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Study of Maternal Mortality at Umaid Hospital, Jodhpur: A Review of Five Years

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Abstract

Introduction: Maternal mortality is a sensitive index to know the type of obstetrics care the women receive during pregnancy, labor and puerperium. It indirectly reflects the socio-economic status of society and state. *Aims & objective*: The present study was undertaken to study the causes of maternal mortality and to plan strategies to further improve the health services to reduce the incidence of maternal mortality in western Rajasthan. *Materials and methods:* This was a retrospective study conducted in Department of Obstetrics & Gynaecology, at Umaid hospital attached to Dr S N Medical college, Jodhpur during the period of five years with effect from January 2005 to December 2009. Data were collected from record room of this hospital and scrutinized. *Results:* Most maternal deaths i.e 70%(181) occurred within 24 hours of admission. Maximum numbers of deaths were in age group of 21-30 years (68.48%), incidence in primigravidae was 37.74%, maximum i.e. 93.4% deaths were in unbooked patients, 72% patients were from rural areas and 28% patients were from urban area. *Conclusion*: Haemorrhage, eclampsia and anaemia are the major causes of maternal deaths contributed by illiteracy in a developing country like India. PPH is a preventable cause of maternal mortality. Hospital delivery, prevention and treatment of anaemia, training of health personal at peripheral level for timely identification and referral of high risk cases, timely availability of blood products and active management of third stage of labor are key factors to reduce maternal mortality due to haemorrhage in our areas.

Keywords: Postpartum Haemorrhage (PPH); Maternal Mortality Rate (MMR); Subtotal Abdominal Hysterectomy (STAH); Puerperium; Eclampsia; Toxaemia.

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Introduction

According to International classification of disease (ICD 10) issued by WHO, Maternal mortality is defined as "The death of a women while pregnant or within 42 days of termination of pregnancy irrespective of duration or site of pregnancy from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes & expressed as per 100,000 live birth.

Maternal deaths are usually divided into two categories

1. *Direct obstetric causes;* Deaths resulting from complications of pregnancy, delivery or their management. About three fourth of maternal deaths in developing countries are due to direct obstetrics causes like haemorrhage (antepartum haemorrhage d/t placenta praevia or abruptio placentae), PPH, rupture uterus, abortion, molar pregnancy, ectopic pregnancy), toxaemia d/t eclampsia and preeclampsia, infection (due to septic abortion, puerperal sepsis) and pulmonary embolism.
2. *Indirect obstetrics causes*; They result from already existing disease or diseases that developed during

pregnancy and which was not due to direct obstetrics cause but was aggravated by physiologic effects of pregnancy eg; anaemia, heart disease, hepatitis, pulmonary tuberculosis, jaundice, malaria etc.

In India, haemorrhage (25.6%) rank first as the cause of maternal death, followed by sepsis (13%), toxaemia of pregnancy (11.9%), abortion (8%) and obstructed labor (6.2%) while other causes together make total 35.3%. The high MMR is due to large number of deliveries conducted at home by untrained persons, In addition, lack of adequate referral facilities to provide emergency obstetric care. The prominent gray areas in our society are the age at marriage and child spacing, family size and fertility patterns, literacy, socio-economic status and also not to forget the customs and beliefs.

Aims & Objectives

The present study of maternal mortality was undertaken with these aims and provide statistical data from January 2005-december 2009.

1. To study the incidence of maternal mortality in Umaid hospital associated with Dr S N Medical College, Jodhpur, Rajasthan.
2. To study various causes of maternal mortality.
3. To find out the commonest cause of maternal mortality, which by further improvement steps can help to reduce maternal mortality.
4. To suggest a plan of management for patients at risk of maternal mortality.
5. To find the impact of antenatal checkup and postnatal care in reducing the maternal morbidity and mortality.
6. Whether a strategy can be planned based on the present study to reduce the incidence of maternal mortality.
7. To give emphasis on better peripheral services by trained birth attendants and health personal, so as to reduce the incidence of maternal mortality.
8. To find out any further improvement which can reduce incidence of maternal mortality.

Material & Methods

This was a retrospective study, for this records of each maternal death was studied in detail under following points 1. Age 2. Area (rural/urban) 3. Booked/Unbooked 4. Referal 5. Obstetric history 6. History of other illness 7. Mode of termination of pregnancy 8. Main cause of death. 9. Contributary cause of death 10. Interval between admission to death.

Results

Two hundred fifty seven (257) mothers died during the time span from January 2005 to December 2009 and MMR was 299/100,000 live births (Table 1).

The age of patients ranged from 16 to 45 years, divided into three groups. There were 42 (16.34%) deaths in patients from 16-20 years, 176 (68.48%) deaths in patients from 21-30 years and 39 (15.18%) deaths in patients who were more than 30 years (Table 2).

Table 1: Average maternal mortality rates of five years from January 2005 to December 2009

Years	Death	Live Birth	MMR/1lac live birth
2005	33	14278	231
2006	48	15509	309
2007	51	17001	300
2008	60	19000	315
2009	65	20087	325
Total	257	85875	299

Table 2: Maternal death in relation to age

Age	No. of Deaths	Percentage
16-20	42	16.34
21-30	176	68.48
>30	39	15.18
Total	257	100

There were 97 (37.74%) deaths of primigravidae while maternal death among second gravidae onwards were 160 (62.26%) (Table 3).

There were only 17(6.6%) booked patients and 240 (93.4%) were unbooked patients (Table 4).

Table 5 shows that 185 (72%) were from rural areas and 72 (28%) from urban areas.

Table 7 shows that most of patients (135/52.5%), died within first 12 hrs of admission.

In the study of 257 mortality 179 (69.65%) patients died d/t direct obstetric causes and 78(30.35%) patients died d/t indirect obstetric causes (Table 8).

Table 3: Correlation of gravidity related maternal mortality

Gravidity	Number of Deaths	Percentage
1	97	37.74
2	40	15.56
3	46	17.90
4	21	08.17
5	23	08.96
>5	30	11.67
Total	257	100

Table 4: Distribution of maternal death according to booked & unbooked status

Status	Number of Deaths	Percentage
Unbooked	240	93.40
Booked	17	6.60
Total	257	100

Table 5: Distribution of maternal deaths according to rural and urban status

Parameter	Number of Deaths	Percentage
Rural	185	72
Urban	72	28
Total	257	100

Table 6: Distribution of maternal death according to mode of termination of pregnancy

Mode of termination	Number of deaths	Percentage
Normal delivery	56	21.79
undelivered	54	21.00
Delivered and aborted at other places	53	20.62
Preterm delivery	13	5.06
Twin vaginal delivery	02	0.78
LSCS	44	17.12
LSCS at other district govt. hospital	04	1.56
LSCS f/b STAH for PPH	08	3.11
Laparotomy f/b STAH for rupture uterus	04	1.56
Laparotomy for rupture ectopic pregnancy	02	0.78
Laparotomy f/b STAH (after normal delivery)	05	1.95
Forceps	06	2.33
Suction evacuation (Molar pregnancy)	02	0.78
Evacuation and Curettage	04	1.56
Total	257	100

Table 7: Admission-Death interval

Interval between Admission and Death	Number of Death	Percentage
0-12 hrs	135	52.5
13-24 hrs	46	17.9
1-3 days	47	18.3
3-7 days	20	7.8
>7 days	09	3.5
Total	257	100

Table 8: Causes of maternal death

Causes	Number of Death	Percentage
Direct	179	69.65
Indirect	78	30.35
Total	257	100

Table 9: Causes of maternal death

Direct Obstetrics Causes	Number of deaths	Percentage
Haemorrhage	70	27.24
toxaemia	53	20.62
Infection	30	11.67
Pulmonary embolism	13	5.06
Sudden cardiorespiratory arrest	11	4.28
Amniotic fluid embolism	2	1.78
Indirect obstetrics causes		
Anaemia	48	18.68
Heart disease	9	3.50
Jaundice	9	3.50
Malaria	8	3.11
Tuberculosis	4	1.56
Total	257	100

Table 10: Underlying conditions leading to main direct obstetrics causes of maternal deaths

Direct Obstetric Causes	Numbers of Deaths	Percentage
Haemorrhage		
Postpartum	40	57.14
Rupture uterus	8	11.43
Placenta Praevia	7	10.00
Placental Abruption	10	14.29
Inversion Uterus	1	1.43
Abortion	1	1.43
Molar Pregnancy	1	1.43
Rupture ectopic	2	2.86
Total	70	100
Eclampsia		
Antepartum	39	73.58
Postpartum	5	9.44
Preeclampsia	9	16.98
Total	53	100
Death DUE to Infection		
Puerperal Sepsis	12	40.00
Septic Abortion	09	30.00
Antepartum chorioamnionitis	09	30.00
Total	30	100

Table 9 shows that most common direct obstetric cause was haemorrhage.

Discussion

The MMR of Western Rajasthan is still very high as compared to some advanced state of India. The higher mortality rate is due to relatively poor socio-economic conditions, illiteracy, poor development of healthcare infrastructure, less development of effective healthcare delivery system, lack of early referral, poor transport and communication.

In the present study maximum numbers of death occurred in age group21-30 years i.e. 176 (68.48%), between 16-20 years deaths was 42 (16.34%) and rest 39 (15.18%) deaths belong to age group above 30 years.

In study of Beena Elhance [1] there were 33.5% deaths in patients from 16-20 years of age, 47.3%

deaths in patients from 21-30 years and 19.01% deaths in patients who were above 30 years of age.

In the study of Sunanda R. Kulkarni [2] deaths were 57.5% (in 21-30 years), 29% (in teenagers) and 13.5% (above 30 years of age).

Shamrishtha et al. [3] concluded 52.4%, 11.9%, 35.0% death in 20-29 years, 15-19 and below 20 years respectively. It is evident that majority of maternal death occurred in age group of 21-30 years which is also observed in present study (68.48%). There is decline in death in age group 16-20 years i.e. 16.34%, because of delay in marriage and first pregnancy and improved literacy.

As far as gravidity is concerned, in the present study maximum number of maternal death occurred in primigravida 97 (37.74%) and in second gravida onwards 160 (61.26%). Main contribution to maternal mortality in primigravidae and multigravidae were due to haemorrhage and eclampsia respectively.

In the series of Vimla Sharma [4] 29% deaths occurred in primi, 56% occured in multi, In the study of Beena et al.[1] 33.5% deaths occurred in primi, and 42% were in multigravidae. In the present study, It is concluded that all primi & multigravidae are at high risk. Extreme of reproductive age and gravidity status act independently to increase risk during childbearing but their effect are usually additive.

In Table 4; Mortality in unbooked patients in the present study were 240 (93.4%), because of poorer the antenatal care, the more unsafe the motherhood. Conversely, 17 (6.6%) deaths were occurred in booked patients in the present study as they did not have regular antenatal checkup. In the following series; observed deaths in booked and unbooked patients were as follows; Shashi khare et al. [5] 15.17% and 84.3%, Nirmala S et al. [6] 12% and 88%, V. Kamala J et al. [7] 7% and 93%, Vimla Sharma [4] 18.5% and 81.5% respectively.

As per Table 5; In the rural versus urban patients deaths were 185 (72%) and 72 (28%) respectively in the present study which was correlated well with the series of Shashi khare[5] ,V Kamala et al [7]. Higher mortality in rural patients may be due to illiteracy, poverty, poor health services infrastructure and inadequate transportation facilities.

In Table 6 of the present study maternal death in relation to mode of termination of pregnancy was maximum among patients delivered at hospital – vaginal delivery 77 (29.96%) and LSCS (17.12%).

V. Kamala jayaram [7] study showed 65% in vaginal delivery & 8% in LSCS, 5% in ruptured uterus, 6.7% in abortions and 15.30% undelivered, while Nirmala Sharma[6] et al. showed 37.8% in vaginal delivery, 2.85 in LSCS, 1.7% in ruptured uterus, 1.7% in ectopic pregnancy and 27.6% in undelivered.

Table 7 compared admission to Death interval; In this review, most of the patients were admitted in emergency out of them 181 (70.4%) died within 24 hours and majority 135 (52.5%) died within 12 hours. Sunanda R. Kulkarni [2] showed 54.6% death in < 24hours & 32.5% deaths in 1-7 days and V. Kamala J. [7] showed 82% deaths in < 24 hours and18% within 1-7 days.

In the present study, as per Table 8; Direct obstetric causes of maternal mortality were 179 (69.65%) and Indirect causes were 78 (30.35%). It was correlated well with the series of V. Kamala J. [7] 66% and 34%, Pal Amitava et al. (2005) 72.9% and 27.09% respectively. 27.2% mortality were due to haemorrhage in 2005 and 27.69% in 2009. Haemorrhage accounted for 70 (27.24%) death from January 2005 to December 2009. Postpartum haemorrhage was responsible for 40 (15.56%), rupture uterus accounted for 8 (3.1%) death and antepartum haemorrhage was responsible for 17 (7.7%) deaths, 1(0.4%) death was attributed to haemorrhage in molar pregnancy. Percentage distribution of maternal death was 22.2% (1990-1994), 21.25%(1995-1998) in the series of Shanti Roy [9], 9.27% (2005), 28.4%(1996-2000) in Pal Amitava et al. [8] series.

V Kamala J. [7] study (2001) showed 26.5% death due to haemorrhage out of which 37.8% due to PPH, 33.4% due to antepartum haemorrhage and 17.8% death due to rupture uterus.

In this study there is no significant change in incidence of maternal deaths due to haemorrhage. This is because of more numbers of serious cases are now being referred from periphery and more influx of complicated cases from rural area in recent period can explain this increased percentage of deaths due to haemorrhage.

In the present series toxaemia was the most common cause of maternal mortality in 2005. Eclampsia accounted for 33.33% in 2005 and 16.92% mortality in 2009. In out of 53 cases of eclampsia, 39 (15.2%) had antepartum eclampsia and 5 (1.9%) had postpartum eclampsia and rest 9 cases(3.5%) had severe hypertension. Most of these patients were admitted in late stage , was primigravidae, belonging to rural area and were unbooked. Toxaemia was present in 29.2%, 20.82%, 50.56% in the series of Shanti Roy (2002), Shashi Khare et al.[5] and Pal Amitava [8] respectively.

Our study showed decline in maternal death due to toxaemia and is comparable to the study done by V. kamala Jayaram [7] and Shanti Roy et al .[9]. There has been change in pattern of management of patients

of toxaemia, with better Intensive care facility and newer antihypertensive and anticonvulsant medications.

In the present study deaths due to sepsis were 30 (11.7%), puerperal sepsis was responsible for 12 (4.7%) deaths, septic abortion accounted for 9(3.5%) deaths and 9 (3.5%) deaths were due to antepartum chorioamnionitis with septicaemia.

Shashi Khare et al. [5] in 2002 observed 13.4% deaths because of sepsis, pal Amitava et al. [8] observed sepsis related deaths as 18.17%.

In the present study there is decrease in incidence of infection related death in 2005 (21.21%) which decreased to 7.7% in 2009. this is because of more numbers of serious cases is now being referred from periphery, women who used to die unattended at home in the past are now brought to hospital, at least for their last breaths. Women with obstructed labor or ruptured uterus are being referred to tertiary centers.

Pulmonary embolism was the reason for 13 (5.06%) deaths in the present study which was 5.9% in series the of Bansal et al. [10], 7% in series of Beena Elhance [1] and 3.09% with Shashi khare et al. [5]. Diagnosis of PE was only clinical in the present study. Most of deaths were occurred soon after delivery. There were sudden deaths in all patients. They complained chest discomfort, shortness of breath, air hunger, tachycardia and cyanosis.

Fortunately there were no maternal deaths related to anaesthesia complications. It is because of improved anaesthesiologist experience, 24 hour availability of anaesthetist at our institute and use of appropriate anaesthetic agents.

In the present study 78 (30.35%) deaths were due to indirect obstetric causes like anaemia 48 (18.68%), heart disease 9 (3.5%) and jaundice 9 (3.5%), tuberculosis 4 (1.56%), malaria 8 (3.11%). Bansal et al. [10] reported that anaemia, heart diseases and hepatic coma were the major indirect causes of maternal deaths.

Vimla Sharma et al. [4] reported 20.49% deaths due to indirect causes. Beena Elhance et al. [1] reported 17.3% deaths due to anaemia, heart disease and hepatitis. Shashi Khare et al. [5] reported 44.74%deaths in 1986-1995 and 51.04% deaths in 1996-2000 years due to indirect causes.

Conclusion

The present study cocluded that the majority of deaths occurred due to Haemorrhage (PPH,APH), Toxaemia, Infection, and Anaemia. Haemorrhage remained the leading cause in whole 5 years (20-35%). Majority of maternal death can be prevented by early risk screening, emergency obstetric care and effective obstetric services.

High maternal mortality reflects not only in inadequacy of health care services for mothers, but also a low standard of living and socio-economic status of the community. In the world as a whole the problem of maternal mortality is; principally one of applying existing obstetric knowledge through antenatal, intranatal and postnatal services rather than developing new skills. Any attempt to lower MMR most takes into consideration like early registeration of pregnancy, at least three antenatal checkups, dietary supplementation including correction of anaemia, prevention of infection and haemorrhage during puerperium, prevention of complications(eclampsia, malpresentation, rupture uterus etc.), treatment of other medical conditions (hypertension, diabetes, tuberculosis etc.), antimalarial and tetanus prophylaxis, clean delivery practices, by training of Dais and female health workers, institutional deliveries of women with bad obstetric history and risk factors, promotion of family planning, identification of every maternal death and searching for it's cause.

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