengths of hospital stay in our burn admissions in contrast to other studies which did not find significant differences across all mechanisms of trauma [17].

Limitations

As in any retrospective study, some data were missing from the records. The Revised Trauma Score, which is based on physiological parameters, may underestimate seriously injured patients with enhanced physiologic responses. The current report documents the burden, characteristics, and outcomes of trauma admissions of a GS service in PMH but does not capture orthopaedics or paediatrics patients.

Conclusion

Trauma contributed significantly to our emergency and total surgical admissions. Interpersonal violence and RTCs were the most common mechanisms of injury. Most trauma victims were young males. Females were mainly affected by animal bites and burns compared to males, while IPV and self-harm affected more males. Firearm injury was very rare. Higher rates of RTS ≤ 11 were found in patients with multiple injuries, aged 65-years and older, female patients, and injuries involving

burns, falls, and RTCs. Substantial numbers of penetrating-injury victims underwent operative procedures. Patients with burns, aged 65-years and older, and those with RTS ≤ 11 had significantly higher rates of mortality. Burn injury and RTS ≤ 11 were significantly associated with longer hospital stay.

The burden, characteristics, and outcomes identified in this study can be used by hospital managers and medical professionals to modify and design a trauma-program that includes training hospital personnel, allocating resources, and preparing guidelines on appropriate prevention strategies (e.g., IPV). Since interpersonal violence is the major mechanism of injury, the role of public health specialists' cannot be over emphasised. Further study is warranted in all hospital departments in Botswana that deal with trauma with the aim to look at the bigger picture of trauma admissions, including paediatrics and orthopaedics.

Dissemination of results

This study will be shared with PMH staff members and the leadership of PMH and Ministry of Health and Wellness.

Authors' contribution

Authors contributed as follow to the conception or design of the work; the acquisition, analysis, or interpretation of data for the work; and drafting the work or revising it critically for important intellectual content: AGB contributed 80%, and MJT and JLT contributed 10% each. The authors approved this version and agreed to be accountable for all aspects of the work.

Declaration of competing interest

The authors declare no conflicts of interest.

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