

Patterns of Trauma Deaths in an Accident and Emergency Unit

Odigie Clement Osime, FMCS, FICS;¹ Stephen Udi Ighedosa, FWACP, PhD;² Olugbenga Ojo Oludiran, FWACS, FICS;¹ Pius Ehiawugan Iribhogbe, FWACS, FICS;¹ Eddy Ehikhamenor, BDS, MSc;³ Sunday Oladepo Elusoji, FMCS, FICS¹

1. Department of Surgery, University of Benin Teaching Hospital, Benin-City, Nigeria
2. Department of Community Health, University of Benin Teaching Hospital, Benin-City, Nigeria
3. Faculty of Dentistry, University of Benin Teaching Hospital, Benin-City, Nigeria

Correspondence:

Dr. Clement Osime
Department of Surgery
University of Benin Teaching Hospital
PMB 1111
Benin City, Nigeria
E-mail: clementosime@yahoo.com

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Abbreviations:

AEU = Accident and Emergency Unit

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Abstract

Introduction: Trauma is a leading cause of death in most countries. Different patterns of trauma deaths are recorded in different countries. The purpose of this study was to evaluate retrospectively the pattern of trauma deaths in the emergency unit of a University Teaching Hospital in Nigeria.

Methods: This is a descriptive, retrospective study. The data were obtained from patient case files and nurses' records. The data abstracted included age, sex, cause of trauma/death, parts of the body injured, time of death, and the duration of stay in the Accident and Emergency Unit (AEU).

Results: A total of 5,537 cases presented to the AEU of the University of Benin Teaching Hospital between 01 January 2001 and 31 December 2004. Of these, 5,446 were due to trauma (98.4%). A total of 127 patients died (case fatality rate: 2.3%). Of the deaths, 81.9% were males. Motor vehicle crashes were the most frequent cause (54.3%), and drowning was the least common cause of trauma (0.8%). The most frequently injured region of the body was the head and neck (53.4%). A total of 67.4% of the deaths occurred within six hours of presentation to the AEU.

Conclusions: There is a great need for improved road safety, adequate pre-hospital medical care, and prompt transfer services for victims of trauma.

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Introduction

The Accident and Emergency Unit (AEU) provides medical care for a variety of cases. Therefore, there are many different causes of deaths encountered in the Unit, and the frequencies of causes of death vary from center to center as well as by regions. What may be common in one center may be relatively uncommon in another center. However, trauma is one of the leading causes of death in most of the AEU's.^{1,2} In most centers, motor vehicle crashes appear to be the most common cause of traumatic deaths.^{3–5} Deaths caused by various forms of violence also appear to be increasing in most centers.^{1,5,6} The age, sex, and occupation of the victims are some factors that may influence the pattern of traumatic deaths.^{6–8}

The purpose of this retrospective study is to evaluate the pattern of deaths resulting from trauma between January 2001 and December 2004 as seen at the AEU of the University of Benin Teaching Hospital in Benin City, Nigeria.

Methods

This is a descriptive, retrospective study of the traumatic deaths that presented to the AEU of the University of Benin Teaching Hospital between January 2001 and December 2004. Patient information abstracted included case files and notes made by nurses. The variables collected included age, sex, causes of trauma, part(s) of body injured, time of day, time of death, and duration of stay. The data collated were processed using frequency tables.

Causes of Death	Number of Cases	Percentage
Trauma	127	44%
Medical Conditions	119	41%
Non-Trauma Surgical Cases	42	15%
Total	288	100%

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Table 1—Deaths in the Accident and Emergency Unit

Age Range (Years)	Gender		Total	%
	Male	Female		
0–10	6	6	12	9.5
11–20	16	5	21	16.5
21–30	33	2	35	27.6
31–40	28	4	32	25.2
41–50	8	2	10	7.9
51–60	5	2	7	5.5
61–70	5	0	5	3.9
>70	3	2	5	3.9
Total	104	23	127	100.0

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Table 2—Age and sex distribution of deaths resulting from trauma

Results

A total of 5,537 patients were evaluated in the AEU between January 2001 and December 2004. Traumatic injuries accounted for 98% (5,446) of the cases. Of the 288 deaths recorded in the Unit, trauma accounted for 44% (127) of the cases (Table 1). The most common cause of traumatic deaths was motor vehicle crashes (54%). The sex and age distribution of trauma deaths are listed in Table 2. The male:female ratio was 4.5:1, and those 21–40 years of age were affected most frequently (53%). The etiologies of the injuries are listed in Table 3. Vehicular crashes were the precipitating event for more than half of the victims. Only one patient died from drowning. Deaths resulting from burns accounted for 11% of trauma deaths, and the majority of these victims suffered from burns of >50% of the body surface. There were five deaths resulting from falls. Three of these patients fell from a palm tree while they were tapping palm wine, and two children fell from a multiple-story building. The head and neck were the body regions most frequently affected in the trauma deaths (53%). The chest was the second most commonly traumatized part of the body, followed by the abdomen (Table 4). For the patients with injuries to the chest and abdomen, it was observed that the majority presented to the hospital late (>12 h).

The majority of patients in this study died within the first six hours, between 18:00 and 0:00 hours (h), followed by 12:00 and 18:00 h. Most injuries occurred during the day (Table 5).

Causes of Trauma	Number of Cases			
	Male	Female	Total	%
Vehicular accident	58	11	69	54.3
Gunshot	18	2	20	15.8
Burns	10	4	14	11.1
Assaults	8	2	10	7.9
Falls	5	2	7	5.5
Stab injury	4	1	5	3.9
Nail puncture	0	1	1	0.8
Drowning	1	0	1	0.8
Total	104	23	127	100.0

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Table 3—Causes of trauma

Discussion

The University of Benin Teaching Hospital in Benin City, Nigeria, is located near a busy expressway, which serves as a gateway to most parts of the country. Trauma accounted for 98% of the cases seen at the AEU of the hospital during the period studied. Other studies have reported similar findings. For example, Accident Centers in urban areas tend to handle a large number of trauma cases, and the number of traumatic injuries has been increasing due to industrialization and increasing spates of violence.⁹ However, Adesunkanmi *et al* reported medical causes of death in an Emergency Unit to be about 74%, while trauma accounted for only 15.2% in a semi-urban hospital.¹⁰

Often times, males are more likely than females to be involved in trauma. In the present study, the male:female trauma ratio was 2:1. Similar findings have been noted in other studies.^{12,13} Males are more likely to be involved in violent activities and motor vehicle crashes, and often sustain more severe injuries compared to females. Consequently, mortality following trauma cases often is higher among males.^{12–14} In the present study, even though the male:female ratio of the trauma cases was 2:1, the male:female ratio of the cases of trauma death was 4.5:1. This pattern also has been reported in other studies.^{12–14}

People 21–40 years of age were the most likely to be killed traumatically. This is the age group that usually is very active and mobile, and often constitutes a greater percentage of a nation's economic work force. A similar pattern has been reported in other studies.^{15,16} If this pattern does not change, it could affect the gross domestic product of the nation. Road traffic crashes accounted for 54.3% of the trauma deaths. In Ilorin, Nigeria, Solagberu reported that 75% of trauma deaths are from road traffic crashes.¹⁵ Other studies also have reported similar findings.¹⁶ Several factors may be related to these findings. Most persons are not able purchase new vehicles, and consequently, they buy used vehicles that may not suitable for driving. The use of old tires is another factor responsible for the increasing rate of

Region	n	%
Head and neck	68	53.4
Chest	31	24.3
Abdomen	13	10.6
Soft tissue	7	5.4
Long bones	6	4.8
Multiple injuries	2	1.5
Total	127	100

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Table 4—Parts of the body injured (n = number)

road traffic crashes. Furthermore, it is common knowledge in Nigeria that many drivers do not have a valid driver's license. All of these factors constitute health hazards on the roads. Swaddiwudhipong *et al* evaluated some of the epidemiological characteristics of drivers, vehicles, pedestrians, and road environments in rural Thailand, and found that each of these factors contributed to the incidence of road traffic injuries.¹⁷ Mayorga *et al* noted similar findings, reinforcing the urgent need to regulate the activities of drivers through government policies intended to minimize the rate of road traffic crashes.¹⁸

Gunshot injuries were the next common cause of trauma deaths. Other studies have reported similar findings. The number of armed robberies has increased in recent years.¹⁰ Similarly, secret cult activities, especially in the higher learning institutions, are increasing. During these activities, guns and other dangerous weapons are used freely. Societies appear to have become more violent, and it is not unusual for victims with severe injuries resulting from violent society activities to present to the emergency department. In one study, violent trauma was the second most common cause of trauma deaths in the AEU, and gunshot injuries accounted for 8.3% of the deaths.¹⁵ Armed robberies account for the greatest percentage of gunshot injuries. In the present study, there were eight cases of assault resulting in death. Five of these deaths occurred while under the influence of alcohol, two cases were cult-related, and the exact cause of death for the last case could not be determined before the patient died. Steps should be taken to reverse the trend of increasing society violence.

The University of Benin Teaching Hospital, which is located in the Niger-Delta region of Nigeria, often is confronted with a large number of burn cases. Some of these cases are related to kerosene or petroleum explosions. In order to reduce burn mortalities, a proper Burn Center must be developed at the University of Benin Teaching Hospital.

Solagberu reported more cases of falls from kola nut trees compared to falls from palm trees in Ilorin.⁹ This may be a reflection of the varying economic activities in different parts of the country.

Trauma to the head and neck region often are very severe and tend to cause death more than injuries to other

Time	n	%
06:00–12:00 h	12	9.5
12:00–18:00 h	37	29.1
18:00–00:00 h	52	40.9
00:00–06:00 h	26	20.5

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Table 5—Time of day of the deaths (n = number)

regions of the body.^{19,20} Early presentation and prompt management of chest and abdominal injuries could minimize the mortality associated with such injuries.

Other reports reflect that most deaths in trauma cases occur within the first six hours of presentation.^{3,8,21} Main treatment failures included a lack of airway control or intravenous infusions during prehospital care, as well as mismanagement in the emergency departments. These features are even more rampant in the developing countries. Therefore, there is a need to train prehospital personnel and to properly equip hospitals for trauma cases.^{22,23} Marmor *et al* observed that most injuries occurred between 08:00 and 16:00 h.¹⁹ These are the peak activity periods in most countries and more trauma events occur during this period, especially road traffic crashes. At such peak periods when more injuries are expected, the relevant authorities in various health institutions should mobilize more staff to work in the AEU.

Conclusions

Trauma is a leading cause of death in developed and developing countries, and takes a great toll on the economic workforce of a nation. Road traffic crashes contribute to a greater percentage of all trauma cases and deserve serious attention. The relevant bodies should ensure adequate regulations are in place to monitor driving activities. Cult activities should be examined, and various sanctions should be implemented against cult members, which also will serve as deterrent to others. The government also should take decisive steps to control the increasing unemployment rate. This is one way armed robberies can be curtailed. Police officers should be educated on the appropriate handling of guns to minimize the incidence of accidental shootings. In Nigeria, a definite government policy on prehospital care is needed in order to salvage as many accident victims as possible before they get to the hospital. An adequate number of experienced medical officers should be utilized in the AEU, especially during the peak activity periods, and they also should be required to participate in training in advanced trauma life support. If the relevant bodies consider the above recommendations, the morbidity and mortality associated with trauma deaths may be reduced.

References

1. Vanbrabant P, Dhondt E, Sabbe M: What do we know about patients dying in the emergency department? *Resuscitation* 2004;60(2):163–170.
2. Godaviciene D, Rimdeika R: Analysis of burn-related deaths in Kaunas University of Medicine Hospital during 1993–2002. *Medicina (Kaunas)* 2004;40(4):374–378.
3. Chiara O, Scott JD, Cimbanassi S, Marini A, Zoia R, Rodriguez A, Scalea T, Milan Trauma Death Study Group: Trauma deaths in an Italian urban area: An audit of pre-hospital and in-hospital trauma care. *Injury* 2002;33(7):553–562.
4. Shalley MJ, Cross AB: Which patients are likely to die in an Accident and Emergency Department? *Br Med J (Clin Res Ed)* 1984;289(6442):419–421.
5. Ndiaye A, Camara S, Ndiaye A, Dansokho A, Sow CM, Ndiaye PD, Bassenne N: Mortality caused by traffic accidents at the Traumatology and Orthopedics Center of Grand-Yoff. A 2-year study. Apropos of 156 cases. *Med Trop (Mars)* 1993;53(4):487–491.
6. Stewart RM, Myers JG, Dent DL, Ermis P, Gray GA, Villarreal R, Blow O, Woods B, McFarland M, Garavaglia J, Root HD, Priutt BA Jr: Seven hundred, fifty-three consecutive deaths in a level I trauma center: The argument for injury prevention. *J Trauma* 2003;54(1):66–70.
7. Etebu EN, Ekere AU: Paediatric accident deaths in Port Harcourt, Nigeria: A 10-year retrospective study. *Niger J Med* 2004;13(2):140–143.
8. Wisborg T, Hoylo T, Siem G: Death after injury in rural Norway: High rate of mortality and prehospital death. *Acta Anaesthesiol Scand* 2003;47(2):153–156.
9. Solagberu BA: Spinal cord injuries in Ilorin, Nigeria. *West Afr J Med* 2002;21(3):230–232.
10. Adesunikanmi AR, Akinkuolia AA, Badru OS: A five year analysis of death in Accident and Emergency room of a semi-urban hospital. *West Afr J Med* 2002;21(2):99–104.
11. Ferrando J, Plasencia A, Ricart I, Canalet X, Segui-Gomez M: Motor-vehicle injury patterns in Emergency-Department patients in a south-European urban setting. *Annu Proc Assoc Adv Automot Med* 2000;44:445–458.
12. Balogun JA, Abercoje OK: Pattern of road traffic accident cases in a Nigerian University Teaching Hospital between 1987 and 1990. *J Trop Med Hyg* 1992;95(1):23–239.
13. Eastridge BJ, Burgess AR: Pedestrian pelvic fractures: Five-year experience of a major urban trauma center. *J Trauma* 1997;42(4):695–700.
14. Rodriguez-Morales G, Rodriguez A, Shetney CH: Acute rupture of the diaphragm in blunt trauma: Analysis of 60 patients. *J Trauma* 1986;26:438–444.
15. Solagberu BA, Adekanye AO, Ofoegbu CP, Udoffa US, Abdur-Rahman LO, Taiwo JO: Epidemiology of trauma deaths. *West Afr J Med* 2003;22(2):177–181.
16. Solagberu BA, Duzé AT, Ofoegbu CP, Adekanye AO, Odelowo EO: Surgical morbidity and mortality pattern in the Accident and Emergency room—A preliminary report. *Afr J Med Sci* 2000;29:315–318.
17. Swadiwudhipong W, Nguntra P, Mahasakpan P, Koonchote S, Tantriratna G: Epidemiologic characteristics of drivers, vehicles, pedestrians and road environments involves in road traffic injuries in rural Thailand. *Southeast Asian J Trop Med Public Health* 1994;25:37–44.
18. Mayorga Mogollon LE: Mortality from traffic accidents in the Tunja-San Gil road area, Colombia, 2001. *Rev Salud Publica (Bogota)* 2003;5(2):158–171.
19. Marmor M, Parnes N, Aladgem D, Birshan V, Sorkine P, Halpern P: Characteristics of road traffic accidents treated in an urban trauma center. *Isr Med Assoc J* 2005;7(1):9–12.
20. Ekere AU, Yellowe BE, Umune S: Surgical mortality in the emergency room. *Int Orthop* 2004;28(3):187–190.
21. McDonald A, Ali J, Mitchell DI, Newnham MS, Barnett A, Williams E, Martin A: Potential role for advanced trauma life support programme in improving trauma care in Jamaica. *West Indian Med J* 2003;52(3):208–212.
22. Siddiqui AA, Zafar H, Bashir SH: An audit of head trauma care and mortality. *J Coll Physicians Surg Pak* 2004;14(3):173–177.
23. Zafarhandi MR, Modaghegh MH, Roudsari BS: Preventable trauma death in Tehran: An estimate of trauma care quality in teaching hospitals. *J Trauma* 2003;55(3):459–465.

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