

Original Research Article

A retrospective study of maternal mortality in a tertiary care hospital in Western Maharashtra, India

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ABSTRACT

Background: Maternal mortality is a vital index of the effectiveness of obstetric services prevailing in a country. The key to progress of a country lies in reducing its maternal morbidity and mortality, hence to give a better assessment of the problem a retrospective study on maternal mortality was carried out. An objective of the study was to find the cause and epidemiological factors for maternal mortality in a tertiary care hospital in western Maharashtra from January 2018 to August 2019.

Methods: A retrospective, descriptive study done at tertiary care hospital in western Maharashtra from January 2018 to August 2019. Data was collected from medical records department and the study was conducted by reviewing the records of maternal death and scrutinizing for various aspects likely to be related to maternal death such as age, locality of residence, antenatal care, admission death time interval and cause of death.

Results: during the study period 63 maternal deaths occurred and 75302 live births, Maternal Mortality Ratio were 83.66 per 1 lakh live birth. 46% of maternal deaths were in age group of 21-25 years, 87% of patients belonged to rural area, 74% belonged to lower socioeconomic status. 43% were unregistered patients, 43% had vaginal delivery, 73% had no free transportation, 68% were referred patients, 60% were referred from private hospitals, 48% of maternal death occurred <24 hours, 73% of maternal death were due to direct cause, 28% of maternal deaths were due to pre-eclampsia and its complications, 15.8% due to sepsis and 12.6% due to Postpartum hemorrhage.

Conclusions: Being a tertiary care hospital, where patients are referred from periphery maternal mortality was found to be on higher side. Proper implementation of government policies with community participation along with strengthening of First Referral Unit (FRU) and Primary Health Centres can help to reduce maternal mortality.

Keywords: First referral unit, Maternal mortality, Pre-eclampsia, Sepsis

INTRODUCTION

According to WHO (world health organization), International classification of diseases 10th edition (ICD-10) Maternal mortality is defined as death of a woman during pregnancy or within 42 days of pregnancy, irrespective of the site and duration of pregnancy or its management, but not from incidental or accidental causes.¹ From 2000 to 2017, the global maternal mortality ratio declined by 38% - from 342 deaths to 211 deaths per one lakh live births, according to UN inter agency

estimates. This translates into an average annual reduction of 2.9%. Though it is substantive, this is less than half the 6.4% annual rate needed to achieve the sustainable development global goal of 70 maternal deaths per one lakh live births.

Two regions, sub Saharan Africa and south Asia account for 86% of maternal deaths worldwide. Sub Saharan Africans suffer from the highest maternal mortality ration 533/ 1 lakh live birth, which is over two thirds (68%) of all maternal deaths per year worldwide, South Asia

follow, with maternal mortality ratio of 163, accounting for 19% of the global total.²

METHODS

A retrospective, descriptive cross sectional study. Study duration was 20 months (January 2018 to August 2019). Study done at District of western Maharashtra.

All cases of maternal mortality, reported in monthly district maternal mortality meeting.

Inclusion criteria

- All reported maternal mortality cases of district maternal mortality committee.

Exclusion criteria

- Non reported maternal mortality cases are excluded from the study.

All cases of maternal mortality reported in monthly district maternal mortality committee were taken for the study. Usually all maternal mortality cases from all parts of district are mandatory to inform district committee. Hence, there will be no chance to miss even single case of maternal mortality. All monthly meetings are attended to collect case papers and summaries, investigation reports, Post mortem report and facility based maternal mortality form filled by concerned doctors along with minutes of meeting. All data was collected, analysed in view of causes and epidemiological aspects of maternal mortality eg. age, parity, socio economic status, literacy and to find faults and lacuna at various levels of prevention.

Study tools

- Facility based maternal death review form.
- Death summary of each maternal mortality case.
- Investigation report of each case.
- Post mortem report of each maternal mortality case.

Data collection and analysis

Data was collected from every monthly meeting of district maternal mortality committee. Appropriate statistical analytical methods such as percentage of no. of deaths with respect to each parameter were used.

RESULTS

The maximum number of maternal deaths 29 (46.03%) were in the age group 21-25 yrs, followed by 16 (25.4%) in those below 20 years of age, 14 (22.22% deaths was noted in age group 26-30 years and the least number of death occurred in age group >35 yrs (Table 1).

In the present study maximum number of maternal deaths were noted in patients who reside at rural areas 55 (87.3%) of Maharashtra compared to patients residing in urban areas 8 (12.7%) (Figure 1).

Table 1: Age wise distribution of maternal deaths.

Age	Maternal death	Percentage
<20 years	16	25.40
21-25 years	29	46.03
26-30 years	14	22.22
31-35 years	3	4.76
36-40 years	1	1.59
Total	63	100

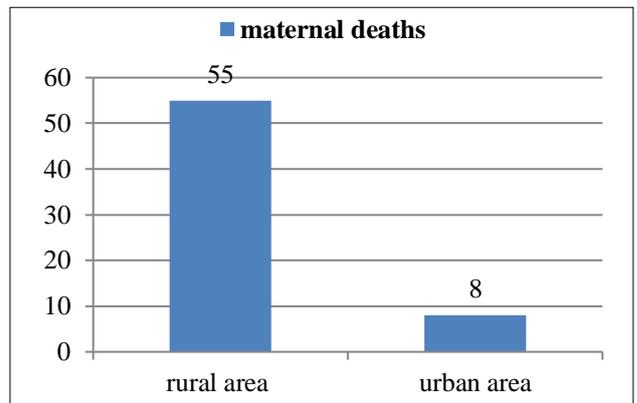


Figure 1: Distribution of cases based on residential area.

Table 2: Distribution based on antenatal registration.

Registration status	Number	Percentage
Unregistered	43	68.25
Registered	20	31.74
Total	63	100

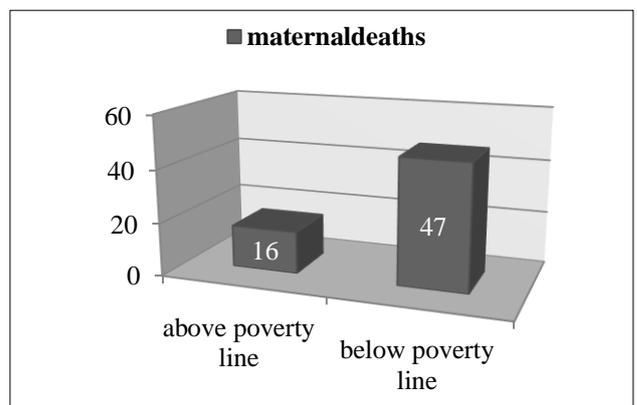


Figure 2: Socioeconomic status.

Most of maternal death 47 (74.6%) occurred in low socioeconomic status (below poverty line) and 16 (25.4%) patients were above poverty line (Figure 2).

In this study it was observed that 20 (31.74%) patients were registered at health care centers and 43 (68.25%) patients were unregistered (with less than 4 antenatal visits) (Table 2).

In the study most deaths 28 (44.45%) occurred in woman who married 18-20 yrs, followed by woman who were married less than 18 years age 14 (22.23%) and those between 18-20 years of age 14 (22.23%) and less 3 (4.76%) in woman who married after 25 yrs of age. In 2 (3.17%) patients the marital status was not known and in 2 (3.17%) patients the marital status was not available respectively (Table 3).

Table 3: Distribution according to age of marriage.

Age	Number	Percentage
<18 yrs	14	22.23
18 - 20 yrs	28	44.45
21 - 25 yrs	14	22.22
>25 yrs	3	4.76
Unmarried	2	3.17
Unavailable	2	3.17
Total	63	100

In the present study it was observed that maximum deaths occurred in woman with parity 1, about 36 (57.14%) and 23 (36.5%) in parity 2-4 yrs the least number of maternal deaths 4 (6.34%) occurred in woman whose parity was >4 (Table 4).

Table 4: Distribution according to obstetric code.

Parity	Number	Percentage
Para 1	36	57.14
Para 2 - 4	23	36.50
>para 4	4	6.34
Total	63	100

In this study authors observed that maximum number of maternal deaths were observed in patients who delivered vaginal delivery 27 (42.86%) followed by LSCS 16 (25.39%), and 15 (23.8%) patients were undelivered and 5 (7.94%) patients had abortions (Table 5).

Table 5: Mode of delivery.

Mode of delivery	Number	Percentage
LSCS	16	25.39
Vaginal	27	42.86
Abortion	5	7.94
Undelivered	15	23.8
Total	63	100

It is observed that around 43 (68.25%) patients were referred from peripheral hospitals and 20 (31.75%) patients came to this hospital for the first time (Figure 3).

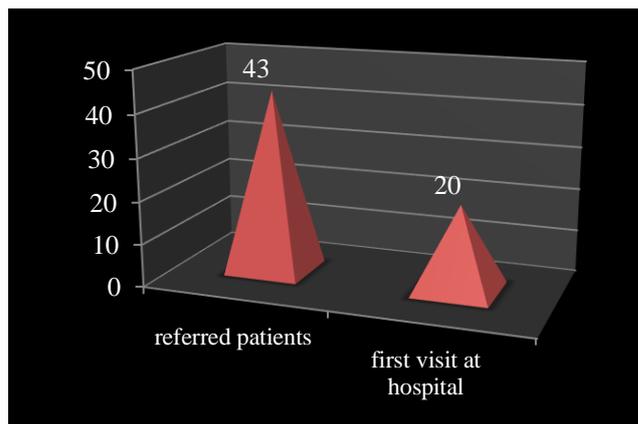


Figure 3: Distribution according to referral status.

It is observed in this study that the most common cause for referral was pre-eclampsia and its complications 16 (25.39%) followed by 5 (11.62%) anemia and patients whose cause of referral was not known respectively. About 4 (9.3%) patients were referred in view of fever (dengue), 2 (4.65%) patients for puerperal sepsis and breathlessness each and 1 (2.33%) patient in view of hypotension, unconsciousness, acute renal failure, heart disease, postpartum psychosis, pulmonary edema, postpartum hemorrhage each (Table 6).

Table 6: Causes for referral.

Reason for referral	Number	Percentage
Pre-eclampsia and its complications	16	25.39
Postpartum hemorrhage	1	2.33
Anaemia	5	11.62
Fever(dengue)	4	9.3
Puerperal sepsis	2	4.65
Breathlessness	2	4.65
Pulmonary edema	1	2.33
Hypotension	1	2.33
Unconsciousness	1	2.33
Acute renal failure	1	2.33
Heart disease	1	2.33
Postpartum psychosis	1	2.33
Further management	2	4.65
Not available	5	11.62
Total	43	100

The study showed that 46 (73%) of patients did not get the benefit of free transportation by government ambulance and only 17 (26.98%) of patients benefitted from schemes providing free transport of pregnant patients for emergency (Figure 4).

It is observed that maximum maternal death 43 (68.25%) occurred during the crucial post natal period, 15 (23.81%) deaths during antenatal period and 5 (7.94%) deaths following abortion (Figure 5).

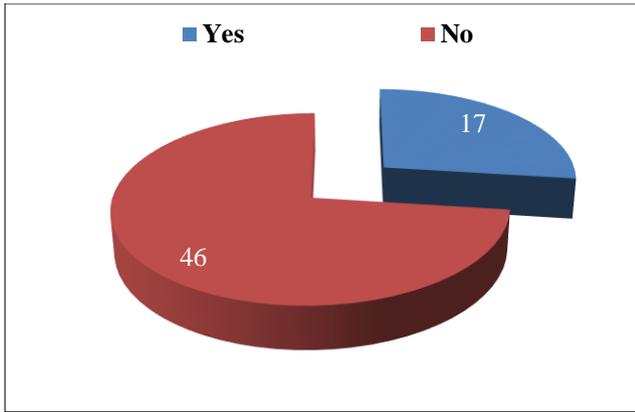


Figure 4: Distribution of cases based on availability of free transportation.

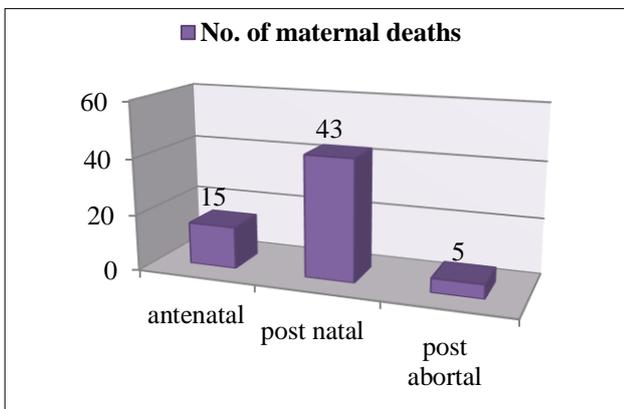


Figure 5: Distribution based on perinatal status of patients.

In this study 30 (47.61%) of maternal deaths occurred within 24 hours of admission while 22 (34.92%) deaths occurred after 72 hours, 8 (12.7%) patients died between 24-48 hours after admission and 3 (4.77%) died between 48-72 hours of admission to this hospital (Table 7).

Table 7: Distribution based on admission to death time interval.

	Number	Percentage
<24 hrs	30	47.61
24-48 hrs	8	12.7
48-72 hrs	3	4.77
>72 hrs	22	34.92
Total	63	100

It is observed that pre-eclampsia and its complications was the most common cause of maternal death 18 (28.57%) followed by sepsis 10 (15.87%) and postpartum hemorrhage 8 (12.69%) respectively. Three (4.76%) deaths were due to anemia, acute fatty liver of pregnancy, pneumonia, hepatitis each. Two (3.17%) deaths were due to suicide, poisoning, thromboembolism and placenta praevia each. The least 1 (1.59%) reason for death was due to road traffic accident, metabolic encephalopathy,

uremic encephalopathy, dengue, heart disease and swine flu (H1N1) each (Table 8).

Table 8: Distribution according to cause of death.

Cause of death	Number	Percentage
Placenta praevia	2	3.17
Postpartum hemorrhage	8	12.69
Pre-eclampsia and complications	18	28.57
Sepsis	10	15.87
Anaemia	3	4.76
Thromboembolism	2	3.17
Acute fatty liver of pregnancy	3	4.76
Swine flu (H1N1)	1	1.59
Pneumonia	3	4.76
Hepatitis	3	4.76
Dengue	1	1.59
Heart disease	1	1.59
Poisoning	2	3.17
Road traffic accident	1	1.59
Suicide	2	3.17
Metabolic encephalopathy	1	1.59
Uremic encephalopathy	1	1.59
Total	63	100

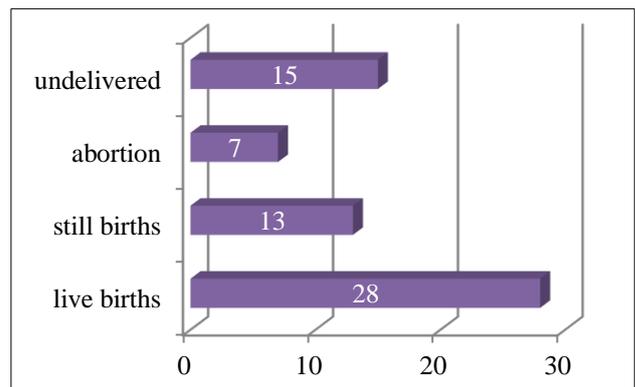


Figure 6: Distribution of cases according to fetal outcome.

In this study 28 (44.4%) patients had live born babies, 13 (20.63%) delivered still born babies, 15 (23.8%) patients did not deliver and 7 (11.11%) had abortion (Figure 6).

DISCUSSION

Global causes of maternal death, WHO systematic analysis suggests that Indirect causes and hemorrhage are the largest cause of maternal death worldwide. Of the Direct causes hemorrhage is the leading cause of maternal death, followed by Hypertensive disorders and Sepsis. Regional estimates varied substantially.³

In context of sustainable development goals, countries have united behind a target to accelerate the decline of maternal mortality by 2030. SDG 3 includes an ambitious

target of “reducing the global maternal mortality to less than 70 per 1 lakh live births, with no country having maternal mortality rate of more than twice the global average”. WHO works to contribute to the reduction of maternal mortality by increasing research evidence, providing evidence based clinical and programmatic guidance, setting global standards, providing technical support to member states on developing and implementing effective policy and programmes.⁴

Hiralal konar conducted an institutional based study “Maternal mortality: A FOGSI study: from January 2005 to December 2007, which showed a wide variation of MMR in five zones of India (West -342, South -229, East- 709, North - 814).⁵

Dr. BK Murthy et al, conducted a study, during study period, January 2001 to December 2010, there were a total 39704 live births and 1220 maternal deaths. The mean MMR in the study period was 302/1 lakh live births.⁶

In the present study maximum number of deaths 46.03% occurred in age group of 21-25 yrs of age group followed by 25.4% deaths in age <20 yrs . Urmila mahala conducted a study in maternal mortality in tertiary care hospital in Rajasthan: A 10 yr review also showed similar results as present study, where maximum maternal deaths (47.4%) occurred in age group 21-25 yrs.⁷ A retrospective study at Dibrugarh Assam by Lima Hazarika observed maximum deaths in age group 15-20 yrs.⁸

In this study 68.25% cases were referred from outside while 31.75% patients came to this hospital first time where death occurred. This shows that patients reach this hospital at advanced stage of complication, in a critical condition and little can be done to manage such cases. Also while referring a patient, free transportation with ambulance was provided to only 26.98% cases, the rest 73.01% patient relatives had to arrange private vehicle to reach this hospital, so it is an obvious type 2 delay: delay at arrival at health care facility. Moreover 74.6% cases belonged to below poverty line category, which somehow contributed to type 1 delay: delay in seeking treatment and also type 2 delay.

In this study, maximum deaths 68.5% deaths occurred in post natal period, 23.81% deaths in antenatal period. Similar results were shown by Naheed Bano et al, in 8 principal hospitals in Pakistan, where out of 108 maternal death in 2009, 78% patients died post natally, 17.5% antenatal period.⁹ Another study by Sahaja Kittur et al, in Hubli showed 75% maternal death occurring in post natal period.¹⁰

In this study out on 63 maternal death, 42.86% patients had delivered vaginally, 25.39% had LSCS, 23.8% were undelivered, and 7.9% had abortion. A 10 yr study conducted in Goa medical college showed similar results, 47.77% delivered vaginally, LSCS in 38.88% case.¹¹

Most common cause of death in this study was pre eclampsia and its complications accounting to 18 (28.5%) of total maternal deaths, sepsis was the second most common cause (15.87%). Similar results were shown by H. Konar, the leading cause of death were hypertension (29.4%) he, followed by Hemorrhage (21.565), Sepsis (15.05%).⁵ In study by B.K Murthy et al, major cause of maternal death was Hemorrhage (26.66%) Eclampsia (26.66%) and Sepsis (18.33%).⁶ A study conducted by Lima Hazarika et al, showed in Assam the leading cause of death was Anaemia (29.1%) followed by eclampsia (23%) and septicemia (17%).⁸

According to the just released SRS bulletin (2016), India has shown impressive gains in reduction of maternal mortality with 22% reduction since 2013. Maternal mortality ratio has declined from 167 in 2011-2013 to 130 per one lakh live birth in 2014-2016.the decline has been most significant in EAG states and Assam from 246 to 188. Among the southern states, the decline has been from 93 to 77 and in other states from 115 to 93. The results signify that strategic approach of the ministry has started yielding dividends and efforts of focusing on low performing states is paying off, especially initiatives like mission Indradanush and Intensified Mission Indradanush with their focused approach are significantly turning the tide in favour of India, other initiatives under the umbrella of NHM like augmentation of infrastructure and HR, capacity building. JSSK (which provides free transport and care of pregnant woman) have also contributed to the success.¹²

CONCLUSION

The issue of maternal mortality is getting high attention globally, hence changes have started as reflected by the decreasing trend. And in depth review of all maternal mortality cases in rural areas will guide us to improve and make policies to reduce maternal deaths and achieve United Nations Millennium development goals.

All authors have to come together and collectively work on the issue to move towards “safe motherhood”. Proper implementation of government policies and programmers with community participation and political commitment is the key along with strengthening of health care facilities and proper training of health care personnel.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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