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A Cross-Sectional Study on Post-Partum Severe Acute Maternal Morbidity And Maternal Deaths in A Tertiary Level Teaching Hospital of Eastern India

Indrani Das [1] , Mousumi Datta [2*], Sandip Samanta [3], Biswajit Mahapatra [4], Partha Mukherjee [5]

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Corresponding Author:
Mousumi Datta, Assistant Professor, Department of Community Medicine, Medical College Kolkata 88 College Street, Kolkata 700073, Kolkata , India.
Tel: +919433414509
Email: drmousumid@gmail.com

Abstract

Objectives: Identification of severe acute maternal morbidity (SAMM) has gained importance in recent years in view of falling maternal death rates and thrust on improving quality of maternal health care. Although most of these events occur in developing countries, reporting system for SAMM is poorly developed in these regions. Aim of this study was to determine the incidence and direct causes of postpartum SAMM along with measuring of relevant new indicators on maternal health in an apex institute of India

Materials and Methods: Hospital based cross sectional study conducted in India on 109 women with severe post partum complications. Outcome measures were SAMM or death.

Results: 99 women had SAMM and there were 10 maternal deaths. Eclampsia was the most common cause of SAMM, but case fatality ratio was higher for PPH. SAMM ratio was 16.22/1000 live births and mortality index was 9.17%.

Conclusion: 1 out of every 10 women with SAMM dies in developing countries. Improving facility based care and prompt referral can be a short term measure to quickly reduce the number of maternal deaths. Facility based monitoring and reporting of severe maternal outcome is an important step for scaling up such efforts.

1- Resident Medical Officer, Department of Gynaecology and Obstetrics, Medical College Kolkata, 88 College Street, Kolkata 700073, Kolkata , India.
2- Assistant Professor, Department of Community Medicine, Medical College Kolkata 88 College Street, Kolkata 700073, Kolkata , India.
3- Assistant Professor, Department of Paediatric Medicine, BC Roy Children's Hospital 111, Narkeldanga Main Road, Kolkata-700054, Kolkata , India.
4 Resident Medical Officer, Department of Gynaecology and Obstetrics, Murshidabad Medical College & Hospital C/o Dr. D Dandapath, Nutan chati, p.o. + district- Bankura pin-722101.
5- Professor, Department of Gynaecology and Obstetrics, Medical College Kolkata, 88 College Street, Kolkata 700073 , Kolkata , India.

Introduction:

Severe acute maternal morbidity (SAMM) also known as maternal near miss is defined as a "very ill pregnant or recently delivered woman who would have died had it not been that luck and good care was on her side" (1). Over the last decade, identification of cases of severe maternal morbidity has emerged as more promising complimentary or even alternative to the investigation of maternal deaths (1, 2). An estimated 50 million women are affected by maternal morbidity every year (4, 5). Morbidity during pregnancy represents a part of the continuum between extremes of good health and death. This is the "tip of the iceberg" concept where maternal mortality represents only the visible tip of the problem. Larger hidden mass of maternal morbidity must be addressed to improve maternal health. 'Severe maternal outcome' which is the sum of maternal death and maternal near miss captures the entire picture. If we consider the timing of these deaths, more than 60% of maternal deaths occur during post-partum period (6). Post-partum haemorrhage, sepsis, eclampsia, PIH related complications, and post-partum shock are the major causes for maternal death. Majority of these deaths occur in the developing world and most of them could be prevented with access to good care in proper time (6). However, information about magnitude of post-partum severe morbidity in developing countries is extremely limited. Severe maternal morbidity to mortality ratio is a possible new indicator of maternal care and could be used to compare improvement in maternity care more accurately than mortality data alone. In studies using disease specific criteria, i.e. criteria or clinical evaluation for common conditions of maternal mortality, prevalence rate of SAMM for different countries varies from 0.80% to 8.23% (7). Given the fact that SAMM is an outcome as well as quality of care indicator, variability of data is wide among countries and also between urban and rural population of the same country (7). Reduction in the present maternal mortality ratio can be best achieved by developing resources for managing severe morbidity that arise during post-partum period in critically ill patients (8). Considering the need of the hour, we decided to conduct a study with specific objectives to determine the incidence and direct causes of post-partum SAMM along with the measurement of relevant new indicators of maternal health in an apex institute of India. Such a study can help us to arrive at conclusions which may help local policy makers to create a realistic policy to reduce maternal death.

Material & Methods:

This was a hospital based cross sectional study conducted at a tertiary level teaching hospital at Kolkata in Eastern part of India. In this part of India, 54.7% of the women marry under 18 years of age (which is the minimum legal age for marriage of girls in India) and 49.2% of the women had institutional delivery as reported in DLHS-3 (District Level Household Survey) (9). Women attending this hospital for delivery care are from both urban and rural areas, primarily of poorer socio-economic status and lower level of education. The period of study was one year (August 2009 – July 2010).

All participants were post-partum women admitted at the obstetric ward of the study hospital. Subjects were evaluated clinically to determine the inclusion and the exclusion criteria. Inclusion criteria were women in post-partum period developing 'severe complication' or women with severe post-partum morbidity requiring hospital admission. Severe complication is further defined as puerperal women with severe haemorrhage, sepsis, eclampsia or pre-eclampsia related morbidities leading to unusual prolongation of hospital stay as:

>2 days hospital stays after vaginal delivery. >3 days hospital stays after vaginal instrumental delivery. >7 day hospital stays after caesarean section.

Women delivering at home or at peripheral health institutions who became seriously ill in puerperal period as a sequel to ante-partum or intra-partum complications, requiring hospital admission were also included in the study. As SAMM is an epidemiologically rare event following a Poisson distribution, sampling was not done. Women satisfying the inclusion criteria were

recruited in the study. Exclusion criteria were surgical (appendicitis, cholecystitis) gynaecological (ovarian cyst, fibroid uterus) or pre-existent medical conditions (DM, pre-existent kidney or heart disease) when they were not a part of the chain of events leading to severe maternal morbidity or mortality. Data was collected by interviewing eligible subjects or family members (in case of severely ill subjects) and by clinical examination, and by laboratory investigations in a structured case record form. Variables included age, parity, monthly family income and literacy status of the subjects, place of delivery, provisional diagnosis, relevant laboratory reports and treatment given. Outcome measure was SAMM or death.

For each subject disease, specific diagnosis was sought. Cases were diagnosed mainly on clinical bases and some investigations based on available resources. PPH was severe when there were clinical signs and symptoms of severe hypovolemic shock (i.e. tachycardia, tachypnoea). All cases of eclampsia were considered as severe. Severe sepsis was regarded when during puerperium local (abdominal/ perineal wound) or genital tract injury were associated with features of organ dysfunction (like ARF) or hypoperfusion (i.e. lactic acidosis, urine output <30 ml/hr or altered mental state). Concurrent data entry was made in Microsoft excel spread sheet. Simple frequencies and percentages were calculated. We further measured maternal health indicators such as SAMM/1000 live births, severe maternal outcome, severe maternal outcome ratio, SAMM mortality ratio and mortality index.

Informed consent to participate in the study was taken from all patients/ family members. Anonymity of subjects was ensured. Subjects/family members were assured about confidentiality of study results and its intended use for academic purposes. The study protocol was approved by the Institutional Ethics Committee of Calcutta National Medical College.

Results:

There were 99 women in our study who suffered from post-partum severe acute maternal morbidity. Mean age of these women was 23.55 yrs. Table 1 depicts the important socio-demographic variables and parity of the study subjects. Maximum incidence of post-partum SAMM was mainly among primi mothers, but there were also women (37%) with post-partum SAMM who had three or higher birth order. More than half of the deliveries took place in apex centre. Eclampsia was the major cause of total morbidity as well morbidity in apex centre, closely followed by PPH. Case fatality ratio (CFR) was, however, higher for PPH (table 3). During the study period there were 6100 live births and 10 maternal deaths; maternal death to SAMM ratio was 1:9.9. Table 4 represents some important indicators of maternal health which were calculated in this study. These indicators are recommended by WHO for monitoring the improvement of maternal health outcome (10). SAMM ratio, severe maternal outcome, and severe maternal outcome ratio are surrogate indicators for maternal health status; higher values indicate a worse situation and the need for scaling up resources and interventions. Higher value of SAMM mortality ratio indicates better care, whereas higher value of mortality index indicates the poor quality of care as a higher proportion of the women with severe maternal outcome die.

Discussion:

The focus on maternal health has widened from maternal mortality alone to severe maternal outcome . Severe maternal outcome is the result of complex medico-social factors with major determinants like the position of women in the society, health service availability and utilisation. SAMM and maternal death probably has the similar set of risk factors, being disproportionately higher among the poor, less educated, at extremes of reproductive period and the women with higher parity (11). Disadvantaged women are more likely to suffer from SAMM. Confident comment on the social profile of the subjects cannot be made from our study as economically weaker section is self-selected in this study. But, even with this limitation, we observed that 75 women out of 99 with severe morbid were illiterate or were able to just sign their names. More than 35% of SAMM occurred

among women of higher birth order and teenage mothers. More than 80% of the subjects had family income of less than INR 1500 per month. These findings strengthen the assumption that similar set of risk factors operate for maternal morbidity and mortality.

In our study maternal near miss ratio was 16.2/1000 live births while severe maternal outcome ratio was 17.9/1000 live births which was much higher than urban Iraq (MNM ratio of 5.06/1000 live births and severe maternal outcome ratio of 5.69/1000 live births) (12). However, maternal death to near miss ratio was similar in both studies, but markedly better than Sagamu, Nigeria (9.9 versus 4.8 in the Nigerian study) (4). Hypertension and haemorrhage were the most important causes of maternal death and severe morbidity. This is in agreement with similar studies from other developing regions (13, 14). The study on near miss conducted at a private teaching hospital at Manipal, India has very similar value of maternal near miss ratio of 17.8/1000 live births, but the MNM: mortality was worse than the present study at 5.6 (15). Such discrepancy is probably the result of difference in delay in referral. The critical events in saving a mother remains identifying life threatening conditions and prompt referral, being vigilant about women of higher birth order, teenage pregnancies, anaemia and hypertensive disorders of pregnancy. Skilled care at birth at health institutions must be promoted. Even in resource limited settings of developing countries like India, 1 out of every 10 women with life threatening conditions can survive with help in time.

Conflicts of interest:

Authors declare that there is no any conflict of interest.

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Table 1: Distribution of SAMM according to socio-demographic variables and parity of study subjects (n=99)

Variables	frequency	percentage
Age of the mother		
≤19	39	39.39
20-29	44	44.44
30-39	16	16.16
Literacy level		
Illiterate	41	41.41
Just literate	34	34.34
Primary	18	18.18
Secondary	6	6.06
Family Income/ month		
<1500	82	82.82
1500-2000	17	17.17
Birth Order		
Primigravida	48	48.48
Second gravida	14	14.14
>3 or more	37	37.37

Table 2: Distribution of causes of severe acute maternal morbidity according to place of delivery (n=99).

Cause of SAMM	Places of Delivery				
	Apex Centre	Sub division Hospital/PHC	Private Sector	Home	Total
PPH	17	9	0	12	38
Eclampsia	22	4	1	12	39
Sepsis	4	1	0	0	5
Genital Injury	3	0	0	0	3
Heart Failure	3	1	0	1	5
Shock	3	0	1	2	6
ARF	2	1	0	0	3
Total	54	16	2	27	99

Table 3: Cause specific Case Fatality Ratio among SAMM.

Cause specific mortality	No. Of cases	No. of Deaths	CFR
PPH	38	6	15.79
Eclampsia	39	2	5.13
Sepsis	5	1	20
Heart Failure	5	1	20

Table 4: Maternal health indicators for the study institution.

Indicators	Calculation	Values
SAMM ratio *(SAMM per 1000 live births)*	99/6100*1000	16.22/1000 live births
Severe maternal outcome *(Maternal Death+ SAMM)*	99+10	109
Severe maternal outcome ratio *(Severe maternal outcome/1000 live births)*	109/6100*1000	17.86/1000 live births
SAMM mortality ratio *(SAMM/maternal deaths)*	99/10	9.9
Mortality Index *(maternal deaths/ SAMM + maternal deaths)*100*	10/109*100	9.17%

• Maternal near miss and SAMM can be used interchangeably
• All values are limited to post-partum period only

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