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Original Research Article

## Impact of government schemes on maternal mortality

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### ABSTRACT

**Background:** To analyze the causes of maternal death over a period of 5 years with respect to direct and indirect causes and to see the effect of various government schemes in MMR reduction.

**Methods:** A retrospective study of maternal death cases was conducted over a 5-year period, from January 2016 to December 2020, in our tertiary health center. Each case was analyzed with respect to age, parity, residence, antenatal booking, admission- mortality interval, etc. Results were analyzed by using percentage and proportion.

**Results:** In our study, there were total 161 maternal death and 66,806 live births giving an MMR of 240.9 per one lac live birth. In the year 2016, there was total 12303 live birth, and it was increased to 14783 in the year 2020. MMR in 2016 was 243.84, and it also increased by 277.34 in the year 2020. Obstetric hemorrhage (28.57%), severe PIH, and eclampsia (19.87%) followed by septicemia (9.93%) were common direct causes of death. Anemia was the most important indirect cause of death.

**Conclusions:** Although various government maternity programs like JSY and JSSK are successful in improving the number of institutional deliveries, but they are still less effective in the reduction of MMR. Besides these schemes, MMR can be reduced by improving female literacy, health, and good antenatal care and by the provision of quality of emergency obstetric care with skilled birth attendance.

**Keywords:** Maternal mortality, JSSK, Millennium development goal and hemorrhage

### INTRODUCTION

Childbirth is a celebrating moment worldwide, but unfortunately, this is not true for thousands of women. In every 2 minutes, one woman dying as a result of pregnancy or childbirth.<sup>1</sup> According to WHO, maternal death is defined as the death of women while being pregnant or within 42 days of the termination of pregnancy, irrespective of the duration and site of pregnancy from any cause or its management. The maternal mortality ratio is defined as the number of maternal deaths during a given time period per 100000 live births during the same time period.<sup>2</sup> It is an indicator of the quality of obstetric care provided in any

community and the utilization of available health resources.

India is a country with high maternal mortality. It accounts for 1/5th of all maternal death of the world. The current MMR of India is 178.<sup>3</sup> Unfortunately majority of these death are due to preventable causes such as hemorrhage, eclampsia, sepsis, and anemia.

To promote institutional deliveries with an aim to reduce maternal mortality and to achieve MDG millennium development goal- 5 that is 75 % reduction in maternal mortality from 1990 by 2015, the government of India started JSY (Janani Suraksha Yojna) in 2005 in which the

state pays women a cash incentive to deliver in an institution. In 2011 government of India launched JSSK (Janani Shishu Suraksha Karayakram), in which women are entitled to services in government health institutions free of cost, including delivery care, cesarean section, drugs, diagnostic facilities, food and treatment of sick newborn up to 30 days also a free provision of blood, free transport from home to health facilities and vice versa and free transportation between health facilities in cases of referral.<sup>4</sup>

After the implementation of these schemes, the rate of institutional deliveries has increased, but maternal mortality is not reduced in that proportion. Unfortunately, we are far away from MDG. This study was planned with the objective to assess the causes of maternal mortality, both direct and indirect, to analyze the demographic and social factors, and to find out the incidence of maternal mortality over a 5-year period from January 2016 to December 2020. As well as to see the impact of JSSK on institutional deliveries and maternal mortality.

## METHODS

The present study is a retrospective study that was carried out in the department of obstetrics and gynecology at Government medical college Bikaner, a district of western Rajasthan. All maternal death cases occurring in our hospital between January 2016 and December 2020 were analyzed.

All maternal mortality cases were recorded at the hospital's monthly maternal mortality meeting. All cases of maternal mortality were confirmed by the hospital

maternal mortality committee. Each maternal death was examined for various factors that may have contributed to the death, including age, residence location, parity, gestational age, antenatal care, admission-death interval, women's condition at admission, cause of death, and contact facility, as well as any delay in reaching the tertiary care teaching hospital from the primary care center. The maternal mortality rate for the study period was calculated using the following formula:

$$MMR = \frac{\text{Total number of maternal deaths}}{\text{Total number of live births}} \times 100000$$

## Statistical analysis

Where appropriate, questionnaire data were pre-coded to facilitate collection and to ensure accuracy, and any translation errors were corrected. Data were entered into Microsoft Excel 365 and then exported to Statistical package for social sciences (SPSS) V.16 for Windows, a statistical software package for social science. Continuous data were described using descriptive statistics like mean and standard deviation (SD), while categorical variables were described using numbers and percentages. To distinguish variations between variables, an independent sample t-test or chi-square test was used.

## RESULTS

In the present study, there were total 161 maternal death and 66,806 total live birth giving an MMR of 240.9 per one lac live birth.

**Table 1: Maternal deaths based on sociodemographic distribution.**

	2016	2017	2018	2019	2020	Total
Age <20 years	8	7	9	4	8	36 (22.36%)
Age 21-25 years	12	10	13	12	20	67 (41.61%)
Age 26-30 years	6	6	8	9	7	36 (22.36%)
Age 30-35 years	3	4	5	1	4	17 (10.55%)
Age >35 years	1	0	2	0	2	5 (3.10%)
Rural	19	15	18	15	27	94 (58.39%)
Urban	11	12	19	11	14	67 (41.61%)
Booked	1	4	4	1	4	14 (8.69%)
Unbooked	29	23	33	25	37	147 (91.30%)
Referred	26	22	28	23	31	130 (80.74%)
Nonreferred	4	5	9	3	10	31 (19.25%)
Primigravida	10	11	9	6	17	53 (32.91%)
Multigravida	20	16	28	20	24	108 (67.08%)
Duration of hospital stays <24 hrs.	22	18	24	16	25	105 (65.21%)
Duration of hospital stay 1 day to 7 day	8	8	12	9	14	51 (31.68%)
Duration of hospital stay > 7 days	0	1	1	1	2	5 (3.11%)

**Table 2: Direct obstetric causes of maternal deaths.**

Direct obstetrics causes of death	2016	2017	2018	2019	2020	Total
PPH	12	7	11	8	8	46 (28.57%)
Severe PIH with antepartum eclampsia	5	4	4	5	14	32 (19.87%)
APH	1	0	2	4	2	9 (5.59%)
Rupture uterus	1	0	2	0	2	5 (3.10%)
Septicemia	2	3	5	1	5	16 (9.93%)
Inversion of uterus	0	2	0	1	1	4 (2.48%)
Ectopic pregnancy	0	0	1	0	0	1 (0.62%)
<b>Total</b>	<b>21</b>	<b>16</b>	<b>25</b>	<b>19</b>	<b>32</b>	<b>113</b>

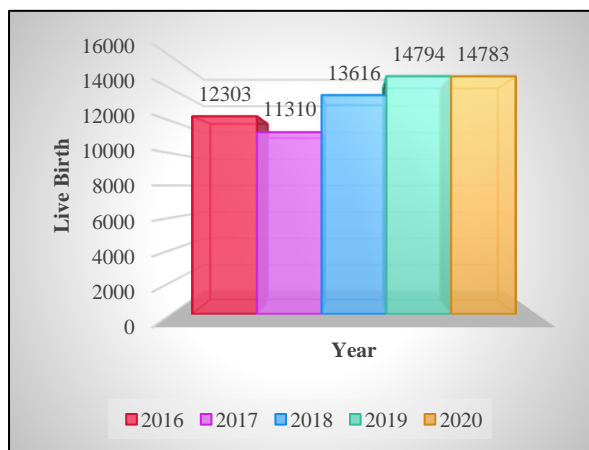
**Table 3: Indirect obstetric causes of maternal deaths.**

Indirect obstetric causes of death	2016	2017	2018	2019	2020	Total
Heart disease	1	2	0	4	2	9 (5.59%)
Hepatitis	2	1	2	0	0	5 (3.10%)
Malaria	1	0	0	0	0	1 (0.62%)
Severe anemia	4	8	8	3	7	30 (18.63%)
Pregnancy with lymphoma	0	0	1	0	0	1 (0.62%)
ARDS	1	0	1	0	0	2 (1.24%)
<b>Total</b>	<b>9</b>	<b>11</b>	<b>12</b>	<b>7</b>	<b>9</b>	<b>48</b>

**Table 4: Year wise distribution of MMR.**

	2016	2017	2018	2019	2020	Total
Live birth	12303	11310	13616	14794	14783	66806
Maternal mortality	30	27	37	26	41	161
MMR per one lac	243.84	238.72	271.73	175.76	277.34	240.9

By analyzing sociodemographic characteristics, it was observed that out of 161 maternal death, 67 (41.61 %) were in the age group 21-25 years, followed by 36 (22.36%) in 26 – 30 years.



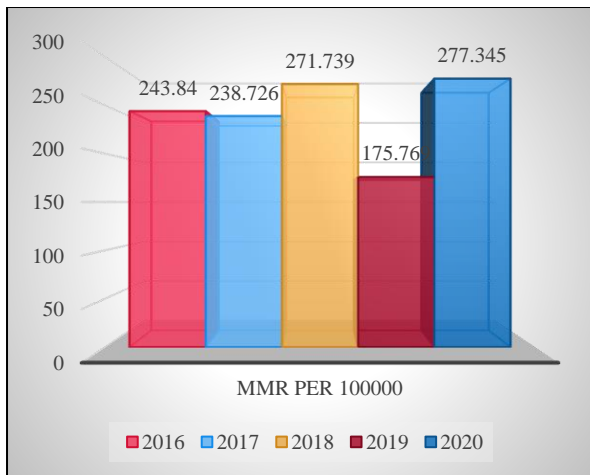
**Figure 1: Year wise presentation of live birth.**

A similar proportion was seen in the less than 20 years age group. 17 (10.55%) patients were in the 31 – 35 age group, and five patients died in the more than 35 years age group. 94 (58.39 %) patients were from rural backgrounds. While 67(41.61%) patients belong to urban

areas. Out of 161 maternal deaths, only 14 (8.69%) had an antenatal booking, while 147 (91.30 %) were unbooked. By gravidity distribution, 53 (32.91 %) were primigravida while 108 (67 %) females were multigravida. (Table 1)

It was observed that maximum death (36.02 %) occurred within 24 hours of admission, followed by 31.68 % of patients who died within seven days of admission. 3.11 % of death occur after seven days of admission. By evaluating the causes of mortality, it was observed that PPH remain the main killer of women causing 46 (28.57 %) death. Severe PIH emerged as the second most important cause of death, accounting for 32(19.87%) death. Septicemia accounted for 16 (9.93 %) death. Antepartum hemorrhage caused 9 (5.59 %) death. 5 (3.10 %) women died following ruptured uterus, and 4 (2.48 %) women died due to inversion of the uterus, and one death occurred due to ruptured ectopic pregnancy with hypovolemic shock. (Table 2)

Amongst the indirect causes, severe anemia responsible for 30 (18.63 %) death, heart disease accounted for 9 (5.59 %) death, hepatitis for 5 (3.10 %) death, and ARDS was causing 2 (1.24 %) death. One woman with malaria, and one died due to lymphoma. (Table 3)



**Figure 2: Year wise presentation of MMR.**

However, between 2016 and 2020, the rate of live birth increased. (Figure 1) After reviewing five years' maternal mortality and institutional deliveries results, it was determined that, despite improvements in hospital deliveries, maternal mortality had not decreased. (Figure 2) In the year 2016, total live birth was 12303 and MMR was 243.84, while in the year 2020, total live birth was 14783 and MMR was 277.34. (Table 4)

## DISCUSSION

The health status of any community or state can largely be assessed by the MMR. Rajasthan is the state of India where maternal mortality is still high. According to sample registration survey year 2010 -12, it was 255 per one lac live birth.<sup>5</sup>

As early marriage is the prevailing custom in rural Rajasthan, most of the women present with their first pregnancy in the age group of 21- 25 years. The table showed that 41.61 % women died in 21 – 25 years of age group and 22.36 % maternal death was in less than 20 years of age group. This reflects how early marriages are killing our poor girls.

In our study majority of death were in rural, unbooked, and multigravida females. This is due to poverty, illiteracy, unavailability of proper antenatal care, limited knowledge of birth spacing methods, and poor intrapartum obstetric care. Results were similar to other studies.<sup>6,7</sup>

Maximum death occurs within 24 hrs. of admission. This reflects that most of the women had reached to our hospital in critical and end-stage of life. In the present study, common direct causes of maternal mortality were hemorrhage (28.57%), PIH and eclampsia (19.87%), and septicemia (9.93%). A similar result was seen in other studies.<sup>8,9</sup> Anemia was the most important indirect cause of maternal death, followed by cardiac disease and

hepatitis. This is due to the primary failure of early detection and treatment of illness in the antenatal period.

Table 4 showing that after the implementation of JSSK in 2011, hospital deliveries were increased, but along with it number of maternal deaths also increased. This might be due to the effect of JSSK, which on one side has tried to promote hospital deliveries to avert maternal death; on the other hand, a maximum number of unbooked, complicated patients reaching the hospital in the moribund state without any single ANC visit. As well as promotion of transport vehicle also worsen a number of deaths by carrying complicating cases like PPH in end-stage of life.<sup>10,11</sup>

## Limitations

The retrospective aspect of this study was a significant limitation. We were unable to determine if survivors of these obstetric complications were consistent with the standard of treatment they received in the hospital. Prospective research involving interviews with women who survived life-threatening obstetric complications may provide more detail in this regard.

## CONCLUSION

Although JSY and JSSK are effective in moving mothers from their homes to hospitals for childbirth, they are ineffective in reducing MMR because they are both demand-driven programs that focus solely on intrapartum treatment without enhancing antenatal services. These systems place an additional burden on our healthcare facilities, which are already understaffed in terms of qualified personnel needed to provide emergency obstetric care.

So, it is concluded that, in addition to their government scheme, MMR can be minimized by enhancing female literacy and nutrition status, early ANC registration, monitoring of high-risk pregnancies, and providing quality emergency obstetric treatment, qualified birth attendants, family planning, and secure abortion facilities. There needs to be a big focus on the implementation of basic and full-spectrum obstetrical services to bring down the maternal mortality rate and morbidity rate. As well as the social advancement of the female gender to be directly involved in the social mainstream.

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