

A 5-year review of obstetrics and gynaecology admission into the intensive care unit of a tertiary hospital in Northern Nigeria

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Abstract

Background: Obstetrics and gynaecology admissions into the intensive care units (ICUs) are quite rare. Careful evaluation and prompt intervention in these patients is required to have a good outcome.

Aim: To determine the indications, incidence, interventions, outcome and causes of death in obstetrics and gynaecology patients admitted into our ICU.

Methods: A retrospective descriptive study of obstetrics and gynaecology patients admitted into the ICU of Aminu Kano Teaching Hospital as conducted. Data from the patient case files and the ICU records were collected over a period of 5 years from January 2012 to December 2016 and were analysed using SPSS 18.

Results: The incidence of obstetrics and gynaecology admission into the ICU was found to be 10% (65/650), out of which 84.6% (55/65) were due to obstetrics cases, while 15.4% (10/65) were due to gynaecology cases. The most common obstetrics indication was hypertensive disorders in pregnancy, mostly eclampsia (46.3%), while the most common gynaecology indication was post-operative complications (66.7%). The major interventions the patients received were blood transfusion (48.9%), mechanical ventilation (44.7%), antihypertensive therapy (42.6%), anticonvulsant therapy (34%) and oxygen therapy (40.4%). The overall mortality rate in this study was found to be 40.4%, out of which 84.2% were obstetrics cases and 15.8% were gynaecology cases. The most frequent cause of death was due to cardiac arrest (63.2%).

Conclusion: Obstetrics and gynaecology admissions into the ICU were found to be very low, with eclampsia being the most common indication. All patients admitted had multidisciplinary management. An obstetrics and gynaecology ICU should be made available in proximity to the department.

Keywords: Complications, gynaecology, intensive care unit admission, indications, obstetrics, outcome

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INTRODUCTION

Obstetrics and gynaecology patients may come with life-threatening conditions that may require intensive care unit (ICU) admission. The management of such patients requires a multidisciplinary approach as most of the patients present with different complications.

A better knowledge of the spectrum, characteristics and outcome of the disease in this group of patients is the first step towards achieving prevention and hence reduction of both maternal mortality and morbidity.¹

Worldwide, obstetrics admission into ICU is rare.² Admission of obstetrics patients occurs approximately at 0.1%–0.9% of all deliveries.³

Life-threatening obstetrics conditions requiring ICU admissions include hypertensive disorders in pregnancy, obstetric haemorrhage and complications of obstructed labour.⁴ Other indications for admission into ICU in obstetrics include complications of diabetes in pregnancy such as diabetic ketoacidosis, pulmonary embolism, heart conditions and monitoring of patients with comorbidities such as sickle cell disease. Eclampsia and preeclampsia are the most common indications for ICU admission in studies done in Ibadan and Benin, Nigeria, and in Bari, Italy.²

Reports on utilisation and outcome of critical care services required in management of all gynaecology patients are rare.⁵ With up to date equipment, ICU care is better with shorter stay and improved outcome.⁶ Since the management of patients in the ICU is multidisciplinary, prevention and early detection of complications may be instituted promptly.

Unlike others, obstetrics patients pose a major management challenge to ICU physicians and obstetricians due to altered physiology during pregnancy, considerations of foetal well-being and the unique type of disorders to be dealt with.⁷

Gynaecology cases such as gynaecological malignancies, dysfunctional uterine bleeding, infections and post-operative complications may also be complicated by life-threatening conditions that may require ICU admission.

Studies for obstetrics and gynaecology admissions into ICU are few in number. A study done in Saudi Arabia by Al-Jabari *et al.* showed that 83% of their admissions into ICU were due to obstetrics complications, while 18% were due to gynaecology complications and 2% were due

to anaesthetic complications.⁸ In the UK, about 0.11% of pregnant women will develop complications that will necessitate admission into ICU.² A Hong Kong study by Vivian *et al.* showed 0.23% of all deliveries required ICU admission,⁷ while an Indian study by Poorina *et al.* obtained an incidence of 0.39%.³ A South African study by Platteau *et al.* on both obstetrics and gynaecology admission into ICU reported the incidence to be 13.3%.⁹

Adelaiye *et al.* in Nigeria reported an incidence of 5.2% for both obstetrics and gynecology ICU admissions. In their study, 58% of their admissions were due to obstetrics complications while 42% were due to complications of gynaecological procedures.¹⁰

Fawole *et al.* in Ilorin, Nigeria, reported an incidence of 12.3% of all ICU admissions and 0.84% of all deliveries.¹¹ Also, a study done in Kano by Mohammad *et al.* showed that 0.073% of all deliveries required ICU admission.²

Many studies showed that majority of the obstetrics cases admitted into ICU are post-partum.^{2,7,11-15}

The duration of stay in ICU varies in obstetrics and gynaecology patients. A study done in Hong Kong by Vivian *et al.* showed a mean period of stay of 1.8 days, while a Kano study by Mohammed *et al.* showed the mean period of stay in ICU of 4.2 days for obstetric patients.^{2,7} For gynaecology admissions, a mean duration of 4.97 days was found in a study done in Kuopio by Heinonen *et al.*, while a South African study by Platteau *et al.* found a mean duration of 19.1 days.^{5,9}

Various studies showed that majority of patients had mechanical ventilation, blood and blood product transfusion.^{2,3,12} Other interventions include inotrope, antihypertensive therapy, anticonvulsant therapy and dialysis.¹² Some more procedures included cardiopulmonary resuscitation, Swan–Ganz catheter, vasoactive infusion, central line insertion and arterial line insertion.^{5,7}

Patients admitted into ICU may develop complications. The most common complications the patients developed is adult respiratory distress syndrome.¹⁰ Other complications include HELLP syndrome, hypertensive encephalopathy, acute pulmonary oedema, deranged renal function, deranged liver function and aspiration pneumonitis.⁷

Several studies showed majority of the patients improved.^{2,3,12} The Nigerian study that looked into both obstetrics and gynaecology admissions showed the overall mortality of 43%, 62.5% of which were obstetrics cases.¹⁰ The Ilorin

study by Fawole *et al.* found a mortality of 48.1%,¹¹ while the Kano study by Mohammed *et al.* found a mortality rate of 26%.² The likelihood of obstetrics mortality was twice that of gynaecology cases.¹⁰

There have been several studies on obstetric admission into ICU, but unfortunately, there are very few studies directed towards gynaecological admissions into the ICU despite wide literature review. It is important to study both obstetric and gynaecological admission into ICU and understand the diseases associated with the ICU admission and their outcome, to improve on the care and management of such patients. This study was undertaken with the aim of determining the indications, incidence, interventions, outcome and causes of death in obstetrics and gynaecology patients admitted into our ICU.

METHODS

This study was carried out in the ICU and Obstetric and Gynaecological Departments of Aminu Kano Teaching Hospital in Kano state. The study covered a period of January 2012 to December 2016.

Study design

It is a retrospective analysis of data from the case files of patients admitted into the ICU from obstetrics and gynaecology department over the period of 5 years.

Study area/setting

The study was carried out in the ICU of Aminu Kano Teaching Hospital. The ICU has 5 beds which admit an average of 150 patients annually.

Study population

All obstetrics and gynaecology patients admitted into the ICU within the study period were included in the study. There were 65 patients from obstetrics and gynaecology department out of 650 patients that were admitted into the ICU during the study period. There were 55 obstetrics cases and 10 gynaecology cases. All patients with missing folders were excluded from the study.

Data collection

A well-structured pro forma was used as the study instrument to obtain data from patient's case notes and ICU records. The data obtained included the sociodemographic data, referral status of the patients, associated medical conditions, obstetrics characteristics, indication for admission into the ICU, duration of stay, interventions received, complications, outcome and cause of death. Each patient's records were reviewed in detail and the data were retrieved and analysed.

Data analysis

The data were analysed using Statistical Package for the Social Sciences software package version 18 (Chicago, IL, USA). Microsoft Excel was used for tables and charts. The data for analysis include demographic data, obstetrics and gynaecology characteristics and details of their ICU stay.

Inclusion/exclusion criteria

1. All obstetrics and gynaecology patients admitted into the ICU within the study period were included in the study
2. All the patients with missing folders were excluded from the study.

Ethical clearance for the study was granted by the Research and Ethics Committee of Aminu Kano Teaching Hospital.

RESULTS

During the study period, a total of 650 patients were admitted into the ICU. There were 65 (10%) obstetrics and gynaecology patients admitted into the ICU during the study period, out of which 55 (84.6%) were obstetrics cases and 10 (15.4%) were gynaecology cases. Forty-seven case notes were retrieved, giving a retrieval rate of 72%. The remaining case notes were missing. The incidence of obstetrics and gynaecology admission into the ICU was found to be 10% (65/650). The study showed that 84.6% (55/65) of the admissions were due to obstetric cases, while 15.4% (10/65) were due to gynaecology cases.

Most of the patients were between 20 and 40 year age group (72.3%) and were primipara (46.8%). The mean age was 30.19 years, while the mean parity was 3.32. These are shown in Table 1.

Thirty-one (66%) patients were referred from another hospital.

Table 2 shows that majority of the patients had no underlying medical condition (61%). Conditions that were found in other patients were hypertension (14.9%) and heart diseases (8.5%).

Table 1: Age and parity

| | Number of cases (%) |
|----------------|---------------------|
| Age | |
| <20 | 7 (14.9) |
| 20-40 | 34 (72.3) |
| >40 | 6 (12.8) |
| Total | 47 (100) |
| Parity | |
| Nullipara | 2 (4.3) |
| Primipara | 22 (46.8) |
| Multipara | 11 (23.4) |
| Grandmultipara | 12 (25.5) |
| Total | 47 (100) |

For the obstetrics cases, majority of the patients were booked elsewhere (65.9%) while 12.2% were not booked at all. Most of the patients were admitted into the ICU post-partum (95.1%), only 4.9% were admitted in antepartum period. The major mode of delivery in the patients was by emergency caesarean section (43.6%). Assisted vaginal delivery was conducted in 2 (5.1%) patients. These and other obstetric parameters were shown in Table 3.

The main obstetrics indications for admission into the ICU were hypertensive disorders in pregnancy (46.3%), followed by puerperal sepsis (19.5%). These and other gynaecology indications are shown in Tables 4 and 5. Majority of the patients (68%) spent 2–7 days in the ICU, while 12.7% spent more than 7 days on admission. The overall mean duration of stay was found to be 4.04 days. The mean duration of stay for obstetrics cases was 4.2 days, while for gynaecology patients, it was 2.8 days. The details are shown in Table 6.

The most frequent interventions done in the patients were blood transfusion (48.9%), mechanical ventilation (44.7%) and oxygen therapy (40.4%). Other ICU interventions included use of anticonvulsant therapy (34.0%), inotropic agents (25.5%) and dialysis (21.3%). These and other interventions are shown in Table 7. Table 8 shows that over a third of the patients (34.0%) did not develop any complications in the ICU. However, the most common complications the patients had were acute kidney injury in 27% of them. Other complications are shown in the same in table 8.

More than half of the patients (59.6%) admitted during the study period improved and were discharged back to the obstetrics and gynaecology wards, while 40.4% of the patients died while on admission in the ICU. These are shown in Figure 1.

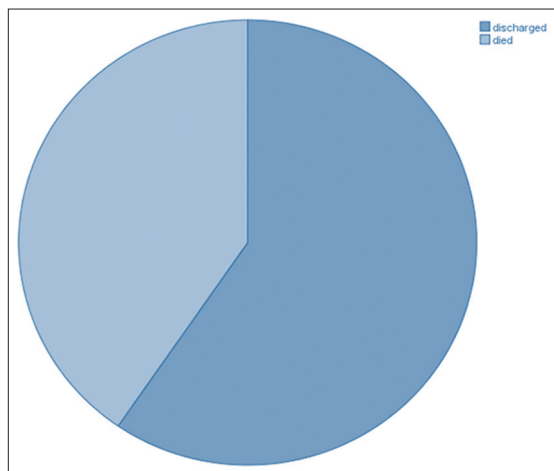


Figure 1: Outcome

Table 9 shows the major cause of death in the patients was cardiac arrest (63.2%), followed by multiple organ failure (15.8%) and respiratory arrest (15.8%).

Table 2: Background medical conditions

| Medical conditions | Frequency (%) |
|----------------------|---------------|
| Hypertension | 7 (14.9) |
| Diabetes | 1 (2.1) |
| Malignancy | 2 (4.3) |
| Sickle cell disease | 2 (4.3) |
| Obesity | 1 (2.1) |
| Heart disease | 4 (8.5) |
| Others (hepatitis) | 1 (2.1) |
| No medical condition | 29 (61.7) |
| Total | 47 (100) |

Table 3: Obstetrics features

| | Frequency (%) |
|---------------------------|---------------|
| Booking status | |
| Booked | 9 (22.0) |
| Booked elsewhere | 27 (65.9) |
| Un-booked | 5 (12.1) |
| Total | 41 (100) |
| Admission status | |
| Antepartum | 2 (4.9) |
| Postpartum | 391 (95.1) |
| Total | 41 (100) |
| Mode of delivery | |
| SVD | 15 (38.5) |
| ELCS | 5 (12.8) |
| EMCS | 17 (43.6) |
| Assisted vaginal delivery | 2 (5.1) |
| Total | 39 (100) |

ELCS: Elective caesarean section; EMCS: Emergency caesarean, SVD: Spontaneous vaginal delivery

Table 4: Obstetric indications for admission

| Indications OBS | Frequency (%) |
|---|---------------|
| Hypertensive disorders in pregnancy (eclampsia) | 19 (46.3) |
| Pulmonary embolism | 3 (7.3) |
| Postpartum haemorrhage | 3 (7.3) |
| Heart diseases | 3 (7.3) |
| Puerperal sepsis | 8 (19.5) |
| Others | 5 (12.2) |
| Total | 41 (100) |

OBS: Obstetric

Table 5: Gynaecological indications for admission

| Indications GYN | Frequency (%) |
|-----------------------------------|---------------|
| Postoperative haemorrhage | 1 (16.7) |
| Other postoperative complications | 3 (50.0) |
| Infections | 1 (16.7) |
| Others (ectopic pregnancy) | 1 (16.7) |
| Total | 6 (100) |

GYN: Gynaecological

Table 6: Duration of stay in the intensive care unit

| Duration of stay in ICU | Frequency (%) |
|-------------------------|---------------|
| 24 h | 9 (19.1) |
| 2-7 days | 32 (68.0) |
| >7 days | 6 (12.7) |
| Total | 47 (100) |

ICU: Intensive care unit

Table 7: Interventions

| Interventions | Frequency (%) |
|------------------------|---------------|
| Mechanical ventilation | 21 (44.7) |
| Antibiotics | 12 (25.5) |
| Antihypertensives | 20 (42.6) |
| Anticonvulsants | 16 (34.0) |
| Central line insertion | 5 (10.6) |
| Anticoagulation | 3 (6.4) |
| Blood transfusion | 23 (48.9) |
| Oxygen therapy | 19 (40.4) |
| Inotropic agents | 12 (25.5) |
| Dialysis | 10 (21.3) |
| Others | 6 (12.8) |
| Total | 47 (100) |

Table 8: Complications

| Complications | Frequency (%) |
|---|---------------|
| HELLP syndrome | 4 (8.5) |
| Aspiration pneumonia | 4 (8.5) |
| Acute kidney injury | 13 (27.7) |
| Cardiovascular accident | 2 (4.3) |
| Sepsis | 3 (6.4) |
| Disseminated intravascular coagulopathy | 1 (2.1) |
| Others | 4 (8.5) |
| No complications | 16 (34.0) |
| Total | 47 (100) |

HELLP: Haemolysis, Elevated Liver Enzymes, Low Platelet count

Table 9: Cause of death

| Causes of death | Frequency (%) |
|------------------------------|---------------|
| Cardiac arrest | 12 (63.2) |
| Multiple organ failure | 3 (15.8) |
| Respiratory failure | 3 (15.8) |
| Others (electricity failure) | 1 (5.3) |
| Total | 47 (100) |

DISCUSSION

The incidence of obstetrics and gynaecology admission into the ICU was found to be 10% (65), which was higher than 5.4% reported in a Nigerian study by Adelaiye *et al.*¹⁰ and lower than 13.3% reported in a South African study by Platteau *et al.*⁹ These variations may probably be due to differences in defining criteria for admission into the ICU.

The study showed that 84.6% of the admissions were due to obstetrics cases, while 15.4% were due to gynaecology cases. This was found to be different from 58% obstetrics and 42% gynaecology cases obtained from the Nigerian study by Adelaiye *et al.*¹⁰ but quite similar to 83% obstetrics and 18% gynaecology obtained from a Saudi Arabia study by Al-Jabari *et al.*⁸

The mean age obtained from this study was quite similar to 29.2 years and 27.2 years obtained in a study done in Ilorin by Fawole *et al.*¹¹ and Mohammed *et al.*² from Kano, respectively, for obstetrics admission into the ICU but different from 55.4 years obtained by a study done in

Kuopio by Heinonen *et al.*⁵ This is probably so because majority of the patients in this study were obstetrics cases (84.6%).

The percentage of primipara (46.8%) obtained in this study is comparable to 47% obtained from a Kano study by Mohd *et al.*² a decade ago. This is probably because majority of the patients admitted were due to eclampsia. Only 22% of the patients were booked which was much lower than 91% obtained in the Hong Kong study by Vivian *et al.*⁷

Most of the obstetric patients were post-partum (95.1%), which is comparable to 80% obtained by Mohd *et al.* Two patients only were admitted antepartum (on account of pulmonary embolism and severe malaria in pregnancy).

The most frequent mode of delivery was found to be via emergency caesarean section (43.6%) which is comparable to 51% obtained in Hong Kong study by Vivian *et al.*⁷

The percentage of hypertensive disorders in the obstetric admission (46.3%) is comparable to 53.3% obtained in Kano by Mohd *et al.* and 66.4% in a South African study by Platteau *et al.* and so many studies done elsewhere.^{2,9} This is quite different for other studies done outside Africa like in Hong Kong by Vivian *et al.*⁷ reporting 58% of obstetrics indications to be due to obstetric haemorrhage. Only 7% of our admissions were due to post-partum haemorrhage which was low compared to 13.3% obtained by Mohammed *et al.* from the same centre. This may be due to the fact that hypertensive disorders in pregnancy are common in our environment. Pulmonary embolism was found in 7.3% of the patients, which is lower than 20.1% obtained from the earlier study done in Kano by Mohammed *et al.*

The main indications for admitting gynaecology patients into the ICU include post-operative complications (50%) such as anaesthetic complications and pain management, followed by post-operative haemorrhage (16.7%) and infection (16.7%). This is quite different compared to other studies which mostly reported post-operative haemorrhage to be the most frequent gynaecology indication of admission into the ICU such as the Kuopio study by Heinonen *et al.*,⁵ which showed the most frequent indications to be due to post-operative haemorrhage (43%) and infections (39%).

Most of the women who ended up in intensive care had undergone surgery and were classified as being at high risk, reflecting the fact that the risk of serious morbidity is especially relevant to those judged to be at high risk because of gynaecology malignancy or pre-existing medical

disorders.⁵ This is similar to the findings in our study which showed that majority of the patients (66.7%) had background morbidities such as hypertension, malignancies or sickle cell disease or had undergone major surgeries. This was also similar to the finding by Adelaiye *et al.* and Heinonen *et al.*^{5,10}

The mean duration of stay for obstetrics patients was 4.2 days which is the same with the findings from the Kano study by Mohammed *et al.* but longer than 1.8 days that obtained in Hong Kong by Vivian *et al.*

The mean duration of stay in gynaecology patients was 2.8 days for gynaecology admissions which is way shorter than 19.1 days obtained in a South African study by Platteau *et al.* and 4.97 days reported from a study done in Kuopio by Heinonen *et al.* These variations may be due to the high mortality in gynaecology patients making their stay shorter and late referrals in our environment.

Almost half of the patients (48.9%) had blood transfusion, which is quite higher than 27% obtained from Mohammed *et al.* from the same centre. Some of them had application of non-pneumatic antishock garment to maintain effective circulation before blood is available. Ventilatory support in the form of mechanical ventilation was given to about 44.7% of the patients which is quite lower than 60% obtained earlier by Mohammed *et al.* from the same centre.

Anticonvulsant therapy and antibiotic therapy were done in 34% and 42% of all the patients respectively probably because hypertensive disease in pregnancy carried the highest percentage. This is similar to the Ilorin study by Fawole *et al.*¹¹ who reported 32.7% required anticonvulsant therapy but 100% required antibiotics. Other interventions the patients received either single or in combination included oxygen therapy, antibiotics, dialysis for those that had acute renal failure, inotropic agents, central line insertion and anticoagulation therapy.

The overall mortality rate in this study was found to be 40.4% out of which 84.2% were obstetrics cases and 15.8% were gynaecology cases. This is similar to overall mortality of 43% obtained from a Nigerian study by Adelaiye *et al.*,¹⁰ 62.5% of which were obstetrics cases and 37.5% of which were gynaecology cases. This is much different from study by Al-Jabari *et al.*⁸ which reported no mortality. This might be due to late presentation and late referral in our study group.

The mortality rate for obstetrics cases was 34% which is high compared to 26.7% reported by Mohd *et al.*² from Kano but lower than 60% reported by Adelaiye *et al.*¹⁰ from

a Nigerian study. The highest mortality was found amongst those with eclampsia.

The mortality rate for gynaecology cases was found to be low 6.4%. This is because of the smaller number of gynaecology cases amongst our study group. This however makes 50% mortality amongst the gynaecology cases. This is different from no mortality reported by Heinonen *et al.*⁵ from Finland.

About 68.4% of the mortality were referred from another hospital; this is almost the same as 68.2% of the mortality reported by Poorina *et al.*³ from India.

The major cause of death reported in this study was found to be cardiac arrest, followed by multiple organ failure and respiratory arrest. One patient died due to failure of electricity in the hospital. The limitation of this study includes our inability to retrieve all case folders and some information that might be relevant to the study could not be obtained since it is a retrospective study and the patients were not available to enquire from them. The study is however strengthened by using the well-structured pro forma, proper data analysis, good team work and support.

CONCLUSION

Obstetrics and gynaecology admissions into the ICU were found to be low. The most common indication for admission was hypertensive disorders in pregnancy, mostly eclampsia. Blood transfusion, oxygen therapy, mechanical ventilation, antihypertensive and anticonvulsant therapy are lifesaving interventions that are most frequently given to patients in the ICU. A multidisciplinary approach to management makes the outcome better. Although majority of the patients improved and were discharged home, there was a high mortality of 40.4%.

An ICU should be established especially for obstetrics and gynaecology and in close proximity for easier and prompt transfer of critically ill patients. Obstetrics and gynaecology staff should be trained on early identification and management of the critically ill patients.

The limitations we had were the inability to retrieve all the case files and being a retrospective study, some information that might have been relevant to the study were missing.

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Conflicts of interest

There are no conflicts of interest.

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