Maternal Mortality in an Urban Tertiary Care Hospital of South India

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Abstract

Objectives: The aim of the study was to help generate information and knowledge regarding the causes and complications leading to maternal deaths in an Urban tertiary care hospital, to find if any of them are potentially preventable and to use information thus generated to save lives. Method: The Medical records of all maternal deaths over a period of 5 years between June 2009 to May 2014 were reviewed and analysed for maternal age, antenatal registration, mode of delivery, parity, admission date interval and causes of death

Results: The maternal mortality rate ranged between 448 to 750 / 100000 births in the study period. The causes of death were eclampsia - pregnancy induced hypertension (39.4%) haemorrhage (35%), Sepsis(6%), Hepatitis (6.5%), Anaemia (13%), Heart Disease (2.6%). Maximum deaths occurred between 21-30 years of age is 84.6%. Mortality highest in post natal mothers 158 (69.2%). Unbooked cases constituted 204(89.4%) of Maternal deaths and included 157(68.8%) of referred cases. Overall mortality was 544/100000 of maternal deaths due to direct obstetric deaths 181 (79.3%) and indirect obstetric deaths 47 (20.6%).

Conclusion: The classical triad of causes of maternal mortality in our study remained eclampsia, haemorrhage, sepsis in that order. Haemorrhage and sepsis are considered potentially preventable causes of maternal deaths.

Keywords: Maternal Mortality, Direct obstetric deaths and indirect obstetric deaths.

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Introduction

Maternal mortality ratio is number of maternal deaths per 100000 live births during the given period. Maternal mortality rate is number of maternal deaths in a given period per 100000 women of reproductive age during same period[1].

Direct maternal death is the result of complication of the pregnancy, delivery, or their management. Indirect maternal death is a pregnancy related death in a patient with pre existing or newly developed health problems. Each minute of every day at least one women in developing country dies as a result of complications arising during pregnancy and child birth[2]. Global maternal mortality rate in 2013 is 210 maternal deaths /100000 live births. In 1990 there 380 maternal deaths /100000 live births. 1% of deaths occur in developed countries and 99% occur in developing countries[3]. 10 countries carry most of the burden. The global adult life time risk of maternal mortality (i,e the probability that a 15 year old women will eventually die from a maternal cause) was one in 190 in 2013[4].

The highest life time risk of maternal death is in Somalia and Chad, where women face a one in 18 and one in 15 lifetime risk respectively[5]. In developed countries MMR average is at 27/100000 births. Developing countries have MMR of 480/100000 while under developed countries have an MMR of 890/100000 births. Two countries accounted for one third of all maternal deaths. India at 17% (50,000) Nigeria 14% (40,000).The ten countries that comprised 60% of maternal deaths reported in 2013 are India 50,000 (17%); Nigeria 40,000(14%); Democratic republic of Congo 21,000 (7%); Ethiopia 13,000(4%); Kenya 6300(2%); China 5900(2%); Uganda 5900 (2%)[3].

Material & Methods

It is a retrospective analytical study. The ethical committee of the institute had approved the study. The present study was carried out in the department of Obstetrics gynaecology department of urban tertiary care hospital. The medical records of all Maternal deaths occurring in the peripartum period between May 2009 to June 2014 were reviewed and correlated with various factors like age, parity, antenatal supervision, Delivery status, Admission death interval, causes of Death. All Women requiring Hospital care were admitted irrespective of Availability of Beds, vacancy of ICU Beds or Antenatal registration in the hospital. The results were analysed by using percentage and proportions.

Results & Observations

In the present Study May 2009 – June 2014, there were 228 maternal deaths among 41,889 deliveries with MMR ranging between448 (in 2009)-750 (from may

2013 to June 2014) with Mean MMR of 544/100000 live births which is higher than the national average.

48.2% of women died within 24 hours of admission, direct obstetric deaths occurred in 79.4% indirect in 20.6% and deaths due to unrelated causes 0.5%. Direct Obstetric deaths include death from eclampsia 39.4%, haemorrhage 35% and Sepsis (6%).

Among the indirect causes anaemia constituted 30 cases followed by liver disorders 15 cases and heart diseases 6 cases. In our study multi gravidas comprised 48.6% and primi gravidas 50.8%. Highest percentage of maternal death was in the postpartum period 158(69.2%) followed by antepartum period 49(21.49%). 110(48.2%) deaths occurred within 24 hours of admission, 53(23.2%) deaths between 1-3 days 41(17.9%) deaths between 3-7 days. 29(12.7%) deaths happened after 1 week.

Table – 1: Year-Wise Distribution of Deliveries and Maternal Deaths

Year	Deliveries	Maternal Deaths	MMR
2009 May – 2010 June	8524	38	445.8
2010 May – 2011 June	7576	34	448.7
2011 May – 2012 June	8643	49	566.9
2012 May – 2013 June	8354	41	490.7
2013 May – 2014 June	8792	66	750
Total	**41889**	**228**	**544/100000**

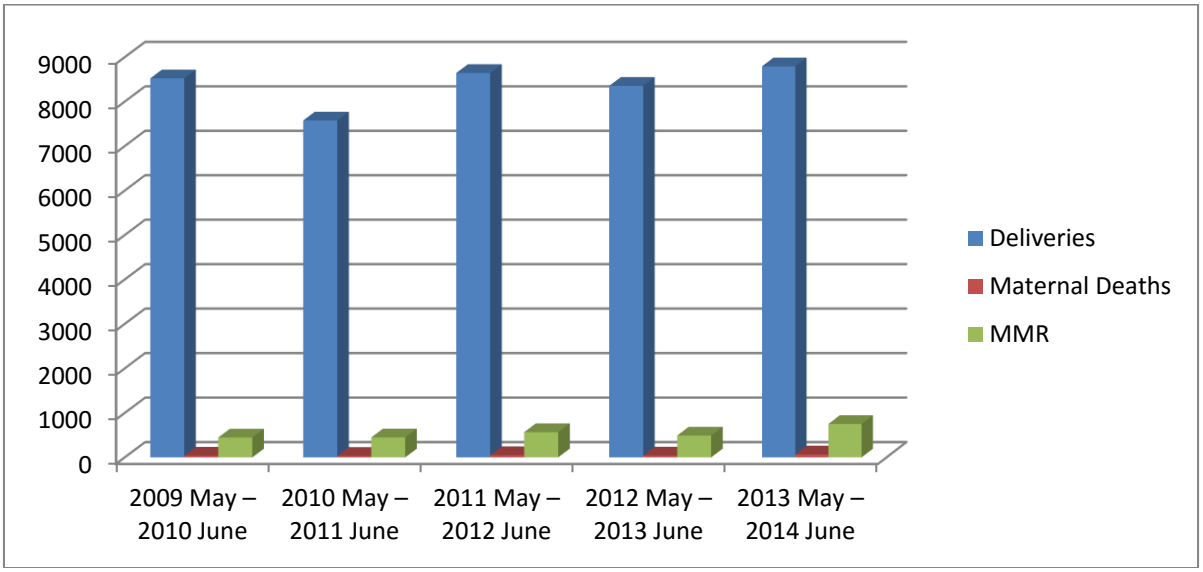

Table 2: Demographic Features

Year	< 20 Years	20-30 Years	> 30 Years	Primi	Multi gravida	Ante partum >20 weeks	Ante partum <20 weeks	Intra partum	Post partum
2009 May – 2010 June	1	34	3	22	16	11	1	2	24
2010 May – 2011 June	0	33	1	15	19	5	1	3	25
2011 May – 2012 June	0	46	3	27	22	9	5	0	35
2012 May – 2013 June	2	34	5	23	17	8	0	1	32
2013 May – 2014 June	8	46	4	29	38	16	5	3	42
Total	**11**	**193**	**24**	**116**	**112**	**49**	**12**	**9**	**158**

Table 3: Referral/Non Referral/Booked/Un Booked

Year	Referral	Non Referral	Booked	Booked elsewhere	Un-Booked
2009 May – 2010 June	30	8	5	28	5
2010 May – 2011 June	18	16	5	15	14
2011 May – 2012 June	31	18	2	45	2
2012 May – 2013 June	30	11	2	33	6
2013 May – 2014 June	48	18	10	45	11
Total	**157**	**71**	**24**	**166**	**38**

Table 4: Admission to Death Time Interval

Year	Less than 1 Day	1 to 3 Days	3 to 7 Days	More than 7 Days
2009 May – 2010 June	22	8	6	2
2010 May – 2011 June	21	5	6	2
2011 May – 2012 June	25	7	10	7
2012 May – 2013 June	17	12	4	8
2013 May – 2014June	25	21	15	10
Total	**110**	**53**	**41**	**29**

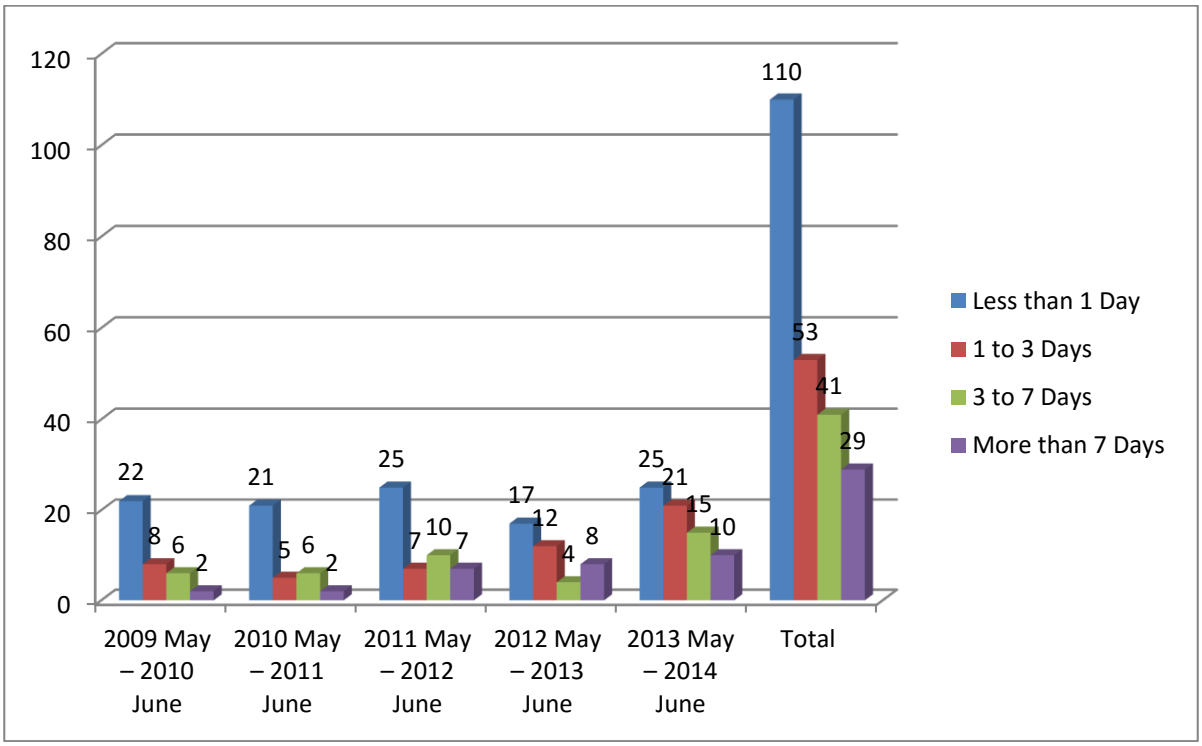

Table 5: Cause of Death

Year	Direct Causes	Indirect Causes	Total
2009 May - 2010 June	30	8	38
2010 May - 2011 June	25	9	34
2011 May - 2012 June	37	12	49
2012 May - 2013 June	34	7	41
2013 May - 2014 June	55	11	66
Total	181	47	228

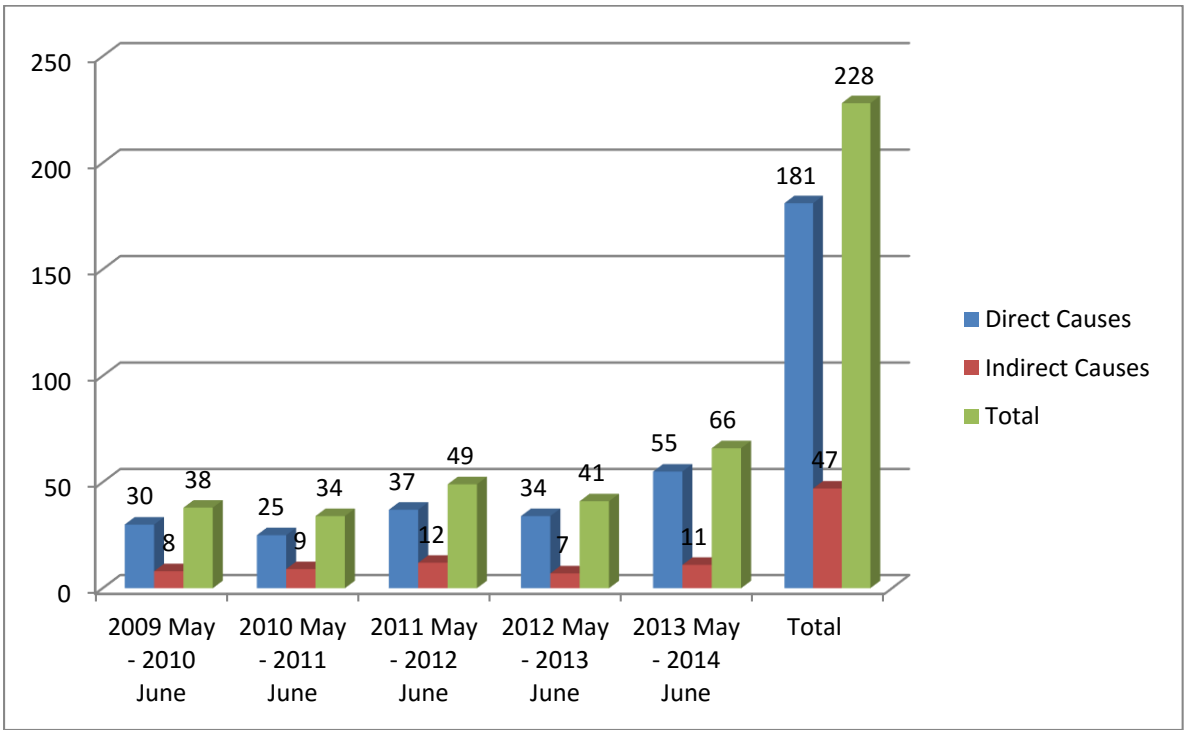

Table 6: Direct Causes

Year	Hypertensive Disorders	Obstructed Labour	Antepartum Haemorrhage	Postpartum Haemorrhage	Sepsis	Surgical Complications	Sudden Deaths	Peripartum Cardiomyopathy
2009 May - 2010 June	12	1	4	4	4	0	3	2
2010 May - 2011 June	9	2	3	6	0	3	2	0
2011 May -2012 June	20	2	3	4	3	3	1	1
2012 May -2013 June	18	0	2	8	3	0	1	2
2013 May-2014 June	31	2	22	25	4	8	2	5
Total	**90**	**7**	**34**	**47**	**14**	**14**	**9**	**10**

Table 7: Indirect Causes

Heart Diseases	Anaemia	Renal Complications	Infectious Diseases	Liver Disorders	Others	Heart Diseases
2009 May - 2010 June	1	1	0	4	2	0
2010 May - 2011 June	1	1	0	4	2	1
2011 May - 2012 June	3	0	3	3	3	0
2012 May - 2013 June	1	1	0	0	5	0
2013 May-2014 June	24	4	4	4	6	5
Total	30	7	7	15	18	6

Table – 8: Comparative Analysis of Direct Causes of Maternal Mortality

Authors	MMR	Haemorrhage	Toxemia	Sepsis
VB Bangal et al (7)	302.6	21.05%	10.52%	10.52%
Verma Ashok et al (9)	345.9	21.8%	20%	21.6%
Arpita N et al (12)	555.5	31.9%	24.2%	7.24%
Jadhav CA et al (13)	395	27.84%	10.75%	3.16%
Present Study	544	35.5%	39.4%	6.14%

According to UNICEF, WHO, UNFPA Maternal Mortality Ratios
Trends in maternal mortality: 1990 to 2013
Estimates by WHO, Unicef, UNFPA, The World Bank and the United Nations Population Division

Year	MMR	Maternal death	Live births	Proportion of maternal deaths among death of female of reproductive age	Life time risk of maternal deaths
2010	200 (140-310)	56,000	27,146	7.4%	1 IN 170
2005	280 (190-420)	76,000	27,220	9.4%	1 IN 110
2000	390 (260-600)	1,07,000	27,300	12.2%	1 IN 73
1995	480 (320-730)	1,32,000	27,554	16.0%	1 IN 53
1990	600 (390-920)	1,63,000	27,329	20.3%	1 IN 38

(International journal population research volume 2012 MMR 1271/1,00,000, live births causes with poor health, infrastructure, poorly equipped health facilities.)

Discussion

Maternal mortality is an index of effectiveness of obstetrics services prevailing in a country. Currently it is estimated to be 178 per 1,00,000 in 2012.despite the Drop from 212 per 100,000 to 178 in 2012.This is far above the desired figure of 100 per 1,00,000 live births as per the objectives of millennium development goals[6].

In the present study of 5 years MMR ranged from 445 in 2009-10 to 750 in 2013-14 with average of 544.Other studies from tertiary care institutions reported mortality rate of 113 to 879 per 100,000 live births. VB Bangal et al[7] at 302.9/1,00,000 live births, Purendare et al[8] at 113/1,00,000 live births, Verma Ashok et al[9] at 345.9/1,00,000 live births, Nishu priya et al[10] at 270/1,00,000 live births.

Our study showed that 84.6% of maternal deaths were among the age groups of 20-30 years, Similar to that reported by VB Bangal et al[7] at 68.42%, Kaur et al[11] 51.8%, Verma Ashok et al[9] 78.5%. In our study multigravidas comprised 48.6% and primi gravidas 58.8%.

This hospital data estimated may be more than community mortality rate as high risk women are referred to hospital for delivery and often the women are only transported to hospital when they develop life threatening complications which is too late and swells the number of hospital deaths. The highest percentage of maternal death was in the post-partum period 158(69.2%) followed by antepartum period 49(21.49 %).

In studies by Purendare et al[8] and Arpita N et al[12] postnatal death rate of 73.33% was observed. In our study 110 deaths occurred within 24 hours of admission.53 deaths between 1-3 days 41 deaths between 3-7 days and 29 deaths happened after 1 week. Nishu priya[10] reported 54.63% deaths within 24 hours of admission. Varma Ashok et al reported 46.15% deaths with in 1st day of admission, Jadhav CA et al[13] 46.83%.In the study by VB Bangal et al[7] 39.5% died within 24 hours of admission and 25.06% after 7 days of Admission.

Direct obstetric deaths occurred in 79.3%.Indirect Obstetric deaths occurred in 20.6%.Deaths due to unrelated causes 0.5%.Among the indirect causes in this study, anemia 30 cases followed by liver disorders 15 cases. Heart diseases 6 cases.

Out of 228 deaths among referral cases 157 (68.8%) followed by non referral cases 71(31.1%) which shows that referrals from else where are in poor general condition which is due to lack of qualified medical attention, delay in referral result in late intervention, lack of transport facility, lack of Blood bank facilities, lack of specialist, lack of lab facilities at

periphery, delay in diagnosing, delay in referral which causes increased mortality.

In our study the most common cause of maternal deaths were hypetension (39.4%), Haemorrhage (35.5%), Sepsis (6%). In the study done by Ananda lakshmy et al[14] found that Sepsis (35.3%) was the leading cause followed by hypertension(16.4%) and Haemorrhage (2.6%). In another study done by Nishu Priya et al[10] post partum haemorrhage was the leading cause of maternal mortality (35.05%) followed by hypertension (27.83%).Anaemia was the indirect cause in 25.7%[8].

Conclusion

The Classical TRIAD of causes of Maternal Mortality in our study remained Eclampsia, Haemorrhage and Sepsis in that order. Haemorrhage and Sepsis are considered one of the potentially preventable causes of Maternal death. The lessons learnt through review of records of Maternal deaths have helped us to identify the high risk group, solely for the purpose of improving service – delivery system by ascertaining the cause of death, reason for inability to provide appropriate care at appropriate time and finding the key interventions at service delivery level to prevent similar deaths. There should be active management of high risk group by frequent visits, direct consultant supervision, bio chemical markers, fluid and component transfusions, aggressive management of Infections and closer monitoring of women in labour. It is not possible to predict which mother will develop complications and hence the high risk approach does not help much. Most complications cannot be prevented by good antenatal care. Hence antenatal care cannot alone prevent maternal mortality. Cost effective approach to reducing maternal mortality involved ensuring high quality emergency obstetric care (EmOC) to mothers who developed complications during delivery.

Conflict of Interest: None
Source of Support: Nil

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