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Research Article
Study of causes of maternal mortality in Nehru hospital, B.R.D. Medical College, Gorakhpur

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Abstract
Objectives: *To find out various direct and indirect causes of maternal mortality over a period of one year in Nehru Hospital, B.R.D Medical College, Gorakhpur.*
Study Design: *An observational descriptive study.*
Study Settings: *Obstetrics and Gynecology Department, Nehru Hospital, B.R.D Medical College, Gorakhpur.*
Study Period: *June 2008 to May 2009*
Results: *A total of 60 maternal deaths were analyzed during the present study period. 81.67 % of the deaths were due to direct causes with eclampsia (55.10%) being the most common cause followed by haemorrhage (20.41%) and septic abortion (12.25%). Anaemia was the most important indirect cause followed by liver disease and cardio vascular diseases.*
Conclusion: *Majority of maternal deaths were preventable by proper antenatal care, early detection of high risk pregnancies and their timely referral to tertiary care centers.*
Keywords: *Maternal mortality, direct and indirect obstetric cause, anemia.*

Introduction
According to WHO, 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 pregnancy, from any cause related to or aggravated by the pregnancy or its management but not by accidental or incidental cause'[1].

Almost half a million women die every year from complications during pregnancy and child birth. About 99% of these women are from developing world.[2] Maternal Mortality is an indicator of the quality of obstetric care in a community, directly reflecting the utilization of health care services available.

One of the most important goals of the MDGs (millennium Development Goals) is to reduce 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 where as most of the maternal deaths from rural areas are under reported.

Low status of the women in the society coupled with low literacy rate also leads to underutilization of available health services. A respectable number of maternal deaths can be averted by skilled care before, during and after child birth.

This study was conducted with the objectives to access the existing causes of maternal mortality

over a period of one year in Nehru Hospital, B.R.D Medical College, Gorakhpur.

Material and Methods

This was an observational descriptive type study of60 cases of maternal mortality over a period of one year from June 2008 to May 2009.

All booked or unbooked patients presenting with life threatening complications related to pregnancy and child birth were included in the study. Detailed history was taken from conscious and well oriented patients and from the accompanying closest relative in case of unconscious patients. Data was collected on a proforma. The details were kept safe and the patients were followed. During follow up, if patient died, then she was included in the study. Women who survived or absconded were excluded from the study. Then the medical records sheets of all identified women were reviewed to note the findings of general examination, local examination, investigation, cause of death and time of death.

Working definitions of life threatening obstetric complications used		
Complication	Essential features	Additional feature
1. Obstetric haemorrhage		
a. Abortionrelated haemorrhage	Gestation of fetus less than 24 weeks	At least one of the following blood loss of > 500 ml Clinical Signs of shock (Pulse > 100/ min. Systolic Blood Pressure < 100 mmHg)
b. Ruptured ectopic pregnancy	Pregnancy outside the uterine cavity with haemoperitoneum	
c. Antepartum haemorrhage	Gestation of fetus ≥ 24 weeks Clinically observed vaginal bleeding	A. Placenta Previa B. Abruptio Placentae
d. Primary postpartum haemorrhage	Genital tract bleeding within 24 hours of delivery Gestation of fetus ≥24 weeks	At least one of the following: Perceived blood loss of > 10 ml Clinical signs of shock
e. Secondary postpartum haemorrhage	Genital tract bleeding after 24 hours of delivery but within 42 days Gestation of fetus ≥ 24 weeks	At least one of the following blood loss > 500 ml Clinical Signs of shock
2. Eclampsia	Generalized fits in a patient without previous history of epilepsy	
3. Obstructed Labour	Clinical signs of shock Temperature ≥37.5^{0}C Odorous vaginal discharge	At least one of the following: Labour > 12 hours Uterine tetany Abnormal Pelvis Bandl's ring Uterine rupture Haematuria Caput or moulding
4. Uterine rupture	Rupture of uterus during labour	
5. Septic abortion	Gestation <24 weeks Temperature≥37.5^{0}C	At least one of the following: Abdominal pain/tenderness, injury of genital tract Odorous vaginal discharge Tender fornices Open cervix with product of conception
6. Puerperal sepsis	Temperature ≥37.5^{0}C within 42 days of delivery	At least one of the following: Odorous vaginal discharge Tender subinvoluted uterus.

Results

During the study a total of 60 maternal deaths were analyzed.

As evident from table I direct causes contributed to 81.67% maternal deaths and indirect causes contributed to 18.33%. Among the direct causes of maternal deaths, majority 55.10% were from eclampsia followed by haemorrhage. The most common indirect cause being anaemia with 6 deaths i.e. 10% of 60 deaths followed by liver disease. Majority of deaths occurred in antenatal period followed by puerperium period.

Time interval from admission of mother to her death is depicted in table V

41.67% of maternal deaths occurred within 24 hrs of admission in hospital and 31.67% of maternal deaths occurred within 1-2 days of admission in hospital. Only 10% deaths happened beyond three days of hospital admission during our study period.

Table I Cause of Death

Cause of Death	Frequency	Percentage
Direct causes	49	81.67
Indirect causes	11	18.33
Total	60	100.00

Table II Direct Causes of Death

Cause of Death	Frequency	Percentage `
Antepartum haemorrhage	7	14.29
Postpartum haemorrhage	3	6.12
Eclampsia	27	55.10
Septic abortion	6	12.25
Obstructed labor	3	6.12
Puerperal sepsis	1	2.04
Ruptured ectopic pregnancy	2	4.08
Total	49	100

Table III Indirect Causes of Death

Cause of Death	Frequency	Percentage
Anemia	6	54.55
Liver d/s	2	18.18
Severe heart d/s	3	27.27
Total	11	100

Table IV Time of Death

Time	Frequency	Percentage
Antepartum	35	58.33
During delivery	3	5.00
During puerperium	16	26.67
After abortion	6	10.00
Total	60	100

Table V Admission death Internal

Admission-Death Interval (in hours)	No of Patients	Percentage
<24	25	41.67
25-48	19	31.67
49-72	10	16.67
>72	06	10.00
Total	60	100

Discussion

Our study was a descriptive observational study of 60 maternal deaths over a period of one year at the department of Obstetrics and Gynaecology, Nehru Hospital, B.R.D. Medical College Gorakhpur. About 81.67% of maternal deaths were due to direct cause i.e obstetric complications of pregnancy, labour and puerperium. The single most important cause leading to maximum number of maternal deaths was eclampsia. They can be prevented by early detection and management of hypertension in pregnancy. Obstetric haemorrhage generally occurring antepartum results in 14.29% of all maternal deaths.

Other direct causes include unsafe abortions, obstructed labor, puerperal sepsis and ruptured ectopic pregnancy. Deaths due to abortions can be prevented by increasing access to safe abortion services.

Rajaram p et al (1995) observed that quacks or untrained traditional birth attendants had excessively interfered with about 33% before they reached the hospital, especially the septic abortion, obstructed labor and ruptured uterus cases[3].

UNICEF reports that approximately 80% of maternal deaths could be averted if women have access to essential maternity and basic health care services[4].

Around 18.33% of maternal deaths were due to indirect causes that is the result of the preexisting diseases or disease that developed during pregnancy which are not due to direct obstetric cause but are aggravated by physiological effect of pregnancy. One of the most significant was anemia. Christial P et al (2009) also reported that prevalence of severe anaemia was high (10.5%)

during pregnancy[5]. Other important indirect causes were liver diseases and cardiovascular diseases.

The admission-death Interval showed a predominance of deaths within 24 hours of admission. Chhabra s, Sirohi R (2004) also observed majority (65%) of maternal deaths within 24 hrs of admission[6].

Antepartum period appeared to be the most critical as 58.33% mothers died in this period. Ujah IA et al (2005) also reported that vast majority of women die within 24 hrs of admission similar to our study.[7]

Conclusion and Recommendations

It was observed that many maternal deaths were due to preventable causes. Unfortunately, in many cases, patients were referred very late, in critical condition. Early detection of high risk pregnancies and referring them to the tertiary center at the earliest can reduce the complications of high risk pregnancies.

Deaths due to hypertensive disorders can be reduced by early identification of PIH, use of $MgSO_4$ and early termination of eclampsia. Lack of prenatal visits and iron supplementation increased the risk for haemorrhage. Deaths due to haemorrhage can be controlled by SBA training of all nursing staff. The need for antibiotics and infection control practices are to be strictly followed to reduce deaths due to sepsis.

Early correction of anaemia and health education on importance of IFA tablets will reduce deaths due to anaemia. Lastly most deaths could be prevented with the help of early referral, quick efficient transport facility, availability of blood and by promoting overall safe mother hood.

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