

**AFRICAN JOURNAL OF  
MEDICINE  
and medical sciences**

**VOLUME 29, NUMBERS 3 & 4, SEPT. & DEC. 2000**



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**ISSN 1116 — 4077**

## \*Surgical morbidity and mortality pattern in the accident and emergency room—a preliminary report.

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### Summary

**Background and Purpose:** A prospective review of surgical patients attending the Accident and Emergency room was carried out to determine the pattern of morbidity and mortality in order to guide planning and provision of surgical services and improve on the quality of care available. **Methods:** Patients were entered into a data sheet from September 1999; a preliminary report of the first six months is presented. **Results:** There were 1,209 patients (850 males and 359 females, M: F= 2.2: 1) with 46 different presentations. Age range was 2 weeks to 95 years. The mode and median age was in the third decade. Morbidity from trauma was 70.5 %, 44.5 % from Road Traffic Accident while mortality from trauma was 2.6 % (32 patients). Nearly half of the mortality (47.2 %) was head injury related. **Conclusion:** The commonest presentation was lacerations (19.4 %) from which there was no mortality while head injury, multiple injury and multiple fractures that accounted for 14.7 % morbidity had 61.1 % mortality. These figures are helpful in planning services delivery and in focusing and improving on the mortality-prone presentations.

**Keywords:** *Accident and emergency, morbidity, mortality*

### Résumé

Un revu prospectif des patients de chirurgie qui arrivent en salle d'accident et d'urgence a été exécuté pour déterminer les modèles de mortalité et de morbidité afin de guider le plan et les provisions des services chirurgicaux et pour améliorer la qualité des soins. Les patients ont été enregistrés à partir de Septembre 1999; Un rapport préliminaire des premiers six mois est présenté. Il y avait 1209 patients (850 mâles et 359 femelles; M:F = 2.2:1) avec 46 présentations différentes. Les âges varient entre 2 semaines et 95 ans. Le mode et le médian d'âge étaient dans la trentaine. Le taux de morbidité à partir du traumatisme était de 70.5%, 44.5% était des accidents routiers pendant que la mortalité était de 2.6% (32 patients) à partir d'un demi de mortalité (47,2%) était des blessures de la tête. Les cas les plus courants étaient des blessures (19.4%) ou il n'y avait pas de mortalité à partir des blessures de la tête. Des blessures et fractures multiples faisaient 14,7% de morbidité et une mortalité de 61,1%. Les figures aident à planifier les services et d'ur à prévoir et améliorer sur Des mortalités des cas présentes.

### Introduction

A periodic review of hospital data is salutary for as long as hospital records remain the best available source of data for describing disease conditions [1, 2,3]. It is desirable, therefore, to update data on common surgical problems presenting at the Accident and Emergency (A and E) in order to guide planning and provision of services to the patients. Available hospital data have been found to be poorly kept in some reports from developing countries [4,5] making retrospective

studies unreliable. In countries or centres where records are reliable, current and properly kept, the data can be useful in measuring the performance of health facilities and in determining allocation and utilization of resources. When a stable surgical statistic is known, any new condition or presentation is easily recognised as different or a new trend of what used to be common becomes easily identified. These reasons encouraged the carrying out of a prospective study of the pattern of surgical morbidity and mortality at our A and E department. The ensuing statistical data and the deductions therefrom would be useful in planning service delivery and improving such, both in quality and efficiency. Quality deals with good outcome of care and efficiency is related to the process of care [6].

### Patients and methods

From the 1<sup>st</sup> of September 1999 to the 29<sup>th</sup> of February 2000, all patients presenting to the surgical section of the A and E in the University of Ilorin Teaching Hospital Ilorin, Nigeria were prospectively studied. Patients were entered into a main data-sheet from where they were analysed with respect to age, sex, and clinical diagnosis, outcome of patients whether admitted, discharged or dead and assumed cause of death. All the presentations individually were further analysed into decades to determine the age impact on them. Patients that died had their data scrutinised to determine the quality of care received in terms of the number and interval of clinical reviews and the casualty officers' perceived problems in the course of offering emergency therapy and resuscitation. No autopsy was done for the patients.

### Results

One thousand two hundred and nine patients were seen between September 1, 1999 and February 29, 2000 with 46 different presentations (Table 1). They comprised 850 males and 359 females (M: F= 2.2: 1) with an age range of two weeks to 95 years and median and mode age of presentation in the third decade. The age incidence rose from the first decade, peaked at the third and gradually fell thereafter, Figure 1. Two hundred and sixty eight patients were 15 years and younger while 941 patients were above 15 years. The mortality comprised 36 patients (26 males and 10 females, M: F= 2.6: 1), age range two to 75 years; mean age 40.1 ± S.D 16.3 years representing 3.0 % of the patients.

Lacerations, bruises and abrasions (superficial trauma) represent the commonest presentation occurring in 235 patients (19.4 %) followed by long bone fractures in 167 patients (13.8 %) of which 118 (9.7 %) were single bone fractures and 49 (4.1 %) were multiple bone fractures—involving two or more bones. As expected, there was no mortality in the laceration and the single bone fracture patients.

*\*This paper was presented at the 35<sup>th</sup> Annual Conference/ Scientific Meeting of the International College of Surgeons (Nigerian National Section) held in Port Harcourt, Nigeria from March 29 to April 1, 2000.*

hundred and fifty patients (78.6 %) were 40 years and younger, from which group 23 of the 36 (63.9 %) deaths occurred. Ten most frequently encountered presentations were seen in nearly two-thirds of the patients (797 patients, 65.9 % morbidity) and they accounted for more than three quarters of the deaths (28 of 36, 77.8 % mortality), Table 3. Certain presentations were commonest within some decades; like HI, burns and scalds, abscesses and pyomyositis seen mostly in the first decade, Table 4.

Table 3: Showing the ten commonest presentations

Serial no	Presentation	Number of patients in each presentation (% of 1,209 patients)	Number of deaths in each presentation (% of 1,209 patients)
1	Lacerations, bruises, abrasions	235 (19.4%)	0 (0.0%)
2	Long bone fractures	167 (13.8%)	4 (11.1%)
	single fracture(118)	(9.8%)	(0) (0.0%)
	multiple fracture	(49) (4.0%)	(4) (11.1%)
3	Head injury	69 (5.7%)	7 (19.4%)
4	Multiple injury	60 (5.0%)	11 (30.6%)
5	Scalp injury	59 (4.9%)	0 (0.0%)
6	Abscesses and pyomyositis	55 (4.5%)	0 (0.0%)
7	RTA with little or no injury	46 (3.8%)	0 (0.0%)
8	Burns and scalds	40 (3.3%)	2 (5.6%)
9	Appendicitis	34 (2.8%)	0 (0.0%)
10	Joint dislocations	32 (2.6%)	0 (0.0%)
Total		797 (65.9%)	28 (77.8%)

## Discussion

The preponderance of males over females agrees with most published works [ 5, 7 ]. This was also the case in the mortality of 26 males and ten females. Zollinger [ 8 ], who in 1955, was the first to examine trauma care quality in motor vehicle accident victims found a very high rate of 84 % lacerations, contusions and abrasions whereas this series showed 19.4 %. This series also differs from Zollinger's in showing that long bone fractures were two and half times commoner than HI. This, however, agrees with an earlier report from Nigeria by Adelaye and Odeku [ 5 ]. Lacerations and long bone fractures accounted for a third (33.3 %) of this series, underscoring the need to develop improved skills in suturing, provide more suturing and dressing materials and splints for fractures in the A and E. Whereas no mortality occurred in the lacerations group, four deaths were recorded among the multiple fractures mostly due to haemorrhage. This emphasises the need for efficient blood transfusion services including prompt access to the blood bank to combat haemorrhagic shock.

It is an interesting observation that the ten most presented conditions constituted 21.7 % of the spectrum of 46 conditions seen (morbidity) but accounted for 77.8 % mortality (28 of the 36 deaths, Table 3). This suggests a need to apply some principles in the social sciences like the Pareto Principle<sup>a</sup> [1], which has found relevance in management economics, to surgery. The observed proportion agrees with the Pareto Principle and can be an effective measure of improving on the services delivered in the A and E.

The third and fourth decades deserve consideration because it is from them that the highest incidences of laceration, long bone fractures, multiple injury, scalp injury, RTA with little or no injury and joint dislocations occurred—all six found in the group of the ten commonest presentations (Tables 3 and 4). Even though the age incidence rose from the first decade and peaked at the third before steadily dropping, the third and fourth decades together were responsible for more than half the mortalities (51.6 %). Therefore, the highest morbidity and mortality are found in these decades. This agrees with the literature worldwide [10, 11, 12, 13]. Children

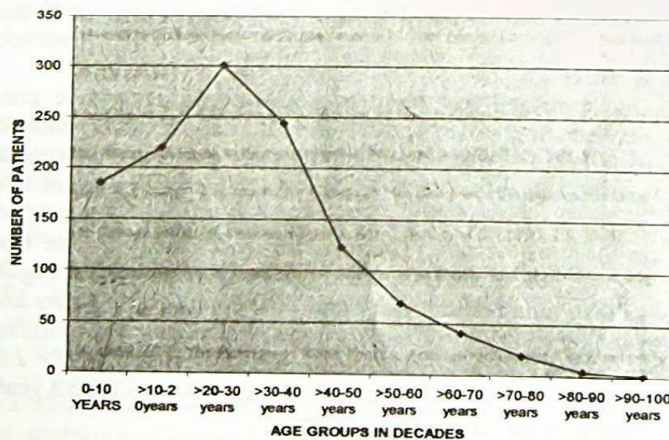
Table 4: Showing distribution of the ten common presentations into decades

S/N	Age in decades and number of patients seen presentation	0-10 yrs	>10-20 yrs	>20-30 yrs	>30-40 yrs	>40-50 yrs	>50-60 yrs	>60-70 yrs	>70-80 yrs	>80-90 yrs	>90-100 yrs	Total number of patients
1	Lacerations	27	37	74	62	25	7	2	1	-	-	235
2	Fractures											
	single	30	16	31	17	14	5	1	3	-	1	118
	multiple	7	7	13	11	6	5	-	-	-	-	49
3	Head injury	22	13	16	9	3	4	2	-	-	-	69
4	Multiple injury	1	6	15	24	8	5	1	-	-	-	60
5	Scalp injury	11	7	18	16	4	3	-	-	-	-	59
6	Abscesses	18	11	12	7	3	3	1	-	-	-	55
7	RTA± injury	4	6	10	17	4	5	-	-	-	-	46
8	Burns	18	5	6	4	4	2	1	-	-	-	40
9	Appendicitis	1	10	17	4	1	-	1	-	-	-	34
10	Joint dislocation	4	8	7	9	4	-	-	-	-	-	32
	Total	143	126	219	180	76	39	9	4	-	1	797

Notes: S/N = Serial number, RTA = Road traffic accident Yrs = Years

**Table 1:** Showing the 46 different presentations

Serial number	Presentation	Serial number	Presentation
1	Scalp Injury	26	Testicular Torsion/Epididymo-Orchitis
2	Head Injury	27	Burns And Scalds
3	Scalp + Head Injury	28	Cuts And Lacerations
4	Chest Trauma	29	Urinary Retention
5	Abdominal Trauma	30	Tumours (? Where)
6	Pelvic Trauma	31	Gangrene ? (Whrere)
7	Hand Injury	32	Neck/ Back Pain
8	Hand Infection	33	Foreign Body (Ear/ Nose/ Throat)
9	Crush Injury	34	Medical Diseases Mispresented To Surgical A And E
10	Multiple Injuuries	35	Oesophageal Disease
11	Joint Dislocation	36	Rta ± Minor Injury
12	Joint Fracture	37	Myalgia
13	Joint Infection/ Inflammation	38	Hernias +Scrotal Disease
14	Long Bone Fractures		
	Single Bone/ Multiple Bone	39	Genital Injuries
15	Osteomyelitis	40	Change Of Catheter
16	Foot Injury	41	Epistaxis + E.N.T. Diseases
17	Foot Infection	42	Maxillo-Facial Injury
18	Acute Abdomen ? Cause	43	Post Operative Complications
19	Appendicitis	44	Assaults
20	Typhoid Perforation	45	Gunshot Injuries
21	Spine Injury	46	Other Unlisted Presentations (To Be Specified)
22	Abscesses Including Pyomyositis		
23	Haematemesis		
24	Bleeding Per Rectam		
25	Intestinal Obstruction		



**Fig. 1:** Number of patients and age in decades

Four deaths (11.1 %) were recorded in the multiple fractures. Though head injury (HI) occurring alone was the third commonest condition in 69 patients (5.7 %), it accounted for the highest number of deaths especially when found as part of multiple injuries (involving two or more regions of the body). Multiple injuries were seen in 60 patients (5.0 %), of which 48 were two-region injuries. Twenty-six patients had HI combined with long bone fractures (26 of 48, 54.2 %), followed by 9 patients with chest trauma and long bone fractures (Table 2

**Table 2:** Showing regional injuries among multiple injured patients

Serial number	Regions injured	Number of patients
1	Head Injury /Long Bone Fracture	26
2	Chest Trauma / Long Bone Fracture	9
3	Not Stated (Written As Rta + Multiple Injury)	6
4	Abdomen / Long Bone Fracture	6
5	Head Injury / Chest Trauma	4
6	Spine / Long Bone Fracture	2
7	Chest / Abdomen	1
8	Head Injury / Spine	1
9	Spine / Chest	1
10	Spine/ Chest / Long Bone Fracture	1
11	Head Injury/ Chest / Long Bone Fracture	1
12	Head Injury/ Spine / Long Bone Fracture	1
13	Spine /Head Injury/Abdomen/ Long Bone Fracture	1
Total		60

Eight hundred and fifty-two patients (70.5 %) had one form of trauma or another, 538 (44.5 %) due to Road Traffic Accident (RTA). Trauma was responsible for 32 of the 36 deaths (88.9 %) with 20 from single-region injuries (7 of which were HI); 11 from multiple-region traumas (10 were HI-related); and one case where the region was not documented. Septicaemia caused the remaining four deaths (11.1 %). Just like RTA was responsible for most of the trauma, it was the cause of death in 23 of the 32 (71.9 %) trauma deaths. Four deaths were in "unidentifiable" patients (11.1 %). Nine

in their first decade presented the highest incidence of HI, abscesses and pyomyositis and burns (Table 4), but only one death was recorded in this decade and from burns, suggesting a good outcome for HI in them. This was also the finding by Shokunbi and Solagberu [9] in their review of mortality from childhood HI in Ibadan, Nigeria.

Trauma has greatly assumed a public health significance as predicted by Adeloje and Odeku from Nigeria in 1970 [5] and Baker *et al* [13] in 1980. It was the commonest cause of presentation in 852 patients (70.5 %) with RTA being the greatest cause of trauma death. This important reality has made trauma the highest cause of death in persons 40 years and below in most parts of the world and certainly in the United States of America [10, 11, 13] and the United Kingdom [10, 12]. In our series, 23 out of the 36 deaths (63.9 %) were of this age group, too. Therefore, trauma is the highest cause of morbidity and mortality in our A and E in persons 40 years and below.

Head injury occurring alone represented 5.7 % of the patients, but it is a significant cause of mortality (19.4 %). Additionally, when HI is found in multiple injured patients as in 34 patients, it contributed to 10 of the 11 deaths in the group. In other words, morbidity from HI (occurring alone, 69 patients and combined with another injury, 34 patients) is 103 of the 1,209 patients (8.5 %) and HI related mortality (occurring alone, 7 deaths and with another injury, 10 deaths) is 17 of 36 deaths (47.2 %). Hence, it is instructive to put in place improvement plans for HI patients. Since a neurosurgical facility is only 170 Kilometres away from our centre, rapid transfer of patients many of who stayed over 24 hours before death would greatly reduce mortality. Shokunbi and one of us (BAS) made this observation in an earlier study [9] but the recommendation of Zollinger [8] for highly trained neurosurgical personnel to be in attendance for serious HI would be appropriate for our centre that presently lacks a neurosurgeon.

### Conclusions

A number of interesting points arise from the statistics presented. Trauma is the highest cause of morbidity and mortality in our A and E in persons aged 40 years and younger. The A and E should be equipped sufficiently to cater for suturing and dressing of wounds, and splinting of fractures since these constituted one third of all cases. Prompt access to the blood bank and an efficient blood transfusion service should be maintained to prevent deaths from haemorrhagic shock. Head injury was the highest cause of death. This study recommends the use of Pareto Principle in the management of morbidity and prevention of mortality among patients attending the A and E.

### Acknowledgements

We acknowledge the painstaking record keeping of all the A and E interns and residents during the course of this work.

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