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Maternal mortality in a referral hospital of Northern India - A sixteen-year review

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Introduction

Maternal death has been recognized as an area of maternity care that requires urgent attention. The most striking feature about maternal health today is the extraordinary difference in maternal death rates between developed and developing countries. Maternal mortality has reached an irreducible minimum in the developed world, whereas it remains alarmingly high in developing countries. In the developed countries, the risk to a woman of dying from pregnancy-related causes is between one in 4,000 and one in 10,000. The corresponding risk for a woman in developing countries is between one in 15 and one in 50. [A] [B] The analysis of maternal deaths in developing countries is incomplete due to paucity of data and unsatisfactory record keeping leading to a lack of national level data.

Institutional data, though not an index of maternal care of the nation as a whole, highlight the magnitude of the problem (all teaching referral hospitals have inflated rates of morbidity and mortality as they serve a very wide area [C]). In this paper, maternal mortality is reviewed retrospectively during the sixteen-year period beginning 1st April 1979 to 31st March, 1995 in the AIIMS (All India Institute of Medical Sciences) Hospital, New Delhi, which is a teaching and referral hospital and caters to high risk pregnancies. The paper is expected to throw some light on the major causes of maternal death and how they could be prevented in developing countries like India.

Data and Methodology

Data for the present review included all maternal deaths, which occurred at the AIIMS hospital during the reference period - 1st April 1979 to 31st March 1995.

During the 16-year period, all the death records of women in the reproductive age group were reviewed. The definition of maternal death used in this paper is that recommended by the World Health Organization in the International Classification of Diseases, Injuries and Causes of Death (ICD 9) [D]. The number of live births, deliveries and obstetric admissions were obtained from the annual reports of AIIMS Hospital.

During the reference period, AIIMSH had a reported admission of 46,443 obstetric cases 26,427 deliveries and 20,016 cases of abortion. The Hospital also registered 126,083 live births and 116 maternal deaths.

Maternal mortality rates were computed and the causes of maternal death were classified as deaths due to direct and indirect causes. The distribution of maternal deaths by age, parity, religion, place of residence, and registration status for antenatal care was also studied. It is worth mentioning that no autopsies were performed in any of the cases due to social reasons.

Results

The following paragraphs present the results of the analysis of the 16 years data in terms of the level of maternal mortality, its demographic correlates and causes of death.

As mentioned earlier, there were 126,083 live births and 116 maternal deaths, that is, a maternal mortality rate of 445 per 100,000 live births. Of these, 64 deaths (55.2 per cent) were due to direct causes. 50 deaths (43.1 per cent) were due to indirect causes and the remaining two (1.7 per cent) were due to unrelated causes. The maternal mortality rates due to direct and indirect/unrelated causes thus worked out to 245 and 190 per 100,000 live births. Of the 116 maternal deaths, 22 were abortion-related; the abortion-related maternal mortality rate was 84 per 100,000 live births. Excluding abortion-related deaths, the maternal mortality rate worked out to 360 per 100,000 live births and 350 per 100,000 live births plus still births.

Nearly 80 per cent of the women who had died during pregnancy were young and in their active childbearing years (20-29). Almost a third (32 per cent) were primi gravida, and more than half (a little over 56 per cent) were first-time pregnancies.

Fifteen women had had their index pregnancy before the completion of two years of marriage and an interval of more 24-month since their last childbirth. Around 93 per cent were Hindu; Muslims and Christians formed five and two per cent respectively of the women who had died. Residence wise, about 68 per cent of the women who had died were either from rural areas or urban slums; among them, 52 per cent were from rural areas. Nearly 93 percent of them had no access to antenatal, care, and more than three-fourths were poor.

Of the 116 maternal deaths, 68 deaths had occurred post partum, 41 during pregnancy but prior to delivery and seven had occurred during labor. Almost 27 per cent or 31 women had died within a week after delivery, 12 had died within two weeks of delivery, and the remaining 25 had died between 2-6 weeks, but within 42 days of delivery.

Table 1 presents a distribution of the maternal deaths by direct and indirect/unrelated causes.

Table 1: Distribution of Maternal deaths by Cause of Death, 1979-1995

Causes of Death	Maternal Death	
	No.	Per Cent
Direct Obstetric	64	55.2
Sepsis	41	35.3
Septic Abortion	16	13.8
Puerperal sepsis	25	21.5
Hemorrhage	3	2.6
Post MTP	1	0.9
Postpartum	2	1.7
Toxemia including eclampsia	19	16.4
Antepartum	10	8.6
Post Partum	9	7.8

Amniotic fluid embolism	1	0.9
Indirect Obstetric	50	43.1
Cortical Venous thrombosis	13	11.2
Viral Hepatitis	14	12.0
Heart disease	9	7.8
Renal failure	5	4.3
Cerebral malaria	5	4.3
Pulmonary embolism	2	1.7
DC after LSCS	1	0.9
Anaesthetic complication after LSCS	1	0.9
Unrelated	2	1.7
Meningitis	1	0.9
Epilepsy	1	0.8
Total	116	100.0

-Of the 116 maternal deaths, 64 (55.2 per cent) were due to direct obstetric causes, 50 (43.1 per cent) were due to indirect obstetric causes and the remaining 2 deaths were due to unrelated causes (Table 1). Among direct causes death due to sepsis was the leading cause (which took 35.3 per cent of maternal lives), followed by toxemia (which took 16.4 per cent of maternal lives) and hemorrhage (accounting for 2.6 per cent of the maternal deaths). The classical triad of infection, toxemia and hemorrhage accounted for more than half (54.3 per cent) of all maternal deaths. Over two-fifths (43 per cent) of deaths were attributable to indirect obstetric causes among which cortical venous thrombosis and viral hepatitis were the leading causes (11-12 per cent); two maternal deaths were due to unrelated causes like meningitis and epilepsy.

Discussion

The AIIMS Hospital caters only to high-risk pregnancies and functions as a teaching referral hospital. As many as 108 of the 116 women who died due to

pregnancy-related causes were referrals complicated by end stage diseases resistant to all emergency measures.

The classical triad of the causes of maternal deaths is sepsis, toxemia and hemorrhage [E]. In our study also, it was one of the major causes of death; more than a third of all maternal deaths were caused by sepsis and accounted for 35.3 per cent of all maternal deaths. In a few cases, severe anemia aggravated the complications due to sepsis while in three other cases, the women developed chest infection and with sepsis. Deaths due mostly arose from the complete abortion.

Almost all, rural births take place at home and the birth attendant is usually the local dai. Although India has legalized abortion and the procedure (MTP or medical termination of pregnancy) is performed free of cost at all Government hospitals, people with a rural background seek the help of untrained dais for MTPs. The prevention of postpartum sepsis and abortion related infections calls for a community based maternal education program to reduce maternal mortality. Such a program should be structured so that the mother to be, her potential attendants and the family together prepare for the delivery in a safe environment and using a safe, hygienic procedure.

The accessibility of a maternity facility or hospital and the availability of blood transfusion largely determines the fate of the maternity patient with hemorrhage. Late arrival at the hospital was primarily responsible for the deaths attributed to hemorrhage. The improvement of geographic accessibility of the maternity facility is thus of utmost importance. Moreover, when the cause of death was examined critically, various probable causes at specific stages of pregnancy or during the postpartum period emerged. In fact, a cumulative chain of morbid events led to the deaths. Hospital related factors were not always responsible for these deaths; they were due to a known infection that had occurred prior to hospital admission; most of the cases were moribund and were admitted as emergency cases.

The rank order of the causes of direct obstetric deaths, next to sepsis, was toxemia including eclampsia, followed by hemorrhage. The contribution of toxemia to maternal mortality decreased but acute renal failure was the immediate cause of death in a few cases. A few patients who died from acute renal failure had eclampsia and accidental hemorrhage and, at a late stage, presented with acute renal failure. When hospitalized, even emergency measures could not help. Most of the deaths could have been prevented by early antenatal

care, treatment of predisposing health conditions, timely availability of medical care and hospitalization.

The data presented here reveal that cortical venous thrombosis and viral hepatitis together constituted the major indirect obstetric causes of death (54 per cent of all indirect obstetric mortality). One woman had jaundice along with cortical venous thrombosis, another had sepsis and meningitis together with cortical venous thrombosis. Viral hepatitis alone constituted more than a quarter of the indirect obstetric causes. Anemia resulting from malnutrition may be one of the precipitating causes of maternal mortality.

This paper brings out the importance of registering all pregnant women and providing them with adequate antenatal care. As many as 93 per cent of the women who died of maternal causes in our study, had not received any antenatal care and more than half of them had delivered at home. The present study puts the maternal mortality rate at AIIMS Hospital at 445 maternal deaths per 1 00,000 live births. This is higher than the national rate **Error! Hyperlink reference not valid.** but has to be noted with caution, since hospital rates tend to be inflated as compared to national rates; also quite a few cases are brought to the hospital in a critical condition.

In summary, improvements in maternal nutrition; early identification and registration of all pregnant women in the first trimester of pregnancy; ensuring that all deliveries are attended by trained dais, that high risk pregnancies are identified promptly and referred in time to a hospital for appropriate interventions and management, including swift access to lifesaving technology are available if things go wrong; would be the measures needed to make motherhood safe. Obstetricians and public health planners will need to identify women at an elevated risk of maternal death and to develop prevention strategies to avoid the conditions that cause these deaths [G] [H]. This will require an improved scientific understanding. Further, with some modifications, vital records could serve as a source of epidemiologic data.

References

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