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A Study on Obstetric Cases Requiring Critical Care Unit (CCU) Admission at Burdwan Medical College and Hospital

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Critical care , Intensive care unit, obstetric cases

ABSTRACT:

Introduction : Obstetric emergencies are a challenge to the obstetrician because of the unique nature of obstetric medicine. The altered physiology of pregnancy, the presence of the fetus, the rapid deterioration of maternal and fetal condition in case of a complication, and the simultaneous management of two lives with different physiologies are a challenge. **Objectives :** Keeping this in mind, present study was planned to analyze obstetric admissions in critical care unit and to study the management and outcome of such cases. **Methods :** The present hospital based prospective observational study was conducted in the Critical Care Unit and in the Department of Gynaecology and Obstetrics of Burdwan Medical College & Hospital between January 2017 to June 2018. Total 264 Obstetric cases admitted to CCU were included in the study. Statistical data were analysed by using Microsoft Excel and SPSS V.20 software. **Results :** In the present study mean age of the patients admitted to the CCU was 23.6±5.36 years. Among the total admissions 66 cases (25 %) had no antenatal visits. Total 77% of patients admitted at term, whereas preterm admission was 14.4%. Mean gestational age is 35.04±8.17 weeks. Majority of the patients were delivered by caesarean section (72.7%). The direct obstetric causes accounted for 87.1% of the total admissions in CCU and medical causes complicating pregnancy were 12.9%. Of the 264 patients admitted to CCU, Hypertensive disorder of pregnancy was the major obstetric cause (50%) followed by Obstetric haemorrhage (28.8%) and sepsis (8.3%). The reasons of CCU admission were low GCS (43.5%), followed by respiratory distress (31.4%), hypotension (17%) and refractory seizures (4.9%). Among the total patients admitted in CCU, 74.6% survived and 25.4% expired. **Conclusions :** Awareness should be created among the population regarding the importance of adequate antenatal care; detection of the danger signs of various obstetric complications and need for contacting the medical facility at the earliest in a case of emergency situations.

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Introduction :

Over the centuries anaemia, eclampsia and haemorrhagic shock have killed millions of our pregnant women and still continue to do so. In spite of great advances in the medical field and improved quality of healthcare available in our country, the maternal mortality in India is very high (By 2010 AD MMR is 210/ 1, 00,000 live births).[1]

In 2000, the leaders of all United Nations Member States agreed that policies conducive to development and to the elimination of extreme poverty would be put in place in global scale. A set of targets has been established and many countries have done a substantial progress towards those outcomes, which became known as the Millennium Development Goals (MDGs). Social determinants and the health system performance play a major role in the occurrence of maternal deaths. One of the MDGs, the reduction of maternal mortality, is a robust indicator of development.

Good progress has been made in achieving MDG (Millennium Development Goals) 4 and 5 to reduce maternal and child mortality. The post 2015 agenda seeks to integrate economic development (poverty reduction) and Sustainable Development Goals (SDG) 'ensuring universal health coverage and access.' Post 2015, SDGs has been taken in international platform to achieve improved health for 'every woman, every child'.

Due to lack of awareness and absence of regular antenatal care, the critically ill patients are referred late and sometimes in moribund conditions with multiple organ damage. In order to provide them specialized care and reduce maternal mortality specialized obstetric intensive care units have been established. The concept is yet to gain stronghold in our country. Obstetric emergencies are challenge to the obstetrician because of the unique nature of obstetric medicine. The challenges are - altered physiology of pregnancy, the presence of the foetus, the rapid deterioration of maternal and foetal condition in case of a complication and the simultaneous management of two lives with different physiologies [2].

Although obstetric patients form a significant proportion of CCU admission in developing countries, there are only a few studies reporting on critical illness during pregnancy [3-5]. Scarpinato et al (as cited in Richa et al) [5] identified serious lack of knowledge on obstetric care and called for increasing reporting of data.

According to the World Health Organization (WHO), "there is a story behind every maternal death or life threatening complication, and understanding the lessons to be learned can help to avoid such outcomes" [6].

A better knowledge of the spectrum, characteristics and outcomes of the diseases involving this group of patients is the first step towards achieving prevention and the current study is done to supplement the present knowledge on obstetric emergencies requiring CCU care. It is noteworthy that the terms Critical Care Unit (CCU) and Intensive Care Unit (ICU) used in different reports are synonymous.

The study was to determine the CCU utilization by obstetric patients, to know different reasons for CCU admission, the intervention required and outcome of such admission in CCU in the setting of a tertiary care hospital

Methods

This hospital based prospective observational study was conducted in Critical Care Unit and in the Department of Gynaecology and Obstetrics of Burdwan Medical College & Hospital between July 2023 to December 2023. The CCU in BMCH is a mixed medical and surgical CCU under the Department of Anaesthesiology and Critical Care Medicine, where obstetric patients are managed jointly by anaesthesiologists and obstetricians. This hospital is a high volume obstetric centre

Study population: Obstetric cases admitted to CCU either from the emergency room, the operating room, the labour room, eclampsia/pre-eclampsia ward or high dependency unit (HDU) of the Department of Gynaecology and Obstetrics of BMCH during the study period. Two hundred sixty four cases admitted in CCU during the study period were included in the study

Inclusion criteria : Obstetric cases admitted to CCU (in the study period) during pregnancy or within 42 days after delivery.

Exclusion criteria : Decline to participate in study, more than 42 days after delivery and poisoning or accidental cases.

Pre designed, pre tested schedule was used to collect the data. Data was collected from BHTs, indoor records of the Department of Gynecology & Obstetrics and CCU, BMCH. Reasons for CCU admission, Primary Diagnosis

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on admission to CCU and type of interventions required like mechanical ventilation, use of central lines, blood /products transfusion, haemodialysis, antibiotics, antihypertensive management, inotropic support and use of $MgSO_4$ etc was also noted.

Data Analysis plan- The data was tabulated in Microsoft Excel software and analysed with SPSS V.20 software. An alpha level of 5% has been taken that is if any p value is <0.05, it was considered as significant.

Ethical considerations- Study was initiated after obtaining the informed consents from the participants and ethical clearance from the institutional ethical committee.

Results

In this study, a total of 30620 deliveries took place in Burdwan Medical College and Hospital, a tertiary Govt. hospital of West Bengal during the period of 1st January 2017 to 30th June 2018. The critically ill obstetric patients referred from different hospitals were 834, out of which 106 (12.7%) patients were transferred to CCU and rest was treated in HDU.

Obstetric patients admitted to the CCU were 264 which constitute 0.84% of the total admission. The total admissions to the CCU were 973, during the study period. Obstetric patients represent 27.1% (264/973) of all CCU admissions.

Table 1: Distribution of participants according to different parameters.

Age (in years)	**No. of cases**	**Percentage**
< 20	75	28.4
20 – 30	164	62.1
>30	25	9.5
Mean age in years	23.6±5.36	
Antenatal care		
Booked	198	75
Un-booked	66	25
Gravida		
1	173	65.5
2	65	24.6
3	20	7.6
≥ 4	6	2.3
Timing of admission to CCU		
Ante partum	5	1.9
Postpartum	259	98.1
POG		
< 28 wks	23	8.7
28 – 36wks	38	14.4
≥ 37 wks	203	76.9
Total	264	100
Mean period of gestation in weeks	35.04±8.17	

In the present study 62.1% of the patients belonged to the age group between 20-30 years. Mean age of the patients admitted to the CCU was 23.6±5.36 years. Among the total admissions 66 cases (25 %) had no antenatal visits, 198 cases (75 %) had antenatal care and percentage of the patients having regular, timely and adequate antenatal care is not exactly

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known. Primi gravida constitute 65.5% and multipara contribute 34.5% of the admissions. Majority of patients in CCU were in postpartum period (98.1%). Total 77% of patients admitted at term, whereas preterm admission was 14.4%. Mean gestational age is 35.04±8.17 weeks. (Table 1)

Table 2: Pregnancy outcome and primary diagnosis among CCU admissions

Outcome	**Frequency**	**Percentage**
Vaginal delivery	46	17.4
Caesarean delivery	192	72.7
Ectopic - laparotomy	17	6.4
Abortion	6	2.3
Undelivered	3	1.1
Total	**264**	**100**
Primary diagnosis		
Direct Obstetric causes	230	87.1
Medical causes complicating pregnancy	34	12.9
Total	264	100

Majority of the patients were delivered by caesarean section (72.7%). Vaginal delivery, laparotomy for ruptured ectopic pregnancy and abortion were noted in 17.4%, 6.4%, 2.3% of cases respectively. The primary diagnoses among admissions to CCU were grouped into two – direct obstetric causes and medical causes complicating pregnancy. The direct obstetric causes accounted for 87.1% of the total admissions in CCU and medical causes complicating pregnancy were 12.9%. (Table 2)

Table 3: Analysis of primary diagnosis

Primary diagnosis			**Number (n=264) (%)**
Obstetric causes 230 (87.1%)	Hypertensive disorder of pregnancy (HDP) 132 (50%)	Severe preeclampsia with hypertensive crisis or other related complications	10 (3.8)
		Eclampsia	119 (45%)
		HELLP Syndrome	3 (1.1%)
	Obstetric haemorrhage 76 (28.8%)	Ante partum haemorrhage	11 (4.2%)
		Postpartum haemorrhage	46 (17.4%)
		Uterine rupture/perforation	8 (3%)
		Ruptured ectopic pregnancy	11 (4.2%)
	Sepsis 22 (8.3%)		22 (8.3%)
Medical causes complicating pregnancy 34 (12.9%)	Heart disease 8 (3%)	Heart failure	4 (1.5%)
		RHD	3 (1.1%)
		Cardio myopathy	1 (0.4%)
		Pulmonary embolism	1 (0.4%)

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	Respiratory disorder 2 (0.8%)	ARDS	1 (0.4%)
	Hepatic disorder 8 (3%)		8 (3%)
	Renal disease 9 (3.4%)	Renal failure	9 (3.4%)
	Diabetes mellitus 1 (0.4%)	DKA	1(0.4%)
	Neurological disorder 3 (1.1%)	CVA	2 (0.8%)
		TB Meningitis	1 (0.4%)
	Others 3 (1.1%)	Intestinal obstruction	1 (0.4%)
		Dyselectrolytemia	1 (0.4%)
		Cerebral malaria	1 (0.4%)

Of the 264 patients admitted to CCU, Hypertensive disorder of pregnancy was the major obstetric cause (50%) followed by Obstetric haemorrhage (28.8%) and sepsis (8.3%). Among the medical causes complicating pregnancy, renal failure (3.4%) cases accounted for maximum admissions followed by heart disease (3%), hepatic disorder (3%), neurological (1%) and respiratory disorder (0.8%). (Table 3)

Table 4: Indications (reasons) of CCU admissions

Indications (reasons) of CCU admissions	**No of cases**	**Percentage (%)**
Low GCS	115	43.5
Respiratory distress (SpO2 < 90%)	83	31.4
Hypotension	45	17
Oliguria / severe acute azotemia	10	3.7
Refractory seizures	13	4.9
Hepatic disorder	8	3
Post cardiac arrest	1	0.4
Others	4	1.6

The reasons of CCU admission were low GCS (43.5%), followed by respiratory distress (31.4%), hypotension (17%) and refractory seizures (4.9%) (Table 4).

Table 5: Mode of interventions in CCU

Interventions	**No of cases**	**Percentage**
Oxygen supplementation	264	100
Antibiotic	259	98.1
Blood products	161	61
Ventilation	218	82.6
Central venous line	133	50.4
Inotrops	82	31.1
Inj. magnesium sulphate	120	45.5
Anticonvulsant other than inj.MgSO4	101	38.3

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Antihypertensive	122	46.2
Haemodialysis	15	5.7

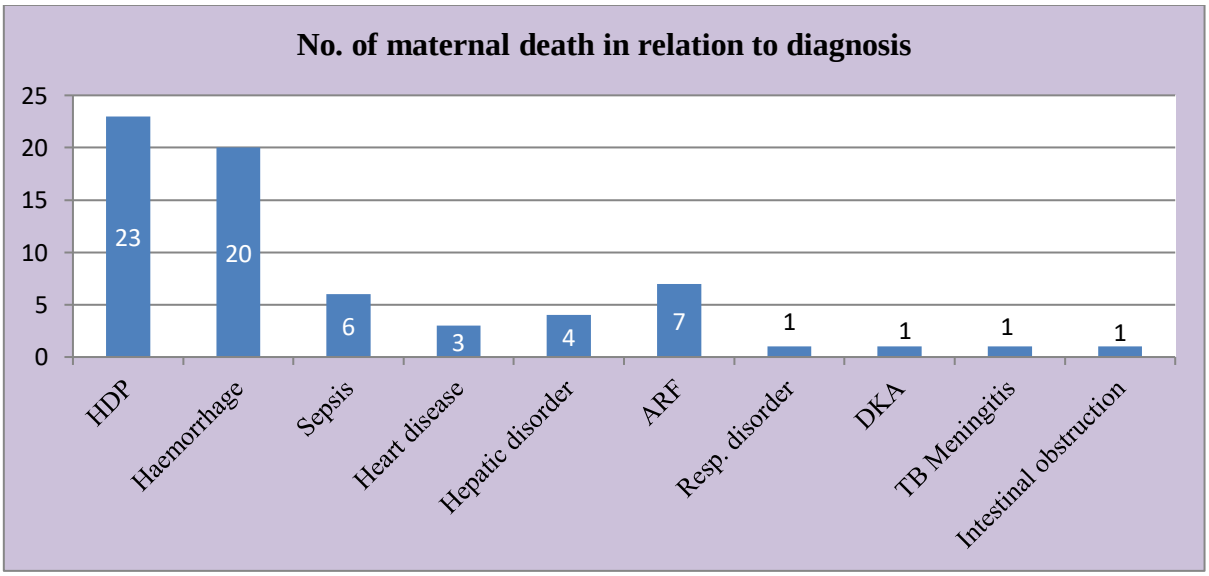
Table 5 depicts mode of intervention in CCU. Mechanical ventilation, Central venous line, Inotropic support and Haemodialysis were needed in 82.6%, 50.5%, 31.1% and 5.7% of cases respectively.

Table 6: Obstetric cases in CCU – outcome

Outcome (n=264)		**No. of cases**	**Percentage**
Survivors	Shifted to general ward	193	74.6
	Shifted to other dept.	4	
Non survivors		67	25.4

Among the total patients admitted in CCU, 74.6% survived and 25.4% expired. (Table 6)

Figure 1: Maternal mortality analysis



The maternal mortality due to direct obstetric causes was more in hypertensive disorder of pregnancy (34.3%) when compared to haemorrhage (29.9%) and sepsis (8.9%). Among the medical causes complicating pregnancy majority of the deaths occurred in acute renal failure (10.4%), hepatic disorder (6%) and heart disease (4.5%). (Figure 1)

Discussion :

Obstetric patients admitted to the CCU were 264 which constitute 0.84% of the total obstetric admissions. The total admissions to the CCU were 973, during the study period. Obstetric patients represent 27.1% (264/973) of all CCU admissions.

In the present study the admission rate in CCU is higher than Gupta et al[7] and Bhatt et al[8] and correlates well with Togal et al.[9]

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Among 264 patients, 106 (40%) patients are referred cases from peripheral hospitals. Among the referred obstetric cases from periphery 12.7% (106/834) needed CCU admission. Those patients were either referred late or managed inadequately from the onset of critical situations. Early detection of the complications, initiation of appropriate interventions and timely referral to the tertiary medical facility are the important predictors of the morbidity and mortality of the patients admitted to CCU.

Among the total 264 cases admitted to CCU, 62.1% belongs to age group between 20 -30 yrs and the mean age incidence is 23.6±5.36 years.

The present study in relation to age correlates well with Gupta et al[7] and Karnad et al[10] but differs from other studies[11,12] In this study booked cases comprises of 75% of the total admissions and it correlates well with the findings of Gupta et al[7]

In this study primi para constitute 65.5% of the admissions when compared to multipara 34.5%. Regarding parity our study doesn't correspond with the study of Verma et al[13] and Suleiman et al[11] where the majority were multigravida.

It was observed that mean gestational age at the time of delivery was 35.04 weeks. Present study compared well with Gupta et al and Togal et al[9] and is closer to Suleiman et al.[11]

This study shows 98.1% were postpartum and 1.9% of the admissions were ante partum. Almost all the patients are admitted in postpartum period. This is closer to the study of Okafor et al.[14]

The 72.2% of the obstetric patients admitted to our CCU were delivered by caesarean section. It is almost equal to the caesarean section rate of 70% reported by Pollock et al [15] in their systematic review and similar to studies by Sriram and Robertson[15] and Leung et al.[16]

In the present study of the 264 patients admitted to CCU, Hypertensive disorder of pregnancy was the major obstetric cause (50%) followed by Obstetric haemorrhage (28.8%) and sepsis (8.3%). It is similar to the study conducted by Daneila N Vasquez et al[2] and Saha R et al.[17]

The leading causes of CCU admission were low GCS (43.5%), respiratory distress (31.4%) and hypotension (17%). These causes were present in the patients admitted in CCU either singly or in combination.

In this study during management in CCU, mechanical ventilation, central venous line, inotropic support and haemodialysis were needed in 82.6%, 50.5%, 31.1% and 5.7% of cases respectively. The percentage of the patients who required ventilation was relatively high in comparison to the studies reported (35%) by Olarraet al and less than 45% described by Afeesa et al.[18]

The maternal mortality due to direct obstetric causes was more in hypertensive disorder of pregnancy (34.3%) when compared to haemorrhage (29.9%) and sepsis (8.9%). Among the medical causes complicating pregnancy majority of the deaths occurred in acute renal failure (10.4%), hepatic disorder (6%) and heart disease (4.5%).

Like many Indian studies[19,20] hypertensive disorders of pregnancy and its complications were the major causes of mortality in this study, being responsible for 34.3% of maternal deaths in CCU.

Among total 67 maternal deaths in CCU, 31 cases (46.3%) were referred from peripheral medical centres. This high mortality rate could be due to late referral from the peripheral centres, lack of awareness about the disease severity by the community, delay in transportation, and delay in initiation of the treatment.

Conclusions

The findings of the present study reinforce the statement by WHO that "There is a story behind every maternal death or life-threatening complication. Understanding the lessons to be learned can help to avoid such outcomes". Low socioeconomic status, lack of education and poor antenatal care, late referral of high-risk cases have been found to have a considerable effect on obstetric complications and outcome.

Early detection and prompt referral to the tertiary centre with intensive care facilities should be promoted among the medical fraternity to reduce the incidence of CCU admissions, maternal mortality and morbidity

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Ethical approval: The study was approved by the institutional ethics committee

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