



Maternal mortality ratio (MMR) study in SMGS Hospital, Jammu: A 5 year retrospective study

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ABSTRACT

Aim: Maternal mortality ratio (MMR) study in SMGS Hospital, Jammu – a 5 year retrospective study.

Material and methods: This was a retrospective study in GMC Jammu for a period of 5 years about the cases of maternal mortality during the period. The data was collected to calculate the total number of live births and the number of maternal deaths in this period. Source of data was maternal mortality register, files from MRD section and census papers. MMR was calculated as total maternal deaths per 1,00,000 live births. The direct causes of death was studied and associated risk factors was also be recorded.

Results: During the study period, there were 160 maternal deaths out of 129575 live births giving MMR of 123.48 in our institution. Majority of deaths occurred in the age group of 20-25 years (60%) and were multigravida (60%), while 75% of patients were referred from other hospital. It is observed that most of the death occurred in post-partum period (80%) and majority of maternal death occurred after 72 hours of admission (50%). Analysis of the causes of death revealed that hemorrhage is the leading cause of death. 80 deaths (50%), out of 200 deaths were due to hemorrhage; 40 deaths (25%) were due to Preeclampsia and Eclampsia. Sepsis related deaths were 32 (20%) and Embolism or unexpected Postpartum collapse related death were 12(5%).

Conclusions: The maternal mortality rate exceeds the overall national maternal mortality rate. The prevention of a significant proportion of maternal mortality can be achieved through the implementation of appropriate antenatal care, the early identification of pregnancies at high risk, and the prompt referral of such cases to specialised tertiary care facilities.

Keywords: Eclampsia, Hemorrhage, Maternal mortality, Preeclampsia

INTRODUCTION

According to the World Health Organisation and the International Classification of Disease-10, a maternal death is characterised as the demise of a woman during pregnancy or within 42 days after the termination of pregnancy, regardless of the duration and location of the pregnancy. This unfortunate event is attributed to any cause that is either directly related to pregnancy or worsened by the management of pregnancy. In 2013, the global maternal mortality ratio (MMR) stood at 210 maternal deaths per 100,000 live births, indicating a decline from the 1990 figure of 380 maternal deaths per 100,000 live births. (1)According to available data, approximately 99% of the women in question originate from developing nations, with a significant majority of over 85% being geographically concentrated in the regions of Africa and Asia.(2) The assessment conducted by the United Nations (UN) regarding the Millennium Development Goal (MDG)-5 revealed limited advancements in sub-Saharan Africa, a region that accounts for half of all maternal mortalities.(3) The progress demonstrated by South Asian countries, including India, which comprises a significant proportion of maternal deaths at 25%, is not deemed noteworthy. According to recent data, the maternal mortality rate (MMR) in India remains elevated, albeit exhibiting a declining trend over time. In the year 2010, the maternal mortality ratio (MMR) in India was

recorded at 200 per 100,000 live births (4). Subsequently, during the period of 2010-2012, the MMR decreased to 178 per 100,000 live births.(5) The rate of maternal mortality is deemed to be unacceptably elevated. In the year 2017, the global maternal mortality rate recorded approximately 295,000 fatalities among women during the course of pregnancy and in the postpartum period. The overwhelming majority of fatalities (94%) transpired within contexts characterised by limited resources, and a significant proportion of these incidents could have been averted. In 2017, it was estimated that Sub-Saharan Africa and Southern Asia collectively contributed to around 86% (254,000) of global maternal mortality. Africa was responsible for approximately 66% (196,000) of maternal deaths, while Southern Asia accounted for nearly 20% (58,000) of such deaths.(6) The World Health Organisation (WHO) acknowledges and commends India for its significant advancements in recent years in the reduction of the Maternal Mortality Ratio (MMR). India has achieved a remarkable decrease of 77%, from 550 maternal deaths per 100,000 live births to 130 maternal deaths per 100,000 live births in the year 2016. India's current maternal mortality ratio (MMR) falls below the target set by the millennium development goal (MDG), indicating progress towards attaining the sustainable development goal (SDG) of achieving an MMR below 70 by 2030. According to the National Health Policy (NHP) of 2017, the objective is to achieve a Maternal Mortality Ratio (MMR) of 100 per 100,000 live births by the year 2020.(7) The Office of the Registrar General in India has released a special bulletin containing data from the Sample Registration System, which presents the maternal mortality rates for the years 2016-2018. It is encouraging to observe that the Maternal Mortality Ratio (MMR) in India exhibited a decline, decreasing from 122 in the period of 2015-2017 to 113 in the years 2016-2018, following a previous MMR of 130 during the interval of 2014-2016.(8) Maternal mortality occurs due to complications arising during and subsequent to pregnancy and childbirth in women. The majority of these complications arise during the gestational period and can be either preventable or amenable to treatment. There may be pre-existing complications that are exacerbated during pregnancy, particularly if they are not effectively addressed as part of the woman's healthcare. The primary complications responsible for approximately 75% of maternal mortality cases encompass severe postpartum haemorrhage, postpartum infection, hypertensive disorders of pregnancy (specifically pre-eclampsia and eclampsia), as well as delivery-related complications and unsafe abortions. The prevention of maternal mortality can be achieved through the implementation of routine antenatal checkups and the appropriate diagnosis and management of complications during labour.(9)

MATERIAL AND METHODS

This was a retrospective study in GMC Jammu for a period of 5 years about the cases of maternal mortality during the period. The data was collected to calculate the total number of live births and the number of maternal deaths in this period. Source of data was maternal mortality register, files from MRD section and census papers. MMR was calculated as total maternal deaths per 1,00,000 live births. The direct causes of death was studied and associated risk factors was also be recorded.

INCLUSION CRITERIA

All maternal deaths occurring in a period of 5 years from January 2018 to December 2022 in the Deptt of Obstetrics & Gynaecology, SMGS Hospital, Jammu.

EXCLUSION CRITERIA

Women that died due to conditions not related to or during pregnancy or within 42 days of termination of pregnancy.

RESULTS

During the study period, there were 160 maternal deaths out of 129575 live births giving MMR of 123.48 in our institution. Majority of deaths occurred in the age group of 20-25 years (60%) and were multigravida (60%), while 75% of patients were referred from other hospital. It is observed that most of the death occurred in post-partum period (80%) and majority of maternal death occurred after 72 hours of admission (50%). Analysis of the causes of death revealed that hemorrhage is the leading cause of death. 80 deaths (50%), out of 200 deaths were due to hemorrhage; 40 deaths (25%) were due to Preeclampsia and Eclampsia. Sepsis related deaths were 32 (20%) and Embolism or unexpected Postpartum collapse related death were 12(5%). Anemia 96(60%), Heart disease 10(6.25%), Jaundice 10 (6.25%), Renal failure 32 (20%), Diabetes (DKA) 10(6.25%) and ARDS 2(1.25%).

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

Years	Maternal death	Live birth	MMR
2018	30	27375	109.59
2019	34	26645	127.60
2020	32	25550	125.24
2021	35	24820	141.01
2022	29	25185	115.15
Total	160	129575	123.48

Table 2: Maternal deaths and its characteristics

Characteristics	Groups	Maternal deaths=160	Percent (%)
Age (years)	Below 20	48	30
	20-25	96	60
	25-30	8	5
	Above 30	8	5
Parity	Primi	64	40
	Multi	96	60
Antenatal care	Referral	120	75
	Non referral	40	25
Socio Economic status	Low	112	70
	Middle	32	20
	upper	16	10
Time of death	Antepartum	16	10
	Intrapartum	16	10
	Postpartum	128	80
Admission death interval (hours)	<24	32	20
	24-48	24	15
	48-72	24	15
	>72	80	50

Table 3: Causes of maternal death

Causes	No. of death	Percentage (%)
Direct cause		
Preeclampsia and Eclampsia	40	25
Hemorrhage	80	50
Septicemia	32	20
Embolism or unexpected Postpartum collapse	8	5
Indirect cause		

Anemia	96	60
Heart disease	10	6.25
Jaundice	10	6.25
Renal failure	32	20
Diabetes (DKA)	10	6.25
ARDS	2	1.25

DISCUSSION

The maternal mortality rate (MMR) observed in our current study stands at 123.48 per 100,000 live births, surpassing both the state and national averages. A significant proportion of the female patients were referred from external medical facilities, leading to a delay in receiving appropriate medical intervention. Consequently, upon admission, a considerable number of these patients exhibited suboptimal overall health status. GMC Jammu, as a tertiary care facility and an educational institution, receives complex cases from rural regions. The admission of moribund cases referred from the periphery, comprising 80% of the total admissions, has contributed to the inflation of the mortality ratio, a trend observed in other teaching institutions in India as well.(10,11)In the current study, it was observed that the majority of deaths occurred within the age group of 20-25 years, a finding that aligns with previous research.(12)In our study, we observed that maternal mortality is higher among multigravida mothers, accounting for 66% of cases. This finding suggests that an increased number of pregnancies and a shorter inter-conception period have a negative impact on the health and social standing of women. Additional research conducted by Sethi et al and Thomas et al similarly demonstrated that multigravida accounted for 55% and 50.8% of maternal deaths, respectively.(13,14)The majority of patients (70%) in this study were found to belong to a low socio-economic status, which aligns with previous research findings.(15,16)

Postpartum deaths constituted approximately 80% of maternal mortality, a finding consistent with previous research. This study observed that the highest number of fatalities took place within 72 hours of hospital admission, accounting for 50% of the total deaths. In their study, Nair et al. (year) observed that 44.90% of maternal deaths transpired within 24 hours of hospital admission, while 42.60% occurred within a timeframe of 1-6 days after admission. In their study, Priya et al. (17) also noted that the highest proportion of fatalities (54.63%) occurred within the first 24 hours of patients being admitted to the hospital. It becomes evident that a significant number of fatalities could have been prevented had they been promptly transferred, thereby emphasising the imperative for efficient and expeditious transportation infrastructure.(18)

In our study, it was observed that haemorrhage emerged as the primary cause of mortality, accounting for 50% of cases. This was closely followed by Preeclampsia and Eclampsia, which accounted for 25% of deaths, and septicemia, which accounted for 20% of cases. The results of our research align with the findings reported in the studies conducted by Bhaskar et al., Onakewhor et al., and Jadhav et al. (15, 16, 19). The study reveals that the hypertensive disorder of pregnancy is responsible for the highest number of fatalities. To this day, a significant proportion of maternal fatalities can be attributed to the classic triad of haemorrhage, hypertensive disorders, and sepsis.

In this study, it was found that indirect causes of death due to anaemia, heart disease, and jaundice account for 60%, 6.25%, and 6.25% of maternal mortality, respectively. These findings exhibit similarities to previous research conducted in this field.(15,16)

CONCLUSIONS

The maternal mortality rate exceeds the overall national maternal mortality rate. The prevention of a significant proportion of maternal mortality can be achieved through the implementation of appropriate antenatal care, the early identification of pregnancies at high risk, and the prompt referral of such cases to specialised tertiary care facilities.

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