

Study of maternal mortality in a tertiary care hospital in a district of Maharashtra

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Abstract

Background: 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, labor, or thereafter. The major causes of maternal mortality are mostly preventable through regular antenatal checkup, proper diagnosis, and management of labor complications. Therefore, the factors at different levels affecting the use of these services need to be clearly understood.

Objective: To assess the maternal mortality ratio (MMR) and the causes of maternal mortality over a period of 3 years in a tertiary care hospital in Maharashtra.

Materials and Methods: A hospital record-based study of maternal deaths over a period of 3 years from January 2012 to December 2014. The information regarding demographic profile and reproductive parameters were collected and results were analyzed using percentage and proportion with the help of Microsoft Excel 2007.

Result: Average of MMR over 3 years study period (January 2012 to December 2014) was observed to be 410/1,00,000 live births. Most of the maternal deaths occurred in age group of 19-24 years (43.4%). Majority of maternal deaths was observed in multipara (52.2%) and women coming from rural area (52.9%). 44.9% of maternal deaths occurred within 24 h of admission. Hemorrhage was the leading direct cause of maternal deaths (33.8%) followed by eclampsia (10.3%) and sepsis (8.1%). Among indirect causes of maternal deaths anemia (14.7%) was the leading cause.

Conclusion: MMR in our study was very high as compared to national average of 167/1,00,000 live births, being a tertiary care hospital as most of the patients were referred from peripheral centers. Most maternal deaths are preventable by intensive health education, basic obstetric care for all, strengthening referral and communication system and emphasizing on overall safe motherhood.

KEYWORDS: Maternal mortality ratio, maternal mortality, postpartum hemorrhage, anemia

Introduction

Maternal mortality is defined as the death of any woman while being pregnant or within 42 completed days of termination

of pregnancy, irrespective of the duration or site of pregnancy, from any cause related to or aggravated by pregnancy, but not from accidental or incidental causes.^[1] Maternal mortality ratio (MMR) is defined internationally as the maternal mortality rate per 1 lakh live births. Maternal mortality remains one of the most daunting public health problems in India. Even today 20% global maternal deaths occur in India.^[2] MMR for India was 301 per 100,000 live births by Sample Registration Survey (SRS) 2003 estimate and came down to 167 by SRS survey 2013 estimate.^[3]

Maternal mortality is ascribed usually to complications that generally occur during or around labor and cannot be accurately predicted. The direct causes of maternal mortality, that is, hemorrhage, unsafe abortion, eclampsia, obstructed labor,

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infection, and others account for about three-fourths of maternal deaths. The remaining one-fourth are indirect causes such as anemia, hepatitis, heart disease, malaria, and human immunodeficiency virus (HIV)/ acquired immunodeficiency syndrome (AIDS). The other contributory causes are early marriage, adolescent pregnancy, poverty, malnutrition, harmful traditional practices, illiteracy/ignorance, etc.^[4] These are mostly preventable through regular antenatal checkup, proper diagnosis, and management of labor complications.^[5]

Maternal mortality is an indicator of the quality of obstetric care in a community, directly reflecting the utilization of health-care services available.^[6] One of the most important goals of the MDGs is to reduce the maternal mortality. It was in this context, this study was conducted with the objectives to assess the existing MMR and the causes of maternal mortality over a period of 3 years in a tertiary care hospital in Maharashtra.

Materials and Methods

This study was a retrospective analysis of all maternal deaths occurring in the Department of Obstetrics and Gynecology of a tertiary care hospital in a district of Maharashtra over a period of 3 years from January 2012 to December 2014. Information about maternal deaths was obtained from death register of Department of Obstetrics and Gynecology, Medicine and Surgery. The information regarding demographic profile, reproductive profile, etiological profile (cause of death), and time interval from admission to maternal death were collected from the records of labor room, medical intensive care unit (ICU), and surgical ICU of the hospital; and results were analyzed using percentage and proportion with the help of Microsoft Excel 2007.

Result

A total of 136 maternal deaths occurred during 3 years study period from January 2012 to December 2014. Average of MMR over 3 years study period was observed to be 410/1,00,000 live births.

Most of these women (52.90%) were from rural area and 47.10% were from urban area. Of the total 136 maternal deaths, 111 women (81.60%) delivered in the hospital whereas 25(18.40%) delivered outside hospital. Majority of deaths (54.40%) occurred in the postnatal period, followed by antenatal (27.90%) and intranatal period (17.70%).

Figure 1 shows distribution of maternal deaths according to their age. Majority of maternal deaths (43.40%) was observed in women of age group 19-24 years followed by 25-29 years age group (35.30%). Only 4.40% and 1.50% deaths were from age group ≥ 35 years and < 19 years, respectively.

Figure 2 shows distribution of maternal deaths according to parity of mother. Majority of mothers were multipara (52.20%) followed by primipara (42.60%). Only 5.20% mothers were grand multipara (≥ 5 deliveries).

Table 1: Causes of maternal deaths ($n = 136$)

Causes of death	Frequency ($n=136$)	Percentage (%)
Direct causes		
Hemorrhage	46	33.80
Eclampsia	14	10.30
Sepsis	11	08.20
Abruptio placentae	7	05.20
Embolism	4	02.90
Retained placenta	4	02.90
Septic abortion	3	02.30
Ruptured uterus	1	00.70
Ruptured ectopic	1	00.70
Obstructed labor	1	00.70
	92	67.70
Indirect causes		
Anemia	20	14.70
Hepatitis	12	08.80
ARDS	8	05.90
Heart disease	4	02.90
	44	32.30
Total	136	100.0

As evident from Table 1, direct causes contributed to 67.70% maternal deaths and indirect causes contributed to 32.30% maternal deaths. Among the direct causes of maternal deaths, majority (33.80%) was from hemorrhage followed by eclampsia (10.30%). Ruptured uterus and ruptured ectopic were the uncommon direct causes responsible for 0.70% maternal deaths each. Anemia (14.70%) was the most common indirect cause of maternal mortality in our study followed by hepatitis (08.80%).

Time interval from admission of mother to her death is depicted in Figure 3. 44.90% maternal deaths occurred within 24 h of admission in hospital and 42.60% maternal deaths occurred within 1-6 days of admission in hospital. Only 12.50% deaths happened beyond 7 days of hospital admission during our study period.

Discussion

Death of mother is a tragic event. In practical life, it has a severe impact on the family, community and eventually, the nation. Reduction of maternal mortality is the objective of MDGs, especially in low-income countries, where 1 in 16 women die of pregnancy-related complications.^[7]

In this study, average of MMR over 3 years study period (January 2012 to December 2014) was observed to be 410/1,00,000 live births. Other studies from tertiary-care institution reported mortality rate of 113 to 879 per 1,00,000 live births.^[8-10] The incidence and proportion of complications seen in mothers is probably very different from what occurs in the community because hospital delivery rate is still not up to

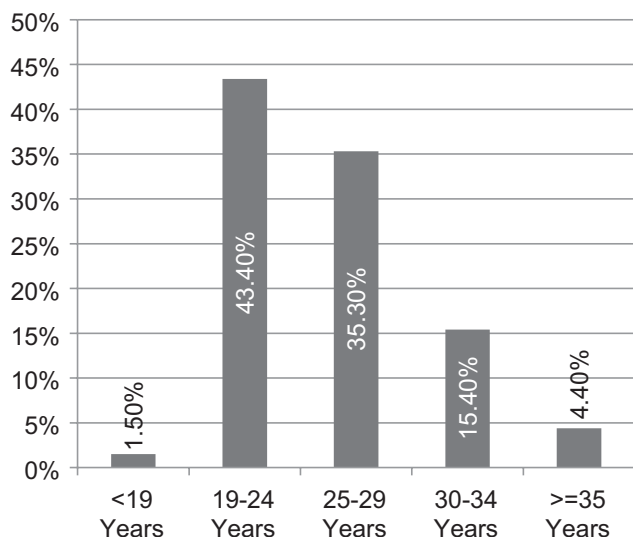


Figure 1: Distribution of maternal deaths according to maternal age.

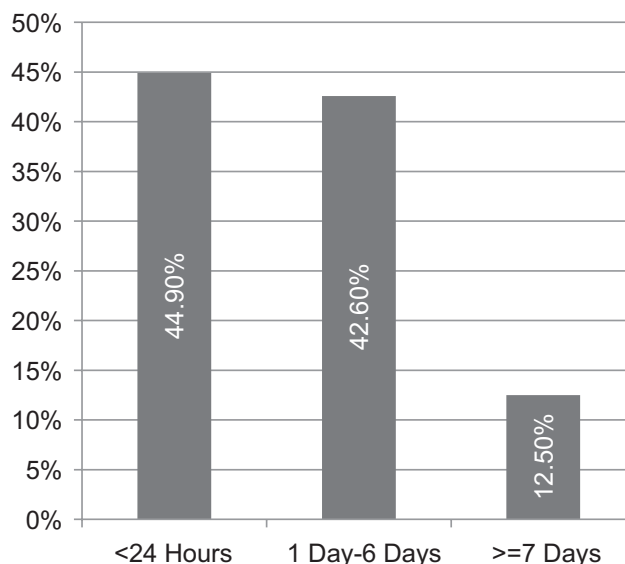


Figure 3: Time interval from admission to maternal death.

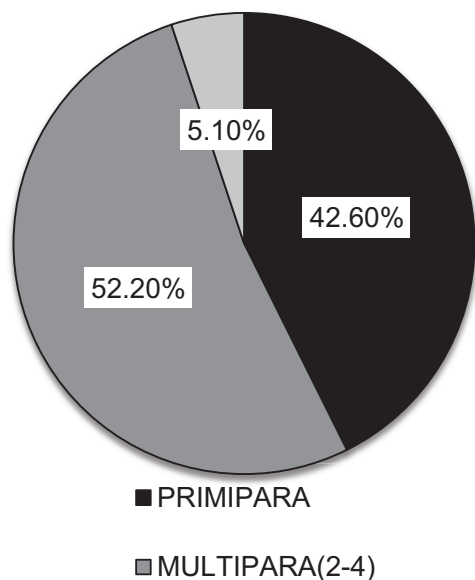


Figure 2: Distribution of maternal deaths according to parity.

the mark in our country. At the same time hospital data estimated may be more than community data as high risk women are referred to hospital for delivery and often the women are only referred to hospital when they develop life threatening complications, which is too late and thus increase the number of hospital deaths.^[11]

In our study, 52.90% mothers were from rural area and 47.10% were from urban area. In contrast Jadhav et al.^[12] in their study on maternal mortality observed that 64.55% maternal deaths was from urban residence and only 35.45% were from rural residence. Of the total 136 maternal deaths, 111 women (81.60%) delivered in the hospital whereas

25 (18.40%) delivered outside hospital. Similarly, Bangal et al.^[13] in their study observed that maximum deaths (64.51%) have occurred in women who delivered at a tertiary care center. Majority of deaths (54.40%) occurred in the postnatal period, followed by antenatal (27.90%) and intranatal period (17.60%). Similar to our study findings Bhosale et al.^[14] in their study revealed that 66.70% maternal deaths happened in the postpartum period followed by antepartum period (29.20%).

In this study, majority of maternal deaths (43.40%) was observed in women of age group 19-24 years. Similarly Bangal et al.^[13] in their study observed that 55.27% maternal deaths were in the age group of 19-24 years. Yerpude et al.^[2] in their study showed that the age group in which most (74.36%) maternal deaths occurred was 21-30 years group followed by <20 years (15.38%) and >30 years age groups (10.26%). This was because the highest number of pregnant women belonged to this group.

In our study majority of mothers were multipara (52.20%) followed by primipara (42.60%). Similarly 42.10% were primi-gravidas and 57.89% were multigravidas in the study by Bangal et al.^[13] and 56.41% were multipara and 35.90% were primipara in the study by Yerpude et al.^[2] Increased number of pregnancies and decreased interval between pregnancies together adversely affect the mother's health and responsible for fatal outcomes.

This study revealed that 32.30% maternal deaths were due to indirect obstetrical causes and 67.70% due to direct causes. Other studies have shown variations in direct obstetrical deaths, 68.70% in a study by Kulkarni et al.^[15] and 60% by Salhan et al.^[16] Common direct causes of maternal mortality in our study were hemorrhage (33.80%), eclampsia (10.30%), and sepsis (08.20%). In a study by Bangal et al.^[13] hemorrhage (21.05%), eclampsia and pulmonary embolism (10.52%),

and sepsis (07.89%) were the main direct causes of maternal mortality. Hemorrhage especially during postpartum is sudden, unpredictable, and more dangerous when woman has preexisting anemia. Anemia (14.70%) was the most common indirect cause of maternal mortality in our study similar to other studies on maternal mortality.^[2,11,12] So focus on anemia prevention and treatment can help in decreasing maternal mortality.

In this study, 44.90% maternal deaths occurred within 24 h of hospital admission and 42.60% maternal deaths occurred within 1-6 days of hospital admission. Priya *et al.*^[11] in their study also observed maximum deaths (54.63%) within 24 h of hospital admission. In contrast, 47.20% maternal deaths were within 1-7 days and 27.07% were beyond 7 days of hospital admission in the study by Bhosale *et al.*^[14] It becomes apparent that many of the deaths that occurred could have been avoided if they were transferred earlier further highlighting the need for adequate and quick transport facilities.

Every pregnancy should culminate in healthy mother and healthy baby and for that we need to ensure that all women should have access to high quality essential and emergency obstetric care along with promotion of overall safe motherhood.

The retrospective record-based nature and relatively small sample size collected over 3 years are the limitations of our study. Some of the information such as sociodemographic characteristics of the mother and the provision of ANC services were not there in the records for analysis. Also no control group has been studied, which could have helped in statistically comparing the various maternal and obstetric factors between mothers who died and those who lived. Overall, this study has managed to contribute substantial additional information regarding the causes of maternal mortality in a tertiary care hospital at a district level where no such study was conducted. This study can serve as a preliminary study to be followed by other large scale community-based studies, which can provide the required data to the health-care authorities for helping them to plan appropriate interventions for reduction of maternal mortality.

Conclusion

An attempt has been made in this study to throw light upon some of the factors which had contributed to maternal deaths in this tertiary care hospital so that timely measures can be taken to prevent such type of incidences in future. MMR in our study is very high as compared to national average of 167/1,00,000 live births, being a tertiary care hospital as most of the patients are referred from peripheral centers. Most maternal deaths are preventable by optimum utilization of existing MCH facilities, identifying loopholes in health delivery system, early identification of high risk pregnancies and their timely referral to higher center.

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