Original Research Article

Study of maternal mortality at tertiary care centre

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Abstract

Background: Pregnancy although is considered as a physiological state, carries risk of serious maternal morbidity and at times mortality. This is due to various complications that may occur during pregnancy, labour or thereafter. Death of women in child birth or pregnancy related events are a devastating experience for a family and for surviving children. It is an indicator for women's status and inequality; it also reflects a country's development in relation to its health care system and socioeconomic-cultural development of that country. **Aim:** The objective of our study is to assess the incidence and various causes of maternal mortality, socioeconomic-demographic factors affecting maternal mortality and to assess preventive factors for maternal mortality in a tertiary care centre. **Methods:** A prospective observational study of maternal mortality at tertiary care centre done over a period of 2 year from 1 Dec 2017 to 1 Dec 2019. All maternal deaths studied in detail and results were analysed in percentage. **Results:** over the study period there were 22 maternal deaths and about 26966 live births, giving MMR of about 81.58, which is lower than national averages. In the study most of the deaths were in women of age group of 20-24 year, in illiterate women residing in rural area, in women from lower middle socioeconomic class, in primigravida and who were un-booked. Most of the deaths occurred in postpartum period and in women who were delivered by caesarean section and after 72 hours of hospital admission. Most of the deaths were due to direct causes. Haemorrhage, hypertensive disorder in pregnancy and sepsis forms the triad of direct causes of maternal death in our study. Pulmonary disease accounts for most common indirect cause of maternal death in our study. **Conclusion:** After this study it was concluded that haemorrhage has emerged as the leading cause of maternal deaths and can be prevented by proper antenatal care, intra-natal and postnatal care. Early detection of high risk pregnancy and timely referral is very important.
Keywords: haemorrhage, hypertensive disorder of pregnancy, maternal mortality, maternal mortality ratio, pulmonary disease, sepsis.

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INTRODUCTION

Parturition is a simple natural process, which can take a turn making it "lethal" for any patient, as it is rightly said 'NORMAL DELIVERY' is a retrospective terminology. Delivery is rebirth for all mothers. Pregnancy and childbirth is a universally celebrated event. Yet for many thousands of women it is a private hell that may well end into death. In most of the developing countries, maternal deaths are the tip of iceberg, which signal everyday tragedies of women's lives and reflect how world's poverty has been feminized. The current maternal mortality ratio (MMR) in Maharashtra is 104/100000 live births, ranking 3rd in India. There is scope for reducing it as majority of the causes of MMR are preventable and curable. A woman dies as a result of complication arising during pregnancy and childbirth every 90 seconds in the world, and every 7 minutes in India. The majority of these deaths are avoidable.

WHO defines maternal death as "the death of a woman while pregnant or within 42 days of termination of

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pregnancy, irrespective of the site and duration of pregnancy, from any cause related to or aggravated by the pregnancy or its management but not by accidental or incidental cause .” There are two groups of maternal deaths: Direct obstetric deaths, resulting from obstetric complications of the pregnant state (pregnancy, labour, delivery, postpartum), from interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above; and indirect obstetric deaths, resulting from previous existing disease or disease that developed during pregnancy and which was not due to direct causes, but which was aggravated by physiologic effects of pregnancy. Examples of such diseases include malaria, anaemia, HIV/AIDS, and cardiovascular disease. The ICD-10 also includes a category for "late maternal death," which is defined as: "the death of a woman from direct or indirect obstetric causes more than 42 days but less than one year after termination of pregnancy." The category, "pregnancy-related death," is used for deaths in which cause is unclear. It is defined as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death."

MATERNAL MORTALITY RATIO- MMR is number of maternal deaths during any given time period per 1,00,000 live births during same time period.

MMR = Total number of maternal deaths/ Total number of live births × 1,00,000

MMR acts as a litmus paper of general health of a country and is a measure of risk of death once a woman becomes pregnant. MMR is a very sensitive index that reflects the quality of reproductive care provided to the pregnant women. The reasons for Women death in pregnancy and child birth are multifaceted. Apart from medical causes, there are logistic causes, failures in the health care system, and lack of transport. Social, cultural and political factors influence the status of women, their health, fertility and health seeking behaviour.

Who kills the mother? It’s the delay that kills the mother. Maternal mortality in resource-poor nations has been attributed to 4 delays:

1. Delay in recognition of the problem.
2. Delay in deciding to seek care.
3. Delay in reaching care in time (i.e. delay in transport).
4. Delay in receiving adequate treatment at tertiary care centre.

MATERIALS AND METHODS

This is a prospective observational study carried out in the department of obstetrics and gynaecology at tertiary care centre of swami ramanand teerth rural government medical college (S.R.T.R.G.M.C), Ambajogai, during the time period of 2 years from 1 December 2017 to 1 December 2019. During the study period there occurred about 22 maternal deaths and about 26966 live births, giving MMR of about 81.58, which is lower than national averages. All maternal deaths occurring in a two-year study period, in the tertiary care centre were traced and interviews were taken from the relatives as well as the health care providers who were present at the time of death of the woman. Written informed consent taken from patient’s relatives regarding its confidentiality. A case record form containing information regarding patient in the form of name, age, place of residence, occupation, education, per capita income, socioeconomic status, gravida /parity, antenatal supervision, past medical and surgical history, general physical examination and systemic examination, all investigations which were done, date and time of delivery, date and time of death, cause of death is filled. Results were analysed using percentage and compared with other studies

RESULT

Table 1: year wise maternal deaths, live births and maternal mortality ratio(MMR)

YEAR	MATTERNAL DEATH	LIVE BIRTH	MMR
2017	6	7744	77.47
2018	8	10347	77.31
2019	8	8875	90.14
Total	**22**	**26966**	**81.58**

Table 2: Age wise Distributions of Maternal Deaths

Age (years)	No. of Cases	Percentage (%)
≤19	1	4.55
20-24	14	63.63
25-29	5	22.72
≥30	2	9.09
Total	**22**	**100**

Table 3: Distribution of Maternal deaths according to their literacy status

Literacy status	No of cases	Percentage (%)
Illiterate	14	63.64
literate	8	36.36
Total	**22**	**100**

Table 4: Distribution of maternal deaths according to their socioeconomic status

Class	No of cases	Percentage (%)
Upper	0	0
Upper middle	4	18.18
Lower middle	10	45.45
Upper lower	8	36.36
Lower	0	0

Table 5: Distribution of maternal deaths according to their place of residence

Class	No of cases	Percentage (%)
Urban	5	22.72
Rural	17	77.27
Total	**22**	**100**

Table 6: Distribution of maternal deaths according to their antenatal supervision

Antenatal supervision	No of cases	Percentage (%)
Booked	7	31.81
Unbooked	15	68.18
Total	**22**	**100**

Table 7: Distribution of maternal deaths according to their gravida / parity status

Gravida / Parity	No. of cases	Percentage (%)
1	11	50
2	5	22.72
3	4	18.18
4 and above	2	9.09
Total	**22**	**100**

Table 8: Admission – Death interval of maternal deaths

Admission – Death interval	No of cases	Percentage (%)
<6 hours	4	18.18
7-24 hours	4	18.18
25-48 hours	2	9.09
49-72 hours	4	18.18
>72 hours	8	36.36
Total	**22**	**100**

Table 9: Distribution of maternal deaths according to mode of delivery

Mode of delivery	No of cases	Percentage(%)
Undelivered	2	9.09
Vaginal delivery	8	36.36
LSCS	12	54.54
Total	**22**	**100**

Table 10: Distribution of maternal death according to Status of patients at the time of death

Status of patient	No. of cases	Percentage (%)
Antepartum	2	9.09
Intrapartum	0	0
postpartum	20	90.90
Total	**22**	**100**

Table 11: Causes of maternal death

Causes of maternal deaths	No. of cases	Percentage (%)
Direct causes	15	68.18
Indirect causes	7	31.81
Total	**22**	**100**

DISCUSSION

In the present study, during the study period there occurred about 22 maternal deaths and about 26966 live births, giving MMR of about 81.58, which is lower than national averages. A total of 22 maternal deaths were analysed with special emphasis on age, literacy status, place of residence, socioeconomic-demographic profile of the patient, antenatal care, parity, time interval from admission to death, cause of death, mode of delivery, status of patient at the time of death and communication facility and delay if any in reaching the tertiary care centre from primary care centre. The findings of the study were compared with the other studies as follow: In the present study maximum maternal deaths (63.63%) were in age group of 20-24 year, this is comparable with the study of M Vijaysree *et al.*[8] and Dr Bhaurao Yadav *et al.*[16] as in their study also maximum maternal deaths i.e. about 55.27% and 40.74% respectively were from same age group but in study of Dr Olopade *et al.*[2] maximum maternal deaths (41.7%) were in the age group of 25-29 years. In the present study maximum maternal deaths (63.64%)were in women who were illiterate. This is comparable with the study of M Vijayasree *et al.*[8] and Dr Madhuri badrinath *et al.*[11], in their study also maximum deaths were from illiterate group i.e. 57.9% and 88.88% respectively. But this is in contrast to study of Dr Anjanadevi santpure *et al.*[12], in her study maximum deaths were in literate group (55.21%). According to Place of Residence, maximum maternal deaths were from rural areas. Out of 22 maternal deaths, 17 (77.27%) were from rural area while only 5 (22.72%) were from urban area. Comparing this with study of M Vijayasree *et al.*[8], in which all deaths(100%) were from rural area. Similarly, Anjanadevi Santpure *et al.*[12], in her study, illustrates that maximum maternal deaths were from rural area (85.07%). But, study of Dr Shabana Sultan *et al.*[7] shows major discrepancy in which maximum maternal deaths occurred in women from urban area (65.68%). As per antenatal supervision in our study, maximum numbers of of maternal deaths were in women who have not taken any antenatal supervision(unbooked). Out of total 22 maternal deaths, 15 women (68.18%) were unbooked. This is comaparable with study of M Vijayasree *et al.*[8], Dr Anjanadevi Santpure *et al.*[12] and Dr Shabana Sultan *et al.*[7] in which maximum maternal deaths were in women who had not received any antenatal supervision (unbooked) in percentage 71.06%, 68.65% and 92% respectively. As per gravida/parity status in our study maximum maternal deaths have occurred in primigravida. Out of 22 deaths, 11 were in primigravida(50%). Similar results seen in the study of Dr Bhaurao Yadav *et al.*[16], Dr Jessica Celina Fernandes *et al.*[9] and Dr Olopade *et al.*[2] i.e. 51,85%, 38.63% and 39.3% respectively. If we consider admission to death interval, in our study maximum maternal deaths were seen in women after 72 hours of hospital admission. Out of total 22 maternal deaths, 8 maternal deaths (36.36%) occurred after 72 hours of hospital admission, 2(9.09%) maternal deaths between 25-48 hours of hospital admission and 4 maternal deaths(18.18%) in each group of less than 6 hours, 7-24 hours and 49-72 hours of hospital admission. In contrast to our study, in study of Dr Shabana Sultan *et al.*[7] maximum maternal deaths (40.5%) were seen in women within 6 hours of hospital admission. Considering socioeconomic status of women, in our study we observed that maximum maternal deaths(45.45%) were observed in lower middle socioeconomic class of modified kuppuswamy scale as opposed to study of Dr Ganesh Tondage *et al.*[17], in which maximum maternal deaths(66.6%) were seen in women with lower socioeconomic class. When we see mode of delivery, in our study maximum deaths were seen in women who delivered by caesarean section. In our study, 54.54% were delivered by caesarean section and 36.36% by normal delivery and 9.09% died without delivering in ANC period. Similarly, Dr Jessica Celina Fernandes's *et al.*[9] study, maximum maternal deaths were attributed to caesarean section (47.7%). Contrastingly, Dr Saini V *et al.*[10] showed in his study that maximum maternal deaths occurred in women who underwent normal delivery (42.2%). Taking into account, the status of patient at the time of death, in our study maximum number of maternal deaths occurred in postpartum period (90.90%), 9.09% in antepartum period and none in the intrapartum period. Similarly, Dr Bhaurao Yadav *et al.*[16] and Dr Saini V *et al.*[10] studies show 81.48%, 18.51%, 0% and 66.2%, 33.7%, 0% for post, ante and intrapartum period respectively. But, Dr Yadav K *et al.*[3] found in his study that 72.16% maternal deaths were in postpartum period, 21.64 in antepartum and 6.18% in intrapartum period. In our study, maternal deaths due to direct causes were 68.18% and 31.81% due to indirect causes. Likewise, study of Dr Monica Soni *et al.*[13] and Dr Anjanadevi santpure *et al.*[12] found in her study that maximum maternal deaths (72.22%) and (59.69%) respectively were due to direct causes. As opposed to this,

Dr Vijayasree *et al.*[8] study says that direct and indirect causes account for 50% each of the maternal deaths. When it comes to direct causes, triad of haemorrhage, hypertensive disorder in pregnancy and sepsis is mostly responsible. In our study, out of death due to direct causes, 27.27% were due to haemorrhage, 22.72% due to hypertensive disorder in pregnancy and 18.18% due to sepsis while these numbers change to 35.82%(haemorrhage), 14.92% (hypertensive disorder in pregnancy) and 8.95% (sepsis) in Dr Anjanadevi Santpure's *et al.*[12] study, 37.96 %(haemorrhage), 15.74%(hypertensive disorder in pregnancy), 10.19%(sepsis), 1.82% (unsafe abortion) and 6.48% (other causes) in Dr Monica Soni's *et al.*[13] study, 21.05%(haemorrhage), 10.52%(hypertensive disorder in pregnancy), 10.52%(embolism) and 7.89%(sepsis) in Dr M Vijayasree *et al.*[8] study. Considering maternal deaths due to indirect causes like anaemia, pulmonary disease, hepatic disease, the most common cause in our study was pulmonary disease, anemia in Dr Anjanadevi Santpure *et al.*[12] study and Dr Monica Soni *et al.*[13] study and hepatic disease in Dr M Vijayasree *et al.*[8] study.

CONCLUSION

Causes of maternal death are beyond medical care. So we have to act at medical, social, economical, transport and cultural levels also. So its delay at all levels play main role in maternal death. Avoiding delay at all levels is most important preventive measure to prevent maternal deaths, so overall to decrease maternal mortality. 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.

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