

MATERNAL MORTALITY: A RETROSPECTIVE STUDY IN A TERTIARY CENTREP. V. Raghava Rao¹, Potharaju Jayanthi²**HOW TO CITE THIS ARTICLE:**

P. V. Raghava Rao, Potharaju Jayanthi. "Maternal Mortality: A Retrospective Study in a Tertiary Centre". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 14, February 16; Page: 2247-2254, DOI: 10.14260/jemds/2015/326

ABSTRACT: AIMS AND OBJECTIVES: Maternal death is a preventable tragedy. The aim of this study is to analyze the causes of maternal mortality in a tertiary centre. **MATERIAL AND METHODS:** The study was conducted by reviewing the records for maternal deaths over the period of one year 1-08-2013 to 31-07-2014 in the Department of Obstetrics and Gynecology, Guntur Medical College, Guntur. Every maternal death was scrutinized for various aspects likely to be related to death such as age, locality of residence, antenatal care, admission death interval and the cause of death. **RESULTS:** The maternal mortality in the present study is 788/ 1 lakh live births. There were 62 maternal deaths in the study period. Most deaths occurred in the 20-25 age group. 51.6% of deaths occurred in the first seventy two hours after admission. Hypertensive disorders (25.80%) and hemorrhage (12.5%) are the two most common direct causes of maternal death. Post-operative and post abortal sepsis, amniotic fluid embolism, pulmonary embolism and peripartum cardiomyopathy are the other direct causes. Indirect causes of maternal deaths were seen in 34.9% of the cases. Hepatitis (9.64%), severe anemia is the two leading indirect causes of maternal deaths. **CONCLUSION:** Most of the maternal deaths can be prevented if the high risk antenatal women are identified earlier and referred to the tertiary centre earlier for diagnosis and management

KEYWORDS: Maternal mortality, Hemorrhage, Hypertensive disorders.

INTRODUCTION: Maternal death is the death of a woman while pregnant or within 42 days of termination of pregnancy irrespective of the duration and site of pregnancy from any cause related to or aggravated by the pregnancy, but not from accidental or incidental causes.⁽¹⁾

In India approximately 28 million women experience pregnancy and 26 million have live births. An estimated 67000 maternal deaths and 1 million newborn deaths occur each year. India has observed appreciable decline in MMR from 677 in 1980 to 254 in 2005-06 and to 212 in 2007-09. National Rural Health Mission and MDG5 target to reduce MMR to less than 100 by 2015.⁽²⁾

Women play a pivotal role in the family and pregnancy care should culminate in a healthy mother and healthy baby and our endeavour should be to bring down the MMR to less than 100 by 2015 as set in the MDG5 document.⁽³⁾

AIMS AND OBJECTIVES: The current study is a retrospective study of maternal deaths in a tertiary care centre, Guntur, Andhra Pradesh for a period of one year from 1-08-2013 to 31-07-2014 with an aim to study the maternal mortality and the complications leading to maternal deaths.

MATERIAL AND METHODS: The study was conducted by reviewing the records of maternal deaths over the period of one year 1-08-2013 to 31-07-2014 in the Department of Obstetrics and Gynecology, Guntur Medical College, Guntur. Every maternal death was scrutinized for various

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aspects likely to be related to death such as age, locality of residence, antenatal care, admission death interval and the cause of death and the data was analyzed to study the cause and complications leading to maternal deaths.

RESULTS: The data of maternal deaths from the tertiary centre have been tabulated as follows.

| Sl. No. | Total no. of deliveries | Total no. of live births | Total no. of maternal deaths | Maternal mortality ratio |
|---------|-------------------------|--------------------------|------------------------------|----------------------------|
| 1. | 8072 | 7862 | 62 | 788 per 1 lakh live births |

Table I: Maternal mortality ratio in the tertiary centre from 1-08-2013 to 31-07-2014

| | Group | Maternal deaths | Percentage % |
|----------------|----------|-----------------|--------------|
| Age (years) | 15-19 | 4 | 6.45% |
| | 20-24 | 45 | 72.58% |
| | 25-29 | 8 | 12.90% |
| | 30-34 | 5 | 8.06% |
| Antenatal care | Booked | 3 | 4.83% |
| | Unbooked | 59 | 95.17% |
| Locality | Rural | 55 | 88.7% |
| | Urban | 7 | 11.29% |

Table II: Maternal deaths and it's characteristics depending upon age, antenatal care, locality (n=62)

| Sl. No. | Referral hospital | No. of cases referred (n=62) | Percentage % |
|---------|-------------------------|------------------------------|--------------|
| 1 | Primary health centre | 29 | 47% |
| 2 | Community health centre | 18 | 29% |
| 3 | District hospital | 7 | 11.2% |
| 4 | Teaching hospital | 4 | 6.4% |
| 5 | Private hospital | 1 | 1.6% |
| 6 | Directly from home | 3 | 4.8% |

Table III: Maternal deaths in relation to referral from other places

| Sl. No. | Time interval | No. of cases | Percentage % |
|---------|-----------------|--------------|--------------|
| 1 | 0-24 hrs | 13 | 20.96% |
| 2 | 24-48 hrs | 5 | 8.06% |
| 3 | 48-72 hrs | 14 | 22.58% |
| 4 | 72-96 hrs | 13 | 20.96% |
| 5 | >96 hrs<42 days | 17 | 27.41% |

Table IV: Time interval between maternal admission and death

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| Sl. No. | Route of delivery | No. of cases | Percentage % |
|---------|-------------------|--------------|--------------|
| 1 | Vaginal delivery | 37 | 60% |
| 2 | LSCS delivery | 13 | 21% |
| 3 | Not delivered | 12 | 19% |
| 4 | Total | 62 | 100% |

Table V: Maternal deaths in relation to the route of delivery

| Sl. No. | Status of mother | No. of cases | Percentage % |
|---------|------------------|--------------|--------------|
| 1 | Post abortal | 1 | 1.6% |
| 2 | Ante partum | 12 | 19.4% |
| 3 | Intra partum | 0 | - |
| 4 | Post-partum | 49 | 79% |
| 5 | Total | 62 | 100% |

Table VI: Status of the mother at the time of death (n=62)

| Sl. No. | Cause of Death | No. of cases | Percentage % |
|---------|--|--------------|---------------|
| 1 | Antepartum eclampsia | 7 | 11.29% |
| 2 | Intrapartum eclampsia | 1 | 1.61% |
| 3 | Post-partum eclampsia | 4 | 6.45% |
| 4 | Severe Preeclampsia with HELPP | 3 | 4.83% |
| 5 | Severe preeclampsia with CCF | 1 | 1.61% |
| 6 | Atonic PPH | 4 | 6.45% |
| 7 | Abruptio placenta | 4 | 6.45% |
| 8 | Post-operative intra peritoneal hemorrhage | 2 | 4.83% |
| 9 | Obstructed labour with rupture uterus | 1 | 1.61% |
| 10 | Adherent placenta with hemorrhagic shock | 1 | 1.61% |
| 11 | Post-operative LSCS with sepsis | 2 | 3.22% |
| 12 | Post abortal sepsis | 2 | 3.22% |
| 13 | Pulmonary embolism | 3 | 4.83% |
| 14 | Amniotic fluid embolism | 3 | 4.83% |
| 15 | Postpartum cardiomyopathy | 1 | 1.61% |
| | Total | 40 | 64.51% |

**Table VII: Direct causes of maternal mortality
(Total no. of maternal deaths n=62)**

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| Sl. No. | Cause of Maternal Death | Number of deaths | Percentage % |
|---------|---|------------------|---------------|
| 1 | Hepatitis | 6 | 9.64% |
| 2 | Severe anemia | 4 | 6.45% |
| 3 | Heart disease | 3 | 4.83% |
| 4 | Portal hypertension with hematemesis | 2 | 3.22% |
| 5 | Guillain Barre Syndrome | 2 | 3.22% |
| 6 | Chronic renal failure with cerebrovascular accident | 1 | 1.61% |
| 7 | Severe acute bronchial asthma | 1 | 1.61% |
| 8 | Pneumonia with ARDS | 1 | 1.61% |
| 9 | Blood transfusion reaction with ARF | 1 | 1.61% |
| 10 | Yolk sac tumour complicating pregnancy | 1 | 1.61% |
| | Total | 22 | 35.49% |

**Table VIII: Indirect causes of maternal mortality
(Total no.of maternal deaths n=62)**

During the study period there are 62 maternal deaths out of 8072 deliveries and 7862 live births giving an MMR of 778 per 1 lakh live births (TABLE I). Only 3 (4.9%) cases were booked and 59 (95.1%) cases were unbooked. 55(89%) women were from rural areas and 7(11%) were from urban areas. 45(69.3%) deaths were in the 20-24 age group. 8(12.9%) were in the 25-29 age group. 5(8.1%) maternal deaths were in 30-34 age group and 4(4.8%) were in the 15-19 age group. (TABLEII)

29(47%) women were referred from primary health centre. 18(29%) were referred from community health centre. 7(11.2%) were referred from district hospital. 4(6.4%) were referred from other teaching hospitals and 1(1.6%) from private hospital. Only 3(4.8%) women came directly from home. (TABLE III)

13 (20.96%) maternal deaths occurred within 24 hours of admission into the hospital. 5 (8.06%) died within 24-48 hours. 14(22.58%) died within 48-72 hours and 13(20.96%) within 72-96 hours. 17 (27.41%) died after 96 hours-< 42 days. (TABLE IV)

37(60%) women had vaginal delivery prior to death. 13(21%) had a caesarean section prior to death. 12(19%) died undelivered. (TABLE V)

49 (79%) of these deaths were in the post-partum period.12 (19.4%) deaths were in the ante partum period. 2 (3.2%) of the deaths were due to post abortal sepsis. (TABLE VI)

Analysis of the direct causes of maternal deaths revealed that eclampsia and hypertensive disorders of pregnancy are the leading causes of death. Out of 62 deaths, 7(11.29%) were due to antepartum eclampsia. 4 (6.45%) were due to post-partum eclampsia. 1(1.61%) was due to intrapartum eclampsia. Severe preeclampsia with HELLP syndrome was associated with 3(4.83%) deaths. Severe Preeclampsia with congestive cardiac failure was associated with 1(1.61%) maternal death.

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Of the hemorrhages, atonic PPH was associated with 4(6.45%) maternal deaths. Abruptio placenta was associated with 4(6.45%) maternal deaths and post-operative intra peritoneal hemorrhage was associated with 3(4.83%) and obstructed labour with rupture uterus was associated with 1(1.61%) maternal death. Adherent placenta with hemorrhagic shock was the cause of death in 1(1.6%) case.

Post-operative caesarean section with burst abdomen and septic shock was the direct cause of maternal death in 2(3.22%) cases. Post abortal sepsis was the cause of maternal death in 2 (3.22%) cases.

Amniotic fluid embolism was the suspected cause of death in 3(4.83%) cases. Pulmonary embolism with post-partum collapse was associated with maternal death in 3(4.83%) cases. Peripartum cardiomyopathy was associated with 1(1.6%) maternal death. (TABLE VII)

Analysis of indirect causes of maternal deaths revealed that Jaundice is associated with 6(9.67%) and anemia was a contributory factor in 4(6.45%) maternal deaths. Portal hypertension with hematemesis was the cause of maternal death in 2(3.22%) cases. Heart disease was associated with 3(4.83%) cases. Blood transfusion reaction, bronchial asthma, yolk sac tumour complicating pregnancy, pneumonia with adult respiratory distress syndrome, chronic renal failure with cerebrovascular accident contributed to 1(1.61%) maternal death each. Guillain Barre Syndrome was associated with 2(3.22%) maternal deaths.

DISCUSSION: The maternal mortality ratio in our present study is 788 per 1 lakh live births. Other studies from tertiary care centres reported a mortality rate of 371-4286/1 lakh live births. Most of the women are from far off places resulting in delayed intervention and were in poor general condition at the time of admission.⁽⁴⁾

In India at present most maternal deaths take place in institutions.⁽⁵⁾ Tertiary care governments's teaching and non-teaching institutions are involved. Poor outcome are mainly due to "Delay I" and "Delay II" though the relatives expect excellent outcomes even with moribund status of patient.⁽¹⁾

Most deaths occurred in 20-25 age group. This is consistent with other studies which reported that most deaths occurred in 21-30 years age group.⁽⁶⁾

51.6% of deaths occurred in the first 72 hours of admission. In another study it has been reported that 63% of deaths occurred in the first 24 hours of delivery.⁽⁷⁾ 79% of maternal deaths occurred in the post-partum period. This is consistent with a study done by Khumathem PD et al, who reported that post-partum deaths account for 70% of maternal deaths.⁽⁸⁾

95.16% of maternal deaths occurred in patients referred from primary health centres, community health centres, district hospitals and private hospitals after the onset of complications. Early diagnosis of complicating factors in pregnancy and early referral of high risk patients to the tertiary centres can go a long way in preventing maternal deaths.

The most common direct cause of maternal death are hypertensive disorders in pregnancy (25.80%) and obstetric hemorrhage accounts for about 12.9% of maternal deaths. This is consistent with other studies, which reported that eclampsia and preeclampsia accounted for 31.4% of deaths while obstetric hemorrhage stood second at 14.5%.⁽⁷⁾ Eclampsia (24.09%), severe preeclampsia (5.45%) and obstetric hemorrhage(21.56%) were the leading direct causes of maternal death in a study done by Konar H et al.⁽⁹⁾

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Indirect causes accounted for 35.49% of maternal deaths in our study. Indirect causes accounted for 28% of maternal deaths as mentioned in WHO fact sheet 2014.⁽¹⁰⁾ Jaundice and portal hypertension with hematemesis accounted for 9.67% and 3.22% of maternal deaths respectively. In other studies hepatitis accounted for 4.16-10.8% of deaths.^(4,6) Severe anemia accounted for 6.45% of cases of indirect cause of maternal deaths. Severe anaemia as a cause of death has been reported in 19.8% of cases in another study.⁽⁷⁾ Rheumatic heart disease was the cause of death in 4.83% of cases and it is similar to other studies which reported it as 3.75%.⁽⁸⁾ Significant proportion of mothers died because of medical disorders in pregnancy. It is a heterogeneous condition that needs a physician or obstetrician trained in medical disorders in pregnancy for improving maternal outcome.⁽¹¹⁾

Most maternal deaths are preventable as the health care solutions to prevent or manage complications are well known. All women need access to antenatal care in pregnancy, skilled care during child birth, care and support in the weeks after child birth. It is important that all births are attended by a skilled health professional for better maternal and fetal outcome.

Preeclampsia should be detected and appropriately managed before the onset of convulsions and other life threatening complications. Administering drugs such as magnesium sulfate for severe preeclampsia can lower a woman's risk of developing eclampsia. Severe bleeding after birth can kill a woman in a short time if unattended. Injecting oxytocin immediately after child birth effectively reduces the risk of post-partum hemorrhage. Puerperal sepsis can be eliminated if good hygiene is practised and if early signs of infection are recognised and treated in a timely manner. To avoid abortion related maternal deaths all women including adolescents need access to contraception, safe abortion services delivered by qualified medical personnel and quality post abortal care.⁽¹²⁾

Obstructed labour can be prevented by use of a partogram during labour and more importantly treatment including caesarean section facility must be available to all women in labour. Prevention of pregnancy associated anemia by iron supplementation will be helpful in preventing maternal deaths due to severe anemia. Blood transfusion facilities and emergency transport in case of need are vital for preventing maternal deaths. Emergency obstetric care services need to be strengthened at community health centres and district hospitals to avoid the time delay in accessing the tertiary care hospitals in an obstetric emergency.

When the mother is brought dead to the hospital or where the cause of death cannot be reasonably be ascertained, autopsy would help in knowing the cause of death. When maternal death is a consequence of unsafe or criminal abortion, medico legal autopsy would be advisable though not widely practiced. Maternal Death Review, which is being implemented at the community level, facility level, district and state level can throw light in identifying gaps in the existing health care delivery system, prioritize and plan for interventional strategies and help to reconfigure the health services to prevent maternal deaths.

CONCLUSION: Maternal death is an avoidable tragedy and most often maternal deaths are due to three delays: delay in deciding to seek care, delaying in reaching care in time, and delay in receiving treatment. Maternal deaths are still high when compared to the developed part of the world. Government of India has initiated the JSY (Janani Suraksha Yojana) scheme and encourages rural women for institutional delivery with incentives, care through ASHA workers, and NRHM encourages skilled birth attendants for partograph management of labour. Maternal deaths due to hypertensive disorders in pregnancy, obstetric hemorrhages, medical disorders in pregnancy like severe anemia,

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hepatitis, heart disease can be prevented to a large extent only if antenatal women with high risk factors are motivated to attend a tertiary care centre at an early date, for early diagnosis, admission and management. Health education of the community, good quality health care, early referral, availability of blood, and improvement in transport facilities can prevent many deaths.

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FINANCIAL OR OTHER**COMPETING INTERESTS:** None**NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:**

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Date of Submission: 04/02/2015.
Date of Peer Review: 05/02/2015.
Date of Acceptance: 07/02/2015.
Date of Publishing: 13/02/2015.