



STUDY OF MATERNAL MORTALITY RATE AT A TERTIARY CARE TEACHING HOSPITAL IN NORTHERN INDIA: A RETROSPECTIVE STUDY

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ABSTRACT - Background: All pregnant women are at risk of obstetrical complications and most of these occur during labour and delivery that lead to maternal morbidity and mortality. Maternal death has serious implications on the family, the society and the nation. Maternal Mortality Ratio (MMR) is a very sensitive index that reflects the quality of reproductive care provided to the pregnant women. Objectives: To assess the maternal mortality ratio and the causes of maternal death over a period of one year at a tertiary care teaching hospital of India. Methods: A retrospective hospital-based study of 25 maternal deaths over a period of 1 year.

1.Introduction- Maternal mortality is defined as the death of any woman while being pregnant or within 42 completed days of termination of pregnancy, irrespective of the duration or site of pregnancy, from any cause related to or aggravated by pregnancy, but not from accidental or incidental causes [1]. Maternal mortality is defined internationally, as maternal death rate per 1,00,000 live births. India is among those countries, which has a very high maternal mortality ratio. The maternal mortality ratio was 2000 per 1,00,000 live births in 1938, which declined to 1000 per 1,00,000 live births by 1959; it dropped down to 540 per 1,00,000 live births in 1999 [2]. It is estimated to be 103 per 1,00,000 live births in 2020. A population-based survey carried out in India, which used longitudinal surveillance and complete coverage of vital events, reported a MMR of 320 per 1, 00,000 live births in rural areas [3]. Pregnancy, although being considered a normal healthy state, carries serious risk of morbidity and at times death [4]. Maternal death has serious implications to the family, the society and the nation. It deprives the surviving infant of mother's care. One of the most important goals of the MDGs is to reduce maternal mortality. Hence this present study was conducted to review the existing maternal mortality ratio and the causes of maternal death at a tertiary care teaching hospital of northern India, so that corrective steps can be taken to reach the goal within the stipulated time frame. The major causes of maternal mortality are haemorrhage, hypertensive disorders, sepsis, obstructed labour and abortions. All of these causes are mostly preventable through proper understanding, diagnosis and management of labour complications. To reduce complications during

pregnancy and labour it is essential to strengthen primary health care infrastructure. Provision of antenatal and intrapartum health care in the community by trained health personnel, form the backbone of any such efforts. The purpose of this study was to analyse causes of maternal deaths and to identify preventable factors leading to maternal mortality in our setup.

2. Materials and Methods -

A retrospective hospital based study was carried out in the Obstetrics and Gynecology Department of Dr. Ram Manohar Lohia Institute Of medical Sciences - a tertiary level health care referral centre in, Lucknow, Uttar Pradesh, India over a period of 1 year. A total 25 maternal deaths were analyzed with the special emphasis on socio-demographic profile of the patient, parity, cause of death, time interval from admission to death, and trimester of pregnancy at the time of death. Results were analyzed by using percentage and proportion.

3. Results-

4. It is observed from table 1 that out of total 25 deaths, 9(36%) were in the age group of 30-34 years followed by 7 (28%) deaths in 25-29 years. According to B.G. Prasad's Classification [5], majority of maternal deaths (76%) belonged to lower class, followed by (24%) from the upper class. By occupation, (47.36%) maternal deaths were seen. Majority (68%) were illiterate and only (32%) had studied upto primary and secondary level.

Table 1: Distribution of maternal deaths according to socio demographic characteristics (n=25)

Socio-demographic characteristics	No. of maternal deaths	Percentage
Age		
20-24 yrs	6	24%
25-29 yrs	7	28%
30-34 yrs	9	36%
35 yrs & above	3	12%
Area of residence		
Urban	2	
Rural	23	
Socio-economic status		
Upper[I]		
Upper middle [II]		
Lower middle [III]		
Upper lower [IV]	6	24%
Lower[V]	19	76%
Education		
Illiterate	17	68%
Primary education	6	24%
Secondary education	2	8%
Higher secondary education		

As seen from table 2, out of total 25 deaths, 1 (4%) woman died within 1 hour of admission; 6 (24%) between 2-12 hours of admission; 3 (12%) between 13-24 hours of admission, 10 (40%), Maximum deaths between 25 hrs- 7 days of admission and 5 (20%) > 7 days of admission. The majority of deaths 17 (68%) occurred after delivery, 4 (16%) in ANC period and 4 (16%) after Abortion. By parity, 9 (36 %) were primigravidas and 14 (56%) were multigravidas.

Table 2: Distribution of maternal deaths by delivery related characteristics.

Variables	No. Of Maternal Deaths	Percentage
Time interval from admission to death (n=25)		
0-1 hrs	1	4%
2-12 hrs	6	24%
13-24 hrs	3	12%
25hrs-7days	10	40%
> 7days	5	20%
Delivery Status		
Delivered	17	68%
Un-Delivered	4	16%
Abortion	4	16%
Parity		
Primigravidas	9	36%
Multigravidas (2-4)	14	56%
Grand multi (>5)	2	8%

As evident from Table 3, both direct causes (76%)and indirect causes contributed to (24 %) of maternal deaths. Amongst the direct causes, 5 (20%) were due to hemorrhage, 4(16%) due to Eclampsia , 2(8%) due to Embolism 2(8%), and Septicemia accounted for 7 (28 %) of the deaths. Amongst the indirect causes,Anemia accounted for 2 (8%) deaths; heart disease for 2 (8%) deaths; and anemia also for 2 (8%) death.

Table 3: Causes of maternal deaths (n=25)

Cause of Death	No. Of maternal Deaths	Percentage
Direct Causes (n=19)		76%
1.Hemorrhage	5	20%
2.Eclampsia	4	16%
3.Embolism	2	8%
4.Sepsis	7	28%
5.ARDS	1	4%
Indirect Causes (n=6)		24%
1.Anemia	2	8%
2. Heart Disease	2	8%
3. CKD	2	8%

4. Discussion-

Death of mother is a tragic event. In practical life, it has a severe impact on the family, community and eventually, the nation. The young surviving children left motherless are unable to cope with daily living and are at an increased risk of death. Reduction of maternal mortality is the objective of MDGs, especially in low income countries, where one in 16 women die of pregnancy related complications[6] In the present study, there were 25 maternal deaths amongst 4901 deliveries, giving a MMR of 510.09 per 1,00,000 live births, which is higher than the national averages. Dr Ram Manohar Lohia Institute Of Medical Sciences, being a teaching institution and a tertiary care centre, get complicated cases from rural areas. Admissions of moribund cases referred from periphery have inflated this mortality ratio, like other teaching institutions of India. Other similar studies from tertiary care institution reported MMR ranged between 213 to 879 per 1,00,000 live births [7,8,9,10,11,12,13,14]. Majority women present with their pregnancy in the age group of 30-34 years. In the present study, Maximum deaths (36%) were in the age group of 30-34 years, followed by (28%) deaths in 25-29 years , similar to that reported by the other studies, Kaur et al [15] revealed that 51.8% of deaths in 20- 30 years, 19.6% in teenage pregnancies and 23.3% in >30 years; Taneja P [16] showed that 78% of deaths in 20-30 years; Sengupta et al [13] observed that 61% of deaths in 20-29 years, 28.62% of

deaths in >30 years and only 9.94% deaths in <19 years; Agarwal et al [17] noticed that 50% deaths in 20-25 years, 27% in 26-30 years, 12% in <19 years; Sikdar et al [18] reported that 23.5% deaths in <20 years; 54.5% in 21-30 years, 18.5% in >30 years, Dogra et al [19] revealed that 48% deaths in 20–25 years while 10.3% in >30 years. The reduction in the number of deaths in women <19 years of age is partly due to liberalization of abortion law (MTP Act), as a result of which many young women seek help from specialist doctors for legal abortions, thus reducing the number of criminal abortions and subsequently the deaths associated with its complications. In the present study, out of the 25 deaths, 9 (36%) deaths were among primigravidas and 14 (56%) among multigravidas, similar to that reported by the other studies, Agarwal et al [17] reported that high deaths among multiparas (43%) than the primiparas (25%); Sikdar et al [18] revealed that (25.5%) deaths in primigravidas and (74.5%) in multigravidas; Thomas et al [20] showed that primigravida contributing to 29.2% and multigravida 50.8% of deaths. Purandare et al [21] observed that out of the 30 deaths, 21 were multigravida and 9 were primigravidas. Too many and too close pregnancies together adversely affect the mother's health and have its roots in the social status of the woman. In the present study, one woman died within one hour of admission; 6 (24%) between 2-12 hours of admission; and 3 (12%) between 13-24 hours of admission and 10 (40%) between 25 hrs to 7 days of admission. Similar to that reported by the other studies, Sikdar et al [18] reported that 48 (19.7%) died within first 12 hours of admission and another 30 (12.5%) died within next 12 hours; 78 (32.2%) died within 1 day, 58 (23.8%) died within 1-3 days, 39 (16%) died in between 4 to 7 days. Agarwal et al [17] revealed that 44% died within 24 hours of admission and 22% within 12 hours of hospital stay; Purandare et al [21] showed that among the 30 deaths, 3 died within 30 minutes of admission, 14 died between 30 minutes and 6 hours, 7 died between 6 and 24 hours and remaining 6 died after 24 hours of admissions. In the present study, direct causes contributed to (76 %) of maternal death, indirect causes contributed to (24%). Common direct causes were hemorrhage (20%) (post-partum hemorrhage, ante-partum hemorrhage and abortion related hemorrhage), eclampsia (16%), pulmonary embolism (8%) sepsis (7%) (Puerperal sepsis, ante-partum sepsis and intra-partum sepsis) and ARDS (4%) and indirect causes were Anemia (8%), heart disease (8%), and CKD (8%). Similar to that reported by the other studies, Trivedi et al [12] reported that among indirect leading causes, hepatitis accounting for 29.43% of deaths. Bera et al [22] revealed that among the direct causes, hemorrhage contributed in 23.8% and sepsis for 16.4% deaths and among the indirect causes, jaundice resulted (19.9%), followed by anaemia and heart disease, with 5.9% and 3.4% deaths respectively. Sengupta et al [13] noticed that among the direct causes, haemorrhage (12.40%) and sepsis (17.82%) and among the indirect causes, hepatitis (29.93%) followed by anaemia (17.82%). Purandare et al [21] observed that among the direct causes, hemorrhage in 70.83% of deaths; followed by septicemia (3.3%) and among the indirect causes, anemia in 55.3%; hepatic disorders in 3.3% and pulmonary embolism accounting for 6.67%. Thomas et al [20] noticed that among the direct causes, hemorrhage in 20.15% and sepsis in 17.4% and among the indirect causes, hepatitis in 11.9% followed by (7.6%) pulmonary

5. Conclusion -

The MMR in our study is higher than the national averages. Most deaths could have been avoided with the help of early referral, quick, efficient and well equipped transport facilities, availability of adequate blood and blood components, and by promoting overall safe motherhood. Analysis of every maternal death through maternal death audit, either at community level (verbal autopsy) or at the institutional level should be carried out. It will help in identifying the reasons and deficiencies in health care delivery system that might contribute in causing pregnancy related deaths.

6. References-

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