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An overview of maternal mortality in a tertiary care hospital from September 2017 to August 2018

Dr. S Lavanya Kumari[1], Dr. Poonam Chaganti[2]
[1] Professor & HOD, Department of Obstetrics and Gynecology, Rangaraya Medical College, Kakinada, Andhra Pradesh, India
[2] Third year postgraduate Department of Obstetrics and Gynecology Rangaraya Medical College, Kakinada, Andhra Pradesh, India

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Abstract
Background: Maternal mortality is one of the indices of health care in every country. It is estimated globally that, every 5 minutes a mother dies due to complications of pregnancy or labour and 15% of women develop life threatening complications. Approximately 17% of the maternal deaths occur in India. India has registered significant improvement in reducing MMR from 167 in 2011-2013 to 130 (per 100,000 live births) in 2014- 2016, according to new data released by registrar general of India.
Methods: It is a retrospective study carried on maternal deaths from September 2017 to August 2018 in Government General Hospital, Kakinada. A self-designed questionnaire was formulated and the causes of death were delineated.
Results: A total of 67 maternal deaths have occurred from September 2017 to August 2018. 40 cases (85%) were referred from periphery. Of 67 cases, 27 (41%) had risk factor awareness but refused admission. Of those 9(33%) cases were booked at private hospitals, 16(59%) cases were booked at other government hospitals and 2 (8%) were booked at GGH. 38(56%) were delivered by caesarean section, 12(17%) cases were delivered by vaginal route in our hospital, 3(4%) cases were abortions. 4 (5%) cases were delivered outside by cesarean section and were referred here due to post-operative complications. Most recurrent indication for cesarean section was hypertensive disorders of pregnancy 21(55%) cases, post caesarean pregnancy 8(21%), abnormal presentations 8(21%), placenta previa 1 case.
Conclusion: Preeclampsia and eclampsia were the leading cause of death followed by anemia, hemorrhage and other indirect causes include sepsis, medical and surgical disorders. Preventing maternal death begins with pre conceptional management; good antenatal, intrapartum and postpartum care, early identification and management of anemia, hypertension and hemorrhage and health education.

Keywords: MMR, maternal deaths, preeclampsia, anemia, PPH, cesarean section

Introduction

Maternal death is always a tragic event and most often is preventable. Between 2016 and 2030, as per the Sustainable Development Goals, the target is to reduce the global maternal mortality ratio to less than 70 per 100,000 live births. The Millennium Development Goal 'five' focused on reducing maternal mortality and achieving universal access to reproductive health care. 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 childbirth, and care and support in the weeks after childbirth.

An estimated 303,000 maternal deaths have occurred globally in 2015 yielding an overall MMR of 216 maternal deaths per 100,000 live births. For the purpose of categorisation, MMR is considered to be high if is 300-499, very high if it is 500-999 and extremely high if it is more than 1000 maternal deaths per 100,000 live births. Over the course of time, the world has made steady progress in reducing the maternal mortality by 44% and reducing the lifetime risk of maternal deaths from 1 in 73 to 1 in 180. At least 99% of maternal deaths occur in developing countries; 800 women still die each day due to direct or indirect causes. Nigeria and India together account for over one-third of death maternal deaths in 2015 with an approximate 45,000 maternal deaths occurring in India. Approximately 17% of the maternal deaths occur in India. The MMR was 230/100,000 in 2008 and has decreased to 130/100,000 in 2014-2016 as declared by Registrar General of India. A woman is most vulnerable in the postpartum period. About 50-70% maternal deaths occur in the post-partum period of which about half of them occur in first 24 hours after delivery and more than two- thirds during the first week. Between 11-17 percent of maternal deaths occur during childbirth itself. The maternal mortality ratio in India is not uniform but varies with regions and states. The Empowered Action Group (EAG) have high maternal mortality ratio 257/100,000 and the Southern states have a lower ratio 105/100,000. This difference is due to availability of government health care, accessibility, socioeconomic status, culture, literacy and awareness and utilisation of different health programmes.

Methods

It is a retrospective study carried on maternal deaths from September 2017 to August 2018 in Government General Hospital, Kakinada. A self-designed questionnaire was formulated and the causes of death were delineated.

Results

A total of 67 maternal deaths have occurred during the period of study from September 2017 to August 2018.

Age

The maternal deaths had age ranging from 15 to 37 years, with

Maximum number recorded in the age group of 20-25 years. Most of the women about n=50, 74% were in the age group of 20-25 years. About n=14, 20% were in the age group above 26 years and n=3, 6% were below 19 years age or teenage pregnancies.

Age distribution of cases

Table 1

Age group	No. Of cases	Percent
Below 19	3	6%
20-25 years	50	74%
Above 26 years	14	20%

Booked or unbooked cases

Of 67 cases, n=56, 83% were booked, of which only n=6 were booked cases at GGH, and rest of them, n=50 at hospitals other than GGH, n=11(17%) were unbooked.

Referral cases

Of the 67 cases, n=40(85%) were referred from other centres including the government and private sector.

Fig 1

Antenatal Checkups

Table 2

Antenatal checkups	Cases	Percentage
<4	18	26%
>4	45	62%

In the 67 maternal deaths, the frequency of Antenatal checkups, n=18 (26%) had less than 4 ANCs, n=45(62%) had more than 4 ANCs.

Risk factor awareness

Of 67 cases, n=27(41%) were informed regarding the risk factors like anemia, thyroid disorders and preeclampsia and have been taking treatment but refused admission.

Of those n= 9(33%) cases were booked at private hospitals, n=16(59%) cases were booked at other government hospitals and n= 2 (8%) were booked at GGH. Of which, n=40(59%) cases, have not been taking regular treatment and some were not attending regular antenatal checkups.

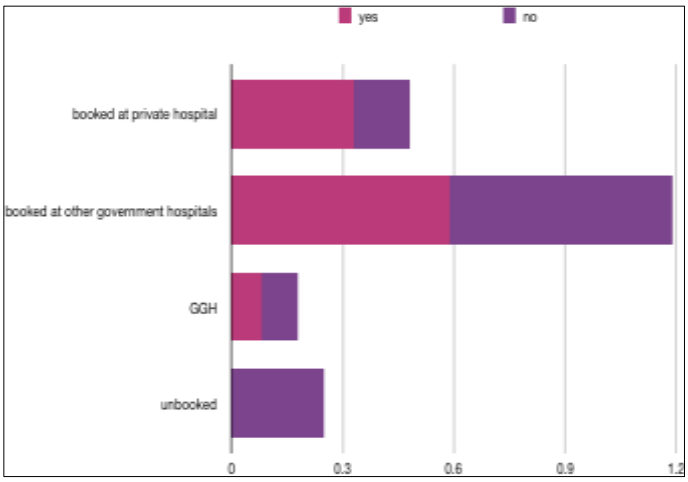

Fig 2

Mode of delivery

Of the 67 maternal deaths, n=38(56%) were delivered by cesarean section, n=12(17%) cases were delivered by vaginal route in our hospital, n=3(4%) cases were abortions; n=4 (5%) cases were delivered outside by Cesarean section and were referred here due to post-operative complications,1(1.4%) case was delivered by vaginal route and was referred here due to PPH,1 was ectopic pregnancy with emergency laparotomy done outside.

On the whole, Antenatal deaths were n=8(11%) cases, they are further grouped trimester wise:

- 3rd trimester-4(50%)
- 2ndtrimester-3(37.5%)
- 1sttrimester-1(12.5%)

Mode of delivery

Table 3

Mode of delivery	No of cases	Percentage
LSCS	38	57%
Vaginal	12	18%
Abortions	3	4%
Delivered outside	6	9%
Antenatal deaths	8	12%

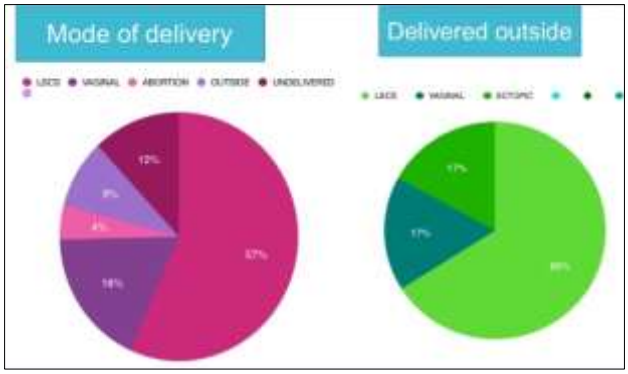

Fig 3

Indications for Cesarean section

Most recurrent indication for Cesarean section was hypertensive disorders of pregnancy n=21(55%) cases, post Cesarean pregnancy n=8(21%) cases, abnormal presentations n= 8(21%) cases, placenta previa n= 1.

Indications of cesarean section

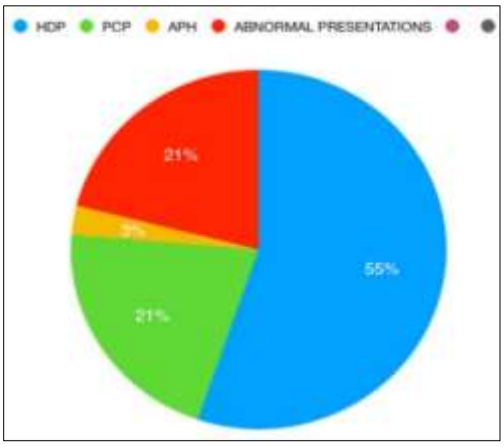

Fig 4

Of 38 LSCS, n= 29(76%) were referred from other hospitals of which n=22 (75%) were booked cases at other hospitals, n=5 (17%) were booked at GGH and n=2 cases were unbooked.

Antenatal visits in women undergoing cesarean section

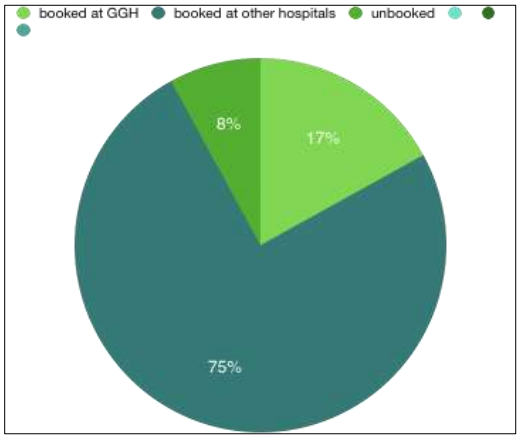

Fig 5

Of n= 12 delivered by vaginal route, n=10(83%) cases were normal vaginal deliveries and n=2(17%) were delivered by outlet forceps.

Table 4

LSCS	Cases	Percentage
Booked	36	95%
Unbooked	2	5%
Emergency	36	95%
Elective	2	5%

Blood or blood products transfusion

Blood and blood products transfusion was done in n=35(52%) cases.

Of which possibly n=3 cases were deaths due to blood transfusion reaction.

Perinatal mortality

Of the 67 maternal deaths, n=15 (22%) cases delivered dead babies which are probably intrauterine deaths.

Cause of death

Most frequent cause of death was related to, hypertensive disorders of pregnancy n=30 (44%),anemia with/without heart failure n=18(26%), atonic postpartum hemorrhage n=4 (5%), Antepartum hemorrhage n=4(5%), ectopic pregnancy n=1 case; prolonged labour n=2 (2%), sepsis related deaths n=12 cases, amniotic fluid embolism n=3(4%), rupture uterus n=2cases, medical disorders associated deaths include ;diabetic ketoacidosis n=3(4%),rheumatic heart disease n= 3(4%), falciparum malaria n=1, acute pancreatitis n=1, postpartum cardiomyopathy n=2, Jaundice n= 5, Surgical conditions like hollow viscous perforation n=1 case. Aspiration related deaths n=2 cases.

Based on the day of death, number of deaths occurring on different days post-delivery were estimated.

Highest number of maternal deaths were recorded on the first day after delivery irrespective of vaginal or cesarean delivery. Most of the deaths have occurred within one week of delivery.

Number of maternal deaths depending on day of death

Table 5

Day of death	Cases	Percentage
Immediate	4	5%
1st day	22	32%
2-3 days	12	17%
4-7 days	15	22%
8-42 days	6	8%
Undelivered	8	11%

Discussion

With advances in scientific knowledge and proven clinical interventions, it is possible to prevent most maternal deaths. It is therefore critical to understand if the deaths were caused due to delay in decision making and care seeking at the household level, or due to delay in transit to health facility.

Women with deficient antenatal care are at higher risk of anemia, preeclampsia and other complications. One of the strategies that has been adopted by the Indian government to combat high rates of maternal mortality is to ensure universal access to Antenatal Care, Emergency Obstetric Care and Skilled Birth Attendance.

Generally checkups are done at interval of 4 weeks up to 28 weeks; at interval of 2 weeks up to 36 weeks and thereafter weekly till delivery. Ideally, this should be more flexible depending on the need and the convenience of patient. In India, as per WHO recommendation, the contacts should be at least 8 with health personnel. The utilisation of health services is mainly

limited to the hospital-based deliveries. This indicates that majority of pregnant women in the country are still not even getting the basic recommended ANC services which was also observed in the present study.

An improved understanding of the causes of maternal death is essential to conceptualise strategies for MMR reduction. Under the International Statistical Classification of Diseases and Related Health Problems, 10th revision (ICD-10), the causes of maternal deaths are categorised broadly into direct and indirect. The former category includes maternal deaths resulting from obstetric complications of the pregnant state (pregnancy, delivery, and postpartum), interventions, omissions, incorrect treatment, or a chain of events resulting from any of the above. The latter consists of deaths resulting from previously existing diseases, or from diseases that developed during pregnancy and that were not due to direct obstetric causes, but were aggravated by the physiological effects of pregnancy (WHO 2012).

In 2001–03 SRS data suggest that haemorrhage (38%) is the leading cause of death in India, and is followed by sepsis 11% and abortion 8%. The relative shares of these causes were notably similar across regions such as EAG states and Assam, South India, and other states. But hypertensive disorders were much higher in South India, whereas abortion-related deaths were higher in EAG states and Assam according to RGI 2003. Using data from the SRS 2001–03, Montgomery *et al*. (2014) re-examined the causes of maternal mortality in India, and found that direct obstetric causes account for over 80% of maternal deaths in India. The pattern was notably similar across rural and urban areas as well as across different states. Obstetric haemorrhage causes about 25 % of the total maternal deaths, whereas other obstetric complications lead to over 20% of maternal deaths, sepsis related deaths 17% and complications following spontaneous or therapeutic abortion 9 % were identified as important causes of maternal deaths in India. Importantly, this study identifies that 18% of the maternal deaths reviewed were caused by anaemia. Abortion-related complications are responsible for about 4% of the investigated maternal deaths.

Similar inferences are available from the description of causes of maternal death in Tamil Nadu during 2008–2009 (Kolandaswamy 2010) [14], which finds that the proportion of direct 81% and indirect 19 % causes of maternal death. Again, haemorrhage is identified as the cause of about 24 per cent of maternal deaths in the state. Tamil Nadu is witnessing an increase in hypertension-related maternal deaths. Eclampsia and pulmonary embolism are identified as other major direct causes of maternal death during 2008–09. However, abortion-related maternal deaths are not identified as a significant cause of maternal death. Such increasing share of indirect causes is also noted in other parts of the country.

In our hospital Hypertensive disorders of pregnancy are the most common cause of death followed by anemia, sepsis, postpartum hemorrhage, thromboembolism, medical disorders and surgical conditions complicating pregnancy.

In Hypertensive disorders of pregnancy, Preeclampsia and eclampsia disorders manifested in the form of pulmonary edema, disseminated intravascular coagulation and postpartum hemorrhage. Out of deaths due to disseminated intravascular coagulation precipitating causes were preeclampsia and eclampsia and sepsis. Hemorrhage accounted for 11 deaths and amongst them, 7 manifested due to disseminated intravascular coagulation (DIC).

Out of 11 cases with PPH, hemorrhage due to atonicity accounted to 4 cases.

Out of 4 cases of antepartum hemorrhage, in 3 cases, Abruptio placentae was the cause of which 3 had preeclampsia as the etiology.

In 1 case of complete placenta previa, came with heavy bleeding per vagina, emergency cesarean section but died due to refractory hemorrhagic shock and acute renal failure.

Emergency relaparotomy was done in 5 cases, (4+1),1 case it was done due to perforation of uterus due to sepsis, which was referred from outside, where subtotal hysterectomy was done here.In 3 cases it was done due to hemoperitoneum due to DIC. In 1 case inferior epigastric artery ligation was done due to rectus muscle hematoma.

In 2 cases of Rupture uterus of which both were post caesarean pregnancy, of which 1 case was twin gestation, died in antenatal period. Both came to GGH with massive hemoperitoneum and died due to hemorrhagic shock.

One case, presented with pain abdomen, vomitings and fever, suspicious of typhoid perforation and resection and end to end anastomosis was done, but the patient died due to fecal peritonitis.

Jaundice related deaths were observed in 5 cases, of which 3 cases are complicated with preeclampsia and of 2 cases, 1 case complicated with hepatitis B and 1 case was complicated with falciparum malaria. Hepatitis B and its complications were seen in 1 case and uncontrolled postpartum hemorrhage due to coagulation failure was the cause of death.

Aspiration related deaths were seen in 2 cases, both died due to severe pulmonary edema.

Blood transfusion reactions were expected to be the cause of deaths in 3 cases, all three after the transfusion developed disseminated intravascular coagulation and died due to shock.

Maternal death is a measure of quality of health care in a community. Though, the risk of death from complications of pregnancy has decreased during past few decades in India, it continues to remain higher than developed countries.

It was observed that maximum numbers of deaths were recorded in the age group of 20-25 years (74%). Preeclampsia and eclampsia remains the leading cause of death followed by anemia, hemorrhage and other indirect causes include sepsis, medical and surgical disorders.

India's attention to maternal mortality is synonymous with the launch of the Child Survival and Safe Motherhood in 1992 (CSSM), which is an outcome of global attention to neglected maternal deaths in low-income countries. Other international events, including the International Conference on Population and Development (ICPD 1994) and the MDGs, played an important role in integrating the fragmented family welfare, child health, and maternal health components into the RCH programme and the NRHM. Several studies indicated that governance and strong political support to the health system are key to a good public health system, such as in Tamil Nadu.

Medical education should be expanded to support the training of staff and functionaries to provide comprehensive emergency obstetrics and neonatal care, which is critical to save maternal and neonatal lives. Improving human resource management can help to fill the gaps in health care provision.

The availability and quality of Emergency Obstetric Care is essential to prevent maternal deaths. Several skilled birth attendants lack the skills to provide even basic emergency care, and there is a shortage of specialists and a poor spread of EmOC facilities in several states with high MMR. The lack of availability and access to blood transfusion contributes to maternal mortality, especially because sometimes even members of the immediate family refuse to donate blood for surgical intervention. The Robson's classification for indications of cesarean section should be followed for emergency cesarean sections.

The majority of maternal deaths took place in the immediate post-partum period, and women are often presenting at obstetric facilities only in very serious condition. Thus, one priority is to provide health education on the early recognition of potentially hazardous conditions as part of an enhanced antenatal care program. Reduction in avoidable maternal deaths in India will require skilled healthcare providers with the capacity to deliver service for not only routine delivery but emergency obstetric care including community consultation and emergency admission to a health-facility.

Obstetrics services themselves could be a target area for intervention, particularly for investments in infrastructure, staffing and training in the rural areas of poorer states. The national health and development programs focusing on poorer states must be maintained and even intensified. The proportion of safe deliveries has increased annually at twice the rate in the rural areas of poorer compared to richer states.

Conclusion

Maternal death is a measure of quality of health care in a community. Though, the risk of death from complications of pregnancy has decreased during past few decades in India, it continues to remain higher than developed countries. It was observed that maximum numbers of deaths were recorded in the age group of 20-25 years (74%). Preeclampsia and eclampsia remains the leading cause of death followed by anemia, hemorrhage and other indirect causes include sepsis, medical and surgical disorders. Though the implementation of Janani Suraksha Yojana which is skilled birth attendance and facility-based deliveries has improved the number of institutional Deliveries, presence of risk factors such as preeclampsia, chronic hypertension and anemia are still rampant. Proper antenatal checkups and early detection of risk factors and stringent methods to ensure the antenatal care is essential now. Economic growth may help initiate improvements in MMR but, to reduce MMR faster, simultaneous investment is important in strengthening the health system; education and empowering women; and making available qualified human resources in health, good governance, and transportation facilities. Also, improvement in recording and sharing vital health information is critical to facilitate policymaking and enhance effectiveness of various interventions.

References

1. Park's textbook of Preventive and Social Medicine, page 610-620.
2. Montgomery AL, Ram U, Kumar R, Jha P. For The Million Death Study Collaborators Maternal Mortality in India: Causes and Healthcare Service Use Based on a Nationally Representative Survey. PLoS ONE. 2014; 9(1):e83331. https://doi.org/10.1371/journal.pone.0083331
3. Maternal Mortality in India: Review of Trends and Patterns, IEG Working Paper No. 353, 2015.
4. Kavita Singh, Seema Puri, Geeta Chopra. Maternal Mortality in India: An Overview of Social Causes, International Journal of Scientific and Research Publications, 2018; 8(3). March 8 ISSN 2250-3153, DOI: 10.29322/IJSRP.8.3.2018.p7503
5. http://dx.doi.org/10.29322/IJSRP.8.3.2018.p7503
6. WHO. International statistical classification of diseases and related health problems, 10th revision (ICD-10). Geneva: World Health Organization, 1994.
7. RGI. Special bulletin on maternal mortality in India 2004–2006. New Delhi: Office of the Registrar General, 2009.
8. Dutta's textbook of Obstetrics, 9th edition, page number 558-560.
9. Essentials of Obstetrics, Lakshmi Seshadri, and page number 867-878.
10. WHO. The WHO Application of ICD-10 to deaths during pregnancy, childbirth and the puerperium: ICD-MM. Geneva: World Health Organization.
11. UNFPA. Concurrent assessment of Janani Suraksha Yojana (JSY) in selected states. New Delhi: United Nations Population Fund, 2009.
12. RGI. Sample Registration System statistical report 2010. New Delhi: Office of the Registrar General of India, 2011.
13. Campbell OMR, Graham WJ. Strategies for reducing maternal mortality: getting on with what works. Lancet, 2006; 368:1284-1299.
14. Kolandaswamy K. Maternal mortality in Tamil Nadu during 2001–10: Varied progress in reducing maternal mortality at the health district level and preventable causes remain unchanged, unpublished dissertation, National Institute of Epidemiology, Chennai, 2010.
15. Muraleedharan VU Dash, Gilson L. Tamil Nadu 1980s–2005: A success story in India, in D Balabanova, M Mckee and A Mills (eds) 'Good Health at Low Cost' 25 years on: What makes a good health system, London School of Hygiene and Tropical Medicine, London, 2011.
16. RGI. Annual Health Survey 2011–12 Fact Sheets, Office of the Registrar General & Census Commissioner, India, New Delhi, 2012.
17. Vandemoortele Jan, Delamonica E. Taking the MDGs beyond 2015: Hasten slowly. IDS Bulletin. 2010; 41(1):60-69.
18. Thaddeus S, Maine D. Too far to walk: Maternal mortality in context, Social Science and Medicine. 1994; 38(8):1091-1110.
19. Vora K, *et al*. Maternal health situation in India: A case study. Journal of Health, Population and Nutrition. 2009; 27(2):184-201.
20. Mehrotra S. Well-being and caste in Uttar Pradesh: Why UP is not like Tamil Nadu. Economic and Political Weekly, 2006.
21. Padmanaban P, *et al*. Innovations and challenges in reducing maternal mortality in Tamil Nadu, India, Journal of Health, Population and Nutrition. 2009; 27(2):202-219.