

# An Audit Of One-Year Intensive Care Practice In A Developing Country

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## Citation

A Abubakar, E Ojo, A El-Nafaty, N Edomwonyi. *An Audit Of One-Year Intensive Care Practice In A Developing Country*. The Internet Journal of Anesthesiology. 2007 Volume 18 Number 2.

## Abstract

**Background:** The intensive care unit (ICU) is that part of the hospital where critically ill patients that require advanced airway, respiratory and haemodynamic supports are usually admitted. Intensive care unit admissions which aim at achieving an outcome better than if the patients were admitted into other parts of the hospital however come at a huge cost to the hospital, the personnel and patients' relations.

**Objective:** To audit the indications and outcome of patients admitted into the ICU of the Federal Medical Centre, Gombe, Nigeria.

**Design:** A twelve month retrospective study.

**Method:** Data were extracted from the case notes and the ICU records of the patient and analyzed.

**Outcome:** An effective intensive care unit goes a long way in reducing morbidity and mortality. However, a significant proportion of our ICU admissions and mortality are due to preventable causes.

**Conclusion:** Efforts should be geared at establishing well equipped and intensive ICU in all our major hospitals to reduce morbidity and mortality. Preventable causes of ICU admissions must be minimised to reduce the costs and burden of care of patients.

## INTRODUCTION

The intensive care unit is a special unit primarily concerned with the care of patients with critical illness and demands a broad based knowledge to cater for all aspects of management of these patients to achieve good outcome <sup>1</sup>.

Over the years, intensive care units have emerged as a distinct discipline manned by career intensivists and range in scope from general, medical, surgical, neurosurgical, cardiothoracic, neonatal, paediatric, coronary care and trauma intensive care units to name but a few.

Worldwide, intensive care unit requires a vast use of up to date resources such as advanced monitors, organ support equipments and highly skilled staff. This however, often taxes the most buoyant health systems even of the developed nations <sup>2</sup>. In most developing nations where there are several financial constraints resulting from poor funding of the health care generally and the ICU specifically, there is often a limit to the availability and specialization of this form of care <sup>3</sup>.

Besides allocation of resources, intensive care also demands

a tremendous amount of time and effort on behalf of the medical and nursing staff to treat and improve survival of the critically ill patients. It therefore follows that the role of the ICU must be justified wherever it exists. This study is therefore carried out to audit our patients' admissions into our ICU and their outcome a year after the establishment of this facility.

## PATIENT AND METHODS

This study is a year audit from September 2006 to August 2007 carried out at the Federal Medical Centre Gombe, a tertiary hospital situated in Gombe State, North-Eastern zone of Nigeria. The hospital is an accredited residency training centre and also serves as a referral centre for its five neighbouring States. It operates a well equipped; three bed modern ICU and a total hospital bed capacity of 256. The ICU has a total number of 8 trained ICU nurses, 2 untrained nurses, 1 Consultant Anaesthetist and 2 resident doctors supplemented with the services of porters and health assistants.

For this study, the clinical parameters of all the ICU

admitted patients that were retrieved from the ICU register and patients' folder for analysis using Epi info 2005 (version 3.3.2) include: Patients' initials, Age, Sex, Diagnosis, Date of admission, Duration of ICU stay and the patients' outcome. In assessing outcome of the patients, those that were managed in the ICU and successfully transferred back to the general ward or were successfully stabilized enough to be referred to other centres were considered good and those that died in the ICU as bad.

## RESULTS

There were a total of 114 patients admitted into the ICU by the different departments and were majorly surgical patients in 76 (66.7%) cases as shown in Table 1.

### Figure 1

Table 1: Distribution of the frequency of Admissions based on specialties

Specialty	frequency	percentage
<b>Surgery</b>	<b>76</b>	<b>66.7</b>
General surgery	57	50
Maxillofacial surgery	8	7.0
Ear, Nose and throat	6	5.3
Orthopaedics	3	2.6
Plastic	2	1.8
Paediatric surgery	1	0.9
<b>Obstetrics/gynaecology</b>	<b>27</b>	<b>23.7</b>
<b>Internal medicine</b>	<b>10</b>	<b>8.8</b>
<b>Total</b>	<b>114</b>	<b>100</b>

The patients' age ranged from one month to 87years with a mean age (32.00±18.32). There were 63 (55.3%) males and 51 (44.7%) females giving a ratio of 1.2:1.

### Figure 2

Table 2: Patients distribution by age group

Age group	Number (percentage)	Cumulative percentage
≤ 10	15(13.2)	13.2
11-20	21(18.4)	31.6
21-30	15(13.2)	44.7
31-40	25(21.9)	66.6
41-50	22(19.3)	85.9
51-60	10(8.8)	94.7
61-70	2(1.8)	96.5
71-80	2(1.8)	98.3
81-90	2(1.8)	100
<b>Total</b>	<b>114(100)</b>	<b>100</b>

### Figure 3

Table 3: Shows the indications for admissions into ICU

Indication for admissions	frequency	percentage
Severe head injury	35	30.7
Respiratory complications	22	19.2
Sepsis	14	12.2
Diabetic coma	14	12.2
Prolonged surgeries	11	9.6
Major Burns	9	7.9
<b>Total</b>	<b>114</b>	<b>100</b>

There were 40 deaths out of the admitted patients with a mortality rate of 35.1 % (Table 4). Twelve (30%) of the overall deaths were as a result of head injuries and this represents about 34.3% of severely head injured patients . Figure 1 shows the duration of ICU stay before death for various indications.

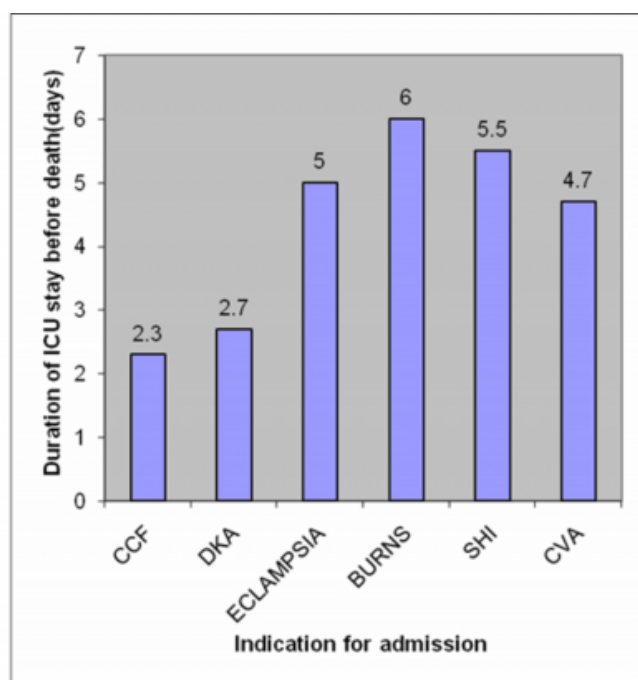
### Figure 4

Table 4: Shows the causes of death

Cause of death	frequency	percentage (%)
Multi organs failure	19	47.5
Cardiac arrest	5	12.5
Sepsis	4	10
Diabetic keto-acidosis	3	7.5
DIC	2	5
Acute respiratory distress	2	5
Acute renal failure	1	2.5
Others	4	10
<b>Total</b>	<b>40</b>	<b>100</b>

**Figure 5**

Figure 1: Average duration of ICU stay before death



SHI refers to severe head injury

## DISCUSSION

There were a total of 114 admissions into our critical care unit in this study and they were majorly surgical patients (66.7%). The workload is therefore similar to that of other parts of Africa which has practically been described as surgical ICU<sup>4</sup> and UK where 60-70% of ICU admissions were surgical<sup>5</sup>. The spectrum of disease is similar to other studies<sup>4</sup> but in sharp contrast, there were no cases of tetanus admitted in our case. This may be due to effective preventive measures by immunization and improved obstetric care.

Trauma related cases (45.6%) constitutes the most common disease entity responsible for admission into the ICU in this study and these were made up of 35 severe head injuries, 17 extra cranial injuries consisting of 9 major burns, 5 thoracoabdominal injuries, 1 spinal injury, 1 facial gunshot and a polytrauma patients. Although trauma has been described as a disease of diverse nature and grades of severity recorded since antiquity; industrialization, technological advancement in means of transportations and wars have resulted in alarming morbidity and mortality from trauma in recent time. While trauma care protocols with an organised approach to the management of trauma victims have been instituted in developed nations to reduce mortality from trauma, this must be coupled with primary preventive measures in the developing world where road traffic

accident, civil unrest and assaults are the main causes.

The traditional goals of intensive care are provisions of haemodynamic monitoring and life support which have increasingly allow complex modern surgeries to be carried out even in patients with high levels of physiological compromise and significant co-morbidities.<sup>5</sup> Our ICU is equipped with multi-parameters monitors for invasive/non invasive blood pressure monitoring, Electrocardiogram, Heart rate, Oxygen saturation and Temperature. Life supportive measures were provided with the use of mechanical ventilators, defibrillators, Nebulizers, Effective suction machines and resuscitative drugs. Over the study period, a total of 87(76.3%) patients were mechanically ventilated for a period ranging from one to 34days and among the ventilated patients, there were 39 (44.8%) mortality which compares favourably with the 50% mortality by Towey et al<sup>4</sup>.

There were overall 74 (65%) survivals and 40 (35%) deaths resulting into overall mortality rate of 35%. The reported ICU mortality rate varies between 15-35% depending on the case mix, age, length of stay and organisational aspects of the unit<sup>6</sup>. Although our observed mortality rate is within this value it is however higher than an overall mortality of 25% recorded by Towey et al<sup>4</sup>. The severity of illness before ICU admission and presence of co-morbid conditions which are significant factors in patient survival may account for the difference. Age and the duration of stay in the intensive care unit which is inversely proportional to survival are also important factors in survival after ICU admission<sup>6</sup>. About 5% of patients in this study were elderly and about a third of the patients were of paediatric age group. Among our patients that stayed 1-3 days the survival rate was 64% compared with 18% among those that stayed for more than 10 days. Our finding concurs with the observation of Lin SC<sup>7</sup> and is probably due to increased risks of multiple organ failure and nosocomial infection with prolonged stay.

We observed multi organ failure in 19 (47.5%) patients as the most common cause of death which is in agreement with the observation by Mayr that acute or chronic multiple organ dysfunction syndromes prevails by far over single-organ failure or unexpected cardiac arrest as causes of death in the ICU<sup>8</sup>. Preventable causes such as burns and head injuries were responsible for a longer average ICU stay before death of 6 and 5.5 days respectively. Most of the mortality in this study was recorded in the categories of patient with head

injuries patients. While severe head injury is a justifiable indication for ICU admission, there will be the need to re-focus on factors for improving outcomes in these categories of patients.

A good outcome in head injury by recommendation of the Royal College of Surgeons of England requires that life-saving decompressive surgery be made available to all patients who require it within 4 hours starting from the time of injury. In our setting and similar to what is obtainable in many Africa settings, adequate pre-hospital care is virtually non-existent and there is always a delay in evacuation of patients to the hospitals making the above recommendation practically infeasible. A better outcome will therefore require a well structured trauma care system involving a well coordinated evacuation and pre-hospital care, prompt resuscitation of patients and rapid evaluation inclusive of CT scanning, early decompressive surgery and an efficient hospital referral system to major Neurosurgical centres when necessary. Above all, such Neurological centres should be readily accessible. Compared with other studies with constraints in ventilating their head injury patients, all our severely head injured patients were mechanically ventilated with a goal of maintaining PaCO<sub>2</sub> at 30mmHg and PaO<sub>2</sub> greater than 80mmHg<sub>9</sub>.

Staffing constitutes the greatest challenge to our intensive care unit. With only one Consultant Anaesthetist and a few supporting staff, our facility falls below the international standard of one intensive care nurse/bed/shift. A more intensive staffing produces higher quality of care with a high intensity physician staffing in ICUs resulting in lower mortality and shorter hospital and ICU stays<sub>10</sub>. There is an urgent need for training of more staff. Provision of other facilities such as a mini dialysis unit besides the main hospital unit and a dedicated ICU side laboratory will also increase the value of ICU care.

We conclude that a well equipped intensive care unit which

greatly facilitates the care of the critically ill patients is a desirable, relevant and vital component to a successful practice in the developing countries. Such modern and innovative intensive care is a feasible and achievable goal in developing nations with rational allocation of resources despite the challenges. Reduction of preventable ICU admissions that lead to a high morbidity and mortality such as trauma related admissions will not only lessen the burden of care but also improve the outcome of our ICU care. We therefore recommend the establishment of ICU in all our tertiary health institutions.

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