

AUDIT OF INTENSIVE CARE UNIT (ICU) ADMISSIONS FROM THE OPERATING ROOM: EXPERIENCE AT THE UNIVERSITY OF BENIN TEACHING HOSPITAL, BENIN CITY, NIGERIA

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ABSTRACT

This is a retrospective study of all surgical patients admitted into the ICU from the operating room in a period of three years from Jan 2007 – Dec. 2009. A total of 7,724 surgical procedures were performed during the 3-yr period. Two hundred and fifty seven surgical patients were admitted from the operating room into the Intensive Care Unit. This constituted 3.4% of all surgical cases performed under anaesthesia. Major surgeries such as trauma laparotomy, acute abdomen, cranial tumour resections, thoracotomy and high risk obstetric cases accounted for 64% of surgical admissions.

Only 42.8% of the cases were planned for ICU admission. The predisposing risk factors for ICU admission were: increasing American Society of Anesthesiologists (ASA) Physical Health Status, emergency procedures, prolonged duration of surgery and major operation. Duration of ICU stay ranged from 24hrs to 23days. There was an ICU mortality rate of 28.4%, while 71.6% of the patients were discharged to the ward.

Introduction

Intensive care has been defined as a service for patients with potentially recoverable conditions who can benefit from more detailed observation and invasive treatment than can safely be provided in general wards or high dependency areas. Intensive care medicine is concerned

predominantly with the management of patients with acute life threatening conditions (the critically ill).¹ This is achieved through the intensive care unit, a special unit primarily concerned with the care of patients with critical illness. It is equipped with a vast array of up to date resources such as advanced monitors, organ support equipments and highly skilled staff to achieve good outcome.²

KEY WORDS: *Audit, Intensive Care Unit Admissions, Operating Room, Outcome*

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The term audit implies a professional commitment to improvement and involves a systematic approach highlighting opportunities for improvement and positive change in clinical practice.² Medical audit has helped in improving medical practice as a tool for development

of risk assessment in anaesthesia in order to improve the quality of care in anaesthetic practice. Medical audit has also helped to define either the individual patient at increased risk of anaesthesia or specific areas of anaesthetic practice which account for the more common causes of morbidity and mortality.^{3,4}

Multiple factors have been shown to influence the overall patient outcome and risk. These include early recognition of complications, timely intervention and adequate monitoring. Unfavourable outcome can be prevented with more knowledge, availability of better drugs, techniques and monitoring equipments.³ Also, the elective or planned admission of selected high risk cases into the intensive care unit can minimize morbidity and mortality.⁵

The American Society of Anesthesiologists (ASA) Physical Status classification system is a scoring system commonly used in anaesthesia. The purpose of the scoring system is simply to assess the degree of a patient's "sickness" or "physical state" prior to selecting the anaesthetic or prior to performing surgery.

The aims of the study were:

1. To determine the proportion of both surgical and medical patients admitted into the ICU.
2. To audit admission of patients from the operating room into the intensive care unit.
3. To determine the predisposing risk factors for postoperative admission into the ICU.

Methods

A retrospective study of all surgical patients admitted into the ICU from the operating room in a period of three years

from Jan 2007 to Dec 2009, was carried out. The information was retrieved from the anaesthetic records in ICU, the nursing records, ICU treatment sheet, patients' anaesthetic charts and theatre records. Patients' initials, age, sex, diagnosis, type and duration of operation, date and time of admission into ICU, indication for admission, admitting specialty, duration of ICU stay and the patients' outcome were documented.

Results:

A total of 7,724 surgical procedures were performed during the 3-yr period. Surgical and medical patients accounted for 60% (n=257) and 40% (n=174) ICU admissions respectively. The 257 surgical patients were admitted from the operating room into ICU and this constituted 3.4% of all surgical cases performed under anaesthesia. Sex distribution showed that 56.8% (n=146) were males while, 43.2% (n=111) were females with a ratio of 1.3:1. Age distribution is shown in Figure 1.

About 70% of the cases were scheduled for emergency procedures while 30% were scheduled for elective procedures. Also, 42.8% of the cases were planned for ICU admission preoperatively while 57% were unplanned for ICU admission.

Figure 2 shows the ASA physical health status of the patients. The breakdown of admissions into surgical specialties is shown in Table 1. Major surgeries such as trauma laparotomy, acute abdomen, cranial tumour resections, thoracotomy and high risk obstetric cases accounted for 64% of surgical admissions into the ICU while minor/moderate procedures such as appendectomy, bronchoscopy and others accounted for 36% of ICU admissions.

Table1: Surgical Specialties Distribution.

<i>Surgical Specialty</i>	<i>No. of patients</i>	<i>Percent (%)</i>
Obstetric & Gynaecology	57	22.2
Trauma	47	18.2
Cardiothoracic Unit	40	15.6
General Surgery	40	15.6
Neurosurgery	27	10.5
Ear, Nose & Throat	23	8.9
Paediatrics	9	3.5
Plastic	6	2.3
Orthopaedics	4	1.6
Urology	4	1.6
Total	257	100

Table 2: Indications for Surgery.

<i>Indication for surgery</i>	<i>No. of patients</i>	<i>Percent (%)</i>
Acute abdomen	42	16.3
Penetrating Injury	36	14.1
Preeclampsia/Eclampsia	26	10.1
Intracranial Disease	26	10.1
Road Traffic Accident	17	6.6
Corrosive Oesophagitis	17	6.6
Carcinoma of Larynx	11	4.3
Foreign Body Aspiration	10	3.9
Post Partum Haemorrhage	10	3.9
Ruptured Uterus	9	3.5
Pericarditis/Patent Ductus Arteriosus	9	3.5
Goitre	8	3.2
Obstructed Labour	6	2.2
Others	30	11.7
Total	257	100

Figure 1: Age Distribution

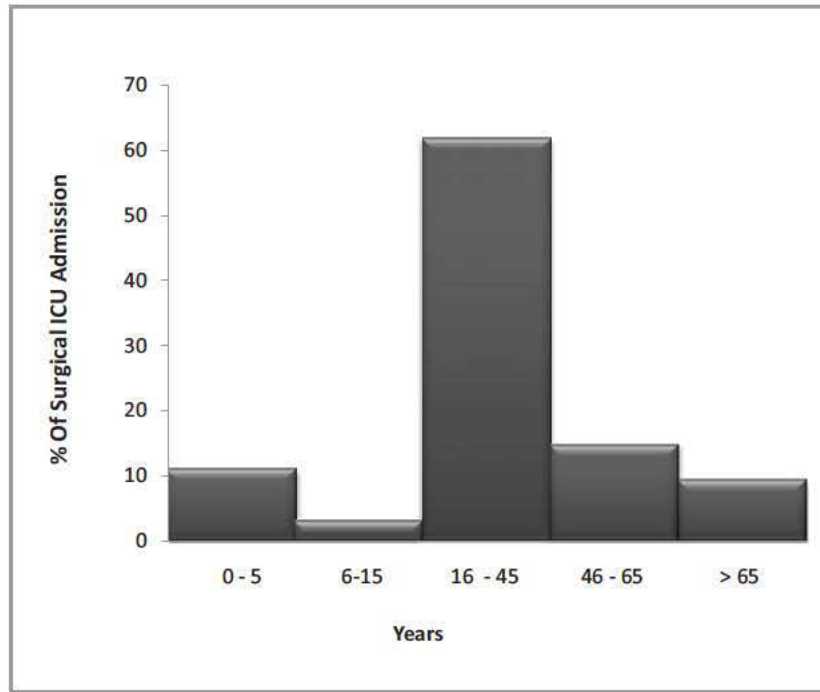
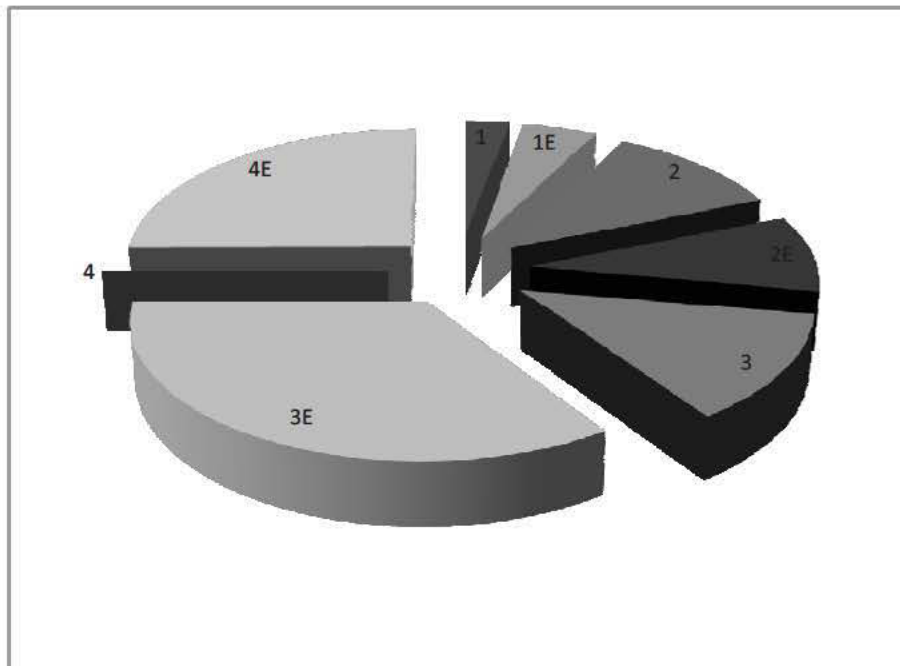


Figure 2: American Society of Anesthesiologists (ASA) Health Status Distribution.



E – Emergencies

Figure 3: Duration of Surgery.

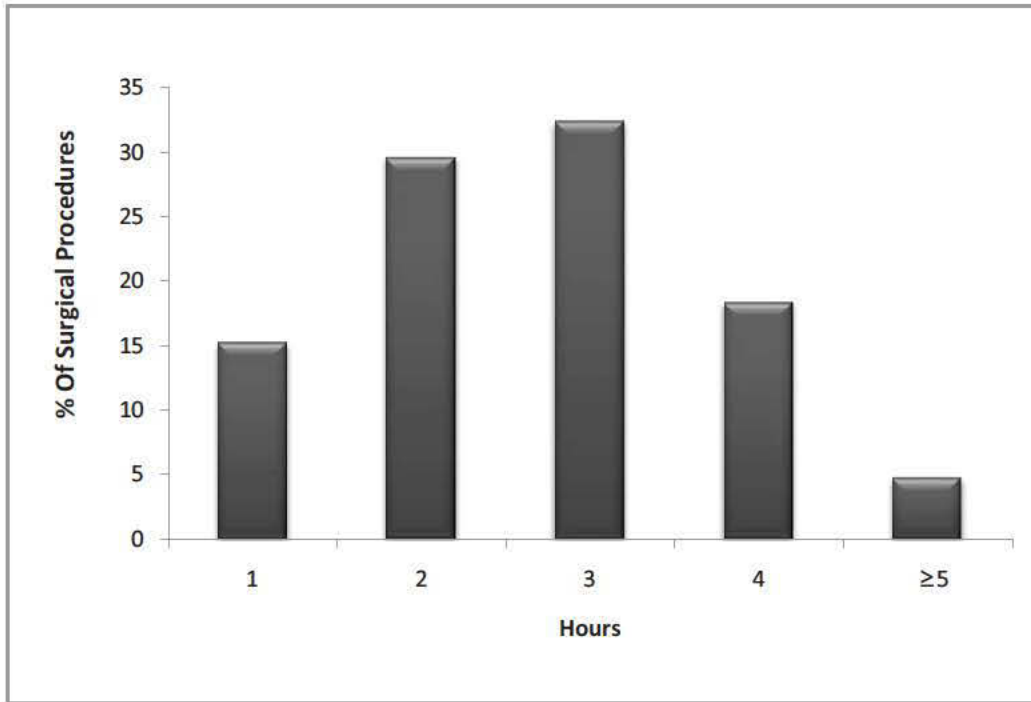


Figure 4: Time Of Admission Into ICU.

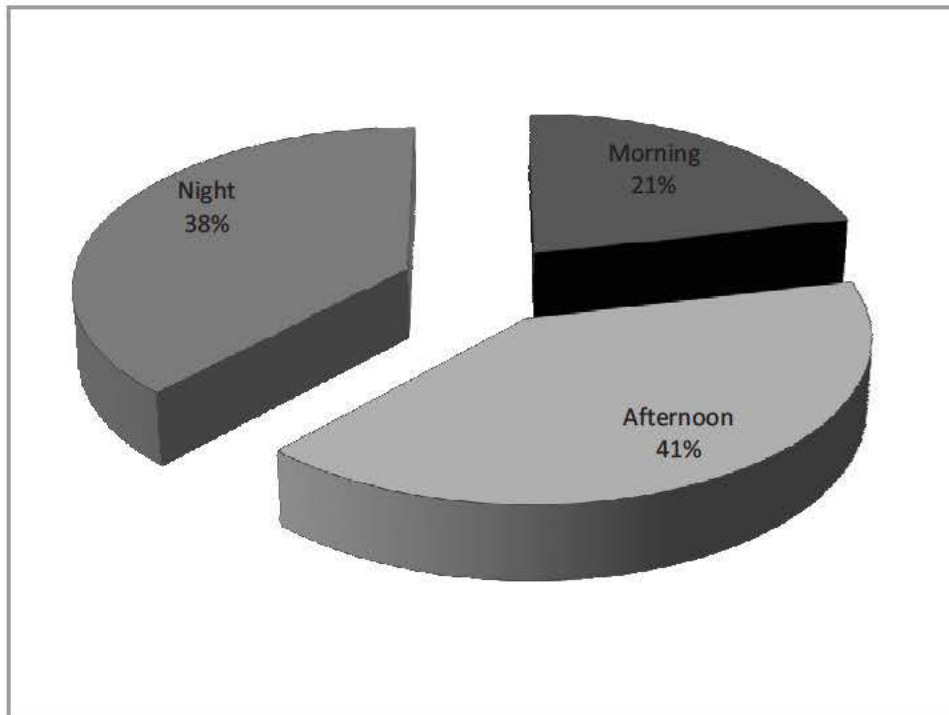


Figure 5: Duration of Stay in ICU.

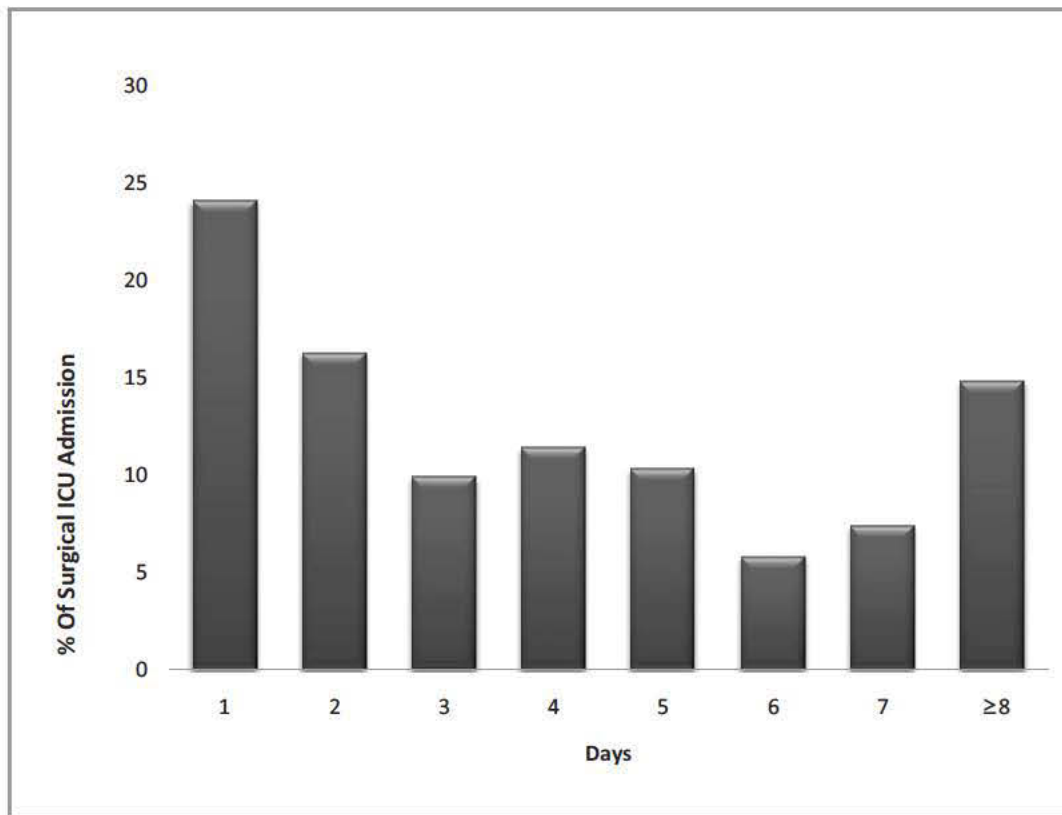
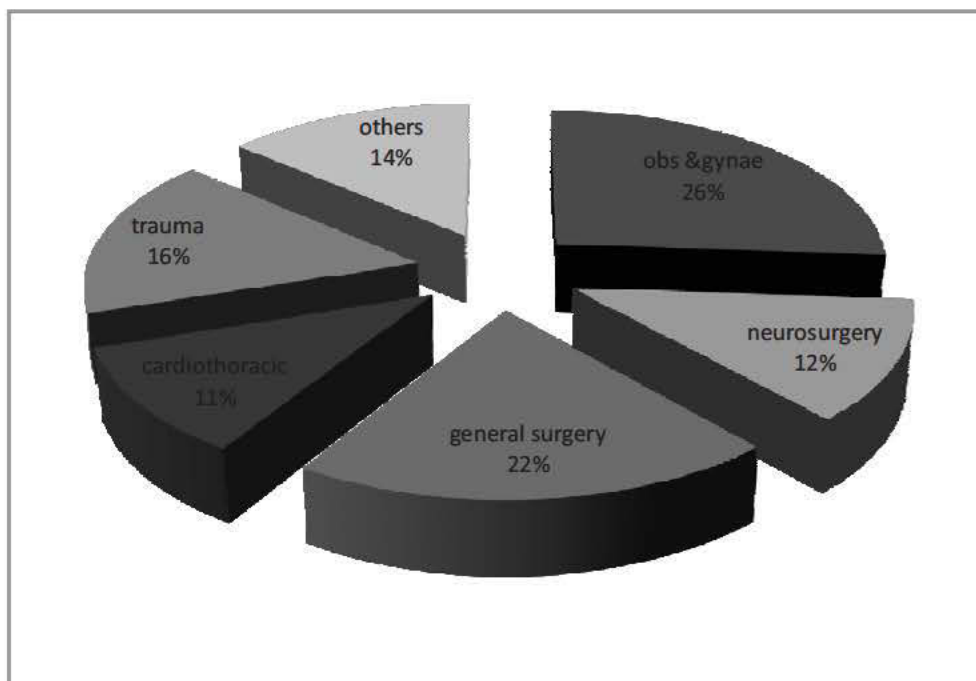


Figure 6: ICU Mortality Rate Distribution by Specialties.



The indications for surgery are shown in table 2. Acute abdomen (16.3%), trauma (14.0%) and Pregnancy Induced Hypertension or Pre-eclampsia/Eclampsia (10.1%) accounted for the majority of admissions. The duration of surgery ranged from 1-12hrs with most lasting 2-3hrs (Figure 3). Figure 4 shows the time of admission into ICU with majority of admissions occurring during the afternoon and night shifts.

Duration of ICU stay ranged from 24hrs to 23days (Figure 5). About 42.2% (n=124) of the admissions required ventilatory support while 54.8% (n=133) were admitted for close observation and oxygen therapy. There was an ICU mortality rate of 28.4% while 71.6% of the patients were discharged to the ward. Of the mortalities recorded (n=73), mortality rate was high among O&G, general surgery and trauma units as shown in figure 6.

This study showed that the major predisposing risk factors resulting in ICU admission were: Increasing ASA Physical Health status 3 or 4 (71.7%), emergency procedures (approx 70%), duration of surgery > 2hrs (80%), type of operation (major, approx 64%)

Discussion:

Our study revealed that ICU admissions from the theatre commonly follow major surgeries in high risk patients (ASA \geq 3) and emergency surgeries which agree with previous study.⁶ This audit revealed an overall post-operative ICU admission of 3.4%. This is slightly higher than 1.5% and 2.2% reported by Satyawan et al⁷ and Rose et al⁸ respectively; this slightly higher incidence could be explained by majority of the patients presenting late to hospital as high risk emergencies with poor postoperative outcome.

Our study shows a high ICU admission of surgical patients. This is similar to what obtains in other places in the developing world, where majority of admissions into the ICU are surgical patients leading to the terminology 'surgical ICU'.⁹ Three previous studies done reported that majority of their patients were over 60 years old.^{3,10,11} This is in contrast with our findings that showed most of the patients to be under 45 years old. This difference could be as a result of high incidence of trauma in the young adults and many obstetric patients are also in the same age group. Almost 60% of ICU admissions were males. This agrees with reports from other parts of the world.¹²

Acute abdomen and penetrating injuries accounted for more than 30% of ICU admission in our study and this is lower than previous report (85%) by Size and coworkers.¹³ These patients usually present as emergencies with little time for optimization, usually have prolonged surgery and are prone to multiple organ failure resulting in prolonged stay in the ICU with possible development of nosocomial infection that may worsen their outcome.¹⁴ Adequate preoperative evaluation, optimization and careful sorting out of these high risks patients for planned ICU admission may reduce morbidity and mortality.

Our study revealed a high incidence of unplanned ICU admission of 57%, contrary to previous reports of 0.04%, 0.08% and 0.27%.^{6,8,15} This could be as a result of more than three-fold increase in admissions following emergency procedures (70%) contrary to a two-fold increase reported by Adamu and coworkers.¹⁶ Patients with ASA 3 and above accounted for more than two-thirds of admissions and the high mortality rate in our study. According to Cullen and colleagues¹⁷ these sub-groups are poor risk

patients presenting as emergencies with little available time for preoperative optimization.

Majority of ICU admissions took place after routine theatre schedule in our study. This agrees with a study reported by Simpson and colleagues.¹⁸ A good number of patients requiring emergency procedures present at odd hours. This could be explained by the fact that our centre serves as a referral centre for many neighbouring states.

The overall ICU mortality rate is high worldwide. Our study revealed a mortality rate of 28.4%. The reported ICU mortality rate varies between 15-35% depending on the case mix, age, length of stay and organisational aspects of the unit.^{10,19,20,21} Our study showed that obstetric and gynaecologic, trauma, general surgery, neurosurgery and cardiothoracic procedures accounted for more than 90% of the ICU mortality. These were found to be the source of major emergency procedures, prolonged hours of operation and increasing ASA status as reported in a study by Muravchick²²

Early referral helps to improve the chances of recovery, reduces the potential for organ dysfunction and nosocomial infection resulting in the reduction of the length of stay in intensive care and hospital. This may ultimately reduce the costs of intensive care treatment.²³

Conclusion

The major predisposing risk factors for ICU admissions were: increasing ASA Physical Health status 3 or 4, emergency procedures, prolonged duration of surgery and major operation. The planned admission of selected high risk cases into

the intensive care unit in the immediate postoperative period can minimize morbidity and mortality.

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