

## CHANGING TRENDS IN MATERNAL MORTALITY IN A TEACHING CUM REFERRAL HOSPITAL

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### SUMMARY

The present study is a retrospective analysis of maternal deaths from 1st January 1985 to 31st December, 1994 at R.G. Kar Medical College & Hospital, Calcutta. There were 87,216 live births and 572 maternal deaths giving a cumulative maternal mortality rate of 6.56 per thousand live births. Amongst the victims majority were unbooked (83.74), multiparous (55.76%), coming either from rural (57.86%) or urban slum (29.37%) and from low income group (77.45%). Almost half (48.95%) of the patients died within 24 hours of hospital admission. Direct causes were responsible for 83.56% of maternal deaths, indirect for 13.64% and unrelated causes for 2.80% of cases. Majority (81.8%) of the deaths were attributable to toxæmia (34.44%), haemorrhage (24.13%) and sepsis (23.25%). Other important causes were hepatitis, anaemia and pulmonary embolism. In the beginning of the study period (1985), MMR was 7.72; sepsis (32.7%) was the leading cause of death followed by haemorrhage (29.5%) and toxæmia (18.03%). In 1994, MMR became 5.57 and toxæmia (37.25%) topped the list followed by haemorrhage (19.60%) and sepsis (15.68%). This changing in trend in the causative factors is the important observation of this study.

### INTRODUCTION

Though pregnancy is essentially a healthy

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process, maternal death still remains to be major hazard in the world. It is said that in every minute, a woman dies as a result of pregnancy or childbirth some-

where in the world (500,000 women in every year). In India 100,000 mothers die every year which is 20% of all maternal deaths in the world (one death in every 5 minutes). Maternal mortality rate reflects the health status of a community. Maternal mortality rate (MMR) is defined as number of women dying from any cause, while pregnant or within 42 days of termination of pregnancy, irrespective of duration and site of pregnancy per 100,000 live births (WHO-1988). MMR varies from country to country, region to region of the same country. MMR is 60 for Sri Lanka & Malayasia, 50 for Thailand, 100 for China, 9 for U.K., 5 for Singapore & 2 for Norway (Grant 1991). In some developing countries MMR is as high as 200 times, compared to the developed countries. Accurate data on maternal mortality in our country is lacking. However a 3-year multicentric collaborative study of 4707 maternal deaths from 41 teaching centres showed the MMR to be 721/100,000 live births (Rao 1982). The ministry of Health & Family welfare reported the national MMR as 460 (1989) while in a subsequent report MMR in India is stated to be 340 (Grant-1991). In India MMR is lowest in Kerala and highest in the states like Madhya Pradesh and Utter Pradesh (RGI-1981).

The aim of this study is to analyse the causative factors, its changing trends and to discuss the measures to be taken to reduce the maternal mortality.

#### **MATERIALS AND METHODS**

A retrospective study of all maternal deaths at R.G. Kar Medical College & Hospital, Calcutta during the period from 1st Jan. 1985 to 31st Dec. 1994 was carried

out from the records. Each death case was analysed with regards to age, parity, socio-economic status, antenatal care, hospital stay, treatment given and causative factors of death. R.G. Kar Medical College & Hospital is a teaching-cum-referral hospital, catering both urban and rural areas, mostly of low and middle socioeconomic class with delivery ranging from 8,500 to 10,500 and abortions ranging from 3000 to 4000 annually. It was neither always possible to follow up all the mothers upto 6 weeks following termination of pregnancy, nor to include all pregnant mothers admitted in other departments of the hospital, in spite of a sincere effort on our part.

#### **OBSERVATIONS**

During the span of ten years (1985-1994) total number of deliveries were 92,440. After deduction total stillbirths (5224), the total number of live births during this period were 87,216 and cumulative maternal mortality rate was 6.56 per thousand live births as seen from Table I. This table also shows yearwise maternal mortality rate which ranges from 5.11 to 7.72/1000 live births.

As seen from Table II 52.97% patients belonged to 21-30 years age group while a large percentage (29.89%) of patients were 20 or below. The parity distribution showed a predominance of multigravida (55.76%) patients though one third of the patients were primigravidae. Majority of the patients had come either from rural (57.86%) or from urban slum (29.37%). 77.45% of patients had come from low income group and

**Table I**  
**MATERNAL MORTALITY RATE PER YEAR**

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	Total
No. of Live Births	7900	7973	8356	7884	8402	9222	9135	9972	9219	9153	87216
No. of Maternal Deaths	61	58	52	55	63	58	58	51	65	51	572
Maternal Mortality rate/1000 Live Births	7.72	7.27	6.22	6.97	7.49	6.29	6.34	5.11	7.05	5.57	6.56

the rest (23.55%) from middle class family. Among the maternal deaths 66.97% were Hindus and 32.86% were Muslims. Majority (83.74%) of the patients were unbooked.

Table III shows about half of the maternal death (48.95%) occurred within 24 hours of admission.

Causes of maternal mortality observed are shown in Table IV. Direct causes were responsible for 478 (83.56%) maternal deaths, indirect causes for 78 (13.64%), and 16 deaths (2.80%) were due to unrelated causes.

Amongst the direct causes, toxæmia was the leading cause of death accounting for 34.44% of death, hæmorrhage accounted for 24.3% while sepsis was responsible for 23.25% of maternal deaths (Fig. 1).

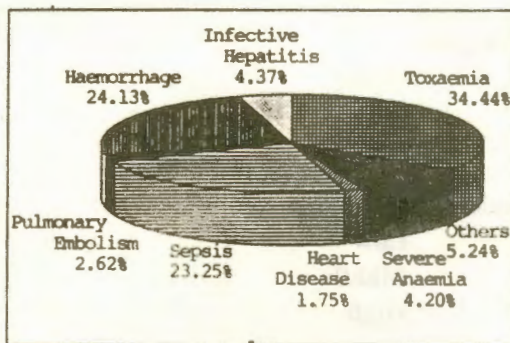


Figure 1. Showing important Causes of maternal deaths

In toxæmia group, eclampsia claimed 170 (86.29%) lives and fulminant toxæmia causes 27 (13.71%) deaths. Antepartum eclampsia was 130 (77.6%) among the eclampsia patients. Majority of the patients had been treated by either lytic cocktail regime or diazepam therapy or by combinations of different drugs.

**Table II**  
**MATERNAL DEATHS IN RELATION TO DIFFERENT FACTORS**

Factors	Number	Percentage
Age in Years		
<20	171	29.89
21-30	303	52.97
31-35	78	13.64
>35	20	3.50
Parity		
Primigravide	190	33.22
Multigravide	319	55.76
Grandmultipara	63	11.02
Residence		
Urban	73	12.77
Urban slum	168	29.37
Rural	331	57.86
Religion		
Hindu	383	66.97
Muslim	188	32.86
Others	1	.17
Socioeconomic Status		
Low	443	77.45
Middle	129	22.55
High	X	X
Antenatal Care		
Booked	93	16.26
Unbooked	479	83.74

**Table III**  
**TIME INTERVAL FROM ADMISSION TO DEATH**

Time	No. of Patients	Percentage
Within 24 hours	280	48.95
24 Hrs. to 7 days	223	38.99
More than 7 days	69	12.06

Table IV  
CAUSES OF MATERNAL MORTALITY

Causes	No. of cases	%
A) DIRECT	478	83.56
Toxaemia	197	34.44
- Eclampsia	170	
- Severe PET	27	
Haemorrhage	138	24.13
Sepsis	133	23.25
- puerperal	34	
- postabortal	96	
- IUFD	3	
Obstetric Shock	7	1.22
Obstructed labour	3	.52
B) INDIRECT	78	13.64
Infective hepatitis	25	4.37
Severe Anaemia	24	4.20
Heart disease	10	1.75
Renal disease	1	.174
Anaesthetic accident	1	.174
Pulmonary embolism	15	2.62
DIC	2	.35
C) UNRELATED FORTUITOUS	16	2.80
Haematemesis & malena	3	.52
Meningitis	1	.17
Acute abdomen	2	.34
Lymphadenopathy	1	.17
Pulmonary Tuberculosis	1	.17
Bronchial asthma	2	.34
CVA	2	.34
SLE with pneumonitis	1	.17
Unknown	3	.52

Amongst the haemorrhagic group the leading cause of death killing (Table V) Post-partum haemorrhage was 38 women (6.64%) followed by

**Table V**  
**HAEMORRHAGIC CAUSES OF MATERNAL DEATHS**

Haemorrhage	No.	% in total deaths
* APH	32	5.59
* PPH	38	6.64
* Retained Placenta	22	3.84
* Incomplete abortion	13	2.27
* Ruptured Uterus	15	2.62
* Ectopic Pregnancy	7	1.23
* Hydatidiform Mole	4	.70
* Uterine Inversion	2	.35
* Vulval Haematoma	1	.17
* Post-Operative Shock	3	.52
<b>Total</b>	<b>138</b>	<b>24.13</b>

APH. Postpartum haemorrhage and retained placenta together were responsible for 60 deaths (10.48%). Antepartum haemorrhage caused 32 deaths (5.59%) of which 19 were due to accidental haemorrhage and 13 were due to placenta praevia. Uterine rupture claimed 15 lives (2.62%) during this period.

Sepsis was the third major cause of maternal deaths claiming 133 lives. Most of the deaths were due to postabortal sepsis (72.18% - 96 cases). Puerperal sepsis was responsible for 34 deaths (25.56%). Intrauterine foetal death with endotoxic shock caused 3 (2.25%) maternal deaths.

Amongst the indirect causes, infective hepatitis was the leading cause being responsible for 25 deaths (4.37%). This was followed by severe anaemia (24 deaths - 4.20%) while pregnancy with heart disease

resulted in 10 deaths (1.75%).

Pulmonary embolism was responsible for death of 15 women (2.62%). The diagnosis was made on clinical basis without any postmortem examination.

33 deaths (5.76%) had occurred in patients undergoing caesarean deliveries. The deaths from LUCS were either from haemorrhage, sepsis, anaesthetic accident or pulmonary embolism or due to primary condition like eclampsia.

The list of unrelated causes of maternal deaths are shown in Table IV.

The changing trends of causative factors in maternal deaths are depicted in Table VI (Figure 2). There is declining trends of mortality caused by sepsis, and to some extent in case of haemorrhagic deaths. The deaths caused by

**Table VI**  
**YEARWISE PERCENTILE CONTRIBUTION OF IMPORTANT CAUSATIVE FACTORS OF DEATHS**

Cause	Year										
		1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Toxaemia	No.	11	12	13	20	20	22	27	22	31	19
	%	18.03	20.68	25	36.136	31.4	37.93	46.55	43.13	47.69	37.25
Haemorrhage	No.	18	17	11	11	21	17	9	11	13	10
	%	29.5	29.31	21.15	20	33.33	29.31	15.51	21.56	20	19.60
Sepsis	No.	20	17	17	10	13	13	11	13	11	8
	%	32.78	29.31	32.69	18.18	20.63	22.41	18.96	25.49	16.92	15.68
Hepatitis	No.	3	3	3	3	4	0	4	0	0	5
	%	4.91	5.17	5.76	5.45	6.34	0	6.89	0	0	9.80
Severe Anaemia	No.	2	2	2	5	2	2	3	2	2	4
	%	3.28	3.44	3.90	9.09	3.17	3.44	5.17	3.92	3.07	7.84

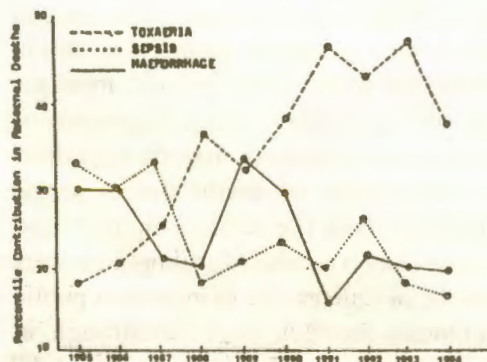


Figure 2. Graphical representations of yearwise percentile contribution of toxaemia, sepsis and haemorrhage in maternal deaths.

toxaemia are showing an increasing trends during last 10 years. This is a relevant observation of our study.

#### DISCUSSION

The declining trend in maternal mortality is almost a common feature found throughout the world. In some places this decline is sharp (Devi & Singh 1994), in other places this is either gradual or in an irregular fashion (Shrotri & Chaudhuri 1994). In this study, cumulative MMR is 656/100,000 live births which is almost double the National figure of 340. This rate is again lower in comparison to the figure of earlier series (Table VII) of this hospital. Besides, the MMR of 1994 has come down to 5.57 from the high figure of 7.72 of the year 1985. But this decline pattern is not uniformly seen during the study period of 10 years. The admission

**Table VII**  
**COMPARISON OF MATERNAL MORTALITY IN**  
**PREVIOUS AND PRESENT STUDIES**

Period of study	Live Births	No of Maternal Deaths	Calculated MMR per 1000 Live Births
Previous Study (1978-1987) (Chatterjee et al)	78329	651	8.31
Present Study (1985-1994)	87216	572	6.56

of variable number of unbooked, critically ill patients explains the variability of MMR in different years.

In the present series, direct obstetric causes are responsible for 87.56% of maternal deaths which is relatively higher in comparison to other studies (Rao, Varawalla et al 1989, Bera et al 1992 etc.). Toxaemia, sepsis and haemorrhage are the three prime killers while enfective hepatitis and anaemia are important indirect causes of maternal deaths - these observations are consistent with the observations of other workers in India (S. Swain et al 1994).

Toxaemia has now become the leading cause of deaths while deaths from haemorrhage and sepsis are showing a declining trend. This observation is in conformity with report of S. Swain et al 1994 but in contrast with other workers like Varawalla et al 1989, Juneja & Rai 1993 and the earlier report of this hospital. In the earlier report of this hospital (Chatterjee

et al 1993) toxacmia was found to be responsible for 19.96% of maternal deaths where as in the present series it is evident that 34.44% of deaths are caused by toxacmia. The decline in death by sepsis and haemorrhage is in fact, due to the use and availability of better antibiotics, blood transfusion facility and prompt management of the patients. The rising trends of deaths from calmpsia may be explained by, the decrease of deaths due to sepsis and haemorrhage (i.e. relative increase) and referral of larger number of calmptic mothers from the periphery due to increased public awareness. Besides no breakthrough in the management of eclampsia could be achieved over the last decade.

The mortality has been found to be more common in unbooked, multiparous, low socioeconomic status group, and in rural or urban slum mothers (Table II). This observation is consistent with other observers (Rao 1980,).



Majority of the aetiological factors of maternal deaths were avoidable and correctable barring only a few ones.

Deaths from toxæmia can be prevented by proper antenatal care, early hospitalisation and maintaining intensive protocol in eclampsia management. Prompt management and replacement of lost volume will reduce the deaths from haemorrhagic cases. Working in aseptic conditions, early management of postabortal and puerperal sepsis will largely prevent the deaths from sepsis. Infective hepatitis can be prevented by improvement in sanitation. Many of the social factors contributing to maternal deaths are improved by health education on maternal, child health and family planning programme.

### CONCLUSION

The major causes of maternal deaths are almost same everywhere in the developing country. These are toxæmia, haemorrhage, sepsis, infective hepatitis and anaemia. The rising trend of death from toxæmia in this series is alarming and is of great concern. Though there are some unpredictable factors, majority of the deaths are preventable. Early registration, regular antenatal care, early referral of high risk cases, proper utilisation of existing ser-

vices including timely use of emergency obstetric care (E O C), improvement in the standard of obstetric care and increase in awareness of the patient and her family will certainly minimise the avoidable maternal deaths.

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