

A Five-year Review of the Pattern and Outcome of Obstetric Admissions into the Intensive care unit of a University Teaching Hospital in Southern Nigeria

Celestine Osita John, Justina Omoikhefe Alegbeleye * and Ijeoma Chioma Oppah

Department of Obstetrics and Gynaecology, University of Port Harcourt Teaching Hospital (UPTH), Rivers State, Nigeria.

Abstract

Background: The care of critically ill patients remains a herculean task in developing countries, Nigeria inclusive. This is due to the late presentation of patients, and the need for highly specialized equipment and professionals.

Objectives: To determine the incidence, pattern and maternal outcome of obstetric patients admitted to the intensive care unit (ICU) of the University of Port Harcourt Teaching Hospital.

Material and Methods: A five-year retrospective study of 141 obstetric admissions to the ICU from January 1, 2012 to December 31, 2016. A pre-structured questionnaire was used to obtain information from the case files, theatre, and ICU registers. Data obtained was collated, entered in a spread sheet, and analyzed using SPSS version 22.0. Results are expressed in means and percentages.

Results: There were 917 ICU admissions during the period under review. Of these, 141 were obstetric patients, constituting 15.4% of the total ICU admissions. The mean age was 31.73 ± 5.9 years, and the mean parity was 1.6 ± 1.5 . About two-thirds 82 (69.5%) of the women were unbooked. Obstetric haemorrhage was the most common indication for admission, 50 (42.3%), followed by severe pre-eclampsia/eclampsia 32 (27.2%). Majority (42.4%) of the patients had caesarean sections, while 18.6% had abdominal hysterectomy. The average length of stay was 3.4 days. The maternal mortality rate was 31.36%.

Conclusion: Admissions into the ICU was more common among unbooked obstetric patients. Obstetric haemorrhage remains a major cause of maternal deaths in developing countries, and the most common indication for ICU admissions.

Keywords: Intensive Care Unit; Obstetric Patients; Outcome; Nigeria

1. Introduction

In most women, pregnancy and delivery are often uneventful. However, in some women, complications may occur during this period which may lead to morbidity and mortality. Globally, approximately 0.1 - 0.9% of obstetric patients are admitted into the ICU [1], while it is up to 10% in developing countries [2].

The management of critically ill obstetric patients is important in improving maternal health (SDG-3) by reducing maternal mortality. Worldwide, the profile of critically ill obstetric patients admitted into the ICU has been shown to be similar; however, there is a clear division in the mortality rate between developed countries and low-resource countries [3]. Available data from Nigeria reported obstetric haemorrhage, complications of severe pre-eclampsia/eclampsia,

* Corresponding author: Justina Omoikhefe Alegbeleye

Department of Obstetrics and Gynaecology, University of Port Harcourt Teaching Hospital (Upth), Rivers State, , Nigeria.

multiple organ failure, late presentation, and lack of antenatal care as major determinants of mortality among critically ill women [4]. This disparity may be due to a combination of clinical and economic factors such as illiteracy, poverty, lack of awareness about health complications, and social/behavioural factors in low-resource countries [5].

The management of critically ill obstetric women in the ICU is a challenge to both the physician and obstetrician. This is because of the complex interactions between the physiological changes of pregnancy and the pathological processes. Studies on critical care in obstetrics are important to identify the key issues that need to be promptly addressed while managing severe maternal conditions [6].

Management of complications entails a multidisciplinary approach involving the obstetrician, anaesthetist, and intensivist. Though obstetric admission constitutes only a small proportion of intensive care unit (ICU) admission, mortality among them is quite high [7]. Early intervention and prompt ICU admission can alleviate the progression of organ dysfunction, thereby improving prognosis. Critical care management of obstetric patients in Nigeria is fraught with the problem of poor health care delivery services, late presentation of patients, and shortage of ICUs [8].

Hence, the study sought to determine the incidence, pattern and maternal outcome of obstetric patients admitted to the intensive care unit (ICU) of the University of Port Harcourt Teaching hospital.

2. Material and Methods

The study was a retrospective descriptive study of critically ill obstetric patients admitted into the ICU of the University of Port Harcourt Teaching Hospital (UPTH), Rivers state, Nigeria from January 1, 2012 to December 31, 2016. The University of Port Harcourt Teaching Hospital is a 884-bed tertiary hospital located at Alakahia in Obio Akpor Local Government Area of Rivers State, Southern Nigeria. It serves as a referral centre for all level of health facilities in Rivers state and other neighbouring states.

The ICU is a multi-specialized nine bedded unit with facilities for monitoring multimodal parameters and mechanical ventilators. It receives patients from all medical and surgical units in the hospital as well as referrals from other centres within and outside the state. It is staffed by intensive care specialist anaesthetists, who are the primary physicians for all patients and registered critical care nurses. All obstetric patients are followed up closely while on admission by a team of obstetrician in addition to the ICU team.

Data was extracted from the ICU admissions and discharge registers and the case files of the patients. The inclusion criteria were admission to the ICU during pregnancy or within 42 days of its termination and availability of the case file for review, while the exclusion criteria were non-obstetric patients, obstetric patients whose case files were not available for review and obstetric patients with incomplete medical records. The data included socio-demographic and obstetric characteristics, booking status, mode of delivery, vital signs, and Glasgow coma scores (GCS) on admission in the ICU, indication and clinical state at ICU admission, critical interventions, and outcome of ICU admission. The length of hospital stay, surgical interventions, fetal outcome, therapeutic interventions (mechanical ventilation, blood transfusions, haemodialysis and hysterectomy) were also obtained. The data was analyzed using SPSS 22.0. The results are expressed in percentages.

Ethical approval was obtained before commencement of the study.

3. Results

A total of 917 patients were admitted into the ICU during the period under review, of which 141 were obstetric patients, constituting 15.4% of the total ICU admission. However, only 118 had complete medical records, giving a data completion rate of 84%. The mean age of the women was 31.73 ± 5.88 years. About 46.6% had secondary education while 3.4% had no formal education. Unbooked patients constituted majority 82 (69.5%) of admissions, while 36 (30.5%) of them were booked. Of the 118 women, 55.1% were admitted into the ICU following term deliveries. This is shown in Table 1.

Figure 1 showed the indications for ICU admissions. Obstetric haemorrhage was the most common indication 50 (42.3%) for ICU admissions. This included ruptured uterus, abruptio placentae, placenta praevia, and primary post-partum haemorrhage due to uterine atony. Other indications were severe pre-eclampsia/eclampsia 32 (27.2%), cardiac conditions 9 (7.6%), pulmonary oedema 3 (2.4%), and renal failure 2 (1.6%).

As shown in Figure 2, 42.4% of the women had caesarean section, of which 40 (33.9%) were emergency caesarean sections and 10 (8.5%) were elective cases, 28 (23.7%) of the patients had vaginal delivery, 22 (18.6%) had exploratory laparotomy and hysterectomy, while 8 (6.8%) had hysterectomy and repair of ruptured uterus.

Administration of intranasal oxygen was the most common 55 (46.6%) intervention instituted in the ICU, followed by blood transfusion 23 (19.5%). About 48% of the women received an average of 2-3 units of blood. However, 11 (9.3%) patients required both blood transfusions and intranasal oxygen therapy, while 2 (1.7%) required haemodialysis.

As shown in Figure 3, while 42 (35.6%) of the patients had no complications, hypovolaemic shock occurred in 13 (11.0%) of the women. Other complications include cerebrovascular disease from eclampsia 10 (8.5%), left ventricular failure 8 (6.8%), acute kidney injury 9 (7.6%), and acute respiratory distress 9 (7.6%). Less common complications were pulmonary embolism, disseminated intravascular coagulation, vesico-vaginal fistula, and bladder rupture. Six of the women required mechanical ventilation, out of which 5 of them died and only 1 woman survived following mechanical ventilation. Non-obstetric indications for admission constituted 17 (14.3%) of the admissions, of which cardiac diseases accounted for 9 (7.6%), pulmonary embolism was 4 (3.4%), renal failure 2 (1.7%), aplastic anaemia and hyperthyroidism were 1 (0.8%) respectively.

Figure 4 showed the duration of ICU stay. The minimum length of stay in the intensive care unit was 24 hours and maximum length of stay was 18 days, with an average of 3.4 days.

There were 37 maternal deaths of which 33 (89.19%) occurred in unbooked patients, while 4 (10.81%) received antenatal care at our facility. The causes of mortality were primary postpartum haemorrhage from ruptured uterus, uterine atony and abruptio placentae, acute renal failure from eclampsia and placentae, and pulmonary embolism. This is shown in Table 2.

The case fatality ratio was highest (69.2%) among women who had exploratory laparotomy and hysterectomy for obstetric haemorrhage, as seen in Table 3. This was followed by exploratory laparotomy and repair of ruptured uterus (60%).

Table 1 Socio-demographic and Obstetric characteristics of the women

Variables	Frequency (n= 118)	Percent (%)
Age (years)		
< 20	1	0.9
20-29	35	29.6
30-39	72	61.0
≥ 40	10	8.5
Level of education		
No formal education	4	3.4
Primary	54	24.6
Secondary	31	46.0
Tertiary	29	26.0
Booking status		
Unbooked	82	69.5
Booked	36	30.5
Gestational age at delivery		
Term	65	55.1
Preterm	53	44.9

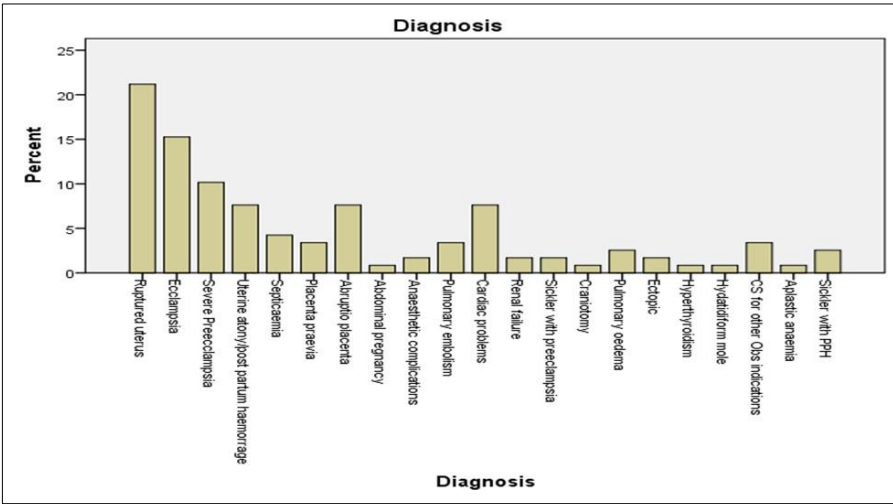


Figure 1 Indications for ICU Admission



Figure 2 Mode of delivery

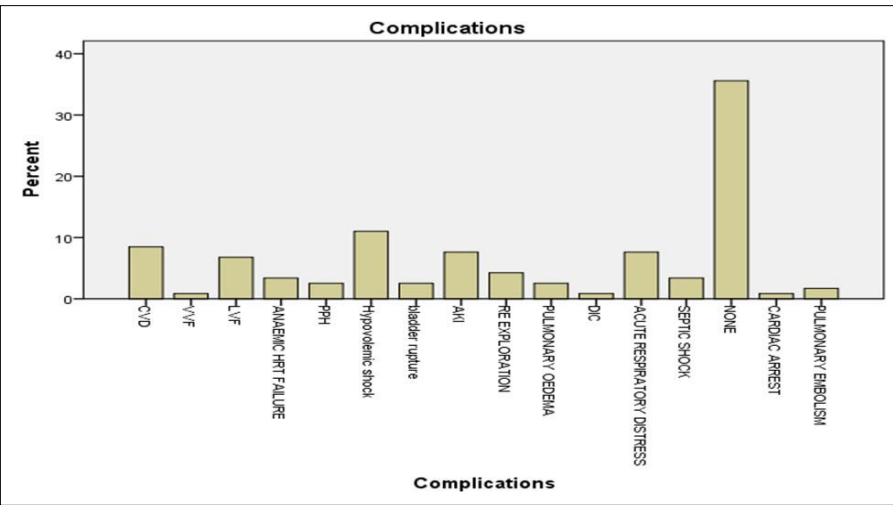


Figure 3 Obstetric complications

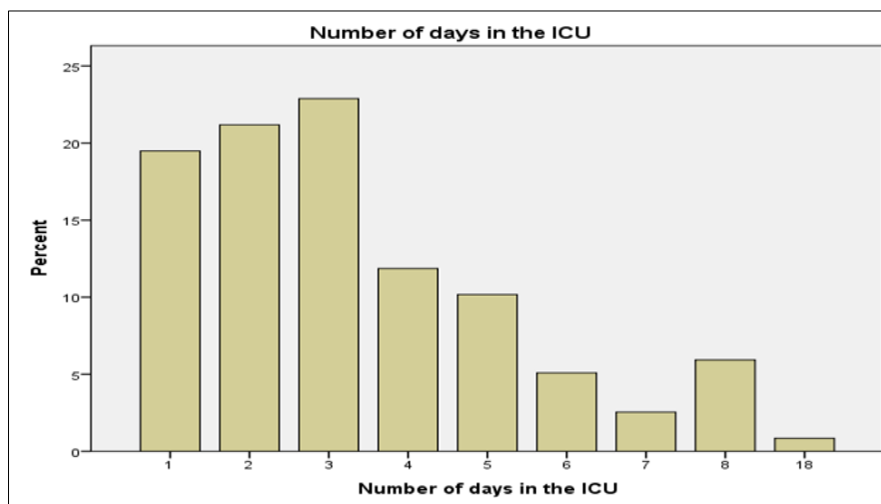


Figure 4 Duration of ICU stay

Table 2 Maternal Outcome

Variables	Outcome		
	Alive	Dead	Referred
Booked	32	4	0
Unbooked	47	33	2
Total	79	37	2

Table 3 Mode of delivery and Maternal Outcome

Mode of delivery	Outcome		
	Alive (n=79)	Dead (n=37)	Referred (n=2)
Spontaneous vaginal delivery	17	10	1
Elective Caesarean section	9	1	0
Emergency Caesarean section	28	11	0
Exploratory laparotomy + repair of ruptured uterus	5	3	0
Exploratory laparotomy + hysterectomy	13	9	0
Referred	1	0	1
Operative vaginal delivery	1	0	0
Exploratory laparotomy + salpingectomy	1	1	0
Suction evacuation	1	0	0
Emergency +Total Abdominal hysterectomy	1	0	0
Undelivered	2	1	0
Exploratory laparotomy	0	1	0

4. Discussion

Pregnancy causes physiological and anatomical changes. These changes play important roles in maternal morbidity and mortality even in women with no prior risk factors, who may require critical care. This implies that adverse maternal outcome may occur in both low and high-risk patients [9,10].

Critically ill obstetric patients constituted 15.4% of all ICU admissions in this study. This is comparable to the 12.3% reported in Ilorin and 14.3% reported in Bangladesh [3,11]. However, it is higher than the 1.25-4.6% reported in developing countries and the 0.38-10% reported in developed countries [12,13,14]. This could be attributed to the higher frequency of obstetric ICU admission referrals to our facility, which at the time was the only fully functional public ICU facility in the state.

Precariously ill obstetric patients accounted for 1.56% of total deliveries, compared to 0.2-1.4% in resource-poor nations and 0.2-1.54% in high income countries [9,15,16,17,18], even though low-resource countries have fewer facilities, the ratio of parturients requiring intensive care is equal globally.

The mean age of these critically ill women is similar to that reported by other researchers [19,20,21], emphasizing that these severely ill women are of reproductive age, with 53.4% having one or no previous delivery, while other authors reported 45-66% [16,22]. As a result, there is a greater need for immediate intervention to save the lives of these young women, who are also active members of the community.

Obstetric haemorrhage was the most common (42.3%) indication for admission to the ICU in this study, followed by hypertensive disorders of pregnancy (27.2%). This is comparable to findings by other authors [23,24,25]. However, in some previous studies, hypertensive disorders of pregnancy was found to be the leading cause of maternal ICU hospitalizations [11,26,27].

In Nigeria, critical care management of obstetric patients is complicated by a lack of ICUs, a weak healthcare delivery system, late referrals, and late presentation of the patients. In this study, obstetric haemorrhage was the primary cause of maternal death. Hence, adequate critical care units, a dedicated blood bank with blood and blood products for obstetric patients, well equipped laboratories, and adequate human and material resources are recommended.

In the current study, almost all the women were admitted during the postpartum period. Previous research has found that most severely ill obstetric patients who required intensive care were in the postpartum period, with a range of 63-100% [14,15,17,21,28], which corroborates our findings. This highlights the importance of well-trained birth attendants who can identify complications and administer appropriate treatment or prompt referral before significant morbidity occurs.

The study found a maternal death rate of 31.36%, which was comparable to a study in Kenya that reported a rate of 33% [13]. However, when compared to previous Nigerian research, ours was much lower. Other researchers reported 45.6% in Ilorin, 52% in Ibadan, and 48% in Enugu [3,16,29]. Substantially lower mortality rates were reported in developed countries such as 6% in Hong Kong, 8% in Riyadh, and 0.15% in New Jersey [12,18].

The case fatality ratio was highest in women who had exploratory laparotomy and hysterectomy, as well as those who had repair of ruptured uterus, due to massive blood loss, late presentation, and a limited supply of blood and blood products. As expected, it was quite low in women who had elective caesarean sections. This is rather disturbing because uterine rupture has been virtually eradicated in most parts of the world due to improved obstetric care. This supports the notion that most unbooked women continue to use traditional birth attendants, where dangerous procedures such as the indiscriminate use of oxytocics and abdominal massage are still used, as evidenced by the women's histories.

Lack of antenatal care, delayed referral, delayed presentation, and massive blood loss were all risk factors for maternal mortality. This high maternal mortality ratio was mostly attributable to a lack of blood and blood products and multiple organ failure on admission.

5. Conclusion

The current study observed that most of the maternal deaths was due to lack of antenatal care, hence, women should be encouraged to register for antenatal care. Also, there is a need for antenatal care services to be subsidized to make them affordable and accessible to all women, thereby preventing women from dying from avoidable causes. The most

common indication for ICU admission were obstetric haemorrhage and hypertensive disorders of pregnancy, most of which occurred in the postpartum period. Therefore, obstetricians must be trained in emergency medicine and critical care to manage these critically ill pregnant women.

Haemorrhagic shock and multiorgan dysfunctions were the leading causes of maternal death. As a result, blood bank services must be fully functional, as some of these deaths were caused by a lack of blood and blood products. In addition, there is a need for training and re-training in emergency obstetrics so that complications can be anticipated, mitigated, and promptly addressed as they occur. Furthermore, doctors and midwives working in distant health facilities must be trained for early recognition of women at risk for timely referrals. Stricter rules and enforcement of laws are needed to rein in the behaviour of traditional birth attendants, as many of these women present from such places.

Compliance with ethical standards

Acknowledgments

We acknowledge the assistance of the record department and nursing staff of the intensive care unit in retrieval of records.

Disclosure of conflict of interest

Authors have declared that no competing interests exist.

References

- [1] Shaheena D, Qureshi DA. Maternal Admission to ICU: An Experience in a Tertiary Care Hospital of Kashmir Valley. *Inproceedings* 2015; 4(10): 138-140.
- [2] Bajwa SK, Bajwa SJS. Delivering obstetrical critical care in developing nations. *Int J Crit Illn Inj Sci*. 2012; 2(1): 32-39.
- [3] Fawole AA, Bolaji BO, Oyedepo OO, Adeniran AS. Critically ill obstetric admissions into a tertiary hospital's intensive care unit. *J Med Investig Pract*. 2015; 10: 16-19.
- [4] Adeniran AS, Bolaji BO, Fawole AA, Oyedepo OO. Predictors of maternal mortality among critically ill obstetric patients. *Malawi Med J*. 2015; 27(1): 16-19.
- [5] Braveman P, Gottlieb L. The Social Determinants of Health: It's Time to Consider the Causes of the Causes. *Public Health Rep*. 2014; 129(2): 19-31.
- [6] Dasgupta A. Obstetric Outcomes with Large Fibroids in Pregnancies Nearing Term: A Study in a Tertiary Care Centre in Rural India. *Obstet Gynecol Int J*. 2017; 7(2): 00244.
- [7] Ozumba BC, Ajah LO, Obi VO, Umeh UA, Enebe JT, Obioha KC. Pattern and Outcome of Obstetric Admissions into the Intensive Care Unit of a Southeast Nigerian Hospital. *Indian J Crit Care*. 2018; 22(1): 16-19.
- [8] Ebirim L.N, Ojum S. Admission of obstetric patients in the intensive care unit: A 5-year review. *J Med Med Sci*. 2012; 3(11): 741-744.
- [9] Lataifeh I, Amarin Z, Zayed F, Al-Mehaisen L, Alchalabi H, Khader Y. Indications and outcome for obstetric patients' admission to intensive care unit: a 7-year review. *J Obstet Gynaecol*. 2010; 30(4): 378-382.
- [10] Yi HY, Jeong SY, Kim SH, Kim Y, Choi S-J, Oh S, et al. Indications and characteristics of obstetric patients admitted to the intensive care unit: a 22-year review in a tertiary care center. *Obstet Gynecol Sci*. 2018; 61(2): 209-219.
- [11] Haque R, Mizanur Rahman M, Jahan S, Begum K. Critically Ill Obstetric Patients Treated in Intensive Care Unit: a Study in a Tertiary Care Institution. *Delta Med Coll J*. 2017; 5 (1): 15 -19.
- [12] Madan I, Puri I, Jain NJ, Grotegut C, Nelson D, Dandolu V. Characteristics of obstetric intensive care unit admissions in New Jersey. *J Mat Fetal Neonat Med*. 2009; 22(9): 785-790.
- [13] 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.
- [14] Ramachandra Bhat PB, Navada MH, Rao SV, Nagarathna G. Evaluation of obstetric admissions to intensive care unit of a tertiary referral center in coastal India. *Indian J Crit Care Med*. 2013; 17(1): 34-37.

- [15] Faponle AF, Adenekan AT. Obstetric Admissions into the Intensive Care Unit in a Sub urban University Teaching Hospital. *Nepal J Obstet Gynaecol*. 2012; 6(2): 33-36.
- [16] Osinaike BB, Olusanya O. Inappropriate Intensive Care Unit admissions: Nigerian doctors' perception and attitude. *Niger J Clin Pract*. 2016; 19(6): 721-724.
- [17] Al-Suleiman SA, Qutub HO, Rahman J, Rahman MS. Obstetric admissions to the intensive care unit: a 12-year review. *Arch Gynecol Obstet*. 2006; 274(1): 4-8.
- [18] Aldawood A. Clinical characteristics and outcomes of critically ill obstetric patients: a ten-year review. *Ann Saudi Med*. 2011; 31(5): 518-522.
- [19] Embu HY, Isamade ES, Nuhu SI, Oyeboode TA, Kahansim ML. Obstetric admissions in a general intensive care unit in north-central Nigeria. *Trop J Obstet Gynaecol*. 2016; 33(1): 14-20.
- [20] Motiang M. Obstetric patients admitted to the intensive care unit of Dr George Mukhari Academic Hospital, Ga-Rankuwa, South Africa. *South Afr J Crit Care*. 2017; 33(1): 12-14.
- [21] Farzi F, Mirmansouri A, Atrkar Roshan Z, Naderi Nabi B, Biazar G, Yazdipaz S. Evaluation of Admission Indications, Clinical Characteristics and Outcomes of Obstetric Patients Admitted to the Intensive Care Unit of a Teaching Hospital Center: Five-year Retrospective Review. *Anaesthesiol Pain Med*. 2017; 7(3): e13636.
- [22] Githae F, Mung'ayi V, Stones W. Course and outcome of obstetric patients admitted to a University Hospital Intensive Care Unit. *East Afr Med J*. 2011; 88(10): 356-360.
- [23] Irene YV, Vaneet K, Gurvinder K, Arun A, Lalita A. Critical care in obstetrics-scenario in a developing country. *J Obstet Gynaecol India*. 2008; 58(3): 217-220.
- [24] Leung NYW, Lau ACW, Chan KKC, Yan WW. Clinical characteristics and outcomes of obstetric patients admitted to the Intensive Care Unit: a 10-year retrospective review. *Hong Kong Med J*. 2010; 16(1): 18-25.
- [25] Tang LC, Kwok AC, Wong AY, Lee YY, Sun KO, So AP. Critical care in obstetrical patients: an eight-year review. *Chin Med J (Engl)*. 1997; 110(12): 936-941.
- [26] Vincent U, Russ E. Critical Care Obstetrics in a Developing Country. *J Turkish-German Gynaecol Assoc*. 2008; 9(1): 9-13.
- [27] Bandeira ARAP, Rezende CAL, Reis ZSN, Barbosa AR, Peret FJA, Cabral ACV. Epidemiologic profile, survival, and maternal prognosis factors among women at an obstetric intensive care unit. *Int J Gynaecol Obstet*. 2014; 124(1): 63-66.
- [28] Gupta S, Naithani U, Doshi V, Bhargava V, Vijay BS. Obstetric critical care: A prospective analysis of clinical characteristics, predictability, and feto-maternal outcome in a new dedicated obstetric intensive care unit. *Indian J Anaesth*. 2011; 55(2): 146-153.
- [29] Okafor UV, Efetie ER, Amucheazi A. Risk factors for maternal deaths in unplanned obstetric admissions to the intensive care unit-lessons for sub-Saharan Africa. *Afr J Reprod Health*. 2011; 15(4): 51-54.