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Research Article

## Maternal mortality: analysis of causes and preventable factors

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### ABSTRACT

**Background:** The aim of this study of maternal deaths is to analyze the causes, whether preventable or not and if preventable to find out the factors that can decrease the maternal mortality.

**Methods:** A retrospective study of maternal deaths from January 2015 to December 2015.

**Results:** There was a total of 56 maternal deaths out of 6976 live births giving the MMR of 802/1,00,000 live births. The MMR is high as it is an institution MMR and this is tertiary care institution which caters to 3 districts. Late referrals were 64.28%. The majority of deaths were in the 21-25 age groups and around term 33 (58.92%). Hypertensive disorders was the commonest cause of death 15 (26.78%) followed by hemorrhage 10 (17.8%) and sepsis 7 (12.5%) and CVT 7 (12.5%). 90% of cases were preventable.

**Conclusions:** Hypertensive disorder pregnancy was found to be the direct major causes of death. Although booking level is high, health education of women, early identification of PIH and its management, early identification of anaemia and prompt correction, early referral, judicious use of IV fluids, blood products and drugs can prevent more than 90% of maternal deaths.

**Keywords:** Maternal mortality, Preventive factors

### INTRODUCTION

The quality of healthcare delivery system of a country is reflected by its MMR. Maternal death is indeed a tragic event during or after a natural process and it is still the leading cause of death in women of reproductive age group. Every minute a woman dies as a result of pregnancy and child birth somewhere in the world. In India approximately 28 million women experience pregnancy and 26 million have live births.<sup>1</sup> Averting maternal deaths remains a challenge to healthcare system in India. Millennium development goal 5 (MDG 5) aims at reducing 75% of MMR over a period of (1990-2015).<sup>2</sup> However India has observed appreciable decline in MMR from 380 in 1990 to 254 in 2004-2006 and to 212 in 2007-2009 and to 178 in 2010-2012. For 2008 there were an estimated 3,58,000 maternal deaths in the World or an MMR of 260 maternal deaths/1,00,000 live births.<sup>3</sup>

By country wise India has the largest maternal deaths (63,000/year). It is one among 11 countries that included an estimated 65% of global deaths. MDG 5 aimed at an annual decline of 5.9% but global decline is only 2.3%. None of the broad MDG region was on track to achieve MDG i.e 59% reduction from 1990 to 2008 but Maldives, Bangladesh and Indonesia has done better progress. India is making progress but not on track to achieve MDG showing only slow progress.<sup>2</sup>

This study is aimed to review the maternal deaths, its causes, to analyze the preventable factors and at what level of healthcare improvement is needed and how to avert the maternal deaths.

Although our health system has good allocation of resources the need for improvement in terms of health

education, CME's and hands on training for healthcare personal and early referral is the need of the hour.

## METHODS

The study was conducted by reviewing the records of maternal deaths over the period of 1 year from January 2015 to December 2015 in the department of Obstetrics and Gynaecology at the Government Mohan Kumaramangalam Medical College Hospital, Salem, India. Every maternal death was scrutinized from various aspects likely to be related to death such as age, locality of residence, parity, gestational age, literacy, AN care, admission - death interval, condition of the women at admission, cause of death, whether preventable or not and if preventable the factor that needs to be improved and at which level of healthcare.

## RESULTS

**Table 1: Maternal deaths and its characteristics.**

Characteristics	Groups	No. of maternal deaths	Percentage
Age (years)	10-20	6	10.7
	21-25	36	64.2
	26-30	6	10.7
	>30	8	14.2
Parity	PRIMI	16	28.5
	G2	27	48.2
	G3 and >	13	23.2
Locality	Urban	1	1.78
	Rural	55	98.21
Transport	Ambulance	49	87.5
	Self	7	12.5
Referral rate	Cases referred	53	94.6
	No referral	3	5.37
Referral	PVT	5	19.43
	PHC	14	26.4
	GH	23	43.3
	MC	11	26.7
Gestational age	Term	33	58.92
	28-37 Weeks	19	33.92
	14-28 Weeks	2	3.57
	<14	1	1.78
	Ectopic	1	1.78

During the study period, there were 56 maternal deaths out of 6976 live births giving an maternal mortality rate (MMR) of 802 per 1,00,000 live births, 92.5% of these deaths were in the postnatal period. 6% of deaths were due to home delivery. A majority of deaths had occurred at term 33 (58.92%). The age group which had the

maximum no. of deaths in this study was between 21-25 years (64.2%) (Table 1).

**Table 2: Maternal deaths and its characteristics.**

Characteristics	Groups	No. of maternal deaths	Percentage
An care	Booked	55	98.2
	Unbooked	1	1.78
Booking	PHC	39	70.9
	GH	11	20.0
	PVT	5	9.09
Delivery	Delivered	50	92.59
	Undelivered	4	7.40
Place of delivery	Institution	47	94.0
	Home	3	6.0
Route of delivery	LN	17	34.0
	LSCS	31	62.0
	Forceps	1	2.0
	Spont expul	1	2.0
Admission status	Stable	20	35.71
	Poor	36	64.28
Admission death interval	<24 hours	18	32.14
	1-2 days	10	17.85
	2-10 days	24	42.85
	>10 days	4	7.14
Co morbid conditions	Fever	17	30.35
	Anaemia	30	53.57
	HT	15	26.78

**Table 3: Causes of maternal deaths (n=56).**

Causes	No.	Percentage
Hypertensive disorders	15	26.78
Haemorrhage	10	17.85
Sepsis	7	12.5
CVT	7	12.5
Pulmonary embolism	4	7.1
VHF	3	5.3
Heart disease	3	5.3
Tb meningitis	2	3.5
Wernicke's encephalopathy	1	1.78
Cerebral malaria	1	1.78
Seizure disorder	1	1.78
Community acquired pneumonia	1	1.78
Acute pancreatitis	1	1.78

27 cases were gravida 2 (48.2%). 55 cases (98.2%) belong to rural areas. Almost 53 cases (94.6%) were referral cases and the referral rate was high (43.3%) from G.H and 20.7% from medical college. The admission status was poor in 64.28% of cases. Among the co-morbid conditions anemia was associated with 53.57% of cases (Table 2).

As seen in Table 3, 18 maternal deaths (34.14%) had occurred within the first 24 hours of admission. Analysis also revealed that hypertensive disorder is the leading cause of death. Out of 53 deaths (26.78%) were due to hypertensive disorders, 17.85% due to hemorrhage, 12.5% due to sepsis, 12.5% due to cerebral venous thrombosis (CVT) and 7.1% due to pulmonary embolism.

## DISCUSSION

The MMR in our study is 802 per 1,00,000 live birth. Other studies from tertiary care institutions reported a maternal mortality rate of (371-4286/1,00,000) live births due to large referral cases.<sup>9</sup> Most women almost 94.6% of women were referred from far off places resulting in delayed intervention and many (64.2%) were in poor general condition at the time of admission. The higher incidence of deaths is due to late referral of cases from periphery and delayed interventions. Most deaths occurred in the 21-25 years (64.2%) age group which correlates with other studies.<sup>8</sup> Post-partum deaths accounted for about 92.5% whereas in other studies it was only 70%.<sup>10</sup> The NRHM through JSY scheme encourages rural women for institutional deliveries with incentives, still home delivery was reported in 6% of cases. 32% of deaths occurred within the first 24 hours of admission whereas in other studies it was 60%.<sup>10</sup> Hypertensive disorders and eclampsia in our study accounted for 26.7% which is comparable with studies which as reported 29.54%.<sup>11</sup> Although the use of mag-sulfate and early termination of pregnancy has let to improve the scenario of eclampsia still early diagnosis of pregnancy induced hypertension (PIH) needs to be emphasized to prevent deaths due to pre-eclampsia. In our study hemorrhage was a cause of death was 17.8% which comparable to other studies which reported 21.56%.<sup>11</sup> The decrease in haemorrhage is mainly attributed to the skilled birth attendant training to all staff nurses, village health nurses at the PHC and GH level.

Sepsis was reported in 12.5% of our cases which is comparable to other studies 13.75%.<sup>10</sup> The need for antibiotics and infection control practices are to be strictly followed to reduce deaths due to sepsis. Anaemia was the highest co-morbid factor associated with the maternal deaths 53.57% in our study.

## CONCLUSION

The nation's goal for averting most deaths with correct intervention strategies must prioritize the important causes for appropriate resource allocation. All in the medical fraternity should develop a "no blame" culture while doing confidential review of maternal deaths, exactly find the possible levels in prevention of that particular death and concentrate in strengthening that area. Maternal deaths are still high in comparison with developed countries. It is also high compared to our nearby state Kerala, India.

Although we have empowered skilled birth attendant to give magnesium sulphate and excellent active management of the third stage of labor (AMSTL) training, still the detection of hypertension is delayed.

So the visit in 3<sup>rd</sup> trimester has to be increased. It needs to be improved in terms of quality for early detection of PIH, early correction of anaemia and health education on importance of contraception, iron-folic acid supplement (IFA) tablets, the imminent symptoms of pre-eclampsia and providing ambulance to all healthcare facilities where delivery takes place in order to reduce the waiting time for the ambulance at the primary health centre (PHC) level. Proper history taking, judicious use of drugs, IV fluids and blood products should be done in managing cases and timely proper decision making at the tertiary care level would have prevented more than 90% of deaths.

Health education of masses along with good quality health care and transport facilities can prevent most of the deaths.

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