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# Clinical Evaluation of Factors Responsible for the Maternal Mortality in LBKMCH, Saharsa

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**Abstract**
Maternal mortality reflects women's basic health status, access to health care and the quality of care that has been provided. Although India has achieved a 59 % reduction in maternal mortality in 2008 as regards to 1990 levels, still it is behind the World Health Organization's (WHO) fifth Millennium Development Goal (MDG 5) of 75 % reduction of 1990 levels by 2015 which comes out to be approximately 5.5 % reduction per year. If we have to expedite this process and catch up with the WHO target, then we have to count beyond the numbers and review each and every maternal death for its possible cause and contributing factors, many of which are avoidable. Hence based on these reported findings the current study was planned to evaluate the Clinical Evaluation of Factors Responsible for the Maternal Mortality in Hospital.

The present study was planned in Department of Obstetrics and Gynaecology, Lord Buddha Koshi Medical College and Hospital, Saharsa. Total 30 cases of the females undergone the maternal mortality were evaluated in the present study. Cases were studied for the immediate causes of death and the predisposing factors. The causes were identified as direct and indirect causes. Direct obstetric deaths are those resulting from obstetric complications of the pregnant state (pregnancy, delivery, and postpartum), from interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above. Indirect obstetric deaths are those resulting from previous existing disease or diseases that developed during pregnancy, and which were not due to direct obstetric causes, rather aggravated by physiological effects of pregnancy.

Closer examination of maternal mortality level is needed to inform planning of reproductive health programs, to guide advocacy efforts and research at the national and international levels, and to inform decision-making. The audit for the reasons for maternal mortality in a resource poor country is extremely helpful in not only identifying the reasons but also in identifying the preventable causes of maternal mortality. Intensive health education, basic obstetric care for all, strengthening referral and communication system, emphasizing blood bank facilities and use of definitive contraceptive measures will help in reducing maternal mortality.

**Keywords:** Maternal Mortality Rate, MMR, Pregnancy, etc

## 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 and 1 million new born deaths occur each year. In addition millions more women and new borns 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 and the new borns. Maternal Mortality Rate is one of the main indicators of maternal and child health care and preventive maternal deaths remains one of the most important goals of national family welfare program. There is continued need to identify complications in pregnancy and child birth which result in maternal death and to study influence of antecedent conditions in maternal mortality. There is also urgent need to understand the events leading to death and to identify opportunities for prevention of death so that maternal mortality can be reduced significantly.

Maternal death or maternal mortality is defined by the World Health Organization (WHO) 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, 2]. Adding to the WHO definition, the CDC extends the period of consideration to include up to 1 year within the end of a pregnancy regardless of the outcome [3].

There are two performance indicators that are sometimes used interchangeably: maternal mortality ratio and maternal mortality rate, which confusingly both are abbreviated "MMR" [4]. By 2017, the world maternal mortality rate had declined 44% since 1990, but still every day 830 women die from pregnancy or childbirth related causes [5]. According to the United Nations Population Fund (UNFPA) 2017 report, this is equivalent to "about one woman every two minutes and for every woman who dies, 20 or 30 encounter complications with serious or long-lasting consequences. Most of these deaths and injuries are entirely preventable [5]. UNFPA estimated that 303,000 women died of pregnancy or childbirth related causes in 2015 [5]. These causes range from severe bleeding to obstructed labour [6], for which there are highly effective interventions. As women have gained access to family planning and skilled birth attendance with backup emergency obstetric care, the global maternal mortality ratio has fallen from 385 maternal deaths per 100,000 live births in 1990 to 216 deaths per 100,000 live births in 2015, and many countries halved their maternal death rates in the last 10 years [5].

Although attempts have been made in reducing maternal mortality, there is much room for improvement, particularly in impoverished regions. Over 85% of maternal deaths are

from impoverished communities in Africa and Asia [5]. The effect of a mother's death results in vulnerable families. Their infants, if they survive childbirth, are more likely to die before reaching their second birthday [5].

Factors that increase maternal death can be direct or indirect. In a 2009 article on maternal morbidity, the authors said, that generally, there is a distinction between a direct maternal death that is the result of a complication of the pregnancy, delivery, or management of the two, and an indirect maternal death [7] that is a pregnancy-related death in a patient with a preexisting or newly developed health problem unrelated to pregnancy. Fatalities during but unrelated to a pregnancy are termed accidental, incidental, or nonobstetrical maternal deaths.

According to a study published in the Lancet which covered the period from 1990 to 2013, the most common causes are postpartum bleeding (15%), complications from unsafe abortion (15%), hypertensive disorders of pregnancy (10%), postpartum infections (8%), and obstructed labour (6%) [6]. other causes include blood clots (3%) and pre-existing conditions (28%) [8]. Maternal mortality caused by severe bleeding and infections are mostly after childbirth. Indirect causes are malaria, anaemia [9]. HIV/AIDS, and cardiovascular disease, all of which may complicate pregnancy or be aggravated by it [citation needed]. Risk factors associated with increased maternal death include the age of the mother, obesity before becoming pregnant, other pre-existing chronic medical conditions, and cesarean delivery [10, 11].

Pregnancy-related deaths between 2011 and 2014 in the United States have been shown to have major contributions from non-communicable diseases and conditions, and the following are some of the more common causes related to maternal death [3]; cardiovascular diseases (15.2%.), non-cardiovascular diseases (14.7%), infection or sepsis (12.8%), hemorrhage (11.5%), cardiomyopathy (10.3%), thrombotic pulmonary embolism (9.1%), cerebrovascular accidents (7.4%), hypertensive disorders of pregnancy (6.8%), amniotic fluid embolism (5.5%), and anesthesia complications (0.3%).

According to a 2004 WHO publication, sociodemographic factors such as age, access to resources and income level are significant indicators of maternal outcomes. Young mothers face higher risks of complications and death during pregnancy than older mothers [12], especially adolescents aged 15 years or younger [13]. Adolescents have higher risks for postpartum hemorrhage, puerperal endometritis, operative vaginal delivery, episiotomy, low birth weight, preterm delivery, and small-for-gestational-age infants, all of which can lead to maternal death [13]. The leading cause of death for girls at the age of 15 in developing countries is complication through pregnancy and childbirth. They have more pregnancies, on average, than women in developed countries and it has been shown that 1 in 180 fifteen year old girls in developing countries who become pregnant will die due to complications during pregnancy or childbirth. This is compared to women in developed countries, where the likelihood is 1 in 4900 live births [12]. However, in the United States, as many women of older age continue to have children, trends have seen the maternal mortality rate to rise in some states, especially among women over 40 years old [10].

Structural support and family support influences maternal outcomes [citation needed]. Furthermore, social disadvantage and social isolation adversely affects maternal health which can lead to increases in maternal death [14]. Additionally, lack of access to skilled medical care during childbirth, the travel distance to the nearest clinic to receive proper care, number of prior births, barriers to accessing prenatal medical care and poor infrastructure all increase maternal deaths.

It was estimated that in 2015, a total of 303,000 women died due to causes related to pregnancy or childbirth [5]. The majority of these causes were either severe bleeding, sepsis, eclampsia, labor that had some type of obstruction, and consequences from unsafe abortions. All of these causes are either preventable or have highly effective interventions [5].

Another factor that contributes to the maternal mortality rate that have opportunities for prevention are access to prenatal care for women who are pregnant. Women who do not receive prenatal care are between three and four times more likely to die from complications resulting from pregnancy or delivery than those who receive prenatal care. For women in the United States, 25% do not receive the recommended number of prenatal visits, and this number increases for women among specific demographic populations: 32% for African American women and 41% for American Indian and Alaska Native women [14].

Four elements are essential to maternal death prevention, according to UNFPA [5]. First, prenatal care. It is recommended that expectant mothers receive at least four antenatal visits to check and monitor the health of mother and fetus. Second, skilled birth attendance with emergency backup such as doctors, nurses and midwives who have the skills to manage normal deliveries and recognize the onset of complications. Third, emergency obstetric care to address the major causes of maternal death which are hemorrhage, sepsis, unsafe abortion, hypertensive disorders and obstructed labour. Lastly, postnatal care which is the six weeks following delivery. During this time, bleeding, sepsis and hypertensive disorders can occur, and newborns are extremely vulnerable in the immediate aftermath of birth. Therefore, follow-up visits by a health worker to assess the health of both mother and child in the postnatal period is strongly recommended.

Women who have unwanted pregnancies who have access to reliable information as well as compassionate counselling and quality services for the management of any issues that arise from abortions (whether safe or unsafe) can be beneficial in reducing the number of maternal deaths [16]. Also, in regions where abortion is not against the law, then abortion practices need to be safe in order to effectively reduce the number of maternal deaths related to abortion.

Maternal Death Surveillance and Response is another strategy that has been used to prevent maternal death. This is one of the interventions proposed to reduce maternal mortality where maternal deaths are continuously reviewed to learn the causes and factors that led to the death. The information from the reviews is used to make recommendations for action to prevent future similar deaths [17]. Maternal and perinatal death reviews have been in practice for a long time worldwide, and the World Health Organization (WHO) introduced the Maternal and Perinatal Death Surveillance and Response (MPDSR) with a guideline in 2013. Studies have shown that acting on recommendations from MPDSR can reduce maternal and perinatal mortality by improving quality of care in the community and health facilities.

Maternal mortality reflects women's basic health status, access to health care and the quality of care that has been provided. Although India has achieved a 59 % reduction in maternal mortality in 2008 as regards to 1990 levels, still it is behind the World Health Organization's (WHO) fifth Millennium Development Goal (MDG 5) of 75 % reduction of 1990 levels by 2015 which comes out to be approximately 5.5 % reduction per year. If we have to expedite this process and catch up with the WHO target, then we have to count beyond the numbers and review each and every maternal death for its possible cause and contributing factors, many of which are avoidable [18]. Hence based on these reported findings the current study was planned to evaluate the Clinical Evaluation of Factors Responsible for the Maternal Mortality in Hospital.

**Methodology**

The present study was planned in Department of Obstetrics and Gynaecology, Lord Buddha Koshi Medical College and Hospital, Saharsa. Total 30 cases of the females undergone the maternal mortality were evaluated in the present study. Cases were studied for the immediate causes of death and the predisposing factors. The causes were identified as direct and indirect causes. Direct obstetric deaths are those resulting from obstetric complications of the pregnant state (pregnancy, delivery, and postpartum), from interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above. Indirect obstetric deaths are those resulting from previous existing disease or diseases that developed during pregnancy, and which were not due to direct obstetric causes, rather aggravated by physiological effects of pregnancy.

All the patients were informed consents. The aim and the objective of the present study were conveyed to them. Approval of the institutional ethical committee was taken prior to conduct of this study.

Following was the inclusion and exclusion criteria for the present study.

**Inclusion Criteria**

Females having a pregnancy of at least 26 weeks gestation with a single uncompromised fetus and uncomplicated pregnancy.

**Exclusion criteria**

Females having foetal distress, toxaemia of pregnancy, CVS/CNS disorders, neuromuscular diseases (eg. myopathies and neuropathies), hypovolaemia, acid base disturbances and electrolyte imbalance, obese, infection on the back, on anticoagulant therapy and vertebral anomaly.

**Results and Discussion**

Maternal mortality is a matter of global concern, more so in the resource poor settings of underdeveloped and developing countries where most of the deaths occur. The maternal mortality ratio in India is 212 per 1,00,000 live births according to 2009 census, which is much above the objective of 109 per 1,00,000 live births as per the fifth Millennium Development Goal (MDG-5) [2]. Autopsy was not conducted in most of the women due to denial for the consent for the same by the bystanders. Hence, the cause of the death was attributed to the disease of presentation of these women. Reducing the maternal morbidity and mortality is the prime healthcare goal in developing countries. They are young healthy mothers who die majority of the times. Loss of a mother shatters the family. Studies have shown that infants who lost their mother during childbirth are more likely to die before reaching their second birthday than infants whose mother survives [19].

As stated by the WHO in its 2005 World Health Report "Make Every Mother and Child Count", they are: severe bleeding/hemorrhage (25%), infections (13%), unsafe abortions (13%), eclampsia (12%), obstructed labor (8%), other direct causes (8%), and indirect causes (20%). Indirect causes such as malaria, anaemia HIV/AIDS and cardiovascular disease, complicate pregnancy or are aggravated by it.

Forty-five percent of postpartum deaths occur within 24 hours [20]. Over 90% of maternal deaths occur in developing countries. In comparison, pregnancy-associated homicide accounts for 2 to 10 deaths per 100000 live births, possibly substantially higher due to underreporting [21]. In developing countries, the most common cause of maternal death is obstetrical hemorrhage, followed by deep vein thrombosis in contrast to developed countries, for which the most common cause is thromboembolism [22].

**Table 1:** Demographic data of enrolled females

| Age in years | No. of Cases |
|---|---|
| <25 yrs | 18 |
| >25yrs | 12 |
| Educational status | |
| Illiterate | 2 |
| Primary | 5 |
| Secondary | 10 |
| Tertiary | 13 |
| Socio-economic status | |
| Upper | 11 |
| Middle | 13 |
| Lower | 6 |
| Type of LSCS | |
| Elective | 11 |
| Emergency | 21 |
| Parity | |
| Primi | 14 |
| Multi | 16 |
| Total | 30 |

**Table 2:** Causes & No. of Cases

| Causes | No. of Cases |
|---|---|
| Anemia | 4 |
| Haemorrhage | 12 |
| Toxemia | 2 |
| Sepsis with multi-organ dysfunction | 6 |
| Preeclampsia, eclampsia, and HELLP syndrome | 2 |
| Acute fatty liver of pregnancy | 2 |
| Ectopic pregnancy | 1 |
| Suspected amniotic fluid embolism | 1 |
| Total | 30 |

Waterstone *et al* [23] defined disease-specific morbidities, namely severe pre-eclampsia, eclampsia, HELLP syndrome, severe hemorrhage, severe sepsis and uterine rupture. Using this system, they recorded an incidence of severe maternal morbidity of 12 per 1000 births. The criteria used, while clearly indicating maternal morbidity, have too low a threshold of morbidity to be called near misses. Furthermore, the most common direct cause of maternal mortality was omitted, namely pulmonary embolus, because

of the difficulty of diagnosing pulmonary emboli accurately when they are not fatal. This illustrates part of the problem of a system based on a specific disease entity. The system also left out early pregnancy complications such as ectopic pregnancies and abortions.

A recent systematic review of the causes of maternal mortality and its geographic distribution has shown that the Indian subcontinent has a significantly higher maternal mortality attributable to sepsis, infection and haemorrhage. The deaths classified as puerperal sepsis (56 of 277 direct causes) are high and comparable to previous studies from India [24, 26].

Total M.M.R 582/100000 live births. Was observed in a study carried out in 31 teaching hospitals from 16 states/ union territories based on information collected for a period of 1 year from April1993 to March 1994. Most of the deaths were due to direct obstetric causes among them pregnancy induced H.T.N. (24.0%), hemorrhage (23.4%) each accounted for nearly25% of deaths [27]. Retrospective analysis from June 1998 to 1993 from case records in the Eden Hospital, Calcutta. Majority of maternal deaths were due to obstetric haemorrhage [28]. Retrospective study of maternal deaths over 7 year period from January 1999 to December 2005 was carried out by Ashok *et al*. Major deaths were in rural areas, haemorrhage and eclampsia were major causes of death. Anemia was an important cause of indirect maternal death [29]. Shankar *et al* reported that primigravidae, teen age mothers, too late reference and lack of awareness were the contributing factors for maternal mortality at VIMS, Bellary [30].

A descriptive study was conducted to assess the role of existing antenatal – care services in promoting institutional delivery in the rural areas of Andhra Pradesh, Gujarat, Bihar and Rajasthan. The result revealed that even after statistically controlling for other factors, mother who received antenatal check – ups are 2 to 5 times more likely to give birth in a medical institution than mothers who did not receive any antenatal check – ups. The researcher concluded that it is possible to promote institutional delivery by promoting antenatal check – ups, associated counseling and expanding quality of services at existing services. As promoting safe delivery is one of the main interventions of Janani Suraksha Yojana, there is a need to know about Janani Suraksha Yojana & the facilities for promotion of maternal and child health [31].

Government should also make stringent rules and standards. License should be issued only to those healthcare units that meet the standards to manage such high-risk pregnancies. Moreover, government healthcare units should be made stronger by providing more facilities. All district hospitals should be strengthened with 24-h blood bank, better operation theatre facilities with adequate staffing, and basic life support (BLS)-equipped and manned ambulances. Janani Suraksha Yojana scheme implemented by the government has reduced the home delivery rates with no significant reduction in the maternal mortality [32].

## Conclusion

Closer examination of maternal mortality level is needed to inform planning of reproductive health programs, to guide advocacy efforts and research at the national and international levels, and to inform decision-making. The audit for the reasons for maternal mortality in a resource poor country is extremely helpful in not only identifying the reasons but also in identifying the preventable causes of maternal mortality. Intensive health education, basic obstetric care for all, strengthening referral and communication system, emphasizing blood bank facilities and use of definitive contraceptive measures will help in reducing maternal mortality.

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