Journal of Indian Academy of Obstetrics and Gynaecology January 2021
Vol. 2, Issue 2

Original Article

AN ANALYSIS OF MATERNAL MORTALITY – 3 YEARS STUDY IN A TERTIARY CARE HOSPITAL

Suvobrata Sarkar✉, N Lavanya, Ranita Roy Chowdhury

ABSTRACT

Introduction: Pregnancy is considered to be a physiological state but can develop severe morbidities or even death during any period. Maternal mortality rate (MMR) is a sensitive index that reflects the quality of reproductive care provided to pregnant women. A maternal death is defined as 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 pregnancy or its management but not from accidental or incidental causes" (ICD-10)

Methodology: A retrospective observational hospital-based study was carried out in the department of Obstetrics and Gynecology, College of Medicine and JNM hospital which is a tertiary level health care referral center, situated in kalyani West Bengal, over a period of 3 years from January 2018 to December 2020. Distribution of maternal deaths in relation to age, parity index, gestational period, mode of delivery and admission to death interval causes of deaths and MMR was calculated.

Results: In this three-year study the total maternal mortality of 60. In 2018 maternal deaths were 24, in 2019 - 12 and 2020 -24. Maternal mortality due to direct causes was 45 (75%) and indirect causes were 15 (25%) altogether. The most common direct cause was hemorrhage (26.6%) considering ante partum, intra partum and postpartum deaths in all three years. The MMR as pr live birth during the study period was 277.

Conclusion: Maternal mortality can be prevented with better antenatal care and early referral as more deaths are due to direct cause.

Keywords: hospital-based, maternal, mortality

INTRODUCTION

Pregnancy is not a disease and childbirth are a universally celebrated event. Yet for thousands of women the outcome is not favorable and may end up even losing their lives. The tragedy is that a large number of these deaths are preventable. MMR is a sensitive index that reflects the quality of reproductive care provided to pregnant women.

© Indian Academy of Obstetrics & Gynaecology 2021

According to the World Health Organization (WHO), "A maternal death is defined as 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 pregnancy or its management but not from accidental or incidental causes" (ICD-10).[1] Maternal mortality ratio (MMR) is defined as the number of maternal deaths per 100,000 live births. Almost half a million women die every year from complications during pregnancy and childbirth. About 99% of these women are from developing world with over 90% concentrated in Africa and Asia.[2]

About 295 000 women died during and following pregnancy and childbirth in 2017. The vast majority of these deaths (94%) occurred in low-resource settings, and most could have been prevented. Between 2000 and 2017, MMR dropped by about 38% worldwide. Between 1990 and 2015, the global maternal mortality ratio (MMR) decreased by 44%, from 385 to 216 maternal deaths per 100,000 live births.[3]In India, Maternal Mortality Ratio has declined to 113 in 2016-18 from 122 in 2015-17 and 130 in 2014-2016.[4]

Hence, this present study was conducted to review the existing maternal mortality ratio and the causes of maternal death at a tertiary care teaching hospital of rural India, so that corrective steps can be taken to reach the goal within the stipulated time frame as most of the deaths are preventable.

METHODOLGY

A retrospective analytical hospital-based study was carried out in the department of Obstetrics and Gynecology, College of Medicine and JNM hospital which is a tertiary level health care referral center, situated in Kalyani, Nadia, West Bengal, over a period of 3 years. Data regarding maternal mortality was collected from maternal mortality register of our hospital after obtaining permission. The details of maternal deaths from January 2018 to December 2020 were collected and analyzed with respect to following epidemiological parameters: - Distribution of maternal deaths in relation to age, parity index, gestational period, mode of delivery and admission to death interval and causes of deaths. Results were analyzed by using percentage. Maternal mortality rate (MMR) was calculated after obtaining the live births of these 3 years from hospital Data base.

Maternal mortality is classified by WHO Application of ICD -10 to deaths during Pregnancy, Childbirth and the puerperium ICD – MM into two major groups - Direct causes and indirect causes. The DIRECT causes are 1. Pregnancy with abortive outcome including ectopic pregnancy and gestational trophoblastic disease. 2. Hypertensive disorders in Pregnancy birth and puerperium including HELLP syndrome.3. Obstetric hemorrhage (except Haemorrhage) excluding abortive hemorrhage 4. Pregnancy related infection excluding abortion outcome 5. Others obstetric complications like Amniotic fluid Embolism, uterine inversion, hepatorenal failure due to vomiting during pregnancy and unexplained. 6. Unanticipated complications of management. The Maternal Death due to INDIRECT causes is due to 7. Non-obstetric complications like a. Anemia b. Cardiac disorders like cardiomyopathy myocardial infarctions c. Liver Disorders like acute fatty liver of pregnancy, infective hepatitis d. Respiratory disorders like ARDS Pulmonary embolism e. Renal disorders like acute renal failure e. endocrinal disorders like diabetes f. neurological disorders like cerebral embolism g. infection/infestations like malaria Dengue HIV etc. Maternal deaths UNSPECIFIED are due to unknown causes. The last category is COINCIDENTAL causes due to external causes.

RESULTS

In this three-year study the total maternal mortality of 60. In 2018 maternal deaths were 24, in 2019 - 12 and 2020 -24. Maternal mortality due to direct causes was 45 (75%) and indirect causes were 15(25%) altogether. The most common direct cause was hemorrhage (26.6%) considering ante partum, intra partum and postpartum deaths in all three years. Other important causes contributing to the mortality were pregnancy induced hypertension, (18.3%) abortion (20%) and sepsis (10%) in pregnancy. Among the indirect cause's death due to hepatic reasons and renal reasons were more frequent. The direct and indirect causes of death are summarized in Table 1 and 2. Another outcome observed in this study was maximum maternal mortality took place during immediate peurperium. 14 maternal mortalities were seen

within 20 weeks of gestation among which 9 was related to abortion, 3 dues to ectopic pregnancy 1 anemia and 1 indirect infective cause (Dengue). One was during ante natal period when patient came with antepatrum eclampsia and succumbed within minutes. Other 45 mortalities were after delivery, though in most cases pathology leading to death raised in antenatal period. Considering the total live births in these 3 years were 21584 the maternal mortality was 277 in our institution.

Maternal mortality was mostly seen among multi gravida patients. Considering the age groups maximum deaths were among 30 to 34 years. Maternal deaths were increased with maternal age.

DISCUSSION

Pregnancy, though a physiological state if not kept under constant vigil, can develop severe morbidities or even death during any period. The death carries with it a huge grief and pain for the family, and also an immeasurable loss to the new born or young ones left behind.

From 2000 to 2017, the global maternal mortality ratio declined by 38 per cent – from 342 deaths to 211 deaths per 100,000 live births, according to UN inter-agency estimates. This translates into an average annual rate of reduction of 2.9 per cent. While substantive, this is less than half the 6.4 per cent annual rate needed to achieve the Sustainable Development global goal of 70 maternal deaths per 100,000 live births. There has been significant progress since 2000. Between 2000 and 2017, South Asia achieved the greatest overall percentage reduction in MMR, with a reduction of 59 per cent (from 395 to 163 maternal deaths per 100,000 live births). Sub-Saharan Africa achieved a substantial reduction of 39 per cent of maternal mortality during this.[5] In our institution the maternal mortality was 277 which is higher than national average. This is because referred cases are higher in this institution.

A study conducted in Safdarjang Hospital in New Delhi revealed that 120 maternal deaths occurred during the year beginning 1 July 2003 to 30 June 2004 with post-partum hemorrhage (26%) as the leading direct cause of death; 89% of cases were un-booked.[6] In our study obstetrical hemorrhage was the leading cause of maternal mortality.

In a study conducted in a tertiary care hospital in a neighboring country, Pakistan, Begum, *et al.* showed the maternal mortality rate as 12.7/1000 live births. In the similar study from a tertiary care hospital, the leading cause of death was obstetric hemorrhage followed by other causes.[7]

Study conducted in West Bengal the majority of the deaths occurred in the 20-24 years' age group, those with Hindu religion, and the postpartum period. One third of mothers had cesarean sections. The majority (78.2%) of deaths were among referred cases. Eclampsia was the leading cause of maternal death (29.1%). The study found that the eclampsia accounted 29.1%, which made it the leading cause of maternal mortality, followed by hemorrhage (22.7%) and infections/sepsis (10.9% Approximately half of the deceased women sought care after 10 hours of developing complications. More than one-third of maternal deaths were registered with type 1 delays.[8] In the current study also most deaths were in postnatal period though the second leading cause was eclampsia.

A total of 120 maternal deaths occurred in a tertiary care centre in southern most part of west Maharastha. Most maternal deaths occurred in the age group of 20-24 years, multiparous women (56.66%), women from rural areas (69.16%), illiterate women (65%), unbooked patients (83.33%), and patients of low socioeconomic status (83.33%). Direct causes accounted for 72.5% of maternal deaths where as 27.5% of maternal deaths were due to indirect causes.[9] In this study direct cause of death was 75% and indirect cause was 25% which was at per with the afore said study.

The Maternal mortality ratio in the study period from December 13 to December 16 in a tertiary care in new Delhi was 361.71/100,000 live births. The number of maternal deaths was 364. Unbooked cases accounted for the majority, i.e., 322, booked being 29 and registered 13. Two hundred and eleven cases were referred from other centers. Maximum deaths occurred between 21 and 30 years (73.07%). Anemia was widely prevalent. Most maternal deaths were due to direct causes like hypertensive disorders (28.02%), pregnancy-related infections (20.87%), and hemorrhage (12.36%). Among indirect causes, anemia, hepatitis, heart disease and respiratory illness accounted for 15.93, 11.53, 3.29 and 5.49%, respectively. Type I

delay was most common (64.28%).[10]

A retrospective study of maternal deaths from January 2015 to December 2015 there was a total of 56 maternal deaths out of 6976 live births giving the MMR of 802/1,00,000 live births. The MMR is high as it is an institution MMR and this is tertiary care institution which caters to 3 districts. Late referrals were 64.28%. The majority of deaths were in the 21-25 age groups and around term 33 (58.92%). Hypertensive disorders were the commonest cause of death 15 (26.78%) followed by hemorrhage 10 (17.8%) and sepsis 7 (12.5%) and CVT 7 (12.5%).[11] The current study institution also cater 3 nearby district and the maternal mortality is more compared to national standard.

This is an institution-based, retrospective study in Minia Maternity and Children University Hospital, Minia governorate, Egypt. Data collection was done between January 2008 and December 2017.From 2008 to 2017 MMR in this hospital was 186/100.000 live births. Most frequent causes of maternal mortality were postpartum hemorrhage, hypertensive disorders of pregnancy and sepsis.[12]

CONCLUSIONS

Maternal mortality reflects the quality of obstetric services given to pregnant women in the community. MMR is still high in India and appropriate steps need to be taken at grassroot level. As most causes of maternal mortality are direct causes scope for improvement is large. Early detection of high-risk cases and early referral can reduce deaths.

BIBLIOGRAPHY

1. International Classification of Diseases and Related Health Problems. Geneva: World Health Organization,1992
2. Badrinath M, Karekal SA. Maternal mortality: A retrospective study. IOSR J Nurs Health Sci 2015; 4:10-3.
3. Trends in maternal mortality: 2000 to 2017: estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. Geneva: World Health Organization; 2019.
4. https://censusindia.gov.in/vital_statistics/SRS_Bulletins/MMR%20Bulletin%202016-18.pdf
5. https://data.unicef.org/topic/maternal-health/maternal-mortality/ last accessed on 06/01/2021.
6. Salhan S. Process documentation of the initiative to "improve the quality of Maternal Health through implementation of facility-based review of maternal deaths" Regional Health Forum. 2005;9(1):19–26. [Google Scholar]
7. Begum S, Aziz-un-Nisa, Begum I. Analysis of maternal mortality in a tertiary care hospital to determine causes and preventable factors. J Ayub Med Coll Abottabad. 2003; 15:49–52. [PubMed] [Google Scholar]
8. Sk MIK, Chattopadhyay A, Anand A, Naskar TK, Chakraborty S. Analyzing the etiology behind mortality associated with antepartum, intrapartum, and post-partum cases in a tertiary care teaching hospital of West Bengal. J Turk Ger Gynecol Assoc. 2018 Jun 4;19(2):65-71. doi: 10.4274/jtgga.2017.0136. Epub 2018 Mar 28. PMID: 29588262; PMCID: PMC5994816.
9. Murthy BK, Murthy MB, Prabhu PM. Maternal Mortality in a Tertiary Care Hospital: A 10-year Review. Int J Prev Med. 2013 Jan;4(1):105-9. PMID: 23411635; PMCID: PMC3570901.
10. Mittal P, Kapoor G, Kumari N, Bajaj B. Review of Maternal Mortality at a Tertiary Care Hospital: What Have we Achieved? J Obstet Gynaecol India. 2019 Apr;69(2):149-154. doi: 10.1007/s13224-018-1129-1. Epub 2018 May 21. PMID: 30956469; PMCID: PMC6430275.
11. *K. P. Mohana Sundari, R. Padma Priya, Subathra. Maternal* mortality: analysis of causes and preventable factors. https://dx.doi.org/10.18203/2320-1770.ijrcog20161478
12. Mohammed, M.M., El Gelany, S., Eladwy, A.R. *et al.* A ten-year analysis of maternal deaths in a tertiary hospital using the three delays model. *BMC Pregnancy Childbirth* **20,** 585 (2020). https://doi.org/10.1186/s12884-020-03262-7

Table 1 Direct Obstetric causes of mortality

Year	Total	Hemorrhage APH+IPH+ PPH	Pregnancy induced Hypertension	Sepsis excluding abortive	Abortive + Ectopic
2018	20	4+2+0=6	6	2	5+1
2019	7	1+2+1=4	2	0	0+1
2020	18	2+0+4=6	3	4	4+1
Total (percentage of total deaths)	45(75%)	16(26.6%)	11(18.3%)	6(10%)	12(20%)

Table 2 – Indirect obstetrics causes of mortality

Year	Total	Anemia	CVS	Liver	Resp	Renal	CNS	Infective
2018	4	0	2	1	0	0	0	1
2019	5	0	1	1	1	2	0	0
2020	6	1	0	2	1	1	1	0
Total	15(25%)	1	3	4	2	3	1	1

Table 3 Demographic factors Age, Parity

Age of mother	Gestational age			
	<20 weeks	20wks to delivery	Post-partum	Total
<20years	1	1	3	5(8.3)
20-24 years	2	0	6	8(13.3)
25-29 years	3	0	12	15(25%)
30-34 years	6	0	14	20(33.3)
>35 Years	2	0	10	12(20%)
Total	14(23.3%)	1	45(75%)	
	Pariety			
Primi	4	1	19	24(40%)
Multi	9	0	27	36(60%)
	Mode of delivery			
Live births	Vaginal (11) instrumental (4) operative (13)			28
Still born/IUFD	Vaginal (12) Instrumental (3) Operative (2) PMCS*(1)			18
	Referred or in patient			
Referred cases	26(43.3%)			
In patient	34(56.6%)			

PMCS – postmortem Caeseraen

Dept.Obs & Gyn,
College of Medicine and JNM Hospital, Kalyani, West Bengal
✉ Email: suvobratas@gmail.com

Received: 11.01.2021
Accepted: 14.01.2021
Published online: 15.01.2021
Citation: Sarkar S, Lavanya N, Roy Chowdhury R. An analysis of maternal mortality – 3 years study in a tertiary care hospital. J Indian Acad Obstet Gynecol. 2021;2(2):37-41.

© Indian Academy of Obstetrics & Gynaecology 2021