

Near-Miss Obstetric Events and Maternal Death: Experience in Combined Military Hospital, Dhaka

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Abstract

Introduction: Obstetric patients can become critically ill for pregnancy related complications other conditions unrelated to pregnancy and may require emergency intensive care. The survival of both the mother and baby depends on the emergency services that are provided at that critical moment.

Objective: To evaluate the level of obstetric emergency services in Combined Military Hospital (CMH) Dhaka by comparative analysis of near-misses and mortalities.

Materials and Methods: This descriptive cross-sectional study which was conducted by observation of critically ill obstetric patients admitted in general intensive care unit (ICU) of CMH Dhaka from July 2012 to June 2013. Data regarding the disease associated with pregnancy and complications requiring ICU admission or transfer were collected and analyzed to calculate the maternal mortality and near miss ratio.

Results: During the study period, 44 cases have been shifted to ICU, representing 2.15% of 2050 deliveries. Haemorrhage (50%) and hypertensive disorder of pregnancy (36.36%) were the two main obstetrical complications requiring ICU management. Surgical intervention was required in 86.3% of cases, 68% required intensive monitoring in ICU followed by blood transfusion in 59% cases. The maternal mortality ratio was 195.12/100000 live birth and fetal mortality rate was 82.2 per 1000 deliveries.

Conclusion: By adopting safe motherhood initiative, both morbidity and mortality of pregnant mother can be lowered down. Early diagnosis by assessment, prompt intervention by team of expert obstetricians, intensivist and anaesthetist in reserve ICU can reduce the maternal mortality and morbidity.

Key-words: Near-miss, ICU Support, Hypertensive disorder in pregnancy, Intervention.

Introduction

Critically ill obstetric patients are a challenge to the intensive care unit physicians¹. Maternal mortality and morbidity are the important quality assurance indicators of the health system of a country². Each year, nearly 5,29,000 women throughout the world die due to pregnancy-associated cases. In addition to maternal death, more than 50 million women suffer severe health problems annually due to pregnancy-related complications³. The journey to safe motherhood is not a sweet dream for Bangladeshi women. Maternal mortality ratio (MMR) is 176 death/1,00,000 live births (2015)⁴. A near miss event is a woman nearly died for the complication of pregnancy, child birth or within 42 days of termination of pregnancy⁵. This study was done to evaluate the level of obstetric emergency services and to identify the short comings for setting priorities to ensure a better maternal healthcare provision in Armed Forces.

Materials and Methods

This cross-sectional study was carried out in Combined Military Hospital (CMH), Dhaka from July 2012 to June 2013 and pregnant patient up to 6 weeks postpartum were included in the study. CMH Dhaka is a multidisciplinary largest hospital in Bangladesh Armed Forces providing tertiary care health service for peripheral CMH and also for the population of Dhaka cantonment. Nearly 3000 deliveries per year are performed in this hospital which is supported by twelve bedded intensive care unit (ICU) within the operation theatre (OT) complex.

Data were collected by observation of critically ill obstetric patients who were shifted to ICU during the study period. Data included maternal age, parity, obstetric history, gestational age, diseases responsible for critical illness, complications leading to ICU admission, intervention required, length of ICU stay, and resulting foeto-maternal mortality and morbidity. Complication prompting ICU admissions were categorized as haemodynamic instability, respiratory compromise or neurological dysfunction. SPSS 19 software was used for data analysis and results were

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presents as frequencies, percentages. To see the standard of care provided for each disease category, the mortality index for each obstetric condition was calculated. This is defined as the number of maternal deaths due to particular obstetric condition divided by the sum of near-miss morbidity and maternal deaths which results from this condition expressed as a percentage⁵⁻⁸.

Definition of Cases: There is a debate for a case definition of severe obstetric morbidity. Three approaches include definition based on management, clinical signs and symptoms and organ systems involved⁹⁻¹³. The disease-specific criteria set by Filippi et al¹⁴ were employed to identify near-miss cases. The five main diagnostic domains are: (1) Severe haemorrhage (leading to shock, emergency hysterectomy, coagulation defects and/or blood transfusion of >2litres) (2) Hypertensive disorders in pregnancy which include eclampsia, severe pre-eclampsia (BP>140/90 mm of Hg and proteinuria >1gm/24 hours) or HELLP (Haemolysis, elevated liver enzyme and low platelet) syndrome (3) Sepsis defined as a temperature less than 36 degree Celsius or more than 38 degree Celsius with clinical signs of shock (systolic BP<90 mm of Hg and HR>120/min) (4) Dystocia which include uterine rupture (5) Severe anaemia (Hemoglobin <6gm/dl without severe haemorrhage).

Result

Four maternal deaths and 17 foetal deaths occurred during the study period. This resulted in a total MMR of 195.12/100000 live birth and a stillbirth rate of 82.2 per 1000 deliveries. The total Maternal Near Miss Ratio (MNMR) was 19.5/1000 live birth and the total mortality index for near-miss cases was 9.09%. During the study period, 44 obstetric patients were transferred to general ICU, representing 2.15% of 2050 live birth. The majority were young, multiparous and having preterm gestation. Surgical intervention was required in most (86.36%) cases and among them, 54.6% required caesarian section, 11.36% caesarian hysterectomy and 20.4% required laparotomy. The duration of ICU stay varied from 1 to 6 days but one case was 15 days (Table-I). Haemodynamic instability (50%), hypertensive disorder (36.36%) and respiratory failure (6.8%) were the major indication for transfer to ICU (Table-II). Table-III shows that among the hypertensive disorders, 5(11.3%) were Eclampsia, 9 (20.4%) were Pre-eclampsia and 2(4.54%) developed HELLP syndrome. Table-IV shows that severe blood loss (50%) was the main cause of haemodynamic instability. Among the other causes, 9(20.5%) were ruptured ectopic pregnancy, 3(6.8%) were haemorrhage due to placenta praevia, 10(22.72%) were postpartum haemorrhage (PPH) which included abruptio placenta 2(2.54%), uterine atony 6(13.6%) and uterine rupture 2(4.54%). 9 patients (20.4%)

needed laparotomy due to ruptured ectopic pregnancy. 5 patients (11.3%) needed caesarian hysterectomy due to uncontrolled haemorrhage.

Medical disorders associated with pregnancy which included acute fatty liver of pregnancy (2.27%), pregnancy with hepatic failure (2.27%) (hepatitis E), pregnancy with uncontrolled diabetes mellitus with chronic renal failure (2.27%) and Eclampsia with complications (2.27%). Table-V shows that the majority(68%) required intensive monitoring in ICU, followed by blood transfusion (59%), ionotropic agents to maintain blood pressure(36%), mechanical ventilation (6.8%), MgSO₄ for control of convulsion (18%).

There were 4 maternal deaths making maternal mortality rate of 9.09%. One due to acute fatty liver of pregnancy and another was due to pregnancy with hepatitis E infection, one maternal death was due to pregnancy with uncontrolled diabetes mellitus complicated by chronic renal failure and another one was hypertensive disorders of pregnancy complicated by gastroenteritis and electrolyte imbalance. The range of stay in hospital till death period was 1 to 6 days except one case stayed 15 days (Table-I).

Table-I: Patient profile of near-miss/maternal deaths at CMH Dhaka

Characteristic	Result
Maternal age (year)	27±3.81
Gestational age (weeks)	28.93±11.29
Parity (number)	2.2±2.61
Duration of ICU stay (days)	2.6±2.24(1 to 6 days, only one 15 days)
Booked status	Unbooked 17(38.63%) booked 27 (61.63%)
Surgical intervention required	86.36%

Table-II: Distribution of patients by indication of ICU admission (n=44)

Indication	Frequency	Percentage
Respiratory failure	3	6.8
Hepatic failure	2	4.5
Renal failure	1	2.3
Hypertensive disorder	16	36.4
Haemodynamic instability	22	50

Table-III: Distribution of patients with hypertensive disorders by survival rates (n=44).

Diagnosis	Mortality	Near miss	Near miss/1000 Live birth	Mortality index
Hypertensive disorders of pregnancy	1(2.27%)	16(36.3%)	7.80	5.8%
Eclampsia	1(2.27%)	05(11.3%)		
Pre-eclampsia	-	09(20.4%)		
HELLP syndrome	-	02(4.54%)		

Table-IV: Distribution of patients with haemodynamic instability by survival rates (n=44)

Diagnosis	Near miss(N/M)	N/M/1000 livebirth
Severe haemorrhage	22(50%)	10.37
Ectopic pregnancy	09(20.4%)	-
Placenta preavia	03(6.8%)	-
Abruptio placenta	02(4.54%)	-
Uterine atony	6(13.6%)	-
Uterine rupture	02(4.54%)	-

Table-V: Distribution of patients by intervention measures in ICU (n=44)

Intervention	Number (%)
Mechanical ventilation	3(6.8%)
Vasoactive infusion	16(36%)
Intensive monitoring	30 (68%)
Blood transfusion	26(59%)
MgSO ₄ therapy	8(18%)

Discussion

In this study, it was observed that 2.14% of the obstetric patient was transferred to general ICU. It shows MNMR was 19.5/1000 live births and MMR 195/100000 live births and mortality index 9.09%. Haemorrhage and hypertensive disorders were the leading cause (50% and 36.3% respectively). Pre-eclampsia, Eclampsia and HELLP syndrome were the leading causes of maternal ill health and subsequent transfer to ICU which is consistent with other published reports¹⁵. Most hypertensive cases were diagnosed at the hospital during antenatal checkup which exposes a weakness in early detection of pre-eclampsia. Hypertensive disorders, however, contributed only 2.27% of maternal death (5.8%-mortality index) which implies effective management of these complications after arrival at the hospital. Obstetric haemorrhage was the 2nd common cause responsible for ICU transfer. Most of the women were admitted due to ruptured ectopic pregnancy and postpartum haemorrhage due to uterine atony. There was no maternal mortality due to obstetric haemorrhage. This suggested that the cases of haemorrhage were successfully managed and blood transfusion facilities were adequate in this hospital. A study in Syria 2010 reported that post-partum haemorrhage is responsible for 40% maternal deaths¹⁶. The scarcity of blood and blood products were a big problem for immediate intervention, thus leading to increased morbidities in many countries. Twenty-four hours free and safe blood arrangement at the tertiary level hospital can minimize maternal mortality due to blood loss^{16,17}.

Sepsis was the second common cause of illness in a study in Pakistan¹⁵. Afessa B. et al also reported that sepsis was the most common cause of systematic inflammatory response syndrome and organ failure in critically ill obstetric patients treated in ICU¹⁸. But in this study sepsis was not responsible for near-miss morbidities and maternal death. Most deliveries took place at the hospital by trained doctors and birth attendants who strictly followed infection prevention measures. Provision of clean and safe delivery services decrease infection-related mortality and morbidity. Duration of ICU stay was 1-6 days. Only one patient stayed 15 days, due to renal failure and needed haemodialysis. In this study, haemodynamic instability was 50%, the most common cause of ICU transfer. The cases were successfully managed by blood transfusion 59%, ionotropic drugs 36% and operative procedures to control the haemorrhage.

The hypertensive crisis was the 2nd common cause of ICU transfer 36.36%. Among them 20.4% were severe pre-eclampsia, 11.3% were eclampsia and 4.54% was HELLP syndrome. They were managed by MgSO₄ therapy, intravenous anti-hypertensive and intravenous corticosteroids. Bhagwangee et al reported that respiratory failure was the most common organ failure in eclamptic patient in the ICU of a South African hospital¹⁴. A similar trend was observed in our study. Ventilation support was required in 37.8% patients, high rate of mechanical ventilation required in eclamptic patient with the favourable maternal outcome. In this study, the cause of maternal death was mostly indirect 6.8%. There were 3(6.8%) maternal deaths due to pregnancy with jaundice (acute fatty liver with pregnancy and pregnancy with hepatitis E) and pregnancy with DM complicated renal failure. Only one (2.27%) patient died due to eclampsia with other medical complications. According to a study in Bangladesh, there were 101 maternal deaths (in 2 medical college hospitals, 4 district hospitals, upazilla hospital and 12 unions) during the period of January 2007 to November 2007. Almost 95% were housewives, 55% were primigravida, 90% of women died within 3 hours of admission, 77% were critically ill during admission. Hypertensive disorders were the major cause of mortality (40%) followed by haemorrhage(38%)⁴.

The maternal death to near-miss ratio is a useful indicator of the quality of care irrespective of their primary source of antenatal or labour care. Maternal death and near-miss ratio are approximately 1:11 in this hospital indicates that every 11 women who survived life-threatening complication in this hospital, one maternal death was reported. It reflects the overall standard of obstetric care is better than 1:5 reported in a centre in Nigeria but it is still a far away from the 1:117-123 reported in Europe. The management of haemorrhage due to ruptured ectopic and postpartum haemorrhage is very much

essential. For this, appropriate training for hospital staffs and the availability of blood transfusion facilities are required. But efforts need to be focused on improving the protocol and resources for combating postpartum haemorrhage. The study shows that, aside from the 04 maternal deaths, there were 40 additional women who received critical care during the same period supporting the view that near-miss appraisal provides a large sample to assess the threat to maternal life. The overall maternal death to near-miss ratio indicates that care for life-threatening complication is optimum.

It is important to mention that this study had limitations. Its retrospective nature carries the possibility of underestimating near-miss cases due to poor documentation. Other limitations are related to the disease-specified method which was used for identifying the near-miss cases. Definition of the condition may not be always straight forward. For example, not all women with eclampsia nearly die and not all women with ectopic pregnancy are critically ill. Finally, this study was done in a military hospital and future studies are recommended to cover the private sector where a high percentage of deliveries take place to compare the maternal death to near-miss ratios for several years to assess the trend in the quality of obstetric care.

Conclusion

Severe obstetric morbidity and its relation to mortality may be a more sensitive assessment of pregnancy outcome than to mortality alone. The common causes of maternal morbidity were postpartum haemorrhage and pregnancy-induced hypertension. Intensive monitoring, blood transfusion, inotropic support and ventilatory support were the common intervention required in ICU. Maternal morbidity and mortality can be minimized significantly by early assessment and aggressive intervention by a team of obstetric intensivist and anaesthetist. Provision of high dependency unit in the obstetrics department is also advocated.

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