

Prevalence and Patterns of Severe Maternal Morbidity beyond Maternal Mortality at PIMS Hospital Islamabad

Severe Maternal Morbidity beyond Maternal Mortality

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ABSTRACT

Objective: To determine the prevalence and patterns of severe maternal morbidity among women delivering at Pakistan Institute of Medical Sciences Hospital, Islamabad.

Study Design: Retrospective descriptive cross-sectional study

Place and Duration of Study: This study was conducted at the MCH Unit II, Department of Obstetrics and Gynecology, Pakistan Institute of Medical Sciences from Jan-2021 to Dec-2022.

Methods: The records of all women who delivered at the hospital during the study period were included. This medical record was reviewed retrospectively to identify cases of severe maternal morbidity based on major clinical conditions such as obstetric hemorrhage, hypertensive disorders of pregnancy, sepsis, cardiac and hepatic dysfunctions, or other life-threatening complications. Descriptive statistics were employed to present the frequency and patterns of severe maternal morbidity among the study participants.

Results: Out of a total 9158 deliveries, severe maternal morbidity was found in 886 women (excluding cases of maternal death) giving a prevalence of 9.7%. The mean age of affected women was 29.4 ± 5.8 years with 58.7% belonging to urban residential status and only 39.3 % were booked cases. Analysis of the patterns revealed that major obstetric hemorrhage was the leading cause of severe maternal morbidity (50.0%), followed by hypertensive disorders of pregnancy (23.7%), sepsis (7%) and anemia (3.6%).

Conclusion: Severe maternal morbidity is a significant public health challenge at tertiary care level, with obstetric hemorrhage, hypertensive disorders and sepsis as the major contributors to its development. The high proportion of non-booked and poorly booked cases is the area where improvement can be expected through increased access to antenatal care and quality.

Key Words: Maternal morbidity, Maternal mortality, Obstetric hemorrhage, Pregnancy complications

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INTRODUCTION

Maternal mortality has traditionally been taken as a primary indicator for the assessment of maternal health. With the advancement in medical healthcare technologies and availability of these facilities, the global maternal mortality ratio (MMR) has significantly declined by 44% and from 385 per 100,000 live births in year 1990 to 216 deaths per 100,000 live births in year 2015.¹ However, it is estimated that approximately 20-30 women experience severe maternal morbidity (SMM) for every maternal death.

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It is estimated that up to 8% of hospital deliveries are complicated leading to poor maternal and neonatal outcomes and may result in death if not timely intervened. A concept called "maternal near-miss" (MNM) was introduced by world health organization (WHO), which helps to provide a good view to identify women who experience life threatening complications during pregnancy and require dedicated attention for their maternal health.²

Unfortunately, 99% of maternal deaths occur in low- and middle-income countries (LMICs), specifically in Sub-Saharan African region and the South Asia (SA) which accounts for 70 and 17 % of global maternal deaths respectively. In a report generated in 2017-18, by Pakistan demographic and health survey, estimated the MMR to be 186 per 100,000 live births which was higher than the neighboring countries including India and Bangladesh. This ratio is in contrast to the developed countries like United States where the MMR is 14 per 100,000, and underscores the importance of focused efforts for improved maternal healthcare in our population.^{3,4}

Maternal pregnancy outcomes form a continuum of severity as they start from a normal or healthy pregnancy and may lead to morbidity, severe morbidity, and ultimately, mortality. This situation gives rise to the concept of “moving beyond maternal mortality”, which emphasizes the understanding and prevention of SMM to address complications, severe enough to threaten survival but can often be managed through timely medical intervention.^{5,6}

The burden of SMM is not only confined to immediate health crisis for the mother yet it extends to women's long-term physical and psychological wellbeing and consequently affects families and health care system. The causes of SMM are same as of maternal mortality and includes obstetric hemorrhages, hypertensive disorders related to pregnancy, sepsis, cardiac diseases and hepatic dysfunctions. Like maternal mortality, a higher ratio of SMM is observed in low- and middle-income countries (LMICs) than the high-income countries (HICs) highlighting the urgent need for surveillance.^{7,8,9} It is therefore important to work on common causes and adopt strategies to manage SMM and prevent long-term negative health consequences through quality improvement activities.^{9,10}

The Pakistan Institute of Medical Sciences (PIMS) is a major tertiary care hospital in Islamabad and manages high-risk obstetric cases reported directly or referred by neighboring healthcare centers, making it an ideal setting for studying SMM. This study was therefore planned to determine the prevalence and patterns of SMM at the MCH unit 2 of the PIMS hospital. Understanding these patterns will enable healthcare administrators to implement evidence-based strategies for prevention, early detection, and timely management of life-threatening maternal complications, ultimately contributing to better outcomes for the mothers.

METHODS

This retrospective descriptive cross-sectional study was conducted at MCH Unit II, Department of Obstetrics and Gynecology, Pakistan Institute of Medical Sciences (PIMS) after taking prior approval from ethical review board of the hospital.

The records of all 9,158 women who delivered (both planned deliveries and those who were referred from other medical center due to any complication) at the hospital from Jan-2021 to Dec-2022 over a period of 2 years were included and analyzed in this study.

Exclusion criteria were set as women who delivered elsewhere and then reported to this hospital only for postpartum care. Moreover, cases with incomplete medical records, needed for the accurate assessment of morbidity status were also excluded.

Data were retrieved retrospectively from medical records available in the department in shape of case files using a structured data collection form. All the information related to demographic variables, obstetric

characteristics, clinical indicators, and maternal outcomes was extracted.

Severe maternal morbidity (SMM) was labeled according to the WHO guidance and adapted to locally relevant clinical parameters (This included life-threatening conditions such as obstetric hemorrhage ≥ 1000 mL, hypertensive disorders, sepsis, organ dysfunctions, or the cases where ICU admission was needed).

Variables related to SMM (such as obstetric hemorrhage, hypertensive disorders of pregnancy, incidence of sepsis, uterine rupture, cardiac disease, and hepatic dysfunction) were recorded.¹¹ Additionally interventions like admission to the intensive care unit (ICU), need for any surgical intervention and blood transfusions were also documented. Hemorrhage was mentioned as a Major obstetric hemorrhage (MOH) when blood loss was ≥ 1000 mL, or any case requiring blood transfusion, surgical intervention, or ICU secondary to hemorrhage.

The data extraction was performed by trained medical officers under the supervision of the team of obstetricians involved in this study.

Data were analyzed using SPSS version 26. Descriptive statistics were employed, to present variables where frequencies and percentages to share categorical variables while mean $\pm$ standard deviation were calculated to present the continuous variables. The prevalence of SMM was determined by dividing the number of SMM cases by the total number of deliveries and expressed as frequency and percentages. Similarly, patterns of morbidity were extracted from the reported underlying causes, organ dysfunctions, and clinical outcomes and presented as frequency and percentages.

RESULTS

A total of 9,158 deliveries were recorded during the two year study period. Out of these, maternal deaths occurred in 17 (0.19%) patients, with a ratio of approximately 1 death for every 539 deliveries. Overall 886 women (9.7%) suffered SMM, as shown in Figure-I.

Prevalence of SMM out of total deliveries

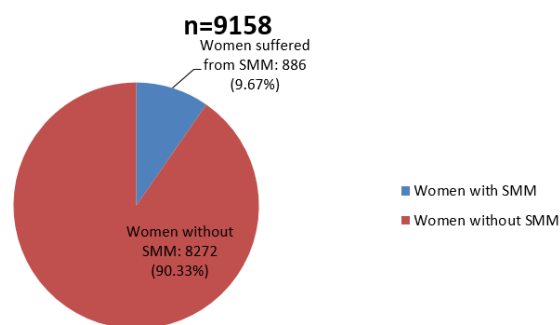


Figure No.1: Prevalence of SMM

The mean age of women with SMM was 29.4 ± 5.8 years. The demographics details and clinical

characteristics of women suffering from SMM are shown in Table-I.

Analysis of 886 cases showed that major obstetric hemorrhage (MOH) was the leading cause of SMM (50.0%). This was followed by hypertensive disorders of pregnancy (HDP) (23.7%), sepsis (7%), complications related to anemia (3.6%), cardiac disease

(3.4%), liver disease (2.7%), obstructed labor (2.7%), COVID-19 or respiratory illness (2.6%), acute renal failure (1.7%), Retained placenta / uterine inversion (1.1%), bladder or bowel injury (0.8%) and other causes (0.7%). The patterns of SMM observed in these patients are shown in Table-2.

Table No.I: Demographic details and obstetric characteristics of women with SMM n= 886

Demographic details and Obstetric Characteristics		Findings
Age (Mean± SD) years		29.4 ± 5.8
Residential status	Urban n (%)	520 (58.7)
	Rural n (%)	366 (41.3)
Antenatal booking status	Booked n (%)	348 (39.3)
	Poorly booked* n (%)	232 (26.2)
	Non-booked n (%)	306 (34.5)
Parity	Primigravida n (%)	277 (31.3)
	Multigravida n (%)	456 (52.5)
	Grand-multipara n (%)	153 (17.3)
ICU admission n (%)		38 (4.3)
Ventilator support n (%)		21 (2.4)
Duration of hospital stay (Mean± SD) days		9.8±3.7

Table No2: Patterns of Severe Maternal Morbidity n= 886

Type of Morbidity	Findings
Major obstetric hemorrhage n (%)	443 (50)
Hypertensive disorders of pregnancy n (%)	210 (23.7)
Sepsis n (%)	62 (7)
Complications related to anemia n (%)	32 (3.6)
Cardiac disease n (%)	30 (3.4)
Liver disease n (%)	24 (2.7)
Obstructed labor n (%)	24 (2.7)
COVID-19 or respiratory illness n (%)	23 (2.6)
Acute renal failure n (%)	15 (1.7)
Retained placenta / uterine inversion n (%)	10 (1.1)
Bladder or bowel injury n (%)	7 (0.8)
Other causes n (%)	6 (0.7)

DISCUSSION

SMM was found in 886 women giving a prevalence of 9.7%. The mean age of affected women was 29.4 ± 5.8 years with 58.7% belonging to urban residential status and only 39.3 % were booked cases. Analysis of the patterns revealed that major obstetric hemorrhage was the leading cause of severe maternal morbidity (50.0%), followed by hypertensive disorders of pregnancy (23.7%), sepsis (7%) and anemia (3.6%).

Comparable trends have been observed globally, indicating that despite advances in obstetric care, SMM remains a significant health care challenge for the obstetricians. The global data also show that incidences of hemorrhage and hypertensive account for the largest proportion of SMM cases.

Geller SE et al. initially worked on the overview of global burden of SMM and found that SMM was increasing, with higher rates in LMIC than rest of the

world. The most common causes reported for these cases were hemorrhage and hypertensive disorders. It was also mentioned that the most preventable factors were the lack of diagnosis and failure of treatment.¹²

This difference in the patterns of morbidity is also exhibited in a study conducted in Sweden which found a lower SMM prevalence (3.5%) during the first birth with uterine rupture, cardiac complications, cerebrovascular accidents, and severe mental health disorders being the leading causes. This variation reflects the improved obstetric surveillance and greater access to intensive perinatal care in these countries.¹³

Ukah UV et al. determined the risk of recurrent SMM among women with prior morbidity in Canadian hospitals. It was found that women who had already suffered from with SMM had a significantly higher recurrence rate (65.2 per 1000, compared to 20.3 per 1000 in women without prior SMM). This highlighted

the need for targeted counseling and care for the at risk mothers.¹⁴

Talking about the regional perspective, results similar to our study were reported in South Asian countries. Rajbanshi *et al.* in Nepal reported a 6.6% prevalence of SMM which were predominantly caused by hypertensive disorders (56.5%) and hemorrhagic complications (26.1%).¹⁵

In India, Rathod *et al.* found an exceptionally high prevalence of overall maternal morbidity (80%) in rural areas of India, particularly higher during the antenatal period (36%) compared to the postnatal period (26%). This high risk was significantly associated with the educational status, parity, and place of delivery.¹⁶ Data from Pakistan also reveal similar trends. Out of 9,130 deliveries, Naila *et al.* reported MNM in 268 cases (2.9%) and maternal deaths in 11 cases (0.12%). Hemorrhage (44%), hypertensive disorders (38%), uterine rupture (8%) and anemia (7%) were the leading causes, closely mirroring our results.¹⁷ Another regional context was elaborated by Aftab F *et al.* with a cohort of women belonging to SA and sub-Saharan African region. It was found that 32.7% of pregnancies had at least one major morbidity, with a significantly higher burden observed in SA (43.9%) than sub-Saharan Africa (23.7%). Prolonged/obstructed labor (11.1%) and infections were the key morbidities associated with the recorded adverse outcomes. Health programs were suggested to identify and treat these prevalent major morbidities.¹⁸

A detailed review as global scenario was worked by Nik Hazlina NH *et al.*, aiming to identify the prevalence and risk factors for SMM and MNM. The analysis found prevalence of SMM as 2.45% with a history of CS and coexisting medical conditions being the key risk factors. Early detection of these risk factors and regular patient follow-up were suggested as crucial steps to improve maternal health.¹⁹

The results of our study and the studies discussed above confirm that while prevalence varies, the primary causes of severe maternal morbidity (SMM) are common and largely preventable. Our findings underscore the need to strengthen antenatal care by, establishing continuous SMM audits and identifying avoidable factors to improve maternal outcomes, and progress toward maternal health.

The limitations of this study include its retrospective, single-center design, which may restrict the generalizability of our findings. A prospective study on this subject with some follow up plan may provide further insight to the prevalence and caused of SMM in women reporting to our tertiary care set ups.

CONCLUSION

SMM is a significant challenge at gynecological and obstetric units at tertiary care hospitals in Pakistan. Obstetric hemorrhage, hypertensive disorders, and

sepsis are the predominant contributors to this life threatening maternal complications. The high proportion of women with inadequate antenatal care is a critical area where intervention can yield improvement. There underscore a need for focused strategies on improving the quality of antenatal services, ensuring early identification, and timely management major obstetric complications to mitigate the severe maternal outcomes for our women.

Author's Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Hina Mushtaq, Hadia Hina, Khansa Qadeer
Drafting or Revising Critically:	Falak Khalil, Syed Azra, Sobia Haneef
Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

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