Original Research Article

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Maternal mortality at a tertiary care teaching hospital in Dibrugarh district, Assam: a retrospective study

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ABSTRACT

Background: Maternal mortality is a measure of quality of health care in a community. Assam has the highest maternal mortality rate among all India's states, which is almost double the national average, with around 328 deaths per 100 000 live births. Three quarters of these deaths are among the tea plantations community. It has serious implications on the family, the society and the nation. Maternal mortality rate (MMR) is a very sensitive index that reflects the quality of reproductive care provided to the pregnant women. The objective of the study was to assess the Institutional maternal mortality and the causes of maternal death over a period of a year at a Tertiary Care Teaching Hospital in Dibrugarh district, Assam.

Methods: A retrospective hospital based study of maternal death cases from September 2015 to August 2016 was conducted to assess the maternal mortality. The study was carried out in the Obstetrics and Gynaecology Department of Assam Medical College and Hospital (AMCH), Assam. The study included 48 maternal deaths in the year. The information regarding reproductive parameters was collected from the maternal death register and the results were analyzed by using percentage.

Results: Out of 9789 total deliveries, Institutional Maternal Mortality was found to be 490 per 1, 00,000 live births. The maternal death was high among the Tea Garden community (66.7%) at the age group 15–20 years and was prevalent mainly in the illiterates (31.3%). Anaemia (29.1%) was the leading cause of death; followed eclampsia (23.0%) and septicaemia (17.0%) while cardio respiratory failure was indirect leading cause for maternal deaths.

Conclusions: There is a wide scope for improvement as a large proportion of the observed deaths were preventable. Most maternal deaths can be limited by utilisation of existing medical facilities and identifying the barriers in accessing health delivery system. Early identification of high risk pregnancies and regular ante-natal check up with timely referral to tertiary care centre can help reduce the mortality among the women.

Keywords: Maternal mortality, Tertiary care, Anaemia, Dibrugarh

INTRODUCTION

Maternal mortality is an issue of great concern both in the national and international health agenda. The medical classification list by the WHO, in ICD-10 (ICD is an international classification of diseases), deaths in

pregnancy, childbirth and the puerperium is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death (obstetric and non-obstetric).² Again, ICD-10 also defined late maternal death as the death of a woman from direct or indirect causes more than 42 days but less than one year after termination of pregnancy. Maternal

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Mortality Ratio (MMR) is the number of maternal deaths per 100000 live births.³ Globally, the trends in estimates of maternal mortality ratio (MMR, maternal deaths per 100,000 live births), by United Nations Millennium Development Goal (MDG) region and other grouping reported a MMR of 538 (year: 1990), 377 (year: 2000), 176 (year: 2015) in Southern Asia including India, where average annual change in MMR between 1990 and 2015 is 4.5%.4 The Scenario in India has made a slight progress yet the life time risk for an Indian woman is still 1 in 160 as compared to 1 in 3800 in the developed world. There is a great difference in MMR within the states, districts depending socioeconomic factors and educational status.³ The trend of MMR in India was 556 (1990): 471 (1995): 374 (2000); 280 (2005); 215(2010) and 174 (2015) which showed progress towards millennium development goal i.e. MMR was reduced by 75% between 1990 and 2015.4

Assam has the highest maternal mortality rate among all India's states, which is almost double the national average, with around 328 deaths per 100,000 live births. A study by Cousins journalist in 2016 reported that three quarters of maternal deaths are among the tea plantations community.⁵ It has serious implications on the family, the society and the nation as well as it deprives the surviving infant of mother's care. As Assam Medical College and Hospital aid and facilitates for Dibrugarh district and the surrounding districts, it is very important to evaluate the causes and social correlates of maternal deaths in the institution. Hence this present study was conducted to review the institutional maternal mortality and the causes of maternal death and to inquire the associated socioeconomic factors so that corrective steps can be taken to understand the gaps, improve the scenario and address the contributing factors.

METHODS

A retrospective hospital based study was carried out in the Obstetrics and Gynaecology Department of Assam Medical College and Hospital (AMCH), a tertiary level health care centre in Dibrugarh, Assam over a period of a year from September 2015 to August 2016. Data was collected from maternal death register and sociodemographic data was collected from the attendant.

Statistical analysis

Data collected was subsequently entered in to computer using Microsoft excel. Results were analyzed by using percentage.

Inclusion criteria

All pregnant women coming to the Assam Medical College and Hospital for deliveries were included in the study.

Exclusion criteria

There is none.

Maternal mortality rate for the study period was calculated by using the formula-

MMR = Total number of maternal deaths/Total number of live births \times 1,00,000.

RESULTS

Out of 9789 total deliveries, Institutional Maternal Mortality was found to be 490 per 1,00,000 live births. It is observed from Table: 1 that out of total 48 deaths, 20 (41.6%) were in the age group of 15-20 years followed by 15 (31.3%) deaths in 30-38 and 13 (27.1%) in the age group 21-29 years. According to the classification for the area of residence, majority of maternal deaths 39 (81.2%) were from rural areas, followed by 9 (18.8%) from the urban areas. By occupation, 66.7% maternal deaths were among the tea garden labourers followed by 14.6% were cultivators or engaged in various agricultural works. 10.4% of the maternal deaths were among the household workers and 8.3% were among the service holders. It was found that 31.3% were illiterate and only 21.8% had studied up to primary level and 12.5% accomplished graduation.

Table 1: Socio demographic profile of the maternal deaths in Assam medical college.

Socio demographic profile	No.	Percentage (%)			
Age (in years)					
15-20	20	41.6			
21-29	13	27.1			
30-38	15	31.3			
Area of residence					
Urban	9	18.8			
Rural	39	81.2			
Occupation					
Tea Garden Labours	32	66.7			
Cultivators/agricultural workers	7	14.6			
Household workers	5	10.4			
Service Holders	4	8.3			
Education					
Illiterate	15	31.3			
Primary education	10	21.8			
Secondary education	9	18.8			
Higher secondary education	8	16.7			
Graduates	6	12.5			

As seen from Table 2, out of total 48 deaths, 14.6% of women died immediately after delivery; 29.2% within twenty four hours post-delivery; and 37.5% within 165 hours and 18.8% in seven days or above post-delivery. Maximum deaths (66.7%) have occurred who delivered

at the tertiary care centre. 20.8% were found to be in undelivered status while 12.5% met with deaths after abortion. Majority of (43.8%) deaths occurred in the 3rd trimester; followed by 29.2% in the post-partum period; 18.8% in the 2ndtrimester and 8.3% in the 1st trimester. By parity, 37.5% were primigravidas and 52.1% were multigravida. 10.4% were in the state of grand multigravida (more than 5).

Table 2: Distribution of maternal deaths by delivery related characteristics.

Variables	No.	Percentage (%)			
Period of death after delivery					
Immediate	7	14.6			
Within 24 hours	14	29.2			
Within 165 hours	18	37.5			
7 days or above	9	18.8			
Delivery status					
Delivered	32	66.7			
Undelivered	10	20.8			
Abortion	6	12.5			
Stage of pregnancy at the time					
of death					
1st trimester	4	8.3			
2nd trimester	9	18.8			
3rd trimester	21	43.8			
Post-partum	14	29.2			
Parity					
Primigravida	18	37.5			
Multigravida (2 - 4)	25	52.1			
Grand multi (more than 5)	5	10.4			

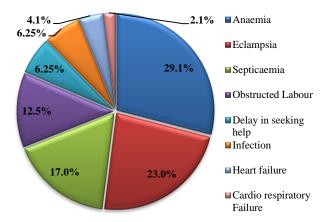


Figure 1: Causes of maternal deaths (n=48).

Figure 1 show the causes contributed to the maternal deaths in AMCH, Dibrugarh for the studied period of time. Amongst the leading causes, 29.1% were due to Anaemia. Eclampsia was responsible for 23.0% of deaths. Septicaemia accounted for 17.0% of the deaths. Amongst the other causes, obstructed labour accounted for 12.5% deaths; infection and delay in seeking help both accounted for 6.25% of deaths; heart failure for

4.1% deaths and cardio respiratory failure for 2.1% deaths.

DISCUSSION

In the present study, there are 48 maternal deaths amongst 9789 total deliveries, giving a mortality rate of 490 per 1,00,000 live births, which is higher than the national average. Assam Medical College and Hospital, Dibrugarh, is a teaching institution and a tertiary care centre which earn many complicated cases from rural areas. There were earlier studies from tertiary care centres where maternal mortality was found ranging between 144 to 824 per 1,00,000 live births.^{3,5-9} There are similar studies (Taye et al) carried out in AMCH from 2012 till 2015 that reported a MMR of 824.64 per 1,00,000 live births.³ This index of reproductive health of the society indicates the influence of socio economic conditions of the community, level of awareness for women's health, nutritional status during pregnancy and also late referral to the hospital. The recent status according to the Sample Registration System (SRS) 2010-12, among the major Indian states, Assam is the leading state as it represented a MMR of 328 per 1,00,000 live births followed by Uttar Pradesh/ Uttarakhand (292), Rajasthan (255), Orissa (235), Madhya Pradesh/ Chhattisgarh (230), Bihar/ Jharkhand (219), Punjab (155), Haryana (146), Gujarat (122), West Bengal (177), Maharashtra (87). 10

It is observed from the study that majority women presented with their pregnancy in the age group of 15-20 years that indicated the prevalent customs of early marriage in rural areas. 41.6% of deaths are in the age group of 15-20 years followed by 31.3% deaths in 30 -38 and 27.1% in the age group 21-29 years. This result is almost similar to that reported by the other studies viz., Bangal et al. 11 The study reported that 55% deaths in the age group of 19-24 years followed by 15.79% deaths in <19 years. Interestingly, the present study is a contrast to an earlier study made in AMC by Taye et al where it was found that only 10% of deaths were among the women of age less than 19 years and 80% deaths were in the age group 20-30 years.³ The risk of death per birth for women age 15-19 is just 28 percent higher than among women age 20–24.⁷ This shift of maternal death rate towards the adolescents in the present study might be due to many biological, economic and cultural factors such as poverty, malnutrition, immature reproductive tract, child marriage, no family planning and gender inequities. 12,13

The present study found 81.2% of the maternal deaths are from rural areas whereas 18.8% are from the urban areas. And among them 66.7% are from the tea garden community where 31.3% were illiterates. This indicate that the tea garden workers often lack access to basic services including schools, healthcare, latrines, safe drinking water, and nutrition.⁵ There are some tea gardens which are very far from a hospital, which means lack of proper transport facility from rural areas to delay for pregnant women to seek medical care and as a result

more women delivering at home. This result is almost similar to earlier studies by Pal et al, Purandare et al, Murthy et al and Fernandes et al. The other statistics for the education and occupation profile among the maternal deaths reflect the agricultural workers,

household workers and service holders irrespective of the education level are also affected with the maternal mortality. Poverty and female illiteracy are important social risk factors which are closely interlinked with maternal health.⁷

Table 3: Comparison	of MMR	of different	studies in India.
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C4J	Study period	MMR (per 100000 live births)	Causes of maternal death		
Study group			Anaemia	Eclampsia	Septicaemia
Bangal et al ¹¹	2006 - 2010	302.9	2.63	10.52	7.89
Taye et al ³	2012 - 2015	824.64	24.73	n/a	8.24
Amitava et al ⁶	1999 - 2004	623.46	4.18	50.5/ 7.3	18.17
Fernandes et al ⁷	2005 - 2014	144.86	n/a	21.43	14.3
Purandare et al ⁸	2000 - 2005	113.44	53.3	n/a	3.3
Murthy et al ¹⁴	2001 - 2010	302.23	10	26.66	18.33
Yadav et al ⁹	2006 - 2010	555.5	14.94	n/a	12.67
Kaur et al ¹⁷	2001 - 2005	1470	44.3	7.5	21.7
Present Study	2015 - 2016	490	29.1	23	17

About 14.6% of women died immediately after child delivery and 37.5% within 165 hours of child delivery. The study also found maximum (43.8%) deaths occurred in the 3rd trimester; followed by 29.2% in the postpartum period and 18.8% in the 2nd trimester. Similar results have been reported by other studies. Purandare et al showed that 73.33% in the post-partum period followed by 26.66% during the ante-partum and 3.3% during intra-partum period.8 Thomas et al showed that the mortality were high in the 3rd trimester and post natal/ post-abortal by 31.9% and 54.9% respectively. 15 Dongra et al revealed that maximum deaths 86.20% occurred in the 3rd trimester of pregnancy. 16 There are studies that had suggested that multiparity is associated with a higher level of risk than primiparity. 50% of maternal deaths were associated with multiparity and 45% were primi parous in study by Fernandes et al which is similar to that found in the present study.⁷

In the present study, the leading cause for maternal death is anaemia that contributed to 29.1% of maternal deaths. The other causes were eclampsia (23.0%), septicaemia (17.0%), and obstructed labour (12.5%). This finding is consistent with Murthy et al where eclampsia (26.66%), and sepsis (18.33%) were the major direct causes of maternal deaths whereas obstructed labour in 0.83%. 15 Kaur et al reported that anaemia was associated in 44.3% cases of maternal deaths, which can be prevented by Iron, Folic acid, protein supplement and blood transfusion.¹⁷ Purandare et al observed that haemorrhage in 70.83% of deaths; followed by septicaemia (3.3%) were among the direct causes and anaemia in 55.3% as indirect causes.8 Other factors such as infection and delay in seeking help accounted for 6.25%. Fernandes et al found 2.4% deaths by infection and Yadav et al reported 7.1% deaths due to obstructed labour. 7,9 Halder et al reported the causes of maternal deaths that had signs of severe systemic infection.¹⁸ It is seen that the causes found in the present study was directly or indirectly related to maternal

mortality which coincides with many studies across India. Studies have found that haemorrhage, sepsis, eclampsia and obstructed labour account for 80% of all maternal deaths worldwide. ¹⁹

CONCLUSION

The causes of maternal deaths are multi factorial but are preventable. The institutional maternal mortality rate for AMCH is 490 per 1, 00,000 live births in the study. The maternal deaths could have been avoided with the help of early referral, sincere concern towards mother's health, quick, efficient, well equipped transport facilities, awareness regarding maternal and child health and by promoting overall safe motherhood. Causes for pregnancy related deaths can also be identified and taken care of at community level or in the institutional level by encouraging and promoting the importance of the health care, antenatal visits, avoiding certain irrational rural beliefs and village health culture and other following interventions such as risk screening, skilled personnel at child birth, good transport facilities, family planning and safe abortion services. Antenatal care (ANC) helps to ensure the wellbeing of the mother and foetus through early detection of risks in pregnancy, prevention of pregnancy and labour complications and ensures the safe delivery of mother and child. The exact ascertainment of the situation could be monitored with the availability of MMR estimate and causes of maternal deaths by addressing the inequalities in access to and quality of reproductive, maternal, and newborn health care services.

Limitation of the study

Maternal deaths due to multiple conditions in a few abortion cases were hard to identify. This study was made on researcher's interest but not a funded project. Moreover, this study was conducted where it had a few restrictions in the matter of time, place and particular influences at the time of data collection.

Strength of the study

The study is useful for identifying areas for improved care and reflected the importance of antenatal care during pregnancy. The research findings have contributed to the importance of health seeking behaviour among the pregnant women.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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