

Pattern of Surgical Emergencies in Rural Southwestern Nigeria

Azeez Oyemomi Ibrahim, Paul O. Abiola¹, Shuaib Kayode Aremu², Olabode M. Shabi³, Tosin Anthony Agbesanwa⁴

Department of Family Medicine, Federal Teaching Hospital, Ido-Ekiti, Departments of ¹Surgery and ³Family Medicine, Afe Babalola University, ²Department of Ear, Nose and Throat, College of Medicine and Health Sciences, Afe Babalola University, ⁴Department of Family Medicine, Ekiti State University Teaching Hospital, Ado-Ekiti, Ekiti State, Nigeria

Abstract

Introduction: Considering the magnitude of deaths prevailing in the accident and emergency department (AED) in health facilities of sub-Saharan Africa, there is a need to have information on the burden of admissions and deaths due to surgical emergencies. Few studies in Nigerian hospitals in urban and suburban areas have been documented, but none in the rural setting. The objectives of this study were to ascertain the sociodemographic profile, causes and outcomes of admissions, and the pattern and causes of deaths due to surgical emergencies. **Methods:** A retrospective survey using a data form and a predetermined questionnaire was used to review the patients admitted for surgical emergencies at the AED of a tertiary hospital in rural southwestern Nigeria from January 2015 to December 2019. The data were analyzed using SPSS version 22.0. The results were presented in descriptive and tabular formats. **Results:** Surgical emergencies constituted 43.9% of all admissions. The mean age of admissions was 42 ± 16.9 years, and majorities were in the young and middle-aged groups. There were more males (66.4%) than females (33.6%). Trauma (60.9%) of which road traffic accident (RTAs) (56.0%), was the leading mechanism of trauma. The mortality rate was 5.4% and was caused majorly by RTAs (33.0%), diabetes mellitus foot ulcers (11.0%), and malignancies (9.8%). **Conclusion:** In this study, surgical emergencies constituted 43.9%, and a majority of the patients were male. Trauma caused by RTA is the most cause of admission. The mortality rate was 5.4%. This finding may provide an impetus for prospective research on this outcome.

Keywords: Pattern, rural southwestern Nigeria, surgical emergencies

INTRODUCTION

Accident and emergency department (AED) constitutes one of the mainstays in the survival of patients with acute injuries and illnesses and is where patients present without prior appointment.^[1] The AED provides an insight into the quality of care available in a particular health institution.^[1,2] In Nigeria, the AED is the predominant route of admission into the medical and surgical wards, with surgical emergencies accounting for between 20% and 45% of all admissions.^[1-3]

Reports from previous studies have indicated that admissions due to surgical emergencies have increased in recent years.^[2,4] These increasing numbers constitute significantly to the global health burden and have implications for personnel planning, surgical training, and provision of health-care delivery, particularly in the rural settings.^[4] Surgical emergencies constitute a major part of the surgeon's workload across the globe.^[1,2] Globally, trauma-bodily injuries are the

leading causes of admission due to surgical emergencies in many countries.^[2,5] Road traffic accident (RTA) (with fractures of the long bones and soft-tissue injuries) is the most common traumatic cause of admission due to surgical emergencies.^[2,6,7] On the other hand, acute abdomen with acute appendicitis, malignancy, and intestinal obstruction are the leading causes of admissions due to nontraumatic emergencies.^[2,8]

Considering the magnitude of deaths prevailing in the AED worldwide and the reports of increasing admissions due to

Address for correspondence: Dr. Azeez Oyemomi Ibrahim, Department of Family Medicine, Federal Teaching Hospital, PMB 201, Ido-Eki, Ekiti State, Nigeria.
E-mail: ibrahimazeez1434@gmail.com

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surgical emergencies, there is a need for emergency physicians and surgeons and other stakeholders in the health sector to have information on the burden of admissions due to surgical emergencies. Such information will enhance the health system's preparedness toward meeting patient expectations, leading to improved health-care delivery and outcomes.^[9]

Few related studies on the morbidity and mortality of surgical emergencies in Nigerian hospitals in the urban and suburban areas have been documented,^[2,10,11] but none to the best of our knowledge, in the rural setting of southwestern Nigeria. Therefore, this study aimed to ascertain the pattern of morbidity and mortality of surgical emergencies at adult AED of the study center in southwestern Nigeria. The objectives of the study were as follows: to ascertain the sociodemographic profile, causes and outcomes of admissions, and pattern and causes of deaths of patients due to surgical emergencies. The research answered the following questions:

1. What is the sociodemographic profile of patients admitted for surgical emergencies at AED?
2. What are the causes of admissions of patients due to surgical emergencies at AED?
3. What are the treatment outcomes of patients for surgical emergencies at AED?
4. What are the pattern and causes of deaths of patients due to surgical emergencies at AED?

METHODS

Study area

The study was carried out at adult AED of the study center in southwestern Nigeria. The study center is a rural community and about 15 km from the State capital. It has a total land area of 332 km², and as at last population census of 2006, it had a total population of 159,114 with an annual growth rate of 3.2%, the 13th-year projected population (by 2019) would be 225,305.^[11] Apart from this hospital, there are other two tertiary hospitals which are located in the State capital. The study center has 180 beds and serves as a referral center to patients from private and government-owned health facilities in the State and its environs. The AED of the hospital offers emergency services to medical and surgical patients, who were rushed in, most of the time, without prior appointment. There were 14 male and 10 female beds. The department runs three shifts from Monday to Friday and 48 h call on Saturdays and Sundays. The medical team included two consultant family physicians and a consultant orthopedics and trauma surgeon and eight medical officers. They are supported by nurses, health assistants, medical records, pharmacists, and information staff and cleaners. In study institution, all adult surgical emergencies are admitted at AED and treated as a rule. This may eventually lead to their discharge within 72 h or transfer to the ward or refer to other health facilities when the need arises. During the study period, the surgery department has 21 consultant specialists, who were responsible for all surgical cases. The specialists included four orthopedics and

trauma surgeons, two neurosurgeons, three general surgeons, three urologists, three plastic and constructive surgeons, two ophthalmologists, three anesthetists, and two maxillofacial and two orthorhinolaryngologists. Following the initial diagnosis, resuscitation, and commencement of management of the patients, the respective consultant specialists were invited by the AED medical team and were responsible for further management of the patients in their respective wards.

Study design

This was a retrospective, observational review of hospital records of surgical patients at adult AED between January 1, 2015, and December 31, 2019.

Study population

This included all surgical patients registered and admitted at adult AED between 2015 and 2019.

Inclusion criteria

Surgical patients aged 15 years and above and whose data were available with complete clinical and diagnostic criteria were included in the study.

Exclusion criteria

Patients who were brought in dead or whose data were incomplete or not available and obstetrics and gynecological cases were excluded from the study.

Data collection instruments and method

The researchers of this study developed the instruments for data collection, which were a data form and a standardized questionnaire. The two consultant specialists at adult AED of the hospital established the face and content validity of the questionnaire. The data form and the questionnaire were used to obtain information from the case record of each patient and admissions and discharge from the nursing report books. Information retrieved included the date and year of admission, sociodemographic profile, cause of admission and the cause of death (if applicable), and the diagnosis based on the final assessment of the consultant specialist. In line with the treatment guideline, the diagnosis was based on the use of the standard clinical and laboratory criteria. Imaging radiological tests such as X-ray, computed tomography, and magnetic resonance imaging were employed for trauma-related cases. Abdominal ultrasound, blood cultures, and tissue biopsy as the case may be for specific nontrauma-related cases. Each patient's outcome as retrieved was to show if the patient was either discharged, dead, discharged against medical advice (DAMA), referred to other health facilities, or transferred to the ward for the continuation of care after initial resuscitation and stabilization at AED. The data were collected by three trained casualty officers and were cross-checked by the principal investigator.

Participants study size

Two thousand and six hundred and twelve patients were admitted for surgical emergencies. Of these admissions, 2433 had their data complete and were included in the study as our

sample size. The remaining 165 patients whose data were not complete were excluded.

Data entry and analysis

All collected data were checked for completeness and entered into Epi -info version 7 and were later exported to SPSS version 22.0 (SPSS Inc., South Wacker Drive, Chicago, USA) for analysis. Tabulation of proportions in frequency and percentage were done. The results were presented in Tables and Figures.

RESULTS

There were 5944 admissions to adult AED of the study center during the study period. Among these admissions, 2612 (43.9%) were due to surgical emergencies. Of these (2612) admissions, the medical records of only 2443 (93.5%) surgical patients with complete data were retrieved from the records office and were included in this study. The medical records of the remaining 169 (6.5%) patients were incomplete and therefore not analyzed.

The mean age of surgical patients was 42 ± 16.9 years, and the age ranged from 15 to 108 years. The majority, 1622 (66.4%), were male. Most, 1270 (52.0%), were married and 1373 (56.2%) were rural dwellers [Table 1].

Of the 2443 surgical patients, the majority, 1488(60.9%), of admissions were due to traumas, of which, RTAs, 833(56.0%) was observed as the commonest traumatic emergency [Figure 1].

From the total patients (1488) admitted for traumas, 1563 diagnoses were made, indicating that some patients were admitted for more than one injury. Soft-tissue injury 500 (32.0%), fracture 406 (26.0), and head injury 234 (15.0%) were the most frequently diagnosed traumas-related admissions [Figure 2].

On the other hand, 955(39.1%) of admissions were due to non-traumas, of which, malignancies, 155(16.2%), diabetes mellitus (DM), foot gangrene, 116(12.2%), acute urinary retention,

106(11.1%) and acute appendicitis, 104 (10.9%) were observed as the common non traumatic emergencies [Figure 3].

The treatment outcome of traumatic emergencies showed that the majority, 1161 (78.0%), were discharged home, 221 (14.9%) were DAMA, 73 (4.9%) died on admission, and 33 (2.2%) were referred to other facilities for their continuation of treatment [Table 2].

In the same vein, the treatment outcome of nontraumatic emergencies showed that the majority, 735 (77.0%), were discharged home, 133 (13.9%) were DAMA, 59 (6.2%) died

Table 1: Sociodemographic profiles (n=2443)

Variables	Frequency (%)
Age group (years)	
<40	1393 (57.0)
40-64	748 (30.6)
65 years and above	302 (12.4)
Mean±SD	42±16.9
Sex	
Male	1622 (66.4)
Female	821 (33.6)
Marital status	
Single	897 (36.7)
Married	1270 (52.0)
Widow	217 (8.9)
Separated	59 (2.4)
Occupation	
Self-employed	777 (31.8)
Farmers	716 (29.3)
Civil servant	655 (26.8)
Dependent	195 (8.0)
Retirees	100 (4.1)
Education	
None	100 (4.1)
Primary	513 (21.0)
Secondary	1195 (48.9)
Tertiary	635 (26.0)

SD: Standard deviation

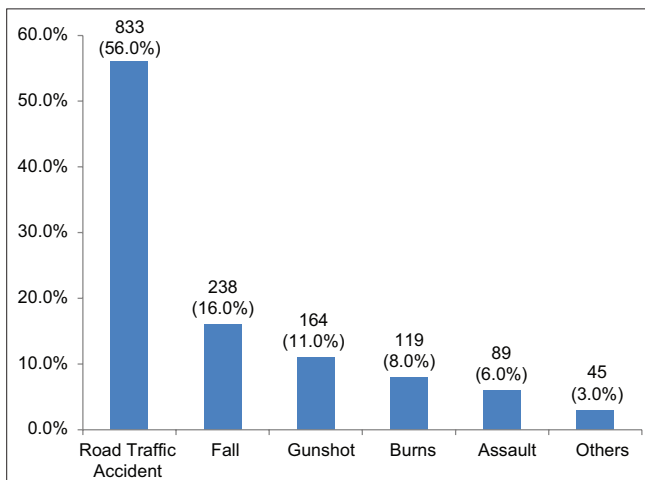


Figure 1: Mechanisms of trauma (n = 1488)

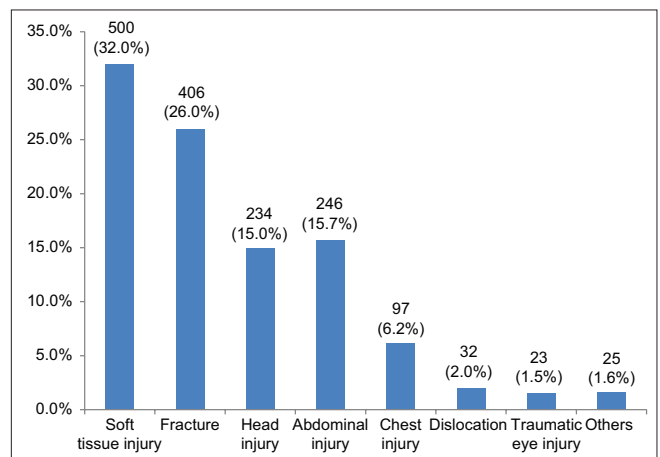


Figure 2: Patterns of trauma based on diagnosis (n=1488)

on admission, and 28 (2.9%) were referred to other facilities for their continuation of treatment [Table 2].

In all, the total number of deaths recorded was 132, with a crude mortality rate of 5.4%. The majority of deaths, 73 (55.3%), were due to trauma and were caused by RTAs, 44 (33.0%), while those from nontrauma cases were caused majorly by diabetes foot gangrene 14 (11.0%) and malignancies 13 (9.8%) [Table 3].

DISCUSSION

This study showed that surgical emergencies accounted for 43.9% of all emergencies at the study center during the period under review. This finding agrees with other studies in sub-Saharan Africa, where they reported that surgical emergencies constituted about 20%–45% of all emergency admissions.^[1,2,12] However, our finding is <56.8% found by Onyemaechi *et al.*^[2] but higher than 17.2% found by Onuoha *et al.*^[13] Compared to our study, the differences of these other studies could reflect the differences in the setting, geographical, and sociodemographic factors. Our study showed that the mean age of admissions was 42.2 ± 16.9 years. This is similar to the mean age reported by other studies and could be due to the similarities in the cutoff age for admissions.^[1,14] However, in the reports by Onyemaechi *et al.*,^[2] and Omoke and Ekumankama,^[15] the mean age was 33.7 ± 17.2 and 32.0 years, respectively. The inclusion of pediatric surgical emergencies may explain the lower mean age in these studies. In the same vein, our mean age was lower than 52.69 and 58.7 years found by Xu *et al.* in China,^[16] and Gale *et al.* in the US, respectively.^[17] The predominance of nontrauma surgical emergencies in the later studies may explain the higher mean ages of the patients. In this study, the majority of our patients were in the second and third decades of life. This was of particular concern, given that they belonged to the most active and productive forces in our society and may result in huge economic losses. This is consistent with findings from

similar studies in Nigeria.^[2,9,10] In this study, the proportion of male preponderance compared to females is consistent with

Table 2: Treatment outcomes of surgical patients (2443)

Variables	Frequency (%)
Traumatic patients (n=1488)	
Discharged	1161 (78.0)
DAMA	221 (14.9)
Death	73 (4.9)
Referred	33 (2.2)
Total	1488 (100.0)
Nontraumatic patients (n=955)	
Discharged	735 (77.0)
DAMA	133 (13.9)
Death	59 (6.2)
Referred	28 (2.9)
Total	955 (100.0)

DAMA: Discharged against medical advice

Table 3: Causes of mortality due to surgical emergencies (n=132)

Variable	Frequency (%)
Causes of deaths due to trauma	
RTA	44 (33.0)
Gunshot	13 (9.8)
Burns	11 (8.5)
Fall	3 (2.4)
Others	2 (1.2)
Causes of deaths due to nontrauma	
DM foot gangrene	14 (11.0)
Malignancy	13 (9.8)
Typhoid perforation	11 (8.5)
Intestinal obstruction	10 (7.3)
Obstructive jaundice	3 (2.4)
Others	8 (6.1)
Total	132 (100.0)

RTA: Road traffic accident, DM: Diabetes mellitus

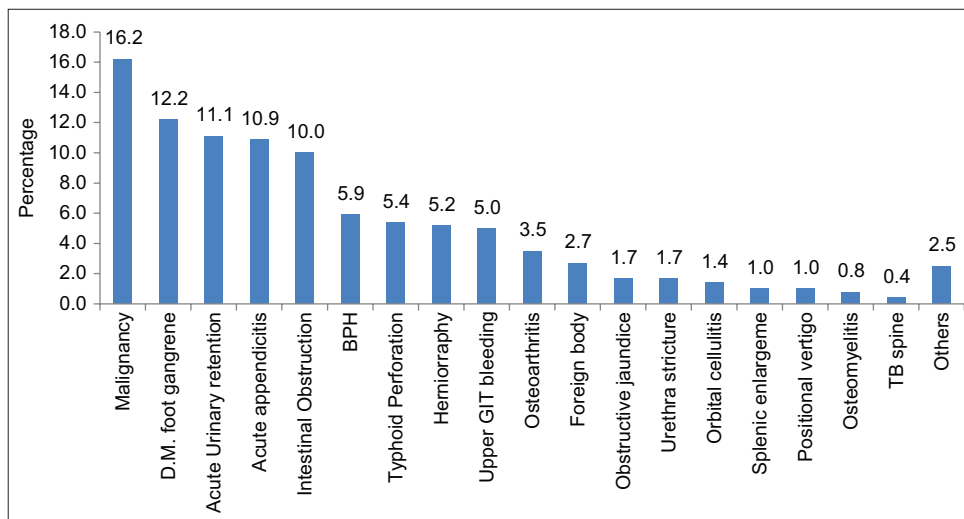


Figure 3: Pattern of nontraumatic emergencies (n = 955)

reports in low- and mid-income countries.^[10,18,19] This could be because the activities of males tend to pose more injuries and risks relative to the female counterparts who engage in petty trading and domestic work.^[18,20] A previous study had reported that women usually seek spiritual healers' intervention first and later in hospitals when complications set in.^[13] However, a study by Uzoechina *et al.* reports higher admissions of females than males.^[11] It may be due to the records of the obstetrics and gynecology cases which were included in the data collated.

In this study, 60.9% of admissions were caused by traumas. This was consistent with findings by Onyemaechi *et al.*,^[2] and Verma *et al.*,^[21] and may be due to the rising incidence of road traffic injuries globally.^[1,2,21] Furthermore, the majority of admissions were in their active and productive age groups, and such age groups have a higher tendency to be involved in the daily exploration of their environments, both in stressful and violent life activities, which predisposes to various bodily injuries, presenting in emergency conditions.^[1] RTAs were the common cause of admission due to trauma and accounted for the increased proportion of patients with soft-tissue injuries (lacerations, bruises, and abrasions), fractures, and traumatic head injury in this study. This is similar to other findings in Nigerian studies.^[1,2,22] Previous studies have reported that hospitals located along the highways tend to see more cases of RTAs due to high vehicular activities along these highways.^[2,23] The location of our hospital along the highways may have contributed to the relatively high incidence of RTAs recorded in this study. Lack of adherence to traffic rules, coupled with bad roads and tyres, may explain this observation. This finding is in line with the recent WHO report^[24] and other reports from urban and sub-urban health facilities.^[6,7,25] In the same vein, 39.1% of emergency surgical admissions in this study were due to nontrauma cases. This contradicts reports by some authors who found nontrauma surgical emergencies to be over 50%.^[15,26] The hospital setting and the pattern of surgical diseases at the study locations may be the reason for this difference. Among the nontrauma patients, malignancies, DM foot ulcer, and acute urinary retention were the leading causes of admissions, and this is similar to other findings in Nigeria.^[2,23,24] This finding calls for focus by the stakeholders to improve primary prevention, which has been identified as the most affordable and cost-effective means of prevention that would address the trend in the incidence of nontrauma cases found in this study.

The outcome of admissions in this study appears to be good with respect to the number of patients that were successfully treated and discharged (77.6%), referred to other facilities (2.5%), and death (5.4%). The availability of various consultant specialists in the field of surgery to handle the difficult cases, among other factors, may be responsible for these outcomes. However, the high number of DAMA patients (14.5%) was similar to the reports of another study and was a source of concern.^[15] Some DAMA patients lacked the funds to pay for the services required. Some patients lose all hope, especially when recovery was slow, and prefer to die

at home or obtain treatment elsewhere. Some with fractures or limb gangrene fear limb amputation and seek treatment from alternative medical practitioners.^[27] DAMA most often was observed to be due to wrong cultural or religious beliefs or attributing the cause of illness to spiritual attacks. Therefore, effective and sustained health education and communication strategies may be needed to improve in early presentation and access to quality health-care services. Continuing enrollment of citizens on the National Health Insurance Scheme should be intensified to reduce the incidence of DAMAs due to financial constraints in our hospitals.^[28]

In this study, the mortality rate was 5.4%. The poor state of our intensive care facilities, delay in prehospital transfer, delay presentation, and inability to afford hospital expenses may have contributed to this mortality. The mortality rate of 5.4% in this study was <7.8%, 8.3%, and 8.5% reported by Onyemaechi *et al.*,^[2] Akinmokun *et al.*,^[14] and Woyessa *et al.*,^[20] respectively. The higher mortalities in those other studies may be due to the locations of those studies in the urban and suburban areas. These locations have been linked to higher fatalities from RTAs, gunshot, burns, and other crimes, which are less frequent in rural areas like the study center. A higher proportion of male death found in this study may be related to the proportion of male to female admissions and men's activities, which tend to pose more injuries and risks, which previous studies have since identified as the cause of early death in men than women.^[18,19] The young adults and middle-aged groups constituted over 87.0% mortality in this study. This finding is of particular concern because these aged groups are the major workforce of the population and, therefore, suggest bad economic implications. Reports from previous studies in Nigeria were consistent with the finding in this study that mortalities occur mostly in the young and middle-aged groups.^[6,7] Reasons for the early death may be due to the involvement of people in these aged groups, in higher fatalities like RTAs (which is the leading cause of death in this study), and poor access to quality health-care services, ignorance, poverty, and wrong traditional or religious beliefs.^[2,7]

In this study, the most cause of death was trauma and is due to RTAs. This agrees with other studies in Nigeria, where RTAs were reported as the most common cause of death in AED.^[14,15] Lack of adherence to safety rules, coupled with bad roads and tyres, may be responsible for this observation. The finding calls for the establishment of a trauma center by policymakers to improve the outcome of surgical emergencies. In the same vein, DM foot gangrene, malignancy, and typhoid perforation were the leading causes of death due to nontrauma cases. Delay presentation, poverty, ignorance, and cultural and religious beliefs may be responsible for the mortality caused by these disease entities. Therefore, deliberate measures need to be implemented to address the causes of these mortalities. The study was not without its own limitations. The lack of postmortem evidence of deaths in patients without a standard gold instrument of diagnosis is a limitation. Furthermore, the

pediatrics, obstetrics, and gynecological surgical emergencies were excluded from this study. We believe that their inclusion will provide confounding variables since they are received and managed by their respective departments using a different protocol.

CONCLUSION

This study found that 43.9% of adult AED admissions were due to surgical emergencies. There were more males than females. The majority of admissions were due to traumas, of which RTAs, was observed as the commonest traumatic emergency. The mortality rate was 5.4% and was caused majorly by RTAs, DM foot ulcers, and malignancies. Concerted efforts by all the stakeholders may be needed to reduce the causes of admissions. The finding calls for the establishment of a trauma center with functional ICU by the policymakers to improve the outcome of surgical emergencies in our environment.

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Research quality and ethics statement

The Institutional review board/IEC approved the study with the reference number ERC/2020/08/402A. The authors followed applicable EQUATOR Network (<http://www.equator-network.org/>) guidelines during the conduct of this research project.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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