

## Hospital Mortality in Trauma Patients

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### Abstract

**Introduction:** The study of mortality in a community makes it possible to define the axes of disease prevention and to readjust public health policies. The achieve of our study was to assess hospital mortality in trauma patients in an orthopedic department of a teaching hospital in sub-Saharan Africa.

**Patients and Method:** We conducted a retrospective prognostic study evaluating hospital mortality during the period from March 1, 2013 to February 29, 2018. The results were analyzed using Statistical Package for the Social Sciences (SPSS) version 26.0. Results: Hospital mortality rate was 1.43%. The Circumstances of death were dominated by road accidents with 48.2%. Trauma to the lower limbs, the spine and polytrauma were the most frequently observed lesions on admission of patients with 40%, 27.3% and 28.2% respectively. Neurovegetative complications (29.51 %) and cardiopulmonary arrest (18.03 %) were the main causes of death at autopsy.

**Results:** Hospital mortality rate was 1.43%. The Circumstances of death were dominated by road accidents with 48.2%. Trauma to the lower limbs, the spine and polytrauma were the most frequently observed lesions on admission of patients with 40%, 27.3% and 28.2% respectively. Neurovegetative complications (29.51 %) and cardiopulmonary arrest (18.03 %) were the main causes of death at autopsy.

**Conclusion:** Traffic accidents are the most common cause of death from trauma. They can be avoided or limited by a good road safety policy.

**Keywords:** Mortality, Trauma, Orthopaedic Surgery

### Introduction

Admission and/or hospitalization of a patient or an injured person with musculoskeletal injuries can lead to death for various reasons. In 2014, the World Health Organization, in its report on trauma and violence, estimated that every day more than 14,000 people around the world die from a trauma. This represents more than 9% of deaths worldwide and nearly 1.7 times the total number of deaths from HIV/AIDS, tuberculosis and malaria [1].

The study of mortality in a community makes it possible to define the axes of disease prevention and to readjust public health policies [2]. In a hospital department, such a study allows for the monitoring and revision of therapeutic measures; these are likely to deteriorate in their implementation over the years, necessitating periodic reviews [3, 4].

On the other hand, in our developing countries, trauma is neglected because priority is given to communicable diseases [2]. Consequently, the number of trauma deaths is increasing, with a heavy toll on pedestrians, cyclists, motorcyclists, the elderly and children [4].

In addition to those who die at the scene of the accident or during transport to health facilities, some of the injured die inside hospitals. The achieve of our study was to assess hospital mortality in trauma patients in an orthopedic department of a level 3 hospital in sub-Saharan Africa.

### Patients and Method

#### Patients

#### Study Population

We were interested in all patients treated in the Orthopedic-Trau-

matology Department of Grand Yoff General Hospital (teaching hospital) during the period from March 1, 2013 to February 29, 2018. Our data sources were emergency, hospitalization and autopsy registers.

### Inclusion Criteria

All patients who were operated on or not in the department after trauma and who died during their hospitalization regardless of age or sex, were included in our study.

### Non-Inclusion Criteria

Patients who had either an isolated abdominal contusion, an isolated traumatic brain injury, or an isolated maxillofacial trauma were not included in our study.

### Sociodemographic and Clinical Characteristics

The mean age of the patients was  $47.93 \pm 21.69$  years. The male sex was predominant with 66.4% (n = 73). The sex ratio was 1.97.

### Method

#### Type of study

We conducted a retrospective prognostic study evaluating hospital mortality.

#### Parameters studied

We assessed the frequency of death, circumstances of death, date and time of death, length of hospital stay of deceased patients and

the causes of hospital death after trauma.

### Statistical analysis

The results were analyzed using Statistical Package for the Social Sciences (SPSS) version 26.0. We performed bivariate analyzes of correlations using Pearson's chi-square test and Fisher's exact test with a significance level of 0.05.

### Results

#### Frequency

During the six years, 110 cases of death by trauma were recorded out of a total of 10915 patients, for a hospital mortality rate of 1.43%.

#### Circumstances of death

They were dominated by road accidents (RTAs) with 48.2% (n = 53) and accidents of everyday accident of the domestic type with 33.6% (n = 37). Work accidents come in third place with 16.4% (n = 18). Violence represented 1.8% (n = 2).

#### Circumstances of death by sex

In men, the circumstances were dominated by RTAs (38.18%) and work accidents (12.7%). On the other hand, in women, accidents of daily living of a domestic nature were the main circumstance of death (19.09 %). The dependence between sex and type of accident was statistically highly significant (p = 0.0028). The distribution of traumatic circumstances of death by sex is shown in Figure 1.

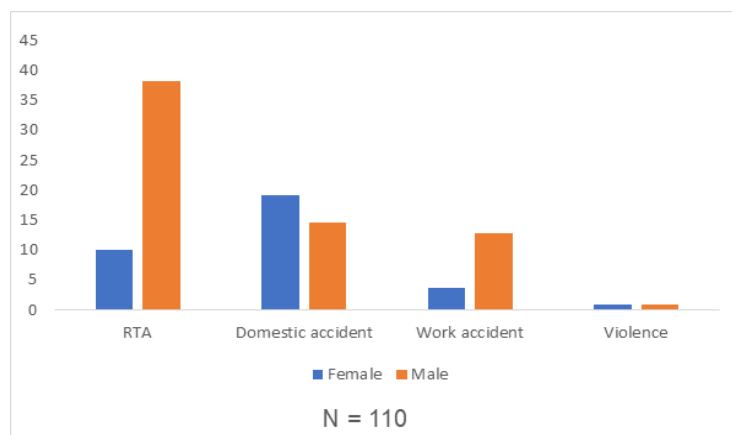


Figure 1: Circumstances of death by sex

### Distribution of Deaths According to Injury Diagnosis

Trauma to the lower limbs, the spine and polytrauma were the most frequently observed lesions on admission of patients with 40%, 27.3% and 28.2% respectively. Trauma to the pelvis was noted in 2.7% and to the upper limbs in 3.6%.

### Distribution of Deceased Patients According to Causes After Autopsy

Neurovegetative complications and cardiopulmonary arrest were the main causes of death at autopsy with 29.51% and 18.03% respectively (Table I). Deaths from severe sepsis accounted for 13.11%. Hemorrhagic shock and pulmonary embolism each accounted for 11.47% of deaths.

**Table I : Distribution of deceased patients by cause after autopsy**

Cause of death	Number (n = 85)	Percentage
Cardiorespiratory arrest (natural death)	9	18.03
Natural cause	2	6.56
Haemorrhagic shock	7	11.47
Hypovolaemic shock	2	3.27
Neuro-vegetative complication	30	29.51
Cardiac failure	2	4.91
Multivisceral failure	3	1.63
Pulmonary embolism	7	11.47
Hemopneumothorax	1	1.63
Unspecified circumstances by RTA	3	3.27
Sepsis severe	19	13.11

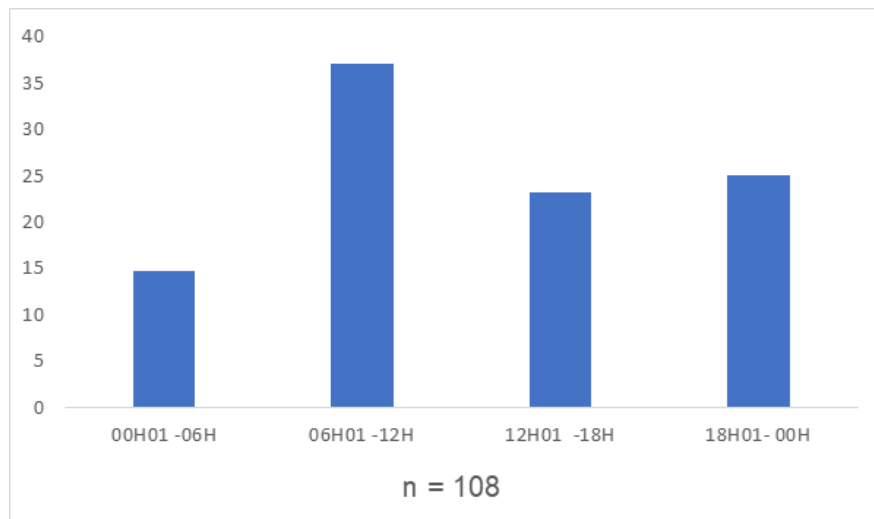
**Distribution of deaths according to length of hospital stay**

The average length of stay was 11.33 days +/- 20.46 days. Twelve patients (10.91%) had died on the day of admission. The average length of stay was shorter for victims of occupational accidents at 3.3 days. The average length of stay was 9.96 days for traffic accident victims. On the other hand, it was higher for

victims of domestic accidents with 18.97 days.

**Distribution of Deaths According to Time of Onset**

Deaths were most common between 6:01 a.m. and 12 p.m. and 6:01 p.m. and midnight respectively, with 37.04% and 25% (Figure 2).



**Figure 2:** Distribution of deaths according to time of onset

**Discussion**

In our series, the hospital mortality rate was 1.43%. In the literature, the mortality rate in orthopedic and trauma surgery varies from country to country. In sub-Saharan Africa, this rate is high and varies from 2.16% to 5.09% [5-9]. In England, mortality in Orthopedics-Traumatology is also high compared to ours with 2.8% [10].

In Japan, the death rate is close to ours at 1.40% [11]. In contrast, in the United States, the death rate in orthopedic and trauma surgery is lower at 0.92% [12].

The circumstances of death in our series are dominated by RTAs

with 33.97% and domestic accidents with 23.72%. This high frequency of RTAs is noted in several studies with rates varying between 52.53% and 83% [ 2, 13-15]. In Japan, the circumstances most responsible for death are falls and RTAs [11]. In contrast, in Australia and New Zealand, suicides and RTAs are more common [16]. The absence of a marked way and the lack of respect for the highway code explain these results in our country. In addition, the ever-increasing rate of high-speed vehicles and the large number of drivers of two-wheelers and cars.

The predominance of RTAs among men is explained by the fact that men are the most exposed in our country because they drive public transport vehicles and two-wheelers. The higher frequency

of domestic accidents in women may be linked to osteoporosis, as these are usually low-energy injuries.

In our study, the injury diagnosis showed that trauma to the lower limbs and polytrauma were the most frequently encountered with 24.4% and 21.8% respectively. Tan et al. and Diemer et al. observe in their series a high frequency of trauma to the lower limb in deceased patients [10, 15].

Neuro-vegetative complications and cardio-respiratory arrest were the main causes of death at autopsy with 29.51% and 18.03% respectively.

In the United States, traumatic brain injury is the leading cause of death in trauma patients with 51.6%. Acute bleeding and multiple organ failure are the second and third leading causes of death after trauma [17].

Our study shows that most deaths (60%) occurred just at the end of the first week of hospitalization. Our results are similar to those of Stewart [18]. The majority of deaths are recorded in the first week. This study includes both emergency and intensive care deaths. In Dutton's study, all cases of death occurred before day 6th and the time of death varied depending on the cause [17].

Deaths were more frequent in our study between 6:01 a.m.-12:00 p.m. and 06:01 a.m.- 12:00 a.m. with 37.04% and 25% respectively. In the Takongmon series [7], 58.6% of deaths occurred between 6 p.m. and 8 a.m.

At these times, the accompanying persons are outside and the medical staff is at the bedside. This situation is responsible for a decrease in patient monitoring as care is provided at 4-hour intervals. Some injured patients, especially head and spinal cord injured patients, require close clinical monitoring due to the rapid changes in their haemodynamic status that may occur. Early diagnosis of life-threatening distress and its prompt management could improve the patient's life expectancy.

## Conclusion

Mortality in orthopedic and trauma surgery is uncommon. It affects men more. The main causes are trauma to the lower limbs and polytrauma. Hence the need to improve the technical means and the vigilance of the nursing staff in our hospitals in order to reduce the death rate. Traffic accidents are the most common cause of death from trauma. They can be avoided or limited by a good road safety policy.

## References

1. Organisation mondiale de la sante (OMS) (2014) Traumatismes et violence : les faits 2014 : 1-20. <https://www.who.int/fr/publications-detail/9789241508018>.
2. Soumah MM, Koumare M, Ndiaye M, Sow ML (2019) Causes de deces a Dakar et politique de sante. Pan Afr Med J 32: 187.
3. Proye C, Camp D, Tirboulet JP, Cornej IB, Verin P, et al. (1988) Mortalite d'un service de chirurgie general de CHU etude de l'annee 1985 :1409 deces post op. J Chir Paris 25: 255-259.

4. Proye C, Tirboulet JP, Corneille B, Sautier M, Martinot JC, et al. (1981) Mortalite d'un service de chirurgie general de CHU etude de l'annee 1990 : 1492 operes, 27 Deces post op. J Chir Paris 128: 453-458.
5. Diakite A, Diaby A, Camara N (2005) Mortalite par accident de la voie publique au CHU-Donka. Mali Medical 2005: 17-19.
6. Orimolade EA, Akinyoola AL, Ikem IC, Oginni LM, Olasinde AA, et al. (2010) Mortality among orthopaedic and traumatology admissions: a ten year review. East Afr J Public Health 7: 361-366.
7. Takongmo S (1993) Mortalite hospitaliere en milieu chirurgical : necessite de l'audit medical. Med Afr Noire 40: 730-733.
8. Chagomerana MB, Tomlinson J, Young S, Hosseinipour MC, Banza L, et al. (2017) High morbidity and mortality after lower extremity injuries in Malawi : A prospective cohort study of 905 patients. Int J Surg 39: 23-29.
9. Ayoade BA, Thanni LO, Shonoiki-Oladipupo O (2013) Mortality Pattern in Surgical Wards of a University Teaching Hospital in Southwest Nigeria: A Review World J Surg 37: 504-509.
10. Tan H, Macdonald D, Matthews S, Giannoudis P (2004) Incidence and causes of mortality following acute orthopaedic and trauma admissions. Ann R Coll Surg Engl 86: 156-160.
11. Aoki M, Abe T, Saitoh D, Oshima K (2019) Epidemiology, Patterns of treatment, and Mortality of Pediatric Trauma Patients in Japan. Sci Rep 9: 917.
12. Bhattacharyya T, Iorio T, et William LH (2002) Rate of and Risk Factors for Acute Inpatient Mortality After Orthopaedic Surgery. J Bone Joint Surg 4: 562-572.
13. Hefny AF, Idris K, Eid HO, Abu-Zidan FM (2013) Factors affecting mortality of critical care trauma patients. Afr Health Sci 13: 731-735.
14. Afuwape OO, Okolo CA, Akinyemi OA (2011) Les Cas De Deces Par Traumatisme Evitables A Ibadan: Une Comparaison Des Scores Traumatisme Revise Et D'un Comite D'etude. W Afr J Med 30: 19-23.
15. Diemer HSC, Mapouka PAI, Tchebemou-Ngweya SJ, Tekpa BJD (2020) Les aspects epidemiologiques de la mortalite en orthopedie traumatologie de l'hopital communautaire. J Eur des Urgences et de Reanim 32: 4-8.
16. Curtis K, Caldwell E, Delprado A, Munroe B (2012) Traumatic injury in Australia and New Zealand. Australas Emerg Nurs J 15: 45-54.
17. Dutton R, Stansbury LG, Leone S, Kramer E, Hess JR et al. (2010) Trauma Mortality in Mature Trauma Systems: Are We Doing Better? An Analysis of Trauma Mortality Patterns, 1997-2008. J Trauma 69: 620-626.
18. Stewart RM, Myers JG, Dent DL, Ermis P, Gray GA, et al. (2003) Seven hundred fifty-three consecutive deaths in a level I trauma center: the argument for injury prevention. J Trauma 54: 66-70.

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