

## Still Too Far To Walk: A Review of Maternal Mortality in a District Hospital of Delhi

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**Abstract: Aims & Objectives:** Epidemiological data pertaining to maternal mortality is valuable in each set up to design interventional programs to favorably reduce the ratio. This study was done to evaluate the maternal mortality rate in our hospital, to assess the epidemiological aspects and to suggest recommendations for improvement. **Methods:** This was a 5- year retrospective study. Epidemiological data was collected from the hospital register and maternal mortality ratio, epidemiological factors and causes affecting maternal mortality were assessed. **Results:** A total of 160 maternal deaths occurred out of 51629 deliveries from June 2012 to July 2017. Most maternal deaths (50.6%) occurred in the age group of 18–24 years and among multiparous (55.6%) and unbooked patients. Majority of deaths (46.9%), occurred in the postnatal period, 26.9% in the antenatal period and 15% intranatal period. Direct causes accounted for 60% of maternal deaths where as 40% of maternal deaths were due to indirect causes. Anaemia (21%) was the single most common cause of maternal mortality in our study. Out of 160 patients, 89(55.6%) were provided ICU care and surgical intervention in the form of hysterectomy, laparotomy and re-laparotomy was done in 15% patients. Majority of patients died between 7-12 hours, depicting enthusiastic resuscitation efforts of critically ill patients. **Conclusion:** There is a wide scope for improvement as a large proportion of the observed deaths are preventable.

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### I. Introduction

Maternal death, as defined by the 9<sup>th</sup> and 10<sup>th</sup> revisions of the International Statistical Classification of Diseases and Related Health Problems (ICD), is “the death of a woman while pregnant or within 42 days of the end of the pregnancy, irrespective of the duration and site of pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.”<sup>1</sup>

Maternal mortality, which reflects the sociocultural and economic disadvantages that women experience, has been identified as a priority issue in health policy and research. Every minute a woman dies during labor or delivery. The highest maternal mortality rates are in Africa, with a lifetime risk of 1 in 16; the lowest rates are in Western nations (1:2800), with a global ratio of 400 maternal deaths per 100,000 live births.<sup>2</sup> India’s maternal mortality ratio (MMR) stood at 570 in 1990, which fell to 470 per 100,000 live births in 1995, 390 in 2000, 280 in 2005, and 230 in 2008.<sup>3</sup> Reduction in India’s maternal mortality rate would make an important contribution to the worldwide reduction of maternal mortality. Our analysis presents the important local variations from global characteristics of maternal mortality as well as the substantial internal variations within India. For policy-makers, faced with constrained budgets but committed to India’s goal of effectively addressing a relatively rare yet highly important health priority, these variations may provide some targets for intensifying or initiating maternal health interventions. The majority of maternal deaths took place after 7 months gestational age and in the immediate post-partum period, and women are often presenting at obstetric facilities only in very serious condition. Thus, one priority is to provide health education on the early recognition of potentially hazardous conditions as part of an enhanced antenatal care program. As well, reduction in avoidable maternal deaths in India will require skilled healthcare providers with the capacity to deliver service for not only routine delivery but emergency obstetric care including community consultation and emergency admission to a health-facility. Secondly, obstetric services themselves could be a target area for

intervention, particularly for investments in infrastructure, staffing and training in the rural areas of poorer states.

Widespread regional variation, besides higher concentration of maternal mortality in specific social groups (religion, caste, or tribe), has also been evident from past studies.<sup>3</sup> Maternal deaths are influenced by various sociodemographic, economic and cultural issues. This study was done to evaluate the maternal mortality rate in our hospital, to assess the sociodemographic aspects and to suggest recommendations for improvement.

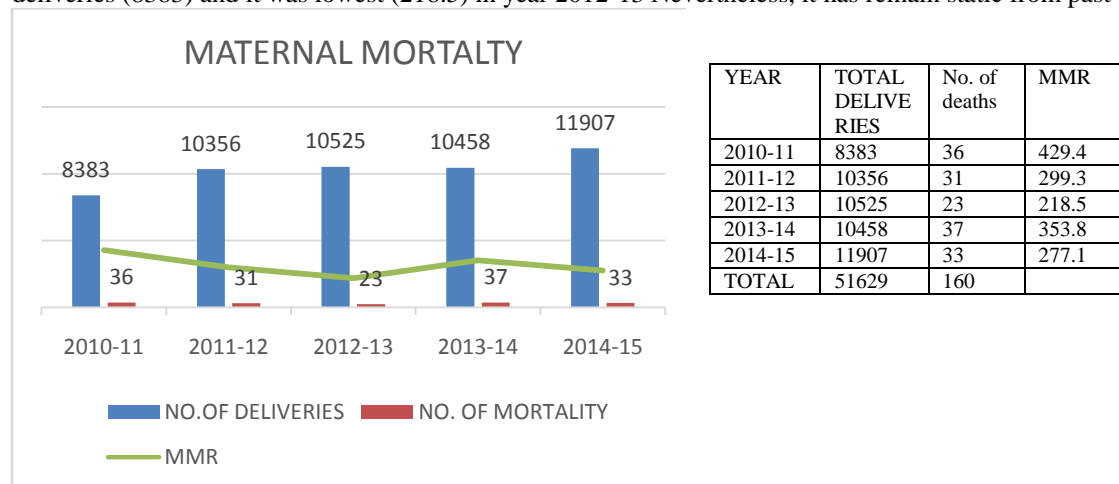
## II. Materials and methods

This was a 5- year retrospective study. Epidemiological data was collected from the hospital register. The data was compiled for demographic profile of patient which included her age, parity and booking status. The cause of mortality was classified as direct or indirect. The direct causes include hemorrhage, infection, hypertension, septic abortion, obstructed labour, ectopic pregnancy, DIC and pulmonary embolism. Indirect causes include anemia, heart disease, jaundice, Dengue and swineflu. The quality of health care was assessed in terms of total duration of hospital stay, number of patients who are given ICU care and surgical intervention like hysterectomy, laparotomies and relaparotomies. The parameters which depict burden on the hospital like total number of deliveries, number of patients being referred from the other peripheral hospitals. The missing data included booking status, referral history and the baby status of deceased mother.

## III. Results

### Maternal Mortality Ratio

Figure 1 presents the annual number of deliveries and maternal mortality ratio past 5 years. A Total of 160 mortalities occurred during this period. MMR was highest (429.4) in 2010-11 with minimum number of deliveries (8383) and it was lowest (218.5) in year 2012-13 Nevertheless, it has remain static from past 4 years.



### Context of deceased women

The details about socioeconomic and demographic characteristics of the deceased women have been described in Table 2. Majority of the women (50.6% ) belonged to age group 18-24 years, and 53.7% of them were unbooked. However data regarding booking status was missing in 23.7% of cases. Mortality was higher (55.6%) among multipara.

	TOTAL	%			
<b>AGE</b>			<b>PARITY</b>		
<18	03	1.9	PRIMI	71	44.4
18-24	81	50.6	MULTI	89	55.6
25-30	60	37.5	<b>BOOKING</b>		
30-35	12	7.5	BOOKED	36	22.5
>35	04	2.5	UNBOOKED	86	53.7
			MISSING	38	23.7

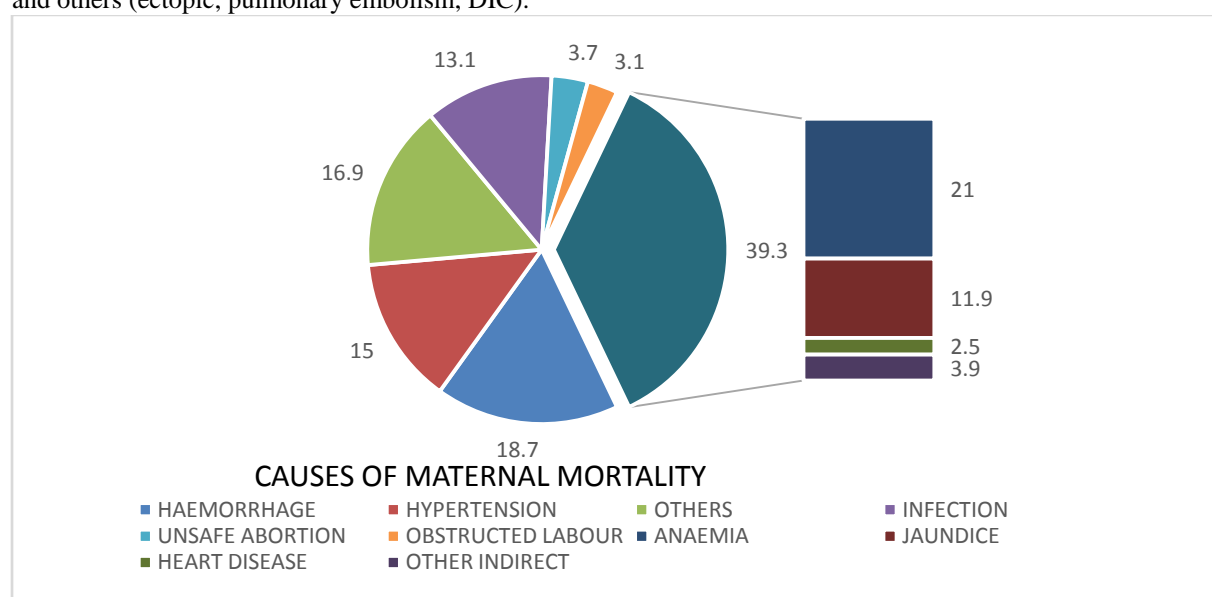
On an average, the deceased experienced two pregnancies, and the average parity was 2.2. Deaths of these women left an average of two children motherless at home. Of total 160 patients, 16 delivered at home and 75 patients were referred from other hospitals or MCD centers.

Table 3. Presents the distribution of maternal mortality in the antepartum, intrapartum and postpartum period and the time interval between admission and death. It was observed that maternal mortality is clustered near term and immediate postpartum period. The mortality in antepartum period accounted for 63(39.4%) cases

out of which 33(52.4%) mortalities were encountered during 3<sup>rd</sup> trimester and near term. In the first trimester, the main cause of mortality was ectopic pregnancy and septic abortion. Majority of death occurred in the postpartum period 75(46.9%) out of which 38(50.7%) occurred in the first 24-hours of delivery. It was observed that 22.8% cases died with in first 6 hours. It is mainly constituted those critically ill patients who survived for this duration due to enthusiastic resuscitation. Those who died between 1 week to 1 month (29.3%) are the ICU admissions who later developed multiorgan failure.

PERIOD	NO. OF PATTIENS		Hospital stay	No. of patients	%
<b>ANTEPARTUM</b>	63	<b>39.4</b>			
1 <sup>ST</sup>	20	31.7	<1h	14	8.7
2 <sup>ND</sup>	08	12.7	1-6h	21	13.1
3 <sup>RD</sup>	12	33.3	7-12h	32	20
TERM	21	48.8	12-24h	29	18.1
<b>INTERPARTUM</b>	24	<b>15</b>	24-48-h	16	10
<b>POSTPARTUM</b>	75	<b>46.9</b>	3-7d	15	9.4
<24H	38	50.7	8-14d	18	11.2
24-48H	18	24	15-30d	14	8.7
UPTO 7DAY	09	12			
7-14 DAY	06	8			
UPTO 1MONTH	04	5.3			

**Figure 3.** Represents causes of maternal mortality which are divided in to direct and indirect. The direct causes which constitute 61.3% of total include hemorrhage, hypertension, infection, unsafe abortion, obstructed labor and others (ectopic, pulmonary embolism, DIC).



The indirect causes are responsible for 39.7% of maternal mortality. It include those conditions which are not directly related to pregnancy for e.g. anemia, jaundice, heart diseases, dengue, swine flu and massive blood transfusion.

Anemia is the single most common cause of maternal mortality which is responsible for 21% of mortality. The second most common cause was hemorrhage which led to 18.7% of mortality. It includes both antepartum and postpartum hemorrhage. Severe preeclampsia and eclampsia together caused 15% of mortality. Antepartum, postpartum or postabortal septicemia was seen in 13.1% of these cases. Pulmonary embolism was implicated as a cause in 11.9% mortalities. In none of the mortalities implicated due to pulmonary embolism, the diagnoses was confirmed by autopsy and hence it seems to be more of imposition than a reality. Unsafe abortion and ectopic pregnancy together caused 6.8% of mortality whereas only 3.1% mothers died due to obstructed labour.

Majority of deceased mother 55.6% received ICU care whereas 40.6% patients died in labour room. These include those patients who died immediately after arrival or developed unexpected intrapartum or immediate postpartum complication or those who were kept under strict surveillance in anticipation of life threatening complications. Only 6(3.8%) patients died in ward. Out of these 6, 4 patients died in the medicine ward due to dengue and swine flu.

Surgical intervention in the form of hysterectomy, laparotomy and re-laparotomy was done in 15% patients. In the five year tenure, total 85 emergency hysterectomies done for uncontrolled PPH and ruptured uterus. Out of these 20 patients expired and 65 patients were saved. Laparotomies for ectopic, uterine perforation after delivery and step wise devascularisation to control PPH was done in 11 out of 160 deceased patients. In 7 cases, relaparotomy was done in patients to confirm and achieve hemostasis after surgery out of which 4 patients expired.

#### **IV. Discussion**

Reduction in India's maternal mortality rate would make an important contribution to the worldwide reduction of maternal mortality. Our analysis presents the important local variations from global characteristics of maternal mortality as well as the substantial internal variations within India. For policy-makers, faced with constrained budgets but committed to India's goal of effectively addressing a relatively rare yet highly important health priority, these variations may provide some targets for intensifying or initiating maternal health interventions.

Dr. Baba Saheb Ambedkar Hospital is a biggest hospital in northwest Delhi catering to the population of 10 lacs. It is a referral center for 3 neighboring hospital and all the dispensaries located in the northwest Delhi. Besides these patients are referred from other government hospitals and private nursing home. Most of the patient referred are complicated and critical which accounts for the high mortality ratio of the hospital. We observed that most of the deceased women never had an antenatal checkup and among those with antenatal care utilization the pattern of follow up was in appropriate in most cases as the majority of pregnant women started using the service around 7-9 months with decreasing number in the 1st and 2nd trimester of pregnancy. Antenatal care is potentially one of the most effective health intervention for preventing maternal morbidity and mortality particularly in places where the general health status of women is poor. It gives opportunity to health care provider to promote a safe place of delivery and to allow the women to know their status of pregnancy. Risk assessment in the pregnancy may explicitly give a place of delivery, for example twins to deliver at hospital.

However, on a large scale communities with less economic progress are likely to be more traditional, giving less autonomy to the women and less positive attitude towards service use. Several reasons that account for the noncompliance to antenatal care include lack of autonomy to women for her health, migration of women to their maternal homes during pregnancy and unaffordable cost of health checkup. Cost of care seeking include cost of medication, transport, official and unofficial fees of care provider, opportunity cost of travel time and waiting time lost from production activities. Effective behavior change communication is needed to bring about proper antenatal care services utilization. Improving the quality of the service delivery and effective monitoring at, evaluation is critically important for improving the utilization of antenatal care services.

In our study, majority of death occurred in the postpartum period 75(46.9%). Antepartum mortalities occurred in 39.4% of cases. Contrary to other studies, we observed intrapartum mortality only in 15% of cases. Thorough review of the documents permitted us to identify the timing of the complication relative to the onset of labour and we were able to identify the antepartum precedents of intrapartum mortality, unlike previous studies.<sup>4,5</sup> We propose that these maternal deaths would likely be misclassified as intrapartum cases in other studies as delivery is often the recommended management.<sup>6</sup>

Contrary to other studies<sup>7,8</sup> in our study anemia turns out to be the most the single most important cause that led to 20% maternal mortality. Although, the data pertaining to mean hemoglobin is lacking but majority of them were severely anemic and required blood transfusion. Prevalence of anaemia in India is among the highest in the world. In India, anaemia is directly or indirectly responsible for 40 per cent of maternal deaths. There is 8 to 10-fold increase in MMR when the Hb falls below 5 g/dl.<sup>9</sup> Early detection and effective management of anaemia in pregnancy can contribute substantially to reducing in maternal mortality. Anaemia, hemorrhage and hypertension together caused 54.7% mortalities which are avoidable causes that can be addressed with better antenatal care and early recognition of complications. Interventions focused on factors leading to maternal morbidity and mortality have been implemented. For example, efforts to address or treat postpartum hemorrhage and infection at health-care facilities have been made by providing tetanus toxoid immunization, iron supplements, malaria intermittent treatment, antiretroviral for HIV, magnesium sulfate, antibiotics clean delivery, partogram, oxytocics, blood transfusion, and if needed, hysterectomy, post abortion care and family planning. Besides these, traditional health providers need to be enlightened on the need to include the use of iron and folate supplements in the management of their pregnant patients. Educating women on early ANC booking and compliance with the use of prescribed medications should also be emphasized.

Unsafe abortion caused 3.7% mortalities in our study. Misclassification of maternal deaths have been well documented.<sup>8</sup> Deaths early in pregnancy may be coded as nonmaternal deaths if the respondent was unaware or unwilling to disclose that the woman died while pregnant or in the postpartum period, which may lead to an underestimation of abortion-related deaths and suicides in our results.

Among those who died, majority of the patients were under strict vigilance in the labour room. Surgical intervention was done in 15% and ICU care was given to 55.6% of these women. However, attempting too many interventions with limited managerial capacity does not lead to success. Future programs should, therefore, focus on specific, evidence-based strategies, such as skilled birth attendance, referral, and EmOC. The PHCs and CHCs should perform all basic EmOC functions while the FRUs and district hospitals should provide comprehensive EmOC on a 24-hour x 7-day basis. An attempt should be made to decentralize clinical life-saving skills, to increase access to maternal health services across widely-dispersed rural populations. Care by midwives in rural areas should be linked through formal referral transport to emergency obstetric services within hospitals. The performance of each service provider should be reviewed with a focus on maternal health services.

## V. Conclusion

Though India has made an appreciable progress in improving its overall health status yet reduction in the maternal mortality ratio (MMR) is far from the goal set by the Millennium Development Goals (MDG) of 109 per one lakh live births by 2015.<sup>9</sup> Efforts to improve maternal health should ensure that all critical inputs, such as staff, drugs, blood, and equipment, are coordinated, provided, and monitored at strategically-selected locations in a timely manner for achieving the objectives. There is a need for coordination between different government and non-government agencies. Decentralization of health services and strengthening of peripheral health care services is essential step to cover the greater population. Policy and programs designed to implement evidence-based strategies and detailed micro-level program planning are needed. Monitoring effective implementation and measuring progress is essential for success.

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