

## Study of Direct and Indirect Causes of Maternal Mortality: A Study from Tertiary Care Centre of Bhopal

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### Abstract

**Background:** Reports have shown that approximately 529,000 maternal mortality due to pregnancy-related causes annually and almost all (99%) of these maternal deaths occur in developing nations. **Aims and Objectives:** To study the direct and indirect causes of maternal mortality. **Materials and methods:** Sixty three women were studied at Department of Obstetrics and Gynecology, Sultania, Zanana Hospital, Gandhi Medical College, Bhopal from April 2008 to March 2009. Age, parity and direct and indirect causes of mortality were recorded. **Results:** Out of 63 maternal deaths, majority (74.6%) occurred due to direct causes and 25.4% due to indirect cause. Most common direct cause of mortality were Hypertensive disorder of pregnancy (42.85%) followed by hemorrhage (15.87%) and septicemia (12.70%). Most common indirect cause of maternal mortality were severe anemia (37.5%) and complicated malaria (37.5%). **Conclusion:** Contribution of direct causes was more in the maternal mortality, of which Hypertensive disorder of pregnancy, hemorrhage and septicemia were most common.

**Keywords:** Mortality, complicated malaria, obstetrics causes of pregnancy.

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## INTRODUCTION

Death of a woman, while she is pregnant or within the 42 hours of termination of pregnancy irrespective of the duration and site of the pregnancy from any cause is termed as the maternal death [1].

Previous reports have shown that maternal mortality among developing countries is 18 times higher as compared to developed countries [2, 3]. A previous hospital based study from India reported the leading causes of maternal mortality as septic abortion, eclampsia, severe preeclampsia, ruptured uterus and hemorrhage and prolonged labor as the direct causes. However, the same study reported hepatitis, heart disease, and severe anemia as the most common indirect causes of maternal mortality [4].

According to the Registrar General of India (RGI) MMR of Madhya Pradesh were 173 per 100000 live births [2]. In present study we tried to investigate the both direct and indirect causes for the maternal mortality of the Bhopal region as this is the place where most of the referral takes place as it is the centre of most of the primary and tertiary care centers and institutions.

## MATERIALS AND METHODS

A hospital based prospective study was performed at Department of Obstetrics and Gynecology, Sultania, Zanana Hospital, Gandhi Medical College, Bhopal from April 2008 to March 2009.

Women dying during pregnancy, child birth or within 42 days of termination of pregnancy, irrespective of site and duration of pregnancy, died due to any causes, related to or aggravated by pregnancy or its management were included in the present study.

Women dying due to accidental cases and those dying beyond 42 days of postpartum period were excluded from the present study.

For each maternal death information was collected regarding the age, parity, area of residence and booking status were recorded in pre-approved proforma.

Every woman was enquired for antenatal care, number of visits and person providing antenatal care. Any complication during pregnancy, labour and puerperium was noted.

Causes of maternal death were categorized as direct and indirect and the most common cause of maternal deaths in the institute was analyzed. Duration of hospital stay in hours i.e. time interval between admission and death was calculated.

The cause of death was carefully analyzed in each case. Any doubtful or incomplete information provided in the file was cross checked by interviewing close relatives of deceased. Hospital death review committee discussed various parameters of all maternal death in details.

All the data was expressed either in numbers or percentage. Frequency distribution of SPSS ver. 20 was used to prepare tables. No statistical test was performed.

## RESULTS

Maximum maternal death occurred in the age group of 21-30 years (74.3%) which is the most fertile period. Maximum [20 (46%)] maternal death occurred in primi patients. Out of 63 maternal death, 47 (74.6%) occurred due to direct causes and 16 (25.4%) due to indirect cause.

**Table 1: Maternal death due to direct causes**

Causes		Number of women	Percentage
Hypertensive disorder of pregnancy (n=27)	Preeclampsia	10	37.03
	Eclampsia	17	62.97
Hemorrhage (n=10)	PPH	6	60
	APH (abruption placenta)	1	10
	Rupture uterus	1	10
	Vesicular mole	1	10
	Ectopic pregnancy	1	10
Septicemia(n=8)	Septic abortion	2	25
	Puerperal sepsis	2	25
	Septicemia with multi-organ failure	4	50
Pulmonary embolism in post LSCS		2	4.25

**Table-2: Maternal due to indirect causes**

Indirect causes	Number of women	Percentage
Severe Anemia	6	37.5
Complicated malaria	6	37.5
Hepatic encephalopathy	3	18.75
Tuberculosis	1	6.25

Out of 63 Maternal deaths, 8 (12.7%) died within 12 hours, 23 (36.5%) died between 2-12 hours, 14 (22.2%) died between 13-24 hours, 17 (27%) died between 25 hours to 7 days and 2 (1.6%) died after 7 days. Majority of the patients died within 24 hours of admission.

## DISCUSSION

Health status of pregnant women is of utmost importance and should be on priority for would be mother and her family members. A good health is important as it can prevent the unwanted complications in women [5, 6]. Factors such as mother's medical history, parity, history of previous complications and types of delivery are the important factors which must be considered for each pregnant woman.

In present study we found that 74.6% of the women died because of the direct causes which are higher than the results of a study performed by WHO globally for identifying the direct causes of maternal mortality, which has reported that nearly 70% of maternal deaths were due to direct obstetric causes worldwide. Hemorrhage and hypertensive disorder of pregnancy were the most common causes of maternal

mortality [7]. Recent study from Ethiopia by Sara et al who studied 59 maternal deaths reported that about 86% of the maternal death occurred due to the direct obstetric causes. The most important were the hemorrhage, hypertensive disorders of pregnancy and obstructed labor which is in hand in hand with the present study findings [8]. Ikhtiar *et al.*, did a case control retrospective study and found that the most important direct causes of mortality were obstetric hemorrhage, puerperal sepsis, pregnancy-induced hypertension, obstructed labor and ruptured uterus [9]. These findings are in line with the present study findings where we found that most common direct cause of mortality was hypertensive disorder of pregnancy followed by hemorrhage and septicemia. Similar results were reported by KO *et al.*, where author reported hemorrhage, sepsis and preeclampsia as the most common direct causes of maternal mortality [10]. A previous study conducted in Gilgel Gibe field research Center of Tigray reported that about 60% of the mortality was due to hemorrhage and hypertensive disorder of pregnancy which is lower than the present study findings [11]. This may be due to the low accessibility and utilization of health service in that area.

In present study 25.4% of the women died due to indirect causes among which severe anemia and complicated malaria were the most common. As per the WHO reports 20-25% of the maternal mortality is due to the indirect causes which is in agreement to present study findings [12]. A recent study by Sara et al showed that about 14% of the maternal deaths were due to indirect causes in last three years from 2019 [8]. WHO reports the common indirect causes of maternal mortality as anemia, malaria, HIV/AIDS, diseases of the heart, lung, liver or kidneys and ectopic pregnancies. In present study findings are in accordance with the WHO reports [12]. Previous studies even reported history of previous illness, asthma, hypertension, tuberculosis, malaria and hepatitis as the important risk factors for maternal mortality [13-15]. Most common indirect causes of maternal mortality reported by Sara et al were which contributed half of the mortality, malaria contribute done-fourth, and TB and preexisting hypertension contributed 12.5% each of maternal deaths [8].

The present study had few limitations; one was the small sample size and second was the cross sectional nature of the study. There is a need of a large randomized clinical trial to strengthen the present study findings.

## CONCLUSION

We conclude that hypertensive disorders of pregnancy has emerged as the leading cause of maternal deaths, which can be prevented by proper antenatal care, screening of pregnant women and early recognition of rise of blood pressure with other clinical signs to prevent development of imminent eclampsia and its complications. Other causes like hemorrhage, sepsis, anemia, malaria, hepatitis should be taken in account to reduce mortality. Maternal death due to these causes can be prevented by providing care at grass root level, linkage between primary, secondary and tertiary care, strengthening of referral services and instituting emergency obstructive services.

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