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Original Research Article

Maternal mortality-a three-year retrospective study in a rural medical college of India

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ABSTRACT

Background: Maternal mortality is a tragic event as family revolves around a mother. The deadly obstetrical triad of hemorrhage, preeclampsia and infection has accounted for a third of all deaths. This study was conducted to assess maternal mortality ratio, demographic profile and causes of maternal death.

Methods: This retrospective longitudinal study was conducted in the department of obstetrics and gynecology for a period of three years from 1st January 2018-31st December, 2020. Total no of death during this period was 134. Records of deaths and demographic profiles were retrieved from the medical record library of aforesaid hospital.

Results: There were 134 maternal deaths amongst 56815 live births with MMR 235.85. The majority of deaths were in 20-29 year of age group and most of the deaths seen in multigravida. The 91.79% death was observed within the 24 hours and after 72 hours. Eclampsia, preeclampsia and hemorrhage were leading cause of maternal death seen in the study.

Conclusions: Maternal mortality is higher than national MMR. Majority of maternal death were preventable by proper antenatal care, early detection of high-risk pregnancies and their timely referral to tertiary care centre.

Keywords: Eclampsia, Hemorrhage, Maternal mortality, Preeclampsia

INTRODUCTION

Maternal death is a tragic condition as it occurs during or after natural process. As per world health organization, maternal death is the death of the women 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 or its management, but not from accidental or incidental causes. One of the key indicators of maternal mortality is maternal mortality ratio (MMR) which is defined as the number of maternal deaths during a given time period per 100,000 live births during the same time period. The index of the quality of health care delivery system of a country as a whole or in part is reflected by its MMR.

Maternal mortality is unacceptably high. About 295000 women died during and following pregnancy and child birth in 2017 globally. The vast majority of death (94%) occurred in low resource setting and most could have been prevented.¹ Sub-Saharan and Southern Asia accounted for approximately 86% (254,000), of estimated global maternal death in 2017.

Africa alone accounted for roughly two thirds (196000) of maternal deaths while Southern Asia accounted for nearly 1/5th (58,000). WHO commends India for its ground breaking progress in recent years in reducing the MMR by 77%, from 550 per 100,000 live births to 130 per 100,000 live births in 2016. India's present MMR is below the millennium development goal (MDG) target and puts the

country on track to achieve the sustainable development goal (SDG) of MMR below 70 by 2030.² As per national health policy (NHP) 2017, the target for MMR is 100 per 100,000 live births by 2020.

A special bulletin by sample registration system office of the registrar general, India provides the level of maternal mortality for the period 2016-2018. It is heartening that the MMR of India has declined to 113 in 2016-2018 from 122 in 2015-2017 and 130 in 2014-2016.³

Women die as a result of complications during and following pregnancy and child birth. Most of these complications developed during pregnancy and most are preventable or treatable. Other complications may exist before pregnancy but are worsened during pregnancy, especially which are not managed as part of the woman's care. The major complications that account for nearly 75% of all maternal deaths are severe bleeding (mostly bleeding after child birth), infection (usually after child birth), high blood pressure during pregnancy (Pre-eclampsia and eclampsia), complications from delivery or unsafe abortion.⁴ The major causes of maternal mortality are preventable through regular antenatal checkup, proper diagnosis and management of labor complications.

Burdwan medical college and hospital is a rural medical college and large no of pregnant mother with high risk factors, mother with PROM, obstructed labor and prolonged labor and mother with abnormal puerperium are referred from BPHC, SD and state general hospital in bad shape which died after admission. We conducted this study to find out MMR, demographic profile and causes of maternal death.

METHODS

This study was carried out in obstetrics and gynecology department of Burdwan medical college-A rural tertiary care centre at Burdwan, West Bengal in India. The study was conducted by reviewing the records of maternal deaths over a period of three years from 1st January, 2018-31st December, 2020.

This was a longitudinal study. Every maternal death was carefully reviewed with special emphasis on age, parity, socioeconomic status, time of death, admission-death interval and causes of death.

Exclusion criteria

All doubtful cases, all accidental cases, maternal deaths occurring beyond 42 days postpartum and incidental causes were excluded from the study.

Statistical analysis

Data was analyzed by using SPSS version 11. Frequency and percentage were calculated for qualitative variables e.g., age, parity, incidence and socio-economic status.

RESULTS

During the study period, there were 134 maternal deaths out of 56815 live births giving MMR of 235.85 in our institution. Majority of deaths occurred in the age group of 20-29 years (59.7%) and were multigravida (65.67%), while 78.36% of patients were referred from other hospital. It is observed that most of the death occurred in post-partum period (91.79%) and majority of maternal death occurred before 24 hours and after 72 hours of admission (38.8% in each group).

Analysis of the causes of death revealed that eclampsia is the leading cause of death. 36 deaths (26.86%), out of 134 deaths were due to eclampsia; 29 deaths (21.64%) were due to obstetric hemorrhage. Obstetric hemorrhage includes atony, following caesarean section, placenta previa. Sepsis related deaths were 18 (13.43%) and pregnancy induced hypertension related death were 15 (12.68%). Anemia, heart disease and pulmonary embolism each account for 7 deaths (5.22%). 5 deaths (3.73%) were caused by hepatic coma following jaundice. Renal failure is responsible for 2.98% of death and suspected amniotic fluid embolism causes 2.98% of death. Diabetic keto acidosis causes 1 death like that of ARDS.

Table 1: Year wise distribution of maternal death and live birth.

Years	Maternal death	Live birth	MMR
2018	54	18892	285.84
2019	34	20488	165.95
2020	46	17435	263.84
Total	134	56815	235.85

Table 2: Maternal deaths and its characteristics.

Characteristics	Groups	Maternal deaths	Percent (%)
Age (years)	15-19	37	27.61
	20-29	80	59.70
	30-39	17	12.68
	>40	0	0
Parity	Primi	46	34.32
	Multi	88	65.67
Antenatal care	Referral	105	78.36
	Non referral	29	21.64
Socio economic status	Low	112	83.58
	Middle	22	16.42
Time of death	Antepartum	11	8.20
	Intrapartum	0	0
	Postpartum	123	91.79
Admission death interval (hours)	<24	52	38.80
	24-48	23	17.16
	48-72	7	5.22
	>72	52	38.80

Table 3: Causes of maternal death (n=134).

Causes	No. of death	Percentage (%)
Direct cause		
Eclampsia	36	26.86
Hemorrhage	29	21.64
Septicemia	18	13.43
Preeclampsia	15	12.68
Pulmonary embolism	7	5.22
Amniotic fluid embolism	4	2.98
Indirect cause		
Anemia	7	5.22
Heart disease	7	5.22
Jaundice	5	3.73
Renal failure	4	2.98
Diabetes (DKA)	1	0.74
ARDS	1	0.74

DISCUSSION

The MMR in our present study is 235.85 per 100000 live births, which is higher than the state and national averages. Most of the women were referred from other hospitals resulting in delayed intervention and many were in poor general condition at the time of admission. BMCH, being a tertiary care centre and a teaching institution, get complicated cases from rural areas. Admission of moribund cases referred (78.36%) from periphery have inflated this mortality ratio, like other teaching institution of India.^{5,6} Most deaths were observed in the 20-29 years age group in present study which is similar to other study.⁷ Maternal mortality is more in multigravida mother (65.67%) in our study and this shows that too many pregnancies and short inter-conception period adversely affects the health and social status of the women. Other studies by Sethi et al and Thomas et al also showed that multigravida contributing 55% and 50.8% of maternal deaths respectively.^{8,9} Most patients were from low socio-economic status (83.58%) and this is consistent with other findings.^{10,11}

Post-partum deaths accounted for about 91.79% of maternal mortality, and this is similar to other studies. In this study maximum deaths occurred within 24 hours and after 72 hours of admission, 38.80% in each group. Nair et al in their study found 44.90% maternal deaths occurred within 24 h and 42.60% within 1-6 days of hospital admission.¹² Priya et al in their study also observed maximum deaths (54.63%) within 24 hours of hospital admission.¹³ It becomes apparent that many of the deaths that occurred could have been avoided if they were transferred earlier further highlighting the need for adequate and quick transport facilities.

Eclampsia, as seen in our study found to be the leading cause of death (26.68%) followed by hemorrhage (21.64%) and septicemia account 13.43%. Our findings

were consistent with studies by Bhaskar et al, Onakewhor et al, Jadhav et al.^{10,11,14} Preeclampsia account for 12.68% of death in this study. Hypertensive disorder of pregnancy causing maximum number death (39.36%) in this study. Even today large number of maternal deaths were due to classic triad of haemorrhage, hypertensive disorders and sepsis.

Indirect cause of death account for 18.63% of total maternal death in this study. Anemia, heart disease and jaundice responsible for 5.22%, 5.22% and 3.73% of maternal death respectively. These are similar to other studies.^{10,11}

Limitations

As Burdwan medical college is a rural one, large no of cases was admitted in poor shape due to late referral and poor transport system and hence admission-death interval is short in big percentage of cases (38.80%) and in these cases proper causes evaluation and management are difficult.

CONCLUSION

The MMR in our study is higher like other tertiary care centre. A number of sociodemographic factors affect maternal mortality. It was observed that poor, illiterate women with poor knowledge regarding spacing of birth, inadequate ANC, coming from remote rural areas are more vulnerable to morbidity and mortality. Eclampsia-preeclampsia, hemorrhage and septicemia were major the direct causes of maternal death. All these are preventable causes of maternal mortality provided the treatment is instituted in time. 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 injection magnesium sulfate, tablet misoprostol as most maternal deaths in rural areas are still due to eclampsia and postpartum hemorrhage. Early detection of high-risk pregnancies and referring them to a tertiary centre at the earliest can reduce the complications of high-risk pregnancies. Early correction of anemia and health education on importance of IFA tablets will reduce death due to anemia. Lastly most deaths could have been avoided with the help of good antenatal, intra-natal and postnatal care, early referral, quick, efficient and well-equipped transport facilities, availability of adequate blood and blood components, and promoting overall safe motherhood.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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