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## OBSTETRIC AND GYNAECOLOGICAL ADMISSIONS IN AN INTENSIVE CARE UNIT OF A NIGERIAN TEACHING HOSPITAL: A 5-YEAR REVIEW

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### ABSTRACT

**Background:** Management of critically ill women in intensive care units (ICU) is crucial in reducing maternal mortality. This study sought to determine the ICU obstetric and gynaecology utilization rate, indications for admissions, assess the outcome and risk factors associated with mortality.

**Design/ settings:** A retrospective descriptive study of admissions in a multidisciplinary ICU setting in a University Teaching Hospital in Nigeria.

**Methods:** Records of obstetric and gynaecological patients admitted to the ICU over a 5-year period were entered into a computer. Data included demographic and clinical characteristics of the patients, interventions performed and outcomes of patients' ICU care. Data was analysed using SPSS version 20 for windows.

**Results:** The MMR was 870 per 100,000 live births. The incidence of obstetric and gynaecological admissions to the ICU was 5.2% (37/706) of all admissions. 20 (58%) were obstetric cases, mostly severe PET/eclampsia 15 (40.5%), 42% of the women were admitted for complications of gynaecological procedures. Commonest complication was adult respiratory distress syndrome (ARDS). The mortality was 16 (43%) overall, 10 (62.5%) were obstetric cases mainly PET/eclampsia (56%). The likelihood of Obstetric mortality was twice that of gynaecological mortality (OR 2.5, 95% CI 0.99 – 6.16, P<0.026). Factors related to poor outcomes were 2 or more interventions (P=0.001).

**Conclusion:** Obstetric and gynaecology ICU utilization was low considering the high MMR. The major indication for admission was severe PET/eclampsia. The need for ventilatory support may predict poor outcome. There is need for dedicated obstetrics and gynaecology ICU to make access easier for Near Miss cases. **Keywords:** Obstetrics; Critical care; Gynaecology; Intensive care unit

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### Abbreviations

ICU intensive care unit

MMR Maternal mortality ratio

PET Pre eclampsia

ARDS Adult respiratory distress syndrome

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## **INTRODUCTION**

Obstetric and gynaecological patients with critical medical or surgical complications represents unique challenge to the Obstetrician and Gynaecologist and often require the management expertise of several subspecialists in the hospital intensive care (ICU), although some tertiary care centers have dedicated maternal fetal ICUs, others are dealt with in a high dependency area, which is short of the intensive care unit<sup>1,2</sup>. However, many obstetric units like ours in the developing world do not have such dedicated units but use the general ICU in the care of critically ill obstetric and gynaecology patients. Intensive care in such settings is reduced to high dependency nursing care while in the developed world, there are high-technology facilities with electronic monitoring, mechanical ventilation and other life-support measures, up-to-date drugs and highly trained and skilled personnel. The Intensive care beds in Nigeria, with a population of over 140 million (2006 census), are very few and restricted to the Teaching Hospitals situated in the urban centers and these are grossly inadequate<sup>2</sup>.

Morbidity after gynaecological surgery ranges from approximately 10% to 20%, whereas mortality is extremely rare<sup>3</sup>. Clinical guidelines and recommendations based on the unusual events of patient death are of little importance in medical care of the general population, and therefore information on severe acute morbidity as evidenced by near-miss cases and utilization of intensive care units (ICUs) may help to audit the quality of care in a more meaningful manner<sup>4</sup>.

The ICU of 730-bed Ahmadu Bello University Teaching Hospital, Zaria, Nigeria has 5 beds. It is a mixed medical-surgical ICU. Critically ill obstetric patients, who until recently were cared for in the Labour Ward, and gynaecological patients especially those with postoperative complications are increasingly being managed in the ICU. Most

published literature tend to look at ICU care in obstetrics and gynaecology separately but this study attempts to look at them together as they are managed by the same unit and specialists in most developing countries like ours.

This article seeks to determine the obstetrics and gynaecology ICU utilization rate, identify common indications for admissions and assess the outcome and risk factors associated with mortality.

## **MATERIALS AND METHODS**

The case notes and ICU charts of all the obstetric and gynaecological patients admitted to the ICU from January 2009 to December 2013 were reviewed. Medical records were obtained for all such admissions and were reviewed by one of two investigators. Coding protocol was established by the team before chart abstraction. Abstraction forms were designed a priori and were tested and revised before the abstraction of full data. Abstracted data included demographics, past medical history, indication for admission, prenatal history, indications for ICU transfer, intervention in ICU, complications, in ICU, length of hospital stay, duration of ICU stay, and deaths during the hospitalization. Patients were grouped as obstetric or gynaecological by admitting diagnosis. Obstetric hemorrhage was considered a distinct entity in this study because the acute physiology in these patients differs markedly from patients with non-hemorrhagic complications, such as preeclampsia and other hypertensive disorders. Delivery data and maternal deaths in the labour ward were also obtained to calculate the MMR

**Statistical analysis:** Data were entered manually into the computer and analysed using the Statistical Package for the Social Sciences version 20 (SPSS Inc., Chicago IL, USA). Results are expressed as mean  $\pm$  SD and number of patients/percentage. Comparative analysis was done using Chi-Square

test and level of significance was set at  $P < 0.05$ .

## RESULTS

During the study period, a total of 706 patients were admitted into the ICU of Ahmadu Bello University Teaching Hospital Zaria. Thirty seven women considered as critically ill were obstetrics and gynaecology patient. The utilization rate of the ICU for obstetric and gynaecology patients varied from 6 to 17 admissions per year during the study period. The mean ( $\pm$  SD) number of days of intensive care required was 3.19 ( $\pm$  1.89). The mortality rate was 16 (43%) in the ICU; 6 (10.8%) gynaecological and 10 (32.4%) due to obstetric cases, Intensive care of obstetric and gynaecological patients accounted for 5.2% (37/706) of all admissions to the ICU. The age distribution of the women admitted to the ICU are presented in Figure 1. Severe PET/eclampsia and Gynaecological malignancies leading to respiratory failure and unconsciousness were the most prevalent disease categories. In comparison with gynaecological patients, obstetric patients were specifically at high risk for ICU death, at an odds ratio of 2.5 (95% confidence interval 0.99–6.160)  $P = 0.026$ . Of the women admitted to intensive care, 40.5% had gynaecological surgery, while 48.6% had caesarean section, 11 (61%) were emergencies and 7 (39%) were elective. Reoperation was carried out in 1 case, due to postoperative haemorrhage from procedure-related injuries. Obstetric women who ended up in the ICU for reasons unrelated to surgery were 2 admitted to the hospital because of eclampsia and two with uterine bleeding problems following vagina delivery. The MMR was **870 per 100,000 live births during the study period**

**Intervention received in the ICU:** Interventions received in ICU either singly or in combination included blood transfusion, oxygen therapy, and mechanical ventilation. (Table I). All those who

needed mechanical ventilation needed other interventions as well. The observation of the number of interventions and outcome of ICU care was statistically significant ( $X^2 = 12.3$ ,  $df = 3$ ,  $P = 0.006$ ) Those with two or more interventions were likely to die

**Indication for admission:** Commonest indication for admission was eclampsia and severe pre-eclampsia. The outcome of ICU care depends on the indication for admission, those admitted for malignancies have a mortality of 50% while those admitted for eclampsia and severe pre-eclampsia had mortality of 60%. (Figure II). However the observed difference in outcome was not statistically significant Table II ( $X^2 = 10.1$ ,  $df = 6$ ,  $P = 0.120$ ).

**Reason for ICU transfer:** The mortality was highest for those transferred to ICU due to unconsciousness (66.6%) and acute chest syndrome (46.1%) while anaesthetic complication has the lowest (9%) (Table III) The difference observed was statistically significant. ( $X^2 = 11.9$ ,  $df = 5$ ,  $P = 0.035$ )

**Duration of Stay in ICU:** The mean ( $\pm$  SD) number of days of intensive care required was 3.19 ( $\pm$  1.89). However the duration of stay did not depend on the reason for ICU transfer as the difference observed was not statistically significant  $X^2 = 40.96$ ,  $df = 35$ ,  $p$ -value 0.225. Also the duration of stay in ICU was not influenced by the indication for admission ( $X^2 = 56.2$ ,  $df = 42$ ,  $p$ -value = 0.069)

### Medical History and complication in ICU

Overall 37.8% (14) developed complications in ICU. In those with no medical condition 35.7% had complications compared to 57% among those with medical condition. Table IV shows that association between medical condition and probability of developing complication in ICU was statistically significant ( $X^2 = 45.5$ ,  $df = 12$   $p$ -value =  $< 0.005$ )

## **DISCUSSION**

Of all admissions to the ICU, 5.4% were obstetric and gynaecological patients which was lower than 13.6% reported in a similar study in Durban<sup>5</sup>. Obstetrics cases comprising mainly of pre-eclampsia and eclampsia were the major reasons for ICU admissions in our study. This is consistent with findings elsewhere<sup>5,6</sup> except in Basra where hypertensive disorders was the third most common reason for ICU admission<sup>1</sup>. The higher percentage of severe PET/eclampsia (43%) is probably as a result of the fact that ABUTH Zaria being a tertiary institution receives all the complicated obstetric cases in the immediate environment. Pre-eclampsia is a major cause of morbidity and mortality worldwide but more so in developing countries. Respiratory support is often required for complications of pre-eclampsia such as pulmonary oedema, seizures and aspiration pneumonitis. However in a developing economy as ours, often times patients that require respiratory support do not get it either because of unavailability of ventilators or inability to afford the cost of ICU care. The need for ventilatory support may predict poor outcome as shown in this study.

The need for gynaecological critical care was frequent as 46% of the admission were for gynaecological reasons, higher than 22% reported by Al-Jabari<sup>5</sup> and 19.7% reported by Seppo in Finland<sup>3</sup>. Overall, the results of this study give a somewhat pessimistic picture of clinical outcome, with 10.8% mortality attributed to gynaecological cases compared to no mortality in ICU reported by Al-Jabari and Seppo<sup>6,7</sup>. Most of the women who ended up in intensive care had undergone surgery and were classified as high risk pre-operatively, reflecting the risk of serious morbidity as a result of gynaecological malignancies or pre-existing medical disorders. Gynaecological malignancies mostly ovarian cancers was the second most

common reason for admission to our ICU as in many other studies<sup>8,9,10</sup>. Usually such cases were complicated by post-operative haemorrhage<sup>1</sup>. Mortality among patients with gynaecological malignancies admitted to ICUs was 50% which was much higher than 26% by Seppo in Finland and consistent with reported range of 40% to 80% as regards gynaecological malignancies<sup>3</sup>.

The challenges of management were reliance on clinical judgment and monitoring as there were instances of paucity of invasive monitoring equipment for some patients. Another problem was the scarcity of blood and blood products, which led to prolonged and complicated resuscitation efforts with resultant high mortality.

Infections were responsible for 15% of maternal mortality worldwide<sup>9,10</sup>. However we had no case of sepsis in our study, because the ICU was regarded as a sterile unit in the hospital and most septic cases were not accepted for admission except cases of burns that are managed in isolation in a separate room. Similarly, Okafor and Aniebue from another region of the country did not report any case of sepsis, although no reason was given for their observation<sup>10</sup>.

The major observation in our study was the high mortality rate of 43% overall which is very high compared to Al-Jabari with no case fatality in King Khalid Hospital<sup>6</sup>. A mortality of 60% amongst obstetric patients is similar to 60% reported by Dao et al<sup>11</sup>, higher than 52% from UCH Ibadan<sup>2</sup> and unacceptably high compared to 26.7% reported by Moh'd from Kano<sup>7</sup> and 17.6% in Basra reported by Sajdai<sup>1</sup>. This may be attributable to the fact that majority of our critical patients are from rural areas with little or no antenatal care and timely hospitalization and interventions were delayed. This lamentable outcomes are still prevalent in our environment. Though majority of these complications and deaths are preventable by



providing basic emergency obstetrics care at the primary health care (PHC) level, but even when PHC exist, they are ill equipped or staffed to handle these situations. Presence of skilled birth attendants at deliveries in the PHC centers are likely to result in early referrals in case of complications, and thus prevent most of the maternal deaths.

The gynaecological mortality was 23.5% which is much higher than the 0% ICU gynaecological mortality reported in Finland<sup>3</sup>, but much lower than the 60% reported among our obstetric patient. The likelihood of death in obstetric patients in ICU were two and half times more than that of gynaecological patients (OR 2.5, 95% Confidence Interval 0.990–6.160,  $P < 0.05$ ). Factor related to poor outcome in this study was the need for two or more interventions in a patient including mechanical ventilation ( $P = 0.001$ ). Many physiological changes occur during pregnancy to adopt to the requirement of the fetus and the addition of a temporary organ system (the placenta)<sup>13</sup>. Low socio-economic status and educational level have considerable effects especially on obstetric complications and outcome which accounted for the highest mortality. The fact that a large percentage (51%) of our patients did not have any form of education may be contributory to the poor outcomes reported<sup>14</sup>.

In 1985 Professor K. Harrison stirred the conscience of the world through his publication on 22774 consecutive births in Zaria, Nigeria<sup>15</sup>, this provided convincing scientific data to convince everyone that poor maternal health and maternal mortalities in developing countries were tragedies which had been neglected for too long. The international community responded with the Safe Motherhood initiatives that were instituted by many organizations, including the WHO following its initial conference on the matter at Nairobi Kenya in 1987. Three major approaches to

improvement of maternal health were identified- availability of skilled personnel, emergency obstetric care and access to family planning. Emergency obstetrics care (EmOC) targeting hypertensive disorders of pregnancy which is presently among the highest cause of maternal mortality and leading cause of maternal death in our ICU<sup>17</sup>, is one of the strategy aimed at reducing maternal mortality. Some of the patients will be critically ill requiring management in ICU. The maternal mortality in Nigeria currently at 576/100,000 live birth (NDHS) is still unacceptably high. Hence dedicated ICU for the critically ill obstetric and gynaecological patients is required in order to provide adequate patient care. The need for health personnel training and continuing health care education may improve outcomes and MDG 5 target may be met in the long run.

Figure 1: Age of obstetrics and gynecology patients admitted into the ICU

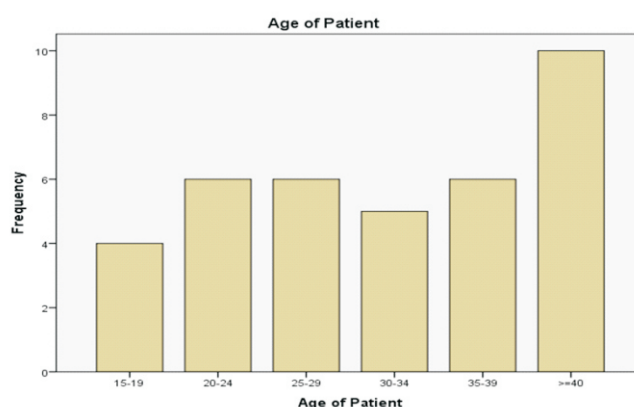
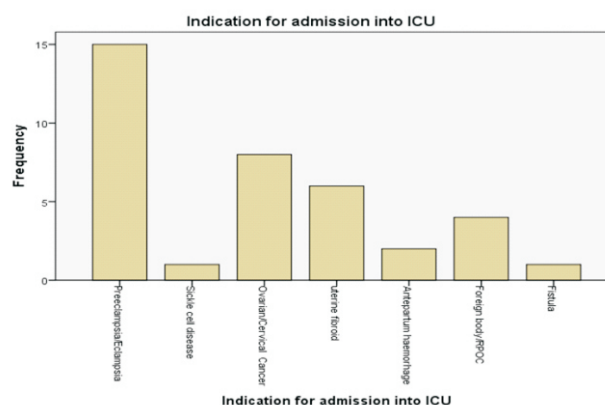


Figure II: Indication for admission into ICU



**Table I:** Influence of intervention received in ICU and outcome

Intervention received	Alive	Dead
Blood Transfusion	5	1
Respiratory support	5	0
=2 interventions	8	15
Others	3	0

$X^2 = 12.3, df = 3, p\text{-value} = 0.006$

**Table II:** Influence of indication for ICU admission on mortality

Indication for admission	No ( % of total )	Deaths ( percentage)
Eclampsia/Pre-eclampsia	15 (40.5%)	9 (60%)
Sickle Cell disease	1 (2.7%)	1 (100%)
Genital Cancers	8 (2.7%)	4 (50%)
Fibroid	6 (16.2%)	0 (0%)
Antepartum Haemorrhage	2 (5.4%)	2 (0%)
Foreign body/RPOC	4 (10.8%)	2 (50%)
Fistula	1 (2.7%)	0 (0%)

$X^2 = 10.1, df = 6, p\text{-value} = 0.120$

**Table III:** Influence of Reason for ICU transfer on mortality

Reason for ICU transfer	No (% of total)	Death ( percentage)
Unconsciousness	9 (24.3%)	6 (66%)
Acute chest syndrome	13 (35.1%)	6 (46%)
Cardiac arrest	2 (5.4%)	2 (100%)
Anaesthetic complication	11 (29.7%)	1 (9.1%)
Hypertensive cardiac failure	1 (2.7%)	1 (0%)
Others *	1 (2.7%)	1 (100%)

$X^2 = 11.95, df = 5, p\text{-value} = 0.035$

**Table IV:** Medical history and complications in ICU

Medical History	Complication in ICU					(%) complication
	Organ failure	Genitourinary Infection	Cardiac arrest	DIC	None	
None	5	0	3	2	18	35.7%
Diabetes	0	1	0	0	0	100%
Sickle cell disease	0	0	0	1	1	50%
Chronic hypertension	0	0	2	0	4	33%
Total	5	1	5	3	23	37.8%

$X^2 = 45.5, df = 12 p\text{-value} = 0.000$

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