

AUDIT ON MATERNAL MORTALITY IN A TERTIARY CARE CENTRE

Dr.S.SHAMSHAD BEGUM, Dr.S.NISSAR BEGUM, Dr.B.PARVATHI, Dr.

P.SARADA, Dr.G.DEDEEPIYA

MD, PROFESSOR AND HOD,
DEPARTMENT OF OBG, GOVERNMENT GENERAL HOSPITAL,
ANANTHAPURAMU, ANDHRA PRADESH, INDIA

MS, ASSOCIATE PROFESSOR
DEPARTMENT OF OBG, GOVERNMENT GENERAL HOSPITAL,
ANANTHAPURAMU, ANDHRA PRADESH, INDIA

MS,ASSOCIATE PROFESSOR
DEPARTMENT OF OBG, GOVERNMENT GENERAL HOSPITAL,
ANANTHAPURAMU, ANDHRA PRADESH, INDIA

DGO,DNB,ASSISTANT PROFESSOR
DEPARTMENT OF OBG, GOVERNMENT GENERAL HOSPITAL,
ANANTHAPURAMU, ANDHRA PRADESH, INDIA

POST GRADUATE
DEPARTMENT OF OBG, GOVERNMENT GENERAL HOSPITAL,
ANANTHAPURAMU, ANDHRA PRADESH, INDIA

CORRESPONDING AUTHOR

Dr. P.SARADA,DGO, DNB,ASSISTANT PROFESSOR
DEPARTMENT OF OBG, GOVERNMENT GENERAL HOSPITAL,
ANANTHAPURAMU, ANDHRA PRADESH, INDIA

ADDRESS:Balaji eye care and laser centre
15/455,(Near S.R.S Lodge), Kamalanagar
Ananthapuramu-515001,MOBILE: 9952311502
E-MAIL.ID: saradapennabadi@gmail.com

Abstract:

Background:

Maternal mortality is a measure of quality of health care in community. Maternal mortality ratio is a very sensitive index that reflect the quality of reproductive care provided to the pregnant women.

Aim & Objective:

- To calculate the maternal mortality ratio in our hospital.
- To assess the causes of maternal mortality.
- To suggest ways to reduce the maternal mortality ratio.

Materials and Methods: A retrospective study is conducted from January 2022 to December 2023 in the Department of Obstetrics and Gynaecology , Government General Hospital , Ananthapuram.

Results: There were total of 22 deaths at the tertiary care hospital during the period January 2022 to December 2023 out of 17400 live births giving Maternal mortality rate of 126/1,00,000 live births. Most of the cases were due to late referrals. The majority of the deaths occurred in primigravida (40.9%), in the age group of 21 to 25 years (36.3%) and between 28 – 27 weeks (50.1%). The most common cause of death in our study was hypertensive disorders of pregnancy (49.9%) followed by PPH (22.7%) sepsis 4 cases (18.1%), pulmonary embolism 2 cases (9.1%). Among indirect causes the most common cause was anaemia 3 cases (75%), and heart disease 1 case (25%).

Conclusion:

Upgradation of hospitals in rural area, early detection of high risk pregnancies, better transportation, and timely referral even in urban areas can bring down the number of maternal deaths.

Keywords: Maternal mortality, High risk, Institutional deliveries, Obstetric causes

INTRODUCTION

Maternal mortality in a region is a measure of the reproductive health of a woman in the area and the quality of the health care delivery system.¹

According to WHO, ‘maternal mortality is defined as death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.’²

Globally 5,00,000 women die due to pregnancy related causes and 99% of these are in developing countries.³ Sub-saharan Africa accounted for 67% and South Asia 24%. India and Nigeria account for one-third of the maternal deaths. According to UN interagency estimates,⁴ global maternal mortality reduced by 38% between 2000 and 2017 (from 242 to 211/1,00,000 live births).

Maternal mortality is classified according to WHO into -

- (1) Obstetric causes- (a) Direct obstetric causes,
(b) Indirect obstetric causes; and
- (2) Non-obstetric causes.

Direct maternal death is the death of the mother that result from obstetrical complications of pregnancy, labour or the puerperium and the intervention, omissions, inadequately managed or a chain of events resulting from any of these factors e.g. gestational hypertension, antepartum hemorrhage, post-partum haemorrhage, obstructed labour, rupture uterus, septic abortion, puerperal sepsis, complications of anaesthesia, surgical complications following LSCS, PPCM, etc.

Indirect maternal death is the maternal death that is not directly due to an obstetrical cause. Death results from preexisting disease or disease developing during pregnancy, labour or puerperium or condition aggravated by maternal physiological adaptation in pregnancy e.g. heart disease complicating pregnancy, anaemia in pregnancy, infectious diseases, liver disorders, acute and chronic renal failure, epilepsy, haematological causes etc.

Non-obstetric causes-e.g. accident, suicide, assault, snake bite, non-obstetric surgical cause etc.

Maternal mortality ratio (MMR) and maternal mortality rate are indicators of maternal mortality.

One of the key indicators of maternal mortality is the Maternal Mortality Ratio (MMR) which is defined “as the number of maternal deaths during a given period per 1,00,000 live births during the same period.”

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

The target 3.1 of Sustainable Development Goals (SDG) set by United Nations aims at reducing the global maternal mortality ratio to less than 70 per 100,000 live births.^{1,5}

It is heartening that the Maternal Mortality Ratio in India has declined over the years to 97 in 2018-20 from 103 in 2017-19 and 130 in 2014-2016, as indicated in the graph below.^{6,7}



The Maternal death review (MDR) was launched by the Government of India in 2010 to enhance the quality of obstetric care and decrease maternal mortality rates by identifying gaps in the healthcare system.

The MDR offers a comprehensive examination of various factors at the community, facility, district, regional, and national levels to minimize maternal deaths. The MDR guidelines have been updated to emphasize surveillance, response, and now include a confidential review component.⁸

Different types of delays according to the Maternal Death Review form are categorized as follows:

- Type I delay—delay in decision-making to seek assistance
- Type II delay—delay in transportation due to vehicle unavailability and referral delays
- Type III—delay in receiving treatment at the institutional level

This study was done to analyse the causes of maternal death, factors responsible for it and the need for health care improvement in rural areas to avoid maternal death. Most of these causes are preventable by early detection of high-risk factors, early referral to higher centre and early intervention.

METHODS:

A retrospective hospital-based study was done for a period of 2 years from January 2022 to December 2023 in the Department of Obstetrics and Gynecology, Government General Hospital, Ananthapuram after getting approval from Institutional Ethics Committee. Data of all the mortalities were collected from individual case sheets, facility based maternal death review form, and MDR case summary.

Inclusion criteria:

All the maternal deaths occurring during pregnancy and within 42 days of delivery, septic abortions, molar pregnancies were included in the study irrespective of age, parity, booking status.

Exclusion criteria:

All the maternal deaths occurring after 42 days of termination of pregnancies, maternal deaths from suicide and brought dead cases were excluded from the study.

Statistical analysis:

Data was entered and analysed using Microsoft Excel 2021.

RESULTS:

During the period of study from January 2022 to December 2023 there were 22 maternal deaths out of 17,400 live births giving an MMR of 126/1,00,000 live births (Table 1).

YEAR	LIVE BIRTHS	MATERNAL DEATHS	MMR
2022	9132	13	142.3
2023	8268	9	108.8
TOTAL	17,400	22	126

Table1: Total deliveries, death and MMR at the tertiary care hospital

It was observed in our study that maximum deaths, 8 cases (36.3%) were in age group of 21-25 years, followed by 7 cases (31.8%) in 26-30 years, 4 cases (18.1%) in <20 years and there were 3 deaths (13.6%) in age group above 30 years.

AGE	NO. OF DEATHS	PERCENTAGE
<20	4	18.1 %
21-25	8	36.3 %
26-30	7	31.8 %
>30	3	13.6 %

Table1: Age distribution

Most of these deaths, 9 cases (40.9%) were primigravida, second gravida 6 cases (27.2%), and third gravida 5 cases (22.7%) fourth and fifth gravida 1 case each (4.5%).

PARITY	NO.OF DEATHS	PERCENTAGE
1	9	40.9%
2	6	27.2 %
3	5	22.7%
4	1	4.5 %
5	1	4.5 %

Table 3 :Distribution according to parity index

Of the 22 maternal deaths 17 cases (77.2%) were referred cases and most of the referrals were from PHC (64.7%).

PLACE OF DELIVERY	NO. OF DEATHS	PERCENTAGE
INSTITUTIONAL	14	73.6 %
NO REFERRAL	2	9.1 %
HOME	2	10.5 %
AMBULANCE	1	5.2 %

Table 4:Distribution according to referral

status

Most of these referrals were from PHC(64.7%) , DH (13.6%) and 17.6% from private hospital.

REFERRAL	NO. OF DEATHS	PERCENTAGE
PHC	11	64.7 %
DH	3	17.6 %
PRIVATE HOSPITAL	3	17.6 %

Table 5:Distribution according to place of referral

PERIOD OF DEATH	NO. OF DEATHS	PERCENTAGE
ANTENATAL	3	13.6 %
POST DELIVERY	19	86.3 %

86.3% of these deaths were in post-natal period, 13.6% during AN period.

Table 6:Distribution according to time of delivery

Of the postnatal deaths 8 cases (36.2%) were term delivery, 11 cases (50%) delivered between 28-37 weeks and 2 cases (9.1%) between 14-28 weeks and 1(4.5%) case <14 weeks.

GESTATIONAL AGE	NO. OF DEATHS	PERCENTAGE
TERM	8	36.3 %
28 – 37 WEEKS	11	50 %
14 - 28 WEEKS	2	9 %
<14 WEEKS	1	4.5 %

Table 7: Distribution according to gestational age

Among the deliveries, 14(73.6%) were institutional delivery ,2(10.5%) delivered at PHC,2(10.5%) delivered at home and 1 (5.2%) delivered in ambulance.

Table 7: Distribution according to place of delivery

10 cases (53.6%) were delivered by LSCS, 8 cases (42.1%) by vaginal delivery and 1 case (5.2%) during suction and evacuation for molar pregnancy.

ROUTE OF DELIVERY	NO. OF DEATHS	PERCENTAGE
LSCS	10	53.6 %
NVD	8	42.1 %
SUCTION & EVACUATION	1	5.2 %

Table 8: Distribution according to mode of delivery

Regarding condition of patient on admission, 14 cases (63.6%) were in poor condition and 8 cases(36.3%) were stable.

ADMISSION STATUS	NO. OF DEATHS	PERCENTAGE
STABLE	8	36.3 %
POOR	14	63.6 %

Table 9: Distribution according to admission status

Maximum post-natal deaths 13(68.4%) occurred >24 hours post-partum and 6 cases(31.5%) occurred in <24 hrs.

POST DELIVERY	NO. OF DEATHS	PERCENTAGE
< 24 HOURS	13	68.4 %
> 24 HOURS	6	31.5 %

Table 10: Distribution according to post delivery time of death.

In our study 81.8% of cases were due to direct obstetric causes, 18.1% of cases were due to indirect obstetric causes. Pre-eclampsia and eclampsia was the most common direct cause of maternal death 11 cases (49.9%) followed by PPH 5 cases (22.7%), sepsis 4 cases (18.1%),pulmonary embolism 2 cases (9.1%).Among indirect causes the most common cause was anaemia 3 cases (75%), and heart disease 1 case (25%).

CAUSE	NO. OF DEATHS	PERCENTAGE
PRE- ECLAMPSIA	3	13.6 %
ECLAMPSIA	8	36.3 %
INDIRECT OBSTETRIC	4	18.1 %
PPH	5	22.7 %
SEPSIS	4	18.1 %
PULMONARY EMBOLISM	2	9.1 %

Table 11:Distribution according to cause of death

DISCUSSION:

The reproductive health of the society can be known by maternal mortality. Maternal mortality ratio in our study was 126/100000 live births. MMR is high because most of the cases about 77.2% were referred from various district hospitals and PHCs. Delayed referral was an important contributing factor.

In our study most of the deaths occurred in age group of 21-25 years (36.3%) which correlates with other studies. Deaths in postnatal period occurred in 86.3% of cases in our study compared to 92.5% in other studies.⁹

Maximum deaths(68.4%) occurred after within 24 hours postpartum in our study which correlates with studies by Sureka et al.¹⁰

Under NHM, various steps are taken to reduce the maternal deaths. One of this is JSY (Janani Suraksha Yojana)-objective of JSY is encouraging institutional deliveries there by reducing MMR.¹¹

In our study 73.6% cases were institutional deliveries, 10.5% delivered at PHC and home and 1 case(5.2) home delivery. Of the institutional deliveries 53.6% were delivered by LSCS and 42.1% by vaginal deliveries.

Though many were institutional deliveries delayed referral to tertiary centre was the cause for increased MMR.

Under JSSK scheme (Janani Shishu Suraksha Karyakram) every pregnant woman is entitled to free delivery including LSCS in public health institute, free transport, diagnostics, medicines, food and blood products. This was also to facilitate institutional delivery.

Pre-eclampsia and eclampsia accounted for 11 cases (49.9%) in our study which was consistent with studies by Sundari et al and Khandale et al.^{9,10} Early identification of GHTN needs to be emphasized during AN check-up. Early referral, use of magnesium sulphate and early termination can prevent deaths due to complications of GHTN.

The second common cause of MMR in our study was PPH 5 cases (22.7%) compared to 10% in study by Khandale et al and 17% in study by Sundari et al.^{9,10} Ensuring availability of blood and blood products, early identification of PPH, early transfusion and early referral to tertiary centre can prevent such deaths. The deaths due to haemorrhage can be reduced by conducting programmes like skilled birth attendant training (SBA) of the medical officers, staff nurses, VHN at PHC and GH level.

Death due to sepsis was 18.1% in our study compared to 12.5% in the study by Sundari et al.⁹ LaQshya-labour room quality improvement initiative was launched in 2017 to improve the quality of the services there by help in reduction of MMR.

Access to family planning services especially abortion care services can reduce deaths due to septic abortions.

The most common cause among indirect cause was anaemia complicating pregnancy about 75% compared to 14% in study by Khandale et al, 41.7% in study by Arpita et al and 53.57% by Sundari et al.^{9,12}

National iron plus initiative launched by Ministry of Health and Family Welfare in 2013 insists on Iron supplementation to all adolescent girls, pregnant and lactating women.

PMSMA (Pradhan Mantri Surakshit Matritva Abhiyan) was launched by Ministry of Health and Family welfare, Government of India. This program aims to provide assured comprehensive and quality AN care free of cost universally to all pregnant women on 9th of every month. In addition to normal AN care, obstetricians often provide special AN care in collaboration with physicians and radiologists.

Ministry of Health and family welfare (MOHFW), GOI has developed an initiative termed Dakshata to reduce the MMR and newborn mortality by improving quality of care at delivery points through training of medical officers for competency enhancement.

CONCLUSION:

Through this study we conclude that hypertensive disorders of pregnancy and its complications are the most important cause of maternal death followed by PPH. All these are preventable causes.

Strategies for maternal deaths should involve workers at the grassroots level due to their multifaceted nature.

Reducing MMR is aided by effective AN care, early detection of high-risk individuals, appropriate treatment in outlying facilities, early referral, and a team approach to managing high-risk cases.

Health education of pregnant mothers regarding warning signs in pregnancy, training of medical officers and staff nurses like skilled birth attendant (SBA), good quality health care ensuring availability of essential drugs like magnesium sulphate, tablet misoprostol and availability of ambulance services round the clock helps in reducing MMR.

REFERENCES:

1. Government of India. Special bulletin on maternal mortality in India 2016-18: Sample registration system, 2016. Available at: https://censusindia.gov.in/vital_statistics/SRS_Bulletins/MMR%20Bulletin%202016-18.pdf. Accessed on 12 October 2021
2. Park K. Preventive medicine in obstetric, Pediatrics and geriatrics: Park's Text Book of Preventive and Social Medicine. 20th ed. Jabalpur: M/S Banarasi Das Bhanot; 2009:479-83
3. Singla A, Rajaram S, Mehta S, Radhakrishnan G. A Ten Year Audit of Maternal Mortality: Millennium Development Still a Distant Goal. Indian J Community Med. 2017;42(2):102-
4. WHO. Trends in maternal mortality: 1990 to 2015 Estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. WHO: Geneva; 2015.
5. WHO. The global health observatory, 2021. Available at: <https://www.who.int/data/gho/indicator-metadata-registry/imr-details/26>. Accessed on 12 October 2021.
6. Government of India. SRS Bulletin-MMR, 2017. Available at: https://censusindia.gov.in/vital_statistics/SRS_Bulletins/MMR-Bulletin2015-2017. Accessed on 12 October 2021.
7. Special bulletin on maternal mortality in India 2018-20, November 2022, **Website link:** <https://censusindia.gov.in/>
8. Ministry of Health and family welfare. Guidelines for maternal death surveillance and response 2017, 2017. Available at: https://nhm.gov.in/images/pdf/programmes/maternal-health/guidelines/Guideline_for_MDSR. Accessed on 12 October 2021
9. Mohana KP, Padma SR, Subathra P. Maternal mortality: analysis of causes and preventable factors. Int J Reprod Contracept Obstet Gynecol. 2016;5(6):1719-21.
10. Khandale SN, Kedar K. Analysis of maternal mortality: a retrospective study at tertiary care centre. Int J Reprod Contracept Obstet Gynecol. 2017;6(4):1610-3

11. Government of India. Maternal and adolescent health care annual report 2019-2020, 2020. Available at: <https://main.mohfw.gov.in/sites/default/files/Annual%20Report%202019-2020>. Accessed on 12 October 2021

12. Ballu AS, Asha MB. A comprehensive study on maternal mortality at a tertiary care hospital. Indian J Obstet Gynaecol Res. 2019;6(3):259-62