

STUDY OF MATERNAL MORTALITY IN A TERTIARY CARE HOSPITALK. V. S. M. Sandhya Devi¹, Ch. Madhuri², K. Sarada Bai³, D. Srividya⁴**HOW TO CITE THIS ARTICLE:**

K. V. S. M. Sandhya Devi, Ch. Madhuri, K. Sarada Bai, D. Srividya. "Study of Maternal Mortality in a Tertiary Care Hospital". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 38, May 11; Page: 6624-6630, DOI: 10.14260/jemds/2015/959

ABSTRACT: BACKGROUND: A woman dies from complications of child birth every minute. The major causes for maternal mortality in India are uncontrolled fertility, inaccessibility or inadequate utilization of health care facilities, illiteracy, ignorance and gender discrimination. **OBJECTIVES:** (1) To identify various causes of maternal deaths in a teaching hospital. (2) To study the profile of population attending the tertiary hospital. **Methodology:** A retrospective study was conducted in a tertiary hospital over a period of 2 years (January 2013-December 2014) and data was analysed manually using case sheets and maternal death audit forms. **RESULTS:** In the study period, there were 11636 deliveries and 97 maternal deaths. The direct causes accounted for 77 maternal deaths with haemorrhage, hypertension and sepsis as leading causes of maternal mortality. **Conclusion:** Emphasis on health education, need for regular antenatal checkups and proper training of health personnel is required to reduce maternal mortality.

KEYWORDS: maternal mortality, direct obstetric death, haemorrhage, sepsis.

INTRODUCTION: Maternal death is defined as "The death of a woman 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 or its management, but not from accidental or incidental causes."⁽¹⁾ A woman dies from complications of child birth every minute.⁽²⁾ The major factors contributing to maternal mortality in India are uncontrolled fertility, inaccessibility or inadequate utilization of health care facilities, illiteracy, ignorance and gender discrimination.

Maternal mortality ratio of India is 178 per 1 lakh live births (2013),⁽³⁾ which is far behind the target of less than 100 maternal deaths per 1 lakh live births by 2015 as mandated in millennium development goals.⁽⁴⁾ Maternal mortality rate is 12.4 per 1 lakh women in age group 15-49 and life time risk is 0.7%.⁽³⁾ Maternal mortality is a reflection of the standards of obstetric service and quality of healthcare. The audit of such mortality would help in identifying the problems and prevent recurrence by taking appropriate measures. Hence the present study was conducted at tertiary care hospital to review the maternal deaths and causes of maternal mortality.

METHODOLOGY: A retrospective study was conducted in King George Hospital, Visakhapatnam which is a tertiary care hospital that caters the North coastal districts of Andhra Pradesh. A total of 97 maternal deaths were recorded during the period of 2 years (January 2013 –December 2014).

All the maternal deaths were analysed using case sheets and maternal death audit forms manually and relevant statistical tests were applied. Permission was taken from District health officials for conducting the study.

OBSERVATIONS AND RESULTS: There were 11636 deliveries conducted with 11239 live births from January 2013 to December 2014 and 97 maternal deaths during the same period.

ORIGINAL ARTICLE

Year	No. of maternal deaths	No. of live births
2013	44	5498
2014	53	5741
2013-2014	97	11239

Table 1: Year wise distribution of maternal deaths

There were 97 deaths over a period of 2 years, of which majority 56.7% of women belonged to rural areas, 96.9% of deaths occurred among the unbooked cases. Most of the mothers 78.35% did not receive adequate antenatal care. By parity 42.27% were primigravida and 57.73% were multigravida.

Age	No. of maternal deaths	% of deaths
Less than 20 years	17	17.53%
21-25 years	47	48.45%
26-30 years	26	26.80%
31-40 years	7	7.22%
	97	100%

Table 2: Age wise distribution of deaths

Majority of the mothers 48.45% were in the age group of 21-25 years. Teenage pregnancies constituted about 17.53%. Maternal deaths in age group above 25 years were 34.02%.

Time interval	No. of deaths	% of deaths
Less than 1 hour	2	2.06%
1-24 hours	47	48.45%
3 days	27	27.83%
4-7 days	14	14.44%
More than 7 days	7	7.22%

Table 3: Admission – death interval

Within 1 day of admission 50.15% of deaths occurred. Most of them were in moribund state at the time of admission.

Time interval	No. of maternal deaths	% of deaths
< 12 hrs	29	29.90%
12-24 hrs	18	18.56%
24-48 hrs	13	13.40%
48-72 hrs	9	9.28%
>72 hrs	22	22.68%
Complications after admission	6	6.18%

Table 4: Distribution of maternal deaths according to interval between onset of complication and admission

ORIGINAL ARTICLE

There were 48.46% admissions within 24 hrs of onset of complication, while 31.96% of the admissions were 2 days after the onset of complication. The cases which developed complications after admission were 6. 18%. Among them, 2 cases developed pulmonary embolism, 1 case was elderly obese hypertensive multigravida with eclampsia and encephalopathy, 1 case of ruptured cornual pregnancy, 1 case developed peripartum cardiomyopathy, 1 case developed intractable postpartum haemorrhage.

Period of gestation	No. of deaths	% of deaths
Antenatal	22	22.68%
Intranatal	2	2.07%
Postnatal	59	60.82%
Post abortal	9	9.28%
Ectopic	5	5.15%
Total	97	100%

Table 5: Maternal Deaths in relation to period of gestation

Most of deaths, 62.89% occurred in the intra natal and post natal period. Antenatal deaths include 22.68%. Deaths due to post abortal complications accounted for 9. 28%, rest of them 5. 15% are ectopic pregnancies.

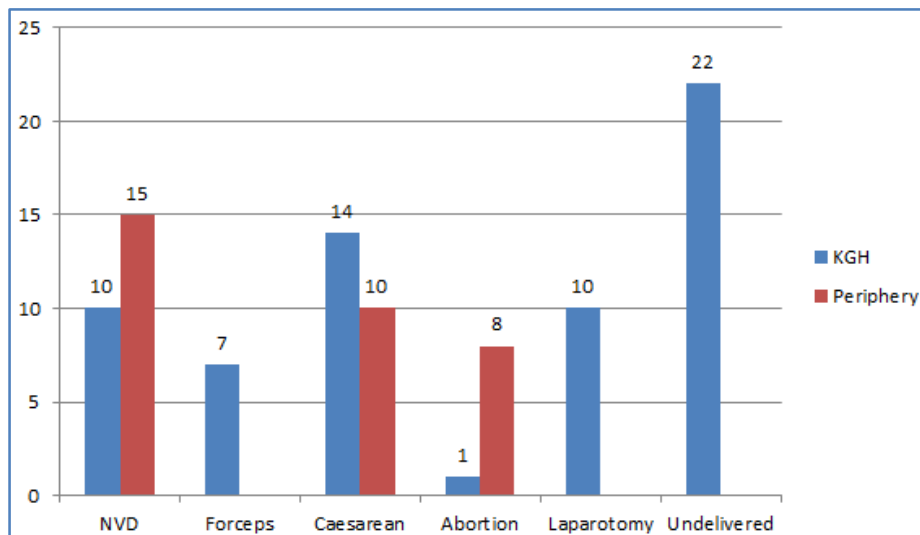


Table 6: Nature of delivery among maternal deaths

Undelivered mothers were 22.68%. Normal vaginal delivery was conducted in 25.77% of cases among which three fifths of deliveries were at periphery. Caesarean section was performed among 24.75% of cases, three fourth of them were performed at KGH after being referred from periphery. Post abortal complications led to 9.28% of the deaths, which were attempted at periphery and following usage of over the counter drugs. Laparotomy was performed at KGH for rupture uterus and rupture ectopic in 10.30% of cases. Forceps was applied in 7.22% of cases.

ORIGINAL ARTICLE

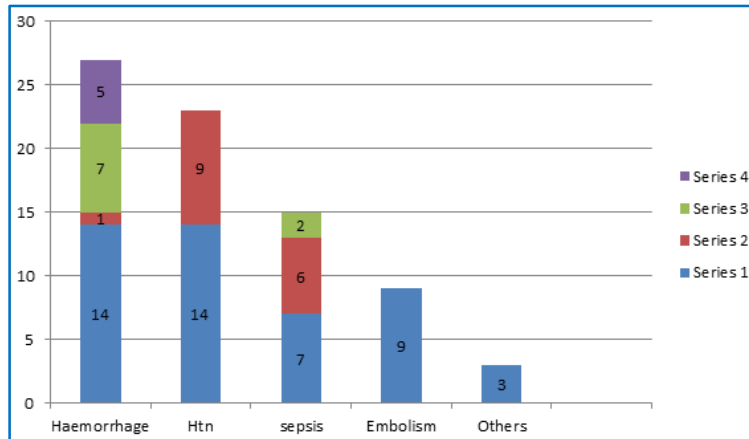


Table 7: Distribution of direct causes of maternal death

Haemorrhage is the leading cause of maternal death, of which 14 deaths are due to postpartum haemorrhage. Among them 11 developed atonic postpartum haemorrhage, 2 developed traumatic postpartum haemorrhage and 1 case had retained placenta which were delivered at the periphery. There was 1 maternal death due to antepartum haemorrhage. There were 7 cases of rupture uterus, 6 were in obstructed labour and 1 previous uterine scar rupture. Haemorrhagic shock and maternal death following ruptured ectopic pregnancies were 5.

Hypertensive disorders of pregnancy is the second leading cause of 23 maternal deaths, 14 deaths occurred due to eclampsia and 9 deaths due to severe preeclampsia. Among them 13 deaths occurred due to pulmonary edema, 3 due to hypertensive encephalopathy and cerebrovascular accidents, 1 death each due to circulatory failure and renal failure and 5 deaths due to liver failure.

Sepsis accounted for 15 deaths, of which post abortal sepsis was in 7 and puerperal sepsis in 6 and 2 deaths due to sepsis following puerperal sterilization done at peripheral centres. Mothers with puerperal sepsis were delivered at peripheral centre and all had anaemia as coexisting medical complication.

Pulmonary embolism accounted for 9 deaths. Rest of the direct causes of death included 2 cases of peripartum cardiomyopathy and 1 case of severe cholestasis of pregnancy.

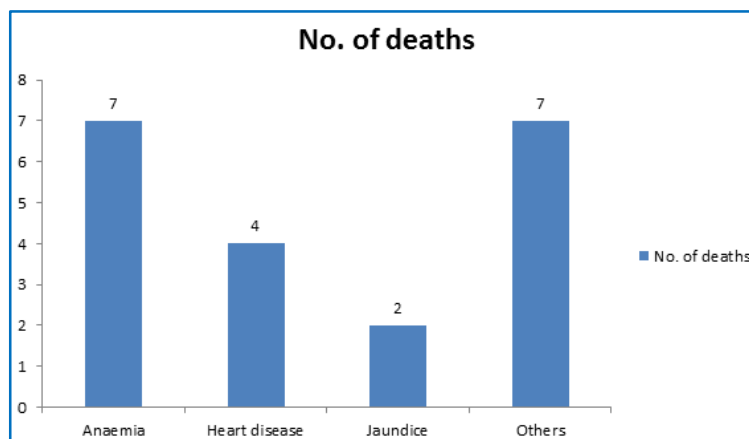


Table 8: Distribution of indirect causes of death

ORIGINAL ARTICLE

Indirect causes accounted for 20 maternal deaths, 7 were due to anaemia, 4 deaths due to heart disease complicating pregnancy, 2 deaths due to jaundice complicating pregnancy and other indirect causes include 5 cases of infections and 1 case of iron poisoning and 1 case of chronic kidney disease. Among deaths due to anaemia 5 had haemoglobin of less than 4g% and 2 had anaemia of 7g%, of which 3 died following sepsis and 4 due to congestive heart failure. Infections include tuberculous meningitis, meningoencephalitis, enteric perforation and sepsis, cerebral malaria and pneumonia.

DISCUSSION:

Author	Hmg.	Htn	sepsis	Anaemia	Jaundice	Heart dis.
Purandare et al (2007)	70.83%	13.3%	3.3%	53.3%		
Vidyadhar et al (2011)	21.05%	10.52%	7.89%	2.63%	21.05%	13.15%
Saini and Gupta (2014)	23.9%	7%	21.1%	8.4%	9.8%	2.8%
N priya et al (2010)	35.05%	27.83%	18.55%	25.7%		
Arpita N et al(2013)	43.6%	33.09%	12.67%	55.7%	23.06%	
Puri et al(2011)	22.22%	31.94%	43.05%	32.7%	34.61%	3.48%
Present study	27.84%	23.71%	15.46%	7.22%	4.12%	2.06%

Table 9: Comparative analysis of main causes of maternal deaths among various studies

Death of mother directly reflects on the upbringing of the surviving children. Reduction of maternal mortality is the aim of millennium development goals.⁽⁴⁾

In the present study, there were 97 maternal deaths amongst 11636 deliveries. King George hospital Visakhapatnam is a tertiary care centre covering the North Coastal areas of Andhra Pradesh. Delayed referrals and moribund patients at the time of admission inflated the maternal deaths. Similar observations were made in studies from other teaching hospitals where the maternal deaths ranged between 30 to 194.^(5,6,7,8,9,10)

Early marriage is still a custom among the rural population, 48.45 % deaths were in age group 21-25 and 26.8% deaths among ages 26-30 and 17.53% deaths were due to teenage pregnancies, 7.22% deaths in mothers above 30 years. These findings correlate with that reported by other studies, Vidyadhar et. al reported 55.2% deaths in age group 19-24, 15.79 % deaths in < 19 years.⁽⁶⁾ Saini and Gupta,⁽⁷⁾ reported 81.69% deaths in age group 21-30 years. Nishupriya et. Al,⁽⁸⁾ reported 74.22% deaths in 21 -30 years. Yadav k et. Al,⁽⁹⁾ reported 72.68% deaths among 20-29 years. Puri et al,⁽¹⁰⁾ showed 71.53% of deaths occurred in 21-30 years age group. Reduction in child marriage reduced teenage pregnancies and thus deaths.

In the present study, 57.73% deaths occurred in multigravidae and 42.27% among primigravida as was observed in other studies, Vidhyadharetal,⁽⁶⁾ reported 57.89% deaths among multigravida and 42.10% among primi; Saini and Gupta,⁽⁷⁾ reported 83.49% of deaths among multigravidas; Nishupriya et. Al,⁽⁸⁾ showed 49.48% were multigravidae; Yadav k et. Al,⁽⁹⁾ reported 56.7% deaths among multigravida and Puri et al. Al,⁽¹⁰⁾ reported 51.53% of deaths among multigravida.

In this study, 60.82% deaths occurred in the post natal period followed by 22.68% deaths in the antenatal period. Similar results have been obtained in other studies; Purandare et al,⁽⁵⁾ showed 73.33% deaths occurred in postpartum period and 26.66% in antenatal period; Saini and Gupta,⁽⁷⁾

ORIGINAL ARTICLE

reported 66.1% of post natal deaths; Nishupriya et. Al,⁽⁸⁾ showed 62.8% postpartum deaths. Yadav k et. Al,⁽⁹⁾ reported 72.16% post natal deaths; Purialka et. Al,⁽¹⁰⁾ showed 63.08% of deaths in postnatal period.

In the present study, 2.06% deaths occurred within an hour of admission, 48.45% deaths occurred within 24 hrs of admission, 27.83% deaths within 1-3 days, 14.44% deaths in 4-7 days of admission, 7.22% of deaths were after 1 week of admission. Results of other studies were similar, Purandare et. Al,⁽⁵⁾ showed 3 women died within 30 minutes, 14 between 30 minutes and 6 hours, 7 between 6 and 24 hours and 6 after 24 hours; Vidhyadar et. Al,⁽⁶⁾ reported 1 death within 1 hour of admission, 15.79% between 2-12 hours of admission, 21.055 between 13-24 hours of admission and 25.06% after 7 days of admission; Saini and Gupta,⁽⁷⁾ reported 42.85% deaths within 24 hours of admission and 57.74% after 24 hours; Nishupriya et. Al,⁽⁸⁾ showed that 54.63% of deaths were within 24 hours of admission, 19.58% within 25-48 hours 10.30% within 49-72 hours and 15.46% after 72 hours of admission; Purialka et. Al,⁽¹⁰⁾ reported 45% of deaths within 24 hours of admission.

In the present study, direct causes contributed to 79.38% of maternal deaths and 20.62% deaths due to indirect causes. Leading causes being haemorrhage 27.4% (postpartum haemorrhage, antepartum haemorrhage, rupture uterus and rupture ectopic), hypertensive disorders 23.71% (Eclampsia and severe preeclampsia), sepsis 15.46% (post abortal, puerperal sepsis and puerperal sterilization), embolism 9.28% and indirect causes 20.62% include anaemia 7.22%, heart disease complicating pregnancy 4.12% and 2.06% jaundice. Similar results were seen other studies, Purandare et. Al,⁽⁵⁾ observed 70.83% deaths due to haemorrhage, 13.3% due to hypertension and 3.3% deaths due to sepsis. Vidyadhar et. Al,⁽⁶⁾ reported 21.05% deaths due to haemorrhage, 10.52% deaths due to eclampsia and pulmonary embolism and 7.89% due to sepsis, 13.15% deaths due to heart disease and anaemia as cause in only 2.63% of deaths.

In Saini and Gupta study,⁽⁷⁾ 60.5% were direct deaths among which 23.9% were due to haemorrhage 21.1% due to sepsis and 7% due to eclampsia and 39.43% were indirect causes of death; Nishupriya et. Al,⁽⁸⁾ showed postpartum haemorrhage 35.05% as the leading cause followed by hypertensive disorders 27.83% and anaemia 25.7%; Yadav k et. Al,⁽⁹⁾ reported 73.19% as direct obstetric deaths of which haemorrhage 43.16%, hypertension 33.09%, sepsis 12.67%, 26.8% were indirect cause with anaemia as leading cause; while Purialka,⁽¹⁰⁾ and group reported sepsis 43.05% as leading cause followed by haemorrhage and eclampsia 22.22% and 31.94% respectively. Thus direct causes-haemorrhage, hypertensive disorders and sepsis are still the leading causes of death.

CONCLUSION: Postpartum haemorrhage is an important cause of maternal mortality followed by hypertension and sepsis. The analysis of maternal deaths in our study reflects ignorance and poor health education regarding importance of antenatal checkups. Identification of high risk pregnancies and awareness regarding danger signs should be imparted. To prevent mishaps in deliveries, early referrals and prompt transportation services are required. Proper training of health personnel is necessary. Campaigns for community based maternal education programme and importance of early resuscitative measures should be emphasized.

REFERENCES:

1. Park Text Book of Preventive and Social Medicine by K. Park, 23rd edition; M/S Banarsidas Bhanot, India; 22nd Chapter, 557.
2. UNICEF- Goal: Improve maternal health.

3. A presentation on maternal mortality levels- census of India, Office of Registrar General, India 20th December 2013.
4. WHO| MDG 5: improve maternal health.
5. Purandare N, Singh A, Upadhya S, Sanjanwala SM, Saraogi RM. maternal mortality at a referral centre: a five year study. J obstetric gynaecology India. 2007; 57(3): 248-50.
6. Vidyadhar B. Bangal, Purushottam A. Giri, Ruchika Garg, maternal mortality at a Tertiary care teaching hospital of rural India: A retrospective study. Int J Bio Med Res. 2011; 2(4): 1043-1046.
7. Saini V. and Gupta M. Review of maternal mortality in an urban tertiary care hospital of North India: International Journal of Basic and Applied Medical Sciences, Vol. 4(1) January – April 2013, pp. 59-64.
8. N Priya, V Ashok, V Suresh. Maternal mortality: ten years retrospective study. JK Science. Vol. 12 No. 3, July-September 2010: 134-136.
9. Yadav K, Namdeo A, Bhargava M: A retrospective and prospective study of maternal mortality in a rural tertiary care hospital of Central India. Indian Journal of Community Health, Vol. 25, No. 1, Jan-Mar 2013: 16-21.
10. P Alka, Y Indra, J Nisha. Maternal mortality in an urban tertiary care hospital of North India. The Journal of Obstetrics and Gynaecology of India May/ June 2011: 280-285.

AUTHORS:

1. K. V. S. M. Sandhya Devi
2. Ch. Madhuri
3. K. Sarada Bai
4. D. Srividya

PARTICULARS OF CONTRIBUTORS:

1. Associate Professor, Department of Obstetrics & Gynecology, Andhra Medical College, Visakhapatnam.
2. Assistant Professor, Department of Obstetrics & Gynecology, Andhra Medical College, Visakhapatnam.
3. Professor & HOD, Department of Obstetrics & Gynecology, Andhra Medical College, Visakhapatnam.

FINANCIAL OR OTHER**COMPETING INTERESTS:** None

4. Post Graduate, Department of Obstetrics & Gynecology, Andhra Medical College, Visakhapatnam.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. K. V. S. M. Sandhya Devi,
8-1-97/3/11, 4A,
Krishnaveni Towers,
Peda Waltair,
Visakhapatnam-530017,
Andhra Pradesh, India.
E-mail: sandhyaobg@gmail.com

Date of Submission: 16/04/2015.
Date of Peer Review: 17/04/2015.
Date of Acceptance: 30/04/2015.
Date of Publishing: 08/05/2015.