RESEARCH ARTICLE

Maternal deaths in a tertiary health care centre of Assam - a one year report

Reeta Bhuyan, Gitanjali Deka, Gokul Chandra Das, Radha Rashmi Baruah, Mridusmita Majumdar

Correspondence: Dr. Radha Rashmi Baruah, Registrar, Dept. of Obstetrics & Gynaecology, Gauhati Medical College & Hospital, Guwahati, Assam. Email- radharashmi2014@rediffmail.com

ABSTRACT

Objective: The present study was undertaken to find out the contributing factors of maternal deaths. **Methodology**: Data for the study was collected from all the maternal deaths that occurred over a period of one year from 1st June 2011 to 31st May 2012 at Medical College Hospital. **Results:** Out of the total maternal deaths, 76.85% belonged to rural areas, 76.86% unbooked cases, 60.18% were illiterate, and majority was from low socio-economic status. Out of 108 cases, 73 cases (67.6%) died within 24 hours of admission. Delays at different levels, often in type 2, contributed to the maternal deaths. Out of 108 maternal deaths, 20 cases (18.52%) received intensive care unit (ICU) care showing a paucity of high dependency unit (HDU)/ICU facility. **Conclusion**: It is seen from the study that poor socio-economic status, illiteracy, poor attendance of antenatal checkup, and pitfalls in referral system were major determining factors of maternal mortality.

Keywords: Maternal death, ANC, referral system.

Maternal mortality in India continues to be unacceptably high. India has an maternal mortality ratio (MMR) of 212/1,00,000 live births (SRS 2007 – 2009), whereas MMR of developed countries is 9/1,00,000 live births [1]. Clinical causes of maternal mortality vary according to regions. In the developed countries, the main killers are hypertensive disorders, haemorrhage and embolism, whereas, in the developing countries, they are haemorrhage, hypertensive disorders, sepsis and septic abortion. Even, within India clinical causes vary according to region. Sepsis is the leading cause followed by haemorrhage, hypertensive disorders and anemia in northern India. Haemorrhage is the leading cause followed by hypertensive disorders, sepsis and anemia in the southern India. Hypertensive disorders are the leading cause followed by haemorrhage, sepsis and anemia in the north-east India [1].

Socio-economic factors like poverty, literacy, child marriage and cast system also plays important role as one of the factor in the multi factorial origin of maternal mortality. Moreover, essential reproductive health services are not available to the majority of women in India. Poor quality of care, unavailability of care, inadequate access to health facilities and delay in seeking healthcare are the main draw backs of our health system. The concept of three delays is designed

Received: 28th October 2015; **Accepted**: 15th November 2015

Bhuyan R, Deka G, Das GC, Baruah RR, Majumdar M. The impact of health care system on maternal mortality – a tertiary hospital based study. The New Indian Journal of OBGYN. 2016; 2(2): 110-4

to locate the deficiencies of the health care system. Identifying the type of delay will help in improving healthcare facilities [2]. The delays are as follows: a) Delay 1- the woman is not recognized as needing emergency obstetric care, b) Delay 2 – the woman arrives late at the referral facility, c) Delay 3 – the facility is either under staffed or under equipped or woman is not able to access the services available [2].

Maternal deaths occur both inside and outside the health institutions. Only estimating mortality rates are not beneficial, to know causes of death is much more important to prevent such deaths. Even for deaths which occur in the hospitals, the actual reasons and the contributory factors may lie in the community. The aim of this study is to find out the different contributing factors of maternal deaths in the health care system.

Materials and Methods

Data were collected for this retrospective study from all the maternal deaths that occurred over a period of one year from 1st June 2011 to 31st May 2012 at Gauhati Medical College & Hospital (GMCH). Inclusion criteria were - 1) Death resulting from complication of the pregnancy itself, labour or the puerperium or within 42 days of termination of pregnancy irrespective of site and duration of pregnancy, 2) Deaths resulting from disease present before, or developing during pregnancy that was obviously aggravated by the physiologic effects of the pregnancy considered. Method of collection of data were- 1) Information obtained by verbal autopsy at the time of admission, 2) Information about maternal deaths was obtained from death register and bed head tickets, 3) Structured questionnaires were used for interviewing the relative(s) and the health care provider(s) present with the deceased woman. Data thus collected were analyzed in the department. The data were analyzed using Microsoft office excel 2007 software.

Results and Observations

In our study, total live births were 9804 and total number of maternal deaths was 108 in the above mentioned period. Month wise distribution of MMR shows that maximum maternal death has occurred in the month of December 2011 and minimum occurred in May 2012 (figure 1). Out of 108 maternal deaths, 83 cases (76.85%) came from rural areas and 25 cases (23.15%) came from urban areas (table 1). The most of the maternal deaths had occurred in unbooked cases, i.e. 83 cases (76.86%) compared to booked 25 cases (23.14%). The patients who had done Antenatal checkup (ANC) at GMCH or other institutions were taken as booked case. 71 cases (65.74%) had irregular ANC between 1 to 3 numbers, 25 cases (23.14%) had more than 3 ANCs and 12 cases (11.11%) had no ANC. 68 cases (62.96%) were referred from Primary Health Centres, District Hospitals, Private Hospitals etc. and 40 cases (37.03%) were direct admissions to our institute.

Table 1: Different features of study group

Categories		**Number (%)**
Total number of maternal deaths		108
Total number of live births		9804
Residence	Rural	83(76.85%)
	Urban	25(23.15%)
Educational status	Illiterate	65(60.18%)
	Primary school	31(28.70%)
	High school	12(11.11%)
Family income	<15000/month	64(59.26%)
	15000-20000/month	37(34.26%)
	21000-30000/month	7(6.49%)
ICU care	Present	20(18.52%)
	Absent	88(81.48%)
Antenatal care	Booked	83(76.86%)
	Unbooked	25(23.14%)
No of ANC	No ANC	12(11.11%)
	1-3 ANC	71(65.75%)
	>3 ANC	25(23.14%)
Referral	Referred	68(62.96%)
	Direct admission	40(37.03%)
Admission to death interval	1-4hrs	27(25%)
	4-12 hrs	23(21.30%)
	12-24 hrs	23(21.30%)
	1-7 days	31(28.70%)
	>7days	4(3.70%)

If the educational status of the patients were taken into account, it is observed that most of maternal deaths

Table 2: Maternal mortality in relation to admission death interval				
Authors	**Year**	**First 24 hrs (%)**	**< 7 days (%)**	**>7 days (%)**
Shirish Sheth, Bombay [14]	1968	63	31	6
Sunanda Kulkarni, Vani Vilas Hospital, Bangalore [8]	1997	54.6	32.5	12.9
Shanti Roy, Patna Medical College, Bihar [5]	1998	54.2	35.2	10.29
Vinutha G, RLJH & RC, Kolar	2007	62.10	29.47	8.43
Verma Ashok et al, R. P. Govt. Medical college, Himachal Pradesh[10]	2008	46.15	36.91	16.93
K. Pratima Devi et al, RIMS, Imphal [7]	2012	60.0	40.0	---
Present study	2011 – 2012	67	28	3

occurred among the illiterate mothers (60.18%).

Similarly, when socio-economic status was considered, it was observed that 59.26% deaths had occurred in families with monthly income of less than Rs. 15,000. As the referral system is an important and integral part of health care system the conditions at what state the patients reached our institute was taken into account. Out of 108 cases, 27 cases (25%) died within 4 hours of admission. 73 cases (67.6%) died

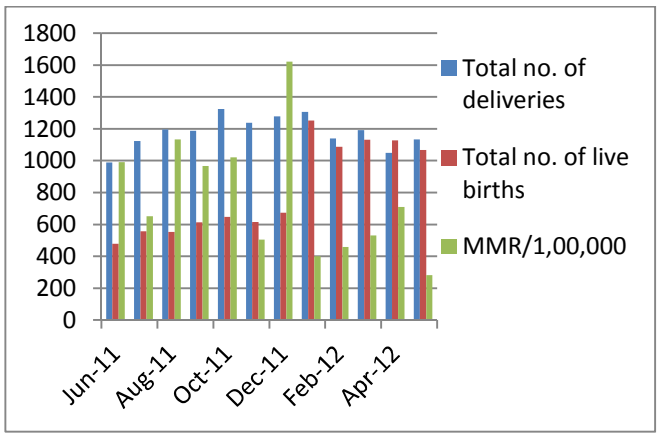

Figure1: Showing month wise distribution of MMR

within 24 hours and 31 cases (28.70%) died within 7 days and 4 cases (3.70%) died after 7 days of admission. Out of 108 maternal deaths, only 20 cases (18.52%) received ICU care showing a definite paucity of HDU/ICU facility. When we consider the types of delay (figure 2) it is observed that out of 108 cases, 34 cases (31.48%) had delay 1, 7 cases (6.49%) had both delay 1 & 2, 64 cases (59.25%) had delay 2 while 3 cases (2.77%) had delay 3. Maximum delay being delay 2 indicates late referral to GMCH. The cases, where delay 3 had been noticed, included 2 cases of atonic PPH and 1 case of severe pre-eclampsia.

Discussion

As this is a tertiary care hospital, many patient reach here at a moribund condition and there are many patient who are not able to reach here at all. As a result the maternal deaths that occur here are just equivalent to the ice-berg phenomenon. Therefore, the incidence and proportion of complications seen in these maternal deaths do not represent the deaths that occur in the community.

In the national level, India has an MMR of 212/1,00,000. However, in our study, MMR was found to be 1101.60/1,00,000 live births. This was probably because Assam is listed in EAG (empowered action group) of states with very high maternal mortality rate and our institute being a tertiary referral centre of this area, high MMR in this institute is likely. Similar results were found by Goswami et al [3] from GMCH in 1994 and S. K. Bera [4] from Kolkata in 1990 showing an MMR of 1234/1,00,000 live births and 1023/ 1,00,000 live births respectively. Sharmistha [5] from Silchar in 1995 and Shanti Roy [6] from Patna in1998 found an MMR of 2089/1,00,000 live births and 2667/1 00,000 live births respectively. However K. Pratima [7] from Manipur in 2012 found an MMR of 90.45/1,00,000 live births which is much lower than our study.

If we consider the influence of antenatal checkup on maternal mortality it was found that maternal death was 76.86% among unbooked cases and 23.14% among

booked cases. Our figures were comparable to K. Pratima Devi who reported 77.5% of deaths amongst unbooked cases. Shanti Roy and Sunanda Kulkarni [8] from Bellary in 1996 found very high incidence among unbooked cases, 89% and 90.6% respectively in their

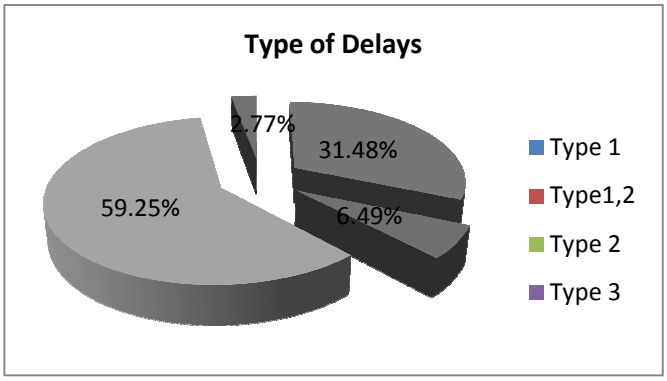

Figure 2: Showing distribution of maternal deaths in relation to delay in seeking health care

studies. Safe motherhood depends on antenatal care. In our country, most of maternal deaths occur in unbooked cases which signify that the very root of our healthcare system is faulty. Moreover it is seen that booked cases die due to unavoidable factors like hypertensive disorders, uncontrolled postpartum haemorrhage, DIC and pulmonary embolism. If we can somehow improve attendance of antenatal checkup, then we can at least pick up the high risk cases and render proper care to them.

Similarly, we found 76.85% maternal deaths from rural areas. This observation is in agreement with findings of Buckshee et al [9] in 1993 and Verma et al [10] in 2008 showing 93.2% and 92.3% of maternal deaths respectively involving rural population. This may be due to lack of ANC and Emergency Obstetric Care facilities, illiteracy, certain social beliefs and customs, poverty and the lack of medical personnel in periphery and rural areas.

Considering the referral system, we found 62.96% mortality among referred cases at our institute, which is less than studies done by other authors. Shantha Seetharam [11] from Bellary in 1997, D. A. Patel [12] from Gujrat in 1997 and Vinutha G. from Kolar in 2007 found 72%, 85% and 83% maternal deaths respectively among referred cases. There is higher rates of maternal mortality in referred cases as they come in critical condition due to delay in seeking care at first referral center, late referral and lack of transport facilities.

Literacy is a stronger predictor of maternal health than economic wealth. Lack of education adversely affects women's health by limiting their knowledge about health related issues and health facilities available in the nearby health centres. In our study, it is seen that 60.18% of patients were uneducated which is comparable with 100% illiteracy among maternal deaths in the study done by Shamshad Begum et al [13] from Pakistan in 2003.

Observing the socio-economic status of cases, it was found that 59.26% of maternal mortality was observed in low socio-economic group in our study. Other authors had also observed higher MMR in lower socio-economic group. About more than 75 % of cases belonged to lower socio-economic status in the studies of Goswami et al, Shanti Roy et al and Vinutha G. All these authors observed very low MMR in high socio-economic group.

In Table 2, the relations between maternal mortality and admission – death interval are being compared. Various authors at different time had found different results which are shown in the above mentioned table. In our study, we observed 67% maternal deaths within first 24 hours of admission which is comparable to figures reported by K. Pratima Devi et al 60%, Dr. Vinutha G 62.10%. However in the present study, mortality in less than 7 days stay was 28% and after 7 days was 3 %, which is very low compared to other studies mentioned in the table 2. This may be due to the fact that Government provides free medicines, free investigations and even ICU care to pregnant patients in our institute.

In our study, we have considered the 3 different types of delay. We observed that maximum no of maternal deaths occur due to delay 2 which indicates late referral to GMCH. Factors responsible may be inadequacy of staff, facilities or patient's poverty,

illiteracy or ignorance about their condition as a result of which these patients were somehow not picked up at the primary referral center. Delay 1 also constitutes a good proportion of cases. Patient's illiteracy, ignorance, poverty, familial customs and lack of transport facilities led them to seek health care late. Delay 3 is seen in 3 cases. These were 2 cases of atonic PPH and 1 case of severe pre-eclampsia. This is due to ignorance on the part of the patient about their critical condition, non – availability of responsible attendant and blood in proper time. Moreover we can reduce delay 3 by making emergency drugs and blood readily available. Adequate ICU and HDU care are also going to make a difference in reducing such delay. In remaining cases, both factors i.e. delay in patients seeking help and delays in referral exist.

In our study, it was found that out of 108 maternal deaths; only 20 cases (18.52%) received ICU care showing a definite paucity of HDU/ICU facility.

Conclusion

The present study highlights the importance of female literacy, improvement of socio-economic status, awareness towards ANC, early referral and speedy transportation of patients and Emergency Obstetric Care. Most of the maternal deaths in our study were due to lack of all the above factors and seen in underprivileged section of the society.

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

References

1. Govt. of India (Sample Registration System). Maternal Mortality in India 2007-09. New Delhi: Registrar General, India; 2011.

2. Maternal Mortality Update 2002: A Focus on Emergency Obstetric Care. New York: UNFPA; 2003. United Nations Population Fund (UNFPA)

3. Goswami A, Kalita H. Maternal Mortality at Guwahati Medical College Hospital. J Obs Gyn India. 1996; 46(6): 785–90.

4. Bhattacharjee S. Maternal Mortality 10 year review a decade of safe motherhood. J Obs Gyn India. 2001; 51 (3): 108–10.

5. Roy S, Singh A, Pandey A, Roy H, Roy S, Roy S. Maternal Mortality in Apex Hospital, Bihar. J Obs Gyn India. 2002; 52 (1): 100–104.

6. Devi KP, Singh CM, Devi SR. Maternal mortality and its causes in a tertiary centre. J Obstetrics Gynaecology India. 2012 (Mar-Apr); 62(2): 168–71.

7. Bera SK, Sengupta A. Evaluation of etiological factors of Maternal Mortality. J of Obs Gyn India. 1991: 182–88.

8. Kulkarni S, Athani S, Seetaram S. Maternal Mortality of Head Quarter Hospital, Bellary. J Obs Gyn India. 1996; 46 (4): 492 – 96.

9. Buckshee K, et al. Demographic, Socio-economic and Medical factors affecting maternal mortality – Indian Experience. The Journal of Family Welfare. 1993 (Sep); 39(3): 1-4.

10. Ashok V, Santosh M, Anupa S. A study on Maternal Mortality, J Obs Gyn India. 2008 (May-June); 58(3): 226-29.

11. Shantha S. Maternal Mortality 10 years review a decade of safe motherhood. J Obs Gyn India. 2001; 51 (3): 108 – 10.

12. Patel DA, Gangopadhyay S, Vaishnav SB, et al. Matenal Mortality at Karamsad- The only rural medical college in Gujrat. J Obs Gyn India. 2001: 51(1): 63 – 6.

13. Begum S, Aziz-ul-Nisa, Begum I. Analysis of maternal mortality in tertiary care hospital to determine the causes and preventable factors. Journal of Ayub Medical college Abbottabad. 2003; 15(2).Available from:http://www.ayubmed.edu.pk/JAMC/PAST/15-2/shamshad%20maternal%20mortality.htm

14. Seth S. Effect of gravida on Maternal Mortality. The Lancet; 2002: 359(1).

---

[1]Reeta Bhuyan, [2]Gitanjali Deka, [3]Gokul Chandra Das, [4]Radha Rashmi Baruah, [5]Mridusmita Majumdar

[1] Asst. Professor, Dept. of Obstetrics & Gynaecology, Gauhati Medical College & Hospital; [2] Asst. Professor, Dept. of Obstetrics & Gynaecology, Gauhati Medical College & Hospital; [3]Professor, Dept. of Obstetrics & Gynaecology, Gauhati Medical College & Hospital; [4] Registrar, Dept. of Obstetrics & Gynaecology, Gauhati Medical College & Hospital; [5] Registrar, Dept. of Obstetrics & Gynaecology, Tezpur Medical College & Hospital.