International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2013): 6.14 | Impact Factor (2013): 4.438

Evaluation of Maternal Mortality Rate (MMR) at a High Volume Tertiary Referral Centre: What are we Missing? A Study Spanning 85,404 Live Births Over 9 Years

SasikalaMootha[1], Usharani Bathula[2]

[1]Associate Professor, Department of Gynaecology, Rangaraya Medical College, Kakinada, Andhra Pradesh, India

[2]Assistant Professor, Department of Gynaecology, Rangaraya Medical College, Kakinada, Andhra Pradesh, India

Abstract: ***Maternal mortality is defined internationally, as maternal death rate per 1,00,000 live births. India is among those countries, which has a very high maternal mortality ratio. The current maternal mortality ratio (MMR) in India is 212/100,000 live births.This study was done to assess maternal mortality in a tertiary medical college hospital situated in semi urban part of coastal Andhra Pradesh. A retrospective hospital based study was carried out in the Obstetrics and Gynecology Department of Government general hospital, Rangaraya Medical College a semi urban tertiary level health care referral centre in Kakinada, Andhra Pradesh, India over a period of 9 years from January 2006 to December 2014. A total 292 maternal deaths were analyzed .The mean maternal mortality rate in the study period was 341.90/100000 live births.Maximum maternal deaths (60.9%) were reported in the age group of 20 to 24 years. However a significant number of deaths (12.3%) occurred in teenage pregnancies. More deaths were reported in multiparous women (54.8%) as compared to Primiparas. (45.2%), more maternal deaths were reported in women from rural areas (80.4%) as compared to women from urban areas (19.6%).Maximum maternal deaths were reported in un booked patients (66.8%) as compared to booked patients (33.2%).The classical triad of eclampsia (47.5%),hemorrhage (28.9%), and sepsis (23.4%) was the major direct causes of maternal deaths. Anemia, jaundice, heart disease and malaria accounted for 15.5%, 22.9%, 21.1% and 7.3%of indirect maternal deaths respectively.***

Keywords: Maternal mortality ratio, Tertiary referral center, Eclampsia, anemia, sepsis

1. Introduction

The standard of obstetric service in a country is assessed by maternal and perinatal death rates. Maternal mortality is defined as the death of any woman while being pregnant or within 42 completed days of termination of pregnancy , irrespective of the duration or site of pregnancy , from any cause related to or aggravated by pregnancy , but not from accidental or incidental causes [1]. Maternal mortality is defined .internationally , as maternal death rate per 1,00,000 live births. India is among those countries, which has a very high maternal mortality ratio. The current maternal mortality ratio (MMR) in India is 212/100,000 live births [2] which is far above the desired figure of 100 per 1,00,000 live births as per the objectives of Millennium Development Goals (MDGs) [1]. The tragedy is that these deaths are largely preventable. Maternal death has serious implications to the family , the society and the nation. It deprives the surviving infant of mother's care. One of the most important goals of the MDGs is to reduce the maternal mortality.

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 a tertiary medical college hospital situated in semi urban part of coastal Andhra Pradesh where large numbers of patients are referred from rural parts coastal Andhra Pradesh. Aims and objectives of the present study are

a) To calculate the maternal mortality rate in our hospital.
b) To assess the epidemiological aspects of maternal mortality.
c) To assess the causes of maternal mortality and any changing trends over 10 years.
d) To suggest ways to reduce the MMR.

2. Material and Methods

A retrospective hospital based study was carried out in the Obstetrics and Gynecology Department of Government general hospital, Rangaraya Medical College a semi urban tertiary level health care referral centre in Kakinada, Andhra Pradesh, India over a period of 9 years from January 2006 to December 2014. A total 292 maternal deaths were analyzed with the special emphasis on socio-demographic profile of the patient, parity , cause of death, time interval from admission to death, and trimester of pregnancy at the time of death. Deaths from accidental or incidental causes no way related to pregnancy are excluded.

Maternal mortality rate for the study period was calculated by using the formula

MMR = (Totalnoofmaternaldeaths / Totalnooflivebirths) × 100000

Mean maternal mortality ratio for the study period was calculated by calculating the mean of yearly MMR of the entire study period.

3. Results

During the study period, January 2006 to December 2014, there were a total of 85,404 live births and 292 maternal deaths. The mean maternal mortality rate in the study period was 341.90/100000 live births. The epidemiological characteristics of maternal deaths are shown in Table 1.

Table 1: Epidemiological characteristics of maternal deaths

Patient characteristics	*Classification*	*No. of cases*	*Percentage*
Age (years)	<20	36	12.3%
	20-24	178	60.9%
	25-29	58	19.8%
	30-34	17	5.8%
	>34	3	1.2%
Parity	Primi gravidae	132	45.2%
	Multi gravidae	160	54.8%
Residence	Rural	235	80.4%
	Urban	57	19.6%
Antenatal status	Booked	97	33.2%
	Un booked	195	66.8%

Maximum maternal deaths (60.9%) were reported in the age group of 20 to 24 years. However a significant number of deaths (12.3%) occurred in teenage pregnancies. More deaths were reported in multiparous women (54.8%) as compared to Primiparas. (45.2%), more maternal deaths were reported in women from rural areas (80.4%) as compared to women from urban areas (19.6%).Maximum maternal deaths were reported in un booked patients (66.8%) as compared to booked patients (33.2%). Year wise distribution of maternal deaths is shown in table 2.

Table 2: Year wise distribution of maternal deaths

Year	*No. of live births*	*No. of maternal deaths*	*MMR*
2006	9330	27	289.3
2007	9170	32	348.9
2008	9550	26	272.2
2009	9050	31	342.5
2010	10500	60	571.4
2011	10200	38	372.5
2012	11250	28	248.8
2013	8204	30	365.6
2014	8150	20	245.4
2006-2014	85404	292	341.9

In the study period 183(62.6%) of maternal deaths were due to direct causes. Year-wise distribution of direct causes of maternal deaths is shown in Table3. The classical triad of eclampsia (47.5%),hemorrhage (28.9%), and sepsis (23.4%) was the major direct causes of maternal deaths.

Table 3: Year-wise distribution of direct causes of maternal deaths

Year	*Ecclampsia*		*Haemorrhage*		*Sepsis*		*Total*
	No	%	No	%	No	%	
2006	3	20.0	8	53.3	4	26.6	15
2007	7	33.3	6	28.5	8	38.0	21
2008	6	37.5	5	31.2	5	31.2	16
2009	11	55.0	5	25.0	4	20.0	20
2010	25	58.0	9	21.0	9	21.0	43
2011	10	45.0	6	27.0	6	27.0	22
2012	7	50.0	4	28.0	3	22.0	14
2013	10	47.0	5	23.0	3	14.0	18
2014	8	57.0	5	35.0	1	7.0	14
Total	87	47.5	53	28.9	43	23.4	183

In the study period, 109 (37.3%) of maternal deaths were due to indirect causes. Anemia, jaundice, heart disease and malaria accounted for 15.5%, 22.9%, 21.1% and 7.3%of indirect maternal deaths respectively. Other causes contributed to 33% of indirect deaths which includes ARDS, Amniotic fluid embolism, Perforating mole, Chorio carcinoma, Epilepsy, Carcinoma Ovary and other concurrent malignancies as shown in table 4.

Table 4: Analysis of indirect causes of maternal deaths

Duration	*Anaemia*		*Heart disease*		*Jaundice*		*Malaria*		*Others*	
2006-2014	No	%	No	%	No	%	No	%	No	%
	17	15.5	23	21.1	25	22.9	8	7.3	36	33

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 ofthe community. The mean Maternal mortality rate in the study period was 341.9/100000 live births. The current maternal mortality ratio (MMR) in India is 212/100,000 live births [2].Various studies done in India in the last 15 years have shown wide variation in MMR ranging from 47/100000 to 625/100000 births [4-9 IJPM] 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 costal Andhra very late stage.

In our study, 80% 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, 54.8% of maternal deaths were reported in multiparous patients. More maternal deaths were reported in women from rural areas (80.4%), unbooked patients (66.8%). All our findings were similar to studies by Jain,[4] Jadhav, [5] Pal, [6] Onakewhor.[7]. In our study, 72.5% of maternal deaths were due to direct causes. Eclampsia (47.9%),hemorrhage (28.9%) and sepsis (23.4%) were the major direct causes of maternal deaths. Our findings were consistent with studies by Jain,[4]Jadhav,[5]Pal,[6]Onakewhor,[7]and Shah.[8]

Even today large number of maternal deaths is due to the classical triad of hemorrhage, sepsis, and eclampsia. All these are preventable causes of maternal mortality provided the treatment is instituted in time. Unfortunately, in many cases, patients were referred very late, in critical condition, unaccompanied by health care worker. Many patients had to

travel a distance of 70 to 80 kilometers in a private vehicle to reach our tertiary center. Most of these deaths are preventable if patients are given appropriate treatment at periphery and timely referred to higher centers.

In the current study, 109 (37.3%) of maternal deaths were due to indirect causes. Anemia, jaundice, heart disease and malaria accounted for 15.5%, 22.9%, 21.1% and 7.3% of indirect maternal deaths respectively. Other causes contributed to 33% of indirect deaths which includes ARDS, Amniotic fluid embolism, Perforating mole, Chorio carcinoma, Epilepsy, Carcinoma Ovary and other concurrent malignancies. These findings were consistent with studies by Jain,[4] Jadhav,[5]Pal,[6]and Onakewhor.[7].

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 post partumhemorrhage. Early detection of high risk pregnancies and referring them to a tertiary center at the earliest can reduce the complications of high risk pregnancies.

The MMR in our study is higher thanthe national averages. Most deaths could have been avoided with the help of early referral, quick, efficient and well equipped transport facilities, availability of adequate blood and blood components, and by promoting overall safe motherhood.Even today most maternal deaths are seen in patients from rural areas, un booked, illiterate patients and patients from low socioeconomic status. Hemorrhage, Eclampsia and sepsis are the major causes of maternal deaths. Improvement in primary health care in rural areas and properimplementation of NRHM programs and up gradation of hospitals in rural areas can definitely bring down the number of maternal deaths.

References

[1] Park K. Preventive medicine in obstetric, Paediatrics and geriatrics: Park's T ext Book of Preventive andSocialMedicine. 20th edition. Jabalpur: M/S Banarasi Das Bhanot; 2009. p. 479-483.
[2] Special Bulletin on Maternal Mortality in India 2007-09: Sample registration system, Office of Registrar General, India; June 2011.
[3] Puri A, Yadav I, Jain N. Maternal mortality in an urban Tertiary care hospital of north India. J ObstetGynaecolIndia 2011;61:280-5.
[4] Jain M, Maharahaje S. Maternal mortality: Aretrospectiveanalysis of ten years in a tertiary hospital. Indian J PrevSoc Med 2003;34:103-11.
[5] Jadhav AJ, Rote PG. Maternal mortality–changing trends.JObstetGynaecol India 2007;57:398-400.
[6] Pal A, Ray P, HazraS,Mondal TK. Review of changing trends in maternal mortality in a rural medical college in west Bengal. J ObstetGynecol India 2005;55:521-4.
[7] Onakewhor JU, Gharoro EP. Changing trends in maternal mortality in a developing country. Niger J ClinPract2008;11:111-20.
[8] Shah RJ, Ali I, BandayA,Fazili A, Khan I. Analysis of maternal mortality in a small teaching hospital attached to tertiary care hospital. Indian J Community Med 2008;33:260-2.