

## Original Research Article

# Three delay model: to find out the reason for maternal deaths

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### ABSTRACT

**Background:** Each year in India, roughly 28 million women experience pregnancy and 26 million have a live birth. Of these, an estimated 67,000 maternal deaths and one million new-born deaths occur each year. A woman dies as a result of complication arising during pregnancy and childbirth every 90 seconds in the world, and every 7 minutes in India. The three delay model can be used to find the causes of delays in relation to maternal deaths.

**Methods:** A retrospective study was carried out in a tertiary care centre. All cases of maternal mortality between July 2010 to June 2016 were included in the study. Then data analysis was done.

**Results:** Out of the total 382 maternal deaths, Majority of maternal deaths 43% were due to type 1 delay. 150 patients had delay in seeking help, 9 patients refused treatment and 5 patients refused admission to health care centre. 13% maternal deaths were due to type 3 delay which include delay in receiving adequate treatment, Delay in diagnosis and intervention, Lack of facilities etc.

**Conclusions:** Type-1 delay was major contributors of maternal deaths in the study region. Therefore, to prevent the preventable maternal deaths effective action should be taken.

**Keywords:** 3 delay, Maternal death, Tertiary care centre

### INTRODUCTION

Everyday approximately 830 women die from preventable cause of maternal mortality. 99% of all maternal deaths occur in developing countries.<sup>1</sup> Globally, there were an estimated 303,000 maternal deaths in 2015, a decline of 44% from 1990.<sup>2,3</sup> Each year in India, roughly 28 million women experience pregnancy and 26 million have a live birth. Of these, an estimated 67,000 maternal deaths and one million new-born deaths occur each year.<sup>4</sup> A woman dies as a result of complication arising during pregnancy and childbirth every 90 seconds in the world, and every 7 minutes in India.<sup>5</sup> The majority of these deaths are avoidable. Maternal health is a very sensitive issue which has not only affected on the social and economic development of a country but also on the

rights of the highest attainable standard of health of an individual. Maternal mortality is the last episode in the long story of a woman's pain and suffering.<sup>6</sup>

Each year in India, roughly 28 million women experience pregnancy and 26 million have a live birth. Of these, an estimated 67,000 maternal deaths and one million new-born deaths occur each year. In addition, millions of 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 their newborns.<sup>7</sup> Maternal deaths or maternal mortality is a definitive indicator of the quality of obstetric care delivered in a community thereby directly reflecting the utilization of health care services available. The three delay model can be applied to

understand the causes of delays in emergency obstetric care which may lead to maternal deaths, eventually calling for interventions to avoid those delays (5 from 3 delay study).

## METHODS

The present retrospective study was carried out at obstetrics and gynecology department of a tertiary care hospital. All cases of maternal mortality between July 2010 to June 2016 were included in the study. The study commenced after the approval of Institutional Ethics Committee. Data regarding maternal mortality was obtained from maternal mortality register after obtaining permission.

### *Inclusion criteria*

- All pregnant women irrespective of gestational age and postpartum within 42 days of delivery registered or unregistered who died due to direct or indirect causes in tertiary care hospital will be included in the study.
- Death due to ectopic pregnancy.

### *Exclusion criteria*

- Coincidental maternal deaths like suicide and accidental deaths

### *The three delay*

#### *Delay 1: delay in deciding to seek care*

The first delay is on the part of the patient, family, or community not recognizing a life-threatening condition.<sup>8</sup> This delay is due to lack of awareness, lack of education, poverty and poor understanding of complications and risk factors in pregnancy and when to seek medical help.<sup>9</sup>

#### *Delay 2: delay in reaching care in time*

The second delay is delay in reaching a health-care facility, and may be due to Poor roads and infrastructure, Geography e.g. mountainous terrain, river lack of transportation, or location. Many villages do not have paved roads and many families do not have access to vehicles. Public transportation (or animals) may be the main transportation method. This means it may take hours or days to reach a health-care facility. Women with life-threatening conditions often do not reach the facility in time.<sup>8</sup>

#### *Delay 3: delay in receiving adequate health care*

The third delay occurs at the healthcare facility. Upon arrival, women receive inadequate care or inefficient treatment because of poor facilities and lack of medical supplies and inadequately trained and poorly motivated medical staff.<sup>9</sup> Resource-poor nations with poor health-

care facilities may not have the services necessary to provide critical care to needed patients in life threatening conditions. Omissions in treatment, wrong treatment, and a lack of supplies and facilities contribute to maternal mortality.<sup>8</sup>

Maternal death is defined as “as 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 pregnancy or its management but not from accidental or incidental causes” (ICD-10).

## RESULTS

In the present study of 6 year duration from July 2010 to June 2016 there were 41749 live births and total number of maternal deaths reported were 382.

out of the total 382 maternal deaths highest number 163(42.6%) of maternal deaths belongs to age group 21-25 yrs, followed by 36.1% in age group of 26-30 yrs, 8.1% maternal deaths were seen in age less than 20 yrs and 3.1% maternal deaths were seen in age group more than 35 yr.

considering the place of residence majority of women i.e. 82% were from urban area and 18% women were from rural area. As far as literacy status is concerned most of the patients were literate 70%, illiterate patients were 23% and for about 7% of patient's education status was not known. Most of the patients were Hindu by religion 80.3%(307), 19%(72) patients were Muslim and only 3 patients (0.78%) were of other community. It was found that maximum number of maternal deaths 53 (14%) in antenatal period were seen in third trimester followed by second trimester 50 (13%) maternal deaths while only 6 (1.6%) antenatal patients died in first trimester.

Looking at the outcome of delivery 35% (134) of women had live issue, 25% (96) women delivered still birth, 9.6% (37) of women had abortion and 6 (1.57%) women were died due to ectopic pregnancy.

In 217 cases delivery was conducted at hospital while 12 antenatal females delivered at home and 1 woman delivered on the way to the hospital, remaining 152 cases includes women who were either undelivered or postorbital or ectopic.

### *Type of delay*

In present study it is found that majority of maternal deaths (43%) 164 were due to type 1 delay (Table 1). 150 patients had delay in seeking help, 9 patients refused treatment and 5 patients refused admission to health care centre.

Type 2 delay seen in 2% (8) maternal deaths which include delay due to lack of transportation between home

and health facility seen in 4 maternal deaths, delay due to lack of transportation between health facility seen in 3 maternal deaths and delay due to lack of communication between health facilities seen in 1 maternal death.

Type 3 delay seen in 51 (13%) maternal deaths which include 16 patients had delay in receiving adequate treatment like inadequate control of hypertension during ANC period, delay in starting antibiotics, poor ANC care. Delay in diagnosis and intervention at referring centre

were seen in 17 maternal deaths. Lack of facilities like OT, ICU, lack of equipment's, or consumables like ventilator essential drug like inj. MgSo<sub>4</sub>, non-availability of blood, platelets at referring centre or subdistrict or district hospital, were seen in 11 maternal deaths and Lack of expertise, training or education like poor surgical skill, inadequate sterility in operation theatre etc. were seen in 7 maternal deaths. In 159 patients delay could not found (Table 1).

**Table 1: Distribution of type of delay.**

Type of delay	No of patients (n=382)	%
Type 1	164	43
Delay in woman seeking help	150	
Refusal of treatment	9	
Refusal of admission	5	
Type 2	8	2
Lack of transport between home to health facilities	4	
Lack of transport between health facilities	3	
Communication breakdown between health services	1	
Type 3	51	13
Delay in receiving adequate treatment	16	
Delay in diagnosis and intervention	17	
Lack of facilities, Equipment's, or Consumables, Blood, OT, ICU	11	
Lack of expertise, training or education	7	
Not found	159	42

## DISCUSSION

Pregnancy although being considered a physiological state, carries risk of serious maternal morbidity and at times death. This is due to various complications that may occur during pregnancy, labour or thereafter.

Maternal Mortality Ratio (MMR) of India has declined by 16 percent from 212 during 2007-09 to 178 during 2010-12. India's rate of decline of MMR between 2007-09 and 2011-13 is 5.7 per cent. MMR of Maharashtra had fall from 104 in 2007-09 to 87 in 2010-2012, achieved target of MDG.<sup>10</sup>

The current challenge is to identify and outline the role of governments, health and other sectors, communities, and households in population-wide strategies to improve access, delivery, and utilisation of health care services.<sup>11</sup> Maternal death differs from place to place, country to country and institute to institute reflecting the type of care provided and health status of the region.<sup>10</sup> Maternal death has serious implications to the family, the society and the nation. It deprives the surviving infant of a mother's care. One of the most important goals of the MDGs is to reduce the maternal mortality.<sup>7</sup> Delay in seeking help, delayed access to care, and poor quality of

emergency obstetric services can lead to undesirable outcomes. A review of which can be used to improve and optimize the existing obstetric services.

In present study it is found that majority of maternal deaths (43%) 164 were due to type 1 delay. There can be due to multiple reasons for the delay in seeking care which are generally barriers of the socio-cultural factors, such as who will decide to seek care, lack of ANC visit, inability to recognize the danger signal. proper antenatal care during pregnancy help in identifying the danger sign of pregnancy and help in design making also. Study done by Sk et al, also found that the delay in seeking care (Type 1 delay) was the most significant contributor to maternal deaths i.e. 48.6 percent, which is nearly same as present studies finding.<sup>12</sup> Khandale et al, also found that Type 1 delay was most common (85.89%) comparatively to Type 2 and 3 delay.<sup>13</sup> Whereas present studies finding on type 1 delay to maternal deaths differ from study done by Mgawadere et al, in which a high proportion of women experienced type 3 delay.<sup>14</sup> typically indicative of substandard quality of care at a healthcare facility. Contributing factors included long waiting times before receiving any type of assessment or treatment at a healthcare facility, non-availability of essential drugs, consumables or equipment, lack of skilled personnel,

missed and incorrect diagnoses, delayed or incorrect treatment.

## CONCLUSION

Authors found that the type-1 delay was major contributors of maternal deaths in the study region. Therefore, to prevent the preventable maternal deaths effective action should be taken. expand coverage of healthcare and raising the awareness, Provision of education and health information to communities about pregnancy and childbirth help the patient to know when to seek medical help and strengthening the functionality of referral networks can prevent these maternal deaths.

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