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Research Article

Retrospective analysis of severe acute maternal morbidity of obstetric ICU in Kamla Raja Hospital, Gwalior

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Abstract
Introduction: *Critically ill obstetrics patients represent an interesting group with unique characteristics whose management is challenged by the presence of a fetus an altered maternal physiology and disease specific to pregnancy. Although pregnancy and labour are considered physiological processes, the potential for catastrophic complications is constant and may develop within minutes.*
To every maternal death, there are about 18 maternal morbidities and maternal mortality and morbidity are a measure of health care quality indices in any given community.
Objectives: *1. To find out the incidence of SAMM. 2. To study outcome of obstetric ICU admitted patients.*
Methods: *Hospital files of all obstetric patients admitted to the Kamla Raja Hospital ICU from 2017 to 2018 were retrospectively reviewed. Age, parity, admission, diagnosis, length of stay, information on the referring hospitals and maternal outcome were analysed.*
Result: *Total 1713 obstetric patients were admitted in the ICU during the study period. Hypertensive disorder of the pregnancy was the commonest cause for ICU admission. Maximum no. of SAMM cases 113(44.84%) were in 20-30 years. Maximum no. of SAMM cases were multigravida 166(65.87%). Out of total 252 cases 156(61.9%) cases were unbooked. In this study, LSCS as surgical management in 190(75.39%) cases followed by laparotomy 13(5.138%).*
Conclusion: *Provision of HDU in the Obstetric Department is helpful to reduce burden of ICU admission. All obstetric residents should have a mandatory short ICU training.*

Introduction

Critically ill obstetric patient represent an interesting group with unique characteristics whose management is challenged by the presence of a fetus an altered maternal physiology and disease specific to pregnancy.[1]

Although pregnancy and labour are considered physiological process the potential for catastrophic complications is constant and may develop within minutes.

Worldwide maternal mortality is the most commonly used indicator to assess the quality of prevailing maternal health care services but over the last decade identification of severe acute maternal morbidity (SAMM) has emerged as a compliment or alternative to investigation of maternal deaths.[2]

Morbidity during pregnancy represents a continuum between extremes of good health and death which can be uncomplicated, complicated,

severely complicated or life threatening and a woman may recover, may be temporarily or permanently disabled or she may die.

WHO defines "SAMM as a woman who nearly died but survived a complication that occurred during pregnancy, child birth or within 42 days of termination of pregnancy".[3]

SAMM also known as maternal near miss can be identified by three different criteria:[3,4]

1. Disease specific criteria: e.g. eclampsia, preeclampsia, antepartum or postpartum haemorrhage or complicated by presence of MODS, DI.
2. Organ specific dysfunction or failure.
3. Management specific: admission to ICU like hysterectomy, laparotomy.

By WHO twenty five criteria divided into three groups- clinical, laboratory based and management based, were set as indicators for the presence of SAMM/MNM.[3]

The concept of maternal near miss is assumed to be a better indicator than maternal mortality alone for designing, monitoring, follow up and evaluation of safe motherhood programme and will be used to develop a culture of early identification of complications and better preparedness for acute morbidities.[5,6,7]

Aims and Objectives

1. To determine the magnitude of SAMM of obstetric admission.
2. To find out the cases of SAMM according to WHO and to prevent it.

Material and Methods

1. Study design: Retrospective study

2. Place of study: Department of Obstetrics and Gynaecology, Kamla Raja Hospital, Gwalior (M.P.), India

3. Study period: One year (2017 to 2018)

4. Inclusion criteria: WHO criteria

Clinical based	Laboratory based	Management based
• Acute cyanosis • Gasping • RR > 40 < 6/min • Shock • Oliguria • Clotting failure • Loss of consciousness lasting < 12 hr • Loss of consciousness and absence of pulse/HR • Stroke • Uncontrolled fits • Total paralysis • Jaundice in presence of preeclampsia	• SPO2 < 50% for > 60 min • Creatinine > 3.5 mg/dl • Bilirubin > 6 mg/dl • Loss of consciousness and presence of glucose and ketoacids in urine.	• Use of continuous vasoactive drugs • Intubation and ventilation for > 60 min not related to anaesthesia • Hysterectomy following infection on haemorrahge • Transfusion > 5 units for red cell transfusion • Requiring CPR

Exclusion criteria

1. Causes not related to pregnancy and its complication.
2. Accidental or incidental causes.

Data collection: Hospital files of all obstetric patients admitted to the ICU, Kamla Raja Hospital from 2017 to 2018 were retrospectively reviewed age, parity, admission diagnosis, length of stay, information of the referring hospitals and maternal outcome were analysed.

Results

Table 1: Prevalence of SAMM and maternal mortality

Month	Total obs. admission	Total ICU admission	Total live birth	Stable patient	SAMM patient	Patient on ventilation	Mortality	Removed from ventilation
Jan	1239	140	858	98	39	3	3	0
Feb	1074	101	729	83	17	2	1	1
March	1050	129	686	120	8	2	1	1
April	1040	114	701	105	7	2	2	0
May	1212	124	821	110	10	5	4	1
June	1183	131	750	116	10	11	6	5
July	1197	163	788	147	7	10	9	1
Aug	1439	165	830	120	29	17	16	1
Sept	1529	152	812	130	16	8	6	2
Oct	1386	180	886	156	20	10	4	6
Nov	1265	152	656	136	12	8	4	4
Dec	1185	162	880	140	13	7	9	0
Total	14794	1713	9397	1461	252	85	65	22

$$\text{Prevalence of SAMM} = \frac{\text{Total no. of SAMM}}{\text{Total no. of admissions}} \times 100 = \frac{252}{14794} \times 100 = 1.7\%$$

$$\text{SAMM incidence ratio} = \frac{\text{Total SAMM cases}}{\text{Total no. of live births}} \times 1000 = \frac{252}{9397} \times 1000 = 26.81/1000 \text{ live births}$$

$$\text{Maternal mortality ratio} = \frac{\text{Total maternal death}}{\text{Total live birth}} \times 1 \text{ lakh live births} = \frac{65}{9397} \times 1 \text{ lakh live births}$$

$$= 611.7/1 \text{ lakh liver births.}$$

Total no. of admission during our study period were 14,794 and liver birth were 9397 and number of SAMM cases were 252.

Table 2: Sociodemographic and obstetric characteristics of women

Characteristics		No. of cases (N=252)	Percentage
Age	< 20 years	47	18.65%
	20-30 years	92	36.50%
	> 30 years	113	44.84%
Education	Illiterate	29	11.50%
	Primary	80	31.74%
	High school	124	49.20%
	Graduate	19	7.53%
Type of residence	Rural	193	76.58%
	Urban	59	23.41%
Antenatal care	Booked	67	26.58%
	Unbooked	156	61.90%
	Partially booked	29	11.50%
Gravity	Primi	86	34.12%
	Multi	166	65.87%
Mode of delivery	Vaginal	32	12.69%
	LSCS	190	75.39%
	Laparotomy	13	5.158%
	Abortion (S & E)	5	1.98%
	Caesarean hystrectomy	4	1.58%
	Hysterectomy	1	0.39%
	Not delivered	7	2.77%

- Maximum no. of SAMM cases 113(44.84%) were in 20-30 years.

- Maximum no. of SAMM cases were multigravida 166(65.87%).

- Maximum no. of SAMM cases were educated upto high school 124 cases (49.2%).
- Out of total 252 cases 156(61.9%) cases were unbooked.
- LSCS as surgical management in 190(75.39%) cases followed by laparotomy 13(5.138%).

Table 3: Duration of ICU stay

Days	No. of cases (N=252)	Percentage
< 5 days	21	8.33%
5-10 days	68	26.98%
10-15 days	138	54.36%
> 15 days	26	10.31%

Table shows that maximum no. of patients 137 (54.36%) have 10-15 days ICU stay followed by 68 cases (26.48%) having 5-10 days ICU stay.

Table 4: Intervention of patients of SAMM

Intervention	No. of cases (N=252)	Percentage
Pulse oximetry	252	100%
O_2 supplementation	200	79.36%
Antibiotic	252	100%
Anti hypertensive	68	26.98%
Blood transfusion	205	81.34%
Ionotropic drugs	80	31.74%
Nebulization	68	26.98%
Ventilator	85	33.73%
Steroid	153	60.71%

100% patients were on pulse oximetry for monitoring, basic vital and O_2 saturation whereas 200(79.36%) patients needed O_2 supplementation. 205(81.54%) patients required blood transfusion and ionotropic supports were given to 80(31.74%) cases whereas 85 cases(33.73%) required ventilatory support.

Table 5: Shifting outcome of SAMM patients admitted to ICU

Outcome	No. of cases (N=252)	Percentage
Shift to unit wards	79	31.34%
Transfer out	27	10.71%
Monitoring area	143	56.74%
LAMA/abscond	3	1.19%
Mortality	65	3.79

Out of 1713 total obstetric ICU admitted patients, 252 cases were SAMM. Out of this 143 cases (56.74%) were shifted to monitoring area and 79 cases (31.34%) were shifted to respective unit wards whereas 65(3.79%) mortalities occurred in obstetric ICU.

Table 6: Underlying causes of lire threatening conditions and SAMM

Variables underlying complications	No. of SAMM cases	Frequency
(A) Hypertensive disorders	116 out of 252	46.03%
Severe preeclampsia	78	67.24%
Eclampsia	37	14.68%
HELLP syndrome	1	0.86%
(B) Obstetric hemorrhage	132 out of 252	52.38%
Abortion related	5	3.78%
Ectopic pregnancy	13	9.84%
Abruptio placenta	31	23.48%
Placenta previa	29	21.96%
Morbid adherent placenta	9	6.81%
Uterine rupture	7	5.30%
Severe PPH	12	9.09%
Others	29	19.69%
(C) Sepsis/severe systemic infection	29	11.50%
(D) Contributory factors		
Anaemia	143	56.74%
Previous CS	46	18.25%
(E) Critical interventions		
Blood transfusion	205	81.34%
Admission to ICU	252	100%
LSCS	190	75.39%
Laparotomy	13	5.15%

There are overlapping of cases as single patient had 2-3 life threatening conditions. So it is very difficult to prevent maternal mortality. Anaemia was major contributing factor and was present in 143(56.74%) cases.

Maximum cases of SAMM due to obstetric hemorrhage were 132(52.38%) followed by hypertensive disorders 116(46.03%).

Table 7: Distribution of cases according to WHO criteria

Parameters	No. of cases	Percentage
(A) Clinical		
Acute gastritis	0	0
Gasping	21	8.33
Respiratory rate > 40 or < 6 min	17	6.75
Shock	56	22.22
Oliguria nor responsive to fluid or diuretics	3	1.19
Failure to form clots	2	0.79

Loss of consciousness lasting ≥ 12 hr	5	1.98
Cardiac arrest	14	5.56
Stroke	7	2.78
Uncontrollable fits/status epilepticus	2	0.79
Jaundice in presence of preeclampsia	2	0.79
Eclampsia	37	14.68
Uterine rupture	7	2.78
Sepsis	29	11.51
Pulmonary oedema	32	12.70
Severe complications of abortion	5	1.98
Any clinical criteria	127	50.40
(B) Laparotomy based criteria		
$SPO_2 < 90\%$ for > 60 min	5	1.98
Creatinne ≥ 3.5 mg/dl	6	2.38
Acute thrombocytopenia (< 50,000 plat/ml)	1	0.40
Any lab based criteria	22	8.73
(C) Management based criteria		
Hysterectomy following inf or Hg	4	1.59
Use of blood products	183	72.62
Intubation and ventilation for > 60 min not related to anaemia	85	33.73
Cardiopulmonary resuscitation	65	25.79
Laparotomy other than for LSCS	13	5.16
Severe preeclampsia with ICU admission	78	30.95
Continued use of vasoactive agent	80	31.75
Any management based criteria	163	64.68

In clinical based criteria maximum no. of SAMM 56 cases is having shock followed by eclampsia 37 cases.

In management based criteria, 183 cases required blood transfusion, 85 cases required ventilatory support and hysterectomy done in 4 cases following haemorrhage.

Discussion

In present study, there was 9397 births in one year. In present study prevalence of SAMM is 1.7%.

Say L et al (2004)[3] reported in a systemic review by WHO that many SAMM studies used criteria of admission to an intensive care unit, worldwide prevalence for such criteria ranged from 0.01 to 2.99%.

Wilson RE et al (2007)[8] found that serious forms of maternal morbidity occurs in about 1% of women in the United States to 3% in some developing countries.

In present study maximum cases of SAMM were due to obstetric haemorrhage 132(52.36%) followed by hypertensive disorders (116 (46.03%).

A study by Khan KS (2006) et al[9] also reported haemorrhage was the leading cause of maternal death in Africa (33.9%) and Asia (30.8%). Thus, it is in accordance with present study as they are both from developing countries. Anaemia was also reported to be an important cause and contributing factor to maternal mortality and SAMM by Rajaram P et al (1995)[10].

Conclusion

With abundant experiences in the field of maternal health it is understood by now that occurrence of complications during pregnancy is not only associated to the level of human development issues but also to difference in detection and management of obstetric complication.

SAMM cases places a significant burden on health resources and reflects the quality of health care available in tertiary care centre of our country. Timely identification of these cases and careful tailored monitoring will help to utilize our resources more effectively.

For proper monitoring and workup of SAMM cases provision of HDU in obstetric department is helpful to reduce the burden of ICU admission.

All obstetric residents should have a mandatory short ICU training.

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