

## ORIGINAL RESEARCH ARTICLE

# Risk Factors for Maternal Deaths in Unplanned Obstetric Admissions to the Intensive Care Unit-Lessons for Sub-Saharan Africa

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## Abstract

This study was undertaken to determine the risk factors for maternal deaths in unplanned or unbooked obstetric admissions to the intensive care unit of a tertiary health centre. Hospital records of unbooked obstetric admissions to the intensive care unit of the hospital from January 1997 to December 2006 were retrospectively reviewed. Data collected included patients' demographics, diagnosis, duration of stay in the ICU and patient outcome. The intensive care unit records showed that there were 25 unbooked obstetric admissions. Major diagnoses for unplanned admissions to the ICU were preeclampsia/eclampsia (41.1%), obstetric haemorrhage (37.5%), and respiratory distress (12.5%). There were 12 deaths (48%). Organ dysfunction on admission, massive blood loss and late presentation were the risk factors for mortality. The high maternal mortality was mainly due to limited supply of blood products and inadequate prenatal care resulting in disease severity (*Afr J Reprod Health 2011; 15[4]:51-54*).

## Résumé

**Facteurs de risque pour les décès maternels dans des admissions imprévues dans l'Unité de soins intensifs : Leçons pour l'Afrique sub-saharienne.** L'étude a comme objectifs de déterminer les facteurs de risque pour les décès maternels concernant les admissions obstétriques imprévues ou non inscrites dans l'Unité de soins intensifs d'un centre de santé tertiaire. Nous avons passé en revue rétrospectivement les dossiers de toutes les admissions obstétriques dans l'unité de soins intensifs de l'hôpital qui n'étaient pas prévues et pas inscrites, à partir du janvier 1977 jusqu'au mois de décembre. Les données recueillies comprenaient les données démographiques, le diagnostic, la durée du séjour dans l'USI et la conséquence pour la patiente. Les dossiers dans l'unité de soins intensifs ont montré qu'il y avait vingt-cinq admissions qui n'étaient pas inscrites. Le diagnostic principal pour les admissions imprévues dans l'USI d'après cette étude, étaient la préclampsie/l'éclampsie (41,1%), l'hémorragie obstétrique (37,5%) et la détresse respiratoire (12,5%). Il y avait 12 décès (48%). Les facteurs de risque de mortalité pour cette étude étaient la dysfonction d'organe au moment de l'admission, une perte massive de sang et un retard dans la présentation. Le taux élevé de la mortalité maternelle était du surtout à l'apport des produits sanguins limités et les soins prénatals inadéquats qui aboutissent à une sévérité de maladie (*Afr J Reprod Health 2011; 15[4]:51-54*).

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**Keywords:** Unplanned obstetric admissions, Intensive care unit, Risk factors

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## Introduction

Unplanned admissions to an intensive care unit are regarded as an accepted quality assurance indicator for obstetrics patients' management<sup>1</sup>. Another indicator of pronounced maternal morbidity is a transfer to an intensive care unit (ICU).<sup>2</sup>

Studies have shown that 0.1% to 0.9% of women develop complications during pregnancy that require

admission to the intensive care unit.<sup>3</sup> The number of pregnant and postpartum women admitted to the ICU may reach up to 7% in parts of the developing world with advanced health care facilities<sup>4</sup>. These may be elective admissions or emergency/unplanned admissions which are more tasking for the ICU staff<sup>5</sup>. In this study, we reviewed the risk factors for maternal deaths in unplanned obstetric admissions to an intensive care unit in Southeastern Nigeria.

## Methods

The intensive care unit (ICU) records were examined for consecutive unbooked obstetric admissions to the ICU of a tertiary health centre from January 1997 to December 2006 and their hospital records (case files and ICU daily records) were reviewed. The data collected included patients' demographics, diagnosis, the need for mechanical ventilation, duration of stay in the ICU and patient outcome. Ethical board approval is not mandatory for retrospective observational studies.

## Results

A total of 1313 patients were admitted to the ICU during the study period with twenty – five unbooked or emergency ICU admissions out of a total of thirty obstetric admissions. There were a total of 9502 deliveries giving an ICU admission rate of 2.5 per 1000 deliveries. The mean age of the patients was 31.8 years. All the patients were admitted to the ICU either postpartum or postoperatively. The average duration of admission was 2.29 days (range 1-7 days). Sixteen patients were either unbooked or referred. Table 1 shows the age distribution and parity of the patients. There were twelve deaths in this group of patients giving a case fatality rate of 48% and 6.25% of all maternal deaths during the study period. The causes of death are shown in Table 2. Five patients received mechanical ventilation while 20 patients received oxygen via an intranasal catheter or facemask. Nine patients received pressor agents for organ support. The causes of death in the preeclampsia/eclampsia group 10/4 (40% mortality rate) were cerebrovascular accident in one patient and multiple organ failure with (MOF) in three others.

**Table 1:** Age and parity of the patients

Age (years)	Number n=25
17-23	4 (16.7%)
24-30	8 (33.3%)
31-37	8 (33.3%)
38-40	4 (16.7%)
<u>Parity</u>	<u>Number</u>
Nulliparous	1
1	14
2	2
3	5
4	1
5	nil
6	1

In the obstetric haemorrhage group 9/6 (67% mortality rate), ruptured ectopic pregnancy, ruptured uterus,

postpartum haemorrhage with renal failure in a sickle cell patient, placenta praevia complicated by massive haemorrhage and hysterectomy, abruptio placenta with disseminated intravascular coagulation (DIC,) and anoxic encephalopathy following intraoperative cardiac arrest were the causes of death. Other co-morbidities were documented in three patients with asthma, sickle cell disease, and gestational diabetes with hypertension. The duration of stay in the ICU in relation to indication for admission is shown in Table 3.

**Table 2:** Causes of deaths

Diagnosis	Number (n=12)
Preeclampsia/eclampsia	4 (36.4%)
Obstetric haemorrhage	6 (45.4%)
Amniotic fluid embolism	1 (9.1%)
Chorioamnionitis	1 (9.1%)

**Table 3:** The duration of stay in the ICU in relation to indication for admission

Indication for ICU admission	Number of patients	Mean duration of ICU stay (days)
Preeclampsia/eclampsia	10	2.3
Obstetric haemorrhage	9	2.2
Postoperative respiratory distress	3	2.3
Gestational diabetes/hypertension	1	2
Chorioamnionitis	1	1
Emergency evacuation of retained products of conception	1	1

## Discussion

The percentage of unplanned obstetric admissions to our ICU was 83% of all obstetric admissions during the study period from a total of thirty. This is similar to other studies where less than 20% of the admissions were planned.<sup>6,7</sup>

The major indications for unplanned admission to the ICU in this study were preeclampsia/eclampsia, obstetric haemorrhage and respiratory distress. This has been reflected in some studies of critical care obstetric patients in the intensive care unit<sup>8,9</sup>. While most studies have focused on both planned and unplanned admissions to the ICU including a previous study in our centre, this study deals solely with unplanned admissions. This is because identifying patients who are at risk of developing serious morbidity or mortality is difficult due to altered physiological parameters associated with pregnancy and marked variability in the timing and presentation of morbid states in pregnant

patients<sup>10</sup>. The planned or booked ICU admissions had no deaths.

An important factor in the 48% mortality rate for the unbooked or unplanned admissions was late presentation in some patients. Often they were only admitted to the ICU when complications developed postoperatively (every patient in this study was admitted postpartum). Thus management was reactive rather than proactive in most cases.

The risk factors for mortality in this study were organ dysfunction on admission, massive blood loss and late presentation. Limited supply of blood products contributed to the high mortality rate in the obstetric haemorrhage group. Fresh whole blood and platelet concentrates that are required in a major coagulopathy were either in short supply or unavailable for emergencies and was a culpable factor in all the obstetric haemorrhage deaths. Two patients died from amniotic fluid embolism and chorioamnionitis, two cases rarely seen in our ICU, the former being mainly a diagnosis of exclusion. Because of the laboratory costs involved in the use of scoring system; clinical evaluation and the need for organ support were the indications for ICU admission. And thus, scoring systems were not used to track maternal outcome. An important limitation in patient management was the reluctance to use invasive monitoring and mechanical ventilation of patients as only twenty percent of the patients in this study received mechanical ventilation. Other limitations include the small size and the retrospective nature of the study.

The admission rate in this study which is similar to that in advanced nations evidently shows that some patients that need critical care management often do not get it.<sup>4</sup>

The need for a high dependency unit (HDU) is important as its use is known to reduce the number of expensive ICU admissions by 53%<sup>10</sup>, while guaranteeing expert obstetric and critical care management<sup>11</sup>.

The mortality rate in this study is similar to that reported from other studies in Sub-Saharan Africa.<sup>12, 13</sup> The government can help by increasing the money allocated to the health sector, introduction of a maternal health insurance scheme, poverty alleviation programmes and free education up to secondary school level. It is known that maternal deaths can be reduced by simply getting more women educated and out of poverty<sup>14</sup>. Eliminating delays in provision and access to quality healthcare would go a long way in reducing maternal mortality.

## Conclusion

The risk factors for mortality in this study were organ dysfunction on admission, massive blood loss and late presentation. The maternal mortality was quite high and was mainly due to limited supply of blood products and inadequate prenatal care resulting in disease severity. With the introduction of subsidized prenatal care in some states of the country, these figures might be reduced in the future.

## Acknowledgement

We thank the staff of the records and intensive care unit departments of the University of Nigeria Teaching Hospital, Enugu for their courtesy and consideration.

## References

1. Chandrasekaran N, Basu S. Obstetric admissions to the Intensive Care Unit – are they predictable? A retrospective study in a tertiary referral centre in Wales. *Anaesthesia* 2007; 62(3): 301 – 302.
2. Mahutte NG, Murphy – Kaulbeck L, Le Q, Solomon J, Benjamin A, Boyd ME. Obstetric admissions to the intensive care unit. *Obstet Gynecol* 1999; 94(2): 263 – 266.
3. Wheatly E, Farkas A, Watson D. Obstetric admission to an intensive therapy unit. *Int J Obstet Anaesth.* 1996; 5(4): 221-224
4. Parikh CR, Karnad DR. Quality, cost and outcome of intensive care in a public hospital in Bombay, India. *Crit Care Med.* 1999; 27(9): 1754 – 1759.
5. Winer N, Tsasaris V. Latest development management and treatment of pre-eclampsia *J Gynecol Obstet Biol Reprod* 2008; 37(1):5-15.
6. Mirghani HM, Hamid M, Ezimokhai DS, Weerasinghe DS. Pregnancy related admission to the intensive care unit: *Int J. Obstet Anaesth.* 2004; 13(2): 82-85
7. Jenkins TM, Troiano NH, Graves SM, Baird SM, Boehm FH. Mechanical ventilation in an obstetric population: characteristics and delivery rates. *Am J Obstet Gynecol* 2003; 18(2): 549-552.
8. Vasquez DN, Estenssoro E, Canales HS, Reina R, Saenz MG, Das Neves AV et al. Clinical characteristics and outcomes of obstetric patients requiring ICU admission. *Chest* 2007; 131(3):718-724.
9. Selo-Ojeme DO, Omosaiye M, Bhattacharjee P, Kadir RA. Risk factors for obstetric admissions to the intensive care unit in a tertiary hospital: a case-control study. *Arch Gynecol Obstet* 2005; 272(3):207-210.
10. Butwick AJ, Carvalho B. Can we improve maternal outcome for high-risk obstetric patients? *Int J of Obstet Anaesth* 2007; 16(4):11-313.
11. Ryan M, Hamilton V, Bowen M, McKenna P. The role of a high dependency unit in a regional obstetric hospital. *Anaesthesia* 2000; 55(12): 1155-1158.
12. Dao B, Rouamba A, Ouedraogo D, Kambou T, Bazié AJ. Transfer of obstetric patients to an intensive care unit: an eighty-two case report in Burkina Faso. *Gynecol Obstet Fertil* 2003; 31(2):123-126.

13. Osinaike BB, Amanor-Boadu SD, Sanusi AA. Obstetric Intensive Care: A developing country experience. *The Internet Journal of Anesthesiology* 2006; volume 10: number2.[www.ispub.com/.../obstetric\\_intensive\\_care\\_a\\_developing\\_country\\_experience.html](http://www.ispub.com/.../obstetric_intensive_care_a_developing_country_experience.html)
14. Harrison KA. Maternal mortality in developing countries. *Br J Obstet Gynaecol.* 1989; 96(1):1-3.