

# An observational study to evaluate direct obstetric causes of maternal mortality at a tertiary care centre in Mumbai, Maharashtra

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## Abstract

**Background:** To evaluate direct obstetric causes of maternal mortality at a tertiary care centre in Mumbai, Maharashtra  
**Methods:** A total of 206 cases of maternal deaths due to direct obstetric causes from January 2011 to December 2015 were analysed in a tertiary care centre. Information was extracted from the patients' case-notes from Medical Record Office, the labour ward registers, the antenatal and postnatal ward registers. **Results:** Majority of mortality occurred in age group of 21 -29, multiparous women belonging to urban Hindu community. Most of the cases were ANC registered as the study was carried out in a tertiary care centre, however 83 % of these were referred to our hospital. Most of the mortality occurred in postpartum period in ICU set up. Most common cause was found to be haemorrhage followed by eclampsia **Conclusions:** Multiple and frequent deliveries in already anaemic young women is the major underlying cause of maternal mortality. Antenatal care starting early in pregnancy, detection and managing pregnancy complications, detection and treatment of associated medical disorders, institutional deliveries, proper referral facility and emergency transport, timely intervention, access to contraceptives and safe abortion services can prevent most of the deaths.  
**Keywords:** Maternal mortality ratio, maternal mortality, prevention, ending preventable maternal mortality.

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## INTRODUCTION

Maternal death is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the 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 deaths or maternal mortality is a definitive indicator of the quality of obstetric care delivered in a community thereby directly reflecting the utilization of health care services available. It differs from

place to place, country to country and institute to institute reflecting the type of care provided and health status of the region.<sup>2</sup> Maternal Mortality Ratio (MMR) is defined as maternal death ratio per 1,00,000 live births. India is among those countries, which has a very high MMR. There is ample scope for reducing it as majority of the causes of MMR are preventable and curable.<sup>3</sup> A woman dies because of complications arising during pregnancy and childbirth every 90 seconds in the world, and every 7 minutes in India.<sup>4</sup> Each year in India, roughly 28 million women experience pregnancy and 26 million have a live birth. Of these, an estimated 67,000 maternal deaths and one million newborn deaths occur each year. In addition, millions of women and newborns suffer pregnancy and birth related ill-health. Thus, pregnancy-related mortality and morbidity continues to have a huge impact on the lives of Indian women and their newborns. Over the last 5-10 years there has not been any significant change in the maternal mortality rate despite repeated review of clinical techniques and development of state of the art investigative facilities and operative procedures. Maternal death has serious implications to the family, the society

and the nation. It deprives the surviving infant of a mother's care. One of the most important goals of the MDGs is to reduce the maternal mortality.<sup>5</sup> It aimed at reducing MMR to 109 by 2015.<sup>6</sup> Though MMR has declined considerably from 314 in 2000 to 167 in 2013, the rate is still very high.<sup>7</sup> Hence, it is important to evaluate the spectrum of causes behind this large number of maternal deaths in our country. Thus, the present study has been undertaken to evaluate the current trends of maternal mortality and compare it with the recent past trends.

### MATERIAL AND METHODS

**Place of Study:** The study was conducted at Lokmanya Tilak Municipal Medical College and General Hospital, Sion, Mumbai 400022, a tertiary care center in the Department of Obstetrics and Gynecology from January 2011 to December 2015.

**Study Design:** Prospective-Retrospective Observational study.

**Inclusion Criteria:** Any female death during pregnancy or within 42 days of delivery due to direct obstetric causes.

**Exclusion Criteria:** Any female death during pregnancy or within 42 days of delivery due to causes other than direct obstetric causes.

**Data collection:** The total deliveries for the period will be extracted from the labor record registers.

**Methodology:** The variables like age (years), residence (locality), obstetric profile (gravidity, previous pregnancy outcome), method of delivery was used to analyze the study. The case notes of those that suffered maternal mortality due to direct obstetric causes will be retrieved and thoroughly studied. Information on all cases of maternal mortality will be extracted from the patients' case-notes from Medical Record Office of our tertiary care Centre, the labor ward registers; the antenatal, postnatal ward registers. The data obtained was tabulated, analyzed and compared with established similar studies.

### RESULTS

The following data was obtained from present study: Majority of the cases, 99 out of 206 belonged to age group of 21-29 years. 62 women belonged to >30 years age group and only 45 were <20 years of age (Figure 1).

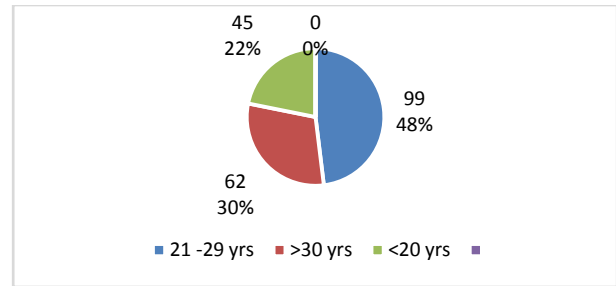


Figure 1: Age wise distribution of maternal mortality data

In the present study, 140 out of 206 women belonged to Hindu community and 66 were from Muslim community (Table 1).

Table 1: Community wise distribution of maternal mortality data

Community	No. of maternal mortality	Percentage
Hindu	140	67.96
Muslim	66	32.03
<b>Total</b>	<b>206</b>	<b>100</b>

As this study was carried out in a tertiary care centre attached to a teaching institute of a metropolitan city hence maximum cases, 167 out 206 belonged to urban areas and only 39 were from rural areas (Table 2).

Table 2: Area wise distribution of maternal mortality data

Area	No. of Maternal mortality	Percentage
Urban	167	81.06
Rural	39	18.93
<b>Total</b>	<b>206</b>	<b>100</b>

In the study, only 56 cases were primigravida. For 81 women it was there 2<sup>nd</sup> pregnancy and 67 were multigravida (Figure 2).

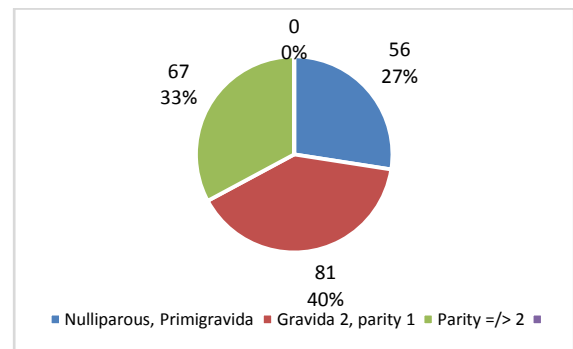


Figure 2: Parity wise distribution of maternal mortality data

Out of 206 cases of maternal mortality, 51 were unregistered, 117 were ANC registered but had <3 ANC visits and 38 were registered with > 3 ANC visits (Figure 3).

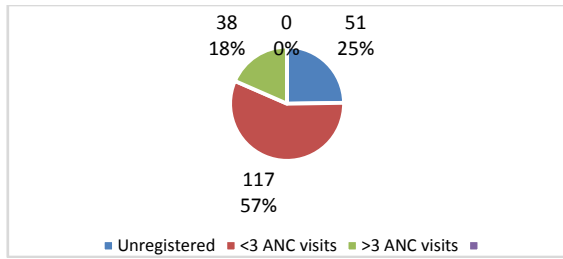


Figure 3: No.of ANC visit wise distribution of maternal mortality data

In the current study of maternal mortality, 78 out of 206 cases had live births. 71 cases of still birth were reported and 44 remained undelivered. There were 6 cases of abortion and 7 of ectopic pregnancy. (Table 3).

Table 3: Perinatal outcomes in cases of maternal mortality

Perinatal Outcome	No. of cases	Percentage
Live Birth	78	37.86
Still Birth	71	34.46
Undelivered	44	21.35
Ectopic	7	3.39
Abortion	6	2.91
<b>Total</b>	<b>206</b>	<b>100</b>

Out 206 cases, 92 were delivered vaginally. 11 were forceps deliveries and 79 were operated cases. 6 cases of abortion were reported, while 44 mortalities were in ANC period (Table 4).

Table 4: Type of delivery wise distribution of maternal mortality data

Type of Delivery	No. of cases	Percentage
Vaginal delivery	92	44.66
Abdominal delivery (LSCS / Laparotomy)	79	38.34
Forceps delivery	11	5.33
Abortion	6	2.91
Undelivered	28	13.59
<b>Total</b>	<b>206</b>	<b>100</b>

In the study, only 28 were undelivered cases, while majority 164 out of 206 had hospital delivery and only 14 cases of home delivery were seen (Figure 4).

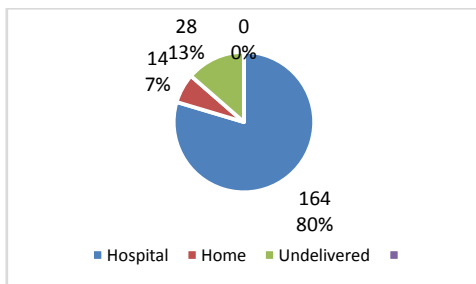


Figure 4: Place of delivery wise distribution of maternal mortality data

Out of 102 cases of maternal mortality, 150 occurred in an ICU setting. However 56 were not admitted in ICU (Figure 5).

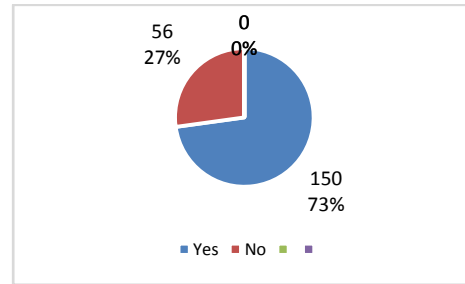


Figure 5: ICU admission wise distribution of maternal mortality data

162 out of 206 cases of mortality occurred in postpartum period and only 44 remained undelivered (Figure 6).

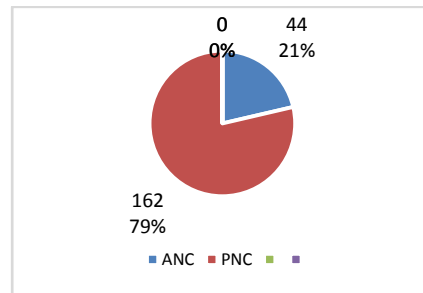


Figure 6: Distribution of maternal mortality data according to period of death

As far as admission to death interval is considered, 54 out of 206 died within 1<sup>st</sup> 12 hour of admission, 37 died in next 12 hours. The study saw 69 deaths within day 1 to day 3. Only 46 mortalities were reported after day 3 from admission (Table 5)

Table 5: Admission to death interval wise distribution of maternal mortality data

Admission to death interval	No of cases of maternal mortality	Percentage
0 – 12 hours	54	26.21
12 - 24 hours	37	17.96
1 – 3 days	69	33.49
>3 days	46	22.33
<b>Total</b>	<b>206</b>	<b>100</b>

In the current study, 51 of 206 mortalities were due to postpartum haemorrhage, followed by 36 cases of eclampsia, 31 cases of sepsis, 22 cases of HELLP and 16 cases of antepartum haemorrhage, 19 of DIC and 14 cases of ruptured uterus. There were only 7 cases of ruptured ectopic, 8 cases of burns and 2 case of amniotic fluid embolism (Table 6).

**Table 6:** Distribution of maternal mortality data according to the causes

Cause of maternal mortality	No of cases	% of total cases
Postpartum Haemorrhage (PPH)	51	24.75
Eclampsia	36	17.47
Sepsis	31	15.04
HELLP	22	10.67
Disseminated Intravascular Coagulation(DIC)	19	9.22
Antepartum Haemorrhage (APH)	16	7.76
Ruptured Uterus	14	6.79
Burns	8	3.88
Ruptured Ectopic	7	3.39
Amniotic Fluid Embolism	2	0.97
<b>Total</b>	<b>206</b>	<b>100</b>

## DISCUSSION

Pregnancy although being considered a physiological state, carries risk of serious maternal morbidity and at times death. This is due to various complications that may occur during pregnancy, labour or thereafter. It is heartening that the Maternal Mortality Ratio of India has declined from 212 in 2007-2009 to 174 in 2014 - 2015.<sup>7</sup> but is still much above the objective of 109 per 1,00,000 live births as per the fifth Millennium Development Goal (MDG-5). In practical life, maternal mortality has a severe impact on the family, community and eventually, the nation. Studies have shown that infants who lost their mother during childbirth are more likely to die before reaching their second birthday than infants whose mother survives; thus, emphasizing the importance of maternal death review. Maternal Death Review is an approach advocated by the WHO to scrutinize practices and outcome of delivery at health facilities and in the community. It analyses deaths and its factors at all levels and is divided into Facility based and Community based Maternal Death Review. Studies suggest that multiple and frequent deliveries in already anaemic young women is the major underlying cause of maternal mortality.<sup>8</sup> Nearly half of all pregnant women suffer from anaemia, 52% in low-resource countries and 23% in high-resource regions.<sup>9</sup> In the present study, out of all the deaths, 33% deaths were among multigravidas and 40% among 2<sup>nd</sup> gravida, with most common cause of death being postpartum haemorrhage. It important to note that, in the present study, many mothers had received antenatal care, had no teenage pregnancy, had very few obstructed labour or rupture uterus, and yet they died. Antenatal care starting early in pregnancy, detection and managing pregnancy complications, detection and treatment of associated medical disorders, institutional deliveries, proper referral facility and emergency transport, timely intervention, access to contraceptives and safe abortion

services can prevent most of the deaths. Inadequate information about pregnancy among women in rural areas and out-of-date knowledge and skills of health professionals and inferior obstetric services were the factors frequently associated with maternal mortality.<sup>10</sup> Health centres should be constructed at rural areas and urban slum areas with trained health workers for timely referral and early detection of high risk cases, as the study 44 % of maternal deaths occurred within 24 hours of admission and 6 were brought dead cases. Initiative from the government would be of paramount importance in this effort by allocation of Sufficient funds to all the health institutions including primary health centres and health centres at urban slum areas which are being neglected. Strengthening of the first referral units with equipment, blood bank, and adequately competent staff should be of prime importance. Continued medical education of the medical personnel at the periphery is required.

## CONCLUSION

Maternal mortality remains an unfinished agenda as India failed to achieve the target of 109 per 100000 lakh live births in 2015 as per MDG-5. And, in the era of Global transition from the MDGs to the Sustainable Development Goals (SDGs), special attention is warranted for Ending Preventable Maternal Mortality (EPMM). As per WHO targets, by 2030, all countries should reduce maternal mortality ratio (MMR) by at least two thirds of their 2010 baseline level. The average global target is an MMR of less than 70/100 000 live births by 2030. The plan to achieve this goal is grounded in a holistic approach by the government. Strengthening health systems to respond to the needs and priorities of women and girls, addressing all causes of maternal mortality, reproductive and maternal morbidities, and related disabilities and improving family planning services to reduce the exposure to unwanted and multiple pregnancies are of paramount importance.

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