AUDIT OF INTENSIVE CARE UNIT SERVICES AT THE UNIVERSITY COLLEGE HOSPITAL, IBADAN, NIGERIA: A 3-YEAR REVIEW

T.C. Okonkwo[1,2], S.I. Olawale[3,4], D.G. Efe[1,5], O.K. Idowu[1,6], M.O. Orji[1,6], A.A. Sanusi[1,6], B.B. Osinaike[1,6]

1. Department of Anaesthesia and Intensive Care, University College Hospital, Ibadan, Nigeria.
2. Department of Anaesthesia, Duchess International Hospital, Ikeja, Lagos, Nigeria.
3. Department of Surgery, University College Hospital, Ibadan, Nigeria.
4. College Research and Innovation Hub, College of Medicine, University of Ibadan, Ibadan, Nigeria.
5. Department of Anaesthesia, Federal Medical Centre, Ebute Metta, Lagos, Nigeria.
6. Department of Anaesthesia and Intensive Care, College of Medicine, University of Ibadan, Ibadan, Nigeria.

Correspondence:
Dr. T.C. Okonkwo
Department of Anaesthesia,
Duchess International Hospital,
Ikeja GRA, Lagos,
Nigeria.
Email:
okonkwo.thankgod@yahoo.com

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ABSTRACT

Background: **Clinical audit remains the bedrock of quality improvement projects and research and should therefore be undertaken continually.**

Objectives: **To review Intensive Care Unit (ICU) admissions at the University College Hospital, Ibadan, over 3 years.**

Materials and methods: **This was a retrospective study of all ICU admissions from March 2020 to February 2023. Data were obtained from admission records and the patient's ICU chart. Collected data included age, admitting speciality, outcome, length of ICU stay, need for organ support, and outcome 30 days after ICU discharge. The primary outcome was the ICU mortality rate, and the secondary outcomes were indications for ICU admission, ICU length of stay, the frequency of specific interventions such as mechanical ventilation and vasopressor/inotropic support, and the 30-day mortality rate after ICU discharge.**

Results: **Six hundred and sixty-six patients were admitted during this period; however, data for only 540 patients were analysed. Most patients were between 21 and 60 years of age. Most admissions (44.07%) were from the operating theatre, with neurosurgery accounting for the highest number of admissions by speciality (38.89%). The ICU mortality rate was 43.89%, while the median length of stay was three days. The admitting speciality, route of admission, the occurrence of acute kidney injury, the need for mechanical ventilation, and vasopressor therapy were risk factors for mortality.**

Conclusion: **In this audit, most admissions were post-operative and from the neurosurgery speciality. The ICU mortality rate remains unacceptably high in our facility when compared to those reported in developed nations.**

Keywords: Audit, Critical care, Intensive care unit, Length of stay, Mortality rate.

INTRODUCTION

The Intensive Care Unit (ICU) is 'an organised system for the provision of care to critically ill patients that provides intensive and specialised medical and nursing care, an enhanced capacity for monitoring, and multiple modalities of physiologic organ support to sustain life during a period of life-threatening organ system insufficiency.'[1] It has also 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.'[2]

The ICU at the University College Hospital, Ibadan, is one of the foremost in Nigeria. It is a level 3 facility that provides critical care services, such as organ support, invasive and non-invasive monitoring, and intensive care nursing. The unit is a 12-bed, mixed medical and surgical, intensivist-led ICU. However, it has not functioned at full capacity in the past few years due to logistical reasons. Recently, a 3-bed paediatric intensive care unit led by a paediatric intensivist has been incorporated. Since its inception, only audits of specific groups have been published, such as the obstetric,[3] cardiothoracic surgical,[4] general surgical,[5] and head-injured patients.[6] The ICU mortality rate in these patient cohorts ranged between 10.8% in the general surgical population and 54.8% in the head-injured patients.[5,6]

Clinical audit is a cornerstone of clinical governance and a catalyst for quality improvement projects.[7] Its primary role is to pinpoint areas that need improvement, thereby guiding the implementation of education, research, and quality improvement strategies. This process is not a one-time event but needs to be part of a continuous, cyclical framework. The significance of clinical audits cannot be overstated in terms of their contribution to improving patient care and outcomes.[8]

This study, therefore, aimed to review ICU services at the University College Hospital, Ibadan, over three years with the intention that its findings will help improve patient care.

METHODOLOGY

The study was a retrospective review of the admission records of all patients admitted into the ICU of the University College Hospital, Ibadan between March 2020 and February 2023. Data were obtained from the ICU admission record, the ICU patient's chart, and the admission records of the various wards where patients were discharged.

Ethical approval

Ethical approval was obtained from the University of Ibadan/University College Hospital (UI/UCH) Joint Ethical Review Committee, with an IRB number of UI/EC/23/0167. Since it was a retrospective review of medical records, informed consent was not required.

Outcome measures

The primary outcome was the ICU mortality rate, whereas the secondary outcome measures were indications for ICU admission, ICU length of stay, the frequency of specific interventions such as mechanical ventilation and vasopressor/inotropic support and the 30-day mortality rate post-ICU discharge.

Data analysis

Data were recorded with the IBM Statistical Package for Social Sciences (SPSS) version 25 (SPSS Inc., Chicago, Illinois, USA) and analysed using the Statistical Software for Data Science (STATA) version 16.0. The qualitative variables (sex, diagnosis at ICU admission, route of admission, admitting speciality, the outcome of ICU stay, outcome 30 days post-ICU discharge, and need for specific interventions) were represented using frequencies and percentages. Quantitative variables (age, length of ICU stay, GCS at admission, duration of ventilation) were represented using mean ± SD or median ± IQR where necessary. The results were presented using tables, graphs and charts for simplicity and clarity. Test of associations for categorical variables was done using the Chi-square test, applying Fisher's exact test where necessary. The level of statistical significance was set at a p-value of < 0.05. Missing data were excluded in analysis. We used the STROBE cross-sectional checklist for reporting.[9]

RESULTS

Over the period under review (March 2020 to February 2023), 666 patients were admitted to the ICU. However, ten patients were brought in dead, and one patient was admitted for social reasons. We excluded all of these from the analysis. Of the remaining 655 patients, data were available for 540 (82.44%), and the analysis was based on these available data - Figure 1.

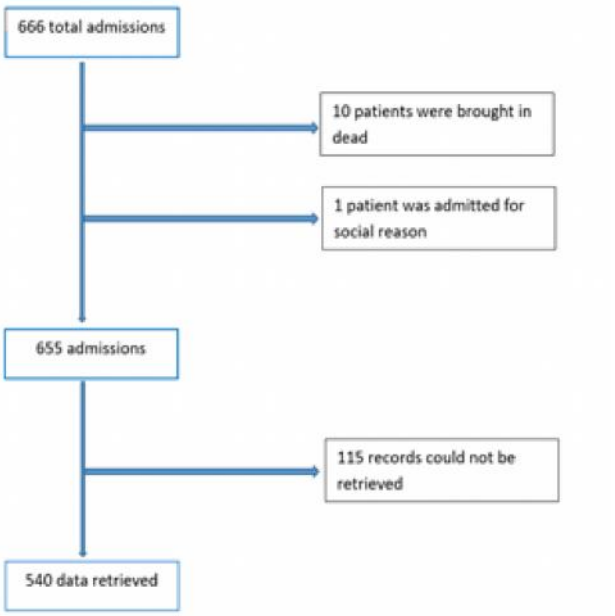

Fig. 1: Study flow chart

The mean age was 43.9 ± 2.08 years. The majority of patients (65.37%) were aged 21-60 years, and 301 (55.74%) were male (male-to-female ratio 1.26:1). Hypertension and diabetes were the most common comorbidities. Table 1 summarises the patients' demographic and clinical characteristics. The median GCS on ICU admission was 7 (interquartile range, 3-11), and at discharge was 15 (interquartile range, 11-15).

Table 1: Socio-demographics and clinical characteristics

Socio-demographics	Frequency (%)
Mean age at last birthday(SD[a])	43.9 (2.08)
Age group (in years)	
<1	9 (1.67)
1-10	28 (5.19)
11-20	24 (4.44)
21-40	189 (35.00)
41-60	164(30.37)
61 and above	126 (23.33)
Gender	
Male	301 (55.74)
Female	239 (44.26)
Median GCS[b] at Admission (IQR[c]) (n=532)	7 (3,11)
Mild (13-15)	127 (23.87)
Moderate (9-12)	79 (14.85)
Severe (≤ 8)	326 (61.28)
Median GCS[b] at Discharge (IQR[c]) (n=278)	15(11,15)
Mild (13-15)	202 (72.66)
Moderate (9-12)	49 (17.63)
Severe (≤ 8)	27 (9.7)
Co-morbidities	
Hypertension	78 (14.44)
Diabetes	43 (7.96)
Sickle cell disease	10 (1.85)
Chronic kidney disease	6 (1.11)
Asthma	3 (0.56)
Ischaemic heart disease	3 (0.56)
Others	14 (2.59)

[a]SD- Standard deviation, [b]GCS- Glasgow Coma Scale, [c]IQR- Interquartile range.
The others include co-morbid conditions only reported in 1 patient. These include – prostate cancer, breast cancer, benign prostate hypertrophy, visual impairment, peptic ulcer disease, systemic lupus erythematosus, delirium, osteoarthritis, morbid obesity, glucose-6-phosphate dehydrogenase deficiency and obstructive sleep apnea

Two hundred and thirty-eight patients (44.07%) were admitted post-operatively via the operating theatre or the post-anaesthesia care unit (PACU). One-fifth were admitted via the ward, while about a third were admitted via the emergency department. Figure 2 shows the route of ICU admission.

Table 2 shows the admitting speciality. A significant proportion of admissions were neurosurgical patients (38.89%), with head injury and brain tumour the leading neurosurgical diagnoses. Admissions from the internal medicine speciality accounted for 16.67% of ICU admissions. Some patients (4.07%) were managed by multiple primary units (i.e., the multidisciplinary).

Table 2: Admission by speciality

Primary unit of admission	Frequency	Percentage (%)
NSU[a]	210	38.89
CTSU[b]	48	8.89
Internal medicine	90	16.67
Cardiology	13	14.44
Clinical pharmacology	1	1.11
Endocrinology	1	1.11
IDU[c]	3	3.33
Nephrology	9	10
Neurology	42	46.67
Pulmonology	13	14.44
Gastroenterology	1	1.11
Haematology	7	7.78
ENT[d] surgery	12	2.22
General surgery	61	11.30
O&G[e]	68	12.59
Orthopaedics	11	2.04
Paediatrics	11	2.04
Urology	7	1.30
Multidisciplinary	22	4.07

[a]NSU- Neurosurgery, [b]CTSU- Cardiothoracic surgery, [c]IDU- Infectious disease unit, [d]ENT- Ear, Nose and Throat, [e]O&G- Obstetrics and gynaecology.

Outcome of ICU stay

Figure 3 depicts the outcome of the ICU stay. Two hundred thirty-seven patients died in the ICU, giving a crude ICU mortality rate of 43.89%.

The risk factors for ICU mortality are summarised in Supplementary Table 1. Age > 60 years, admitting speciality, route of admission, GCS on admission, acute kidney injury, need for vasopressors, mechanical ventilation, and re-intubation were associated with higher mortality. In contrast, blood transfusion, need for tracheostomy, and enteral feeding were associated with lower mortality.

Outcome at 30 days following ICU discharge was only available in 101 patients. Thirty-six patients (35.64%) died within 30 days of ICU discharge, while 65 (64.36%) were still alive at 30 days post-ICU discharge.

Length of stay in the ICU

The median ICU stay was 3 days (interquartile range, 2-9). More than 60% of patients were discharged or died within one week of admission. Thirty-nine patients (7.22%) spent less than 24 hours in the ICU, while

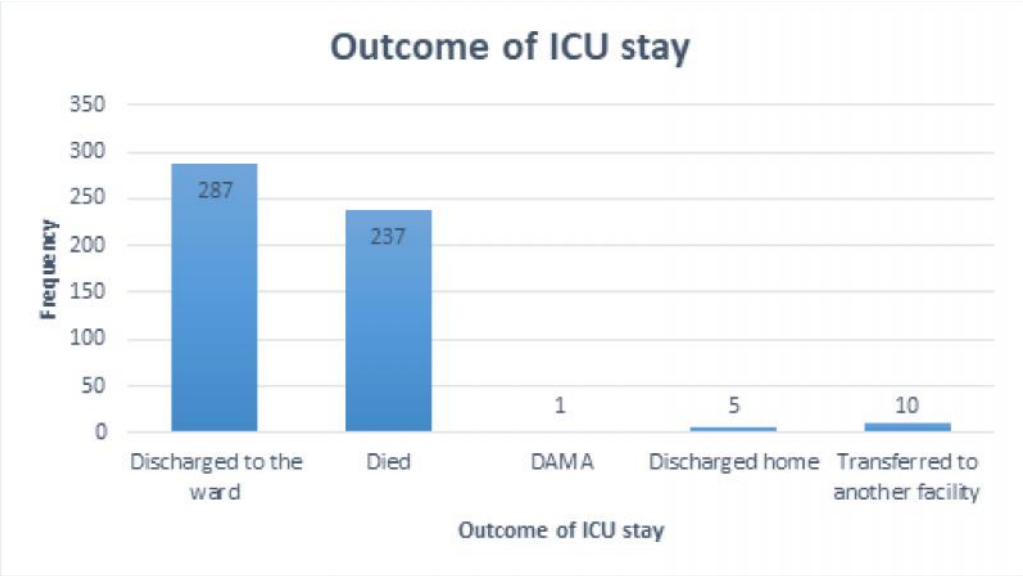

Fig. 2: Route of Admission
A&E- Accident and emergency, PACU- Post-anaesthesia care unit, HDU- High dependency unit.

8.70% spent more than 21 days in the ICU. Thirty-six (15.19%) deaths occurred within 24 hours of admission, and 61.6% (i.e. 146) within one week of admission. Table 3 highlights factors that affect the length of ICU stay. Significant factors included route of admission, electrolyte derangements and the need for mechanical ventilation. Patients admitted through the emergency room appeared to have a longer length of ICU stay compared to others.

Interventions in the ICU.
Four hundred and eight patients (75.56%) were mechanically ventilated. Almost all received invasive ventilation; only 3 of these patients (0.74%) received non-invasive ventilation. The median number of ventilator days was 4 (interquartile range, 2-8). Two hundred and fifty-three patients (46.85%) required vasopressors, and the median duration of vasopressor use was two days (interquartile range, 1-4). About 40% were sedated, and 28.89% of all patients admitted to the ICU required re-intubation. Eighty-nine patients (16.48%) underwent elective tracheostomy during their admission. Table 4 summarises other interventions undertaken in the ICU and critical incidents. A total of 228 patients (42.22%) suffered at least one cardiac arrest, and only 4.82% of them were discharged from the ICU ($p < 0.001$).

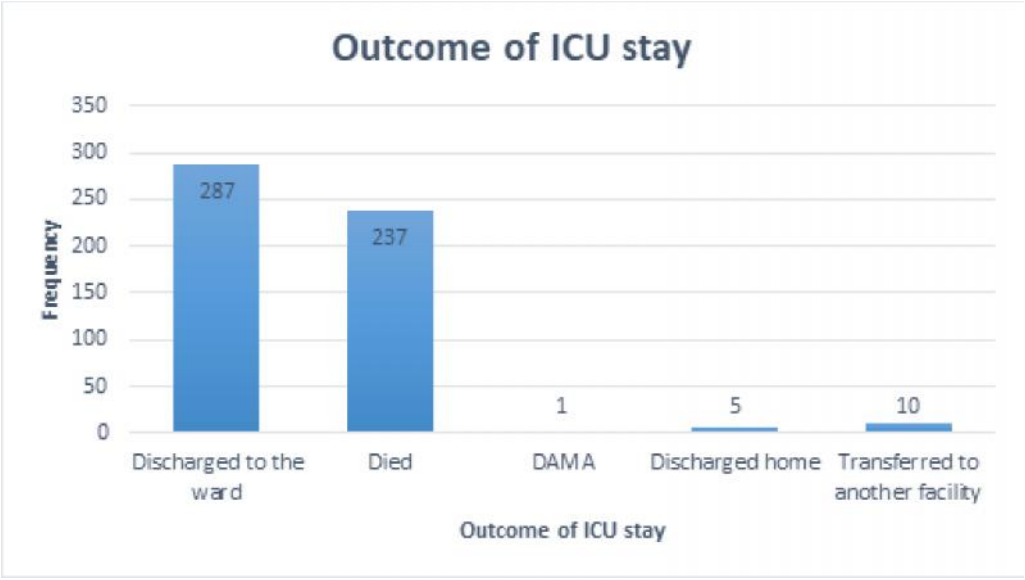

Fig. 3: Outcome of ICU stay
DAMA- Discharged against medical advice

Table 3: Factors that affects length of ICU stay

Variables	Length of ICU stay		
	≤3 weeks	>3weeks	p-value
Age (in years)			
<1	9 (100.0)	0 (0.00)	0.077
1-10	25 (89.29)	3 (10.71)	
11-20	23 (95.83)	1 (4.17)	
21-40	180 (96.24)	9 (4.76)	
41-60	142 (86.59)	22 (13.41)	
61 and above	113 (90.40)	12 (9.6)	
Sex			
Male	269 (89.37)	32 (10.63)	0.075
Female	224 (93.72)	15 (6.28)	
Route of Admission			
A&E[a158]	140 (84.18)	26 (15.82)	0.013*
Ward	104 (94.69)	6 (5.31)	
Labour ward	15 (100.0)	0 (0.00)	
HDU[b]/PACU[c]	18 (100.00)	0 (0.00)	
Theatre	211 (93.36)	15 (6.64)	
Private Facilities	3 (100.00)	0 (0.00)	
Haematology clinic	2 (100.0)	0 (0.0)	
Electrolyte Derangement			
No	285 (98.62)	4 (1.38)	0.000*
Yes	208 (82.87)	43 (17.13)	
Need for Mechanical Ventilation			
No	129 (97.73)	3 (2.27)	0.002*
Yes	364 (89.22)	44 (10.78)	
Need for Vasopressor			
No	259 (90.24)	28 (9.76)	0.356
Yes	234 (92.46)	19 (7.54)	

[a]A&E- Accident and emergency, [b]HDU- High dependency unit, [c]PACU- Post-anaesthesia care unit

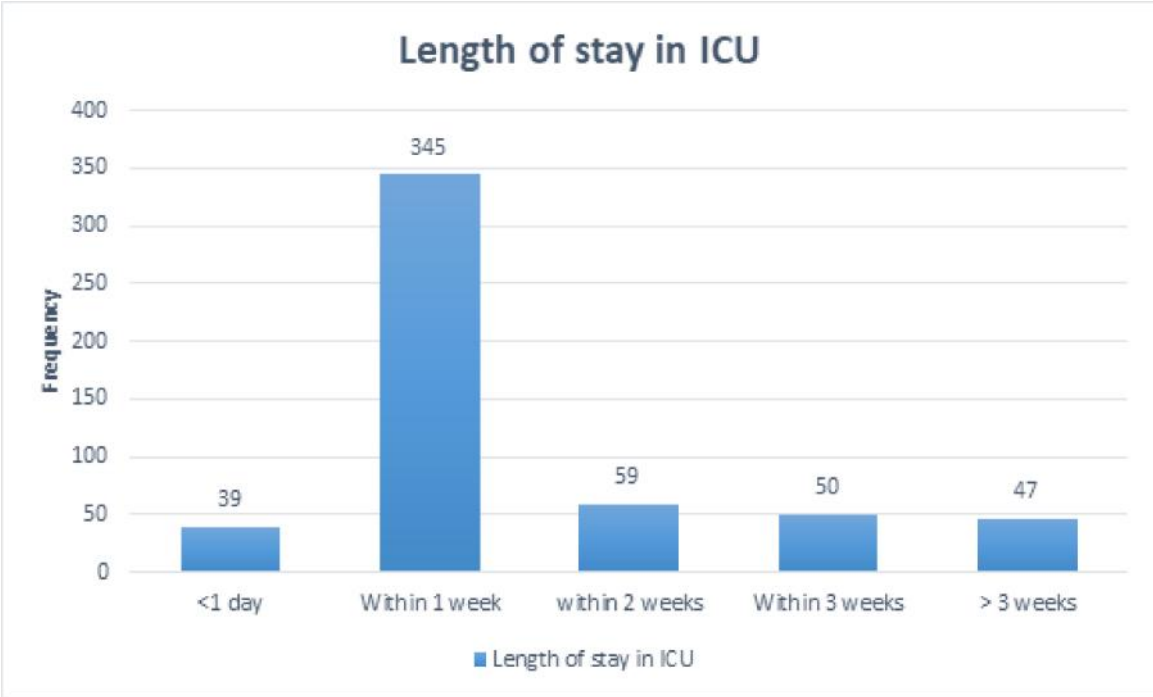

Fig. 4: Length of ICU stay

Table 4: Interventions and critical incidents in the ICU

Parameters	Frequency (%)
Cardiac Arrest	228 (42.22)
Electrolyte derangement	251(46.48)
Acute kidney injury	109 (20.19)
Blood Transfusion	237 (43.89)
Feeding	290 (53.70)
Need for Mechanical ventilation	408 (75.56)
Need for reintubation	156 (28.89)
Need for Tracheostomy	89 (16.48)
Need for Vasopressor	253 (46.85)
Need for sedation	212 (39.26)

DISCUSSION

This audit revealed that the majority of ICU admissions were neurosurgical and that there was a high ICU mortality rate. The majority (64.2%) of critically ill patients admitted into the ICU of the University College Hospital, Ibadan, were within the 21 – 60 years age bracket with a male-to-female ratio of 1.26:1. Previous audits in Nigeria by Acharya *et al.*,[7] Poluyi *et al.*,[10] and Ojiakor *et al.*,[11] reported similar demographic statistics.

Just like in most other local ICU audits, in which 42-75.3% of ICU admissions were postoperative, the commonest route of admission was the operating theatre.[12–16] Prin *et al.*, in Lilongwe, Malawi, also reported that almost half of patients admitted to the ICU came from the theatre.[17] The majority of admissions were from the neurosurgical speciality, with brain tumour and head injury being the commonest neurosurgical diagnoses. Onyekwulu and Anya[14] in Enugu, Southeastern Nigeria and Poluyi *et al.*,[10] in Lagos, Southwestern Nigeria, reported similar findings, with the majority (41.2% and 32%, respectively) of ICU admissions being from the neurosurgical speciality and severe head injury accounting for 70.9% and 77.3% of these admissions, respectively.[14] Ilori and Kalu in Calabar, Southern Nigeria, reported a different pattern, with the majority (24.7%) of admissions coming from the general surgery speciality (post-abdominal surgery) and only 4.7% being neurosurgical.[12] Similarly, in the study by Bolaji and Kolawole in Ilorin, North Central, Nigeria, over 60% of admissions were from general surgery, with only 1.9% being neurosurgical.[15] About 17% of admissions were from the medical team. This is in keeping with previous local audits in which medical admissions account for less than 20% of ICU admissions.[10,14,16,18] Also, like in these previous audits, a significant proportion of these medical admissions were neurological.

We reported an overall mortality rate of 43.89%. This figure is relatively high compared with the findings of Onyekwulu and Anya (34.6%)[14] and Ilori and Kalu (32.9%),[12] but much lower than that recorded by Poluyi *et al.* (61.4%).[10] In a previous audit of trauma victims in our ICU, the mortality rate was 45.1%,[19] while it was 47.6% in another audit of obstetric admissions.[3] These mortality figures are higher than those in developed nations (4-19%).[20–22] When outcomes were considered by speciality, patients admitted from the internal medicine specialities (neurology, nephrology, and pulmonology) had the highest mortality. This might be attributable to a higher incidence of comorbidities and higher illness severity scores, which are commonly associated with medical admissions.[23,24] Other factors associated with significantly higher mortality included age > 60 years, route of admission, GCS at admission, AKI, need for vasopressor, mechanical ventilation or re-intubation. On the other hand, the need for blood transfusion, tracheostomy and enteral feeding was associated with lower mortality. Controversy exists in the literature regarding the impact of these interventions on short- and long-term mortality.[25–27] For instance, a recent study by Pardo *et al.*[28] reported higher 28-day mortality with early enteral nutrition, which contrasts with current recommendations.

Previous studies have identified the elderly (age ≥ 65 years), medical admissions, severity of illness score, presence of co-existing medical comorbidities, the need for mechanical ventilation or vasopressor therapy, renal failure, unplanned admissions, delayed ICU admission and low serum albumin levels as independent predictors of ICU mortality.[4,5,7,10,18–21,29,30] The higher mortality recorded in our study and those of other studies from low and middle-income countries might be due to a range of factors such as late presentation, and thus higher illness severity, inadequate staffing, poor funding, poor maintenance culture and the unavailability of essential critical care facilities such as monitors, medical consumables, ventilators, emergency medications, arterial blood gas analysers amongst others.[12,16,18,19,31–33]

The length of ICU stay is vital to patient experience, cost of care and resource utilisation and is influenced by factors specific to the highly complex environment of the ICU.[34,35] The median length of ICU stay was three days and is comparable with previous similar audits. In a previous audit of specific patient cohorts in our ICU, Eyelade *et al.*[3] reported a median ICU stay of 48 hours (range: <24 hours to 21 days), Osinaike *et al.*[4] reported a mean stay of 5.71 ± 5.26 days, while Ayandipo *et al.*[5] reported a mean ICU stay of 3.1 ± 3 days. Onyekwulu and Anya reported a mean length of stay of 4.9 ± 3.2 days.[14]

A significant proportion of patients who spent less than 24 hours in the ICU actually died. Onyekwulu and Anya also reported a high mortality among patients

who spent less than 24 hours in the ICU.[14] Ilori and Kalu showed that 64% of mortality occurred in the first 24 hours of ICU admission.[12] In the study by Amanor-Boadu *et al.*[19] among trauma victims, a quarter of deaths occurred in the first 24 hours of ICU admission. This may be due to late admissions, high severity of illness, or the absence of strict admission protocols that target patients with potentially recoverable conditions. The early identification and referral of critically ill patients is paramount in improving outcomes.[12,33]

About 9% of patients in our study spent over three weeks in the ICU. It has been estimated that 2-11% of critically ill patients would require a prolonged stay.[36] Some authors have noted that an increasing length of ICU stay, though not associated with increased ICU mortality risk, is associated with an increased risk of long-term mortality after hospital discharge.[13,36] This fact was partly corroborated by our findings, which found that mortality in those who spent more than three weeks on admission was only 19.15%, compared to 46.34% among those who spent less than three weeks. However, it was impossible to determine its relation to the 30-day mortality rate since the outcome could not be ascertained in most of the patients discharged to the ward. Factors identified to prolong the length of stay included route of admission, electrolyte derangement and mechanical ventilation. Several factors have been identified in the literature that influence the length of stay in the ICU. They include route of admission (patients admitted post-operatively tend to spend a shorter time in the ICU compared to those admitted via other routes), social and psychological factors, sodium, magnesium, urea and creatinine levels, presence of comorbid medical conditions, re-admissions, delirium, malnutrition, need for mechanical ventilation or vasopressors and disease severity.[35,37,38]

Critically ill patients seem to have shorter long-term survival following ICU discharge when compared to age-matched cohorts.[39] Unfortunately, most research in sub-Saharan Africa only considers the immediate outcome of ICU stay, probably due to the unavailability of follow-up data and poor record keeping. In this retrospective cohort study, the outcome 30 days post-ICU discharge could not be ascertained in almost two-thirds of the population. About a third of the remaining patients died within 30 days of discharge from the ICU. The huge proportion of unavailable data makes statistical inference implausible. Factors that affect long-term outcomes include older age, male sex, low socio-economic status, extended hospital stay and discharge to a location other than home.[39]

In this audit, the proportion of ventilated patients is relatively high compared to previous local audits (2.8-19%).[12–14] The median duration of ventilation was four days against a mean of 15 hours in the study by Ilori and Kalu.[12] The high percentage of ventilated patients is in keeping with epidemiological studies that estimate that about 70% of ICU patients will require mechanical ventilation at some point during their stay.[40,41] Ventilation was an independent predictor of mortality in this audit. Several studies have also highlighted mechanical ventilation as a risk factor for mortality.[18,19,40] This is most likely due to the problems associated with ventilation, such as ventilator-associated pneumonia and ventilator-induced lung injury, amongst others

Almost half of the patients in this audit required vasopressor therapy and it was a significant predictor of mortality. The study by Ayandipo *et al.*[5] also reported this correlation with mortality. Thongprayoon *et al.*[22] in a descriptive study investigating the use of vasopressors in ICUs in the US over seven years, reported that vasopressors were used in 27% of ICU admissions for 22% of ICU stays. They were more commonly employed in cardiac ICUs than other types of ICU. Vasopressin, epinephrine, norepinephrine, dopamine and phenylephrine were the commonly used agents in decreasing order. An increasing use of norepinephrine was reported towards the latter years of the audit. They, however, did not examine the relationship between vasopressor therapy and mortality. Though our audit did not consider the usage rate of vasopressors, dopamine, epinephrine, and less frequently, norepinephrine are the commonly employed vasopressors in our centre. The high vasopressor use in our audit may be partly attributable to the absence of an institutional guideline on vasopressor use and the growing recommendation to use vasopressors early in shocked patients.[42]

The limitations of this study include the retrospective design and the large proportion of missing or unrecorded data. Similarly, it is a single-centre audit, and findings may not represent the national or global picture. Lastly, we do not measure illness severity score in our facility, hence making comparisons and benchmarking impossible.

CONCLUSION

This retrospective cohort study of patients admitted at the ICU of the University College Hospital, Ibadan, revealed that most admissions were post-operative and from the neurosurgery speciality. The ICU mortality rate was 43.89%, which is relatively high but comparable to previous audits in Nigeria. Factors associated with higher mortality rate were age > 60 years, admitting speciality, route of admission, GCS

at admission, AKI, need for vasopressor or mechanical ventilation.

Authors e-mail addresses and ORCID number.
T.C Okonkwo- okonkwo.thankgod@yahoo.com, https://orcid.org/0009-0007-3519-5302
S.I Olawale- olawalesp@gmail.com, https://orcid.org/0000-0001-5891-8031
D.G Efe- douglasefe4u@gmail.com, https://orcid.org/0009-0002-7626-585X
O.K Idowu- zolaspecky@yahoo.com, https://orcid.org/0000-0002-2945-2268
M.O Orji- drmat02@yahoo.com, https://orcid.org/0000-0001-7529-251X
A.A Sanusi- arinolasanusi@yahoo.com, https://orcid.org/0000-0003-1725-9097
B.B Osinaike- drosiniake@yahoo.co.uk, https://orcid.org/0000-0002-5848-5018

Author contributions
TCO - Conceptualisation, Data curation, Formal analysis, Methodology, Writing - original draft, Writing – review and editing.
SIO - Formal analysis, Writing – review and editing.
DGE - Writing – review and editing.
OKI - Writing – review and editing.
MOO - Writing – review and editing.
AAS - Writing – review and editing.
BBO - Conceptualisation, Methodology, Supervision, Writing – review and editing.

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Conflict of interest
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REFERENCES

1. **Marshall JC,** Bosco L, Adhikari NK, *et al.* What is an intensive care unit? A report of the task force of the World Federation of Societies of Intensive and Critical Care Medicine. J Crit Care. 2017 Feb;37:270–276.
2. **Smith G,** Nielsen M. Criteria for admission. Br Med J. 1999 Jun 5;318(7197):1544–1547.
3. **Eyelade OR,** Amanor-Boadu SD, Sanusi AA, *et al.* Intensive care unit admissions during the puerperium in Ibadan. Trop J Obstet Gynaecol. 2005;22(1):56–59.
4. **Osinaike B,** Akinyemi O, Sanusi A. ICU utilization by Cardio-Thoracic Patients in a Nigerian Teaching Hospital: Any Role for HDU? Niger J Surg. 2012 Jul 1;18(2):75–79.
5. **Ayandipo OO,** Afuwape OO, Idowu OK. General surgical admissions in the intensive care unit in Ibadan, Nigeria: a 30 month review. Cent Afr J Med [Internet]. 2016 [cited 2024 Aug 15];62(9–12):9–12.
6. **Balogun JA,** Akwada O, Awana E, Balogun FM. Access to the Intensive Care Unit by Severe Head Injury Patients. J Neurosci Rural Pract. 2019 Oct;10(4):666–671.
7. **Acharya SP,** Bhattarai A, Bhattarai B. An Audit of An Intensive Care Unit of A Tertiary Care Hospital. J Nepal Med Assoc. 2018;56(212):759–62.
8. **Ullman AJ,** Ray-Barruel G, Rickard CM, Cooke M. Clinical audits to improve critical care: Part 1 Prepare and collect data. Aust Crit Care. 2018 Mar 1;31(2):101–105.
9. **von Elm E,** Altman DG, Egger M, *et al.* The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. J Clin Epidemiol. 2008 Apr;61(4):344–349.
10. **Poluyi EO,** Fadiran OO, Poluyi CO, *et al.* Profile of Intensive Care Unit Admissions and Outcomes in a Tertiary Care Center of a Developing Country in West Africa: A 5 Year Analysis. J Intensive & Crit Care. 2016;2(3):1–7.
11. **Ojiakor SC,** Nkwerem SP, Ushie SN, *et al.* A Review of Admission Pattern in Intensive Care Unit in a Tertiary Health Institution in Southeast Nigeria. Trop J Med Res. 2022 Apr 16;21(1):1.
12. **Ilori IU,** Kalu QN. Intensive care admissions and outcome at the University of Calabar Teaching Hospital, Nigeria. J Crit Care. 2012 Feb 1;27(1): 105.e1-105.e4.
13. **Ogboli-Nwasor EO,** Ezema EC, Egbuniwe MC. Intensive Care Unit admissions and outcome in a university teaching hospital: a 6-year review. Orient J Med [Internet]. 2016 [cited 2024 Jan 12];28:3–4.
14. **Onyekwulu FA,** Anya SU. Pattern of admission and outcome of patients admitted into the Intensive Care Unit of University of Nigeria Teaching Hospital Enugu: A 5-year review. Niger J Clin Pract. 2015 Nov 1;18(6):775–779.
15. **Bolaji BO,** Kolawole IK. The Intensive Care Unit of the University Teaching Hospital, Ilorin, Nigeria: a ten year review (1991 - 2001). South Afr J Anaesth Analg [Internet]. 2005 [cited 2024 Jul 22];11(4):4.
16. **Isamade ES,** Yiltok SJ, Uba AF, *et al.* Intensive care unit admissions in the Jos University Teaching Hospital. Niger J Clin Pract. 2007 Jun;10(2):156–161.
17. **Prin M,** Ji R, Kadyaudzu C, *et al.* Associations of day of week and time of day of ICU admission

with hospital mortality in Malawi. Trop Doct. 2020 Oct;50(4):303–311.
18. **Akinjola OE,** Olateju SO, Idowu AO, *et al.* Indications and Outcomes of Medical Intensive Care Admissions in a Nigerian Tertiary Hospital. Ann Health Res. 2023 Dec 23;9(4):4.
19. **Amanor-Boadu SD,** Sanusi AA, Oyeleke SO, Soyanwo OA. Intensive Care for Trauma Victims in a Developing Country. Priorities and challenges for improvement. Afr J Trauma. 2003;1:51–54.
20. **Demass TB,** Guadie AG, Mengistu TB, *et al.* The magnitude of mortality and its predictors among adult patients admitted to the Intensive care unit in Amhara Regional State, Northwest Ethiopia. Sci Rep. 2023 Jul 25;13(1):1.
21. **Capuzzo M,** Volta CA, Tassinati T, *et al.* Hospital mortality of adults admitted to Intensive Care Units in hospitals with and without Intermediate Care Units: a multicentre European cohort study. Crit Care. 2014 Oct 9;18(5):1–15.
22. **Thongprayoon C,** Cheungpasitporn W, Harrison AM, *et al.* Temporal trends in the utilization of vasopressors in intensive care units: an epidemiologic study. BMC Pharmacol Toxicol. 2016 May 7;17(1):1–9.
23. **Atumanya P,** Agaba PK, Mukisa J, *et al.* Characteristics and outcomes of patients admitted to intensive care units in Uganda: a descriptive nationwide multicentre prospective study. Sci Rep. 2024 Apr 30;14(1):1–9.
24. **Eze CO,** Okoro FC, Nnaji T, *et al.* Mortality Pattern in Intensive Care Unit: Experience at Abakaliki Southeastern Nigeria. World J Cardiovasc Dis. 2020 Jul 13;10(7):7.
25. **Tobi KU,** Imarengiaye CO. Blood transfusion in critically ill patients in an intensive care unit of a tertiary hospital in nigeria. East Afr Med J. 2014 Dec;91(12):435–441.
26. **Chorath K,** Hoang A, Rajasekaran K, Moreira A. Association of Early vs Late Tracheostomy Placement With Pneumonia and Ventilator Days in Critically Ill Patients. JAMA Otolaryngol Head Neck Surg. 2021 May;147(5):1–10.
27. **Hébert PC,** Wells G, Tweeddale M, *et al.* Does transfusion practice affect mortality in critically ill patients? Transfusion Requirements in Critical Care (TRICC) Investigators and the Canadian Critical Care Trials Group. Am J Respir Crit Care Med. 1997 May;155(5):1618–1623.
28. **Pardo E,** Lescot T, Preiser JC, *et al.* Association between early nutrition support and 28-day mortality in critically ill patients: the FRANS prospective nutrition cohort study. Crit Care. 2023;27(7):1–14.
29. **Kalýn BS,** Özçaylak S, Solmaz Ý, Kýlýç J. Assessment of Risk Factors for Mortality in Patients in Medical Intensive Care Unit of a Tertiary Hospital. Indian J Crit Care Med. 2022 Jan;26(1): 49–52.
30. **Size M,** Borgstein E, Haisma H. One-year audit of admissions to the Intensive Care Unit of the Queen Elizabeth Central Hospital, Blantyre. Malawi Med J. 2005 Jun;17(1):12–14.
31. **Okafor UV.** Challenges in critical care services in Sub-Saharan Africa: Perspectives from Nigeria. Indian J Crit Care Med. 2009;13(1):25–27.
32. **Ogunbiyi O,** Sanusi A, Osinaike B, *et al.* An overview of intensive care unit services in Nigeria. J Crit Care. 2021 Dec 1;66:160–165.
33. **Tobi KU,** Ogunbiyi OA. Critical care in sub-Saharan Africa, where are we? A review. J West Afr Coll Surg. 2024 Mar;14(1):1–4.
34. **Awad A,** Bader-El-Den M, McNicholas J. Patient length of stay and mortality prediction: A survey. Health Serv Manage Res. 2017 May;30(2):105–120.
35. **Arabi Y,** Venkatesh S, Haddad S, *et al.* A prospective study of prolonged stay in the intensive care unit: predictors and impact on resource utilization. Int J Qual Health Care. 2002 Oct;14(5):403–410.
36. **Williams TA,** Ho KM, Dobb GJ, *et al.* Effect of length of stay in intensive care unit on hospital and long-term mortality of critically ill adult patients. Br J Anaesth. 2010 Apr 1;104(4):459–464.
37. **Toptas M,** Sengul Samanci N, Akkoc Ý, *et al.* Factors Affecting the Length of Stay in the Intensive Care Unit: Our Clinical Experience. Biomed Res Int. 2018 Mar 20;2018:e9438046.
38. **Peres IT,** Hamacher S, Oliveira FLC, *et al.* What factors predict length of stay in the intensive care unit? Systematic review and meta-analysis. J Crit Care. 2020 Dec 1;60:183–194.
39. **Doherty Z,** Kippen R, Bevan D, *et al.* Long-term outcomes of hospital survivors following an ICU stay: A multi-centre retrospective cohort study. PLOS ONE. 2022 Mar 28;17(3):e0266038.
40. **Abate SM,** Basu B, Jemal B, *et al.* Pattern of disease and determinants of mortality among ICU patients on mechanical ventilator in Sub-Saharan Africa: a multilevel analysis. Crit Care. 2023 Jan 24;27(1):1–13.
41. **Kübler A,** Maciejewski D, Adamik B, Kaczorowska M. Mechanical ventilation in ICUs in Poland: A multi-center point-prevalence study. Med Sci Monit. 2013 Jun 3;19:424–429.
42. **Carlos Sanchez E,** Pinsky MR, Sinha S, *et al.* Fluids and Early Vasopressors in the Management of Septic Shock: Do We Have the Right Answers Yet? J Crit Care Med. 2023;9(3):138–147.

SUPPLEMENTARY

Risk factors for ICU mortality

Variables	Outcome of ICU stay		
	Discharge n (%)	Dead (%) n (%)	p-value
Age (in years)			
<1	5 (55.56)	4 (44.44)	0.042*
1-10	21 (75.00)	7 (25.00)	
11-20	18 (75.00)	6 (25.00)	
21-40	105 (55.56)	84 (44.44)	
41-60	94 (57.32)	70 (42.68)	
61 and above	60 (47.62)	66 (52.38)	
Sex			
Male	174 (57.81)	127 (42.19)	0.350
Female	129 (53.97)	110 (46.03)	
Specialty			
NSU[a]	123 (58.57)	87 (41.43)	0.000*
CTSU[b]	42 (87.50)	6 (12.50)	
Internal Medicine	35 (38.89)	55 (61.11)	
ENT[c] surgery	9 (75.0)	3 (25.0)	
General surgery	32 (52.46)	29 (47.54)	
O&G[d]	37 (54.41)	31 (45.59)	
Orthopaedics	7 (63.6)	4 (36.4)	
Paediatrics	6 (54.5)	5 (45.5)	
Urology	4 (57.1)	3 (42.9)	
Multidisciplinary	8 (36.4)	14 (63.6)	
Route of Admission			
A&E[e]	74 (44.58)	92 (55.42)	0.000*
Ward	42 (38.18)	68 (61.82)	
Labour Ward	7 (46.67)	8 (53.33)	
HDU[f]/PACU[g]	5 (27.78)	13 (72.22)	
Theatre	175 (77.43)	51 (22.57)	
Private Facilities	0 (0.0)	3 (100.0)	
Haematology clinic	0 (0.0)	2 (100.0)	
GCS[h] at Admission			
Severe	154 (47.24)	172 (52.76)	0.000*
Moderate	52 (65.82)	27 (34.18)	
Mild	93 (73.23)	34 (26.77)	
Time of ICU Admission			
Night Time	161 (57.71)	118(42.29)	0.428
Day Time	134 (54.47)	112 (45.53)	
Length of stay in ICU			
<1 day	3 (7.69)	36 (92.31)	0.000*
1 week	199 (57.68)	146 (42.32)	
2 weeks	37 (62.71)	22 (37.29)	
3 weeks	26 (52.00)	24 (48.00)	
> 3 weeks	38 (80.85)	9 (19.15)	
Electrolyte Derangement			
No	152 (52.60)	137 (47.40)	0.077
Yes	151 (60.16)	100 (39.84)	
Acute kidney injury			
No	259 (60.09)	172 (39.91)	0.000*
Yes	44 (40.37)	65 (59.63)	
Blood Transfusions			
No	153 (50.50)	150 (49.50)	0.003*
Yes	150 (63.29)	87 (36.71)	
Need for Tracheostomy			
No	242 (54.02)	206 (45.98)	0.033*
Yes	59 (66.29)	30 (33.71)	
Need for Vasopressor/inotropic			
No	246 (85.71)	41 (14.29)	0.000*
Yes	57 (22.53)	196 (77.47)	
Need for Mechanical Ventilation			
No	116 (87.88)	16 (12.12)	0.000*
Yes	187 (45.83)	221 (54.17)	
Need for Re-intubation			
No	226 (58.85)	158 (41.15)	0.046*
Yes	77 (49.36)	79 (50.64)	
Feeding			
No	92 (36.80)	158 (63.20)	0.000*
Yes	211 (72.76)	79 (27.24)	

[a]NSU-Neurosurgery, [b]CTSU- Cardiothoracic surgery, [c]ENT- Ear, Nose and Throat, [d]O&G- Obstetrics and Gynaecology, [e]A&E- Accident and Emergency, [f]HDU- High dependency unit, [g]PACU- Postanaesthesia care unit, [h]GCS- Glasgow coma scale.