

Study of Severe Acute Maternal Morbidity (SAMM) in A Tertiary Care Hospital

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Abstract:

Background : Severe maternal morbidity also known as 'near miss' may be a good indicator of the quality and effectiveness of obstetric care, as it may identify priorities in maternal care more rapidly than mortality alone.

Objective : The objectives of this study was to observe the pattern of severe acute maternal morbidity (SAMM) and its associated factors in a tertiary care hospital.

Study design and setting : This descriptive cross-sectional study was done from August 2011 to February 2012 at Dhaka Medical College Hospital (DMCH), which is a tertiary care hospital in Dhaka city.

Methods : A total 100 consecutive cases of SAMM were taken from Obstetrics and Gynaecology department of DMCH. Five factor scoring system was used to identify the SAMM cases from all the severe obstetric morbidity. For each case of SAMM, data was collected on a) Nature of obstetric complication(s) b) Units of blood transfusion c) Presence of organ-system dysfunction/failure d) ICU admission e) Length of hospital stay.

Results : In this study severe acute maternal morbidities occur in a prevalence of 2.68% and ratio of maternal death was 6.43 per 1000 deliveries. The most frequent primary obstetric factors of severe morbidity detected in this sample were post partum hemorrhage (29%), eclampsia (24%) and sepsis (16%). Other causes were ectopic pregnancy (8%), obstructed labour (7%), ante-partum hemorrhage (5%), abortion (4%), ruptured uterus (3%), anesthetic complication (2%) and miss matched blood transfusion (2%).

Conclusion : This study suggests that the treatment of SAMM cases may be improved by developing evidence-based protocols for the management of hemorrhage, eclampsia and infection.

Key Words:

Severe, acute, maternal, morbidity, tertiary care hospital.

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Introduction

Pregnancy and childbirth are important events in the lives of women, families, and communities, and critical for the continuation of the human race.¹ Child birth is a rewarding

event for majority of couples, yet it may turn into a nightmare by an unforeseen life threatening complication.² Pregnancy, childbirth, and the postpartum period may have negative outcomes ranging from minor conditions to more serious morbidities and even death. Among all maternal deaths, 99% occur in developing parts of the world, where maternal morbidities are also more prevalent.³ Mantel et al defined severe maternal morbidity as 'a very ill pregnant or recently delivered woman who would have died had it not been but luck and good care was on her side.'⁴ SAMM occurs approximately five times more frequently than maternal death.⁵ In developed countries, morbidity rates range from 0.05 to 1.7%.^{6,7} In countries with low resources, prevalence ranges from 0.6 to 8.5%.⁸ In spite of the high maternal mortality ratios in many of the centers in resource-poor settings, the actual number of maternal deaths per centre may not allow detailed quantification of associated risk factors and determinants that are locally important.⁹ SAMM events occur in larger numbers and are thought to provide more information about standards of care and

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specific local considerations than can be provided by maternal deaths.¹⁰ Severe maternal morbidity also known as 'near miss' may be a good indicator of the quality and effectiveness of obstetric care, as it may identify priorities in maternal care more rapidly than mortality alone.¹¹ In depth study of the cases of severe acute maternal morbidity would definitely play a vital role in identifying the deficiency as well as strengths in the provision of obstetrical services in developing countries, and would be useful in correcting and strengthening the obstetrical care hence further reducing maternal mortality ratio. In order to provide insight into the quality of maternal care in Dhaka Medical College

Hospital (DMCH) this study was conducted to determine the pattern of severe acute maternal morbidity (SAMM) and its associated factors.

Materials and Methods

A descriptive cross-sectional study was conducted at Dhaka Medical College Hospital from August 2011 – February 2012. Five factor scoring system was used to identify the SAMM cases from all the severe obstetric morbidity. This scoring system comprises of Organ – system failure, ICU admission, transfusion >3 units, extended intubation (>12 hour), and surgical intervention (hysterectomy, relaparotomy). These factors are given the score of 5, 4, 3, 2, and 1 respectively. A five factor scoring system can theoretically have score from 0 to 15 (no clinical factor present to all clinical factors present).¹² 100 consecutive cases of SAMM was taken by purposive sampling technique according to five factor scoring system who had the score of 8 or greater during pregnancy and up to 42 days postpartum.

For each case of SAMM, data was collected on a) Nature of obstetric complication(s) b) Units of blood transfusion c) Presence of organ-system dysfunction/failure d) ICU admission e) Length of hospital stay. Cases of severe obstetric morbidity were identified during daily morning meetings, where all the new admission in the last 24 hour and serious inpatient cases were discussed. All the cases were followed during their hospital stay till their discharge. Five factor scoring system was used to identify the near miss cases from all the severe obstetric morbidity. For each case of SAMM, data were collected on demographic characteristics including age, occupation, socio economic condition, duration of hospital stay, educational status, gestational age at the time of sustaining the SAMM morbidity, history of previous caesarean section, type of pregnancy, antenatal checkup, taking history of TT Injection, mode of delivery, delivery at hospital or home, nature of obstetric complication(s), unit of blood transfused, presence of organ-system dysfunction/failure, extended Intubations, ICU admission, and timing of SAMM event with respect to admission.

Information on maternal deaths and deliveries conducted during the study period were obtained from hospital records. Interpretation was performed by using a computer based statistical program SPSS version 11 for windows (statistical package for social sciences). Categorical variables were expressed as proportions (percentages) and numerical data was expressed as means (standard deviation) and ranges. The prevalence of near-miss cases is defined as the number of near-miss cases divided by the number of deliveries in the hospital. The frequencies of SAMM events are reported according to the clinical condition responsible, referral status of the patients and whether the complications were present upon arrival or occurred while on admission at the hospital. Maternal mortality ratio was calculated as the number of maternal deaths per 100,000 live births. Ethical clearance has been obtained from the concerned authority to conduct the research work of study subjects.

Results

Consecutive 100 women were identified as severe acute maternal morbidity cases by five factor scoring system and 3732 women delivered at DMCH during that study period. The incidence of SAMM cases in this study was 2.68%. Twenty four maternal deaths occurred during the same period, resulting in a ratio of maternal death 6.43 per 1000 deliveries. Among the subjects mean age was 26.64 ± 5.38 years, majority women were house wives (89%) and only 8% were service holder, more than three-fifth (69%) of the study population came from poor socio economic condition and more than four-fifth (85%) of the study population had either no formal education (34%) or educated up to primary level (51%).

Table-I

<i>Demographic characteristics of the subjects</i>	
Age (years) (mean)	26.64± 5.38
Occupation (%)	
Housewife	89
Service	08
Other	03
Socio economic condition (%)	
poor	69
Low middle class	23
Middle class	7
Rich	1
Educational status (%)	
Illiterate	34
Primary School	51
Secondary education	09
Higher education	06

The Gestational age range of the women was 5 - 42 weeks. A majority of the women (57%) were within the group >28 weeks. Mean gestational age at the time of inclusion to the study was 31.66 ± 9.34 weeks and among the 24% study people who were in puerperium 90% of them found in the first week following delivery. In this study 36% women were primi gravida, 23% 2nd gravida, 32% 3rd gravida and 9% were 4 or more gravida. Maximum studied patients (73%) had no previous history of caesarean section. More than one third patients (35%) were taken antenatal check up regularly but a substantial proportion of the women with SAMM were taken antenatal care either irregularly (33%) or non-booked (32%). Most of the study populations (92%) were taken TT Injection regularly. Among the study subjects 45% women were severely anaemic, 37% moderately anaemic and 23% mildly anaemic. Among deliveries, there were 41 vaginal deliveries (38 spontaneous and 03 requiring the use of forceps) and 59 caesarian sections. Most of the women (76%) were delivered at hospital and 93% women in this study were developed complications before admission in hospital. A total of 81% were referred for ICU but only 23% women were admitted to the ICU. Among the study patients hysterectomy was performed in 19% and laparotomy was done in 13%.

Among the study subjects, the most frequent primary obstetric factors causes SAMM: post partum hemorrhage (29%), eclampsia (24%), sepsis (16%). Other causes were ectopic pregnancy (8%), obstructed labour (7%), ante-partum hemorrhage (5%), abortion (4%), ruptured uterus (3%), anesthetic complication (2%) and mismatched blood transfusion (2%).

Table-II

Primary obstetric factors causes SAMM of the study patients (n=100)

Parameters	No. of patients	Percent %
PPH	29	29.0
Sepsis	16	16.0
Eclampsia	24	24.0
APH	5	5.0
Abortion	4	4.0
Obstructed labour	7	7.0
Ruptured uterus	3	3.0
Miss matched blood transfusion	2	2.0
Ectopic pregnancy	8	8.0
Anaesthetic complication	2	2.0
Total	100	100.0

Presence of different factors according to five factor scoring system among the study subjects, organ system failure (95%) was the most common factor followed closely by ICU admission needed (81%) either provided or not.

Table-II

SAMM five-factor scoring of the study patients (n=100)

Factors	Total
Organ system failure	95
ICU admission needed (provided or not)	81
Transfusion >3 units	78
Extended intubations	76
Surgical intervention	32

Discussion

This study showed that severe acute maternal morbidities occur in a prevalence of 2.68 % and ratio of maternal death was 6.43 maternal deaths per 1000 deliveries. A study carried out in same institute between March to August 2005 showed that the prevalence of SAMM cases was 3.73 %. SAMM cases observed in this study were lower than the previous study. Wide variation of these discrepancies may be due to different inclusion criteria or improved obstetric care. In a study conducted at Kathmandu Medical College Teaching Hospital in Nepal the prevalence of SAMM case was 2.3% and a ratio of maternal death of 324 maternal deaths per 100,000 live births.¹³ Ratio of mortality to near miss morbidity in that study was 1: 7.2. This ratio to those of African country where the range is 1: 5-12. In European studies it is 1:117-223. A study carried out at the tertiary care maternity hospital of the University of Campinas in the state of São Paulo, Brazil showed that the severe maternal morbidity ratio ranged between 15 and 42 cases per 1,000 deliveries, depending on the set of criteria used.¹⁴ In rural South Africa facility-based incidence of 541 SAMM cases per 100,000 births (95% CI 368—767) and an estimated population-based incidence of 441 per 100,000 births, assuming no case occurred outside a health facility¹⁰. Range of prevalence of SAMM cases varied between 0.4%- 8% in a systematic review of maternal morbidity and mortality done by WHO¹⁵. This wide variation in range was seen due to the difference in the Criteria used for the identification of the SAMM cases and the place of study. Different studies performed in different regions of the world showed that the prevalence of SAMM cases varied through most of the results similar to this study.

The demographic characteristics of this study population classified as SAMM were: mean age 26.64 ± 5.38 years, 36% women were primi gravida and 64% of them were multi gravida. A majority of the women (33%) were within the age group 20 - 24 years. In a study at Dhaka Medical College Hospital in 2005 mean age was 27.23 ± 6.70 years and 33.80% of the subjects belonged to 20-25 years age group, 71.83% were multipara¹⁶. In a study in Nepal the demographic characteristics of the women classified as near miss were: median age 27 (18-35), 11 (30.5%) women were nulliparous and majority of them were para 1-2. Souza JP et al in a study showed that the characteristics of the women classified as near miss were: mean age $27.5 (\pm 7.4)$ years (slightly more than 15% of the women were adolescents), 33.87% women were nulliparous and 25.80% had three or more previous deliveries.¹⁷ In a study in South Eastern Nigeria the mean age was 25.3 ± 1.3 years, a majority of the women (69.2 %) were within the age group 20 - 29 years.¹⁸ The demographic characteristics of women in this study were identical to other studies.

The results of this study showed that a substantial proportion of the women with SAMM were taken antenatal care either irregularly (33%) or non-booked (32%). More than three-fifth (69%) of the study population comes from poor socio economic condition and 85% had no formal education or educated up to primary level. Riffat J et al found at Lyari General Hospital in Pakistan in the year 2007, 472% patients were non-booked, while 52.8% were booked cases. Seventy percent of the cases of near miss were unbooked at KMCTH in Nepal.^{2, 13} Oyibo et al in a study found that the women visiting the Nwezenyi Community Health Centre in the Izzi Local Government Area of Ebonyi State in South East Nigeria with at-risk pregnancies sought antenatal care late, in the second and third trimesters, while only 4.1% booked their antenatal care visit to the health center in the first trimester and almost half of the women (46.2 %) had no formal education.¹⁸ Okunlola et al and Adekanle et al reported a prevalence of late booking of antenatal care visits of 86% and 82.6% respectively in southwestern Nigeria, and Ebeigbe et al reported a prevalence of 79.9% of late booking of antenatal care visits in the Niger Delta.¹⁹ While it was not within the scope of this study to explore the reasons for poor antenatal care, previous studies and this study findings suggest that ignorance of and misconceptions about the purpose of antenatal care, illiteracy and financial constraints, are the dominant underlying factors in late initiation of antenatal care or remain unbooked. Most of the women (93%) in this study were developed complications before admission in hospital. We may suggest that low status of women who do not attend

antenatal care in a given health unit but are referred there when they develop life-threatening obstetric complications, contribute significantly to maternal morbidity. In this study we significantly observed that most of the women (92%) were taken TT injection regularly.

Seventy six women were delivered at hospital and mean gestational age at the time of inclusion to the study was 31.66 ± 9.34 weeks. Among the 24% women who were delivered at home, 90% were in the first week following delivery. Maximum studied patients (73%) had no previous history of caesarean section. Of a total of 100 deliveries, there were 41 vaginal deliveries (three requiring the use of forceps) and 59 Caesarian sections. Although undesirable, high rates of Caesarian section may be acceptable among women who develop severe maternal morbidity due to the urgency required to resolve the gestation and the factors that may make a vaginal delivery difficult to occur.

Among the study subjects descriptive analysis showed that the most frequent primary obstetric factors causes SAMM: post partum hemorrhage (29%), eclampsia (24%), sepsis (16%). Other causes were ectopic pregnancy (8%), obstructed labour (7%), ante-partum hemorrhage (5%), abortion (4%), ruptured uterus (3%), anesthetic complication (2%) and miss matched blood transfusion (2%). Oladapo OT et al in a study showed that the proportion of SAMM events occurring varied between diagnostic categories; haemorrhage (23.3%), hypertensive disorders (15.8%), dystocia (8.5%), infections (10.0%) and anaemia (11.5%)²⁵. Chhabra P et al found eclampsia/pre-eclampsia (35%), haemorrhage (35%), sepsis (13%), obstructed labour (9.5%) and other medical conditions (11%) as causes of severe maternal morbidity. Severe anaemia was observed in 22% of cases.¹¹ Souza JP et al found 57.3% Hypertensive syndromes, 13.7% haemorrhage, 4.8% Sepsis, 3.2% Abortion and 21% Non-obstetrical complication were the primary determinant factor of near miss.¹⁶ The most common maternal morbidity observed in this study was haemorrhage and eclampsia. This is consistent with other studies presented internationally and locally.

Regarding the presence of different factors according to five factor scoring system among the study subjects, organ system failure (95%) was the most common factor followed closely by ICU admission needed (81%) either provided or not. Though a total of 81% were referred for ICU but only 23% women were admitted to the ICU. Admission to the ICU may represent the most severe cases; however, depending on the availability of beds and on their accessibility, the degree of gravidity may vary. A large proportion (58%) of women were referred for ICU but could

not be provided due to insufficient ICU beds. Therefore, a large number of severe cases would be excluded from this study and to minimize this situation we categorize them equally as those were admitted to the ICU. The mean duration of hospital stay was 12.98 ± 5.563 days. The range was minimum 4 to maximum 30 days. Hysterectomy was performed in 19%: the proportion of hysterectomy was higher in obstructed labour. Out of the total patients population 65% received prenatal care, but still 82% of them were moderate to severe anemic when examined. This reflects poor compliance in addition to the adverse socioeconomic status of the study population.

Conclusion

In summary, these study shows that severe acute maternal morbidities (SAMM) occur in a incidence of 2.68 % and ratio of maternal death was 6.43 per 1000 deliveries. The primary associated factors of severe morbidity detected in this sample were post partum hemorrhage (29%), eclampsia (24%), and sepsis (16%). From the findings of this study, attempts to improve in the management of near-miss morbidities may best be achieved by developing evidence-based protocols for the management of hemorrhage, eclampsia and infection. Although this study did not specifically address avoidable factors but it may raise awareness of the deficiencies in the management of serious maternal morbidities. It is apparent from this study that tertiary institutions in Bangladesh could also benefit from evaluation of their quality of obstetric care by including severe acute maternal morbidities investigations in their maternal death enquiries.

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