To study causes of maternal mortality in tertiary care centre, south Gujarat over a period of 2 years

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Abstract

Introduction: Pregnancy is not a disease state but sometimes it leads to severe morbidity and carries risk for mortality. Maternal death not only affect family but it also has an impact on society as well as nation. Maternal mortality rate is reflection of the quality of health care services provided by the country to the women population.

Materials and Methods: This is a retrospective study of maternal deaths using facility based maternal death review forms supplied by Ministry of Health and Family Welfare Government of India filled by doctor on duty at that time as a baseline document.

Results: This study shows that major cause of maternal mortality in tertiary care centre was hypertensive disorders of pregnancy however hypertensive disorder of pregnancy alone was not the only cause of maternal death, it was complicated with different other causes like ARDS, APH, HELLP syndrome, PPH, Sickle cell disease, ARF, DIC, severe Anaemia and many others. Hypertensive disorders of pregnancy contributed 33% of all deaths whereas Sepsis (12%), Hepatitis (10%), Haemorrhage (8%), Heart Disease (7%), Anaemia (5%), ARDS (5%), Sickle Cell Crisis (4%), Amniotic Fluid Embolism (2%), Diabetes Mellitus (2%) and others (12%).

Conclusion: Most maternal deaths are preventable by optimum antenatal, intranatal and postnatal care. Early referral of high risk pregnancies to tertiary care centre will definitely change the outcome.

Keywords: Maternal mortality, Hypertensive disorders of pregnancy, Sepsis.

Introduction

Each year in India, roughly 28 million women experience pregnancy and 26 million have a live birth. Of these, an estimated 67000 maternal deaths occur each year.[1] In addition, millions more women suffer pregnancy and birth related ill-health. Thus pregnancy related mortality and morbidity continues to have a huge impact on the lives of Indian women.

If the definition of maternal death is to include a death due to pregnancy and childbirth it must include deaths taking place before childbirth (e.g. abortion, ectopic pregnancy) those taking place during the childbirth (antepartum, postpartum and intrapartum haemorrhage) as well as death taking place sometime after the actual event of childbirth (e.g. Sepsis). Moreover, not all maternal deaths are due to condition resulting solely from pregnancy. Some are caused by pre-existing condition have been aggravated by pregnancy (e.g. Hepatitis). This distinction is clearly made in ninth and tenth revision of International Classification of Diseases (ICD 9 and ICD 10) which define maternal death as follows.

A maternal death is defined as the death of a women while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy its management but not from accidental or incidental causes.[2] Women die from a wide range of complication in pregnancy, childbirth or the postpartum period. Most of these complications develop because of their pregnant status and some because pregnancy aggravated an existing disease. The four major killers are: severe bleeding, infections, hypertensive disorders of pregnancy and obstructed labour. Globally, about 80% of maternal deaths are due to this direct causes. Among the indirect causes 20% of maternal deaths are diseases that complicate pregnancy or are aggravated by pregnancy, such as Malaria, Anaemia and HIV.[3] Women also die because of poor health at conception and a lack of adequate care needed for healthy outcome of pregnancy for themselves and their babies. The causes of maternal mortality are multiple, inter-related, complex and almost always preventable[4]. Delayed referral, poor transport facilities, underutilization of health facilities and poor socioeconomic status are all responsible for the high rate of maternal deaths.[5] The reason for death of a women in pregnancy and childbirth are many layered. Behind the medical causes are logistic causes, failure in the health care system, etc. and behind these are the social, cultural and political factors which together determine the status of women, their health, fertility and health seeking behaviour.[6] In India the use of maternal health care services is directly or indirectly associated with women's socioeconomic status.[7,8] Poor families do not find themselves in a position to be able to bear the cost of delivery care service.[9]

Maternal mortality decline from 556 to 174 in 1990-2015.[10] This decline in mortality from 556 to 174 over a period of 25 years is because of advances in antibiotic, blood transfusion and use of magnesium sulphate in Eclampsia, newer modalities like Obstetric

ICU setting in some tertiary care centers, referral system and better way of transport. Government is also running 108 ambulance services for safe referral of emergency patients.[11] In the 2012-2017 twelfth five year plan Government of India's current new policy that, all deliveries to be undertaken by a Skilled Birth Attendant (SBA). Under the reproductive, maternal, new born, child, and adolescent health (RMNCH+A) component of National Health Mission (NHM) more than 70,000 Auxiliary Nurse Mid wives (ANM), Lady health adviser (LHA) and Staff Nurses (SN) have also been trained as Skilled Birth Attendant (SBA). ANMs are incentivized to perform skilled deliveries in the villages with a high number of home deliveries, including the remote and inaccessible areas with a high proportion of home deliveries. The Pradhan Mantri Surakshit Maitritava Abhiyan (PMSMA) has been launched to ensure quality antenatal and postnatal care to pregnant women in the country.[12]

So we decided to analyse facility based maternal death review forms in accordance with maternal death in Tertiary Care Centre, South Gujarat.

Materials and Methods

Tertiary Care Centre, South Gujarat initiated filling of FBMDR forms introduced by Ministry of Health and Family Welfare GOI in 2011. In this study we have analysed the data of the FBMDR forms filled by doctor on duty between May 2015 to April 2017. During this period we have contributed to the national/state level data of MDR. This study has analysed the data filled in these forms using open EPI software.

Results

In table 1 we analysed the distribution of our subjects with respect to their ages as age influences the pregnancy related complications.

Majority of our subjects in a present study i.e. 98% were between 19-35 years of age whereas there were no subjects below 18 years of age. This data was taken from patient's case paper which they had written during their admission in our hospital. Therefore exact age estimation of the subject can't be made out. Two % of the subjects had age more than 36 years.

Majority of the subjects i.e. 60% were in the range of 2^{nd}-4^{th} Gravida whereas only 4% were ≥5 Gravida and 36% were primigravida subjects.

Majority of the subject's i.e.77% were between 1-3 para whereas only 5% were showing ≥4 parity. Eighteen % of the patients were nullipara.

Table 1: Women's background information

Variables	No. of maternal deaths	Percentage
Age	n=83	
<18	0	0
19-35	81	98%
>36	2	2%
Gravida	n=83	
1	30	36%
2-4	50	60%
>5	3	4%
Para	n=83	
0	15	18%
1-3	64	77%
>4	04	5%

Registration Status: Out of 83 maternal deaths 61 (74%) subjects were referred cases to our institute, 15 (18%) subjects were emergency admission and 7 (8%) subjects were registered subjects.

Out of 7 registered patients 2 subjects died of amniotic fluid embolism, 2 subjects died of PET and its complications which include DIC with AFE and anemia with AFE. One subject died of eclampsia and 1 subject died of jaundice with thrombocytopenia. One patient died of PPH due to uterine inversion in case of home delivery.

Majority of patients were referred from private hospital i.e. 23 patients which contributes 38% of all referrals. 18 patients were referred from district hospital, 7 patients were referred from CHC, 6 patients were referred from private clinic, 4 patients were referred from tertiary hospital and 3 patients were referred from PHC.

Table 2: Registration status

Registration Status		
Registered	7	8%
Referred	61	74%
Emergency	15	18%
Referring Center		
DH	18	29%
PHC	3	5%
CHC	7	11%
Private hospital	23	38%
Tertiary hospital	4	7%
Private clinic	6	10%

In admission death interval majority of subjects died after 3 days of admission i. e. 27 subjects which accounts for 33% of all subjects whereas 5 subjects died within 2 hours of admission which accounts for 6% of total deaths.

Majority of subjects i.e. 43 subjects were unaware of the onset of complication to admission whereas 1 subject admitted less than 2 hours before the onset of complication. So this suggest that 43(45%) subjects had been complicated before admission to our institute and were unknown about onset of complication to them. 28 subjects admitted more than 24 hours after the onset of complication, 8 subjects admitted within 2-6 hours, 2 subjects admitted within 7-12 hours and 1 subject admitted within 13-24 hours after the onset of complication.

Table 3: About the fatal illness and death

Admission death interval (n=83)		
<2 hours	5	6%
<6 hours	7	8%
7-24 hours	23	28%
1-2 days	12	14%
2-3 days	9	11%
>3 days	27	33%
Duration of onset of complication to admission (n=83)		
<2 hours	7	8%
2-6 hours	8	10%
7-12 hours	2	2%
13-24 hours	1	1%
>24 hours	28	34%
Don't know	37	45%

Table 4 shows total number of maternal death in tertiary care centre, south Gujarat was 83 out of which 46 were direct causes and 37 were indirect causes of death.

Table: 4 Distribution of maternal deaths according to cause of death

Direct cause of maternal deaths n=46 (55%)		
Haemorrhage- APH	2	4%
Haemorrhage- PPH	5	11%
Hypertensive disorder in pregnancy	27	59%
Sepsis	10	22%
Amniotic fluid embolism	2	4%
Obstructed labour and Rupture uterus	0	0%
Indirect cause of maternal death n=37 (45%)		
Anaemia	4	11%
Heart disease	6	16%
Hepatitis	8	22%
ARDS	4	11%
Diabetes mellitus	2	5%
Sickle cell crisis	3	8%
Others	10	27%

Out of 46 direct causes of death 27 deaths were caused by hypertensive disorders of pregnancy and its complication, which was a major contributor of direct causes of death and measures 59% of all direct causes of deaths. Other direct causes of maternal death were sepsis (22%), postpartum haemorrhage (11%), antepartum haemorrhage (4%), amniotic fluid embolism (4%).

Out of 37 indirect causes of death 8(22%) were caused by hepatitis which was a major indirect cause of death. Other causes were heart disease 6(16%), anaemia 4(11%), ARDS 4(11%), sickle cell crisis 3(8%) and others 10(27%).

Discussion

A hospital based retrospective study was carried out in the Obstetrics and Gynaecology department, Tertiary Care Centre, South Gujarat. An attempt was made to find out the maternal mortality rates to analyse the various causes and predisposing factors responsible for maternal death. The study covered the total number of deliveries which occurred during the period i.e. May 2015 to April 2017.

This study was made of a retrospective study of Maternal Deaths where FBMDR forms of Maternal Death approved by Ministry of Health and Family Welfare filled by resident doctors on duty were used. We analysed the study using FBMDR format as a baseline document.

A teaching institution and referral centre, this institute had an average of 8598 deliveries per year. A total of 17196 deliveries occurred during the study period and 83 maternal deaths occurred. The maternal mortality rate was 482.67 per 100000.

1. The total number of deliveries of present study was 17196.
2. The total number of maternal deaths in the study period was 83.
3. The Maternal mortality rate of present study was 483 per 100000 live births.
4. Direct causes of deaths were 46 i.e. 55% whereas indirect causes were 37 i.e. 45% of total causes of death.
5. Hypertensive disorders of pregnancy constitute 33% of total causes of death.
6. Sepsis constitute 12% of total causes of death.
7. Haemorrhage constitute 8% of total causes of death.
8. Amniotic fluid embolism constitute 2% of total causes of death.
9. Hepatitis constitute 10% of total causes of death.
10. Heart disease constitute 7% of total causes of death.
11. Anaemia constitute 5% of total causes of death.
12. Acute respiratory distress syndrome constitute 5% of total causes of death.
13. Sickle cell crisis constitute 4% of total causes of death.
14. Diabetes mellitus constitute 2% of total causes of death.
15. Others constitute 12% of total causes of death.
16. Of the direct causes of death,
17. Hypertensive Disorders of Pregnancy constitute 59% of direct causes of death.
18. Sepsis constitute 22% of direct causes of death.
19. PPH constitute 11% of direct causes of death.
20. APH constitute 4% of direct causes of death.
21. AFE constitute 4% of direct causes of death.
22. Of the indirect causes of death,

23. Hepatitis constitute 22% of indirect causes of death.
24. Heart disease constitute 16% of indirect causes of death.
25. Anaemia constitute 11% of indirect causes of death.
26. ARDS constitute 11% of indirect causes of death.
27. Sickle cell crisis constitute 8% of indirect causes of death.
28. Diabetes mellitus constitute 5% of indirect causes of death.
29. Others constitute 27% of indirect causes of death.
30. Of the total deaths 98% death were occurred in age group 19-35 whereas there were no subjects in age group less than 18 years. 2 % deaths were occurred in age group more than 35 years.
31. Of the total deaths 77% of the deaths were occurred in para 1-3 whereas 5% occurred in multipara. 18% of deaths were occurred in nullipara.
32. Of the total causes of death 74% were referred subjects whereas only 8% subjects were registered subjects. 18% of the subjects were emergency subjects.
33. Of the referring centre 38% were private hospital, 29% were district hospital, 11% were community health centre, 10% were private clinic, 7% were tertiary hospital and 5% were primary health centre.
34. Being a referral centre maternal mortality rate of our institute was more than the mortality rate of Gujarat and India.

Conclusion

In this study we have found that hypertensive disorders of pregnancy is the major cause of maternal mortality. So the focus should be early detection of hypertension at all levels of ANC, appropriate management of the same including termination of pregnancy for maternal indication if the need arises.

Also referral of complicated case needs strengthening in terms of appropriate referral (after giving initial treatment) and laying down referral pathways to tertiary care.

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