

STUDY OF MATERNAL MORTALITY AT A TERTIARY REFERRAL CENTER

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ABSTRACT

BACKGROUND

Epidemiological data pertaining to maternal mortality is valuable in each set up to design interventional programs to favourably reduce the ratio. This study was done to evaluate the maternal mortality rate in our hospital, to assess the causes of maternal mortality.

MATERIALS AND METHODS

This is a longitudinal prospective study. Study group: consisting of 50 cases of maternal deaths. Study period: 13 months i.e., from November 2016 to November 2017. This study was carried out at Government general hospital Kakinada attached to Rangaraya Medical College, Kakinada.

RESULTS

In this study, 10% maternal deaths seen in 1st trimester of pregnancy. 10% maternal deaths before delivery. 80% maternal deaths occurred after delivery. Among these, 60% maternal deaths after lower segment caesarean section. 20% maternal deaths after normal vaginal delivery. In this study, direct causes of maternal mortality 66%. Among these: preeclampsia - 15 cases (30%), Haemorrhage - 9 cases (18%), Infections – 4 cases (8%). Indirect causes of maternal mortality 34%. In these Anaemia – 4 cases (8%), Jaundice – 4 cases (8%). 60% maternal deaths are referral cases.

CONCLUSION

In our hospital, maternal mortality rate is 437 per 100,000 live births. It is very high because, in this center most of the cases. About 60% are referral cases from surrounding area. Unbooked cases are 74%. Most of cases about 70% cases are from rural area. Among these, 80% maternal deaths occurred after delivery. 60% maternal deaths occurred after lower segment caesarean section. 20% maternal deaths occurred after vaginal delivery. In this study 66% maternal deaths occurred because of direct cause. Among these Preeclampsia (15) cases - 30%, Haemorrhage (9) cases - 18%, Infection (4) cases - 8%. In our study indirect causes of maternal deaths 34%. Among these, anaemia (4) cases - 8%, jaundice (4) cases - 8%.

KEYWORDS

Maternal Mortality Rate (MMR), Maternal Mortality, Lower Segment Caesarean Section (LSCS), Preeclampsia, Haemorrhage.

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BACKGROUND

The stand of medical health of a country is assessed by maternal and perinatal death rates. Maternal mortality is defined as death of any woman while being pregnant or within 42 completed days of termination of pregnancy irrespective of anaemia, duration or site of pregnancy, from any cause related to aggravated by pregnancy but not from accidental or incidental causes (ICD-10).

About 99% of these women are from developing world with over 90% concentrated in Asia and Africa.¹

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Maternal mortality defined internationally as, "maternal death rates per 100000 live births". India is among those which has high mortality. Maternal mortality rate for the study period was calculated by using formula,

$MMR = \frac{\text{Total no of maternal deaths}}{\text{total no of live births}} \times 100000.$

Mean Maternal Mortality Ratio: For the study period was calculated by calculating, "the mean of yearly MMR of the entire study period".

The tragedy of the situation is that these deaths are largely preventable. The progress in maternal health has been uneven, inequitable, and unsatisfactory.²

Aim of the Study

- To calculate the maternal mortality in our hospital.
- To analyse the risk group for maternal mortality.
- To analyse the cause for maternal mortality in our hospital.

MATERIAL AND METHODS

This is a longitudinal prospective study. Study group: consisting of 50 cases of maternal deaths. Study period: 13 months i.e., from November 2016 to November 2017.

This study was carried out at Government general hospital Kakinada attached to Rangaraya Medical College, Kakinada.

Inclusion Criteria

- Pregnant woman who delivered either by vaginal or caesarean section.
- Delivered outside hospital and referred, or delivered in GGH, Kakinada.
- Pregnant woman from rural or urban background.
- Who are willing to participate.
- Booked and unbooked cases in hospital.

Exclusion Criteria

- Woman who are not willing to participate.
- Woman died after 42 days after delivery.
- And woman not died to pregnancy related problems.

RESULTS

During the study period November 2016 to November 2017 total period 13 months there were total of 11,438 live births and 50 maternal deaths.

The mean mortality rate in the study period was 437/100000 live births.

Patient Characteristics	Classification	No. of Cases	%
parity	Primi	24	48%
	Multi	26	52%
residence	Rural	35	70%
	Urban	15	30%
Antenatal status	Booked	13	26%
	Unbooked	37	74%
Referral cases		30	60%
Tribal cases		5	10%

Table 1. The epidemiological Characteristics of Maternal Deaths

Maximum maternal deaths reported from rural areas that is 70% compared to 30% from urban areas. Most of the deaths are from unbooked cases (74%). Deaths from booked cases only (26%). According to parity, deaths occurring in: Primi gravida are 48%, Multigravida are 52%. However, significant number of maternal deaths were reported from referral cases that is 60%, among these 10% are tribal cases.

Classification	No. of Cases	Percentage
1 st trimester	5	10%
2 nd trimester	Nil	Nil
3 rd trimester	45	90%
Before delivery	5	10%
After delivery	40	80%
Vaginal delivery	10	20%
Lower segment caesarean section	30	60%

Table 2. Relation between Pregnant Status and Maternal Deaths

In the present study, 1st trimester maternal deaths are 10%. 2nd trimester maternal deaths are nil. 3rd trimester maternal deaths were 90%. Among these, 10% maternal deaths occurred before delivery. 80% maternal deaths occurred after delivery. It indicates safe period during pregnancy was 2nd trimester. And risk period is more after delivery. In the present study, 60% maternal deaths occurred after lower segment caesarean section when compared 20% deaths after vaginal delivery. It indicates that caesarean section increases the chances of maternal mortality more than vaginal delivery. In our present study, direct cause of maternal death was 33 (66%).

Disease	No. of Cases	Percentage
Preeclampsia	15	30%
Haemorrhage	9	18%
Infection	4	8%
Amniotic fluid embolism	3	6%
Postoperative aspiration	2	4%

Table 3. Distribution of Direct Causes of Maternal Deaths

In the study period, 66% maternal deaths were due to direct cause. Among these, highest number of about 15 cases (30%) maternal deaths predisposing factor is preeclampsia followed by haemorrhage in 9 cases (18%), infection 4 cases (8%). amniotic fluid embolism 3 cases (6%) post-operative infection of gastric contents leads to sudden cardiac arrest in 2 cases (4%) in this study period, indirect cause of maternal deaths 18 cases that is 36%. In this jaundice 4(8%), anaemia 4 cases (8%), sudden cardiac arrest 3 that is 6%.

Disease	No. of Cases	Percentage
Anaemia	4	8%
Jaundice	4	8%
Sudden cardiac arrest	3	6%
Heart disease	1	2%
Blood transfusion reaction	1	2%
Gastroenteritis with AKI	1	2%
Thyrotoxicosis with atrial fibrillation	1	2%
Sickle cell anaemia with crisis	1	2%
ARDS with pneumonia	1	2%
Postoperative intestinal obstruction	1	2%

Table 4. Distribution of Indirect Causes of Maternal Deaths

In indirect causes of maternal death, jaundice 4 cases (8%) followed by anaemia 4 cases (8%) followed by sudden cardiac arrest 3(6%) are common.

DISCUSSION

According to the World Health Organisation (WHO), "a Maternal Death is defined as a death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of pregnancy or its management "(ICD-10).

United Nation (UN) report card on Millennium Development Goal -5 concluded that the progress shown by the South Asian countries including INDIA which accounts for 25% of all maternal deaths is also not impressive.³

The sensitive index of the quality of health care system connecting as a whole or part is reflected by its Maternal or Perinatal Mortality Rates.⁴ The mean maternal mortality in the study period is 437/100000 live births. It is very high. The current MMR is 176/100000 live births.

Various studies done in India in the last 15 years there is wide variation in MMR ranging from 47/100000 to 625/100000.⁵ In our study we have comparatively high MMR which could be due to the fact that our hospital is a tertiary care centre receiving 60% referral cases and 74% unbooked cases and 70% from rural areas most of the referral cases are received in late critical stages.

Direct Obstetric Death

They are those resulting from obstetric complications during pregnancy, delivery, and postpartum. Deaths due to, haemorrhage, preeclampsia/eclampsia or those due to complications of anaesthesia or caesarean section are classified as direct obstetric deaths.

Indirect Obstetric Deaths

They are those resulting from previous existing disease, or diseases that developed during pregnancy, and which were not due to direct obstetric causes but aggravated by physiological effects of pregnancy.

For example, deaths due to aggravation of an existing cardiac or renal disease are indirect obstetric deaths.

An amendment made to ICD-10 (International classification of diseases) in 2010 now includes indirect maternal deaths due to HIV in maternal mortality.

The scope of maternal mortality has been widened in the ICD -10 to include Pregnancy - related death, which is defined as any death during pregnancy, child birth, or the postpartum period even if it is due to accidental or incidental causes.⁶

Complications of pregnancy can sometimes lead to death after the 6 weeks postpartum period; these are now categorized as late maternal deaths.

Late Maternal Death

Is defined as death of a woman from direct or indirect obstetric causes, more than 42 days but less than one year after the termination of pregnancy.

Although progress has been made in the recent years and maternal deaths worldwide have dropped by 34% since 1990, it is much below the millennium developmental goal (MDG) adopted by the international community in 2000.

Under MDG5, the goal set was to reduce the maternal mortality by 75% between 1990 and 2015.

In India, the average MMR has declined from 254 in 2004-2006 to 212 in 2007 -2009.

In our study maternal deaths due to preventable causes like anaemia 8%, infection 8%, haemorrhage 18% were decreased.

In our study like in developed countries preeclampsia cases 30% and amniotic fluid embolism 6 %increased and because of jaundice 4 cases 8% reported. Even though our study indicates high maternal mortality rate. Preventable conditions like anaemia, haemorrhage, infection decreased so indirectly it indicates a development in health care programmes.

In our study, 5(10%) maternal deaths reported in 1st trimester 45(90%) cases reported in 3rd trimester. In 3rd trimester, 5 cases (10%) maternal deaths occurred before delivery, 40 cases (80%) maternal deaths occurred after delivery. Among these, vaginal delivery 10 cases (20%), Lower segment caesarean section 35 cases (70%). This indicates, increasing rate of lower segment caesarean section increases risk of maternal mortality.

The recent World Bank data puts the MMR for India reported in 2015 as 174 per 100000 live births which was significant decline from 215 figure that was reported in 2010.

Top 5 worst countries for Maternal Mortality

- Sierra Leone-1360.
- Central African Republic -882.
- Chad-856.
- Nigeria-814.
- South Sudan-789.
- Top 5 best countries for Maternal Mortality:
- Finland, Iceland, Greece, Poland-3.

Unregulated fertility, unsafe abortion, inadequate antenatal care, lack of trained birth attendants are mainly recognize as the factors responsible for high maternal mortality in the developing countries. The current MMR in India is 176 per 100000 live births which is as per the designed figure 100 per 100000 live births as per the objective of millennium development goals 5, the tragedy is that these deaths are largely preventable, maternal deaths is a serious complication to the family, society and the nation. It deprives the surviving infant mother care.⁷ One of the most important goals of millennium development goals is to reduce maternal mortality.

Even today large number of maternal deaths is due to the classical triad of haemorrhage, sepsis, and eclampsia. All these are preventable causes of maternal mortality provided the treatment is instituted in time.⁸

Unfortunately, in many cases, patients were referred very late, in critical condition, unaccompanied by healthcare

worker. Many patients had to travel a distance of 70 to 80 kilometres in a private vehicle to reach our tertiary center.⁹

Most of these deaths are preventable if patients are given appropriate treatment at periphery and timely referred to higher centers. Training of medical officers and staff nurses working in rural areas by programs like basic emergency obstetrics care (BEMOC) and skilled attendant at birth (SAB) training gives a ray of hope of reducing maternal mortality.

Maternal deaths can be prevented by improving the health care facilities in rural areas by ensuring round the clock availability of certain basic drugs like magnesium sulfate, tablet misoprostol as most maternal deaths in rural areas are still due to eclampsia and postpartum haemorrhage.

Early detection of high risk pregnancies and referring them to a tertiary care center at the earliest can reduce the complications of high risk pregnancies.

National Rural Health Mission (NRHM)

Can play a major role in reducing maternal mortality by advocating institutional deliveries and timely referral of high risk cases.

Although we have not actually evaluated the impact of aforementioned educational programs on maternal mortality, it would be interesting to direct future studies in this regard.

Steps to reduce Maternal Mortality (Actions for safe Motherhood)

It is a coordinated, long term effort within the families, communities and the health systems. It also involves the national legislation and policy. Actions may vary in respect of an individual country. The government must make a maternal mortality a priority public health issue and periodically evaluate the programs in an effort to prevent or minimize maternal deaths. Specific actions are discussed under the following groups-

Health Sector Actions

- Basic antenatal, Intranatal, postnatal care. Risk assessment is a continued procedure throughout and is not once only.
- Maternal mortality conferences to evaluate the cause of the death and avoidable factors.
- Emergency obstetric care (EmOC) is to be provided either by the field staff at the door step of a pregnant woman or preferably at the first referral center (FRU).
- A skilled attendant should be present at every birth. Functioning referral system is essential for integration of domiciliary and institutional services.
- Good quality obstetric services at the referral centers are to be ensured. Facilities for blood transfusion, laparotomy and caesarean section must be available at FRU level.
- Prevention of unwanted pregnancy and unsafe abortion. All couples and individuals should have access

to effective, client oriented and confidential family planning services.

- Frequent joint consultation among specialists in the management of medical disorders pregnancy particularly anaemia, diabetes, cardiac disease, viral hepatitis and hypertension.

Community, Society and Family Actions

- These are essential to safe motherhood. Wide range of groups, healthcare professionals, religious leaders and safe motherhood communities can help the woman to obtain essential obstetric care.

Health Planners/Policy Makers' Actions

- To organize community education, motivation and formation of safe motherhood committee at the local level.
- To strengthen the referral system for obstetric emergencies.
- To develop written management protocols for obstetric emergencies.
- To improve the standard and quality of care by organizing refresher courses for the health care professionals.
- Periodic audit of the existing healthcare delivery system and to implement changes as needed.

Legislative and Policy Actions

- Decentralisation of services to make them available to all the women.
- Safe abortion services and post abortion care must be ensured by national policy.
- Social inequalities and discrimination on grounds of gender, age and marital status are to be removed.

Maternal Near Miss (MNM)

Woman who experienced and survived a severe health condition during pregnancy, child birth or postpartum are considered as Maternal Near Miss or Severe Acute Maternal Morbidity (SAMM).

CONCLUSION

In our study, maternal mortality is very high about 437 per 100000 live births it is because 60% cases are referral 74% unbooked cases, 75 cases from rural areas are referred in late critical stages. On contrast compared to other studies in our hospital preventable maternal deaths because of anaemia (8%), infection (8%) and haemorrhage (18%) only reported it indicates preventable maternal deaths are decreased.

In our study, Preeclampsia 30% cases, amniotic fluid embolism 6% cases reported. 90% maternal deaths occurred after delivery in these 20% had vaginal delivery and 60% maternal deaths were reported after lower segment caesarean section. It indicates by decreasing lower segment caesarean section can also decrease maternal mortality. Improvement in primary health care in rural areas and by trained medical attendant, improving the literacy,

economic condition of the public can decrease maternal mortality in our country.

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