RETROSPECTIVE EVALUATION OF CAUSES AND SOCIAL CORRELATES OF MATERNAL DEATHS AT ASSAM MEDICAL COLLEGE AND HOSPITAL, DIBRUGARH, ASSAM, INDIA

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ABSTRACT

Reduction of maternal death to achieve MDG – 5 Target - 6 is a challenge for most of the developing countries of the world in spite of steady decline in maternal death. There is a great difference in MMR of developing and developed countries as well as within the countries, states, districts depending upon the socioeconomic and educational status. This study was conducted to estimate the MMR, evaluate the causes of maternal death and to formulate strategies for reduction of maternal death at Assam Medical College and Hospital, Dibrugarh, Assam.

MATERIAL AND METHODS

A retrospective study of causes of maternal deaths from 1st January 2012 to 31st August 2015 at Obstetrics and Gynaecology Department of Assam Medical College and Hospital, Dibrugarh, Assam, India. The records were collected from Maternal Death Register and analysis were made to find out the MMR, causes of maternal deaths and its contributing factors.

OBSERVATIONS

There were 279 maternal deaths out of 33833 live births giving MMR of 824.64. Hypertensive disorder of pregnancy (37.63%) was the leading direct cause followed by infections (14.69%) and hemorrhage (12.90%) and the anaemia (24.73%) was the commonest indirect cause of maternal death. Contributory factors like age, locality, booking visit play a major rule in maternal death in our study.

KEYWORDS

Maternal Mortality Ratio, Infection, Hypertensive Disorder of Pregnancy, Direct and Indirect Causes, Anaemia.

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INTRODUCTION

Maternal death s is defined as "The death of a woman while pregnant or within 42 days of termination of pregnancy irrespective of the duration and site of pregnancy, from any cause related or aggravated by the pregnancy or its management but not from accidental or incidental causes."[1] Maternal Mortality Ratio (MMR) is the number of maternal deaths per 100000 live births. MMR ranges from 760 per 100000 live births in African countries to 8 per 100000 live births in industrialized countries.[2] Everyday in 2015, about 830 women died due to complications of pregnancy and child birth. Of the 830 daily maternal deaths 550 occurred in Sub-Saharan Africa and 180 in Southern Asia, compared to 5 in developed countries.

There has been 43% decline in maternal death worldwide from 1990 to 2015 which translates into an average annual decline of just 2.3% but to achieve the Millennium Development Goal (MDG) 5: Target 6 (75% decline in MMR), the decline rate should have been 5.5%.[3] The MMR in India is decreasing steadily. It was 212 (2007-2009), 178 (2010-2012) and 167 (2011-2013). The MMR of India was 420 in 1990 and MMR for MDG in 2015 is 109.

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It is encouraging that a few states of India like Kerala (61), Maharashtra (68), Tamil Nadu (79), Andhra Pradesh (92) and Telangana (92) have achieved MMR below MDG Goal.[4] The MMR in Assam was 480 (2004-2006), 390 (2007-2009), 328 (2010-2012) and 300 (2011-2013).[4] For last few years Assam top the list of maternal deaths in India. The life time risk of maternal deaths in the age group 15-49 is 1.6% in Assam compared to 0.2% in Kerala during 2001-2003. As most of the deaths in Dibrugarh district and nearby districts occur at Assam Medical College and Hospital, it is very important to do a critical analysis of the causes and social correlates of maternal deaths in this institution.

MATERIALS AND METHODS

This is a retrospective analysis of causes and social correlates of 279 maternal deaths from January 2012 to August 2015 at Assam Medical College and Hospital, Dibrugarh, Assam. During this period, there were 33833 live births resulting in MMR of 824.64. The data was collected for publication from Maternal Death Register after taking permission from the Head of the department and the Superintendent of the institution.

RESULTS AND OBSERVATIONS

There were 279 maternal deaths during this period. Analysis of causes showed that 105 (37.63%) maternal deaths occurred due to hypertensive disorder of pregnancy, 41 (14.70%) due to infections (Septic abortion 12 + puerperal sepsis 29), 36 (12.90%) due to hemorrhage (APH-13, PPH-15, Ectopic- 5, Abortion-3) in pregnancy. Severe anaemia was directly responsible for 69 (24.73%) maternal deaths of which 2 cases were associated with Bronchial Asthma, one with cardiomyopathy and one with intestinal obstruction.

It was also observed that severe anaemia contributed in 34 (12.19%) out of 105 maternal deaths due to hypertensive disorder of pregnancy and 23 (8.24%) out of 41 maternal deaths due to septicemia. There were 10 (2.55%) maternal deaths due to obstructed labour, out which 6 had ruptured uterus. There were four (1.43%) maternal deaths due to pulmonary embolism, four (1.43%) due to jaundice, five (1.792%) due to CNS causes (One due to GBS, one due to Myasthenia Graves, one due to meningitis, one due to quadriplegia with electrolyte imbalance and one due to epilepsy), one due to anaphylaxis following blood transfusion, one due to heart disease, two due to Adult Respiratory Distress Syndome (ARDS) and one due to anesthetic mishap. Direct causes were responsible for 68.82% (192) of maternal deaths and indirect causes were responsible for 31.18% (87) of maternal deaths in our institution.

Out of the 279 maternal deaths 231 (82.80%) were unbooked and only 48 (17.20%) were booked cases; 179 (64.16%) were referred from different level of health care facilities and 100 (35.84%) came directly from home. Out of 224 (80.29%) maternal deaths were between age group of 20-30 yrs.; 29 (10.40%) were less or equal to 19 yrs. and 26 (9.32%) were age group of more than 30 yrs.; 146 (52.33%) maternal deaths were primigravida, 65 (23.29%) were second gravida, 40 (14.333%) were third gravida and 28 (10.03%) were fourth gravida and above.

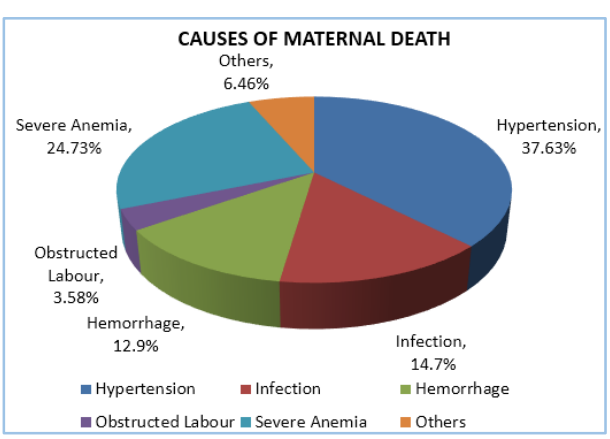
Out of 279 maternal deaths 46 (16.49%) maternal deaths were less than 30 kilometers, 96 (34.40%) were 30-60km, 108 (37.38%) were 60-100km and 29 (10.40%) were more than 100km away from our institution. Maternal deaths in relation time of admission to death: Out of 279 deaths 40 (14.34%) died within two hours of admission, 20 (7.17%) died between two to four hours, 33 (11.83%) died between four to 10 hours and 186 (66.67%) died after 10 hours.

Maternal Death in Relation to Gestational Age and Delivery

Out of 279 maternal deaths 20 (7.17%) patient died in early pregnancy, out of which 12 were septic abortion, 3 were incomplete abortion with hemorrhage and 5 were ectopic pregnancy. In late pregnancy 259 maternal deaths occurred, out of which 89 (31.90%) died before delivery and 170 (60.93%) died after delivery. Out of the 170 maternal deaths after delivery, 17 (6.09%) delivery occurred at home and 14 (5.02%) vaginal delivery and 07 (2.51%) LSCS occurred at other institution & 126 (45.16%) were delivered at AMCH of which 73 (26.16%) had vaginal delivery and 6 (2.15%) had instrumental vaginal delivery (Forceps 6 + craniotomy 2) and 47 (16.85%) had emergency LSCS and 6 (2.15%) had exploratory laparotomy.

Direct Causes – 197 (70.61%)	Indirect Causes – 82 (29.39%)
Hypertension – 105 (37.63%) • APE – 53 (18.99%) • PPE – 11 (3.94%) • HTN- 41(14.70%)	Severe anaemia – 69 (24.73%)
Infection – 41 (14.70%) Septic abortion-12 (4.30%) Puerperal sepsis-29 (10.39)	Jaundice – 4 (1.43%)
Hemorrhage – 36 (12.90%) • APH – 13 (4.66%) • PPH – 15 (5.38%) • Ectopic-5 (1.79%) • Abortion 3 (1.08%)	CNS disorder – 5 (1.79%) • Myasthenia graves – 01 • Meningitis – 01 • Epilepsy – 01 • GBS – 01 • Quadriplegia – 01
Obstructed labor 10 (3.58%)	Heart disease – 01 (0.36%)
Embolism 04(1.43%)	Anaphylaxis due to blood transfusion – 01 (0.36%)
Anesthetic complication-01(0.36%)	Acute respiratory distress syndrome – 02 (0.72%)

Table 1: Maternal Death in Relation to Causes

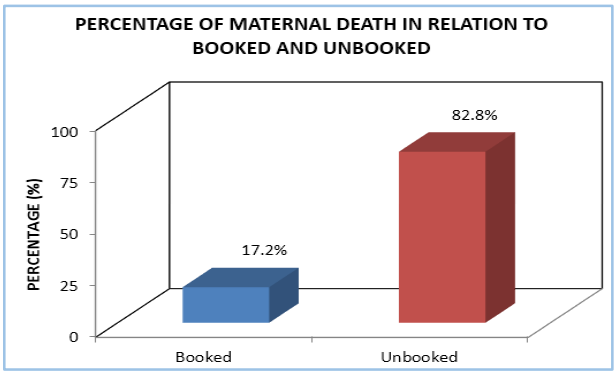


Severe anaemia contributed in 34 (12.19%) out of 105 maternal deaths due to hypertensive disorders of pregnancy and in 23 (8.24%) out of 41 maternal deaths due to septicemia.

So severe anaemia contributed in 57 (20.43%) out of 279 maternal deaths.

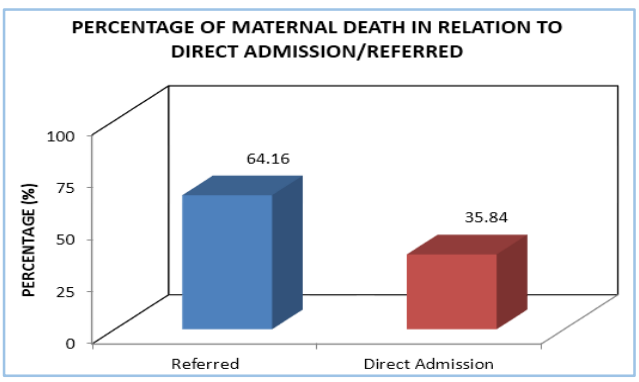
Unbooked	Booked	Total
231 (82.80%)	48 (17.20%)	279

Table 2: No. of maternal deaths in relation to booked/unbooked



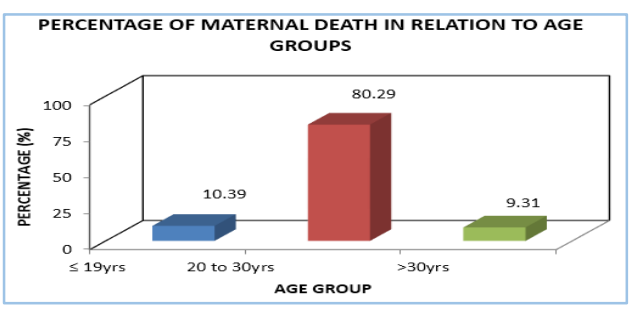
Referred	Direct Admission	Total
179 (64.16%)	100 (35.84%)	279

Table 3: No. of maternal deaths in relation to status of referral



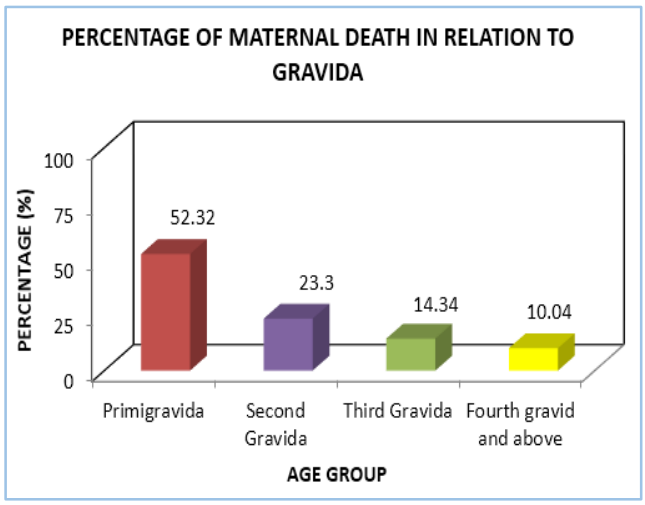
≤19yrs	20 to 30yrs	>30yrs	Total
29 (10.39%)	224 (80.29%)	26(9.31%)	279

Table 4: Number of maternal death in relation to age groups



Primigravida	Second Gravida	Third Gravida	Fourth Gravid and above
146 (52.32%)	65 (23.30)	40 (14.34%)	28 (10.04%)

Table 5: Number of maternal death in relation to Gravida



≤ 30 KM	30 to 60 KM	>60KM to 1ooKM	>100KM
46 (16.49%)	96 (34.41%)	108 (38.71%)	29 (10.39%)

Table 6: Number of maternal death in relation to distance from our institution

< Two hours	Two to four hours	Four to 10 hours	> 10 hours
40 (14.34%)	20 (7.17%)	33(11.83%)	186 (66.67%)

Table 7: Number of maternal deaths in relation to time interval between admission and death

Early Pregnancy (upto 20 weeks)	Pregnancy Beyond 20 weeks
Abortion – 15 (5.38%) • Septic abortion – 12 (4.30%) • Incomplete abortion with severe bleeding – 03 (1.26%)	Undelivered – 89 (31.90%)
Ectopic – 5 (1.79%) • Laparotomy – 2	Delivered – 170 (60.93%) • Home delivery- 17 (6.09%) • Vaginal delivery in other institution-14(5.02%) • Vaginal delivery in our institution- 79 (28.31%) [Forceps-04; craniotomy-02] • LSCS in other institution- 07(2.51%) • LSCS in our institution- 47(16.85%) • Exploratory laparotomy- 06 (2.15%) [Rupture uterus – 06]

Table 8: Number of maternal deaths in relation to gestational age and status of delivery & intervention

	Chakraborty S		Pal Amitava	Vidyadhar B. Bangal	Jadhav C. A	Varsha N. Patil	Surat Zaman	Sasikala Mootha	Nidhi Gupta in phase II	Milan Taye (Our Study)
Years of study	1989-1991	2006-2008	1999-2004	2006-2010	2007-2012	2009-2011	2012-2013	2006-2014	2012-2015	1996-2005
Total live births	22748	34318	83244	12544	39905	13188	10291	85404	33833	11878
Maternal Deaths	254	166	519	38	158	63	73	183	279	282
MMR	1051	494.33	623.46	302.9	395	477	709.35	341.90	825	2374
Age Groups				19-29 yrs. 68.42	20-29yrs 74.67%	20-29yrs 74.60%	18-29yrs 75.32%	20-29yrs 80.7%	20-30yrs 80.29%	Mean age 25.68
Gravida-primi				42.10%	49.36%	46.03%	43.835%	45.2%	52.32%	
Booked/ Unbooked			8.28%/91.72%	28.94%/71.06%	78.48%/ 21.51%	74.60%/25.4 %	≥4 ANC 8.62%	66.8%/33.2%	17.20%/82.80%	7.4%/92.6%
Time of admission to death in hrs.									21.52% died ≤4hrs	33% died ≤ 10hrs
Direct causes	60 to 71%	66 to 69%	>3/4th of the total deaths	50%	73.2%	52.35%	69.84%	62.7%	68.82%	63.3%
Indirect causes	28 to 39.5%	30 to 33%	<1/4th of the total death s	50%	26.8%		30.16%	37.3%	31.18%	34.2%

Table 9: Comparison of our study with other studies

DISCUSSION

In our study direct causes were responsible for 70.16% and indirect causes were responsible for 29.39% of the total 279 maternal deaths out of 33833 live births (MMR-824.64). Hypertensive disorder of pregnancy 37.63%, infection 14.69% (Septic abortion 4.30%), hemorrhage 12.90% and obstructed labour 3.58% were the major direct causes of maternal death and severe anaemia was the commonest indirect cause solely responsible for 24.73% of maternal deaths in our study. Other indirect causes of maternal death in our study were CNS abnormality 1.79%, jaundice 1.43%, ARDS 0.72%. Chakraborty S. et al. reported preeclampsia and eclampsia in 27.63%, hemorrhage 26.60%, unsafe abortion 6.49%, anaemia 6.46% and pulmonary embolism 2.72%.[5] Jadhav CA et al. reported reported hemorrhage 27.84%, hypertensive disorder of pregnancy 10.75%, sepsis 3.16%, anaemia 33.33% and CNS disease 1.26% as causes of maternal death.[6]

Vidhyadhar B. Bangal et al. in their study reported eclampsia as the cause of death in 10.5%, sepsis in 7.89%, hepatitis in 21.05% and heart disease in 13.15%.[7] Pal Amitava et al. in their study reported that major obstetrics complications accounted for three fourth of the maternal deaths including toxemia 50.56%, sepsis 18.17% and hemorrhage 9.72%. The major indirect causes for maternal deaths in their study were anaemia 4.18% and jaundice in 1.84%.[8] Surat Zaman et al. in their study stated that eclampsia was the cause of death in 28.76%, anaemia in 23.24%, septicemia in 9.58% and septic abortion in 5.48%.[9] In Sasikala Mootha et al. study direct causes accounted for 62.7% of maternal deaths with eclampsia in 47.5%, hemorrhage in 28.9% and sepsis in 23.4%.

The indirect causes lead to 37.3% of maternal deaths with anaemia responsible for 15.5%, jaundice 22.9%, heart disease 21.1% and malaria for 7.3%.[10]

Varsha N. Patil et al. reported hemorrhage in 28.57%, hypertensive disorder of pregnancy 12.69%, sepsis 6.34%, uterine inversion 1.58% and obstructed labour in 3.17%. Indirect causes included severe anaemia in 33.33%, heart disease 17.46%, liver disease 9.52%, pulmonary disease 9.52%, CNS disease 4.76% and acute renal failure, diabetes, malaria, laryngospasm each in 1.58%.[11] Nidhi Gupta et al. reported direct causes including hemorrhage in 26.6% (APH-6.2% and PPH- 20.4%), toxemia 20.0%, septicemia 12.6%, rupture uterus 2.9% and ectopic pregnancy in 1.2% in Phase II. Indirect causes included anaemia in 22.9%, ARF in 0.50%, jaundice 7.2%, heart disease in 1.7% and DIC in 1.9%. Other causes reported were malaria in 1.2%, blood transfusion in 0.5%, meningitis or encephalitis in 0.4% and AIDS in 0.2%.[12]

In comparison to other studies, except Surat Zaman et al. and Nidhi Gupta, our MMR was higher. This was because of high percentage of unbooked cases and referral cases from different districts, medical colleges and bordering states like Arunachal Pradesh and Nagaland. The percentage of maternal death due to severe anaemia was also very high in our study.

CONCLUSIONS

Complications of pregnancy and child birth is a major threat to the life of a woman in developing countries. Most of the causes of maternal deaths are multi factorial and preventable. A well-organized multi-disciplinary approach including education, transportation, communication, poverty eradication and well equipped hospitals are required to reduce maternal death in the community in long run.

Attitude to women needs to be changed in the society. Every pregnancy needs to be planned with judicial use of contraceptives.

Every healthy Indian needs to donate one unit of blood religiously at least every six months to prevent maternal death. Prevention of anaemia, hypertension, sepsis and well trained dedicated and challenging health staff are required to prevent maternal death at the earliest. The maternal deaths occurring at tertiary centre do not reflect the MMR of the community but it helps in evaluation of causes, strategy and planning to reduce maternal mortality.

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