

## Study of Maternal Mortality in a Tertiary Health Care Centre in Akola District of Maharashtra (India)

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## Abstract

## Original Research Article

**Background:** Maternal mortality reflects the quality of obstetric care given to pregnant women in the community. Maternal mortality in India continues to be unacceptably high. This study was conducted to find the maternal mortality ratio in the hospital and to assess some epidemiological aspects and causes of maternal mortality. **Material and methods:** The present retrospective record based study was conducted in Community Medicine department in collaboration with Obstetrics and Gynaecology department of Government Medical College and hospital, Akola, Maharashtra. Data regarding maternal mortality for year 2018 was collected from Maternal Mortality register. Information regarding age, residence, religion, gestational age, parity, causes of maternal deaths, time interval between admission and death, time of death in relation to pregnancy, etc. was recorded in pre coded proforma. **Results:** During the study period there occurred 5689 live births and 30 maternal deaths in the hospital. Thus maternal mortality ratio in this hospital was 527.3 per 100000 live births. 86.6% maternal deaths occurred above 20 years of age. Most of these women were from urban area (86.6%). 80% maternal deaths occurred in third trimester or during postpartum period. 53.3% deaths occurred in primipara while 46.7% in multipara. Direct causes of maternal deaths were –haemorrhage (16.7%), Eclampsia (16.7%), sepsis (13.3%) and Rupture ectopic (3.3%). Indirect causes contributing for maternal mortality were severe anaemia (6.6%), hepatitis (16.7%), ARDS (16.7%) and heart disease (10.0%). 56.7% maternal deaths occurred within 24 hours of admission to the hospital. Of these 36.78% deaths occurred within 12 hours of admission. **Conclusion:** being the tertiary care hospital maternal mortality was found to be on higher side. In present study most of the maternal deaths were due to preventable causes. So emphasis should be made to reduce the maternal mortality by regular ANC and PNC check-ups, identification of high risk pregnancies, strengthening timely referral system to such higher canters.

**Keywords:** Maternal mortality, maternal mortality ratio, eclampsia, primigravida, antepartum.

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## INTRODUCTION

The maternal mortality is an important indicator of standards of obstetric care and has been used as an index of the status of maternal health [1-3]. It is a sensitive indicator of the quality of obstetric care in a community which reflects the utilization of health care services available [4]. Deaths due to pregnancy and during the child birth are common among women in the reproductive age groups. Reduction of maternal mortality has thus been an area of concern and the Governments across the globe have set time bound targets to achieve it [5].

According to WHO, maternal death is defined as the death of a woman while pregnant or within 42 days after delivery, 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 [6-8]. Maternal mortality ratio measures women dying from 'puerperal causes and is defined internationally, as the maternal deaths per 100,000 live births [9, 10]. The International Conference on Population and Development in 1994 had recommended reduction in maternal mortality by at least 50 per cent of the 1990 levels by the year 2000 and further one half by the year 2015. The Millennium Development Goals (MDG) has set the target of achieving 200 maternal deaths per lakh of live births by 2007 and 109 per lakh of live births by 2015 [5, 11].

The World Health Organization reports that the MMR in the South Asian region ranks second only to sub-Saharan Africa. Together, these two regions

account for 86% of global maternal deaths [12]. The situation is even worse in India. WHO estimates show that out of the 529,000 maternal deaths globally each year, 136,000(25.7%) are contributed by India. This is the highest burden for any single country [13]. Even today 20% of global maternal deaths occur in India [14]. Maternal Mortality Ratio (MMR) in India has shown a decline from 167 per 100,000 live births in the period 2011-13 to 130 per 100,000 live births in the period 2014- 16. Currently maternal mortality ratio (MMR) in Maharashtra (India) is 61/100,000 live birth [15, 16].

Since MDG could not be achieved, new sustainable development goal has been set up. SDG – Goal 3 ensure healthy lives and promote wellbeing for all at all ages, Target 3.1 is to reduce global maternal mortality ratio to less than 70 per 100000 live births by 2030 [17].

Though tertiary care hospitals provides specialist obstetrics care services, institutional mortality rates are higher because most of the seriously ill patients are referred to the tertiary health care center. About 80% of maternal mortality occurs due to direct causes i.e. obstetric complications of pregnancy, labour and puerperium and obstetric hemorrhage being the commonest [18]. In addition to these socio-economic factors like poverty, illiteracy, early marriage, religion, availability of health care services and its inadequate access are also responsible for high maternal mortality. Many of these factors are preventable.

It was in this context, this study was conducted with the objectives to assess the existing MMR and the causes of maternal mortality in a tertiary care hospital in Maharashtra.

## AIM AND OBJECTIVES

1. To assess maternal mortality ratio ( MMR )
2. To evaluate causes of maternal mortality over period of one year in tertiary care hospital in Maharashtra.

## MATERIAL AND METHODS

The present retrospective record based study was conducted in the department of Community Medicine in collaboration with Department of Obstetrics and Gynaecology of Government Medical College and hospital, Akola, Maharashtra (India). Data regarding maternal mortality was collected from Maternal Mortality register after obtaining permission from the medical record section of the hospital.

Patients studied were the women died in the hospital due to pregnancy or related complications from 1<sup>st</sup> January 2018 to 31<sup>st</sup> December 2018. Data was collected from case papers maintained in record section of the hospital. Information was recorded in pre coded proforma regarding age, residence, religion, gestational age, parity, causes of maternal deaths, time interval between admission and death, time of death in relation to pregnancy, etc. Descriptive data was tabulated as absolute figures and percentages. The details of number of live birth from 1<sup>st</sup> January 2018 to 31<sup>st</sup> December 2018 was collected from medical record section. Maternal mortality ratio for the study period was calculated by using the formula – Maternal Mortality Ratio = (Total no. of maternal deaths / Total no. of live births) x 100000.

## RESULTS

In the present study during the study period 1st Jan to 31<sup>st</sup> Dec. 2018 there occurred 5689 live births and 30 maternal deaths in the hospital. Thus maternal mortality ratio in this hospital is 527.3 per 100000 live births.

**Table-1: Maternal deaths in relation to various characteristics**

Characteristics		No. of Maternal deaths	Percentage
Age (years)	≤ 20	4	13.4
	21-30	13	43.3
	≥31	13	43.3
Residence	Urban	26	86.6
	Rural	4	13.4
Religion	Hindu	19	63.3
	Muslim	7	23.3
	Bouddha	4	13.4
Gestational age	1 <sup>st</sup> Trimester	1	3.3
	2 <sup>nd</sup> Trimester	5	16.7
	3 <sup>rd</sup> Trimester and thereafter	24	80.0
Partum deaths	Antepartum	7	23.3
	Postpartum	23	76.7
Parity wise death	1 <sup>st</sup> parity	16	53.3
	2 <sup>nd</sup> parity	8	26.7
	≥ 3 <sup>rd</sup> parity	6	20.0

Table 1 shows age distribution of the patients died due to maternal causes. About 86.6% maternal deaths occurred above 20 years of age while only 4 (13.4%) deaths occurred up to 20 years of age. Most of these women were from urban area (86.6%) while 13.4% were from rural area. 63.3% women belonged to Hindu while 23.3% to Muslims and 13.4 % to bouddha.

80% maternal deaths occurred in third trimester or during postpartum period. 16. % deaths

occurred during second trimester. Only 3.3% deaths occurred during first trimester.

Nearly two third deaths (76.7%) occurred in the postpartum period while 23.3% deaths occurred during pregnancy. About half of the deaths (53.3%) occurred in primipara while 46.7% deaths occurred in multipara i.e. 26.7% in parity 2<sup>nd</sup> and 20% in parity above 2.

**Table-2: Causes of maternal mortality**

Causes of maternal deaths		No. of maternal deaths	Percentage
Direct causes	Haemorrhage	5	16.7
	Eclampsia	5	16.7
	Sepsis	4	13.3
	Rupture ectopic	1	3.3
Indirect cause	Severe Anaemia	2	6.6
	Hepatitis	5	16.7
	ARDS	5	16.7
	Heart disease	3	10.0

Table 2 shows direct causes attributed to maternal deaths. Major causes were –haemorrhage including ante partum and postpartum causes 5(16.7%), Eclampsia 5(16.7%), sepsis 4(13.3%) and Rupture ectopic 1(3.3%). Maternal death can occur due to direct (obstetric) causes or due to indirect (medical) causes. In the present study 15(50 %) deaths were due to direct causes and 15(50%) deaths were due to indirect causes.

Indirect causes contributing for maternal mortality were severe anaemia 2 (6.6%), hepatitis-5(16.7%), ARDS- 5 (16.7%) and heart disease-3(10.0%). In present study most of the maternal deaths were due to preventable causes.

**Table-3: Time interval from admission and death**

Time interval ( Hours)	No. of maternal deaths	Percentage
≤ 12	11	36.7
12-24	6	20
24-72	4	13.3
72-168	7	23.3
≥168	2	6.7

Table 8 shows time distribution of maternal deaths in relation to admission-death interval. More than half of all deaths 17(56.7%) occurred within 24 hours of admission to the hospital. Of these 11(36.78%) deaths occurred within 12 hours of admission. 4(13.3%) deaths occurred between 24-72 hours after admission, 7(23.3%) between 3-7 days and 2(6.7%) deaths occurred after 7 days of admission to the hospital.

## DISCUSSION

Present study shows that in the year 2018 i.e. from January to December 2018, there occurred 30 maternal deaths in this hospital. The rate (MMR) was found to be 527.3 per 1 lakh live births. Maternal mortality rate for India for the year 2014-2016 was 130 per 1 lakh live births while that of Maharashtra was 61 per 1 lakh live births [15, 16].

High maternal mortality ratio of 632 per lakh live births in a tertiary care hospital of Central India was observed by Lilare R.R. during 2016 [19]. Similar study conducted by Nair A during 2016 in tertiary care hospital in Maharashtra also revealed very high MMR of 410/ 1 lakh live births which is similar to the present study [20]. This might be due to the fact that these studies were carried out at tertiary care hospital where most of the high risk pregnancies are admitted. Bhadra *et al.* in their study carried out in rural tertiary hospital of West Bengal reported maternal mortality rate of 233 [21]. In a similar study by Urmila Mahala *et al.* conducted in 2016 at tertiary care hospital in Rajasthan the MMR was found to be 253.13 / 1 lakh live births [22]. The present study has comparatively high MMR. This is because our hospital is a tertiary care hospital and receives a lot of complicated referrals from adjoining districts and rural areas.

In the present study 86.6% of maternal deaths were in the age group above 20 years as highest number of births is reported in this age group. Similar findings were also reported by Bhadra [21], Mahala [22] and Shah [23].

In the present study 86.6% maternal deaths were from urban areas and only 13.4% were from rural areas. This may be because of awareness in urban people about the availability of health care services at this institute; many complicated cases of pregnancy are admitted in this Institute. Jadhav *et al.* [24] in their study on maternal mortality observed that 64.55% maternal deaths were from urban residence and only 35.45% from rural residence. In contrast to this Kashyap V *et al.* [25] in their study found that 80.5% maternal deaths were from rural areas and stated that these deceased were from remote geographical locations and awareness regarding care was very low among them

In present study, primigravida constituted 53.3% maternal deaths. This may be because of early marriages and early pregnancies during which there body is not ready to undergo the physiological changes of pregnancy. Similar findings were also stated by Kashyap *et al.* [25] i.e 56.4% deaths were observed in primigravida. In contrast to this finding, Nair A *et al.* [20] (52.2%), Bangal VB *et al.* [26] (57.89%) and Yerpude PN *et al.* [14] (56.41%) observed more maternal deaths in multigravida.

Direct causes contributing to maternal mortality in the present study were attributed to well-known triad of maternal mortality as eclampsia (16.7%), haemorrhage (16.7%), and septicaemia (13.3%). Major indirect causes in our study were hepatitis (16.7%), ARDS (16.7%) and heart disease (10.0%). Severe anaemia contributed only 6.6%. These findings were similar with that of many other similar studies [19, 20, 23, 27-30].

A recent systematic review of the causes of maternal deaths and its geographical distribution has shown that the Indian subcontinent has a significantly higher maternal mortality attributed to sepsis, infection and haemorrhage [31].

All these are preventable causes of maternal mortality. Most of these deaths were preventable if patients were given appropriate treatment at periphery and timely referral to higher centres.

Most of the deaths i.e. 56.7%, occurred within 24 hours of admission to the hospital while 43.3 % deaths occurred after 24 hours of admission & in postpartum period. Priya *et al.* [32] in their study also observed maximum deaths (54.63%) within 24 hours of hospital admission. 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.

## CONCLUSION

Being the tertiary care hospital maternal mortality was found to be on higher side in this hospital. Present study shows that in the year 2018 the maternal mortality rate for this hospital was 527.3 per 1 lakh live births. In present study most of the deaths were due to preventable causes of maternal mortality. So efforts should be made to reduce the maternal mortality by regular antenatal and postnatal check-ups, early identification of high risk pregnancies and their treatment, and strengthening timely referral system to such higher canter.

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