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Original Research Article

Trends in maternal mortality in a tertiary hospital in West Delhi

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ABSTRACT

Background: Aim of current study was to find out incidence, causes and complications leading to maternal deaths in a tertiary care hospital and possible prevention of maternal deaths.
Methods: Individual records of all maternal deaths over a period of five years from January 2006 to December 2010 were studied and causes of death and avoidable factors in each case were studied.
Results: Major causes of maternal deaths were same throughout the study. The causes of maternal deaths were Hemorrhage (19.21%), Sepsis (15.76%), PIH (12.80%), Jaundice (8.37%). Direct obstetric causes contributed to 65.51% of cases. Indirect causes of maternal death contributed to 45.81%. Anemia alone accounted for 26.1% deaths. Maternal Mortality Ratio (MMR) was 362.57/100000 live births. There were 31.03% referred cases and 44.8% cases were admitted to ICU. Unbooked cases accounted for 84.72% of maternal deaths and these were mostly uneducated.
Conclusions: Interventions for reduction of MMR are regular antenatal care, risk screening, skilled personnel at childbirth, good transport facilities, family planning services and safe abortion services. These facilities not only reduce burden on tertiary hospitals but also help in improving maternal prognosis.

Keywords: Maternal mortality ratio, Direct obstetrics deaths, Booked cases

INTRODUCTION

Maternal death is defined as death of women while pregnant or within 42 days of termination of pregnancy from any cause related to or aggravated by pregnancy or its management.[1] The maternal mortality ratio is maternal death per 100,000 live births in one year. WHO estimates show that out of the 529,000 maternal deaths, globally each year, 136,000 (25.7%) are contributed by India.[1] This is the highest burden for any single country. There are variations in maternal mortality by region and state. The government of India has been time and again making policy and setting goals for reducing maternal mortality.[1] National rural health mission (NHRM) goal is to reduce MMR to 100 by 2012. Worldwide MMR ranges from 200-600/100,000 births.[2] Millennium development goal report 2010, Goal-5 is to improve maternal health and reduce by three quarters, between 1990 and 2015, the maternal mortality ratio. The maternal mortality estimation interagency group (MMEIG) composed of WHO, UNICEF, UNFPA and the World Bank, together with an independent technical advisory group (TAG), has developed and updated existing maternal mortality estimates using statistical modeling for countries where no reliable data on maternal mortality exists. In 2008, the maternal mortality ratio in developing regions was 290 maternal deaths per 100,000 live births, representing a 34% decline since 1990. Despite this important progress an estimated 358,000 maternal deaths occurred world wide in 2008. The average annual percentage decline in the global maternal mortality ratio was 2.3%, short of the 5.5% annual decline necessary to meet the MDG target. While there is progress to celebrate, efforts to save lives must be accelerated. Global estimate for lifetime risk is I in 74, for every 74 women one will die of maternal causes.[3]

METHODS

Deen Dayal Upadhyay hospital is one of the biggest urban tertiary care centers in Delhi. It is a referral center for many district health centers, primary health centers and private nursing homes. This hospital caters to a population of about 40 lakhs and is the only tertiary referral center of west Delhi. This case study analyses the trends in maternal mortality over 5 years in this hospital and maternal health care delivery system in this part of west Delhi. The present study was carried out in the department of obstetrics and gynecology of this hospital. The individual records of maternal death occurring from January 2006 to December 2010 were carefully analyzed to find out incidence of factors involved in maternal deaths with a view to know the avoidable risk factors. All women requiring hospital care were admitted irrespective of the availability of basic bed vacancy or registration in hospital.

RESULTS

Between January 2006 and December 2010, there were 55,988 deliveries and 203 maternal deaths as depicted in (Table 1) which shows year wise distribution of deliveries, maternal deaths and yearly MMR.

Table 1: Distribution of deliveries and maternal deaths (year wise).

Year	Live births	Maternal deaths	MMR/100,000 LB
2006	9683	47	485
2007	9045	32	353
2008	11036	35	317
2009	10542	43	407
2010	15682	46	293
Total	55,988	203	362.57

Average MMR was 362.57/100,000 live births. The delivery method is depicted in (Table 2). Among the maternal deaths which occurred in the hospital 50.7% (103/203) delivered vaginally, 23.1% (47/203) were post caesarian, 19.7% (40/203) remain undelivered and 6.40% (13/203) were early pregnancy deaths.

Table 2: Delivery method and maternal death.

Delivery method	N	%
Undelivered	40	19.7
Post vaginal	103	50.7
Post LSCS	47	23.1
Early pregnancy	13	6.4
Total deaths	203	

Among the maternal deaths 64.5% (131/203) were those who were critical on admission. Those who were referred to our hospital from other private and government hospitals contributed 31.03% (63/203) and 44.8% (91/203) were shifted to ICU. Among total maternal deaths 84.72% (172/203) were unbooked cases and only 15.27% (31/203) were booked cases. Looking into the total distribution of maternal deaths according to age it was noted that highest mortality of 69.9% (142/203) in the age group of 21 to 30 years, while mortality of 19.2% (39/203) and 11.8% (24/203) was noted in women aged >30 years and <20 years. Obstetric complications causing maternal deaths is depicted in (Table 3). Direct obstetric deaths occurred in 65.5% (133/203). Hemorrhage contributed to 29.32% (39/133), Sepsis 24.06% (32/133), PIH 19.54% (26/133), post puerperal sepsis 8.27% (11/133), Eclampsia 5.26% (7/133), Embolism 4.51% (6/133), Unsafe abortion 3% (4/133), Inversion uterus 3% (4/133), Rupture uterus 1.5% (2/133), Ectopic pregnancy 0.75% (1/133), Obstructed labor 0.75% (1/133). Atonic PPH contributed to 43.58% (17/39), Traumatic PPH 17.94% (7/39), abruption 30.76% (12/39) and Placenta previa 7.69% (3/39). Sepsis cases included probable septicemia, diagnosis mainly on clinical grounds. Surgical wound sepsis was also included in this. Indirect causes of maternal deaths contributed to 45.81% (93/203). Anemia 56.98% (53/93), DIC 15.05% (14/93), tuberculosis 3.22% (3/93), epilepsy 3.22% (3/93), hepatitis 2.05% (2/93) and head injury 1.07% (1/93). Comparative analysis between different studies in past and our present study (Table 5).

DISCUSSION

Pregnancy is a normal healthy state that most women aspire at some point in there lives. Yet while pregnancy and childbirth should be an occasion for rejoicing life threatening complications may occur which if inappropriately managed could lead to maternal death and disability. Most of these deaths (99%) occur somewhere in developing countries. Every minute one maternal death occurs somewhere in developing world.[5] Every year over half a million women die during pregnancy and following childbirth.[5] The MMR is an indicator of the quality of health care available during pregnancy, childbirth and in the postpartum period. MMR in our study was 362.57/100000 live births. Table-5 gives comparative analyses of the Indian studies done in past years which show wide variations in MMR and incidence of causes leading to maternal death. This variation could be explained due to many variables. Our study showed that 69.9% of women die between ages 21 and 30 years as highest number of women belong to this age group. Similarly, multigravidas constituted 54% of the maternal deaths. 60% of women died within 24 hours of the admission to hospital which was possibly due to poor general condition of women on admission, ignorance among patients, late referrals and poor facilities in district and primary health centers and at times due to long traveling time from near by states.

In our study there were about 55,988 deliveries in 5 years and 203 maternal deaths. More than 73% of maternal deaths occurred in postpartum period and included 50.7% deaths after vaginal delivery and 23.1% of deaths after LSCS. Total no of LSCS done over span of 5 years were 11,698.

Table 3: Direct obstetric deaths (year wise distribution in percentage).

Year	He	Sepsis	PIH	Eclampsia	Unsafe abortion	Post puerperal sepsis	Rupture uterus	Embolism	Inversion uterus	Total deaths
2006	8 (17.02)	8 (17.02)	5 (10.63)	2 (4.25)	0	1 (2.12)	1 (2.12)	1 (2.12)	1 (2.12)	47
2007	5 (15.62)	2 (6.25)	4 (12.5)	1 (3.12)	1 (3.12)	2 (6.25)	1 (3.12)	2 (6.25)	0	32
2008	9 (25.71)	6 (17.14)	7 (20.0)	0	0	3 (8.57)	0	1 (2.85)	1 (2.85)	35
2009	7 (16.27)	7 (16.27)	3 (6.97)	3 (6.97)	1 (2.32)	3 (6.97)	0	1 (2.32)	2 (4.65)	43
2010	10 (21.73)	9 (19.56)	7 (15.21)	1 (2.17)	2 (4.34)	2 (4.34)	0	1 (2.17)	0	46
Total	39	32	26	7	4	11	2	6	4	

Table 4: Indirect causes of maternal deaths (year wise distribution in percentage). `

Year	Anemia	Jaundice	DIC	Hepatitis	TB	Epilepsy	Head injury	Total deaths
2006	14 (29.78)	3 (6.38)	2 (4.25)	0	1 (2.12)	0	1 (2.12)	47
2007	9(28.12)	1(3.12)	0	0	0	0	0	32
2008	7(20.0)	4(11.4)	4 (11.4)	1 (2.85)	0	1 (2.85)	0	35
2009	12 (27.9)	2 (4.65)	4 (9.30)	1 (2.32)	0	0	0	43
2010	11 (23.91)	7 15.21)	4 (8.69)	0	2 (4.34)	2 (4.34)	0	46
Total	53	17	14	2	3	3	1	

Table 5: Comparative analysis.

Year	MMR	Hge	Anemia	PIH	Jaundice	Sepsis	Direct obstetric causes
Pal et al	623.46	9.72	4.18	50.56	1.84	18.17	
Khosla et al		19.35	6.45	35		3.26	
Salan et al		18.18	27.27	16.3		14.54	60
Prasanta et al		9.72	4.8	50.56		18.17	
Puri et al	690	12	13	18		24	55.38
Bhattacharyya et al	599.3	21.91		36.14		19.54	82.09
Present study et al	326.57	19.21 (39/203)	26.1 (53/203)	12.84 (26/203)	8.37 (17/203)	15.76 (32/203)	65.51 (133/203)

This study highlighted that 84.72% of deaths occurred in those who were unbooked. 15.27%cases were booked. High percentage of deaths in unbooked cases indicated the importance of adequate antenatal care. Direct obstetric deaths accounted for 65.51% of deaths in our study and included hemorrhage (19.21%), sepsis (15.76%) and PIH (12.80%). All these factors are preventable by high risk screening and proper antenatal, intranatal and emergency obstetric care. Other studies showed that deaths due to hemorrhage range from 9.72 to 21.91%. There is significant decrease in deaths due to hemorrhage due to liberal use of blood and components, vigorous fluid replacement. Postpartum hemorrhage is a major contributor to maternal mortality and morbidity and it is important to evaluate the avoidable factors. The common errors include not treating anemia in pregnancy, not practicing active management of third stage of labor, delay in recognition and lack of skills. The remedies include correct medical treatment and use of uterine temponade. Among indirect causes of maternal deaths in our study anemia accounts for 26.1% of maternal deaths. In other studies, as shown in (Table 5) incidence of anemia range from 4.18 to 27.27%. High incidence of anemia in our study is due to the factor that many patients come to our hospital without any antenatal checkup, with low income group and poor nutrition status. Anemia can be prevented by iron, folic acid and protein supplementation in antenatal visits and blood transfusion. It is also major contributory factor to direct obstetric deaths due to PPH and sepsis. Intravenous use of iron sucrose has shown good results.

Other indirect causes included jaundice, DIC, hepatitis, Tuberculosis. Delhi government has started audit of high risk cases and track review of anemia cases per month. Besides poor resources of health facilities in rural areas women may lack awareness of the seriousness of the problems. Delayed referral, poor transport facilities, underutilization of health facilities and poor socioeconomic status are responsible for the high rate of maternal deaths. Health Ministry launched Janani Shishu Suraksha Karyakram (JSSK) to benefit more than one crore pregnant women and new borns in June 2011. The new initiative of JSSK would provide completely free and cashless services to pregnant women including normal and cesarian operations and sick new born (upto 30 days after birth) in government health institutions in both rural and urban areas. The free entitlements under JSSK include: free and cashless delivery, free cesarian section, free user charges, free drugs, consumables, free diagnostics, free diet during stay in hospital, free transport in referral cases and drop back from institution.

CONCLUSION

A relook at the causes of maternal death and the socio-medical factors contributing to maternal death brought out a completely new understanding of how to prevent maternal mortality. Care is required in each step: Pre conceptional counselling, health education to all women especially to adolescents and antenatal, intranatal and postpartum care. If obstetric complications are handled effectively, the mortality could be substantially reduced. It was also shown that once major obstetric complications which can cause death develop, even a trained birth attendant or a nurse can not do much at home as many of these complications require surgical interventions, injection of antibiotics, blood transfusion and other aggressive treatment. Complications can arise at any stage. Quick diagnosis and management is required and this emphasizes the effective training of post graduates in treating surgical complications like postpartum hemorrhage. Postgraduates should be trained in skilled procedures like B-Lynch sutures and Internal Iliac Artery ligation. If postpartum hemorrhage occurs patient dies within 30 minutes without treatment. Cost effective approach to reduce maternal mortality was by ensuring high quality emergency obstetric care (EmOC) to mother who develop complications during delivery. Anemia, sepsis and hemorrhage leading to maternal deaths are potentially preventable causes of maternal deaths. Every maternal death has a story to tell and can provide indications on practical ways of addressing the problem. Even a simple review of one maternal death can help to save another life. Now a days there is monthly audit of maternal deaths and confidential enquiry in each case so that mistakes are not repeated. A commitment to act upon finding these reviews is a key prerequisite to success. Every maternal death is a tragedy. What is an even greater tragedy is to fail to learn from why mother died.

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