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Original Research Article.

Obstetric Intensive Care Unit (ICU) Admission Evaluation: Experiences in a Tertiary Care Hospital

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ABSTRACT

Aims: To review pregnant patients up to 6 weeks postpartum who needs ICU admission.

Methods: This cross sectional study was conducted in the Dept of OB-GYN of Chittagong Medical College Hospital, Bangladesh from 1st Jan'2014 to 30th June'2016. Pregnant patients up to 6 weeks postpartum admitted in dept of OB-GYN & subsequently shifted to ICU were included.

Results: In our study period, out of total 47,941 obstetric patients, 124 transferred to ICU. The mean age 27.41 years [Range: 17 – 47 years]. Rural resident 69.35% (n=86). 54.84% (n=68) of middle class. Multi gravida / para 70.16 %(n=87). Antenatal 69.35%(n=86). 48.39% (n=60) received irregular antenatal care. Hypertensive disorder of pregnancy - most frequent obstetric indication for ICU admission which was 41.13%(n=51) [eclampsia: 26.61%(n=33); PE:13.71% (n=17); HEELP:0.81%(n=1)]. Obstetric hemorrhage stood second position which was 31.45% (n=39) [Rupture uterus 12.10% (n=15); APH due to placental cause 8.87% (n=11); PPH 6.45%(n=8); ectopic pregnancy 3.23% (n=4); molar pregnancy 0.81%(n=1)]. Obstructed labour & sepsis in 3rd & 4th position which included 9.68% (n=12) & 6.45% (n=8). Others 11.29% (n=14). However, 50% (n=62) transferred for both respiratory failure & hemodynamic instability, 41.94 % (n=52) for respiratory failure, 7.26% (n=9) for hemodynamic instability. Among 124 patients 41.94% (n=52) fully recovered. Majority 33.87%(n=42) stayed in ICU for 1 day [range:1-45 days].

Conclusion: Appropriate primary health care, efficient referral system & multidisciplinary approach including ICU is essential for management of these critical patients & to reduce maternal mortality & morbidity.

Key words: Intensive Care Unit (ICU); Maternal Mortality; Maternal Morbidity.

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INTRODUCTION

Pregnancy, delivery and puerperium can be complicated by severe maternal morbidity with potential catastrophic consequences necessitating intensive care unit (ICU) admission. About 830 women die from pregnancy or childbirth related complications around the world everyday and for every maternal mortality, 20 or 30 others experience acute or chronic morbidity.[1] So, maternal death have been described as the tip of the iceberg and maternal morbidity as the base. Transition from studying maternal mortality to morbidity for evaluation of maternal health services has followed a worldwide trend for this reason. According to WHO, admission to ICU is one of the criteria to measure severe acute maternal morbidity (SAMM). There is growing evidence that admission of high risk patient to the intensive care unit (ICU) is associated with a fall in maternal mortality.[2] Critically ill obstetrical patients account as much as 7% of intensive care unit admission in developing countries, while they account for small proportion between 0.1 and 0.9% in developed countries.[3-5] Management of critically ill obstetric patient is very complex and require the co-operation of Obstetrician, Intensivists and Anesthetist.[6] The objectives of this study are to review all critically ill pregnant patients up to 6 weeks postpartum who needs ICU admission of a tertiary care hospital to identify the demographic characteristics, indication for admission, cause of transfer to ICU, outcome, duration of ICU stay & to determine the conditions associated with maternal mortality.

METHODOLOGY

This cross sectional study was conducted in the Dept of OB-GYN of Chittagong Medical College Hospital, Bangladesh from 1st January' 2014 to 30th June' 2016. Pregnant patients up to 6 weeks postpartum admitted in dept of OB-GYN & subsequently shifted to ICU were included in this study.

Chittagong Medical College & Hospital is a 1313 bedded tertiary care hospital with 318 bed in Dept of OB-GYN. There are 12 bed in general ICU for all critical patients of the hospital except CCU and NICU. The decision to transfer the patients to ICU is governed by obstetric team and anaesthesiologist. Patients are managed by anaesthesiologist, but multidisciplinary consultation are taken when required. Data included maternal age, address, socioeconomic condition, parity, antenatal/postnatal, booking status, indication for admission, cause for ICU transfer, length of stay in ICU, mortality and cause of mortality were recorded in predesigned pro-forma & analyzed. These patients were followed up until discharge from hospital or until death. Early pregnancy complications like ectopic pregnancy, abortion and molar pregnancy were included in this study as they contribute to maternal mortality and morbidity.

RESULTS

In the two and half year study period (1st January' 2014 - 30th June' 2016), total admitted pregnant patients in the Dept. of OB-GYN were 47,941. Among them 124 patients were transferred to ICU for critical care representating 0.25% or 1 in every 400 obstetric population. Maximum 69.35% (n=86) patients were of 20-30 years of age. Mean age of the subjects were 27.41 years and the lowest and highest ages were 17 & 47 years respectively. Distribution of patients by residence revealed that 69.35% (n=86) patients were from rural areas. Majority 54.84% (n=68) patients belonged to middle class.(Table 1)

Antepartum admission 69.35% (n=86) were more as compared to postpartum. But 99.19% (n=123) patients were transferred to ICU postnatally. 48.39% (n=60) had irregular ANC and 24.19% (n=30) didn't receive any antenatal checkup during her pregnancy period. Majority 70.16% (n=87) patients were multigravida/para (Table 2).

Table 1: Socio demographic factors of the patients (n=124)

Age	**Percentage (Number)**
< 20 years	8.06% (n=10)
20– 30 years	69.35% (n= 86)
30– 40 years	21.26% (n=27)
>40 years	0.81% (n=1)
Residence	
Urban	30.65% (n=38)
Rural	69.35 %(n=86)
Socio-economic condition	
Middle Class	54.84% (n=68)
Poor	45.16% (n=56)

Table 2: Patient Characteristics (n=124)

Ante natal/ Post natal	**Percentage (Number)**
Ante natal	69.35 % (n=86)
Post natal	25% (n=31)
Early pregnancy complications	5.65% (n=7)
ANC	
No	24.19% (n=30)
Irregular	48.39% (n=60)
Regular	27.42% (n=34)
Parity	
Primi gravida/ para	37.90% (n=47)
Multi gravida/ para	70.16% (n=87)

Table 3: Primary Patient Diagnosis (n=124)

Hypertensive disorder pregnancy	**Eclampsia**	26.61%(n=33)	41.13% (n=51)
	Severe Pre-Eclampsia	13.71%(n=17)	
	HEELP	0.81%(n=1)	
Haemorrhage	**Ruptured Uterus**	12.10%(n=15)	31.45% (n=39)
	Antepartum Haemorrhage(APH)	8.87%(n=11)	
	Postpartum Haemorrhage(PPH)	6.45%(n=8)	
	Ruptured Ectopic Pregnancy	3.23%(n=4)	
	Molar Pregnancy	0.81%(n=1)	
Obstructed labour		9.68% (n=12)	
Sepsis	**Puerperal sepsis**	4.84% (n=6)	6.45% (n=8)
	Septic abortion	1.6% (n=2)	
Others		11.29% (n=14)	

Hypertensive disorder of pregnancy was the most frequent obstetric indication for ICU admission which was 41.13% (n=51). Among them 26.61% (n=33) patients presented with eclampsia, 13.71% (n=17) had severe Preeclampsia (PE) and 0.81% (n=1) were diagnosed as HELLP syndrome. Obstetric haemorrhage stood second position of ICU admission which was 31.45% (n=39) included 12.10% (n=15) rupture uterus, 8.87% (n=11) APH due to placenta praevia, 6.45% (n=8) PPH, 3.23% (n=4) ruptured ectopic pregnancy, 0.81% (n=1) molar pregnancy. Obstructed labour was in 3rd position with 9.68% (n=12). In the 4th position, there was sepsis representing 6.45% (n=8) which comprises puerperal sepsis 4.84% (n=6) and septic abortion 1.6% (n=2). Other reasons were 11.29% (n=14) including 2.42% (n=3) heart disease, 1.61% (n=2) antepartum eclampsia with obstructed labour, 1.61% (n=2) Guillain-Barre syndrome(GBS). Rest included post-operative shock, AKI with shock, shock with internal haemorrhage, uterine inversion with shock, severe anaemia with renal failure, antepartum eclampsia with abruptio placentae, diabetic ketoacidosis 0.81% (n=1) each (Table-3)

Majority 50% (n=62) were transferred to ICU for both respiratory insufficiency & hemodynamic instability, 41.94%

(n=52) for respiratory insufficiency, 7.26% (n=9) for hemodynamic instability & 0.81% (n=1) for close monitoring of patient due to repeated convulsion (Table 4). Airway protection became necessary in 91.94% (n=114) women who were intubated and subsequently given mechanical ventilation. A large number 57.26% (n=71) of patients did require the ionotropic support along with blood transfusion for maintenance of hemodynamic stability.

33.87% (n=42) stayed in ICU for 1 day. The period of stay in ICU varied from 2 days to 45 days for the remainder. Out of 124, 41.94% (n=52) were survivors and shifted back to ward after stabilization while 58.06% (n=72) expired.

43.05% (n=31) patients died due to complications related to hypertensive disorder of pregnancy followed by obstetric haemorrhage which was 25% (n=18). Obstructed labour and sepsis constitutes 7.26% (n=9) each. Rest 4.03% (n=5) included heart disease 1.61% (n=2), diabetic ketoacidosis, anaemic heart failure and postpartum GBS 0.81 % (n=1) each.

Table 4: Indication for ICU transfer (n=124)

Both respiratory failure and hemodynamic instability	50% (n=62)
Respiratory failure	41.94% (n=52)
Hemodynamic instability	7.26% (n=9)
Close monitoring	0.81% (n=1)

Table 5: Outcome of patients (n=124)

Alive	41.94% (n=52)
Died	58.06% (n=72)

DISCUSSION

In our study, we observed that 124 i.e 0.25% of obstetric patients were transferred to ICU which is consistent with other studies.[7,8] It's frequency was 1.34% and 1.4% in developing countries.[9,10] The frequency also reported as 2.23% and 2.1% in some other studies.[11,12] The frequency rate in developed countries varied from 0.1 – 0.9% and 0.17 – 0.26% in different studies.[3-5,9] In this study, majority 69.35% (n=86) were between 20 – 30 years of age and multipara. It was matched with other study.[9,12] Rural resident were 69.35% (n=86) and 30.65% (n=38) urban resident. Bibi and her associates observed that 73% of the residents came from rural area and 27% from urban area. Majority came from rural areas because of delay in taking decision, less availability of transport and geographical barriers. They failed to take emergency obstetric care timely and the conditions get much worse when they need to be transferred to ICU. The present study demonstrated that the prime causes of admission to ICU were hypertensive disorder of pregnancy accounts about 41.13% (n=51) and 26.61% (n=33) were due to eclampsia which is consistent with previous studies.[5,8,12,13] The higher maternal morbidity and mortality due to eclampsia in developing countries has been ascribed to late referral, delay in hospitalization, late transportation, unbooked status of patient and multiple seizures prior admission.[14] So early detection, prompt referral to tertiary centres and aggressive management of these patients particularly in labour and postpartum period along with provision of intensive care facilities to provide the optimum care of circulations, blood pressure and ventilation could minimize the prevalence of multiorgan failure and mortality of critically ill patients.[12] The second most common cause for admission to ICU was obstetrical haemorrhage representating 31.45% (n=39). It is about 22.8% in another study which is closer to the studies from Nigeria, France and Turkey.[5,8,12,15] It was the third leading cause of ICU admission in the study conducted in Pakistan.[9,16] Rupture uterus was the leading cause of obstetric haemorrhage in our study which is 12.10% (n=15). Multiparity, induction and augmentation of labour by oxytocin or prostaglandin at rural area or at home by untrained dai, poverty, rural resident, delay in decision making, delay in referral, delay in transportation, non-monitoring of home delivery are important factors for rupture uterus. Scarcity of blood and blood products was a big hurdle in the timely intervention, thus leading to increased morbidity and mortality.[16] Provision of free and safe blood banking services round the clock at tertiary care hospitals like ours is likely to yield better outcomes.[9] Obstructed labour is the third most common cause of admission to ICU accounted for 9.68% (n=12). Almost similar findings were found in another study which was 7.4%.[8] Unbooked status or irregular/poor utilization of antenatal care, non-supervised home delivery are the important factors for obstructed labour. Sepsis accounted for 6.45% (n=8) of ICU admission whereas Shaikh et al found 10% of ICU admission which was comparable with the study of Demirkiran et al .[12] Freda Richa and Bibi S reported 26.7% and 17% of infections respectively.[8,9] In our study, puerperal sepsis and septic abortion were responsible for sepsis. Prolong labour, obstructed labour, unsafe delivery accelerates the risk of puerperal sepsis and induced abortion increases the risk of septic abortion. Septicaemic patient develops multiorgan failure. Afessa et al also reported that sepsis was the most common cause of systemic inflammatory response syndrome and organ failure in critically ill obstetric patients treated in ICU.[17] Adequate ANC, appropriate supervision of labour, clean and safe delivery, family planning, prevention of unplanned pregnancy will decrease sepsis related morbidity and mortality. In our study, 50% (n=62) obstetric patient admitted to ICU for both respiratory failure and hemodynamic instability, 41.94% (n=52) for respiratory insufficiency and 7.26% (n=9) for haemodynamic instability. Bhagwanzee S. et al reported that respiratory insufficiency was the commonest organ failure in eclamptic patient in the ICU of a South African Hospital.[18] Ventilatory support or mechanical ventilation were required in 91.94% (n=114) patients in our study. Shaikh S. et al reported mechanical ventilation in 71% (n=59) ICU patient and the rate similar to that reported by Gupta S. , while the rate was lower in the other study.[12,19] Ruhina Baloch observed 80.92% (n=123) patients received mechanical ventilation.[19] In our study 58.06% (n=72) of the patients admitted in ICU died. Shaikh S. et al found 46% (n=35), Baloch R et al 68.4%, Dao et al 60% and Asinaiki et al 50% maternal death while the rate varies between 1.3 – 41.2% in different study.[5,8,9, 13,20]

CONCLUSION

Chittagong Medical College & Hospital serve the area of nearly 50,000 sq km and provide health care services to a population of 40 million.[21] In our hospital, many cases referred in a critical state from other public/private hospital as it is a tertiary referral centre. Appropriate primary health care, efficient referral system & multidisciplinary approach including ICU is essential for management of these critical patients & to reduce maternal mortality & morbidity. Of course, the need for maternal intensive care should not be the only criteria considered in the quality of maternal care but it must be one of the most important ones. But availability of bed in ICU is an issue as patients are transferred to general ICU. So, establishing an obstetric ICU/HDU in our setting is a very time bound and important modality for obstetric patient care.

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