

## Original Research Article

## Patterns of Admission and Clinical Outcomes among Patients admitted into the Intensive Care Unit at Babcock University Teaching Hospital: A 5- Year Review

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Received: 13.07.2022

Accepted: 18.08.2022

Published: 02.09.2022

**Journal homepage:**<https://www.easpublisher.com>**Quick Response Code**

**Abstract: Introduction:** The intensive care unit (ICU) is a health care delivery service for patients who are in critical condition with potentially recoverable diseases. This study was aimed to determine the admission patterns, clinical outcomes among patients admitted in the intensive care unit (ICU). **Methods:** A retrospective review of all patients admitted into the ICU at Babcock University Teaching Hospital (BUTH) from 2016 to 2021. Data was collected from individual patient case notes and the ICU admission and discharge registers. **Results:** A total of 137 patients were included in this study, consisting of 78 (57.4%) males and 58 (42.6%) females. Ages ranged from 4 to 90 years with a mean age of 47.60 ± 19.52 years. The most common cases admitted were general surgery patients of which there were 58 (42.6%). Neurological cases were however the major causes of death (6.6%), followed by sepsis (4.4%) and respiratory diseases (4.4%). The overall mortality rate of the ICU was 27.2%. Deceased patients spent longer days in ICU (5.73 days) as compared to patients who were discharged. **Conclusions:** The overall mortality was considerably high and general surgery and neurological cases were the most common causes of admission in ICU and mortality respectively.

**Keywords:** Admission, Intensive Care Unit, outcome, mortality.

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### INTRODUCTION

Intensive care is a continuum of care from various source of admissions where patients' requiring a frequent assessment of vital signs, invasive hemodynamic monitoring, intravenous medications and fluid management, ventilatory and nutritional support to assure safe and effective outcomes [1]. It is also regarded as a special department of a tertiary hospital for patients with the most severe and life-threatening conditions which will often require constant and close intensive monitoring, support from specialist equipment and medications in order to maintain normal physiological functions [2]. Patients' may be admitted into the ICU from the emergency department or from the general ward following deteriorating clinical condition or as a postoperative case from the operating theatre following major invasive surgeries with high risk of complications [2]. The concept of an "advance support of life" which is the foundation for intensive care was developed in the 1950s [3]. In 1953, Bjorn Aage Ibsen established the first ICU in Copenhagen where patients received intermittent positive pressure ventilation [4]. In 1960s, the importance of cardiac

arrhythmias as a source of morbidity and mortality in myocardial infarction was recognized, and this led to the routine use of cardiac monitoring in ICUs and the development of coronary care unit [5]. Intensive care medicine is still evolving in developing countries and many tertiary hospitals in Nigeria have developed critical care facilities for the care of the critically ill patients. Critical care is a major challenge in developing countries where health needs often outstrip available resources and, unfortunately, most of the critical health care facilities are still in their primordial stages of development [6-8].

Mortality in ICU is a global burden. It varies across the world depend on ICU infrastructure, staff availability, and training, pattern, and cause of ICU admission. In developed continents like North America, Oceania, Asia and Europe, ICU mortality is relatively low with the rate of 9.3%, 10.3, 13.7% and 18.7% respectively, while in the rest of the world such as South America, and the Middle East the mortality found to be 21.7% and 26.2% [9, 10]. In Africa, the ICU mortality rate is high as compared to the other

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developed continents. The mortality rate in Nigeria, Uganda, Tanzania, and Kenya were reported as 32.9%, 40.1%, 41.1%, and 53.6% respectively [11-14]. In Ethiopia, different studies showed that the mortality rate is relatively similar to other Africa countries. Studies done in Jimma, Addis Ababa, and Mekelle showed that the mortality rate was 50.4%, 32% and 27% respectively [15-17]. Provision of ICU care is often very challenging, inadequate medications due to and medical equipments, lack of ICU trained personnel and poor infrastructures are some of the main challenges to providing optimal care to critically ill patients [3, 7]. Therefore, a description of admission patterns and clinical outcome will enable the identification of commonest causes of admissions and to use the available limited resources in developing countries. Therefore, we aimed to describe the admission patterns, clinical outcomes and associated factors among patients admitted into the Intensive care unit of Babcock University Teaching Hospital, Ogun, Nigeria.

## MATERIALS AND METHODS

The ICU is a unit in the hospital which became active in 2013 due to the expanding demand for Critical care in the region. There are two separate ICUs. A general ICU and a Cardiac only ICU. This study was however limited to the general ICU. It is a 4 bedded general adult only ICU, with admissions from both general and surgical specialties, including Obstetrics and Gynecology cases. The presence of experienced professional medical staffs, ventilators and other relevant critical care equipments has contributed to the success of the unit. Admissions also include referrals from government and other hospitals in the South west region of the country.

This is a 5-year retrospective review carried out in the Babcock University Teaching Hospital, Ilishan Remo, Nigeria between 1st January 2016 and 31st December 2021. Data was collected from individual patient case files and ICU admission and discharge registers. These include demographic characteristics, diagnosis on admission, reason for admission, duration of admission, medical/surgical specialty requesting admission, nature of interventions,

and patient’s outcome. The data was recorded using Microsoft Excel.

## STATISTICAL ANALYSIS

Data collected was analyzed using the Statistical Package for the Social Sciences for Windows version 26 (SPSS Inc., Chicago, IL, USA). Descriptive statistics was carried out and categorical variables were reported as frequencies and percentages whereas; median and interquartile range (IQR) were used for continuous variables. P value was set at 0.05.

## RESULTS

A total of 225 patients were admitted from January 2016 to December 2021 .Eighty eight patients had incomplete data on logbook and their charts could not be located. Therefore only 137 (60%) patients were included in this study, of which 78 (57.4%) were males and 58 (42.6%) were females. The study showed that general surgery and neurological cases accounted for 42.6% (58) and 14% (14) of all admissions into ICU while the lowest was internal medicine (1.5%). The ages ranged from 4 years to 90 years with a mean of  $47.60 \pm 19.52$  years and a median age of 45 years. Age group (20-40 years) accounted for 35.3% of all the ICU admissions as shown in Table 1.

According to Figure 2, the overall mortality rate of the ICU was 27.2%. Ninety nine patients (72.1%) were survivors, among them 1 (0.7%) of patients was referred to another setting for further treatment. Neurological cases were however the major causes of death (6.6%), followed by sepsis (4.4%) and respiratory diseases (4.4%). The proportion of death among males (16.2%) was higher than females (11.0%). However, there was no significant sex difference in patients’ clinical outcome ( $P > 0.05$ ). There was also no significant age difference in patients clinical outcome ( $P > 0.05$ ), however the elderly age group ( $>60$  years) had higher mortality rate (11.8%). The median length of ICU stay (IQR) was 3 (1–50) days. The most frequent stay (30.9%) was 2 days. Deceased patients spent longer days in ICU (5.73 days) as compared to patients who were discharged.

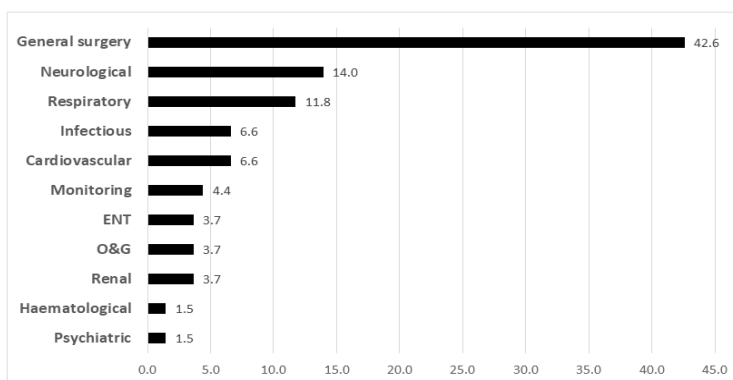
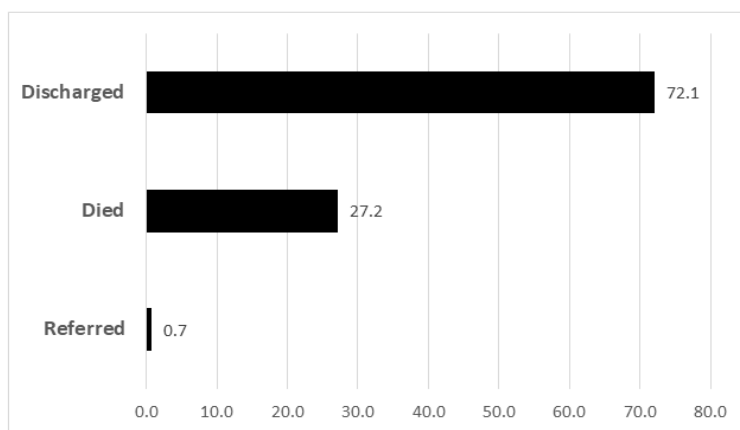


Figure 1: Pattern of admission into ICU

**Table 1: Socio Demographic Characteristics and clinical outcomes among Patients (January 2016 to December 2021)**

Variables	Clinical Outcomes				P value
	Died	Discharged	Referred	Total	
<b>Sex</b>					
Male	22 (16.2%)	55 (40.4%)	1 (0.7%)	78 (57.4%)	0.647
Female	15 (11.0)	43 (31.6%)	0 (0.0%)	58 (42.6%)	
<b>Age (years)</b>					
<20	4 (2.9%)	7 (5.1%)	0 (0.0%)	11 (8.1%)	0.329
20-40	10 (7.4%)	38 (27.9%)	0 (0.0%)	48 (35.3%)	
41-60	7 (5.1%)	25 (18.4%)	1 (0.7%)	33 (24.3%)	
>60	16 (11.8%)	28 (20.6%)	0 (0.0%)	44 (32.4%)	
<b>Length of stay in ICU (Mean ± SD)</b>	5.73 ± 5.79	5.14 ± 6.32			0.622



**Figure 2: Outcomes of patients admitted into ICU**

## DISCUSSION

The outcomes of patients admitted to intensive care unit depends on the clinical condition of patients arrival, level of training and experience of staff, resource, infrastructure and capacity of the unit [2, 18, 19]. Intensive Care Unit requires a vast use of up to date equipment and highly skilled staff. The outcome of patients admitted into the ICU will also depend on the level of training and experience acquired by staff. In developing countries where financial resources are limited training and re-training of staff may not be adequate. 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 [20].

In this study, the overall mortality rate in ICU was found to be 27.2%. This finding is higher in most literature studies, mortality rate was 39% in a study done at Addis Ababa and Jimma (37.7%) [21, 22]. It was 40.1% in Uganda [19] and 41.1% in Tanzania [23]. In agreement with our findings, similar report from Ethiopia had 27% mortality rate [24]. In the current study, the median length of ICU stay found to be 3 days which is in contrast to the other African countries [23, 25]. Concerning the patterns of admission, majority of the patients (42.6%) were admitted into ICU following a general surgery procedure followed by neurological (14.0%) and respiratory diseases (11.8%). However, it

was different from studies done in Ethiopia and Uganda, infectious illness and cardiovascular were the main reasons for admission [24, 26]. Also from this study, the most common cause of death was neurological cases. Similarly, motor vehicle accident leading to traumatic brain injury was the common cause of death according to a study by Onyekwulu *et al.*, [27]. Another study by Adenekan and Faponle [28] also reported that road traffic crashes were responsible for most deaths in major trauma admissions to the ICU.

## CONCLUSION

The overall mortality rate in the ICU was considerable high. General surgery cases had the highest number of admissions into the ICU while neurological cases were the most common causes of death. Improving the acute critical care service through the expansion of the care, supply emergency airway equipments and medications, implementation of admission criteria protocol could decrease mortality and morbidities among critical ill patients admitted into ICU.

## LIMITATION OF THE STUDY

Retrospective cross sectional study has limitations especially, it does not show cause –effect relationship.

## ETHICAL APPROVAL

Study was approved by the institutional ethics committee (Babcock University Health Research Ethics Committee BUHREC).

## Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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**Cite this article:** Omotayo F. Salami, Oguntade O. Florence, Imonitie Clifford (2022). Patterns of Admission and Clinical Outcomes among Patients admitted into the Intensive Care Unit at Babcock University Teaching Hospital: A 5- Year Review. *EAS J Anesthesiol Crit Care*, 4(5), 72-76.