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Maternal Mortality in a Tertiary Care Hospital: A 5 - Year Review

Dr. Vijay Kumar Saini[1], Dr. B. S. Jodha[2]

[1]3rd Year Resident

[2]Senior Professor

Abstract: ***Background; Epidemiological data pertaining to maternal mortality is valuable in each set up to design interventional programs to favourably reduce the ratio. This study was done to evaluate the maternal mortality rate in our hospital, to assess the epidemiological aspects and causes of maternal mortality, and to suggest recommendations for improvement. Methods; This was a 5 year retrospective study. Epidemiological data was collected from the hospital register and maternal mortality ratio, epidemiological factors and causes affecting maternal mortality were assessed. Results; During the study period, January 2015 to December 2019, there have been a complete of 106471 live births and 166 maternal deaths. The mean maternal mortality ratio within the study period was 155.90/100000 live births. Maximum maternal deaths (41.56 %) were reported within the age bracket of 20 to 24 years. More deaths were reported in multiparous women (63.25 %) as compared to Primiparas. (36.74 %), More maternal deaths were reported in women from rural areas (68.07 %) as compared to women from urban areas (31.92 %).Maximum maternal deaths were reported in unbooked patients (83.73 %) as compared to booked patients (16.26 %). In the study period, 79.51 % of maternal deaths were due to direct causes. The classical triad of hemorrhage (59.01 %), eclampsia (15.90 %), and sepsis (25.00 %) was the major direct causes of maternal deaths. In the study period, 20.48 % of maternal deaths were due to indirect causes. Anemia, jaundice, and heart disease accounted for 41.17 %, 52.94 %, and 5.88 % of maternal deaths respectively. Conclusion; There is a wide scope for improvement as a large proportion of the observed deaths are preventable.***

Keywords: Maternal mortality ratio, maternal mortality, prevention

1. Introduction

Maternal mortality is an important indicator of health. According to the World Health Organization (WHO), "A maternal death is defined as death of a lady while pregnant or within 42 days of termination of pregnancy, regardless of the duration and site of pregnancy, from any cause associated or aggravated by pregnancy or its management" (ICD-10). Almost half a million women die per annum from complications during pregnancy and childbirth. About 99% of those women are from developing world with over 90% concentrated in Africa and Asia. The tragedy is that these deaths are largely preventable. The progress in maternal health has been uneven, inequitable, and unsatisfactory.

Most of the evidence for maternal mortality is obtained through hospital data and community based reports, which are situated mostly in urban areas, whereas most of the maternal deaths are from rural areas. This study was done to assess maternal mortality in umaid hospital a tertiary medical college hospital situated in urban area under DR. S.N. medical college jodhpur (Rajasthan) where large numbers of patients are being referred from rural areas of western Rajasthan.

National rural health mission was introduced in April 2005 by the prime minister. One of the primary goals of this scheme was to reduce the maternal mortality by training the rural health attendants in necessary skills required to reduce the maternal deaths.

1.1 Aims and Objectives

- To calculate the maternal mortality ratio in our hospital.
- To assess the epidemiological aspects of maternal mortality.
- To assess the causes of maternal mortality.
- To suggest ways to reduce the MMR.

2. Methods

The present study is a retrospective study, conducted within the department of Obstetrics and Gynecology of umaid hospital DR. S.N. Medical College jodhpur. Data regarding maternal mortality collected from maternal mortality Register after obtaining permission from the Medical Superintendent of the hospital. The small print of maternal deaths from January 2015 to December 2019 collected and analyzed with reference to following epidemiological parameters-

- Area wise distribution of maternal deaths.
- Gravidity wise distribution of maternal deaths.
- Maternal deaths consistent with receipt of antenatal care.
- Distribution of maternal death according to age
- Causes of maternal deaths.

Inclusion Criteria;

1) Death of a woman during pregnancy.
2) Death of a woman during childbirth.
3) Death a woman within 42 days after termination of pregnancy.

Exclusion Criteria

- Death of a woman during pregnancy or within 42 days of termination due to accidental/ incidental causes.
- The details of number of live births from January 2015 to December 2019 collected from record room which maintains labour registry.
- Maternal mortality ratio for the study period was calculated by using the formula-

MMR= Total Number of Maternal death × 100000
Total Number of Live Births

3. Results

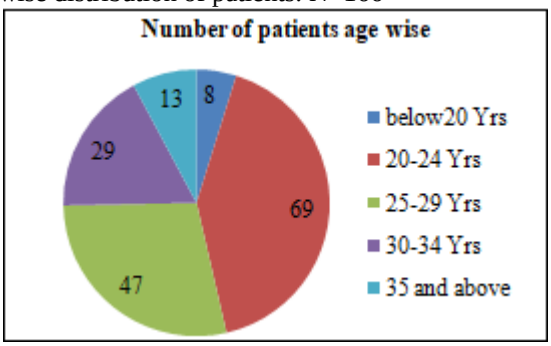
During the study period, January 2015 to December 2019, there have been a complete of 106471 live births and 166 maternal deaths. The mean maternal mortality ratio within the study period was 155.90/100000 live births.

The epidemiological characteristics of maternal deaths are shown in Table 1. Maximum maternal deaths (41.56%) were reported within the age bracket of 20 to 24 years. More deaths were reported in multiparous women (63.25%) as compared to Primiparas. (36.74%), More maternal deaths were reported in women from rural areas (68.07%) as compared to women from urban areas (31.92%).Maximum maternal deaths were reported in unbooked patients (83.73%) as compared to booked patients (16.26%).

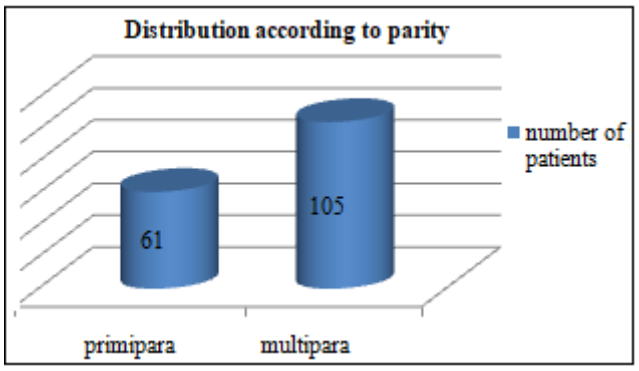
Table 1: Epidemiological Characteristics of maternal deaths n=166

Patient characteristics	Number n=166	Percentage
Age		
<20	08	4.81%
20-24	69	41.56%
25-29	47	28.31%
30-34	29	17.46%
35 and above	13	7.83%
Parity		
Primipara	61	36.74%
Multipara	105	63.25%
Residence		
Rural	113	68.07%
Urban	53	31.92%
Antenatal care		
Booked	27	16.26%
Unbooked	139	83.73%

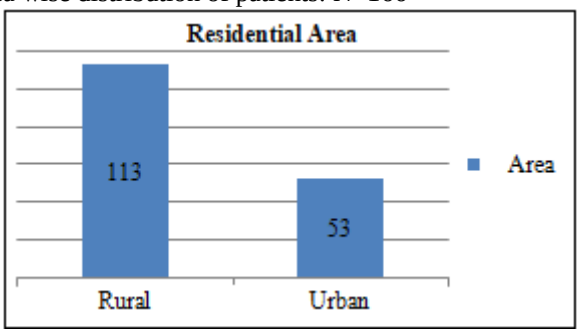
Age wise distribution of patients: N=166



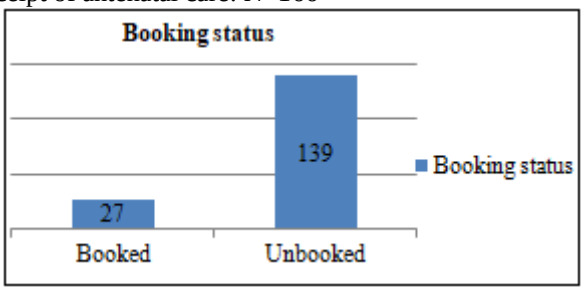
Parity wise distribution of patients: N=166



Area wise distribution of patients: N=166



Receipt of antenatal care: N=166



In the study period, 79.51% of maternal deaths were due to direct causes. Year-wise distribution of direct causes of maternal deaths is shown in Table 2. The classical triad of hemorrhage (59.01%), eclampsia (15.90%), and sepsis (25.00%) was the major direct causes of maternal deaths.

In the study period, 20.48% of maternal deaths were due to indirect causes. Anemia, jaundice, and heart disease accounted for 41.17%, 52.94%, and 5.88% of maternal deaths respectively as shown in Table 3.

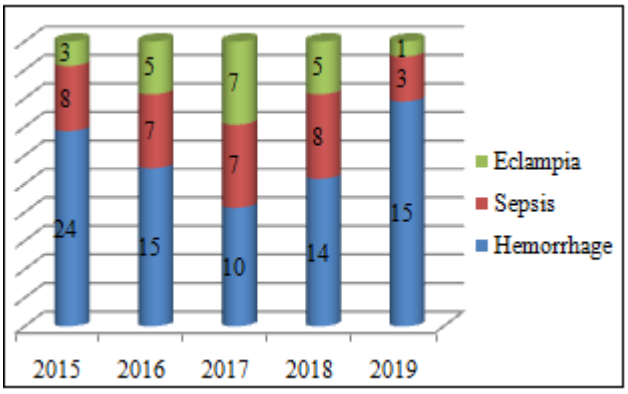
Table 2: Year wise distribution of direct cause of maternal deaths

Year	Direct cause		Haemorrhage		Sepsis		Eclampsia	
	No.	%	No.	%	No.	%	No.	%
2015	35	83.33	24	68.57	8	22.85	3	8.57
2016	27	87.09	15	55.55	7	25.92	5	18.51
2017	24	70.58	10	41.66	7	29.16	7	29.17
2018	27	75	14	51.85	8	29.62	5	18.51
2019	19	82.6	15	78.94	3	15.78	1	5.26
Total	132	79.51	78	59.01	33	25	21	15.9

Direct cause of maternal death: N=132

Year	Indirect cause		Anaemia		Jaundice		Heart disease	
	No.	%	No.	%	No.	%	No.	%
2015	7	16.66	2	28.57	3	42.85	2	28.57
2016	4	12.9	1	25	3	75	0	0.00

2017	10	29.41	4	40	6	60	0	0.00
2018	9	25	4	44.44	5	55.55	0	0.00
2019	4	17.39	3	75	1	25	0	0.00
Total	34	20.48	14	41.17	18	52.94	2	5.88



Indirect cause of maternal death: N=34

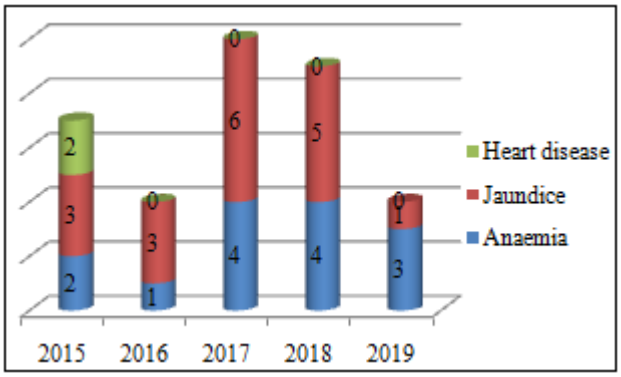
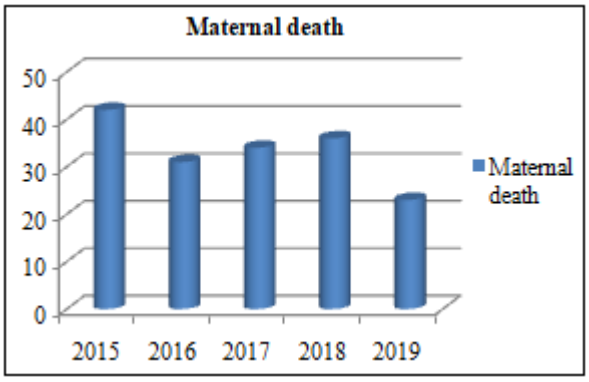


Table 4: Year wise maternal mortality

Year	Total birth	Live births	Maternal deaths	MMR/100000 live birth
2015	22645	21915	42	191
2016	21960	21282	31	145
2017	21883	21311	34	159
2018	21669	21034	36	171
2019	21540	20929	23	109
Total	109697	106471	166	155



4. Discussion

Maternal mortality is an index of reproductive health of the society. High incidence of maternal deaths reflects poor quality of maternal services, late referral and low socioeconomic status of the community. The mean Maternal mortality rate in the study period was 155.90/100000 births. The current maternal mortality ratio (MMR) in India is 130/100,000 live births.[1] Various studies done in India in the last 15 years have shown wide variation in MMR ranging from 47/100000 to 625/100000 births.[2-7] Madhu Jain has reported a very high MMR of 2270/100000.[3] This study has comparatively high MMR, which could be due to the fact, that our hospital is a tertiary care hospital and receives a lot of complicated referrals from rural areas of southern Maharashtra and also from North Karnataka at a very late stage.

In our study, 69.87% of maternal deaths were in the age group of 20 to 29 years, as highest numbers of births are reported in this age group. Similarly, 63.25% of maternal deaths were reported in multiparous patients. More maternal deaths were reported in women from rural areas (68.07%), unbooked patients (83.73%). All our findings were similar to studies by Jain,[3] Jadhav,[4] Pal,[5] Onakewhor.[6]

In our study, 79.51% of maternal deaths were due to direct causes. Hemorrhage (59.01%), eclampsia (15.90%), and sepsis (25%) were the major direct causes of maternal deaths. Our findings were consistent with studies by Jain,[3] Jadhav,[4] Pal,[5] Onakewhor,[6] and Shah.[7]

Indirect causes accounted for 20.40% of maternal deaths in our study. Anemia, jaundice, and heart disease were responsible for 41.17%, 52.94%, and 5.88% of maternal deaths, respectively. These findings were consistent with studies by Jain,[3] Jadhav,[4] Pal,[5] and Onakewhor.[6]

Reorientation of medical officers and staff nurses working in rural areas by programs such as basic emergency obstetrics care and skilled attendant at birth training gives a ray of hope for reducing maternal mortality. Maternal deaths can be prevented by improving the health-care facilities in rural areas by ensuring continuous availability of certain basic drugs such as injection magnesium sulfate and tablet misoprostol as most maternal deaths in rural areas are still due to eclampsia and postpartum hemorrhage. [8] Blood banks should also be available in the rural health centers. Provision of 24 h ambulance services for transportation of patients should be seriously considered. Roads of rural areas should be well connected to the nearby towns. Proper health education and iron supplementation should be started in schools itself to reduce the incidence of anemia.

The Reproductive and child health program (1997), National Rural Health Mission in 2005, etc., were few government programs to improve basic health-care delivery system. At present, Janani Shishu Suraksha Karyakram, a central Government-sponsored program, is running in states to increase institutional deliveries. Delivery in institutional facilities has risen from 26% in 1992-1993 to 72% in 2009. The MDG was established in the UNs in 2000. One of the targets was to reduce MMR by three-quarters (75%) between 1990 and 2015 and also to achieve, by 2015, universal access to reproductive health.[9] Since MDG could not be achieved, new post-2015 target (sustainable development goal) has been set up. By 2030, all countries should reduce MMR by at least two-thirds of their 2010 baseline level. The average global target is an MMR of <70/100,000 live births by 2030. The supplementary national target is that no country should have an MMR

>140/100,000 live births (a number twice the global target) by 2030. [10]

5. Conclusions

Even today most maternal deaths are seen in patients from rural areas, unbooked patients. Haemorrhage, Eclampsia and sepsis are the major causes of maternal deaths. Improvement in primary health care in rural areas and proper implementation of NRHM programs and up gradation of hospitals in rural areas can definitely bring down the number of maternal death.

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