

A 365-Day Record of Maternal Admissions in Intensive Care Unit at the University of Port Harcourt Teaching Hospital in Nigeria

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Abstract

BACKGROUND. The intensive care unit provides critically ill patients with the necessary monitoring, care and supports to optimize their organ/system functions. Parturients are often at risk of sudden deteriorations or exacerbation of chronic illnesses from direct or indirect causes and would often require admissions into the intensive care or high dependency unit. This study is aimed at looking at the trends of maternal admissions in 365 days at the intensive care unit of a tertiary teaching hospital in Southern part of Nigeria, a country that contributes significantly to the global proportion of maternal morbidity and mortality. **METHODS.** The study adopted a retrospective approach. All critically ill parturients admitted and requiring organ support or close monitoring in the ICU had their files and ICU documents reviewed. The review was held from January-December 2018. **RESULTS.** Thirty-nine (39) parturients with a mean age (years) of 33 ± 1.3 were admitted, representing 2.9% of annual deliveries. All admissions were postnatal and came predominantly from the unbooked labour ward (51%) and the time lag from maternal deteriorations to presentation to the ICU was 72 ± 10 hours. The main indications for admissions were due to postpartum haemorrhage (33.3%), complications of hypertensive disorders of pregnancy (30.9%) and sepsis (25.6%). Nineteen (48.7%) patients died from obstetric haemorrhage, complications of hypertensive disorders of pregnancy, sepsis and pulmonary embolism. **CONCLUSION.** The trend of maternal admissions at this specific time frame reflects the burden of maternal critical care in our environment. It highlights the need to holistically tackle the known scourge with improved care.

Keywords

Maternal, Admissions, 365 Days, ICU, Portharcourt

1. Introduction

Pregnancy or the puerperium can become complicated by acute physiological derangements from various aetiological causes which are either obstetrical or non-obstetrical and could result in organ-system dysfunctions with limitation of functional reserves. The physiological adaptations in pregnancy often mask the early recognition of functional impairments and influence the threshold for intervention [1]. This explains the frequency and severity of near misses and the large proportion of maternal morbidity and mortality in resource-limited settings with poorly defined strategies for intervention [2] in addition to poor health systems and infrastructure.

The end station for maternal critical illness is the high dependency or intensive care unit or an extension of the concept of maternal critical care on the Labour ward complex where organ-system support suffices [3]. Most of the reports on maternal deaths in Nigeria emanate from tertiary health facilities with relatively advanced intervention strategies and the widely reported large proportion of maternal deaths in Nigeria which contribute about 10% of the global average [4], is a cause for concern, and it calls for concerted efforts to curb the increasing trend [4]. The role of the intensivist is crucial to managing the critically ill par-turients. However, it is imperative that the multidisciplinary team which involves, the obstetrician, midwife, obstetric anaesthetist, and other supporting units, remains the norm.

For decades, it has been reported of the recurring indications for ICU admissions of mothers who developed complications that are pregnancy related or occurring in the puerperium and consisting of hypertensive disorders of pregnancy: eclampsia and severe pre-eclampsia, haemorrhage (antepartum and post-partum), sepsis, pulmonary embolism etc. These risk factors for maternal morbidity and mortality are common in both the developed and in resource limited settings, but the outcome differs. While in the developed countries, the maternal mortality ratio is 21/10,000 deliveries, it is twice this figure in developing countries [5] [6] [7]. The difference between the two settings is defined by the quality of critical care services and the responses of the associated health systems. In most publications on maternal admissions in the ICU, a four year to more multiple year reviews were often considered to assess the prevalence of maternal admissions [8] [9]. It is obvious that this attempt could blur the burden of maternal critical illness and the seriousness it deserves to curb maternal deaths. A monthly, yearly approach to assessment may help provoke attempts to implement protocols to improve maternal health.

In this study, we evaluated the trends of maternal admissions in one year at the intensive care unit of a major referral health facility in River State Nigeria.

2. Method

Ethical clearance exemption was obtained from the University of Port Harcourt teaching hospital ethics and research board. The study was a retrospective study

of all maternal admissions beyond twenty-four hours (24 hours) between the first of January 2018 and the 31st of December 2018. The intensive care unit (ICU) of the University of Port Harcourt teaching hospital (UPTH) serves as an accredited referral centre for the management of the critically ill. A team of anaesthetists-intensivists led it with support from allied specialties. Pieces of information about the parturients were obtained from the records in the ICU and the parturients' folders and all information detailing the demographics, indications for ICU admission, sources of admissions, time of noticed deteriorations before admission, ICU interventions and outcome were collated. Inclusion criteria were: Maternal admissions > twenty-four hours in ICU, all pregnant women from conception to 42 days postpartum; mothers aged ≥ 18 years, Obstetrics and Non obstetric indications. Including those admitted for monitoring following complications in pregnancy and the puerperium. The calculated sample size for retrospective study to assess the proportion of mothers admitted in the ICU was twenty-six parturients, but all parturients admitted within the stipulated duration of the study (1 year) were evaluated.

Data obtained were analysed by a statistician using EPI-INFO version 3.5.1 (CDC Atlanta, Georgia, USA). Absolute numbers and simple percentages were used to describe categorical variables. Mean and median were expressed appropriately.

3. Results

One thousand three hundred and twenty-five deliveries were recorded in 2018 (1325). Thirty-nine (39) patients were admitted into the ICU (2.9%). Total annual ICU admission was one hundred and eighty patients (180) and the maternal admission was 21% of the annual ICU admission. The age of the patients ranged from 24 to 42 years. With mean age 33 ± 1.3 years and mean BMI was 32 kg/m^2 . The mean time lag at presentation was 72 ± 10.4 hours from the time of maternal deterioration (**Table 1**).

The reasons for ICU admission were: Postpartum haemorrhage 13 (33.3%), complications of hypertensive diseases of pregnancy: pre-eclampsia and eclampsia 12 (30.9%), sepsis 10 (25.6%), peri partum cardiomyopathy with pulmonary edema 2 (5.1%) and pulmonary embolism 2 (2.6%). All the patients were admitted during the postnatal period.

Table 1. Patient demographics.

Variable	Mean \pm Standard deviation
Age	33 ± 1.3
BMI	32
Length of stay (LOS)	4 ± 0.1
Pre-ICU onset of symptoms(hours)	72

Patients' demographics, length of stay, onset of symptoms.

The sources of referral (**Table 2**) included: Unbooked Labour ward, 20 (51.3%), postnatal ward 6 (15.4%), obstetric theatre 4 (10.3%), peripheral ICU. 3 (7.6%), and accident & Emergency 6 (15.4%). ICU interventions (**Table 3**) included: Invasive mechanical ventilation 5, noninvasive ventilation 4, renal replacement therapy 4, and vasopressor use 25. Nineteen (19) patients died representing 48.7% from sepsis (6), postpartum haemorrhage (6), complications of hypertensive disorders of pregnancy (5), and pulmonary embolism (2).

4. Discussion

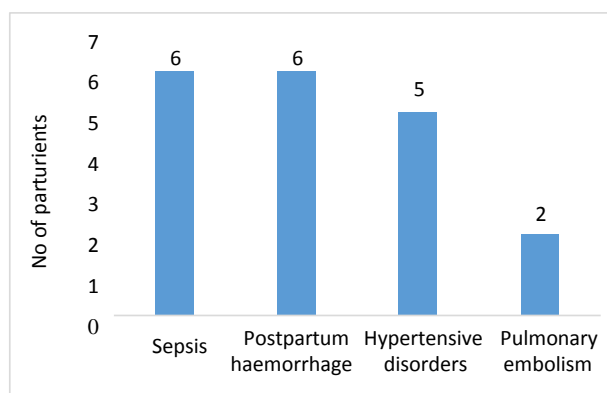
The physiological adaptations of pregnancy blur the ease of identifying and intervening in managing the critically ill parturients and this presents a big challenge to health care providers [10]. These changes often mask maternal sudden deteriorations, thus increasing the risk for severe morbidity and mortality. It is advocated that the unique nature of maternal critical illness should lower the threshold for intensive care admissions [11]. This view is important as maternal critical care admissions serve as a surveillance for maternal health [12] and requires regular audit to assess the outcome [13]. This underscores the essence of this review of the trend and outcome in one year. In this study the rate of maternal admission was 2.9% of annual deliveries, with about 49% maternal deaths and with over 50% of the maternal admissions coming from the Unbooked Labour ward. The maternal poor outcome in this study is comparable with the findings of Eyelade and Olamijulo *et al.* [14] [15] and it has not decreased [15] and they were attributed to well-known causes which included sepsis, obstetric haemorrhage, complications of hypertensive disorders of pregnancy and pulmonary embolism (**Figure 1**). The source of most of the poor outcome remains the Unbooked Labour ward (**Table 2**) which collaborates with reports by Ozumba *et al.* and others [15] [16], a subset of patients with doubtful antenatal care and a significant pool of high risk parturients who would require close monitoring and prompt care either in the high dependency unit or intensive care unit and not in the normal Unbooked Labour ward that is bereft of basic monitoring and supporting facilities. It is imperative to state that the poor outcome of the critically ill parturients in resource limited settings has a complex mix of risk factors involving Unbooked population, presentation at secondary health facilities, late referral from non-hospital delivery sites etc., to late presentation at the intensive care units for the very ill parturients and adverse maternal factors. These factors contribute to increased morbidity and mortality [17] whereas suboptimal care and delay to recognize sudden maternal deteriorations and lack of prompt intervention and the capacity to provide satisfactory organ-system support even at advanced centres of care represent inherent system failures that would contribute to the burden of care [18]. In developed countries, obstetric critical care is an integral part of obstetric practice with evidence-based guidelines and protocols to govern the management of the critically ill parturients. Such an organised setting contributes to the observed reduction in maternal morbidity and

Table 2. Sources of referral.

Variable	Frequency (n)	Percent (%)
Unbooked Labour ward	20	51.3
Postnatal ward	6	15.4
Obstetric theatre	4	10.3
Accident &Emergency	6	15.4
Peripheral ICU	3	7.6

Table 3. ICU Intervention.

Variable	Frequency (n)	Survival
Invasive mechanical ventilation	5	2
Non-invasive Ventilation	4	3
Haemodialysis	4	2
Norepinephrine Use	25	15

**Figure 1.** Causes of maternal deaths.

mortality as depicted by the Dutch report which had an admission rate of 2.4/1000 deliveries and a mortality rate of 3.9% [19]. The commonest indications for ICU admission in this study were postpartum haemorrhage, complications of hypertensive disease in Pregnancy, sepsis from obstructed Labour, ruptured uterus and chorioamnionitis, others included cardiomyopathy with decompensated pulmonary edema and pulmonary embolism. These indications for ICU admission are widely reported and known in both the developed and resource limited countries [20] [21] [22]. Here is a case of two populations with similar demographics but varied sociopolitical environments, same aetiologies of maternal critical illness but with very significant differences in outcome [18]. This is the drive for maternal critical care to become a public health issue with emphasis on prevention, easy recognition and prompt intervention to reduce this recurring burden of maternal morbidity and mortality.

In this study, the mean age of parturients was thirty years with a range of twenty-five to forty-five years (Table 1) and the parturients were all admitted

postpartum. This was the average age of parturients admitted into the intensive care units as observed by other workers [23]. It was also observed that maternal admissions sometimes reflect rapid changes in obstetric demographics such as increases in maternal age, comorbidity, assisted conception, increases in caesarean section rates, and poor antenatal care etc. This was ably shown by Ebirim *et al.* [24], of the associated increase in the number of intensive care admissions with multiparity. The observed seventy-two-hour period of delay from the onset of sudden maternal deteriorations to admission to the ICU (**Table 1**) was a significant risk factor for severe morbidity and mortality. This underscores the relevance of early recognition of maternal deteriorations and prompt intervention and the involvement of the intensive care team which influence maternal outcome [25] [26].

Most reports on maternal mortality emanate from tertiary hospitals with the requisite manpower and facilities to significantly improve maternal outcome. The influence of the economic burden of critical care in low resource settings make health insurance a necessity to curb the out-of-pocket expenditure of poor parturients. This is strongly advocated by the authors in addition to a multidisciplinary contribution in the management of these patients by relevant stakeholders at an early stage of deterioration and tracking of patients at risk and rapid intervention prior to admission to the intensive care unit. These efforts as dictated by local protocols would circumvent the rapid deteriorations that could not be salvaged even in the intensive care units and improve outcome.

5. Conclusion

Obstetric haemorrhage, sepsis and complications of hypertensive disorders in pregnancy still remain major risk factors for maternal deaths in developing countries. We highlighted the contributions of intra-hospital delays and poor access to critical care as recurring challenges to the care of parturients who require organ support and advocate for concerted efforts to improve critical care services through adequate funding, health insurance and health education.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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