

Maternal mortality at a rural medical college of Assam: a retrospective study

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ABSTRACT

Objectives: To assess the maternal mortality ratio at a rural medical college of Assam.

Methods: A retrospective study of 73 maternal deaths over a period of 2 years from 1st January 2012 to 31st December 2013.

Results: There were 73 maternal deaths amongst 10,291 live births over the period of study giving the MMR of 709.35. Eclampsia was the most common cause of maternal death. Most common (43.83%) maternal death was seen in primigravidas. Maximum maternal deaths were observed within 12- 24 hours of admission, maximum number of maternal deaths was seen in the age group 18- 23 years & most of the women had no ANC.

Conclusion: The maternal mortality is much higher than the national (and Assam state) MMR.

Key words: MMR, rural, eclampsia

Conflict of interest: None. **Disclaimer:** Nil.

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 is defined internationally, as maternal death rate per 1,00,000 live births. Every year, approximately 358,000 women die from complications of Pregnancy and childbirth worldwide. Sub-Saharan Africa and South Asia accounted for 87% of global maternal deaths [2].

India is among those countries, which has a very high maternal mortality ratio. Maternal mortality ratio was 2000 per 1,00,000 live births in 1938, which declined to 1000 per 1,00,000 live births by 1959; it dropped down to 540 per 1,00,000 live births in 1999[3]. Currently it is estimated to be 254 per 1,00,000 live births which is far above the desired figure of 100 per 1,00,000 live births as per the objectives of Millennium Development Goals (MDGs) [1]. India is one of the countries with a high maternal mortality ratio (MMR) and the highest (136,000) estimated number of maternal deaths[4]. The main causes of

Received: 19 March 2014/ Accepted: 30 March 2014

Zaman S, Begum AA. Maternal mortality at a rural medical college of Assam: a retrospective study. Journal of Obstetrics & Gynaecology Barpeta, 1(1): 46-51

maternal mortality in India are hemorrhage, sepsis, abortion, hypertensive disorders and obstructed labor. MMR for India was 407 by sample registration system (SRS) 1997 estimate and came down to 301 per 100,000 live births by SRS 2003 estimate. Going by this pace, we would achieve the MMR of 195 by the year 2012 and of 160 by 2015, far from the NRHM goal of 100 per 100,000 live births by 2012 or Millennium Development Goal of 109 per 100,000 live births by 2015. A population based survey carried out in India, which used longitudinal surveillance and complete coverage of vital events, reported a MMR of 320 per 1, 00,000 live births in rural areas [5]. MMR of Assam is 390 [6].

Pregnancy, although being considered a normal healthy state, carries serious risk of morbidity and at times death [7]. Maternal mortality is ascribed usually to complications that generally occur during or around labor and cannot be accurately predicted. The major causes of maternal mortality are mostly preventable through regular antenatal check up, proper diagnosis and management of labor complications [8].

Material and Methods

A retrospective hospital based study was carried out in the Obstetrics and Gynecology Department of Fakhruddin Ali Ahmed Medical College and Hospital - a rural tertiary level health care referral centre at Barpeta, Assam, India over a period of 2 years from January 2012 to December 2013. A total 73 maternal deaths were analyzed with the special emphasis on age of the patient, parity, cause of death, time interval from admission to death, trimester of pregnancy at the time of death. Results were analyzed by using percentage and proportion.

Results And Observations

There were 73 maternal mortality amongst 10291 live births over the period of study giving an MMR of 709.35 which much higher than that of Assam state.

It is seen from the table 1 that by parity 32 (43.83%) maternal deaths were primigravidas

followed by 18 (24.65%) in parity 2, 13 (17.80%) in primipara, 5 (6.84%) each in para3 and grand multipara.

Table 2 shows data according to religion. It is seen that 58 (79.45%) maternal deaths were Muslim by religion compared to 15 (20.55%) of Hindu.

As seen from table 3, out of total 73 deaths, 7 (9.58%) women died within 1 hour of admission; 4 (5.47%) between 1-3 hours of admission; 9 (12.32%) between 3-6 hours of admission and 14 (19.17%) between 6-12 hours of admission, 15 (20.54%) between 12-24 hours of admission, 10 (13.69%) between 24-48 hours of admission and 14 (19.17%) after 2 days of admission. Maximum death occurred between 12- 24 hours of admission.

It is observed from the above that maximum, 29 (39.72%) deaths occurred in the age group 18- 23 years followed by 35.6% in the age group 24- 29 & least, 5 (6.84%) in 35- 40 years of age. [Table 4]

Table 5 shows that 32 (55.17%) had no ANC, 6 (10.34%) maternal deaths had only 1 ANC, 3 (4.10%) had 2 ANC, 3 ANC were on 10 (17.27%) deaths and only 5 (8.62%) had atleast 4 ANC.

It can be interpreted from the table 6 that 72 (98.63%) deceased were inhabitant of rural area and only 1 (1.67%) from urban area.

Out of 73 maternal deaths 36 received blood transfusion , off which 21 got 1 unit, 3 women got 2 units , 4 patients were given 3 units of blood transfusions while 4 or more units were transfused to 8 patients. [Table 7]

It is observed that 34 (46.58%) deaths occurred in the postnatal period followed by 27 (36.98%) in the antenatal period & 12 (16.44%) in intrapartum period.

Majority of the death (55.55%) occurred in the third trimester followed by 25.92% in first trimester & least (18.51%) amongst the total 27 death that occurred in antenatal period. (table 9)

It is seen from table 10 that out of 73 maternal deaths 28.76% is due to eclampsia, 23.24% is due to anemia, 9.58% due to septicemia, 6.85% is due to retained placenta, and 5.48% is due to septic abortion. Pulmonary embolism, ruptured uterus &

Table 1. Parity & Maternal Deaths

Parity	No of maternal deaths (%)
Po	32 (43.835)
P1	13 (17.808)
P2	18 (24.657)
P3	5 (6.849)
≥P4	5 (6.849)

Table 2: Religion

Religion	No of maternal death (%)
Hindu	15 (20.55)
Muslim	58 (79.45)

Table 3: Admission to death interval

Time interval(hrs)	No of maternal death (%)
0- 1	7 (9.59)
1 -3	4 (5.48)
3 -6	9 (12.32)
6- 12	14 (19.17)
12- 24	15 (20.54)
24- 48	10 (13.69)
≥48	14 (12.32)

Table 4: Age distribution

Age(yrs)	No of maternal death (%)
18- 23	29 (39.72)
24 -29	26 (35.6)
30 -34	13 (17.8)
35 -40	5 (6.84)

Table 5: Antenatal checkup

No of ANC	No of maternal death (%) (n=58)
0	32 (55.17)
1	6 (10.34)
2	3 (4.10)
3	10 (17.24)
≥4	5 (8.62)

Table 6: Inhabitance

Locality	No of maternal death (%)
Urban	1 (1.37)
Rural	72 (98.63)

Table7: Blood transfusion

Unit of blood transfusion	No of maternal death (n=36)
1	21
2	3
3	4
≥4	8

Table 8: Period of death

Period of death	No of maternal death (%)
Antenatal	27 (36.98)
Intranatal	12 (16.44)
Postnatal	34 (46.58)

Table 9: Trimester wise distribution of death

Trimester	No of maternal death (%)
First	7 (25.92)
Second	5 (18.51)
Third	15 (55.55)

PPH are responsible for 4.11% maternal death each individually. PIH & ruptured ectopic each are responsible for 2 (2.73%) maternal death. Suspected amniotic fluid embolism causes 1 maternal death like that of ventricular arrhythmia, abruptio placentae & pulmonary edema with haemoptysis.

Discussion

In the present study, there were 73 maternal deaths amongst 10,291 deliveries, giving a MMR of 709.35 per 1, 00,000 live births, which is higher than the state & national averages. FAAMCH, being a teaching institution and a tertiary care centre, get complicated cases from rural areas. Admissions of moribund cases referred from periphery have inflated this mortality ratio, like other teaching institutions of India. Other similar studies from tertiary care institution reported MMR ranged between 213 to 879 per 1,00,000 live births [5,9,10,11,12,13,14,15,16].

In the present study maximum, 29 (39.72%) deaths occurred in the age group 18- 23 years followed by 35.6% in the age group 24- 29 years &

Table10: Causes of death

Cause of maternal death	Nos. (%)
Eclampsia	21 (28.76)
Anemia	17 (23.28)
Ruptured Uterus	3 (4.11)
MTP Perforation	2 (2.74)
Septic abortion	4 (5.48)
Septicemia	7 (9.58)
Retained placenta	5 (6.85)
PIH	2 (2.73)
Pulmonary embolism	3 (4.11)
Ruptured ectopic	2 (2.74)
Suspected amniotic fluid embolism	1 (1.37)
PPH	3 (4.11)
Ventricular arrhythmia	1 (1.37)
Abruptio placentae	1 (1.37)
Pulmonary edema & haemoptysis	1 (1.37)

least, 5 (6.84%) in 35- 40 years of age. Purandare et al reported majority of deaths in the age group 20-24 years. Vimal [17] showed 50.9% death in the age group 20 -30 years, 29% death in primigravidas & approx 56% death among multigravidas.

In the present study, out of 73 maternal deaths, 58 (79.45%) were Muslims & 15 (20.55%) were of Hindu by religion. 99.63% maternal death belongs to rural area in our study which is comparable to the study of Bangal et al [18].

In the present study, 7 (9.58%) women died within 1 hour of admission; 4 (5.47%) between 1-3 hours of Admission; 9 (12.32%) between 3-6 hours of admission and 14 (19.17%) between 6-12 hours of admission, 15 (20.54%) between 12-24 hours of admission, 10 (13.69%) between 24-48 hours of admission and 14 (19.17%) after 2 days of admission. Maximum death occurred between 6 - 12 hours of admission. Ratan Das et al reported that 30.85% women died within 6 hours of admission, 30.07% died between 6-12 hours of admission, 24.21% women died between 13-24 hours of admission and 14.84% women died after 24 hours of admission. Bangal et al [18] in their

study showed that, one women died within one hour of admission; 6 (15.79%) between 2-12 hours of admission; and 8 (21.05%) between 13-24 hours of admission and 9 (25.06%) after 7 days of admission. Sikdar et al [19] reported that 48 (19.7%) died within first 12 hours of admission and another 30 (12.5%) died within next 12 hours; 78 (32.2%) died within 1 day, 58 (23.8%) died within 1-3 days, 39 (16%) died in between 4 to 7 days. Agarwal et al [20] revealed that 44% died within 24 hours of admission and 22% within 12 hours of hospital stay. Purandare et al [10] showed that among the 30 deaths, 3 died within 30 minutes of admission, 14 died between 30 minutes and 6 hours, 7 died between 6 and 24 hours and remaining 6 died after 24 hours of admission.

In the present study, majority of the death (55.55%) occurred in the third trimester followed by 25.92% in first trimester & least (18.51%) amongst the total 27 death that occurred in antenatal period. In our study, 46.58% deaths occurred in the postnatal period followed by 36.98% in the antenatal period & 16.44% in intrapartum period.

Bangal et al [18] reported 39.47% deaths in the 3rd trimester; followed by 31.57% in the post-partum period and 23.68% in the 2nd trimester. Purandare et al [10] showed that (73.33%) in the post-partum period followed by (26.66%) during the ante-partum and (3.3%) during intra-partum period. Thomas et al [21] showed that who presented in the 1st, 2nd and 3rd trimester and postnatal/post-abortion were 3.5%, 9.7%, 31.9% and 54.9% respectively. Dogra et al [22] revealed that maximum deaths 86.20% occurred in the 3rd trimester of pregnancy.

We could not collect any information of ANC in 15 cases out of total deaths. In rest of the 58 deaths, there were no ANC in 32 (55.17%), 6 (10.34%) maternal deaths had only 1 ANC, 3 (4.10%) had 2 ANC, 3 ANC were on 10 (17.27%) deaths and only 5 (8.62%) had atleast 4 ANC. Ratan Das et al [23] reported the incidence of unbooked cases as 89.84% in their study. High incidence of deaths among the unbooked cases has also been observed in study done by Roy et al [24].

Bangal et al [18] reported 28.94% as booked cases and 71.06% as unbooked in their study.

In present study, by parity 43.83% maternal deaths were primigravidas followed by 18 (24.65%) in parity 2, 13 (17.80%) in primipara, 5 (6.84%) each in para 3 and grand multipara. Bangal et al [18] reported 42.10% deaths among primigravidas and 57.89% among multigravidas. Agarwal et al [20] reported that high deaths among multipara (43%) than the primipara (25%); Sikdar et al [19] revealed that (25.5%) deaths in primigravidas and (74.5%) in multigravidas; Thomas et al [21] showed that primigravidas contributing to 29.2% and multigravida 50.8% of deaths. Purandare et al [10] observed that out of the 30 deaths, 21 were multigravidas and 9 were primigravidas. Too many and too close pregnancies together adversely affect the mother's health and have its roots in the social status of the woman.

In our study, out of 73 maternal deaths 36 received blood transfusion, of which 21 got 1 unit, 3 women got 2 units, 4 patients were given 3 units of blood transfusions while 4 or more units were transfused to 8 patients. Purandare et al [10] showed that out of the 30 deaths, 3 were not given any blood transfusion while 19 patients were given one or two units of blood and five were given three or more units of blood.

Eclampsia, as seen in our study was found to be the leading cause of death which is similar to the study was done by Roy [24]. In our study, out of 73 maternal deaths 28.76% is due to Eclampsia. Eclampsia was responsible for 26.99% maternal death in a study conducted by Bashra Khan et al [25] in Pakistan. In the present study, 23.24% maternal deaths have occurred due to anemia which is comparable to studies by Mavalankar et al [26]. In our study, 9.58% maternal mortality is due to septicaemia and 5.48% is due to septic abortion. Bangal et al [18] reported 7.89% maternal death due to sepsis. Pulmonary embolism is responsible for 4.11% maternal death in present study. Purandare et al [10] reported 6.67% maternal death as a result of pulmonary embolism. Ruptured uterus is responsible for 4.11% maternal death in

our study. Purandare et al [10] reported 6.67%. In present study, 6.85% maternal mortality is due to retained placenta, PPH is responsible for 4.11% maternal death & ruptured ectopic is responsible for 2 (2.73%) maternal death. Bangal et al [18] reported 21.05% maternal death due to hemorrhage (post-partum hemorrhage, ante-partum hemorrhage and abortion related hemorrhage). In the present study, PIH is responsible for 2 (2.73%) maternal death. Purandare et al [10] reported 13.3 % maternal death as a result of PIH. One maternal death was caused by each and these causes were suspected amniotic fluid embolism, ventricular arrhythmia, abruptio placentae & pulmonary edema with haemoptysis.

Conclusion

The MMR in our study is higher than the state and national averages. Most deaths could have been avoided with the help of good antenatal, intranatal and postnatal care, early referral, quick, efficient and well equipped transport facilities, availability of adequate blood and blood components, and by promoting overall safe motherhood. To reduce the maternal mortality and morbidity the main thrust should be on implementing basic and comprehensive emergency obstetrics care. Analysis of every maternal death through maternal death audit, either at community level (verbal autopsy) or at the institutional level should be carried out. It will help in identifying the actual cause of maternal deaths and deficiencies in health care delivery system that might contribute in formulating preventive measures to reduce pregnancy related deaths.

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